

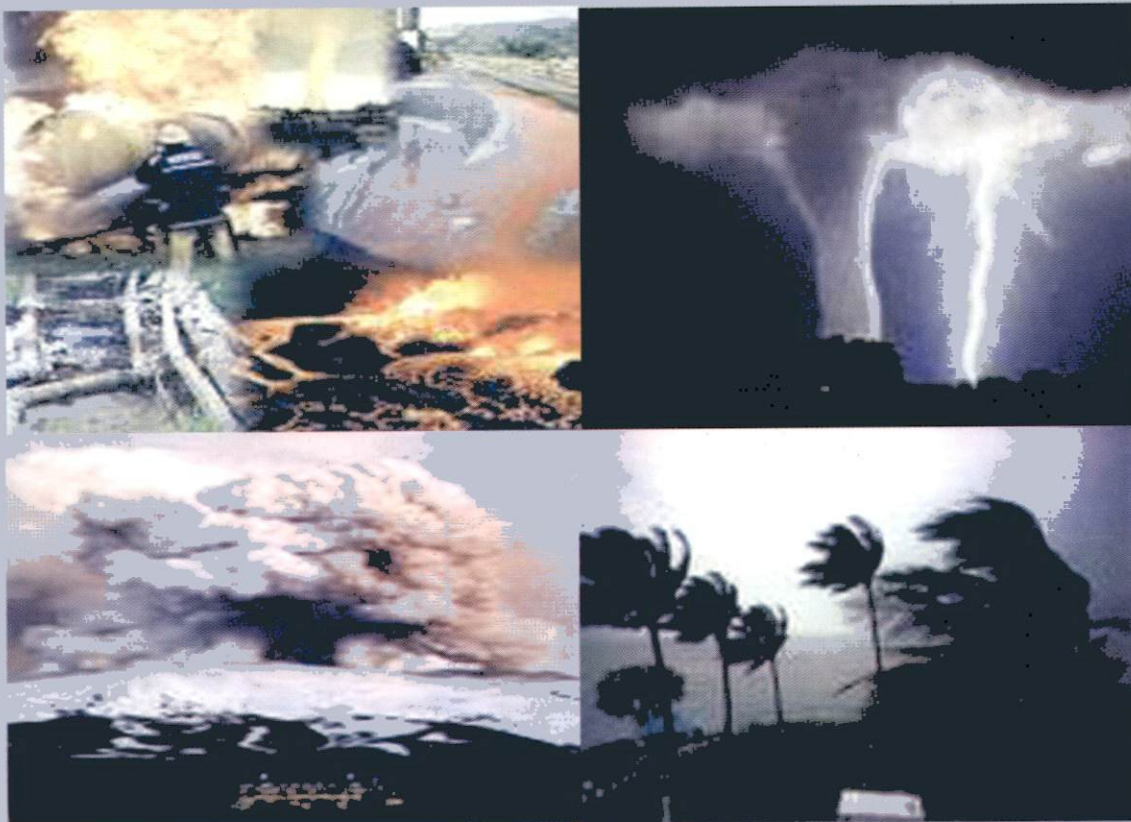


KARNATAKA STATE OPEN UNIVERSITY
Manasagangotri, Mysore - 570 006

912

Final Year MA in
MASS COMMUNICATION AND JOURNALISM

SELF INSTRUCTIONAL MATERIAL



COURSE III : COMMUNICATION DIMENSIONS

BLOCK I : ENVIRONMENTAL COMMUNICATION

KSOU: A Pioneer in Open and Distance Education

The history of Karnataka State Open University dates back to 1969 in which the erstwhile Institute of Correspondence Course and Continuing Education (ICC&E) was established under the patronage of the University of Mysore. KSOU in the present form of Open and Distance Learning system took its birth in 1996 as eight such open university in the country. Today the KSOU is one of the well established and highly reputed open university, generating human resources through innovative academic programmes.

Located amidst pristine surroundings of the Manasagangotri campus in Mysore, the cultural capital of Karnataka, KSOU is committed to provide access to higher education in general and knowledge information in particular to the masses, with innovative methods of teaching. The university has successfully completed ten years of existence and has served the educational needs of half a million students from all over the Indian subcontinent. KSOU as a prime university is committed to remove the disparities and bring about much needed corrections in the higher education system. The Karnataka State Open University thrives and is in the forefront to fulfill the constitutional obligations in terms of access, quality, equity and equality with the motto of **Higher Education to Everyone, Everywhere.**

Karnataka State Open University's innovative steps in certain areas have been recognized as the long strides in open and Distance education thus finding a coveted place for itself in the area of ODL. Since switching over to ODL in 1996, the university has served more than three lakh students in various academic disciplines. The university offers 56 academic programmes leading to Certificate, Diploma, Degree and Post Graduate Degrees.


The number of students enrolling to various programmes of the university is expected to grow considerably in the coming years and the institution is gearing up to meet the new challenges. The Degrees, Diplomas and Certificates offered by KSOU are widely recognized and are on par with those awarded by any other University in the country and abroad. The university truly believes and tirelessly strides towards the concept of **Student First but Quality Foremost.**

A Flexible Mode of Learning

Programmes offered by KSOU in the distance education mode are custom-designed by a team of experts and specialists drawn from reputed universities, industry and in-house faculty. The curriculum is sanctioned by experts and is adapted after an academic audit. The inbuilt flexibility enables to bring in changes quickly thus ensuring the system to be more dynamic and updated at all times.

Along with the students coming from formal stream who have passed the qualifying examinations, learners with no formal education who intend to pursue higher education are also encouraged to seek admissions for various academic programmes. The programme delivery is essentially through multimedia package comprising printed self instructional material, personal contact programme, radio counseling and online support. KSOU offers a wide range of disciplines to choose from PG programmes and a varied combination of optional subjects to select from UG programmes. Students are allowed to pursue their studies in other universities and institutions, subject to certain regulations.

KSOU Objectives

-  To provide access and equity through open - flexible learning, which is relevant to learners, at their doorsteps.
-  To create individualized virtual learning spaces to the needs of the new age learners and to enable universal knowledge resource sharing through innovative pedagogy.
-  Better quality assurance and excellence through institutional collaboration and accessibility.
-  To ensure institutional determination towards emancipatory learning.
-  To create environment and knowledge media of first choice for learners and professionals worldwide.
-  To keep pace with the new age requirement and encourage proactive convergence of media and technology for teaching and learning.
-  To innovate, explore and practice new avenues in knowledge management and sharing for positive social intervention.
-  To ensure sustained efforts to interpret and operationalise learner's needs to develop new skills through collaborative learning.



Karnataka State Open University
Manasagangotri,
Mysore-570006

Final MA-MCJ Paper-3
Code: MCJ 23

COURSE III COMMUNICATION DIMENSIONS

BLOCK I ENVIRONMENTAL COMMUNICATION

Unit	1	Environmental concepts	01
Unit	2	Environmental debate	23
Unit	3	Environmental pacts	47
Unit	4	Environmental issues	71
Unit	5	Environmental journalism	95

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Final Year MA - Mass Communication and Journalism.
INSTRUCTIONAL DESIGN

COURSE I SPECIALIZED COMMUNICATION

PAPER CODE :21

BLOCK I INTERNATIONAL COMMUNICATION

- Unit 1 International news flow**
- Unit 2 Communication as a human right**
- Unit 3 UNESCO and new communication order**
- Unit 4 Issues in international communication**
- Unit 5 Mc Bride Commission report**

BLOCK II INTERCULTURAL COMMUNICATION

- Unit 1 Eastern and western perspective of culture**
- Unit 2 Intercultural communications: Philosophical dimensions**
- Unit 3 Communication as a concept in eastern and western culture**
- Unit 4 Linguistic aspects in intercultural communication**
- Unit 5 Mass media and mass culture**

BLOCK III MARKETING COMMUNICATION

- Unit 1 Media and marketing forces**
- Unit 2 Marketing and consumer behavior**
- Unit 3 Marketing methods and dimensions of retailing**
- Unit 4 Product promotion communication**
- Unit 5 Marketing research**

BLOCK IV FINANCIAL JOURNALISM

- Unit 1 Economic theories**
- Unit 2 Institutional financing**
- Unit 3 Investment and money market**
- Unit 4 Financial journalism: Concept and issues**
- Unit 5 Financial journalism in India.**

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INSTRUCTIONAL DESIGN**

COURSE II MEDIA APPRECIATION AND RESEARCH

PAPER CODE: 22

BLOCK I COMMUNICATION PSYCHOLOGY

Unit	1	Mass media and public opinion
Unit	2	Communication and leadership
Unit	3	Communication and social perception
Unit	4	Marketing communications
Unit	5	Communication and mass behaviour

BLOCK II MEDIA CRITICISM

Unit	1	Impact of business interest on media content
Unit	2	Media environment
Unit	3	Media text analysis
Unit	4	Mediated culture: European contours
Unit	5	Media technology issues

BLOCK III MEDIA ADVOCACY

Unit	1	Media practice: Interpretative, investigative and depth
Unit	2	Media crusade
Unit	3	Campaign journalism
Unit	4	Embedded media
Unit	5	Media advocacy and ethical issues

BLOCK IV MEDIA RESEARCH

Unit	1	Elements and approaches of media research
Unit	2	Research design
Unit	3	Tools for data collection
Unit	4	Media research methods
Unit	5	Data analysis techniques

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COURSE III COMMUNICATION DIMENSIONS PAPER CODE: 23

BLOCK I ENVIRONMENTAL COMMUNICATION

Unit	1	Environmental concepts
Unit	2	Environmental debate
Unit	3	Environmental pacts
Unit	4	Environmental issues
Unit	5	Environmental journalism

BLOCK II BROADCAST JOURNALISM

Unit	1	Camera techniques and lighting
Unit	2	Script writing
Unit	3	Anchoring, News reading
Unit	4	Video editing techniques
Unit	5	Audio recording techniques

BLOCK III FILM STUDIES

Unit	1	Film classics
Unit	2	Film criticism and review
Unit	3	Film genres
Unit	4	Film as a mass medium
Unit	5	Indian Films

BLOCK IV PHOTOJOURNALISM

Unit	1	Development of photography
Unit	2	Importance and characteristics of photojournalism
Unit	3	Aesthetics in photography
Unit	4	Photojournalism techniques
Unit	5	Professional photographic institutions

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COURSE IV CURRENT AFFAIRS AND SOCIAL ISSUES PAPER CODE: 24

BLOCK I CURRENT AFFAIRS

- Unit 1 International political organizations**
 - Unit 2 Indian political setup**
 - Unit 3 Liberalization, Privatization, Globalization**
 - Unit 4 Futuristic approaches in media**
 - Unit 5 Sustainable development and mankind**
-

BLOCK II ECONOMIC ISSUES

- Unit 1 Economic development and planning**
 - Unit 2 Corruption, scams and dishonesty**
 - Unit 3 Trade, Commerce and industry**
 - Unit 4 Environment and agriculture**
 - Unit 5 Terrorism and clash of ideas**
-

BLOCK III ISSUES IN FOCUS

- Unit 1 Mass movements**
 - Unit 2 International disputes**
 - Unit 3 Interstate and local disputes**
 - Unit 4 Democracy and electoral systems**
 - Unit 5 Communism and authoritarian regimes**
-

BLOCK IV SOCIAL ISSUES

- Unit 1 Illiteracy, poverty and educational needs**
- Unit 2 Gender discrimination and lost opportunities**
- Unit 3 Crime, judiciary and human rights**
- Unit 4 Public administration and bureaucracy**
- Unit 5 Religion and society**

Final Year MA - Mass Communication and Journalism.
INSTRUCTIONAL DESIGN

COURSE V COMMUNICATION SKILLS

PAPER CODE: 25

BLOCK I SPOKEN COMMUNICATION

Unit	1	Fundamentals of speech communication
Unit	2	Effective public speaking
Unit	3	Voice, pronunciation and diction
Unit	4	Social behaviour and interaction
Unit	5	Media grammar

BLOCK II WRITTEN COMMUNICATION

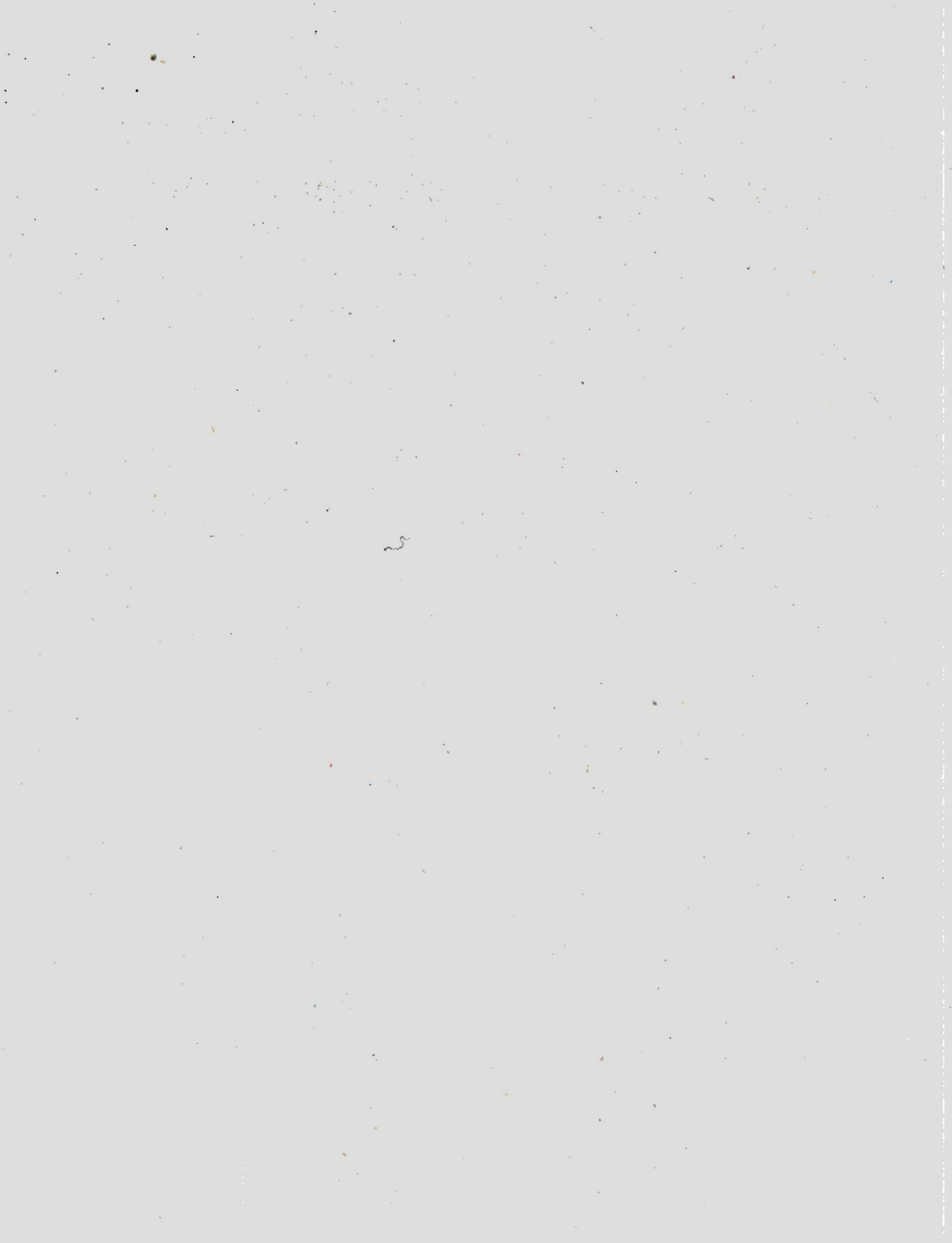
Unit	1	Usage and common errors in media language
Unit	2	Basics of technical writing
Unit	3	Preparation of press kit
Unit	4	Special publications
Unit	5	Translation

BLOCK III GRAPHIC COMMUNICATION

Unit	1	Computer graphics
Unit	2	Cartooning and illustrations
Unit	3	Animation
Unit	4	Artistic approaches in media
Unit	5	Colour schemes

BLOCK IV NON-VERBAL COMMUNICATION

Unit	1	Basics of Semiotics
Unit	2	Nature of body language
Unit	3	Importance of eye contact
Unit	4	Gestures and emotions
Unit	5	Positive appearance



Structure

1.0 Objectives

1.1 Introduction

1.2 Rise of environmental consciousness

1.2.1 The reflection hypothesis

1.2.2 The post-materialism hypothesis

1.2.3 New middle-class thesis

1.2.4 Regulationist /political closure approach

1.3 Ecosystem

1.4 Carrying capacity

1.5 Ecotourism

1.6 Deep ecology

1.7 Ecofeminism

1.8 Social Ecology

1.9 Bioregionalism

1.10 The tragedy of the commons

1.11 Back to the land

1.12 Let Us Sum Up

1.13 Check Your Progress

1.14: For Further Reading

1.0 Objectives

The environment was recognized as a problem in the 1960s. Until then pollution was accepted as an unpleasant fact of life about which people could do little. It began to be seen as a problem when environmental activists showed convincingly that conditions in certain areas had deteriorated.

The Current unit will help you

- identify the key concepts related to the environment
- understand the main elements of the environmental concepts and
- examine the significance of the concepts in the present environmental discourse.

1.1 Introduction

Although the environment occasionally and spectacularly draws attention to itself in the form of major disasters and accidents, environmental problems by and large depend for their public visibility on complex processes of claims-making activity. As the environmental concern grew several concepts became the subjects of study for scientists and social scientists. Understanding these concepts is important to fully understand the environment as an issue. The concepts related to the environment have come from different disciplines including natural sciences, social sciences and philosophy.

1.2 Rise of environmental consciousness

One of the questions that environmental sociologists have tried to answer is why environmental consciousness and movements grew dramatically in the late 1960s and the early 1970s. Four main explanations have been put forward.

The reflection hypothesis

The post-materialist hypothesis

The new middle-class thesis

The regulations/political closure approach.

1.2.1 The reflection hypothesis

The reflection hypothesis starts with the observation that environmental deterioration in Western industrial nations first began to climb after the Second World War, reaching its zenith by late 1960s. The dramatic upswing after 1970 in environmental consciousness and concern is interpreted as a direct reaction to this worsening situation.

Studies have indicated that a majority of the public has increasingly come to view a wide range of environmental problems as threatening both their personal health and the overall quality of the environment, and that this threat has increased markedly. Furthermore, this majority perceives environmental quality as deteriorating and likely to continue to do so.

The green concern in Western Europe varies directly according to the seriousness of ecological conditions. Thus, in Southern Germany, Belgium, Luxembourg, the Netherlands, Northern France and Switzerland, where the pollution of rivers, forests and soils is most acute, environmental concern is highly developed. By contrast, in Britain and Scandinavia where environmental deterioration is less obvious, environmentalism is more moderate and absorbed into mainstream politics.

Other data, however, have not supported this reflection hypothesis. While environmental quality has been steadily deteriorating for much of this century, the public has ignored these developments for most of this period. Instead, perception of environmental problems may even be independent of the magnitude of the problems themselves. For example, concern about air pollution arose in the United States in the late 1960s at the same time as the levels of a number of common air pollutants were found to have declined in a broad sample of urban areas. This suggests that public concern is at least partially independent of actual environmental deterioration and is shaped by other considerations; for example, the extent of mass media coverage.

Furthermore, most of the modern environmental problems, particularly second generation problems such as acid rain, global warming, ozone depletion and toxic contamination, are likely to be invisible to the naked eye except in the most extreme cases. As a result, the public perception that environmental problems have reached 'crisis' proportions does not necessarily reflect the reality of actual problems but rather the particular view of scientific experts, environmentalists and the media.

1.2.2 The post-materialism hypothesis

A second explanation locates environmental concern as part of a more extensive shift in values among certain segments of Western societies. This approach has as its touchstone Inglehart's 'post materialism thesis'.

Inglehart's interpretation is derived from the 'hierarchy of needs' proposed by the humanistic social psychologist, Abraham Maslow. Inglehart proposes that the economic worries experienced by an older generation during the Great Depression and the two World

Wars had little meaning for the post-Second World War 'baby boom' generation which had the financial security to allow them instead to address their non-materialist needs for belonging and individual fulfilment. This cohort was less interested in promoting economic growth and progress than in furthering post-materialist values as a concern for ideas, the pursuit of personal growth, autonomy in decision-making and improving the quality of the physical environment. Significantly, post-materialism was not simply a life cycle phenomenon, fading out of existence when the post-war generation settled down and started families of their own, but a lasting value change.

In contrast to the reflection hypothesis, the growth of environmental consciousness and concern is not seen as being directly related to the actual extent to which the environment has deteriorated. The 'objective facts' about pollution and environmental damage and shortages do not and cannot exist in some kind of cognitive and moral vacuum, but rather arise from a moral debate over the nature of the good society which cannot 'easily be settled by an appeal to facts and rational argument.

The post-materialist hypothesis has been challenged by some sociologists who demonstrate that public environmental concern is not just restricted to advanced industrial countries but exists on a global scale. Widespread grassroots environmental activism has been seen in developing nations like India, Mexico, Brazil and Uruguay. The people in these countries are willing to pay higher prices and taxes in order to protect the environment than is the case in some more industrialised nations such as Finland and Japan. Environmentalism, they conclude, should not be viewed as a product of a post-materialist shift in values but rather as a more complicated phenomenon, emerging from multiple sources in richer and poorer nations alike.

The problem is that it is never made clear where these post-materialist values originate. It may be surmised that they are a function of interests. For example, industrialists can be expected to oppose an ideal society which, among other things, accepts a no-growth philosophy or one which is predominantly socialist. It is not as easy to figure out where post-materialists, including environmentalists, get their values. It is argued that a commitment to non-material values forged in adolescence is part of a long term drift away from any strong allegiance to the culture of business and is more likely to occur in homes where the parents have already embraced post-materialist values. There is also a view that

environmentalism is an expression of the interests of the new middle-class fraction. These people who move away from traditional paradigm which emphasise pro-business value. This is the basis for the third sociological explanation for the growth of environmental consciousness and concern: the new middle-class thesis.

1.2.3 New middle-class thesis

The new middle-class thesis is a companion to the post-materialism thesis. But it puts a greater emphasis on the social location of those who adopt an environmentalist ethic. According to this view, environmentalists are drawn disproportionately from that segment of society which has been termed 'social and cultural specialists'—teachers, social workers, journalists, artists and professors who work in creative and/or public service-oriented jobs.

It is not entirely clear why this occupational segment should be more inclined to produce environmentalists with post material values as against other sections of the middle-classes. One possible explanation lies in the nature of their involvement and interaction with their clients. By virtue of their positions they are socially situated so as to witness first hand the victimisation of the powerless by the heralds of industrial progress. For example, doctors staffing community, health clinic are strategically located to witness the adverse effects on school children of elevated lead levels in the soil of neighbourhoods built around polluting, inner city factories. As a result they tend to become personally involved in environmental problem even to the point of becoming advocates for their patients' interests. Alternatively it may simply be that those who enter professions which have a significant creative or social welfare component may choose these deliberately, guided by an already existing post-materialist value orientation. By contrast, those who are more interested in technical or financial goals choose to work in banks, engineering firms, public works departments, etc. In reality, it is probably some combination of these two explanations which is operative here.

A useful comparison may be made to the extensive involvement of Catholic religious orders in movements for social change in Latin America, the Philippines and other Third World nations. Initially guided by certain altruistic values, it is only when missionaries from Ireland and other European nations directly encounter the often violent realities of life among the 'shirtless ones' in despotic regimes that they adopt an explicitly activist and often radical perspective. Similarly, members of the new middle class may enter their jobs possessing certain inclinations but it is the fact of being in the firing line of environmental injustice that pushes them towards a more explicit ecological consciousness.

An alternative explanation suggests that this new knowledge class is not so much altruistic as intensely cognizant of its own interests. Since they are the ones most likely to enjoy the positive organisational fruits of activism of New Social Movements (NSMs) -jobs in universities, government departments, regulatory agencies and pressure groups, research grants, conference travel, etc—it is not surprising that members of the new middle class make up the bulk of the constituency of support for environmentalism, feminism, anti-nuclearism etc.

There are two major difficulties in attempting to explain NSMs, such as environmentalism, in terms of the rise of a new middle class. First, the recent research has indicated that the social composition of NSMs is more diverse than the class explanation has acknowledged. For example, the evidence from public opinion polls and voting patterns in Germany in the late 1980s which indicated that the distribution of support for *Die Grünen* (Greens) was, in fact, flattening out. This is consistent with recent research in the United States on the environmental justice movement which reports a rising presence in environmental protests by members of disadvantaged groups. Some have observed that 'need is hierarchical, smog is democratic' to illustrate that in the contemporary 'risk society' we are all centrally affected by environmental problems, a fact which sooner or later will lead to increased environmental consciousness across class lines.

Second, even if the thesis that the new middle class is over-represented could be supported empirically, this may indicate that this group is simply better able to perceive and mobilise against problems such as environmental deterioration than are the equally concerned but less positively resourced lower classes. As it happens, segments of the middle class were similarly over-represented in many 'old' social movements—a further indication that they possess resources (flexible time, leadership skills, etc.) which allow them to participate more intensely.

1.2.4 Regulationist /political closure approach

There have been attempts to account for the rise of environmental consciousness and action by identifying tensions in the political systems of some Western European nations.

From this perspective, the New Social Movements are said to have arisen as a defensive reaction against the intrusion of the state into the everyday life of ordinary citizens—what Habermas terms the 'colonization of the life world'. While this generally fits better as

an explanation for the growth of social movements organized around alternative sexual identities and lifestyles, it can also be seen as having some relevance to the environmental sphere.

It can be argued that the proliferation of new chemical and nuclear, and, most recently, biogenetic technologies, has brought a host of new risks into the daily lives of modern citizens. Governments have sometimes been the architects of these risks; at other times the henchmen of those who are the risk creators. Modern social movements such as the environmental movement choose as their targets risks which appear to represent the ultimate threat to our 'life chances' because they seem to be uncontrollable and irreversible: nuclear power plants, deranged ecosystems, the arms race and biotechnology.

Another plane of this structural explanation casts the rise of environmentalism in the context of 'neo-corporatism'. Corporatist-type political arrangements exist when the state joins in partnership with private industry and sometimes big labour unions to circumvent formal democratic procedures and make key political and economic decisions behind closed doors. Frequently, this form of circumscribed decision-making can result in damage to the environment, especially since corporatism is premised on sustained economic growth and high levels of employment.

It is argued that the political closure imposed by corporatist arrangements has precipitated new forms of ecological protest. NSMs are said to have arisen outside mainstream politics in civil society in order to address grievances and themes (including ecological destruction) which have been systematically marginalized by the corporatist state. Such issues have been officially excluded because they are of no significance or challenge to the interests of the major parties in the corporatist partnership. It is in nations in which political debate has been stifled under a real or apparent consensus and decision-making dominated by a small group of 'social partners' that ecological movements, notably the Greens, have been most active in the, political sphere.

In West Germany, for example, bureaucratic policy-makers had, by the 1970s, increasingly begun to avoid parliamentary institutions, preferring to make key decisions in concert with industry representatives behind closed doors. The rise of *Die Cranen* can thus be interpreted as an attempt to re-establish the democratic political link between the state and the citizenry, first through the formation of extra-parliamentary citizen initiative groups, and later by re-entering parliaments in the form of alternative parties with the goal of helping to restore parliamentary legitimacy.

While these regulationist/political closure explanations have the advantage of placing the rise of environmentalism in a wider historical and cultural context, they tell us more about the structural source and channeling of grievances which are held by environmental activists than they do about any individual motivation to embrace a green view of the world. Furthermore, while it is possible to understand why in some European nations the centre of gravity of environmental discourse was to be found in ecological movements rather than in politics, it is less evident how environmentally related grievances came to be constructed into full-blown claims within these newly emergent green networks. This is especially relevant since these decentralized NSM groups tend to work out their new collective meanings and identities in a pre-political or private context rather than in the full glare of politics and public policy-making.

While each of the approaches discussed thus far has its merits, none is able, to adequately account for the manner in which environmental problems are defined, articulated and acted upon by social actors.

In contrast to much of the existing sociological literature on the environment social constructionist approach focuses on the social, political and cultural processes by which environmental conditions are defined as being unacceptably risky and therefore actionable. Environmental debates reflect the existence not just of an absence of certainty (e.g. about energy futures, the extent of the hazardous waste problem, the health effects of low level radiation) but rather the existence of contradictory certainties: severely divergent and mutually irreconcilable sets of convictions both about the environmental problems we face and the solutions that are available to us.

There was a widespread belief that environmentalism is a phenomenon peculiar to the rich nations of the North, a product of the move toward 'postmaterialist' values among the populations of North America and Western Europe. By equating environmentalism exclusively with affluence, scholars seem to posit an evolutionary sequence of poor societies becoming prosperous before they can find green movements in their midst. Indian environmental historians have disputed the view that the societies of the Third World are too poor to be green. They bring in data from developing countries to suggest that there does in fact exist a vibrant and growing environmental constituency in societies such as Brazil, India and Thailand, countries varied among themselves but appear similar when it comes to the poverty of the masses of their peoples.

The rise of environmental consciousness has led to understanding of several concepts related to the environment.

1.3 Ecosystem

Ecosystem refers to any system in which there is interdependence upon and interaction between living organisms and their immediate physical, chemical and biological environment. Ecosystems operate on a wide variety of scales, ranging from tropical rain forests to small rock pools and in each nutrients and matter move continuously between the various components, often well-defined cyclical pathways. The interdependence of biotic and abiotic elements has inbuilt mechanisms to stabilize the ecosystem within certain limits. The ecosystem's self-regulating and self-perpetuating mechanism characterizes the ecological balance of the system which behaves like a super organism. As an individual organism grows in size and complexity until maturity, an ecosystem too develops through its successional stages such as a fallow land gradually turning into a mature forest as it is not interfered with through external disturbances including human activities. Every ecosystem has a characteristic climax community representing the converging state of maximum complexity and stability attained by it through natural growth and evolution. Many modern ecologists contest this view and consider the biological community to be a mere chance association of species who could adapt to the environment in a place and time. The history of landscape over thousands of years reveals that a forest landscape of today had different species composition and other abiotic characteristics at different times.

An ecosystem provides several services. Ecosystem services are the natural processes of ecosystems for sustenance of life on earth and to fulfill human needs. Economic theory recognizes four kinds of capital (human, financial, manufactured and natural), of which ecosystem services fall under 'natural capital'. Ecosystem services have consumptive value (for example, drugs and medicines, fuels), productive use values (for example, silk, ivory, leather), social value (for example, customs), ethical value (mere existence of a species itself gives pleasure), aesthetic value (pleasure derived by visits to wild areas), option values (value of some species are not known and form basis for future use) and ecosystem service value (self maintenance).

The ecosystem services are broadly categorized into production of goods; regeneration, stabilizing and life-fulfilling services; preservation options. The ecosystem services range from species' existing value to stabilization of climate.

Ecosystem Services

Major Event

Broad Examples

Production of goods
products. genetic resources

Food, pharmaceuticals, fibre, energy, industrial

Regeneration services
services

Cycling and filtration services and translocation

Stabilizing services

Stabilization of climate, moderation of weather,
regulation of hydrological cycle, regulation of coastal stability, compensation/substitution of
species and control of pests

Life-fulfilling services
discovery and serenity

Aesthetic beauty, existence value, scientific

Preservation of options
supply of goods and services

Maintenance of ecological components and

The global biodiversity value has been recently estimated at a minimum of about \$.9 trillion per annum and the benefits of forest cover have been estimated to be worth about \$ 5-12 billion per annum. A tree provides ecological services to the tune of about \$ 2 billion through cleaning air, release of Oxygen, formation of fertile soil, control of erosion, recycling of water and habitats for other forms of life. On the contrary, cutting and selling a tree fetches only about \$ 600. Pollination is one of the ecological services of nature, which unfortunately is showing a declining trend globally due to human interference.

1.4 Carrying capacity

Carrying capacity refers to the number of individuals who can be supported in a given area within natural resource limits, and without degrading the natural social, cultural and economic environment for present and future generations. The carrying capacity for any given area is not fixed. It can be altered by improved technology, but mostly it is changed for the worse by pressures which accompany a population increase. As the environment is degraded, carrying capacity actually shrinks, leaving the environment no longer able to support even

the number of people who could formerly have lived in the area on a sustainable basis. No population can live beyond the environment's carrying capacity for very long.

The ecological basis of environmental destruction is probably best described through three competing functions of the environment. The environment serves three general functions for human beings: supply depot, living space and waste repository. Used as a supply depot, the environment is a source of renewable natural resources (air, water, forests, fossil fuels) that are essential for living. Overuse of these resources results in shortages or scarcities. Living space or habitat provides housing, transportation systems and other essentials of daily life. Overuse of this function results in overcrowding, congestion and the destruction of habitats for other species. With the waste repository function, the environment serves as a sink for garbage (rubbish), sewage, industrial pollution and other byproducts. Exceeding the ability of ecosystems to absorb wastes results in health problems from toxic wastes and in ecosystem disruption.

Furthermore each of these functions competes for space, often impinging upon the others. For example, placing a garbage landfill in a rural location near to a city both makes that site unsuitable as a living space and destroys the ability of the land to function as a supply depot for food. Similarly, urban sprawl reduces the amount of arable land which can be put into production while intensive logging threatens the living space of native peoples.

In recent years, the overlap, and therefore conflict, among these three competing functions of the environment has grown considerably. Newer problems such as global warming are said to stem from competition among all three functions simultaneously. Furthermore, conflicts between functions at the level of regional ecosystems now have implications for the global environment.

1.5 Ecotourism

One of the concepts related to tourism that has become popular in the recent years is ecotourism. This concept emerged in the context of increased emphasis on sustainable tourism. Sustainable tourism has been defined as the management of tourism resources to fulfill economic, social and aesthetic needs on maintaining cultural integrity, ecological, biological diversity and life-support systems. Ecotourism is orienting tourism towards understanding and supporting the multi facets of ecosystem, ecological services and biodiversity.

Ecotourism is one of the fastest growing segments of the tourism industry attracting up to 60 per cent of international tourists. As the natural environment is the prime attraction in

ecotourism, it aims to promote travel in natural habitats to understand the culture and history of the environment with awareness, concern and action to conserve natural resources for the benefit of local people. Ecotourism has been defined as 'purposeful travel to natural areas to understand the culture and history of the environment, taking care not to alter the integrity of the ecosystem, while producing economic opportunities that make conservation of natural resources beneficial to local people'

It was after the Rio Earth Summit in 1992 that a necessity to establish environmental and social-friendly tourism was felt.. Ideally ecotourism industry should work for economic upliftment of tribals and others, who are directly dependent on forests and forest products, leading to positive involvement of local communities.

Ecotourism includes wildlife, bird and whale watching; dive tours; hunting and fishing tours. Besides mammalian species, ecotourism also attracts people towards forests, birds, fish and coral reefs. Ecotourism of coral reefs and rainforests helps understand the significance of complex community interaction. An ecotourism aspiring for ideal tourism should remember that undisturbed or less disturbed ecosystems consisting of plant, animal and microbial communities are crucial to maintain a clean and healthy environment (for example, unpolluted air and water). In 2002 the World Tourism Organisation (WTO) and the United Nations Environment Programme (UNEP) made efforts to coordinate the activities of ecotourism to review experiences around the world to ensure its sustainable future development.

The educational features of these activities include protection of biological and cultural diversity, limiting the negative impact of the natural and socio-cultural environment in view of conservation, generation of employment and income to local communities, mode of ecotourism operation in sensitive areas and respect for indigenous traditional rights. The United Nations declared 2002 as the International Year of Ecotourism and the summit was held at Quebec City, Canada (May 19-22,2002). Issues and themes discussed in the summit included use of national parks and protected areas, balance between development and conservation objectives and policies, measuring ecological and social costs and benefits of ecotourism, contribution to conservation and assessment of environmental and socio-cultural impacts of ecotourism. Biosphere reserves were established under the Man and Biosphere (MAB) programme to promote conservation of biodiversity and sustainable development scientifically through the efforts of local

communities. Thus, biosphere reserves became ideal habitats to develop ecotourism, which benefit the local communities, maintain cultural biodiversity and associated values. There are 408 biosphere reserves distributed in 94 countries of the world, Such a unique network is instrumental for international coordination for sustainable ecotourism through exchange of knowledge, experiences and practices.

There is ample scope to highlight the value of plants or plant products in health care and to inculcate the habit of preserving or cultivating such plants in their vicinity. Ecotourists should be aware that the rate of extinction of biota is increasing at an alarming rate. Human interferences are mainly responsible for increase in the number of endangered species. Ecotourism should be oriented towards educating the ecotourists about the reasons of diversity extinctions and to focus their interest to protect endangered life.

Growth of tourism poses a significant threat to many protected areas. The current scenario of pollution and habitat destruction has revealed that although some ecosystems are of high value they cannot withstand even a slight variation as they are fragile (for example, coral reefs). Tourism expansion in Asia-Pacific resulted in destruction of mangroves. Indian mangroves have been reduced to less than one third in the last three decades. To allow the recovery of such ecosystems, tours to such habitats becomes nonviable. It is necessary to restrict or abandon ecotourism in such habitats and educate the public on human interference. Among 109 countries possessing coral reefs, 90 countries have damaged reefs due to tourism or other human interferences. Recovery of coral reefs is very slow and takes up to 50 years. There is a danger of destruction of both mangroves and coral reefs in the name of ecotourism. Similarly mountain ecosystems suffer like mangroves and coral reefs due to tourism as well as other human influences.

The non-governmental environmental organizations have been advocating their management and conservation through community-based initiatives. Ecotourism impacts are direct on the marine ecosystem due to activities such as beach driving, hunting, boating, fishing and scuba diving. Construction activities also cause enormous disturbance to wildlife habitats of marine ecosystems. Coastal recreation activities in mangrove habitats degrade the ecosystem. It leads to resource degradation and loss of vulnerable habitats (for example, breeding grounds of fishes and turtles). Fourteen beaches of Goa are under great pressure due to intensive tourism. Thus, education as well as explicit planning of ecotourism is necessary to protect the fragile ecosystem

from human impact. Deep ecologists oppose very concept of ecotourism as they believe that such an activity is interference in the processes of nature.

1.6 Deep ecology

Deep ecology as a concept originated in an essay written by Arne Naess, a Norwegian in 1972. The essay called for environmentalists to embrace an ethic, termed biospheric egalitarianism that would place humans on a more or less equal footing with other species. Biospheric egalitarianism would be truly 'deep' ecology in contrast to the 'shallow' ecology which concerned itself merely with pollution or resource depletion without going to the deeper roots of the ecological crisis. The central objective shallow ecology according to Naess was maintaining "the health and affluence of people in developed countries. Naess called for a fundamental change in human consciousness that acknowledged the intrinsic value of all natural things, the biocentric equality of all species, and the "submergence of human self in a larger natural self." Therefore, deep ecology is distinct from 'anthropocentrism', the belief that humans stand apart and above the rest of creation, and 'biocentrism', which rejects a human-centred perspective by looking at history from the perspective of other species and nature as a whole.

They argue that longstanding attempt to ignore both the interconnectedness of all living organisms and the dependence of humans on nature has contributed to the alienation of man from himself.

Rejecting mainstream approach to ecological problems they express themselves in more drastic terms, these ecologists speak of the need for industrial disarmament seeking not to temper future growth, but actually to reverse the entire Western cycle of exploitation of nature, consumption and pollution. They will be happy with nothing less than reducing growth, reversing the process outright. The need is not to manage resource consumption more gently and efficiently but to limit consummation absolutely. Deep ecologists call for a radical reorientation of the very philosophical foundations by which humanity deals with Nature. They argue that domination of nature by humanity is fundamental to Western philosophy. Starting with the Old Testament:

God said unto [Adam and Eve], "Be fruitful, and multiply and replenish the earth, and subdue it: and have dominion over the fish of the sea and over the fowl of the air, and over every living thing that moveth upon the earth."

The idea of dominating and subduing nature was also implicit in the Greek scientific approach. The secrets of Nature were viewed no longer as mysteries to be contemplated or forces to be propitiated, but as objects and laws to be conquered and revealed and eventually mastered. To deep ecologists this entire philosophical basis is an anathema. Not only is nature not to be subdued as some final victory by Humanity, but humanity is an integral part of Nature and not dominant over it. They emphasize that people must conduct their lives on the planet in a non-intrusive fashion, for humanity is not the centre of existence, but only one of its elements. This vision of ecology calls for nothing less than a wholesale reordering of the very character of humanity and of attitudes that have persisted for millennia.

The critics of deep ecology say that while everyone would applaud the idea that all mankind could benefit from a more reverential approach to nature and the world in which we live, the roots of humanity's exploitation of nature lie very deep. They argue that only the hunters, fishers, and gatherers of prehistoric times lived in a full rhythm with their environment, taking no more than they required. But the first seeds of exploitation were sowed in the early settled agricultural communities of prehistoric people. With the planting of the first seed, people sought to gain something extra out of the earth, to push the process, to multiply their holdings. The planting and harvesting of seeds rapidly led to production in excess of the individual's needs—the first step, in a sense, toward a plunder of the earth. Deep ecology calls upon people to abandon this exploitative and plundering approach toward the planet and urges a sense of sufficiency, of "enoughness" upon the collective humanity. There are many environmental groups in India which believe in deep ecology.

1.7 Ecofeminism

Ecofeminism emerged in the 1970s from the synthesis of a diverse collection of feminist and environmental philosophies and tactical ideas. The term *ecofeminisme* was coined in 1974 by French writer Françoise d'Eaubonne to "represent women's potential for bringing about an ecological revolution to ensure human survival on the planet." This effort was based on analysis of environmental problems from the perspective of the feminist critique of patriarchal systems, as well as on attempts to offer alternative systems intended to liberate both women and nature from oppression.

The basis of ecofeminism is the belief that there is an ideological connection between the oppression of nature and the oppression of women in patriarchal societies. It is

therefore necessary to view the rape of a woman as stemming from the same impulse that leads corporations and governments to “rape” the wilderness by destroying it. The goal of ecofeminists is to reform patriarchal society, which they believe will simultaneously empower women and end wanton destruction of the Earth. Ecofeminists are often critical of deep ecology, which they say ignores “major causes of nature oppression” and has “falsely assumed that the earth could be saved without undermining patriarchal structures.”

Carolyn Merchant, one of the important ecofeminist theorists, shows in her book *The Death of Nature* (1980) how the scientific revolution of 16th- and Seventeenth-century Europe rejected the previous view of the cosmos as an organism and replaced it with a hierarchical, machine-based model. This facilitated the eventual domination of both nature and women. Merchant believed that environmentalism and women’s movements thus shared an interest in rejecting many of the values imposed by the modern scientific view of the world. Gray’s *Green Paradise Lost* (1981) is an interdisciplinary study of feminism, ecology, philosophy, religion, and psychology that calls for a rejection of alienation of humans from one another and from the Earth. This is to be replaced by an Edenic society based on harmony, wholeness, diversity, and interconnection.

Environmental thinker and activist Vandana Shiva makes it clear that one of the missions of ecofeminism is to redefine how societies look at productivity and activity of both women and nature that have mistakenly been deemed passive, allowing for them both to be ill-used. The value of the tree is not measured in terms of the ecological service it provides but only in terms of how much wood it provides.

Ecofeminists criticize Western lifestyle which gobbles up resources leading to ecological destruction. Ecofeminists agree that nearly every feature of modern human existence is bad for the environment — driving, eating meat or vegetables, using electricity, having children, and exhaling.

Ecofeminism has been criticized as idealist, focusing too much on the idea of a mystical connection with nature and not enough on the actual conditions of women. But many ecofeminists reject both mysticism and essentialist ideas about the connection between women and nature.

One of the significant features of the Indian environmental movement is the participation of women in it. In some of the environmental struggles women have played a determining part. They have not only participated but also have led marches, demonstrations, strikes and fasts. They have

boldly faced brutal political culture, harassment, attacks and jail terms. Some feminist scholars have argued that all women's groups are environmentalist regardless of whether they know what the environment means. They posit that near-mystical bond exists between women and nature, an intrinsic and proto=biological rapport which is denied to men. Others have argued that the participation of women in environmental movements stems from their closer day-to-day involvement in the use of nature and additionally from their greater awareness and respect for community cohesion and solidarity. In the in the division of labor typical of most peasant, tribal and pastoralist household, it falls on women to gather firewood, collect water and harvest edible plants. They are thus more easily able to perceive and more quickly respond to, the drying up of springs or the disappearance of forests. In movements like Chipko women constituted the front-line defence, a tactical move that worked well in inhibiting loggers.

1.8 Social Ecology

This philosophy is primarily the invention of Murray Bookchin, an anarchist philosopher who founded the Institute for Social Ecology in the US and was one of the first thinkers to provide a radical critique of society based on ecology.

Inspired by Peter Kropotkin and other nonviolent anarchists, Bookchin concluded that environmental problems could not be solved in a freemarket capitalist society because such hierarchical and authoritarian social, economic, and political structures allow humans to dominate others and nature. Bookchin argued that humans should emulate nature, which is characterized by a form of cooperation among organisms that furthers evolutionary goals. Social ecologists therefore counsel decentralizing social and economic relationships to allow the creation of new forms of democratic community, economic production, and "appropriate technology" (smallscale, renewable, and sustainable energy sources) that are more modest in scale and less consumptive. Although this sounds similar to deep ecology's project of creating a classless, decentralized society, Bookchin has criticized deep ecology as a form of "antihumanist" and "eco-brutalist" environmentalism that is hopelessly naive about the need for widespread social change and ending human oppression.

1.9 Bioregionalism

Bioregionalism—a sythesis of such countercultural philosophies as back-to-the-land communalism, appropriate technology, social anarchism, and feminism—is considered by many proponents to be a means through which Bookchin's theory of social ecology

can be implemented. Bioregionalists often think of themselves as having moved beyond environmentalism and general philosophizing into the realm of developing practical ideas about building and living in human social communities that are compatible with ecological systems.

Bioregionalists commit to living an ecologically sustainable, stable, and self-sufficient lifestyle in a small community developed in close accordance with the natural patterns of the specific ecological region in which it exists. It has been described as “show of solidarity with a region” and “ecology with a vengeance” because it meant refusing to destroy the environment as the dominant culture does and preventing others from doing so by any nonviolent means necessary. The focus here is on developing specific, individualized social programs for cities, suburbs, rural areas, and wilderness areas based on analysis of local conditions, then growing these outward toward the entire bioregion. Political groups in various bioregions of the continent would then cooperate in larger bioregional congresses.

Some scholars consider bioregionalism to be compatible with ecofeminism because notions of community and home tie together feminist attitudes about social relationships with ecological attitudes about the right forms of harmonious environmental living. They think that the concept of bioregionalism is incomplete without ecofeminism: Since feminism emphasizes the value of personal relationships and rejection of oppression, it supplies important perspectives on how domestic life should be revalued in local places.

1.10 The tragedy of the commons

In 1968, Garret Hardin, professor of biology at the University of California in the US published “the tragedy of the commons” as an article in the journal ‘Science’. His essay quickly became part of the ‘required reading’ for the new environmentalists and was reprinted widely. In certain situations, an individual’s preferences are in conflict with the needs of the system to which the individual belongs. If individual freedom is maximized in these situation, the common good is sacrificed to the detriment of the system, and ultimately, of its individual members. He says that the tragedy of the commons develops this way: “Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast will below the carrying capacity of the land. Finally, however, comes the day or reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.”

Hardin (1968) based his scenario of the tragedy of the commons on the historical case of the Commons in medieval England. The tragedy occurred because each farmer increased the number of his animals grazing in the commons pasture of his village, leading to disastrous overgrazing, and eventually to the demise of the Commons. Each individual herdsman acted rationally in adding another animal to his herd, because he perceived (correctly) that the additional animal is only a small increment to the total herd grazing the commons. The tragedy occurs because each herdsman maximizes his individual utility, without considering the societal consequence when such individual utilities are aggregated to a societal disaster. Each man is locked into a system that compels him to increase his herd without limit in a world that is limited. Ruin is the destination toward which all men rush, pursuing his own best interest in a society that believes in the freedom of the commons.

Hardin argues that today most individual couples do not fully perceive their responsibility for contributing to societal overpopulation. He believes that pollution is a consequence of population. He interprets environmental pollution as a tragedy of the commons in a reverse way; each factory, owner, for example, puts something (sewage, chemical, or radioactive wastes) into the commons, instead of taking a resource out of the commons. The tragedy of the commons is a helpful concept for development problems. Migration of people from villages to cities is also given as an example for the tragedy of the commons. Each rural individual or family that migrates to city feels that they are improving their situation, and indeed they may often do so. But when millions of peasants move to urban centers like Mumbai, Kolkata and Bangalore the total result is traffic problems, smog, unemployment, and overcrowding. Essentially any solution to the tragedy of the commons rests on the common society persuading, coercing, or forcing the individual to behave in ways that are to the advantage of the system, but that may conflict with the individual's personal preferences. In the commons scenario described by Professor Hardin such system-influenced individual behavior would consist (1) of not adding another grazing animal to the commons pasture, or (2) if the commons are already overgrazed, of decreasing the size of the individual's herd.

System influences on individual behavior amount to sacrificing a certain degree of individual freedom in exchange for a future system state that will be more healthy, and hence will

benefit its individual members. But this reward is usually somewhat removed in time from the individual's immediate decision about resource use, and seldom is it dramatically visible, because the preventive acts taken now help, in the aggregate, avoid an unwanted future state.

Environmental thinker Vandana Siva has found several holes in the Hardin's theory. She has argued that "Hardin's assumption about commons as unmanaged open-access systems stems from the belief that management takes effect only in the hands of private individuals. But groups do manage themselves, and commons are not open access systems as Hardin proposes, they in fact apply the concept of ownership, not on an individual basis, but at the level of the group. And groups do set rules and restrictions regarding use. Regulations of utility are what protect pastures from overgrazing, forests from disappearing, and water resource from vanishing." Giving the example of the Third World countries she has observed that the principle of cooperation, rather than, competition, among individuals still dominates. Hardin's 'tragedy of the commons' ignores social organization based on cooperation among members.

1.11 Back to the land

Ruskin was a fierce critic of Britain's burgeoning factory system. He spoke out against the shoddy quality of machine-made goods, and attacked the aesthetics of products designed for show instead of function. In Ruskin's view mass production enslaved workers to machines and robbed them of the pleasure of their own labor. To right these wrongs he advocated a return to what he saw as the superior practices of the medieval craft guilds. For Ruskin, a visibly hand-made object had beauty because its irregularities betokened the freedom of the artisan who made it.

Soon after the impact of the industrial revolution was felt thinkers and writers began looking at the country life which was in direct contrast to the emerging urban-industrial culture. They wrote about the need to go back to land as the coal mines, textiles, railroads and shipyards were emerging as visible symbols of enormous expansion of industry and trade. William Wordsworth (1770-1850), John Ruskin (1819-1890), Edward Carpenter (1844-1929) and Mahatma Gandhi (1869-1948) were the proponents of back to the land philosophy. Some groups of people, especially in the developed countries, have been trying to propagate the back to-the-land philosophy.

The back-to-the-land movement was a social movement based around the idea of living a self-sufficient life close to nature. It was characterized by the idea that everyday life is methodically practiced and based on a set of moral values or choices. For many people homesteading became a spiritual practice, giving meaning to daily life through adhering to values of simplicity and anti-consumerism.

Back-to-the-landers drew significant connection between art and architecture on the one hand, and the natural world and social and economic conditions on the other. They criticize the economic thinking for emphasizing material wealth at the expense of social welfare, and insisted on the moral basis of any true economics. The conditions of industrial mass production, they argued, were destructive of human sensibility and of a harmonious relationship with nature. Industrial production they argued involved making the worker into a tool, his fingers like cog-wheels and his arms like compasses. Demanding 'engine-turned precision' of human being is a degradation of them. More than that, to demand precision or perfection goes against what we understand of the natural world of which we are part. Nature teaches us that impression and imperfection are essential if anything is to be good.

1.12 Let Us Sum Up

The environment began to be seen as an issue in the 1960s. Increased awareness about environmental pollution led to the growth of the environmental movement around the world. As the issue importance sociologists tried to explain the factors behind rise in environmental consciousness. It was argued that the reflection hypothesis, the post-materialist hypothesis, the new middle-class thesis, the regulations/political closure approach played an important role in the growth of environmentalism. As the environment debate broadened to touch several aspects of human life new concepts and ideas emerged. These concepts centred on man's responsible behaviour towards the environment. Preserving ecosystems and achieving sustainable development emerged as the key components of the environment discourse. There different approaches to understanding of the environment as an issue and resolving it.

1.13 Check Your Progress

1. Explain the factors that led to the growth of environmental consciousness.
2. Do you think that ecotourism will have negative impact on the environment? Elaborate Justify your view.

3. What is your understanding of the relationship between women and the environment?
4. Do you think back-to-the-land philosophy will help solve many of our environmental problems?
5. What do you learn from 'the tragedy of the commons'?

1.14: For Further Reading

1. Cox, Robert. (2006). *Environmental Communication and the Public Sphere*. Thousand Oaks: Sage.
2. Gadgil, Madhav. (2005). *Ecological Journeys: The Science and Politics of Conservation in India*. New Delhi: Permanent Black.
3. Gadgil, M., & Guha, R. (1995). *Ecology and Equity*, New Delhi: Penguin.
4. Guha, R. (1989). *Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya*. Delhi: Oxford University Press.
5. Guha, R. (2000). *Environmentalism: A Global History*. New Delhi: Oxford University Press.
6. Krishna, S. (1996). *Environmental Politics*. New Delhi. Sage.
7. Palmer, Joy, A. (2004). (Ed). *Fifty Great Thinkers on the Environment*. London: Routledge.
8. Singh, S. 'Biodiversity and Ecotourism with Special Reference to India.' *Tourism Recreation Research* 27: 9295.2002.
9. Sridhar, K.R. and Seema, S. (2006). Ecotourism: Ecological and Biodiversity Perspective. *Ecodevelopment*, 10 (6), 119-130.

<http://www.devalt.org/ldaJesb/biodiv/strategy.htm>

UNIT 2: THE ENVIRONMENTAL DEBATE

Structure

2.0 Introduction

2.1 Objectives

2.2 A historical perspective

2.3 Development vs Environment

2.4 Man, animal and the environment

2.5 Regulations for environmental safety

2.6 Climate change and reducing carbon emission

2.7 DDT, health and environment

2.8 The nuclear debate

2.9 Biofuel and food security

2.10 Population Effect

2.11 Environmental education in schools

2.12 Let Us Sum Up

2.13 Check Your Progress

2.14 For Further Reading

2.1 Objectives

There has been no unanimity with regard to understanding of the environmental question. There are people who look around at the vast expanses of concrete jungles and lament the transformation of our landscape. They are concerned that current industrial and waste-disposal practices are degrading our land, air, and water, and that we are depleting our fixed supply of natural resources—minerals, fossil fuels and forests. They read reports from scientists that we are losing unprecedented numbers of species and huge areas of rain forest and coral reefs in the tropics.

This Unit will give you needed information to:

1. understand issues concerning sustainable relationship between nature and society
2. examine the discourse with regard to development and environment
3. analyze perspectives on energy options and their effect on the environment
4. discuss approaches to resolving global environmental problems.

2.0 Introduction

Most respected scientific authorities agree that human beings as a species are even altering global-scale processes and conditions like the atmosphere and climate. And then, of course, are the claims that the human population is simply too big and growing too fast for the planet's finite resources—and that some catastrophe is imminent. The people are worried about pollution, disappearance of the last wild places on earth, destruction of unique natural heritage of biodiversity and global processes that we do not understand but sustain the economies of nations. There are influential groups and organizations that argue that environmental questions are a hindrance to development and that with modern science and technology provide answers to most of the environmental problems. Many issues are being debated. They are related to complex social, economic, scientific and cultural factors. This unit examines some the issues that are often the subjects of debate.

2.2 A historical perspective

The causes and consequences of environmental destruction have to be understood in their proper context. We must begin by recognizing that the crisis of the earth is not a crisis of *nature* but a crisis of *society*. The chief causes of the environmental destruction that faces us today are not biological, or the product of individual human choice. They are social and historical, rooted in the productive relations, technological imperatives, and historically conditioned demographic trends that characterize the dominant social system. Hence, what is ignored or down played in most proposals to remedy the environmental crisis is the most critical challenge of all: the need to transform the major social bases of environmental degradation, and not simply to tinker with its minor technical bases. As long as prevailing social relations remain unquestioned, those who are concerned about what is happening are left with few visible avenues for environmental action other than purely personal commitments to recycling and buying green products, socially untenable choices between jobs and the environment, or

broad appeals to corporations, political policymakers, and the scientific establishment the very interests most responsible for the current ecological mess. In other words, because the crisis has social roots, the solution must involve the transformation of historical relationships on a global scale in order to fashion a sustainable relationship between nature and society.

History teaches us that societies have long been at war with the environment, treating nature as little more than a resource to be tapped and as a sink into which to dump their wastes. At times such a one-sided exploitation of nature has led to regional environmental catastrophes that have in turn led to the fall of whole civilizations. Until the last few centuries human society existed on so small a scale in relation to the global environment that its effects remained fairly negligible.

'This situation began to change with the emergence, in stages, of the capitalist world system, which began in Europe in the late 1400s. The great historical transformation initiated by Columbus' voyage across the Atlantic more than five hundred years ago marked the origins of what was to become the capitalist world system and the simultaneous creation of a world hierarchy of nation states, defined by the relation of colonizer and colonized, more developed and less developed. The European colonization of the greater part of the globe, beginning with the "New World" and extending to the Asian and African continents, led to the extraction of vast quantities of economic surplus whether in the form of precious metals, *such* as gold and silver, or agricultural products, *such* as sugar, spices, coffee, tea, and many more—and therefore to the social and ecological transformation of the colonized regions. "The gold and silver of the New World" the great French historian Fernand Braudel wrote, "enabled Europe to live above its means, to invest above its savings".

The rise of modern colonialism was thus a crucial force behind the commercial revolution experienced by European society from the sixteenth through the eighteenth centuries. Additional sources of food which originated in the Americas; Asia and Africa were taken back to Europe, transforming European agriculture and then the agriculture of the entire world. All of this helped prepare the way for the next great stage of capitalism's advance, the industrial Revolution, which took place in Europe in the late eighteenth and early nineteenth centuries and led to a rapid increase in the scale and intensity of production and to the development of a set of divisions that are at the core of our understanding of the modern world. The division was between economy and nature, between capital and labor, and between center and periphery. Today's discourse with regard to development and environment has to be understood in this context. Let us examine some of the debates.

2.3 Development vs Environment

The development paradigm that focused only on economic growth completely ignored its consequences on the environment. It was realized many years later that the development path chosen by many nations was environmentally destructive. Should development be at the cost of the environment? This question was raised in many international fora. The four decades of the development experience had established by the 1980s that development and its synonym economic growth which were used to refer to a sustained increase in per capita income were unsustainable processes.

Development was unsustainable because it undermined ecological stability and destroyed people's livelihoods. Economic growth had promised to create abundance. It has promised to remove poverty. Instead, by causing the destruction of livelihood and life-support systems in the Third World growth itself became a source of poverty and scarcity. While the 1970s focused on the growing polarization and inequality that went to hand in hand with economic growth, in the 1980s the focus shifted to the issue of sustainability.

The World Commission on Environment and Development (WCED), established as an independent body United Nations Environment Programme in 1983, aimed to respond to ever increasing concern about the problematic impacts of human activity on the natural resources of the Earth and to examine developmental problems of our planet and to formulate possible proposals to resolve these problems. The report of the commission *Our Common Future* (1987) made a comprehensive analysis of the global situation and focused on the concept of sustainable development. The concept is now accepted vital element of world dialogue and debate on environmental issues, largely because of the understanding of its central importance spelled out in the report. The concept stresses on the need to achieve a balance between environment and development. As defined by WCED, sustainable development is a dynamic process designed to meet today's needs without compromising the ability of future generations to meet their own ends. It requires societies to meet human needs by increasing productive potential and by ensuring equitable economic, social and political opportunities for all. Sustainable development must not endanger the atmosphere, water, soil, and ecosystems that support life on earth. It is a process of change in which resource use, economic policies, technological development, population growth and institutional structures are in harmony and enhance current and future potential for human progress. The report which provoked a huge debate is based on certain understanding of development and economic growth wherein we may read a prescription for imposing a western standard of living on all the world's people, irrespective of their true needs and desires. A number of environmental organizations in the developing countries and individuals claim that the commission's definition of development is highly contentious. Perhaps the true causes, rather than the cures, of the ecological devastation, environmental destruction and increasing poverty rest in the western standard of living prescription.

Today's dominant development pattern based on western culture and its mechanistic stance takes little account of the diversity of ethical positions, cultures and traditions that actually exist. Furthermore, it fails to encapsulate the true complexity and interrelatedness of all the processes which shape our earth and maintain its stability. Vandana Siva, one of India's leading environmentalists and scientists, and author of several books, has argued that the ideology of the dominant pattern of development derives its driving force from a linear theory of progress, from a vision of historical evolution created in eighteenth century Western Europe and universalized throughout

the world, especially in the development decades. The linearity of history, pre-supposed in the theory of progress, created an ideology of development that equated development with economic growth, economic growth with expansion of the market economy, modernity with consumerism, and non-market economics with backwardness.

One of the strongly asserted views in the developing countries is that many countries in the West have depended upon polluting industries for their wealth but they have now started arguing that uncontrolled economic development in the Third World will lead to environmental disaster. Developing countries such as China, India and Brazil point out that they must make industrialisation and economic development a priority because they have to support their growing populations. Developing countries must address current problems; they cannot afford to worry about the distant future. They also point out that as First World countries are most to blame for current environmental damage, it is unfair to demand that developing nations limit their own growth to solve these problems. Taking care of millions of people who are starving is more important than saving natural resources, some of which are renewable. When developing countries are faced with dire poverty and a constant battle for survival it is not fair to expect them to share the green concerns of developed countries.

Although developing countries need to be treated differently when it comes to taking measures to prevent environmental destruction preserving their environment is important as poverty and environmental damage are often linked. Destroying the rainforest gives native peoples nowhere to go except urban slums. Polluted water can lead to crop failures. Climate change will turn fertile fields into desert and flood coastal areas where hundreds of millions live. Developing countries have to choose sustainable development if they want a future for their people.

Some fear that too much emphasis on green issues holds back developing countries. Because this is seen as interference in their affairs, it also contributes to a greater divide between the First and Third worlds. Many also believe it is a deliberate attempt to stop possible economic competitors. After all, the US and the EU already put high tariffs on products made cheaply in developing countries which could be sold in the developed countries. It is pointed out that limiting the development of profitable but polluting industries like steel or oil refineries the developed countries are forcing developing nations to remain economically backward.

Since the earth cannot support unrestricted growth every nation should achieve sustainable development that combines environmental care, social justice and economic growth. No one wants to stop economic progress that could give millions better lives. But we must insist on. Some of the developed countries have imposed stricter environmental norms that have led to increase in the cost of production. Their prices may be undercut by goods produced cheaply in developing countries at the cost of great pollution. This will not be fair. The world will be better if all nations stick to strict

environmental rules. The reality is that for many nations such rules are not in their interests. That may lead to loss of millions of jobs. The equal application of strict environmental policies would create huge barriers to economic progress, at a risk to political stability.

Environmentalists have been pointing out that nations are losing more from pollution than they are gaining from industrialization. Uncontrolled economic development in China in the last two decades has created serious, chronic air and water pollution. This has increased health problems and resulted in annual losses to farmers of crops worth billions of dollars. So uncontrolled growth is not only bad for the environment but it does not make economic sense too.

Scientific progress has made people too confident in their abilities to control their environment. Some scientists say that rapid industrialization does not have to put more pressure on the environment. Scientific advances have made industries much less polluting. The developing countries can learn from the environmental mistakes of the developed world. There are also alternative renewable types of energy such as solar, wind and hydropower.

The debate with regard to benefits of green revolution, which has become synonymous with development, continues. It is claimed that the green revolution has doubled the size of grain harvests. Thus, cutting down more forests to provide more space for crops is no longer necessary. It is now possible to feed the world's increasing population without harming the environment. Genetically modified crops can also benefit the developing world by requiring much less water, fertiliser or pesticide use while giving better yields. This is another example of economic development leading to environmental benefits. But these claims are rejected by any agricultural scientists. They view green revolution as a threat to biodiversity of the Third World since it replaces native seeds with hybrids.

The long-term environmental or economic consequences have not been understood. What has been found is that in the short run such hybrid crops can cause environmental problems by crowding out native plants and the wildlife which relies on them. The farmer growing hybrid crops must buy costly new seed every year because it cannot be saved to plant the following year's crops. Farmers using hybrid seeds in what was the richest part of India went bankrupt. As a result, fertile lands lay idle and unploughed, resulting in droughts and desertification. Technologies cannot substitute nature and work outside nature's ecological processes without destroying the very basis of production. What is seen as development today may turn out to be a great environmental tragedy in the future.

2.4 Man, animal and the environment

There have been heated and emotional debates about rights of animals. Often the same environmental groups that campaign on environmental issues are also concerned for the wel-

fare of animals: both sets of concerns derive from a commitment to the value of Nature and the Earth. The question of animal rights has many political and social implications. It is also about ethical principles. It was Australian philosopher Peter Singer who for the first time put forward the claim in the 1970s that animals also have 'rights'. There are ethical questions about keeping farm animals, consumption of meat and using animals as sources of entertainment in the context of zoos, circuses, horse racing etc. The issue is also connected with biodiversity, vegetarianism and animal experimentation.

Since some animals, like human beings, also have the ability to think (to some extent) and feel the pain they have the right to free and healthy life. The opposite argument is that man's abilities to think, talk, to form social systems with rights and responsibilities and to feel emotions are uniquely developed well beyond any other animals. For these reasons animals do not deserve to be given rights. Only human beings who are members of society have 'rights'. Rights are privileges that come with certain social duties and moral responsibilities. Animals are not capable of entering into this sort of 'social contract' – they are neither moral nor immoral creatures, they are amoral. They do not respect our 'rights', and they are irrational and entirely instinctual. Amoral and irrational creatures have neither rights nor duties – they are more like robots than people. All human beings or potential human beings can potentially be given rights, but non-human animals fall into that category.

The defenders of animal rights see a great danger in this line of argument. Not only animals, but also human infants and mentally handicapped adults may be excluded from basic rights.

With regard to descent it is said that human beings are related by common descent to all other animals and therefore we owe a duty to care for our animal cousins. These arguments are rejected by those who say that that sort of thinking will have absurd consequences, to the extent of respecting the right to life of bacterial and the right of the AIDS virus to move freely and without restriction and to associate freely with other living organisms.

Animal rights activists say cruelty to animals as a sign of an uncivilized society. A society that respects animals and restrains base and violent instincts is considered a more civilized one. Cruelty to animals encourages violence and barbarism in society more generally.

Those who do not accept the idea of rights for animals think that it is perfectly natural to use animals for our own nutrition and pleasure. There is so much suffering in the wilderness as animals struggle to survive, are hunted by predators, and compete for food and resources. Human beings have been successful in this struggle for existence and do not need to feel ashamed of exploiting their position as a successful species in the evolutionary process. Animal Rights activists are accused of being hypocrites, extremists, and terrorists who don't even care about human life. It is alleged that organisations such as PETA (People for Ethical Treatment of Animals) which use terrorist tactics and death-threats are extremist organizations. Those against the idea of 'rights' for animals

state that modern medicine could not have been developed without experiments and tests on animals. Although they accept that animal welfare is a reasonable concern they think that talking of animal 'rights' is a sign of extremism and irrationality.

The basic cause of preventing exploitation of animals is not undermined by the fact that a small number of extremists and criminals attach themselves to it. And it is not reasonable to expect animal rights campaigners not to take medicine because it has been tested on animals. They must look after their own health whatever way they can until a more humane sort of medicine is developed. It is important to stress here that animals, like human beings, are part of the environment. Animal rights organizations have been saying in their campaigns that protecting animals is in man's own interest.

2.5 Regulations for environmental safety

While some ecologists argue that regulations are needed to ensure that environmental destruction is prevented others argue that such laws adversely affect our society and economy. Those who argue that environmental laws and regulations are an unnecessary and often unfair burden on the economy and on individuals bear witness to workers loosing jobs and economic developments stymied by environmental laws. They are moved by tales of people who have been forced out of their trade because they can't afford to comply with all the environmental rules. This group is agitated when rigid environmental regulations seem arbitrary and unfair making the industry implement expensive new practices and use specified equipment so that the level of some multi-syllabic pollutant can be lowered by .001 in the air or water. It is pointed out that several respected scientists do not agree that the atmosphere or climate is in trouble. The people on this side of the environmental debate doubt the validity of the environmental doomsday scenarios that have proliferated in the recent years. They argue that the earth has not stopped turning yet. They reject dire predictions as baseless. Even if some of these environmental tragedies do come to pass, these folks retort, "so what?" Scientists have not been able to clearly articulate to the public the significance of their predictions. The people on this side of the environmental debate are tired of paying more for environmentally-friendly products and holding up huge development projects. They argue that environmental red-tapism is expensive, frustrating and ties up the courts with litigation.

The proponents of regulations assert that if people want a life free of worry about getting sick from pesticides on food, radiation from power lines, asbestosis, toxic waste in the soils, and smog overhead stringent regulations are a must. As with many debates currently raging in contemporary politics and livingrooms, the problem lies in the fact that people want all modern amenities, but reality offers us only a set of trade-offs and difficult choices.

2.6 Climate change and reducing carbon emission

There is now widespread agreement amongst both scientists and politicians that glo-

bal climate change is taking place. Such a process is seen as a threat to humanity as it may lead to more extreme weather events, such as hurricanes, droughts and floods, as well as a rise in sea levels as a result of global warming melting polar ice caps, which would result in the loss of many low-lying coastal areas. Global warming may also bring tropical diseases to previously temperate regions such as Europe and North America.

There is also a consensus that human emissions of carbon into the atmosphere, largely created by the burning of fossil fuels such as coal, oil and natural gas, are responsible for climate change. Some scientists and some politicians still question this consensus. Most governments accepted the reality of global climate change in the late 1990s, when the large majority of states signed up for the Kyoto Agreement which attempted to check the increase in carbon emissions in developed countries and provide a framework for future action to reduce overall emissions. Although some countries, in particular the US, refused to sign up to the Kyoto Agreement, and expressed skepticism over the whole climate change issue, most have now come to accept the conclusions reached by the United Nations' Intergovernmental Panel on Climate Change.

Global attention is now focused on the best ways to reduce carbon emissions, bearing in mind the potential economic costs of doing so. A key issue is whether it would be best to seek reduced emissions through direct government regulation, or whether market mechanisms are preferable. While regulation might ban certain polluting practices, such as coal-fired power stations, and force businesses and consumers to adopt cleaner technologies, market mechanisms seek to put a price on carbon emissions and so provide a strong financial incentive to reduce them. This could be done either by taxing carbon emissions, or through a cap-and-trade mechanism whereby businesses must obtain permits giving them the right to pollute to a certain level – allowing companies which reduced emissions dramatically to profit from selling their unused permits to their more polluting peers. While some argue that market mechanisms have the ability to reduce carbon emissions others argue that regulation is essential if climate change is to be checked.

The supporters of market mechanisms say that such mechanisms are open ended and provide an ongoing profit motive for companies, state agencies, and individuals to reduce emissions, as doing so either creates additional profits (cap and trade) or yields up additional tax reductions (carbon tax). This is a better approach than a regulatory approach, which only requires cuts to a certain level and provides no longer-term incentive for companies to drive down emissions by investing in new technology – meaning companies will take the minimum action necessary to meet the regulatory standard.

Those who defend regulatory approach contend that regulation already exists and has proved effective, so it is unnecessary to try to construct market-based solutions. Pollution and climate change is essentially a result of market failure, and governments need to intervene to resolve this. Regulations are flexible as they can be strengthened and extended over time, building on initially moderate measures. Regulations can also be introduced in such a way that companies are given an incentive to reduce their carbon emissions as much as possible.

It is argued that market mechanisms provide a better means of tackling climate change at a global level. With the exception of the European Union, regulations are set by individual countries so there is a great risk that each state will come up with its own set of regulations in an attempt to limit carbon emissions. Not only will this be unnecessarily complicated and raise the costs of compliance considerably, there is also a risk that states will have an incentive to introduce only lax regulations in an attempt to attract more business investment than other, more demanding jurisdictions.

By contrast, market mechanisms can provide a more coordinated and effective international response. A cap and trade system will sit alongside existing international financial and commodities markets. Cap and trade also provides incentives for developing countries to participate by offering them a chance to profit by adopting green technologies and preserving their forests. And although an identical global tax level for carbon emissions seems as unlikely as coordinated regulation, agreement on the principle of carbon taxation would be much easier to achieve. Individual countries could set their own carbon tax rates if they wished, but as they will all be taxing the same damaging emissions the overall impact in the market will be to provide a powerful push to reduce emissions.

The view in favour of regulations says that because it is not possible to achieve a perfect market in carbon emissions, regulations are to be preferred. Firstly, some types of emissions are more damaging to the environment than others, but this is hard to recognise in a carbon tax or trading system. Regulations can be more targeted in order to deal with the biggest problems first. For example, government policy has required vehicle exhausts to become much less damaging to the environment over the past few years, and can also demand that companies (e.g. power generators) update their equipment and working methods. The deadlines and potential sanctions accompanying such government demands can also focus investment into research and development, which the market alone would not provide. Secondly, the existing global marketplace is quite imperfect. Many countries lack the kind of open economies needed for market mechanism to operate effectively. Unless efforts to curb carbon emissions are to be put on hold until their economies are sufficiently reformed for market incentives to have a chance of working, regulations will have to be the main method of emissions reductions in such places. And on a global scale market incentives are hugely distorted by such oddities as the exemption of aircraft fuel from taxation.

The proponent of market mechanisms have tried to explain that using such mechanisms are likely to have a greater impact on people's behaviour than regulations. Both a carbon tax and a trading system that prices emissions would raise the cost of fuel and electricity for ordinary people, providing an incentive to reduce their personal carbon footprint. This would have an immediate impact, and would affect all kinds of consumers, whereas regulations mandating efficiency standards for vehicles or homes would apply only to new purchases and not to the huge number of existing automobiles and houses, making any overall progress in reducing emissions extremely slow.

Regulations can also have perverse effects – for example, requiring higher fuel efficiency standards may reduce the cost per mile to the motorist and so actually encourage more driving and so more pollution. By contrast, raising the cost of the fuel itself (as either cap and trade or a carbon tax would) will provide incentives for both greater engine efficiency and reducing mileage. It has been argued that regulations do not just affect big businesses – they create costs which industry passes on to consumers in the form of more expensive electricity, vehicles, gasoline, etc. Regulations often favour particular industries over others for political reasons, which is far more unfair than using market mechanisms to send green price signals to consumers.

Supporters of regulation do not agree with the above arguments. They say although market-based proposals can sound great in theory economists fail to recognize the way in which people actually live their lives. Because people value the personal freedom their motor vehicle gives them, and feel that they have no choice but to use it to get to work and to reach other destinations, they will be ready to pay higher fuel taxes without changing their behaviour. Similarly, making homes energy efficient can involve a lot of initial expense, and even if this investment would pay for itself in lower bills or taxes over a number of years, many people will not feel the investment is worthwhile. Only by regulation requiring people to change their behaviour can this inertia be addressed. Regulations force those really responsible for carbon emissions to face up to their responsibilities and to invest some of their vast profits in green technology.

2.7 DDT, health and environment

The modern era environmentalism began with an investigation into the long term effect of using chemicals for crop protection. One of the issues that is still being hotly debated is the use of DDT (dichloro-diphenyl-trichloro-ethane), an insecticide. Although it has been banned in many countries it continues to be used. DDT's inventor, Dr Paul Müller, won the Nobel Prize for it in 1948. DDT was first used in disease control in 1944, among typhus-ridden soldiers released from prison camps. In subsequent years DDT was used to reduce mosquito populations – and thus malaria rates – but is banned in many countries because of its allegedly dangerous side-effects. It was Rachel Carson who brought world attention to the harmful effects of DDT. Her book 'Silent Spring' led to the passage of legislations banning the insecticide. In the year 2000 the United Nations Environment Programme

granted an exemption on the ban for the purpose of malaria control. However, bans in the West have led to decreased production and opposition to DDT's use in the developing world. Some of the international development agencies provide funding for their public health programmes only to those countries that do not use DDT.

It is argued that application of DDT was so successful that in the years following the second world war malaria was eradicated in Europe and the US, and the burden of the disease was reduced in Africa, Asia and Latin America. The benefits of this can hardly be exaggerated. The mosquito-borne malaria parasite kills over 2 million people annually. Africa, where 90 per cent of those fatalities occur, bears most of the human and economic costs of the disease. The effective ban on DDT has increased the mosquito population and made both mosquito control and malaria treatment more difficult. DDT works: Europe and North America have not harboured malarial mosquitoes since the 1940s.

In one of the most miraculous public health developments in history, Greece saw malaria cases drop from 1-2 million cases a year to close to zero, also thanks to DDT. Meanwhile, in India, malaria deaths went from nearly a million in 1945 to only a few thousand in 1960. Some 300 million people a year are debilitated by malaria, at immense cost to both human health and the economies of poor nations. Most of those who die are children under the age of five. In some parts of Sub-Saharan Africa, one in 10 infant deaths, and one in four deaths of children under four years are attributed to malaria.

It is important to note that DDT is banned because it is a poison that can kill any living creature, including humans, and can cause sterility. It does great, potentially irreparable damage to the environment. Therefore, while it is true that DDT is a useful tool in fighting malaria, its side-effects are simply too bad: there's too much cost and not enough benefit. That doesn't mean that the opposition is callous to the suffering of victims of malaria – they should receive the best possible treatment, and alternatives to DDT should intensively be sought. But DDT should not be used.

There are many who feel that in the short term DDT is by far the most effective way of limiting and reversing the plight of malaria sufferers. There are many things that can be used in the long term against malaria: medicines, draining stagnant water, screens on windows, bug repellent, bednets treated with insecticides, and hopefully, an eventual vaccination against the disease. But many scientists are of the view that DDT is tremendously damaging even if used only for a short time. It kills insects other than mosquitoes. Not only the target insect is killed, but other wildlife too. The target insects easily develop resistance. Then the target insect returns to the treated area and has no predators to keep it in check; the problem becomes worse than before. It thus greatly interferes with the food chain and the ecosystem. Even if only used for a month, DDT's damaging effects could be permanent. Investigations are still ongoing into the pollution done by DDT drives in the 1950s.

Some African countries have been arguing that DDT's obvious benefits are deliberately being overlooked by the West because it offers medical companies the opportunity to market much more expensive medical solutions to nations that desperately need to combat malaria. It is true that other solutions exist – but the nations concerned cannot afford them. And, of course, malaria is one of the main reasons that they are so poor. It is hypocritical of the West to impose its political and environmental views on developing countries, especially when many western countries have benefited hugely from the use of DDT in the past. The opposition to DDT, according to one view, is based on an anti-chemical sentiment that is fashionable but totally without scientific basis.

However, DDT is opposed worldwide because it is said to be bad for people and the planet. Medical solutions are supported because they're good for people and do not harm the planet. The cost of alternative medicines is not that high and is falling all the time. Moreover, an important principle is being defended here – the environment must be protected from overwhelming damage even when it's in man's interests to harm it. Nor should western governments and charities fund the use of poisons that would be banned in their home countries - to do so would be hypocritical and unethical.

With regard to death and illness related to the use of DDT it is claimed that no DDT-related human fatalities or chronic illnesses have ever been recorded, even among the DDT-soaked workers in anti-malarial programs or among prisoners who were fed DDT as volunteer test subjects — let alone among the 600 million to one billion who lived in repeatedly-sprayed dwellings at the height of the substance's use. It is contended that even if there is harm done to man that would be a better option than the threat of death.

While no human fatalities have been recorded (which doesn't mean they haven't occurred), the effects of DDT may be tremendously harmful to man. Chemical pollutants may build up within biological material – in human beings, in food and water sources. This “bioaccumulation” means that as organisms interlinked in food chains and food webs nourish and reproduce themselves, pollutants may become magnified in potency from one generation to another, making those who were not there when the pollutant was introduced suffer the effects more.

2.8 The nuclear debate

Nuclear fission is the splitting of large atoms into smaller atoms with the release of energy stored in the original nucleus. It produces no greenhouse gases or other such pollutants but does produce radioactive waste that must be stored safely for thousands of years. There is also the risk of a nuclear explosion (due to meltdown) if the reaction gets out of control. This is different from nuclear fusion, a process by which small atoms are joined to create larger atoms, releasing energy in the process. It may take many years before this technology becomes usable.

Nuclear power has been the subject of hugely contentious debate. Public fear about nuclear energy was fuelled by accidents such as Chernobyl and Three Mile Island. The Chernobyl disaster led to widespread protests against nuclear power in many developing countries including India in the 1980s. Some European countries have announced that they will not build anymore nuclear power plants. Germany has made an announcement that it will be closing down its 19 nuclear power stations by 2020.

The majority of the world's electricity is currently produced via fossil fuels. These are not infinite resource and will run out shortly. Increasing oil prices reflect both rapidly rising demand for energy across the globe, and the limited supply of fossil fuels to meet this need. Although estimates are very variable as to exactly how long fossil fuels will last it is possible that oil will be exhausted within 50 years and coal within 25 years. It is therefore, advocated that nations should invest in nuclear energy for the future.

The pro-nuclear groups speak of nuclear energy as a clean form of energy. Their arguments are as follows. It does not produce gaseous emissions such as greenhouse gases, which are harmful either to the population or to the environment. It is true that it does produce radioactive waste. Since this is in solid form it can be dealt with much more easily and stored away from centres of population. The damage caused to the environment and populations due to the burning of fossil fuels is far in excess of the damage done to the environment due to the nuclear industry including even the Chernobyl catastrophe. In this sense nuclear energy is very much preferable to the burning of fossil fuels at the moment. Furthermore, as new technology becomes available to allow the more efficient use of nuclear fuel, less nuclear waste will be produced. (A recent example is the development of the fast breeder reactor, which uses fuel much more efficiently.) However, this trend will only continue with investment. Judging from the pace of development of nuclear technology since its inception it is fair to say that with more investment nuclear energy will become an even more desirable source of energy with many of its current drawbacks curtailed. The high price of oil at present looks set to continue, and makes the economic case for investment in nuclear power even more attractive.

It is a curious fact that the number of further years that fossil fuel resources will last has remained unchanged for the last few decades. It is virtually impossible to predict how long these resources will last because there are undiscovered resources and because the rate of use cannot be predicted accurately. There are still vast unexploited resources in some parts of the world. In addition some estimates predict that the lifetime of natural gas is about 350 years! There is no need at the moment to search for a new power source. That money would be better spent on creating technology to clean the output from power stations. We can explore other sources of energy when it becomes necessary in the future. When we do so it will be from a much more advanced basis making development easier.

But those opposed to nuclear energy argue that no nuclear facility is cent per cent safe. Even apart from the safety issues, they say, there are a number of problems with nuclear power. It is expensive and relatively inefficient. The cost of building reactors is enormous and the price of subsequently decommissioning them also huge. Without massive government subsidy the nuclear industry cannot make money and building new plants is uneconomic compared to other methods of power generation. Then there is also the problem of waste. Nuclear waste can remain radioactive for thousands of years. It must be stored for all this time away from water into which it can dissolve and far from any tectonic activity. This is virtually impossible and there are serious concerns over the state of waste discarded even a few decades ago. Governments have frequently resorted to dumping waste into the sea; an action which it has been shown has led to an increase in radioactivity along many coastlines.

When it comes to safety of nuclear reactors the pro-nuclear view is that the overwhelming majority of nuclear reactors have functioned safely and effectively for their entire lifetimes. The two major nuclear accidents, at Three Mile Island and Chernobyl, were both in old style reactors, made worse in the latter case by poor Soviet safety standards. The new reactors are built with highest safety standards. Perhaps the best guarantee of safety standards in the nuclear industry is the increasing transparency with which the industry is presenting itself. Many of the problems in its early days were caused by excessive control due to the origin of nuclear energy from military applications. As the gap between the two separates so the nuclear industry becomes more accountable.

The nuclear industry does not have safety record. There are a number of separate problems. There is always the risk of a meltdown or explosion. At Three Mile Island incident was very close to meltdown. The fall out from Chernobyl was detected in many places outside the former Soviet Union. The effects on the local people and the environment were devastating. It is perfectly true that modern nuclear reactors are safer but they are not perfectly safe. There is always that chance of a disaster and if we build more reactors then sooner or later there will be another Chernobyl. It is quite simply not worth the risk. The dumping of nuclear waste, as explained above, also presents a host of problems. There have also been a number of 'minor' accidents in nuclear power stations recently. The industry and the governments are saying that these problems are being ironed out and that they will not happen again. Time and time again, however, these same problems reoccur and one has to conclude that the industry is not to be trusted. It is too dominated by the profit motive to really care about safety and too shrouded in secrecy to be accountable. In addition, the nuclear industry has had a terrible cost on the lives on those living around power plants. It cannot be a coincidence that the rate of occurrence of certain types of cancer, such as leukaemia, is much higher in the population around nuclear plants.

Those who argue that nuclear power is the best option available now say that there are enormous problems with every form of alternative energy. The most efficient source of renewable

energy has been hydroelectric power. However, this usually creates more problems than it solves. Building a large dam necessarily floods an enormous region behind the dam which in turn can displace tens of thousands of people. There are also enormous ecological costs to dam building. Solar energy has never lived up to expectations since it is hugely inefficient. A solar panel the size of Europe would be needed to power a city the size of London! Wind energy is only marginally better but wind farms require large expanse of land. The worst performers of all have been geothermal and tidal energy which have been hopelessly inefficient because no rocks have been found that are hot enough and no waves have been found that are strong enough. The great irony is that not only are most renewable sources inefficient but many are also ecologically unsound. The opposition to the building wind farms in certain areas has been just as strong as the opposition to nuclear power because wind farms destroy the scenery, being so unsightly and large, and may also be bad for wildlife. For these reasons it is argued that fossil fuels should not be seen as better than nuclear power.

The opponents of nuclear power admit that alternative energy is not efficient enough to serve the energy needs of the world's population today. However, they say that with investment all these methods could be made efficient enough to serve mankind. It is also true that initiation of alternative energy schemes such as big dams have caused problems. Many dam projects, for example, could have been replaced by solar power had the technology been available, without the downside to the dams. In addition, there is almost always one renewable resource that a given country can exploit; tides for islands, the sun for equatorial countries, hot rocks for volcanic regions etc. and so any given country can in principle become self-sufficient with renewable energy. The global distribution of uranium is hugely uneven (much more so than fossil fuels) and the use of nuclear power therefore gives countries with uranium deposits disproportionate economic power. It is far from inconceivable that uranium could be subject to the same kind of monopoly that the OPEC (Organisation of Petroleum Exporting Countries) places on oil. Indeed, if the whole world went over to nuclear power, supplies of usable uranium ore would run out within a few short decades. This prevents countries from achieving self-sufficiency in energy production.

The pro-nuclear lobby that supports the position of the five permanent members of the United Nations Security Council is of the view that spreading the peaceful use of nuclear power brings us important security benefits. Under the Non-Proliferation Treaty the declared nuclear weapons states (the US, UK, Russia, France and China) have promised to assist other countries in gaining access to civilian nuclear power providing that they in turn do not seek nuclear weapons.

But the problem is that the technology needed to generate nuclear power is the same as that needed to create nuclear weapons, and it is all too easy for any state to claim it is only interested in peaceful uses even while pursuing military applications. This is the route India and Israel have followed. The anti-nuclear groups suggest that solar, wind and geothermal energy sources could be the best alternatives. This debate therefore covers not just nuclear energy but also the alternatives of fossil fuels and renewable sources.

2.9 Biofuel and food security

Biofuel is being seen by some countries as a solution to world's energy and climate problems. But the fuel from plants is being introduced without much thought about wider implications. There are two kinds of biofuel: ethanol, processed from sugarcane or corn, and biodiesel, made from biomass. Europe gave the first push to biofuel, mandating that it should contribute 6 per cent of fuels used in vehicles by 2010 and 10 per cent by 2020. Farmers were given subsidies to grow crops for fuel. The bulk of European biodiesel comes from domestically grown rapeseed. But to meet its growing needs, Europe is looking to import soyabean-based fuel from Brazil and Argentina and palm oil from Indonesia and Malaysia. It was in this context that President of Cuba Fidel Castro wrote a series of articles arguing that rich countries will create a global food crisis that will condemn more than 3 billion people to death by starvation and lack of water. While current global grain surplus, after fulfilling human needs, is only 80 million tonnes rich countries expect a supply of 500 million tons of corn and other cereals. The question is where these grains have to be produced. The US and European countries are striking deals with developing countries for the supply of grains. The fear is that large expanse of farm land in the developing countries is going to be used for producing biofuels. Inevitably this massive increase in the demand for grains is going to come at the expense of the satisfaction of human needs, with poor people priced out of the food market.

What does this switch of land from growing food to fuel mean for nutrition security? More important, will this strategy work against climate change? Biofuels crops are also energy-intensive, due to the use of fossil-fuel derived fertilisers and pesticides and fossil-fuel run machinery. Biofuels crops will also increase pressure on the world's dwindling supplies of fresh water, with battles over water potentially becoming a major source of conflict in coming decades.

In 2006, Mexico experienced tortilla wars, as people found the price of their staple, corn, had doubled. The hike was a result of the crop's new market as vehicle fuel and corporate control over it—in this case, by one company, Archer Daniels Midlands, the largest ethanol processor in the region with financial stakes in a Mexican company that makes tortillas and refines wheat. So Midlands benefits when tortilla prices increase and consumers switch from corn to wheat, or when there is a switch from food to fuel.

Today oil companies are growing crops for fuel, and agribusiness is moving towards biofuel. For instance, Cargill, the agribusiness multinational, is now a big player in the biofuel market. The impact is felt by the poor food consumers of the world. According to Food and Agriculture Organization (FAO) food prices will increase between 20 and 40 per cent in the next 10 years or so because of this switchover.

This "switch", will, however, do little to avert climate change. All the biofuel in the world will be a blip on the world's total fuel consumption. In the US, for instance, it's agreed that if the entire corn crop is used to make ethanol, it will replace only 12 per cent of current gasoline—petrol—used in the country. This is when the use of gasoline in the US and in Europe is

rising due to increasing transportation needs. It is estimated that filling a 95-litre fuel tank with pure ethanol would require roughly 200 kg of corn, which has enough calories to feed one person for a year.

If we factor in fuel inputs that go into converting biomass to energy—from diesel to run tractors, natural gas to make fertilizers, fuel to run refineries—biofuel is not energy-efficient. It is estimated that only about 20 per cent of corn-made ethanol is ‘new’ energy. This reckoning does not account for the water it will take to grow this new crop. There are fears that rainforest might be cut to expand biofuel crop cultivation; this will contribute substantially to climate change.

So how should biofuel be used to reduce greenhouse gas emissions? Any strategy must be founded on an understanding that biofuels are not substitutes for fossil fuels, they can make a difference if we limit our fuel consumption. If that’s the case, governments should not give subsidies to grow crops for biofuel. They should, instead, invest in public transport that will reduce the number of vehicles on roads. Biofuels should be just for public buses and only if cars get off the road.

Biofuels could be a part of the climate solution but only if they are used to help the world’s poor to leapfrog to a non-fossil fuel-based energy future. The poor are today providing the world its only real opportunity to avoid emissions. For, the bulk of renewable energy - 80 per cent-is the biomass-based energy used by the poorest to meet their cooking, lighting and fuel needs.

So, the opportunity for a biofuel revolution is not in the rich world’s cities to run vehicles-but in the grid-unconnected world of Indian or African villages, where there is a scarcity of electricity for homes, and generator sets to pump water and to run vehicles. It here that fossil fuel use will grow because there is no alternative. Instead of bringing fossil fuel long distances to feed this market, this part of the world can leapfrog to a new energy future. The biofuel can come from non-edible tree crops like jatropha in India. Jatropha is grown on wasteland in India.

This also means that this fuel market will need to be redesigned. In today’s business model, the company will grow the crops, extract the oil, transport it first to refineries and then back to consumers. The new model needs distributed growth in which millions of biofuel growers and millions of distributors and millions of users are involved.

2.10 Population Effect

Population in the third world is being increasingly and falsely identified as a primary cause of environmental destruction. This tendency is also articulated in some of the UNCED documents which are heavily focused on population pressure.

The sparsely populated rural areas of the US use for more chemical than heavily populated regions of the Third World. There are four main reasons why population cannot be identified as the primary cause of environmental destruction.

1. The large number of people in the Third World whose population is growing do

not participate in the use of most of products that are causing environmental destruction because these are not within their purchasing power. They do not use chlorofluorocarbons (CFCs) for refrigeration and hence cannot be identified as agents of ozone destruction.

2. The large number of poor people use insignificant fractions of the resources used by the North and the elites of the South. Thus, an average US citizen uses 250 times as much energy as an average Nigerian. Northern lifestyle, therefore, contributes disproportionately to the pressure on resources including the resources of the South.

3. Production processes that have emerged from northern industrialized countries are inherently destructive of the environment and this destruction capacity of an independent of population growth. As has been stated environmental destruction is a function of the resource destroying capacity of the technologies of production and the goods produced or consumed per capita.

4. Population growth is not a cause of the environmental crisis but an aspect of it; both are related to the alienation of resources and destruction of livelihoods, first by colonialism and then by Northern imposed models of maldevelopment.

Population growth arises from the same causes that lead to poverty on the one hand, and environmental degradation and resource alienation in the other. This is apparent from Indian data which shows that population control programmes have systematically failed because people in destitution make a rational choice to have more children.

The focus on population in the case of environmental destruction is erroneous at two levels. Firstly, it blames the victims. Secondly, by failing to address economic insecurity and by denying the rights to survival that underline population growth. Current policy prescriptions avoid the real problem. False perception of the problem leads to false solutions.

2.11 Environmental education in schools

Although environment is part of the syllabus in schools one of the major criticisms is that the grossly inadequate education as imparted in our schools has led to general insensitivity towards the environment.

Environment-related knowledge and concerns have been included in the text books. The illustration of a factory spewing forth smoke captioned 'Idols of modern India' in textbooks of the 1960s, now carries the revised caption 'Sources of pollution'. But environmentalists have opined that even the new curricula do not serve to impart to children a coherent understanding of the issues. Substantive knowledge about such concerns is imparted mainly as part of the teaching of science.

The attempts made to reorganize elementary school science as 'environmental studies' (EVS) and to incorporate ecological concerns in secondary school science have not altered the character of science learning. EVS merely triggers a conflict of values in the context of man's relationship with nature, which cannot be resolved within the prevailing value-premises of science learning. Science as EVS arouses concern for the destruction of nature, whereas

school science in general imparts a sense of control over nature.

EVS attempts to develop the idea of co-habitation or adjustment with nature: not just with animals and plants, but even with physical phenomena such as rivers, mountains and oceans. The value-premise underlying this idea is that all human acts need to be reviewed in terms of the impact they might have on living as well as non-living components of nature. The syllabi and textbooks used in the teaching of EVS reveal a two-fold objective: one, to impart knowledge about the environment; two, to arouse concern for the state of the environment. The first objective requires children to learn about different components of the environment and the inter-relationships which connect them. This EVS-imparted knowledge has now been reorganised around the concept of sustainability of life. The current presentation of these topics also features information about the concepts of 'degradation' and 'pollution'. These ideas imply an obvious value-judgment, whose basis is the concept of life. The ability of elements like air and water to sustain life provides a delineation of the scale on which 'degradation' is said to have occurred.

The second objective of EVS often finds a didactic expression in the shape of suggestions on 'what needs to be done' to repair the damage to the environment or to improve its degraded state. Answers consist of telling children what they can do. For instance, in the context of garbage disposal, children are asked to be more careful about where they dump garbage. A second type of answer consists of telling children that scientists are working to find solutions to environmental problems - like new kinds of pesticides which would only eliminate specific pests. A third body of answers consists of informing students that the government is taking steps to improve the situation. For instance, to control river pollution, the government is making arrangements for the treatment of sewage in all riverside towns and cities.

EVS attributes the cause of environmental degradation to industrialization and modern lifestyle. For example, in the context of pesticides, while use of these chemical killers have been proved to be harmful to the environment, what scale of their use might deserve to be called indiscriminate or excessive is left uncertain.

EVS texts do not just question modernization; they project a categorically different organization of the world. This runs counter to the knowledge represented in the rest of the curriculum. The relationship between EVS and other school subjects involves a conflict between two structures of ideas and information that do not seem to be reconcilable. In one structure, concepts of change and progress are forwarded, together with ideas of economic growth, exploitability of earth's resources and 'faith in human ingenuity. In the other, knowledge is held together by the concept of limits to the exploitability of the earth's resources and the parallel idea of the morally- oriented limits to exploiting life forms for human needs.

The values that are concomitant to belief in economic growth appear to be inimical to awareness of the limits and problems posed by the natural environment. In this context, the knowledge that EVS imparts would appear as a major source of discordance. In post-independence India, school education has played an important role in projecting a benign, uncritical

perception of modern science and technology. But today, questions are raised by children in classrooms which neither textbooks nor teachers answer. Children want to know if Medha Patkar, Sunderlala Bahuguna and Baba Amte are great people or a nuisance.

The conflict between the EVS perspective and that of modern science has its roots in values, and not in poor management. These values are centered in the perception of nature as an object. Historically, these values and attitudes found a cultural symbol in the European bourgeois, and an ideological symbol in modern science. The manner in which the scientific outlook has been defined denies any consciousness or sensibility to nature. Such denial is also characteristic of the capitalistic outlook which presents nature as resource to be exploited for the maximisation of profit. This consistency between the two outlooks has facilitated the use of science for profit maximisation.

Behind the positivistic veneer of school science, there lies the agenda for distancing the child from his or her own nature. In a bid to make science - learning a means of developing the capacity of objective study, school science curricula attempt to give a value-neutral character to the study of natural phenomena, including the non-human living members of nature. A specific attempt is made, for instance, to help children overcome any hesitation or inhibition that they might feel in dissecting for examination a live frog or rat. But no science text discusses the manner in which animals respond to the violence inflicted on them in the course of study by humans, apparently because such discussion might generate an attitude incompatible with the attitudes and values into which the school science curriculum attempts to socialise children. A truly positivistic orientation towards science would surely treat this issue as a valid subject of study.

Since the ecological crisis is related to the political economy of modern science, the role of education in promoting the study of science in this value-neutral manner should be seen as a factor contributing to the ecological crisis. As an institutionalised activity, education has a distinctly promotional role in the context of ideas. Education enables men and women to shed - during childhood - all those instincts and inhibitions that they might feel when confronted with situations requiring them to act as invaders or destroyers of nature or as witnesses to such destruction.

The **socialising aspect** of science learning is not a logical adjunct to the intellectual capacities which this learning helps to develop in children. Therefore, it cannot be argued that if science were to be learnt with respect for nature, it would lack certain basic mental attributes which science teaching attempts to develop today with its value-neutrality and indifference to nature. If concern and sensitivity towards the environment are to be reflected in school science as a whole, the curricula need to be designed differently.

The new design must provide for space where the value-premises of modern science - we can identify two - can be questioned. The first value-premise consists of the idea that scientific enquiry has no moral responsibility towards the object of enquiry. Scientific experiments are conducted in a manner that leaves the enquirer unaccountable for the consequences of his actions. Thus, while children are made to dissect and kill frogs, they are not required to

study how the collection and killing of frogs would affect the structure of bio-relationships to which the animals belonged. Similarly, a scientist-engineer studying a mineral is not supposed to be concerned with the manner in which mining in the area where the mineral is found will affect the landscape and those dependent on it.

Often, the claim that scientific activity ultimately promotes human welfare and prosperity is used to give it immunity against the charge that it might have caused ecological damage. Such a plea has validity only if we ignore the gross disparities in welfare and prosperity between regions where activities like mining are performed and the regions where the products of mining are consumed. Scientists rarely accept accountability for such disparities; they find a convenient shelter behind the argument that the disparities are the outcome of poor management and visionless politics, not science.

The second value-premise is that specialised activity alone counts as scientific enquiry. Leaving aside some eminent exceptions and idealists, scientists as a community universally treat the right to pursue narrowly specialised enquiry as an aspect of professional science. This right absolves them from taking serious interest in other areas of science. This tendency has provided the social sciences with a model; knowledge in both natural and social sciences now accumulates in a manner that lacks personal or individual integration, as opposed to institutional integration which does occasionally take place under the name of interdisciplinary research.

As a socialising agency, the school starts preparing children for specialised study from the elementary stage. The label 'integrated science', currently in vogue, barely masks the methodological expectation embedded in the lessons - that enquiry must aim at specialised findings. Holistic understanding is professed in prefaces to books and in documents of state policy, but nothing in the actual practice of classroom instruction indicates that such understanding is intended. There is nothing in the study of science that might indicate to children that nature is a set of complex relationships. It is hard to imagine how any socialising function of the school would operate if there were no institutionalised roles available in adult society to which the schooled and socialised children could be allocated on growing up.

The trend towards reorganisation of school science curricula by the incorporation of environmental concerns is too weak to make any major impact on the socialising character of science instruction and on the inter-linkages between science, politics and the economy. As an isolated strategy, this incorporation cannot disturb the nexus that prevails between the consumption-oriented capitalistic economy and the teaching of science. This nexus ensures that the awareness brought about by science instruction will never cross the limits imposed on it by the economic interests vested in the continued use and proliferation of pesticides, chemical fertilisers and modern weapons. Allowed only to grow within these limits, the celebrated scientific temper cannot answer the child's search for coherence.

Science education in schools must accept the biggest share of the blame for this situation, for in no other area of the Indian school curricula have syllabi and textbooks grown in

size over the recent years as much as they have in science. Those concerned about redesigning science curricula and altering the socialising agenda of science teaching will have to look beyond science, both in order to grasp the problem better and to seek the means to solve it. They will have to examine modern science and social sciences in the context of basic problem areas of civic life in our country, such as health, livelihood, housing and consumption.

2.12 Let Us Sum Up

The chief **causes** of the environmental destruction are **social** and **historical**, rooted in the **productive relations**, **technological imperatives**, and historically conditioned **demographic trends** that characterize the dominant social system. Development based on economic growth is unsustainable because it undermines ecological stability and destroys people's livelihoods. What is needed is a balance between development and environment. Sustainable development that will endanger the atmosphere, water, soil, and ecosystems that support life on earth should be the focus of the nations. Although some see solution to environmental problems through market mechanisms there appears to be no alternative to regulation if problems have to be addressed immediately.

Much of the debate on the environment is focused on energy sources since the use of fossil fuels has led to such phenomenon as global warming. While some people consider nuclear energy and biofuel as right options to prevent global warming others point out the long term consequences of such options. In order to make young people more sensitive toward the environment redesigning of science curricula is important. There are many more debates concerning the environment. Only a few of them have been discussed here. Students are advised to read newspapers and magazines to understand news trends in the environmental discourse.

2.13 Check Your Progress

1. What is sustainable development? What do you think are the right options for achieving sustainable development?
2. Examine the responsibilities of developed and developing nations with regard to issues concerning environment and development.
3. Explain the main arguments with regard to reducing carbon emissions.
4. Discuss the consequences of using biofuel to meet increasing energy needs.
5. Is population a primary cause of environmental destruction? Offer your views.

2.14 For Further Reading

1. Allaby, Michael. (1999). *Thinking Green: An Anthology of Essential Ecological Writing*. London: Barrie & Jenkins.
2. Chapman, G., Kumar, K., Fraser, C., & Gaber, I. (1997). *Environmentalism and the Mass Media: The North-South divide*. London. Routledge.

3. Cooper, David and Palmer, Joy. (2002). *The Environment in Question: Ethics and Global issues*. London: Routledge.
4. D'Souza, Dilip. (2002). *The Narmada Dammed. An Inquiry into the Politics of Development*.
5. Kumar, Krishna. (1996). An Agenda of Incoherence. *Down to Earth*, 4(17), 23-25).
6. Roy, Arundhati. (1999). The Greater Common Good: The Human Cost of Big Dams. *Frontline*, June 4, 4-29.
7. Rubin, C.T. (1994). *The Green Crusade: Rethinking the Roots of Environmentalism*. New York: The Free Press.
8. Shiva, Vandana. (1989). *The Violence of the Green Revolution: Ecological Degradation and Political Conflict in Punjab*. Dehra Dun: Author.
9. Shiva, Vandana. (2002). *Water wars: Privatization, Pollution and Profit*. New Delhi: Indian Research Press.
10. Sengupta, Ramprasad. (2002). *Ecology and Economics: An Approach to Sustainable Development*. New Delhi: Oxford University Press.
11. Smith, Paul M. and Warr, Kiki (eds). (2001). *Global Environmental Issues*. London: Hodder and Stoughton.
12. World Commission on Environment and Development (WCED). (1987). *Our Common Future* (The Brundtland Report). Oxford: Oxford University Press.

UNIT 3: ENVIRONMENTAL PACTS

Structure

3.0 Objectives

3.1 Introduction

3.2 Kyoto Protocol

3.3 The Montreal Protocol

3.4 Convention on biological diversity

3.5 The Biosafety Protocol

3.6 Convention on Persistent Organic Pollutants

3.7 Convention on International Trade in Endangered Species

3.8 Convention to Combat Desertification

3.9 The Basel Convention

3.10 Let Us Sum Up

3.11 Check Your Progress

3.12 For Further Readings

3.0 Objectives

International agreements are concluded by sovereign governments and governed by international law. They can be called by different names, such as a “treaty” or “convention.”

The present unit is an effort to make you

- understand the significance of the international agreements related to environment;
- examine the major features of the agreements;
- discuss the issues associated with the implementation of the agreements, and
- examine the role of developing countries in adoption and implementation of the agreements.

3.1 Introduction

Once a treaty has been negotiated, it is available for signature by governments. Each country then takes the next step toward implementing the treaty according to its distinct legal requirements. Once a government has completed its domestic legal requirements for ratification, including the enactment of any necessary implementing legislation, it deposits an instrument of ratification to the treaty’s depositary. A certain number of countries must deposit an instrument of ratification before the treaty enters into force, at which point it becomes effective and binding on those countries. Some treaties set up an institutional framework.

3.2 Kyoto Protocol

International efforts to control greenhouse gas emissions began in the early 1990s. These early attempts to create a climate accord produced the United Nations Framework Convention for Climate Change (UNFCCC) agreed upon in 1992. The UNFCCC consisted of voluntary emission targets on the part of states. The failure of states to reduce emissions under this regime led to further negotiations resulting in the adoption of the Kyoto Protocol in 1997, which for the first time established “legally binding” reductions in greenhouse gas emissions of 5.2 per cent below 1990 levels, by 2008–2012, for all industrialized countries. The European Union (EU) under this agreement was required to reduce its greenhouse gas emissions by 8 per cent below 1990 levels, the United States by 7 per cent, and Japan by 6 per cent. In line with a prior agreement in the climate negotiations (known as the Berlin Mandate) developing countries, including China, although parties to the agreement were to remain out of this initial stage in emission reductions.

Subsequent negotiations on the implementation of the Kyoto Protocol from 1997 to 2001 focused mainly on two sticking points: provisions for tradable emission permits, which would allow countries to comply with emission reductions by purchasing emission permits from countries that did not need them, and inclusion of allowances for “carbon sinks,” which would provide emission credits for forests and farmlands. The European Union resisted both proposals as thinly veiled attempts to disguise real failures to meet the emission reduction targets. Support for these measures came from the United States, Japan, Canada, Australia, and New Zealand. Negotiations broke down at the Hague in November 2000, when both sides refused to give in on this dispute.

In March 2001, with these issues still unresolved and with no major industrial country yet having ratified the agreement, the United States declared that the Kyoto Protocol was “fatally flawed” and announced that it was unilaterally pulling out of the climate accord.

Nevertheless, negotiations designed to prepare the way for ratification of the Kyoto Protocol went forward in July 2001 in Bonn. For the treaty to come into force it had to be ratified by countries accounting for 55 per cent of global greenhouse gas emissions. This meant that without US participation, eventual ratification by Japan, Canada, and Australia was essential. Under these circumstances, the European Union was forced to give way on point after point in the negotiations—adopting the very positions that the United States (along with Japan, Canada, Australia, and New Zealand) had previously advanced at the Hague.

Although the Kyoto Protocol was kept alive in Bonn, despite the exit of the United States, it was shot full of holes, belying the targeted reductions in emissions. Farmlands and forests were to be treated as carbon sinks, resulting in credits in emission reduction. In effect, countries would be counted as having “reduced emissions” simply for watching their trees grow. Tradable pollution permits were to be allowed, enabling countries like Japan, Canada, and Australia, which had increased their greenhouse emissions substantially since 1990, to purchase emission permits from countries like Russia that, due to the collapse of the Soviet Union and most of its industrial structure, had experienced dramatic declines in emissions since 1990. The sole penalty for failing to meet emission reduction targets would be that a country’s targets in the next round would be increased by a certain percentage. Proposals to institute reparations for damage to the climate, to be paid by those countries that did not meet

the targeted reductions, were dropped. In a major concession to Japan, the “legally binding” character of the original agreement was also dropped in favor of language that said the accord was “politically binding.” The very thing that had distinguished the Kyoto Protocol from the original UNFCCC—the establishment of “legally binding” reductions in emissions—was thus abandoned.

The refusal of the United States, which alone accounts for a quarter of the world’s greenhouse gas emissions to remain a party to the climate accord was the most glaring failure of the agreement arrived at in Bonn. The US ratification of the climate treaty came to a halt in the face of the opposition of the US auto–industrial complex (which meant that there was zero support for ratification of the accord within the US Senate). By the year 2007, 172 states had signed and ratified the Kyoto Protocol.

Thanks to backroom deals between the European Union and the Russian Federation — despite US intransigence — the Kyoto Protocol on Global Climate Change finally came into force in February 2005. Many believe that Kyoto’s resuscitation is a defining moment in global climate policy. Even if implemented fully, the protocol’s targets would have made only a minor dent. With the US — the world’s largest carbon emitter — stubbornly opposed to Kyoto, its potential is already impaired. It’s also evident by now that even many of the ratifying nations won’t meet targets. The Kyoto Protocol may well be remembered as a failure of imagination and ambition.

While the treaty may not substantially improve atmospheric carbon concentrations, Kyoto’s coming into force is still important, given that its public failure would have stymied future global initiatives and disheartened climate activists seeking more profound global action. Kyoto’s political legacy — an insistence that no nation, however powerful, be allowed to veto global public interest — is notable.

US arguments about an inequitable protocol, because major developing countries weren’t required to make emission reductions, is both insulting and dangerous. What began as a diversionary tactic for its own policy reticence, is now propagated even by US academia and non-governmental organisations, citing China and India’s billion plus populations. Easy enough targets as anything multiplied by a billion becomes a huge number.

The truth is that the average American’s emissions are nearly ten times as much

carbon as the average Chinese and over 20 times as much as the average Indian. The US refusal to restrict emissions until China and India take on 'equitable' roles, is absurd. It is a diversion of focus from excessive emissions of industrialised nations to the marginal (survival) emissions of developing countries.

There is certainly a real need to involve the developing world in the effort to curb global emissions. Kyoto sought to do this through variants of emission trading schemes — here investors from industrialised nations capitalise on cheaper emission reductions in developing countries. Even if it works, the clean development mechanism cannot be a long-term solution. In time, developing countries will use cheaper emission reductions themselves. The North cannot sidestep difficult decisions forever. Market mechanisms are a solution only if they lead to real, appropriate technological innovation, not mere emission shell games. Real contributions from developing countries will come not from cheap emission cuts, but from their ability to benefit from technological leaps in infrastructure and lifestyle decisions. We need policy architecture with the right incentives for the right decisions.

What Kyoto has left unresolved is the question of allocating emission rights in an unequal world. Asking countries to reduce emissions by a percentage of current emissions won't work for developing countries. How do you ask someone emitting at nearly zero, to reduce emissions to absolutely zero? Why should a Boston resident consume more than someone in Bareilly?

Anil Agarwal, the founder editor of the Down To Earth magazine had proposed a mechanism, whereby the atmosphere would be regarded as a global common, with a per capita allocation of emission rights and equal emission spaces. Nations can manage this system of allocations on the basis of past (1990) population levels. Nations that use more than allocated emissions would then rent 'emission space' from those using less than allocated emissions. A self-correcting market with an equal incentive for over-emitters and under-emitters to maintain low emissions is needed.

3.3 The Montreal Protocol

In 1987, international negotiators met to adopt legally binding commitments in the Montreal Protocol on Substances that Deplete the Ozone Layer, which required

industrialized countries to reduce their consumption of chemicals harming the ozone layer.

During the evolution of its implementation, as a result of changing conditions and increased information, additional requirements have been added to the Montreal Protocol through amendments adopted in London (1990), Copenhagen (1992), Montreal (1997) and Beijing (1999).

As of September 2002, 183 countries have ratified the Montreal Protocol which sets out the time schedule to “freeze” and reduce consumption of **ozone depleting substances** (ODS). The Montreal Protocol requires all parties to ban exports and imports of controlled substances to and from non-parties.

Production and consumption of CFCs, halons and other ozone depleting chemicals have been phased out in industrialized countries and a schedule is in place to eliminate the use of methyl bromide, a pesticide and agricultural fumigant. Developing countries (Article 5 Parties) operate under different phase-out schedules, having been given a grace period before phase-out measures would apply to them, in recognition of their need for industrial development and their relatively small production and use of ODS.

Developing countries have agreed to freeze most CFC consumption as of 1 July 1999 based on 1995-97 averages, to reduce this consumption by 50% by 1 January 2005 and to fully eliminate these CFCs by 1 January 2010. Other control measures apply to ODS such as halons, carbon tetrachloride and methyl chloroform. For methyl bromide, used primarily as a fumigant, developed countries froze their consumption at 1995 levels and will eliminate all use by 2010, while developing countries have committed to freeze consumption by 2002 based on average 1995-98 consumption levels.

Control Measures of the Montreal Protocol

Substance	Developed Countries		Developing Countries	
	Consumption Freeze	Phase-Out	Consumption Freeze	Phase-Out
Chlorofluorocarbons (CFC)	1 July 1989	1 January 1996	1 July 1999	1 January 2010
Halons	---	1 January 1994	1 January 2002	1 January 2010
Other Fully Halogenated CFCs	---	1 January 1996	---	1 January 2010
Carbon Tetrachloride	---	1 January 1996	---	1 January 2010
Methyl Chloroform	1 January 1993	1 January 1996	1 January 2003	1 January 2015
Hydro-chlorofluorocarbons (HCFCs)	1 January 1996	1 January 2030	1 January 2016	1 January 2040
Methyl Bromide	1 January 1995	1 January 2005	1 January 2002	1 January 2015

3.4 Convention on biological diversity

The Convention on Biological Diversity (CBD) recognises the rights of countries on their genetic resources. It emphasises (a) the conservation of biodiversity (b) its sustainable use (c) fair and equitable sharing of benefits arising out of its use and (d) the preservation of knowledge and practices of indigenous communities.

In 1972, the United Nations Conference on the Human Environment (Stockholm) resolved to establish the United Nations Environment Programme (UNEP). Governments signed a number of regional and international agreements to tackle specific issues, such as protecting wetlands and regulating the international trade in endangered species. These agreements, along with controls on toxic chemicals and pollution, have helped to slow the tide of destruction but have not reversed it.

In 1987, the World Commission on Environment and Development (the Brundtland Commission) concluded that economic development must become less ecologically destructive. In its landmark report, *Our Common Future*, it said that: "Humanity has the ability to make development sustainable-to ensure that it meets needs of the present without compromising the ability of future generations to meet their own needs". In 1992, the largest-ever meeting of world leaders took place at the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil. One of the historic agreements signed at the "Earth Summit" was the Convention on Biological Diversity. This was the first global agreement on the conservation and sustainable use of biological diversity. Over 175 countries have ratified

the agreement.

The Convention has three main objectives:

1. The conservation of biodiversity,
2. Sustainable use of the components of biodiversity, and
3. Sharing the benefits arising from the commercial and other utilization of genetic resources in a fair and equitable way.

The Convention focuses on the fact that natural resources are not infinite. It introduced a new philosophy for the Twenty first century, that of sustainable use. While past conservation efforts were aimed at protecting particular species and habitats, the Convention recognizes that ecosystems, species and genes must be used for the benefit of humans. However, this should be done in a way and at a rate that does not lead to the long-term decline of biological diversity.

The convention argues that conservation will bring us significant environmental, economic and social benefits in return.

Some of the many issues dealt with under the Convention include:

- Measures and incentives for the conservation and sustainable use of biological diversity.
- Regulated access to genetic resources.
- Access to and transfer of technology, including biotechnology.
- Technical and scientific cooperation.
- Impact assessment.
- Education and public awareness.
- Provision of financial resources.
- National reporting on efforts to implement treaty commitments.

The Convention on Biological Diversity, as an international treaty, identifies a common problem, sets overall goals and policies and general obligations, and organizes technical and financial cooperation. However, the responsibility for achieving its goals rests largely with the countries themselves.

Private companies, landowners, fishermen, and farmers take most of the actions that affect biodiversity. Governments need to provide the critical role of leadership, particularly by setting rules that guide the use of natural resources, and by protecting biodiversity where they have direct control over the land and water. Under the Convention, governments undertake to conserve and sustainably use biodiversity. They are required to develop national biodiversity strategies and action plans, and to integrate these into broader national plans for environment and development. This is particularly important for such sectors as forestry, agriculture, fisheries, energy, transportation and urban planning. Other treaty commitments include:

- Identifying and monitoring the important components of biological diversity that need to be conserved and used sustainably.

- Establishing protected areas to conserve biological diversity while promoting environmentally sound development around these areas.
- Rehabilitating and restoring degraded ecosystems and promoting the recovery of threatened species in collaboration with local residents.
- Respecting, preserving and maintaining traditional knowledge of the sustainable use of biological diversity with the involvement of indigenous peoples and local communities.
- Preventing the introduction of, controlling, and eradicating alien species that could threaten ecosystems, habitats or species.
- Controlling the risks posed by organisms modified by biotechnology.
- Promoting public participation, particularly when it comes to assessing the environmental impacts of development projects that threaten biological diversity.
- Educating people and raising awareness about the importance of biological diversity and the need to conserve it.
- Reporting on how each country is meeting its biodiversity goals.

One of the first steps towards a successful national biodiversity strategy is to conduct surveys to find out what biodiversity exists, its value and importance, and what is endangered. On the basis of these survey results, governments can set measurable targets for conservation and sustainable use. National strategies and programmes need to be developed or adapted to meet these targets.

The conservation of each country's biological diversity can be achieved in various ways. "In-situ" conservation - the primary means of conservation - focuses on conserving genes, species, and ecosystems in their natural surroundings, for example by establishing protected areas, rehabilitating degraded ecosystems, and adopting legislation to protect threatened species. "Ex-situ" conservation uses zoos, botanical gardens and gene banks to conserve species.

Promoting the sustainable use of biodiversity will be of growing importance for maintaining biodiversity in the years and decades to come. Under the Convention, the "ecosystem approach to the conservation and sustainable use of biodiversity" is being used as a framework for action, in which all the goods and services provided by the biodiversity in ecosystems are considered. The Convention is promoting activities to ensure that everyone benefits from such goods and services in an equitable way.

Each government that joins the Convention is to report on what it has done to implement the accord, and how effective this is in meeting the objectives of the Convention. These reports are submitted to the Conference of the Parties (COP) - the governing body that brings together all countries that have ratified the Convention. The reports can be viewed by the citizens of all nations. The Convention secretariat works with national governments to help

strengthen reporting and to make the reports of various countries more consistent and comparable, so that the world community can get a clearer picture of the big trends. Part of that work involves developing indicators for measuring trends in biodiversity, particularly the effects of human actions and decisions on the conservation and sustainable use of biodiversity. The national reports, particularly when seen together, are one of the key tools for tracking progress in meeting the Convention's objectives.

The Convention's success depends on the combined efforts of the world's nations. The responsibility to implement the Convention lies with the individual countries and, to a large extent, compliance will depend on informed self-interest and peer pressure from other countries and from public opinion. The Convention has created a global forum-actually a series of meetings-where governments, non-governmental organizations, academics, the private sector, and other interested groups or individuals share ideas and compare strategies.

The Convention's ultimate authority is the Conference of the Parties (COP), consisting of all governments (and regional economic integration organizations) that have ratified the treaty. This governing body reviews progress under the Convention, identifies new priorities, and sets work plans for members. The COP can also make amendments to the Convention, create expert advisory bodies, review progress reports by member nations, and collaborate with other international organizations and agreements.

The Convention's members regularly share ideas on best practices and policies for the conservation and sustainable use of biodiversity with an ecosystem approach. They look at how to deal with biodiversity concerns during development planning, how to promote transboundary cooperation, and how to involve indigenous peoples and local communities in ecosystem management. The Conference of the Parties has launched a number of thematic programmes covering the biodiversity of inland waters, forests, marine and coastal areas, drylands, and agricultural lands. Cross-cutting issues are also addressed on matters such as the control of alien invasive species, strengthening the capacity of member countries in taxonomy, and the development of indicators of biodiversity loss.

3.5 The Biosafety Protocol

Since the domestication of the first crops and farm animals, man has altered their genetic makeup through selective breeding and cross-fertilization. The results have been greater agricultural productivity and improved human nutrition. In recent years, advances in biotechnology techniques have made it possible to cross the species barrier by transferring genes from one species to another. There are now transgenic plants, such as tomatoes and strawberries that have been modified using a gene from a cold water fish to protect the plants from frost. Some varieties of potato and corn have received genes from a bacterium that enables them to produce their own insecticide, thus reducing the need to spray chemical insecticides.

Other plants have been modified to tolerate herbicides sprayed to kill weeds. Living Modified Organisms (LMOs) often known as genetically modified organisms (GMOs) — are becoming part of an increasing number of products, including foods and food additives, beverages, drugs, adhesives, and fuels. Agricultural and pharmaceutical LMOs have rapidly become a multi-billion-dollar global industry.

Biotechnology is being promoted as a better way to grow crops and produce medicines, but it has raised concerns about potential side effects on human health and the environment, including risks to biological diversity. In some countries, genetically altered agricultural products have been sold without much debate, while in others, there have been vocal protests against their use, particularly when they are sold without being identified as genetically modified.

In response to these concerns, governments negotiated a subsidiary agreement to the Convention to address the potential risks posed by cross-border trade and accidental releases of LMOs. Adopted in January 2000, the Cartagena Protocol on Biosafety allows governments to signal whether or not they are willing to accept imports of agricultural commodities that include LMOs by communicating their decision to the world community via a Biosafety Clearing House, a mechanism set up to facilitate the exchange of information on and experience with LMOs. In addition, commodities that may contain LMOs are to be clearly labeled as such when being exported.

Stricter Advanced Informed Agreement procedures will apply to seeds, live fish, and other LMOs that are to be intentionally introduced into the environment. In these cases, the exporter must provide detailed information to each importing country in advance of the first shipment, and the importer must then authorize the shipment. The aim is to ensure that recipient countries have both the opportunity and the capacity to assess risks involving the products of modern biotechnology. The Protocol will enter into force after it has been ratified by 50 governments.

An important part of the biodiversity debate involves access to and sharing of the benefits arising out of the commercial and other utilization of genetic material, such as pharmaceutical products. Most of the world's biodiversity is found in developing countries, which consider it a resource for fueling their economic and social development. Historically, plant genetic resources were collected for commercial use outside their region of origin or as inputs in plant breeding. Foreign bioprospectors have searched for natural substances to develop new commercial products, such drugs. Often, the products would be sold and protected by patents or other intellectual property rights, without fair benefits to the source countries.

The treaty recognizes national sovereignty over all genetic resources, and provides that access to valuable biological resources be carried out on "mutually agreed terms" and

subject to the “prior informed consent” of the country of origin. When a microorganism, plant, or animal is used for a commercial application, the country from which it came has the right to benefit. Such benefits can include cash, samples of what is collected, the participation or training of national researchers, the transfer of biotechnology equipment and know-how, and shares of any profits from the use of the resources.

THE Indian government has decided to ratify the Cartagena Protocol on Biosafety (CPB). But the much-delayed move has been dubbed by environmentalists as a mere “technical formality”. Critics feel that the protocol would do little to break the grip of powerful international trade regimes that are overriding environmental concerns today.

India will become the 36th country to ratify the protocol which aims to provide a safe mechanism for the transfer, handling and use of living modified organisms (LMOs). The pact will come into effect only after 50 countries have ratified it. Negotiated under the aegis of the Convention on Biological Diversity (CBD), it was adopted in 2000 after five years of talks and two aborted attempts.

On the demand of the developing countries a ‘Precautionary Principle’, has been included. The principle states that a country can take action to protect itself by barring import of a GM organism, even if there is a lack of scientific data that it could be dangerous. Experts say that the weak link is that the protocol does not override provisions of other international agreements such as the World Trade Organisation (WTO) treaty. The main flaw in the pact pertains to implementation of the ‘precautionary principle’. Though according to the rule a country can ban genetically modified (GM) products even in the absence of scientific data about their harmful effects, WTO regulations mandate that an import can be barred only on the basis of scientific evidence.

According to Gene Campaign, a Delhi-based non-governmental organisation (NGO), the protocol would be ineffective for India as the country lacks scientific know-how at the local level. Further, while the WTO has a strong dispute settlement system that has presided over several environment-related disputes, the CBD (under which the CPB operates) does not have one. Experts feel that this could make the provisions of CPB toothless. However, proponents of the pact argue that as India would be playing a major role in biotechnology-based trade in the future, the decision to ratify will prove beneficial.

3.6 Convention on Persistent Organic Pollutants

Persistent Organic Pollutants (POPs) are chemical substances that persist in the environment, bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and environment. With the evidence of long-range transport of these substances

to regions where they have never been used or produced and the consequent threats they pose to the environment of the whole globe, the nations of the world have called for urgent global actions to reduce and eliminate releases of these chemicals.

The objective of this Convention is to protect human health and environment from persistent organic pollutants. The convention has adopted measures to reduce or eliminate releases from intentional production and use.

POPs have been linked to adverse effects on human health and animals, such as cancer, damage to the nervous system, reproductive disorders, and disruption of the immune system. Because they circulate globally via the atmosphere, oceans, and other pathways, POPs released in one part of the world can travel to regions far from their source of origin.

The agreement initially targets a group of POPs, informally called the "dirty dozen." The "dirty dozen" include:

- Certain insecticides, such as DDT and chlordane, which were once commonly used to control pests in agriculture and in building materials, as well as to protect public health, are now considered POPs.
- PCBs, which were used in hundreds of commercial applications, such as in electrical, heat transfer, and hydraulic equipment, and as plasticizers in paints, plastics, and rubber products.
- Certain chemical byproducts, such as dioxins and furans, which are produced unintentionally from most forms of combustion, including municipal and medical waste incinerators, open burning of trash, and industrial processes.

The Dirty Dozen

POP	Global Historical Use/Source
Aldrin and dieldrin	Insecticides used on crops such as corn and cotton; also used for termite control.
Chlordane	Insecticide used on crops, including vegetables, small grains, potatoes, sugarcane, sugar beets, fruits, nuts, citrus, and cotton. Used on home lawn and garden pests. Also used extensively to control termites.
DDT	Insecticide used on agricultural crops, primarily cotton, and insects that carry diseases such as malaria and typhus.
Endrin	Insecticide used on crops such as cotton and grains; also used to control rodents.
Mirex	Insecticide used to combat fire ants, termites, and mealybugs. Also used as a fire retardant in plastics, rubber, and electrical products.
Heptachlor	Insecticide used primarily against soil insects and termites. Also used against some crop pests and to combat malaria.
Hexachlorobenzene	Fungicide used for seed treatment. Also an industrial chemical used to make fireworks, ammunition, synthetic rubber, and other substances. Also unintentionally produced during combustion and the manufacture of certain chemicals. Also an impurity in certain pesticides.
PCBs (Polychlorinated biphenyls)	Used for a variety of industrial processes and purposes, including in electrical transformers and capacitors, as heat exchange fluids, as paint additives, in carbonless copy paper, and in plastics. Also unintentionally produced during combustion.
Toxaphene	Insecticide used to control pests on crops and livestock, and to kill unwanted fish in lakes.
Dioxins and furans	Unintentionally produced during most forms of combustion, including burning of municipal and medical wastes, backyard burning of trash, and industrial processes. Also can be found as trace contaminants in certain herbicides, wood preservatives, and in PCB mixtures.

The Treaty also includes provisions restricting trade of POPs for which uses or production continue to exist and bans all export of POPs, except for environmentally sound management once there are no longer any uses allowed. In addition, a strong financial and technical assistance provision in the agreement will provide support to developing countries and countries in economic transition to assist them in implementing the obligations under the Treaty. The Treaty includes a science-based procedure to allow for the addition of other chemicals to the agreement.

The Convention calls upon parties to take certain specified measures to reduce releases of unintentionally produced POPs with the goal of their continuing minimization and, where feasible, ultimate elimination. It specifically requires parties to:

1. Develop national action plans to address the release of these POPs.
2. Promote the development of preventative measures.
3. Apply best available techniques (BAT) for certain new pollution sources (e.g., municipal, hospital, and hazardous waste incinerators) within 4 years after the Convention enters into force. parties must also promote BAT and best environmental practices for other new and existing sources.

The Convention also requires parties to develop appropriate strategies for identify the following.

- Stockpiles consisting of or containing intentionally produced POPs chemicals.
- Products and articles in use and wastes consisting of, containing, or contaminated with any POPs Chemicals
- Sites contaminated with POPs.

The convention requires Parties to take appropriate measures so that POPs wastes are managed in an environmentally sound manner. This includes both destruction and disposal techniques. Although remediation of contaminated sites is not required, any such remediation must be performed in an environmentally sound manner.

The Convention creates a flexible system of technical and financial aid to help developing countries and countries with economies in transition to meet their obligations. Although the Convention does not create a new fund or establish specific assessments, developed countries are to collectively provide new and additional financial resources. These funds will enable developing country Parties to meet the agreed full incremental costs of implementing measures to fulfill their obligations under the Convention. On an interim basis, the Convention designates the Global Environment Facility (GEF) as the primary, but not exclusive, component of the financial mechanism. The GEF is a financial mechanism established to address global environmental threats.

The Convention also specifies that developed countries provide technical assistance and capacity building to help developing countries and countries with economies in transition meet their obligations.

The Convention provides for an effectiveness evaluation, which will begin four years after the Convention enters into force. This evaluation will be based on a POPs monitoring and data collection effort that will use existing monitoring programs and mechanisms to the extent possible.

India has signed the treaty but has not ratified it. Recent studies in India have shown high levels of dioxins, PCBs and organo-chlorine pesticides in human milk samples, wildlife and dairy products. Very high levels of dioxins related compounds have been found in breast milk samples collected from India. Concentration of Dioxins and other POPs were detected and measured in tissues of humans, fishes, chicken, lamb, goat, predatory birds, and Ganges River dolphins collected from various locations in India. Dioxins were found in most of the samples analysed, with the highest in the liver of spotted owl. Concentrations of DDT were highest in butter samples.

Therefore, many activists have been arguing that it will be in the interest of our health and environment to expeditiously ratify and implement the Stockholm Convention and enforce it.

3.7 Convention on International Trade in Endangered Species

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

Widespread information nowadays about the endangered status of many prominent species, such as the tiger and elephants, might make the need for such a convention seem obvious. But at the time when the ideas for CITES were first formed, in the 1960s, international discussion of the regulation of wildlife trade for conservation purposes was something relatively new. With hindsight, the need for CITES is clear. Annually, international wildlife trade is estimated to be worth billions of dollars and to include hundreds of millions of plant and animal specimens. The trade is diverse, ranging from live animals and plants to a vast array of wildlife products derived from them, including food products, exotic leather goods, wooden musical instruments, timber, tourist curios and medicines. Levels of exploitation of some animal and plant species are high and the trade in them, together with other factors, such as habitat loss, is capable of heavily depleting their populations and even bringing some species close to extinction. Many wildlife species in trade are not endangered, but the existence of an agreement to ensure the sustainability of the trade is important in order to safeguard

these resources for the future.

Because the trade in wild animals and plants crosses borders between countries, the effort to regulate it requires international cooperation to safeguard certain species from over-exploitation. CITES was conceived in the spirit of such cooperation. Today, it accords varying degrees of protection to more than 30,000 species of animals and plants, whether they are traded as live specimens, fur coats or dried herbs.

CITES was drafted as a result of a resolution adopted in 1963 at a meeting of members of The World Conservation Union. The text of the Convention was approved at a meeting of representatives of 80 countries in Washington DC., United States of America, on March 3, 1973. The convention came into force on July 1, 1975. As many as 172 countries have joined the convention.

Although CITES is legally binding on the parties – in other words they have to implement the Convention – it does not take the place of national laws. Rather it provides a framework to be respected by each party, which has to adopt its own domestic legislation to ensure that CITES is implemented at the national level.

CITES works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system. Each party to the Convention must designate one or more Management Authorities in charge of administering that licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.

Roughly 5,000 species of animals and 28,000 species of plants are protected by CITES against over-exploitation through international trade. They are listed in the three CITES Appendices. The species are grouped in the Appendices according to how threatened they are by international trade. They include some whole groups, such as primates, cetaceans (whales, dolphins and porpoises), sea turtles, parrots, corals, cacti and orchids. But in some cases only a subspecies or geographically separate population of a species (for example the population of just one country) is listed.

Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.

Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

The Conference of the Parties (CoP), which is the supreme decision-making body of the Convention and comprises all its member States, has a set of biological and trade criteria to help determine whether a species should be included in Appendices I or II. This Appendix contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade. Changes to Appendix III follow a distinct procedure from changes to Appendices I and II, as each party's is entitled to make unilateral amendments to it.

A specimen of a CITES-listed species may be imported into or exported (or re-exported) from a State party to the Convention only if the appropriate document has been obtained and presented for clearance at the port of entry or exit. There is some variation of the requirements from one country to another and it is always necessary to check on the national laws that may be stricter.

India joined CITES in 1976. As part of its obligations under the convention, India is committed to implement a resolution CITES adopted at its Eighth Meeting of the Conference of Parties (COP-8) in Kyoto in 1992. The resolution required CITES members to prohibit trade in specimens that violate the convention, penalise such trade and confiscate specimens illegally traded or possessed and designate both a management authority and a scientific authority. COP is the convention's apex decision-making body and comprises of all its members. Despite several extensions, India has failed to fully implement the 1992 decision.

3.8 Convention to Combat Desertification

Desertification is the degradation of land in arid, semi-arid and dry sub-humid areas. It is caused primarily by climatic variation and human activities; desertification does not refer to the expansion of existing deserts. It occurs because dryland systems, which cover over one third of the world's land area, are extremely vulnerable to over-exploitation and inappropriate land use. Poverty, political instability, deforestation, overgrazing and bad irrigation practices can all undermine the land's fertility. Combating desertification is essential to ensure long-term productivity of inhabited drylands.

The international community has long recognized that desertification is a major economic, social and environmental problem of concern to many countries in all regions of the world. In 1977, the United Nations Conference on Desertification (UNCOD) adopted a Plan of Action to Combat Desertification (POCD). Despite this and other efforts, the United Nations Environment Programme (UNEP) concluded in 1991 that the problem of land degradation in arid, semi-arid and dry sub-humid areas had intensified, although there were "local examples of success".

As a result, the question of how to tackle desertification was still a major concern for the United Nations Conference on Environment and Development (UNCED), which was held in Rio de Janeiro in 1992. The Conference supported a new, integrated approach to the problem, emphasizing action to promote sustainable development at the community level.

The Convention was drawn up at the Conference and was signed in 1994. The Convention which is a legally binding instrument has been ratified by Over 170 countries. It came into force on December 26, 1996.

The Convention aims to combat desertification and mitigate the effects of drought in those countries experiencing serious drought/or desertification, particularly in Africa through effective action at all levels. These measures are underpinned by international cooperation and partnership arrangements, under an integrated approach complying with Agenda 21, to contribute to sustainable development in the areas concerned. Action 21 is an international action plan designed to achieve sustainable development in the Twenty first century.

Under the Convention measures to combat desertification include action to promote the integrated development of land in arid, semi-arid and dry sub-humid areas to:

- prevent and/or reduce land degradation;
- rehabilitate partly degraded land;
- reclaim desertification areas.

The Convention is being implemented through national, sub-regional and regional programmes which are designed to form an integral part of a country's national sustainable development policy. They are updated under an ongoing participative process in the light of work on the ground and the results of research.

Local communities play a key role in the formulation and implementation of these action programmes as they are dependent on the land.

Closer international cooperation between developed and developing countries is essential to implement the Convention. Nevertheless, the governments of the countries affected by desertification retain responsibility for the creation of an enabling environment to help local populations themselves bring an end to the process of land degradation. Governments must make politically sensitive changes such as greater decentralisation of decision-making, improvement of land tenure systems and empowerment of women and farmers.

The Convention does not have a centralised financial mechanism for projects but there is a Global Mechanism to help mobilise substantial financial resources from existing sources and to rationalise and improve their management.

The Conference of the Parties is the Convention's supreme body. It is responsible for taking the decisions necessary to promote its effective implementation.

India is a signatory to the Convention. One of the obligations to the Convention is preparation and implementation of National Action Programme (NAP) to combat desertification.

The Ministry of Environment and Forests (MoEF) is the National Coordinating Agency for the implementation of the Convention in the country. As an affected party, a 20 years' comprehensive National Action Programme (NAP) to combat desertification in the country has been prepared. The programme includes the following.

- Community based approach to development,
- Activities to improve the quality of life of the local communities,
- Raising awareness,
- Drought management preparedness and mitigation,
- R&D initiatives and interventions which are locally suited, and
- Strengthening self-governance leading to empowerment of local communities.

3.9 The Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal is the most comprehensive global environmental treaty on hazardous and other wastes. The Basel Convention, ratified by 170 countries (Parties) including India, aims to ensure environmentally sound management and disposal of hazardous wastes. The convention aims to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous and other wastes.

The cross-border transport of hazardous wastes seized the public's attention in the 1980s when "toxic ships" started sailing from port to port trying to offload their poisonous cargoes made the front-page headlines around the world. This was mainly due to tighter environmental regulations in industrialized countries. As the costs of waste disposal skyrocketed, "toxic traders" searching for cheaper solutions started shipping hazardous wastes to Africa, Asia, Eastern Europe and other regions. Once on shore, these waste shipments were dumped indiscriminately, spilled accidentally or managed improperly, causing severe health problems—even death- and poisoning the land, water and air for decades or centuries.

To combat these practices, the Basel Convention was negotiated under the auspices of the United Nations Environment Programme in the late 1980s. It was adopted in 1989 and entered into force in 1992. The Basel Convention regulates the Transboundary movements of hazardous and other wastes applying the "Prior Informed Consent" procedure (shipments

made without consent are illegal). Shipments to and from non-parties are illegal unless there is a special agreement. Each party is required to introduce appropriate national or domestic legislation to prevent and punish illegal traffic in hazardous and other wastes. Illegal traffic is criminal. The Convention obliges its parties to ensure that hazardous and other wastes are managed and disposed of in an environmentally sound manner (ESM). To this end, parties are expected to minimize the quantities that are moved across borders, to treat and dispose of wastes as close as possible to their place of generation and to prevent or minimize the generation of wastes at source. Strong controls have to be applied from the moment of generation of a hazardous waste to its storage, transport, treatment, reuse, recycling, recovery and final disposal.

Wastes are substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law. Annex I of the Convention, as further clarified in Annexes VIII and IX, lists those wastes that are classified as hazardous and subject to the control procedures under the Convention. Annex II of the Convention identifies those wastes that require special consideration (known as "other wastes", and which primarily refer to household wastes). Parties may also inform the Convention Secretariat of additional wastes, other than the wastes listed in Annexes I and II of Convention, that are considered or defined as hazardous wastes under their national legislation and of any requirements concerning transboundary movement procedures applicable to such wastes. "Disposal" (as defined by the Convention) includes operations resulting in final disposal and operations which may lead to resource recovery, recycling, reclamation, direct re-use or alternative uses.

The Convention regulates biomedical and healthcare wastes, used oils, used lead acid batteries and persistent organic pollutant wastes (POPs wastes). POPs are chemicals and pesticides that persist for many years in the environment. They are transported great distances from their point of release, bioaccumulate (thus threatening humans and animals at the top of the food chain), and cause a range of health effects.

Polychlorinated biphenyls (PCBs) are also regulated. These are compounds used in industry as heat exchange fluids, in electric transformers and capacitors, and as additives in paint, carbonless copy paper, sealants and plastics. Thousands of chemical wastes generated by industries and other consumers should be disposed off as per the norms fixed by the convention.

The Conference of the Parties (known as the COP), of which all the States that are party to the Convention are members, is the primary organ of the Convention. The Conference of the Parties develops the policies that will guide the implementation of the Convention, and it can adopt amendments to the Convention, as well as new instruments, such as Protocols, if it considers that these would assist in the achievement of the goals of the Convention. The

COP meets at least once every two years, and seeks to reach its decisions by consensus.

Some of the issues the Convention deals with are:

- Electronic and electrical waste (“e-waste”) such as mobile phones and computers
- Ships destined for dismantling
- Mercury and asbestos wastes
- Illegal dumping of hazardous wastes Based on national reports transmitted to the Secretariat of the Basel Convention in 2001.

That industrialised countries, which have ratified the Basel Convention and the Basel Ban apart from enacting domestic laws to stop export of hazardous wastes, continue to see poor countries as dust bins. Part of the problem lies in the provision of the convention, part of it in its interpretation, and a substantial part in its enforcement.

During the seventh Conference of Parties (COP-7), held in Geneva, Switzerland, in 2004 the Basel Convention took some important decisions. Recognising that ships containing hazardous materials, such as asbestos, PCBs, toxic paints and fuel residues, could themselves become hazardous waste, the members decided that countries exporting ships for recycling should seek the prior informed consent of importing countries. The parties to the convention also stressed that the global management of ship dismantling must be made environmentally sound. The decision on ship dismantling encourages developed nations to develop domestic ship recycling facilities. This would reduce their need to export ships to countries with limited capacities to manage the hazardous wastes contained in them. Countries like India, China and Bangladesh, which have huge ship-breaking facilities, have to bear the burden of such toxic substances. But since ship-breaking activity is a major economic activity for them, providing employment to thousands of people, some of them emphasised the need for de-contamination of waste ships prior to export rather than no export at all.

In India, hazardous wastes are regulated under the Hazardous Wastes (Management and Handling) Rules, 1989, amended in 2003. Indian rules list only 29 of the 76 items banned by the Basel Convention. The remaining 47 items can actually be imported after obtaining a license from the Directorate General of Foreign Trade (DGFT). The Directorate General of Foreign Trade is the agency under the Union ministry of commerce and industry, which issues licenses for all imports, including scrap. Environmentalists have been arguing that India is literally becoming the biggest centre of dirty trade in the world. It gets waste from 105 countries, including some of the poorest in Africa. It also gets almost all kinds of scrap — from steel to incineration ash, to pig hair. This waste trade is growing bigger and bigger. Environmentalists say that India has not been able manage its own waste and it is importing more and more from the rest of the world. With this trade growing exponentially India is likely to become a big trashcan.

3.10 Let Us Sum Up

Most countries in the world have realized that need for adopting measures to deal with problems related to the environment. They have realized that many of the environmental problems are global and that international agreements are necessary to preserve biological diversity and to prevent environmental destruction. Although some of the agreements have not been fully implemented the over result has been encouraging. More and more countries are joining and ratifying conventions. International pressure is building up on those countries which have not signed or ratified the agreements. There has been a gradual change in the attitude of the developing countries toward the issue of environment. During its participation at the Stockholm conference in 1972 India had rejected environmentalism as western fad and had argued that if development meant pollution it wanted more of it. Despite such a posture at the conference India realized in the following years that the environment was an issue. It began introducing various measures that included making laws and joining international conventions. International efforts are a must to achieve sustainable development and to ensure a better future for the mankind.

3.11 Check Your Progress

1. What is the significance of the Kyoto Protocol? What are the problems involved in its implementation?
2. What are the responsibilities of the governments in preserving biodiversity?
3. What are the measures adopted by the parties to the convention on persistent organic pollutants to protect human health and the environment from.
4. Highlight the key features of the Convention on International Trade in Endangered Species.
5. Why is closer international cooperation between developed and developing countries is essential in preventing desertification?
6. Do you think developing countries are becoming dustbins for the developed countries? Do you think that Basel Convention will help prevent such inequalities?

3.12 For Further Readings

- Aldy, Joseph E., Ashton, John and Baron, Richard. (2003). *Beyond Kyoto: Advancing the International Effort Against Climate Change*: Arlington: Pew Center on Global Climate Change
- Atapattu, Sumudu, A. (2006). *Emerging Principles of International Environmental Law*. New York: Bridge Street Books
- Imber, Mark, F. (2000). *Environment, Security and UN Reform*. New York: St. Martins.

- Jha, Veena. (2003). Trade and Environment: Issues and Options for India. Geneva: UNCTAD
- Rosendal, Kristin. (2000). The Convention on Biological Diversity and Developing Countries. London: Kluwer Academic Publishers
- Smith, Paul M. and Warr, Kiki (eds). (2001). Global Environmental Issues. London: Hodder and Stoughton.

<http://www.downtoearth.org.in>

<http://www.cseindia.org>

<http://www.UNEP.org>

<http://www.envfor.nic.in>

Structure

4.0 Objectives

4.1 Introduction

4.2 Deforestation

4.2.1 Indian forests

4.2.2 Sacred groves

4.3 Biodiversity loss

4.4 Water pollution

4.5 Air pollution

4.6 Global Warming

4.7 Depletion of the ozone layer

4.8 E-waste

4.9 Big dams

4.10 Endangered wildlife

4.11 Let Us Sum Up

4.12 Check Your Progress

4.13 For Further Reading

4.0 Objectives

Even as countries continue to achieve progress in terms of development indices they are faced with issues that are a consequence of such a progress. The number of environmental issues has increased over the years.

This Unit will enable you to :

- understand the major environmental issues being debated around the world;
- examine the factors that have led to the emergence of environmental issues, and
- know efforts made to address the environmental issues.

4.1 Introduction

While some countries have made serious efforts to deal with environmental problems others have either ignored or paid little attention to them. Even before known environmental problems have been resolved new ones have emerged. With economic growth and accelerated industrialization the number of environmental issues will also increase. The problems that have been identified as environmental issues are many. Only a few of them have been discussed here. Students are advised to gather information about environmental issues from different sources and to observe problems in their own communities and neighborhoods.

4.2 Deforestation

Forests are an integral part of any civilization. Civilizations have developed and flourished along the forests and their eco systems. They have been the sources through which the society has met many of its needs. Forest is an area with a high density of trees. These plant communities cover large areas of the globe and function as carbon dioxide sinks, animal habitats, hydrologic flow modulators and soil conserves constituting one of the most important aspects of the biosphere.

Colonization of the Asian, African and Latin American countries by the European powers led to unprecedented depletion of forest cover.

The most important direct causes of deforestation include the conversion of forest lands for agriculture and cattle-raising, urbanization, road construction, industrial logging, mining, oil exploitation, construction of oil and gas pipelines, shrimp farming (in the case of mangroves), fires and the construction of huge hydroelectric dams. Large-scale monoculture

tree plantations to ensure the global paper industry with cheap raw material are also a direct cause of deforestation as in many cases they have been preceded by firing or clear cutting of native forests.

However, the real motor behind all these activities being carried out in an unsustainable and predatory way is the “development” model currently in force. This model implies the unrestricted exploitation of the totality of the planet’s resources, with the aim of feeding an ever-growing consumer market, in particular in the Northern industrialised countries. Inequality in terms of exchange between the North and the South that has generated an increasing and unpayable foreign debt, obliging more and more resources to be exploited and extracted, just to pay off its service, has increased devastation. The International Monetary Fund, the World Bank, regional multilateral banks and the World Trade Organisation have been fundamental in this process, promoting and supporting governments to centre their efforts to orient production towards exports, with the aim of complying with the foreign debt service. Furthermore, structural adjustment programmes imposed by these organisms has implied that the States have “shrunk”, with the consequence that there is a lack of human and financial resources at State level to address forest protection and sustainable management.

In most cases, the hidden causes of deforestation and forests degradation are related to macro-economic strategies offering strong incentives to obtain short term profits, instead of seeking sustainability in the long term. Deeply rooted social structures are also important, causing unequal land tenure and discrimination of indigenous peoples, of subsistence farmers and of poor people in general. In other cases, political factors are at stake, such as the lack of participatory democracy, military influence and exploitation of rural zones by urban elites.

According to the Food and Agricultural Organisation (FAO), 90 per cent of deforestation is caused by unsustainable agricultural practices, while logging and plantation forestry play a greater role in forest degradation. However debatable these figures may be, unsustainable agriculture is undoubtedly one of the major direct causes of deforestation and forest degradation in many countries of the world. A simplistic approach to the problem would imply blaming the “ignorance” of the farmers involved in this process. The process is however more complex. Few people actually decide that they want to leave their native land, go to the forest, cut it and convert it into agricultural land. They are driven to such actions by national and international forces with interests different to theirs.

Some underlying causes originate within the country —either Northern or Southern— while others can be found outside national boundaries. In the latter situation, the main responsibility usually lies in the North. Macro-economic policies imposed on the South through a number of mechanisms can also contribute to deforestation. One of the more obvious results

of such policies has been the increasing incorporation of Southern agricultural exports to markets in Northern countries, usually at the expense of forests. The same macro-economic policies have resulted in the concentration of wealth in the North which, coupled with strong incentives to consumerism, have created unsustainable consumption patterns which have a strong impact particularly —though not exclusively— on Southern forests.

Southern governments and elites also hold responsibility for some deeper causes of deforestation. Government policies on indigenous peoples' rights —particularly those affecting territorial rights— have been the cause of much deforestation which would not have occurred if those rights had been recognized. Policies over land tenure rights in general have resulted in the concentration of the best agricultural lands in a few hands and the consequent migration of poor peasants into the forests, resulting in large-scale felling of trees. In most cases however government policies are linked to external actors such as multilateral institutions, “co-operation” agencies and transnational corporations who must share the blame. It is known that building access roads is one of the main underlying causes of deforestation. The road then opens up the forest to loggers, landless peasants, mining companies and many other actors, resulting in generalized deforestation. Road-building is one of the activities promoted and funded by multilateral institutions such as the World Bank and other regional multilateral banks and it allows governments to comply with the International Monetary Fund's policies to increase exports. Road-building is also linked to transnational corporations' interests, as they can thereby access natural resources and incorporate them into the global market.

4.2.1 Indian forests

The forest policy in India today has its origins in the colonial exploitation of forests. The Indian Forest Department (headed by German botanist Dietrich Brandis for the first two decades) was established by the British in 1864 with the primary objective of meeting the need and demand of the British Empire. The taking over of the ownership of forest was one of the means through which the colonies were reduced to dependant economies. The scientific and technological development in the British Empire had a direct impact on the Indian forest wealth. By the end of the nineteenth century, the British had become the world leaders in deforestation.

Even after independence, the successive governments continued exploitation of forest as a great source of revenue without bothering about the consequences on ecology and eco systems.

Rules and regulations were created to facilitate the process of revenue streams for the government. Forests that brought easy revenue became the first targets of “development”

planning in India.

The forest resources could be turned into wealth without any investment being made. The annual reports of successive governments in different states clearly indicate that the forests were to fill the coffers. The wealth that stood in the form of trees had only to be just cut and transported.

Planning in Independent India hardly moved away from the British model of development. In the last 60 years of Independence hundreds of big dams have consumed lakhs of hectares of pristine forests destroying virgin ecosystems. The successive governments never paid attention to the consequences of agricultural expansion that involved building of big irrigation dams. Commercial exploitation of forest continued unabated despite legislations enacted with the stated objective of promoting scientific forestry.

The European model of sustained-yield forestry which could not be replicated in India led to replacement of forests by plantations. Teak plantations were developed in many forests around the country. Only the commercial value of the forest was recognized completely ignoring the other ecological services it provided. Forests were cleared to raise plantation crops. It was a lucrative economic proposition. Thick evergreen forests were destroyed to make way for coffee estates and tea plantations.

The forest cover of the country is estimated to be only 678.333 sq.kms accounting for 20.64% of the geographic area of the country. Very dense forests, moderately dense forests, open-forests and mangroves constitute 1.5%, 10.32%, 8.76% and 0.14% of the geographic area respectively. These forests are also under great stress. Declaring some forests as national parks and reserve forests has helped in conservation. Joint forest management programme and setting up of village forest committees which attempted to involve local communities in protecting forests have produced limited results. Attempts have also been made to protect sacred groves which had been preserved by rural communities for centuries.

4.2.2 Sacred groves

India has a long history of nature worship through the veneration of forest groves.

These sacred groves, which are dedicated to local deities or ancestral spirits, are protected by local communities through social traditions and taboos that incorporate spiritual and ecological values. Preserved over the course of many generations, sacred groves represent native vegetation in a natural or near-natural state and thus are rich in biodiversity and harbor many rare species of plants and animals. The *devara kadus* of Kodagu district in Karnataka

are a part of an intricate ecosystem paddy wetlands, grasslands and groves.

The rapid march of modernization over the past century has depleted India's sacred groves and altered the traditional social systems that have protected them. The threats to sacred groves differ as much as the regions and groves themselves. Sacred groves in many parts of the country have been destroyed over the past century to make way for development projects such as railroads, highways and dams. In many places the government has ignored local communities' customary management rights and allowed the development of commercial forestry operations or encroachment by people migrating from outside the community who do not respect traditional practice. Some "pan-Indian" groves are burdened by large numbers of tourists and pilgrims. Many groves are suffering what is called "Sanskritization," the transformation of primitive nature worship into formal Hindu practice. This has led to the clearing of areas in groves to make way for temples and a shift in focus to idols rather than nature itself.

Of greatest concern is the loss of traditional wisdom and practices brought about by the increasing presence of westernized urban culture and an ever-expanding market economy. These forces have led many communities to lose their unified identity, a key element of their conservation practice, and to destroy resources in their sacred groves in return for short-term commercial gain.

Many conservationists, communities, government and nongovernmental organizations in India have realized that development, progress and modernity do not mean turning one's back on tradition, but rather that traditional wisdom can and must be integrated into modern systems. The cause of protecting India's sacred groves has been gaining attention and regional preservation efforts have begun. New sacred grove management plans aim to restore power to local communities. Sacred grove awareness campaigns in communities and schools propose to educate people about the value of biodiversity.

4.3 Biodiversity loss

Biological resources are the pillars upon which civilizations have been built. Nature's products support such diverse industries as agriculture, cosmetics, pharmaceuticals, pulp and paper, horticulture, construction and waste treatment.

Biodiversity is an all encompassing term that describe the variety of all life and natural processes on the Earth. It includes the variety of all life and natural processes on the Earth, including diversity within species, between species and of ecosystems. Biodiversity provides food and medicine, fresh air and clean water, protection from natural disasters and green spaces for humans.

Studies show that biodiversity is in grave danger from habitat loss, invasive species, pollution, climate change and overexploitation. Biodiversity loss is defined as the long-term or permanent qualitative or quantitative reduction in components of biodiversity and their potential to provide goods and services, to be measured at global, regional and national levels. The loss of biodiversity threatens our food supplies, opportunities for recreation and tourism, and sources of wood, medicines and energy. It also interferes with essential ecological functions.

Human activities have taken the planet to the edge of a massive wave of species extinctions, further threatening our own well-being. For instance, current rates of loss are estimated at 100 to 1,000 times natural background levels. We still do not know the total number of species on the Earth, estimates vary between 5 million and 100 million, most of these species belonging to the insect and plant families. The conservation status of most species is not known, but two large animal groups - mammals and birds - have been comprehensively studied, and may represent the status of biodiversity in general. Over 15,500 species are threatened. As many as 23 per cent of mammals and 12 per cent of birds are considered to be at significant risk of total extinction. While it is difficult to put a figure to bio-diversity loss in terms of number of species lost, it is possible to measure the reduction in area of biodiversity hotspots. Biodiversity hotspots are areas of high species richness and species diversity, as well as high levels of endemism. Another feature of biodiversity hotspots is the number of species found within small areas.

For thousands of years we have been developing a vast array of domesticated plants and animals important for food. But this treasure house is shrinking as modern commercial agriculture focuses on relatively few crop varieties. And, about 30% of breeds of the main farm animal species are currently at a high risk of extinction. While the loss of individual species catches our attention, it is the fragmentation, degradation, and outright loss of forests, wetlands, coral reefs, and other ecosystems that poses the gravest threat to biological diversity. The extensive use of timber contributes to deforestation. It is estimated that we are losing tropical forests at a rate of between 70 000 and 170 000 square kilometres a year, equal to 21-50 football fields a minute. While many developed countries are showing a net increase in forest cover, due to plantation and reforestation, there is still a global net forest loss. Plantations and newly planted forests do not fulfill many of the subsidiary functions of old-growth forests necessary for a balanced ecosystem. thus leading to other problems such as soil erosion, inadequate groundwater recharge and the problems associated with monocultures. The built environment contributes to biodiversity loss in many ways. Cities, buildings, roads and dams all destroy natural habitats and migratory routes.

Global atmospheric changes, such as ozone depletion and climate change, only add to the stress. A thinner ozone layer lets more ultraviolet-B radiation reach the Earth's surface where it damages living tissue. Global warming is already changing habitats and the distribution of species. Scientists warn that even a one-degree increase in the average global temperature, if it comes rapidly, will push many species over the brink. Our food production systems could also be seriously disrupted.

The loss of biodiversity often reduces the productivity of ecosystems, thereby shrinking nature's basket of goods and services, from which we constantly draw. It destabilizes ecosystems, and weakens their ability to deal with natural disasters such as floods, droughts, and hurricanes, and with human-caused stresses, such as pollution and climate change. Already, we are spending huge sums in response to flood and storm damage exacerbated by deforestation; such damage is expected to increase due to global warming.

A convention on biological diversity was signed in 1992, at the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil. The Convention on Biological Diversity, the first global agreement on the conservation and sustainable use of biological diversity gained rapid and widespread acceptance. Over 150 governments signed the document at the Rio conference, and since then more than 175 countries have ratified the agreement. The Convention has the main objective of conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of utilization of genetic resources. The Convention came into force on the 29th December, 1993. India which was a signatory to the Convention enacted Biological Diversity Act in 2002 aimed at conserving biodiversity in India.

The goal of halting the loss of biodiversity by 2010 is the subject of several key international agreements. Each recognizes the rapid degradation of ecosystems and habitats, the increasing threat to many species populations and the urgent need to take action that will halt the decline in irreplaceable natural resources.

In political terms, these commitments represent a radical departure from previous approaches. For the first time, an overall conservation target has been adopted rather than generally formulated objectives or specific measures that may or may not have the desired conservation effect. In that sense, the significance of these agreements cannot be overstated.

However, given the current rapid decline in biodiversity and the ever-increasing extent and intensity of many human activities, the objective of halting the decline in biodiversity

by 2010 will require unprecedented efforts in adapting activities to the needs of natural systems.

4.4 Water pollution

Water pollution is the most serious of all the environmental problems as polluted water can cause many diseases and kill aquatic life. Water pollution occurs when a body of water is adversely affected due to the addition of large amounts of materials to the water. The sources of water pollution are categorized as being a point source or a non-source point of pollution. Point sources of pollution occur when the polluting substance is emitted directly into the waterway. A pipe spewing toxic chemicals directly into a river is an example. A non-point source occurs when there is runoff of pollutants into a waterway, for instance when fertilizer from a field is carried into a stream by surface runoff.

There are many pollutants. A toxic substance is a chemical pollutant that is not a naturally occurring substance in aquatic ecosystems. The greatest contributors to toxic pollution are herbicides, pesticides and industrial compounds. Organic pollution occurs when an excess of organic matter, such as manure or sewage, enters the water. When organic matter increases in a pond, the number of decomposers will increase. These decomposers grow rapidly and use a great deal of oxygen during their growth. This leads to a depletion of oxygen as the decomposition process occurs. A lack of oxygen can kill aquatic organisms. As the aquatic organisms die, they are broken down by decomposers which leads to further depletion of the oxygen levels.

A type of organic pollution can occur when inorganic pollutants such as nitrogen and phosphates accumulate in aquatic ecosystems. High levels of these nutrients cause an overgrowth of plants and algae. As the plants and algae die, they become organic material in the water. The enormous decay of this plant matter, in turn, lowers the oxygen level. The process of rapid plant growth followed by increased activity by decomposers and a depletion of the oxygen level is called *eutrophication*.

Thermal pollution can occur when water is used as a coolant near a power or industrial plant and then is returned to the aquatic environment at a higher temperature than it was originally. Thermal pollution can lead to a decrease in the dissolved oxygen level in the water while also increasing the biological demand of aquatic organisms for oxygen.

Modern agricultural practices are major sources of water pollution. Farms often use large amounts of herbicides and pesticides, both of which are toxic pollutants. These sub-

stances are particularly dangerous to life in rivers, streams and lakes, where toxic substances can build up over a period of time. Farms also frequently use large amounts of chemical fertilizers that are washed into the waterways and damage the water supply and the life within it. Fertilizers can increase the amounts of nitrates and phosphates in the water, which can lead to the process of eutrophication.

Allowing livestock to graze near water sources often results in organic waste products being washed into the waterways. This sudden introduction of organic material increases the amount of nitrogen in the water, and can also lead to eutrophication. Excessive amounts of sediment in waterways can block sunlight, preventing aquatic plants from photosynthesizing, and can suffocate fish by clogging their gills.

Pollution by industries is much more hazardous than pollution by agriculture. Clearing of land can lead to erosion of soil into the river. Waste and sewage generated by industry can get into the water supply, introducing large organic pollutants into the ecosystem. Many industrial and power plants use rivers, streams and lakes to dispose of waste heat. The resulting hot water can cause thermal pollution. Thermal pollution can have a disastrous effect on life in an aquatic ecosystem as temperature increases it decreases the amount of oxygen in the water, thereby reducing the number of animals that can survive there.

Water can become contaminated with toxic or radioactive materials from industry, mine sites and abandoned hazardous waste sites. Use of pesticides on agricultural fields for decades has led to contamination of ground water. The studies conducted by the Centre for Science and Environment in 2003 and 2006 have shown that the bottled water and soft drinks of Coca Cola and Pepsi companies contain pesticide residues several times above the norms fixed by the Bureau of Indian Standards. The findings of the Centre were later confirmed by the Joint Parliamentary Committee that probed the issue.

Heavy use of acid precipitation is caused when the burning of fossil fuels emits sulfur dioxide into the atmosphere. The sulfur dioxide reacts with the water in the atmosphere, creating rainfall which contains sulfuric acid. As acid precipitation falls into lakes, streams and ponds it can lower the overall p^H of the waterway, killing vital plant life, thereby affecting the whole food chain. It can also leach heavy metals from the soil into the water, killing fish and other aquatic organisms. Because of this, air pollution is potentially one of the most threatening forms of pollution to aquatic ecosystems.

Although central and state governments have launched many programmes to deal with water pollution nothing much has been achieved. Rivers continue to be polluted and some of them have become sewage canals. Effluents are being let out into the rivers and water bodies

without treatment. A stricter implementation of the law concerning water pollution is needed.

4.5 Air pollution

Air pollution means the presence in the atmosphere of one or more contaminants in such quality and for such duration as is injurious, or tends to be injurious, to human health or welfare, animal or plant life.' It is the contamination of air by the discharge of harmful substances. Air pollution can cause health problems and it can also damage the environment and property. It has caused thinning of the protective ozone layer of the atmosphere, which is leading to climate change. Modernisation and progress have led to air getting more and more polluted over the years. Industries, vehicles, increase in the population, and urbanization are some of the major factors responsible for air pollution. The following industries are among those that emit a great deal of pollutants into the air: thermal power plants, cement, steel, refineries, petro chemicals, and mines.

Air pollution results from a variety of causes, not all of which are within human control. The source of pollution may be in one country but the impact of pollution may be felt elsewhere. The discovery of pesticides in Antarctica, where they have never been used, suggests the extent to which aerial transport can carry pollutants from one place to another.

Carbon monoxide, carbon dioxide, chloroflorocarbons, lead, nitrogen oxide, suspended particulate matter and sulphur dioxide are the major air pollutants.

Carbon monoxide (CO) is a colorless, odorless gas that is produced by the incomplete burning of carbon-based fuels including petrol, diesel, and wood. It is also produced from the combustion of natural and synthetic products such as cigarettes. It lowers the amount of oxygen that enters our blood. It can slow our reflexes and make us confused and sleepy. Carbon dioxide (CO₂) is the principle greenhouse gas emitted as a result of human activities such as the burning of coal, oil, and natural gases. Chloroflorocarbons (CFCs) are gases that are released mainly from air-conditioning systems and refrigeration. When released into the air, CFCs rise to the stratosphere, where they come in contact with few other gases, which leads to a reduction of the ozone layer that protects the earth from the harmful ultraviolet rays of the sun. **Lead** is present in petrol, diesel, lead batteries, paints, hair dye products, etc. Lead affects children in particular. It can cause nervous system damage and digestive problems and, in some cases, cause cancer. Nitrogen oxide (NO) causes smog and acid rain. It is produced from burning fuels including petrol, diesel, and coal. Nitrogen oxides can make children susceptible to respiratory diseases in winters. Suspended particulate matter (SPM) consists of solids in the air in the form of smoke, dust, and vapour that can remain suspended for extended

periods and is also the main source of haze which reduces visibility. The finer of these particles, when breathed in can lodge in our lungs and cause lung damage and respiratory problems. Sulphur dioxide (SO₂) is a gas produced from burning coal, mainly in thermal power plants. Some industrial processes, such as production of paper and smelting of metals, produce sulphur dioxide. It is a major contributor to smog and acid rain. Sulfur dioxide can lead to lung diseases.

In India, air pollution is widespread in urban areas where vehicles are the major contributors and in a few other areas with a high concentration of industries and thermal power plants. Vehicular emissions are of particular concern since these are ground level sources and thus have the maximum impact on the general population. Also, vehicles contribute significantly to the total air pollution load in many urban areas. The Central Pollution Control Board has been monitoring air quality in many cities. India's liberalized economy has created a booming market for cars, particularly in wealthier urban areas. An average of 963 new private vehicles are registered for use on the city's roads every day.

Pollution levels in the capital city of Delhi improved in 2001, after the government ordered that all public transportation vehicles use compressed natural Gas or CNG, a cleaner fuel. But a study by the Centre for Science and Environment in 2007 has showed that the city's air is quickly becoming as polluted as it had been before that measure was enacted. A comprehensive air pollution control plan is needed for India. The government of India has set an ambitious target of achieving the air-pollution standards mandated by World Health Organisation by 2011-12 in all major cities of the country.

Pollution caused by the burning of fossil fuels like coal and diesel has contributed to a worrisome slowdown in rice harvest growth in India in the past two decades. This type of pollution, which previous research showed can cut rainfall and lower temperatures. Since India is one of the world's major producers of rice this is a cause for concern.

4.6 Global Warming

Global warming has become the focus of attention scientist, environmentalists and planners in the recent years. Adequate evidence has been found to show that human activities have led to alarming increase in the levels of world temperature.

The atmosphere becomes warmer as various gases absorb the long-wave radiation of heat from the Earth, in a way similar to the heating of the air in a greenhouse. The 'greenhouse effect' prevents warmth being dissipated into space and keeps the overall temperature

of the Earth higher than it would be without these gases. Industrial activity over the past 150 years has increased the amount of carbon dioxide (CO₂) in the air by about a quarter and since this particular gas is the main 'greenhouse gas' it has resulted in a rise in temperature of 0.5°C. Over the next fifty years it is estimated that levels of CO₂ will rise by a further 30 per cent. There are many other greenhouse gases, notably methane, ozone, nitrous oxide (laughing gas) and chlorofluorocarbons (CFCs). Although the concentrations of these gases are much lower than that of CO₂, some of them have a greater greenhouse effect. Again over the next fifty years it is anticipated that these other gases will double the effect of CO₂. By making assumptions of the amount of each gas likely to be released into the air, computer models have predicted a potential rise in temperature of between 1.5 and 4.5°C by 2050. The oceans of the world will take longer to warm, so that the increase will be spread over a relatively long period.

These temperature rises may seem to be small and of little real significance. However, the warming will not be spread evenly, and local variations may see increases or more than 10°C at the polar regions.

What then will be the effect of this global warming? When heated, water expands and occupies more space. This will be the prime cause of higher sea levels, although increased melting of the south polar ice cap will add to this. Since many of the major towns of the world are located by the sea, the effect may be catastrophic. Certainly it is doubtful if the recently completed Thames Barrage will be high enough to cope with the spring tides rising above a higher initial base level. It is generally agreed that larger temperature changes occurring in high latitudes will affect the grain-growing areas particularly. Marginal lands will be at risk. Even if warmer temperatures speed crop growth and increase yields (extra CO₂ has a similar effect) they will also benefit pests, weeds and diseases.

It is likely that a change of climate in already marginal areas of farming, such as the Sahel in Africa, will lead to increased desertification, drought and erosion of the soil. In temperate regions, winters may become warmer and wetter, with drier and hotter summers. This assessment is complicated by the effect of cloud cover, which is almost impossible to predict.

Yet it is not too late to do all that can be done to minimize the greenhouse effect and to reduce its causes. The controls are needed to reduce CO₂ and the other gases. An overall policy which includes reduction in the incineration of fossil fuels by domestic and industrial activities, more efficient and economical use of internal combustion engines, control on the

production and use of CFCs and a reduction in deforestation must be matched by a world policy of energy conservation. As the developing nations of the world anticipate a rise in living standards, it is essential that they make technological advances which avoid the need to increase the pollution of the atmosphere.

The campaign against global warming received a big boost with the awarding of Nobel Peace Prize for 2007 to Al Gore and the Intergovernmental Panel of Climate Change (IPCC). Al Gore, the former Vice President of the United States and the IPCC under the leadership of Rajendra Pachauri have been making efforts to influence policies that would bring down the level of greenhouse gases. Al Gore's documentary film 'An Inconvenient Truth' presents global warming as a part of climate change and shows with evidence the consequences of rising global temperature.

4.7 Depletion of the ozone layer

Ozone, composed of three atoms of oxygen (O_3), is concentrated in a zone between 20 and 25 km above the Earth. It has been said to protect the planet and its people like a delicate veil protects the face beneath. Solar radiation contains ultraviolet rays and of these UV-B causes skin cancer, ageing and wrinkling, and eye malfunctions in humans, slows plant growth, destroys marine algae and fish larvae and breaks down the chemical structure of paints and plastics. At our present levels of UV-B white paints change to yellow, coloured pigments fade and fabrics rot under its influence. Any depletion in the amount of O_3 increases the UV radiation which reaches the Earth. Sun-bathing by those with light-coloured skins, already a potentially harmful activity, may become a risk to health to rank alongside smoking, drug and alcohol abuse. Estimates indicate that between 10 and 30 per cent of the sun's UV-B reaches the surface of the Earth at the present time. Were O_3 levels to fall by only 10 per cent the increase in UV-B would be 20 per cent.

The British scientists were the first to recognize the serious depletion of ozone in the polar region, which, during the Antarctic spring, resulted in a 'hole' in the layer. A similar depletion in the layer above the Arctic has also been recorded.

O_3 is an unstable form of oxygen, readily giving up the third atom, particularly to atoms of chlorine. CFC gases are not destroyed by the usual chemical reactions in the lower atmosphere. Instead they rise into the upper atmosphere where ultraviolet radiation causes free chlorine atoms to be released. These collect one of the oxygen atoms to form chlorine monoxide and oxygen. A further reaction releases the chlorine atom, thus again freeing it to destroy ozone in a 'chain' sequence. Nitrous oxide also plays its part in O_3 destruction and its

release from high-flying aircraft is a contributory factor.

Fortunately the danger of the depletion of the ozone layer has now been recognized internationally and many conferences have been held on the subject. Arguably that held in Montreal, Canada, in September 1987 was the most significant as it stimulated the debate on CFCs. The Montreal Protocol demanded a 50 per cent reduction in the use of CFCs by 1999.

The use of CFCs as aerosol propellants and in refrigeration units needs to cease completely and the gas already in redundant refrigeration units must be prevented from escape into the air. Alternative foaming agents must be used. Generally it seems that HFCs (hydrofluorocarbons) may be the answer in the short term, but in due time the use of HFAs (hydrofluoroalkanes) should be a better alternative. As for the use of CFCs in the electrical industry, tighter production controls can lead to a full recycling of the gases to prevent their release into the air.

4.8 E-waste

E-waste or 'electronic waste' refers to equipment or products having a battery or an electrical cord, which have become obsolete, either due to advancement in technology, changes in fashion, style and status, or are nearing the end of their useful life.

E-waste generally consists of obsolete electronic devices such as computers, servers, mainframes, monitors, TVs and display devices, telecommunication devices such as cellular phones, calculators, audio and video devices, printers, scanners, copiers and fax machines, besides refrigerators, air-conditioners; washing machines, microwave ovens and toys.

It also covers recording devices such as DVDs, CDs, floppies, tapes; electronic components such as chips, processors, mother boards, printed circuit boards and industrial electronics. Such wastes are generated by manufacturers, distributors, retailers, consumers, re-users and recyclers and can subsequently arise also from individual households, Government, public and private sectors, importers and secondary markets for old PCs, cell-phones and others.

Trade in e-waste, like that in other scrap, is dominated by the 'informal' sector. Although the waste trade sector in India is known as part of the 'informal' sector, it has a system that is highly organised with extensive coordination in an established network. However, the recycling of e-waste is undertaken in a very unscientific manner, impacting both health and environment.

E-waste or Waste from Electronic and Electrical Equipment (WEEE) is no longer a

subject of academic discussion at environment forums. Instead, there is a growing realisation that the issue may assume dangerous proportions over the next few years, if left unaddressed. According to a survey by IRG Systems South Asia the total waste from electronic and electrical equipment in India has been estimated to be 1,46,180 tonnes per year based on selected EEE tracer items. This figure does not even include WEEE imports. Mumbai currently tops the list of major cities with e-waste. India's financial hub has an estimated 11,017 tonnes of e-waste, followed by Delhi at 9,730 tonnes, Bangalore 4,648 tonnes, Chennai 4,132 tonnes and Kolkata 4,025 tonnes. Even smaller cities such as Ahmedabad (3,287 tonnes), Hyderabad (2,833 tonnes), Pune (2,584 tonnes) and Surat (1,836 tonnes) figure in the list.

As per the existing pollution control laws, companies generating any kind of waste have mandatory responsibilities to ensure that the wastes generated in their premises are either treated, stored, and disposed safely or safely transported to the recycling units registered by State and Central Pollution Control Board. However, there are no specific laws for e-waste today and large quantities of it find their way into the unorganised sector. The magnitude of the problem was captured as early as 2003 when a report released by Toxics Link, an NGO working on toxics and waste issues in India, claimed that a whopping 1.38 million Personal Computers (PCs) would be obsolete technology from the business sector and individual households. It said around 1,050 tonnes of electronic scrap was being produced by manufacturers and assemblers in a single calendar year, whereas in a single month, there was a reported case of import of 30 tonnes of e-waste at Ahmedabad port.

Meanwhile, the minimum number of computers procured by an average-scale scrap dealer or the 'Kabariwallah' is estimated at a whopping 20-25 per month!

A majority of IT companies import computers under custom bonding. A custom-bonded computer, once its lifecycle of three years is over, is either donated to schools or destroyed in the presence of customs officials so it cannot be reused. At Bangalore, the defaced computers are being stored within the premises of these companies.

Effects of E-waste constituents on health		
Sources of e-toxins	Constituents	Health effects
Solder in printed circuit boards, glass panels and gaskets in computer monitors	Lead (pb)	Damage to central and peripheral nervous systems, blood systems and kidney damage Affects brain development of children
Corrosion protection of untreated and galvanized steel plates	Hexavalent Chromium (CrVI)	Asthmatic bronchitis DNA damage
Plastic housing	Brominated flame retardants	Disrupts endocrine system functions
Front panel of CRTs	Barium (Ba)	Short-term exposure causes muscle weakness Damage to heart, liver and spleen
Relays and switches, printed circuit boards	Mercury (Hg)	Chronic damage to the brain Respiratory and skin disorders due to bio-accumulation in fishes
Motherboard	Beryllium	Carcinogenic (lung cancer) Inhalation of fumes and dust causes chronic beryllium disease or beryllicosis. Skin diseases such as warts

Big IT companies, including Infosys, Wipro and TCS, at the moment, are not disposing off e-waste except safely storing the same in their premises.

The IT companies have not been served notice by the pollution control boards. They have only been asked to store the waste within their premises and as such not dispose it off to the Kabariwallah.

Simultaneously, a massive operation is being put in place to create necessary infrastructure to manage the waste. The unit will have the capacity to manage two tonnes of e-waste per day. We are currently evaluating the unit, following which we will award 'consent to operate'," he says.

Various issues will have to be considered to ensure a foolproof e-waste management system in India. There are questions of who pays for proper disposal of it. In Europe and Japan, manufacturers pay for recycling of products or the same is built into the cost of the product. A similar model will be difficult to follow in India, as any escalation in the price of the product, after accounting for the cost of e-waste disposal, will drive customers towards the grey market or the unorganized sector.

As use of computers and electronics grows, there is a marked preference among the less ethical companies in industrialized countries for transferring the burden of handling e-waste to other countries rather than adding the cost of managing it to their overall operations. Such harmful activity is being pursued with the help of facilitating agents in violation of the Basel Convention of the United Nations Environment Programme, which bans movement of hazardous waste. Illegal and environmentally harmful export of e-waste to Asian countries is being reported in media. It has been revealed that discarded computers, television sets, refrigerators, mobile phones, and electrical equipment have been despatched to India, China, and Pakistan in large numbers for ultimate disposal in environmentally unacceptable ways and at great risk to the health of labour.

India's response to smuggling of e-waste into the country has been extremely feeble. The matter has been left to the Central Pollution Control Board with a mandate to prescribe guidelines for safe processing. The general lack of environmental safeguards was exposed by the BBC a couple of years ago through an undercover investigation that proved the existence of a thriving e-waste disposal hub in a suburb of New Delhi, operating in appallingly dangerous conditions. India urgently needs regulations to define e-waste, measures to stop illegal imports, and institutional structures to handle safe disposal of domestic scrap.

4.9 Big dams

Humankind has used dams for thousands of years for irrigation and management and use of floodwaters. In the modern era captive storage of large volumes of water behind dams have served several other functions such as generation of hydropower and water supplies to expanding urban centres and industries. Interventions such as large dams have always involved substantial resources, organisation and know-how and therefore kingdoms and later states have played the most significant role in initiating such works. With the development and availability of sophisticated technology, first in Europe and the US and later in Asia, Africa and Latin America, modern dam building gained great impetus all over the world in pace with urbanisation, expanding population, intensive agriculture and growth of industries. From the 1930s to the 1970s the construction of large dams became – in the eyes of many – synonymous with development and economic progress. Viewed as symbols of modernization and humanity's ability to control and use nature's resources, dam construction saw a dramatic increase. In this period, governments in most countries of the world were building increasing numbers of dams.

Today nearly half of the world's rivers have at least one large dam and there are more than 45,000 large dams in the world. However, majority of the large dams are concentrated in a few countries, with China, the US, India, Japan and Spain accounting for more than three-quarters of all large dams worldwide and approximately two-thirds of existing large dams are located in the developing countries.

Large dams were systematically promoted as the single most important and effective intervention to meet the water and energy requirements of a growing population and an expanding, modernising economy. They came to be seen as the epitome of public welfare projects, providing a definitive logic for long term, strategic investments with their ability to deliver multiple benefits. Some of these additional benefits of dams such as regional development, job creation, and fostering an industry base with export capability, triggering economic growth and change was typical of other large-scale public infrastructure projects. These ripple effects were most often cited as additional considerations for building large dams. Other goals included creating income from export earnings, either through direct sales of electricity or by selling cash crops grown under assured irrigation or processed products from electricity-intensive industry such as aluminium refining. Dams were an important component of national interest investments and there were no doubts as to their role in generating a variety of resources to attain national developmental priorities aiming to address the needs of the economy and people.

Large dams have continued to attract attention due to their increasingly well-established generic nature of the impacts on ecosystems, biodiversity and downstream river regimes. The creation of a large dam reservoir necessarily involves inundation of a large area and this has led to the loss of forests and wildlife habitat, the loss of species populations and the degradation of upstream catchment areas. The dam alters the existing river regime and acting as a physical barrier to species migration, nutrient exchange, and others, has contributed to the loss of aquatic biodiversity and upstream and downstream fisheries. Among the previously neglected but increasingly well known impact of dam impacts was the altered flood regime of rivers adversely affecting downstream floodplains, wetlands, and riverine, estuarine and adjacent marine ecosystems. Where a number of dams have been sited on a river the cumulative impacts on water quality, natural flooding and species composition were complex, leading to considerable losses, much of which could remain undetected for long periods of time. In some cases, enhancement of ecosystem values does occur, through the creation of new wetland habitat and the fishing and recreational opportunities provided by new reservoirs. But in many cases, large dams have led to significant and irreversible loss of species and diverse ecosystems. In recent years, the impacts of possible emission of greenhouse gases from reservoirs on global climate change have raised concern.

India is one of the largest dam building nations in the world. There are 4291 dams in India. 3596 have been built and 695 are under construction. One of the biggest dam projects in India, the Narmada Valley project has been described as India's greatest planned environmental disaster. It has been planned to build 3,200 dams that will reconstitute the Narmada and her 41 tributaries into a series of step reservoirs. Of these, 30 are to be major dams, 135 medium and the rest small. Two of the major dams will be multi-purpose mega dams—The Sardar Sarovar in Gujarat and the Narmada Sagar in Madhya Pradesh. The project will alter the ecology of the entire river basin of one of India's biggest rivers.

One of the appalling facts about dam building in India is the absence of reliable data base on the performance and impacts of large dams. Major and medium irrigation projects have consumed almost all the irrigation budget of independent India. Even when India has invested enormous capital, effort and resources in building large irrigation projects, there is total absence of systematic evaluation to ascertain if the investment is justified, if dams have delivered what they initially promised? How efficiently? At what cost?

In her book 'The Greater Common Good' Booker Prize winning writer and campaigner against big dams Arundhati Roy says "Big Dams are to a Nation's 'Development' what Nuclear

Bombs are to its Military Arsenal. They're both weapons of mass destruction. They're both weapons Governments use to control their own people."

4.10 Endangered wildlife

Wildlife and wildlife habitat play a vital role in the ecological and biological processes that are essential to life itself. The functioning of the biosphere, and hence the maintenance and enhancement of human life, depends on countless interactions among plants, animals, and microorganisms. These ecological processes are essential for agriculture, forestry, fisheries, and other endeavours necessary to human life. They also help maintain environmental quality by degrading and otherwise removing some pollutants and by preventing waste accumulation. Some of the biological processes in which wild species play a key role are pollination, germination, seed dispersal, soil generation, nutrient cycling, predation, habitat maintenance, waste breakdown, and pest control. Birds, for example, can be important in controlling insect pests. Wildlife needs to be managed and conserved for its potential contributions to the future welfare of man. A critical function of wildlife in this connection is as gene banks. Much of the recent spectacular progress in agriculture and animal husbandry is based on selective breeding which depends on the availability of large pools of genetic diversity to choose from. There is concerted effort now to preserve this diversity by preserving wild ancestors of crops like wild rice. The same logic applies to domesticated animals and we must make serious efforts to preserve wild stocks, particularly of the cattle family such as gaur, mithun, banteng, wild buffalo and wild yak.

The rise of capitalism and expansion of European colonialism in the eighteenth and nineteenth centuries led to a loss of wildlife on a scale never before seen in human history. The spread of commerce resulted in the death of hundreds of millions of large animals at the hands of traders. The final and apparently irreversible decline of our wildlife that began during the second world war has continued unabated ever since. Many development projects taken up after independence have been a significant factor in this process.

Many species of wildlife are endangered; some have become extinct due to the destruction of the animals' habitats from agricultural, industrial, and urban developments, as well as having to compete with humans for food. Several hundred species of animals still face the danger of extinction. Progressive loss of habitat, illegal hunting and wildlife trade, removal of dead and fallen trees, collection of minor forest produce, livestock grazing, fire, commercial exploitation of forests, unscientific management practices are the main causes for the decline of wildlife population in India.

The vast global trade in wildlife has definite links to people living in forest areas. Roving gangs of poachers enlist people living in and around forest areas to act as scouts. Being financially vulnerable, elements from these local communities are exploited and misled into helping the poachers. Local people who are poor, mostly landless and socially oppressed are used as prized guides by outsiders to hunt. There are also instances where urban dwellers hunt wildlife either for meat or just for the thrill of it. Wildlife that has high economic value is basically hunted by professional poaching gangs.

The advent of technology by way of flash lights, modern firearms, automobile brake cables and steel wires (instead of vines used earlier for snaring) and anti-malarial drugs (used for poisoning wildlife) has greatly aggravated the problem. Highly deplorable form of sport hunting by the urban elite still continues in many parts of our country. Often retaliatory hunting is carried out against crop raiding ungulates or cattle lifting predators.

Although there are many wildlife sanctuaries threats on wildlife continues. The International Union for the Conservation of Nature and Natural Resources (IUCN) is the world's main authority on the conservation status of species. The IUCN Red List of Threatened Species is the world's most comprehensive inventory of the global conservation status of plant and animal species. In 2007 a total of 41,415 species were on the Red List. Wildlife Protection Act (WPA)1972 has been an important legislation that has helped protect many species in India. Hunting and trading in wildlife is banned under WPA. Wildlife is categorised under various schedules. The threatened animals are categorized as critically endangered, endangered and vulnerable. Some of the animals in the endangered list are elephant, tiger, Assamese Macaque, blackbuck, wild water buffalo and Rhinoceros. Violation of the provisions of the act is punishable with imprisonment upto seven years and fine upto Rs. 10000. A case was filed against Hindi film star Salman Khan in 1998 under the Act for hunting the endangered blackbuck which is revered by the Bishnoi community in Rajasthan. Although many cases have been filed against killing of endangered animals there have been very few convictions.

4.11 Let Us Sum Up

Environmental issues are mostly the result of the development path countries of the world have chosen after the industrial revolution. Macro-economic policies imposed on the South by the North through a number of mechanisms have also contributed to emergence of problems including deforestation. These policies offer strong incentives to obtain short term profits instead of seeking sustainability in the long term. Projects aimed at meeting the needs of the elite have ignored the rights of the local communities whose participation is important

for the success any conservation programme. As the forest cover shrinks diversity in biodiversity declines. Loss of biodiversity destabilizes ecosystems, and weakens their ability to deal with natural disasters such as floods, droughts, and hurricanes, and with human-caused stresses, such as pollution and climate change. The goal of halting the loss of biodiversity by 2010 marks a radical departure from previous approaches. Water is getting contaminated with toxic or radioactive materials from industry, mine sites and abandoned hazardous waste sites. A stricter implementation of the water norms is needed to prevent damage to ecosystems.

Overwhelming evidence has been found by scientists to show that human activities have led to global warming. The consequences of increase in global temperature are already visible. Electronic waste will be a new challenge to those dealing with environmental pollution. The problem will assume a serious proportion if no plan is put in place to handle the problem.

Big dams have destroyed ecosystems and displaced millions of people in India. Despite the dangers involved in building big dams they are still seen as symbols of development as exemplified in the response of the Gujarat and Madhya Pradesh governments to the demand of the environmental groups opposing big dams. Progressive loss of habitat, illegal hunting and wildlife trade, fire, commercial exploitation of forests, unscientific management practices have led to decline wildlife population in India. A comprehensive environment policy is needed to address all these issues.

4.12 Check Your Progress

1. Critically examine the factors that have led to the decline of forest cover.
2. What are the consequences of biodiversity loss? What measure you think can conserve biodiversity?
3. Identify human activities have led to global warming and depletion of ozone layer?
4. Examine the environmental consequences of large dams focusing on a dam in your state?
5. Why is wildlife conservation important? What are the factors that have caused decline in wildlife population?

4.13 For Further Reading

1. Allaby, Michael. (1999). *Thinking Green: An Anthology of Essential Ecological Writings*. London: Barrie & Jefkins.
2. Agarwal, Anil. (2000) (Ed). *Down to Earth Survival Primer*. New Delhi: Centre for

- Science and Environment.
3. D'Souza, Dilip. (2002). *The Narmada Dammed: An Inquiry Into the Politics of Development*. New Delhi: Penguin.
 4. Gadgil, Madhav. (2005). *Ecological Journeys: The Science and Politics of Conservation in India*. New Delhi: Permanent Black.
 5. Gadgil, M., & Guha, R. (1995). *Ecology and Equity*. New Delhi: Penguin.
 6. Ghosh, A.K. (2007). *Biodiversity Conservation*. New Delhi: APH Publishers.
 7. Guha, R. (2000). *Environmentalism: A Global History*. New Delhi: Oxford University Press.
 8. Roy, Arundhati. (1999). The Greater Common Good: The Human Cost of Big Dams. *Frontline*, June 4, 4-29.
 9. Sengupta, Ramprasad. (2002). *Ecology and Economics: An Approach to Sustainable Development*. New Delhi: Oxford University Press.

<http://www.devaltdaJesb/biodiv/strategy.htm>

www.globalissues.org/Envlssues/Biodiversity/Loss.asp

<http://www.jri.org.uk/brief/biodiversity.htm>

<http://www.envfor.nic.in/>

<http://www.unep.org/>

http://www.cseindia.org/html/eyou/climate/index_climate.htm

www.earthislandprojects.org/tpp/esfactsheet.htm

Structure

5.0 Objectives

5.1 Introduction

5.2 The environment as an issue in the media

5.2.1 Low salience issue

5.3 Environmental news in the Indian media

5.4 Objectivity Vs advocacy

5.5 Let Us Sum Up

5.6 Check Your Progress

5.7 For Further Readings

5.0 Objectives

Though people had been aware of the environmental deterioration in a limited localised context for generations the media played an important role in broadening that awareness and transforming many discrete problems into a major public issue. What has previously been perceived as individual difficulties were redefined as part of a more general problem of 'the environment. Media attention became vital in framing the environmental problem as novel and important.

The present unit will help you

- understand how the environment as a issue began appearing in media;
- examine the problems involved in covering environmental issues;
- analyse the role of the media with regard to environmental news coverage, and
- understand how environmental journalism developed in the Indian media.

5.1 Introduction

The daily press was initially slow in grasping the basic substance and style of environmentalism leaving it to the activists, public interest groups and affected communities. The news media were not sure how seriously to treat the growing number of claims by scientists that nature was in trouble because of their preoccupation with industrial growth as a major indicator of development. Often, a journalist would spend enough time with researchers to understand that there was a legitimate story, only to have an editor who did not understand ecological principles junk the idea. But as the environmental problems became more and more visible the media attention increased. As the environmental movement began gaining public support media attention to the environmental issues increased. The number of journalist who reported on the environment increased.

5.2 The environment as an issue in the media

A widespread recognition of the environment as an issue by the media was noticed in the early 1970s. When the Earth Day was celebrated in 1970 the mass media afforded the environmental issue instant and widespread recognition. The interpretation of the Earth Day as 'Day One' of the new environmentalism was widely embraced by the media. As environment moved from being a fringe issue to an issue of paramount concern to the public the media began paying greater attention to it. In the same year the New York Times created an environment beat, a practice that would be followed by major newspapers across in the United States. Television networks broadcast special programmes on pollution, newspapers hired environmental reporters, advertising agencies emphasised ecological features of products, book companies published environmental paperbacks and magazines devoted entire issues to

the protection of nature. By the time the UN Conference on Environment was held in 1972 there was considerable rise in the press coverage of the environmental issues. An information explosion occurred in the mass media leading to a rise in public concern for the environment.

In the early 1970s many newspapers established environmental beats and environmental journalism became an established field in the United States and Europe. By the mid 1970s, a series of factors had forced even reluctant media managers to treat environmental stories as mainstream news. Growing evidence of damage and mounting protests from citizens groups had put environmental concern on the public agenda. Even more important from the media perspective was that the environment had become a political story. Pollution and protection were being hotly debated in legislatures, and opposition politicians found they could score points in the media by attacking governments for failing to protect the public from environmental decline. More and more media began to take the environment seriously. Media interest in the environment seemed to grow till the late 1970s after which a declining trend was visible.

But by the early 1980s there was already a decline in environmental reporting. Many environmental beats disappeared or were institutionalised—absorbed into general news, energy or science reporting—and the few environmental reporters who remained were often starved for space, time and front pages as the environmental movement was in doldrums. This declining trend affected specialised periodicals too.

Media reporting of environmental problems increased at the end of the 1980s reaching a peak in 1989-90 in many countries around the world and declining steadily after that. Studies of media content in the US show that environmental coverage in the early 1990s was less than two per cent, despite the high level of concern amongst the public.

Unlike many other topics, the environment was plagued both by enormous complexity, tied as it was to a range of economic and political issues, and a great deal of scientific uncertainty. As if these problems were not enough, they were made worse by media need for a hard news peg and short deadlines, by the lack of adequate sources and the tendency toward crisis reporting.

Environmental issues can be extraordinarily complex. Covering them well requires sophisticated knowledge about science, law, politics, history, ethics, economics and international relations. Once environmental reporting became a part of newsgathering journalists began to realise that environmental subjects were multifaceted, involving not just technical information but also legal, financial, political and social considerations. Much of what needed to be covered affected human health and involved evaluating costs and benefits and government regulations. Moreover, environmental concerns usually involved a long and tenuous string of interrelated concerns that all had an impact on people's lives. To cover a story properly, the environmental reporter needed to deal with all of them. There were almost always uncertainties about scientific data. Experts disagreed about interpretations and applications of research, or how to manage

environmental trade-offs.

To a large extent, media coverage of environmental issues is constrained and shaped by the same production constraints which govern news work in general. Organisational factors, professional ideology and newsmen's sense of news values affect what is selected as news. Since what happens makes news, it seems that news is always or mainly concerned with the unusual and the unexpected.

While the construction of news may be influenced by cultural or political factors, it is generally seen as the result of inescapable organisational routines within the newsroom itself. Rather than digging for information reporters opt instead for a diet of routine news derived from a mix of scheduled events and pre-formulated accounts of events so as to meet the deadlines and story quotas. News that conforms to the existing formats is favoured over longer and more nuanced stories that deal with underlying causes and conditions. This means that that environmental issues and problems are often framed by journalists within an event orientation. This event orientation not only allows news sources to control the establishment of story frames but also absolves journalists from attending to the bigger environmental picture. Event-centred reporting has become so dominant that journalists are required to picture environmental hazards like global warming, ozone depletion, acid rain and others. as the recent outcomes of an event rather than the inevitable outcome of a series of political and social decisions.

While event-centred coverage has the advantage of raising public awareness of otherwise ignored environmental topics, it also has a negative side. By focusing on discrete events rather than on contexts in which they occur, the media tend to give news consumers the impression that individuals or errant corporations rather than institutional politics and social developments are responsible for those events. Powerful institutions like the government, bureaucracy and political institutions are not blamed. Media stories on environmental hazards highlight only one cause and ignore others.

5.2.1 Low salience issue

The problem is keeping environmental issues not only visible but also a higher priority. People tend to view the environment as an important issue to monitor, but not urgent enough to require immediate attention. Politically, the attitude is that environmental problems can be put aside temporarily—while problems such as unemployment, crime on the streets, and the economy must be addressed immediately.

The environment is considered a 'low-salience issue' according to those who conduct opinion polls. When compared with other national concerns such as education, health care, social security and the short-term conditions of the economy, the environment consistently is pushed out of the emergency room and into the waiting room.

There are some problems which are simple to cover. You can go down to the local river, stick a hand in the water and photographing it as it emerges covered with mud. When these most graphic forms of pollution are not visible, so too is the local media attention that thrive on compelling pictures of trashed beaches, brackish water, and stained skies. The general public usually does not see the direct, immediate effects of many environmental problems when they walk out of the front door.

Most environmental issues today are more complex and more difficult to communicate than they were year ago, for both the media and the public. Today we have carbon dioxide build-up contributing to global climate change, invisible chemicals that are harming random member of future generations, minuscule air pollutants that aggravate our lungs, and species we never knew existed disappearing off the face of the planet. All of these subjects require time to explain and more scientific literacy than was needed to understand shores full of dead fish.

These factors, coupled with the fact that many of the most pressing environmental issues are slow burners that will go on for decades—as opposed to the breaking stories that are here today, gone tomorrow—help explain why media coverage often does not convey the depth or urgency of environmental problems.

Many environmental journalists have reported long-term trend of declining interest among editors in the daily fare of environmental reporting. Some reporters say they lack adequate time or space to research and report the issues, while others complain that when they do have sufficient time, their stories are relegated to the back pages of the newspaper or late in the broadcast.

5.3 Environmental news in the Indian media

When the United Nations Conference on Human Environment was held at Stockholm in 1972 very few correspondents of the Indian newspapers covered it. The environment concern was dismissed as a Western fad irrelevant to the Third World countries. The attitude of the press appeared to be in line with Prime Minister Indira Gandhi's defence of development over environment at the Conference. But, a gradual change in the attitude of the press was noticed after the Conference. The press began taking some interest in the environment only after the Chipko movement began in the Himalayas for the protection of forests. It was the first popular struggle against the destruction of the environment in independent India that received international recognition. When the environmental news began appearing in the media in the 1970s, it was seen as part of a broad area of development journalism. One of the objectives of development journalism was to create awareness among the people about the need to protect the environment. Journalists specialising in development reporting also wrote on environmental issues.

While a widespread recognition of the environment as an issue by the Western and European media was noticed in the 1970s, such a trend became visible in the Indian press in the 1980s. The decade witnessed many environment-related events that attracted the press attention. The government took several measures aimed at protecting the environment beginning with The Forest (Conservation) Act of 1980. As the environmental movement grew into a significant force newspapers began paying attention to the questions raised by the environmental groups. Environmental groups brought pressure on the government to stop some projects and review some of its development policies. Protest of various forms launched by environmental groups against environmental destruction provided dramatic news to the press. The struggle for protection of Silent Valley in Kerala made headlines in the local and national press as Kerala Sastra Sahitya Parishat (KSSP) intensified its campaign to mobilise people's support in the early 1980s. No other movement had got so much of media attention as the Silent Valley movement after the Chipko movement of the 1970s.

The Bhopal disaster of December 1984 proved to be the turning point in environmental reporting. It was only after the disaster that newspapers paid attention to the seriousness of the environmental pollution. The magnitude of the disaster shook many newspapers out of their indifference to environmental problems. Thousands of correspondents descended on Bhopal to cover the worst ever-industrial disaster. The disaster continued to make news for years as the victims' embarked on a long struggle for justice. Hundreds of environmental groups took birth following the disaster. The dramatic increase in their number indicated greater awareness among the people about the environment. More environmental groups meant more environment-related events.

With the increase in awareness, popular campaigns were launched against environmentally destructive projects. Anti-nuclear campaigns intensified in the wake of the Chernobyl disaster. The involvement of writers, artists, film stars and religious leaders in the protest against building of nuclear power plants provided dramatic news for the newspapers. Environmental pressure groups which realised the importance of publicity began interacting with the pressmen by providing them information and by taking them on a tour of the controversial project sites. No other pressure group has used the press as devastatingly as environmentalists have done. There was a healthy co-operation between the press and the activists.

The English press appeared to be slow in picking up environmental stories. The reports about people's action for environmental protection appeared first in local Indian language newspapers and then in the major Indian-language newspapers and later in the English dailies. The leading English newspapers demonstrated greater interest in the environmental issues in the 1980s. Newspapers contributed to the beginning of an informed public debate on environmental issues. An explosion of investigative journalism made its impact on the reporting of issues and events. Newspapers attempted to dig out information about the controversial projects likely to cause environmental hazards.

The Centre and the state governments enacted legislations and launched several plans for protecting the environment resulting in an increase in the number of environment-related activities. The government began its dual role as a facilitator of economic growth and as environmental regulator and champion. The newspapers found environmental intervention, in a limited degree, by the government necessary to stop natural resources from being exploited. Such a role of the government made it a major source of news for the newspapers. But, the information given to the press by the newspapers by the governmental agencies was of very general nature. Hardly any information was available about controversial projects. The government built an iron curtain around the projects and prevented the newspapers from gathering technical details. The Official Secrets Act was used to deny information about controversial projects to the press. Difficulty in getting information has been considered as one of the reasons for very low coverage of environmental news.

This decade also saw a sudden spurt in the number of public interest litigations filed by activists. Once the Supreme Court had developed a new public interest litigation to tackle matters of public interest that were otherwise neglected, it was inevitably drawn into issues concerning the environment. Controversies involving courts make headlines in the newspapers. Since reporting court is a regular beat in most of the major newspapers, environmental issues being heard receive good coverage in the newspapers. The Supreme Court took up a huge number of issues including discolouring of the Taj Mahal by industrial pollutants, deforestation, pollution in Delhi, pollution of Yamuna and Ganges and garbage disposal. The pro-environment judgements led to increased use of public interest litigation. As the court began handling more environmental cases, the press attention to them increased.

By the beginning of the 1990s the newspapers had realised that environment was one of the issues that the nation had to address. When the Earth Summit was held in Rio de Janeiro in 1992 a huge contingent of Indian media men covered it. It was in total contrast to how the Stockholm conference was covered two decades ago. It indicated a realisation by the Indian media that a global policy was needed to address environmental problems and that they were not the concerns of people in the developed countries alone. All those newspapers that had dismissed environmentalism as a Western fad sent their correspondents to cover the Rio Summit. The Summit received comprehensive coverage in the newspapers with some newspapers bringing out special supplements. Many newspapers introduced special sections and columns on the environment as the environmental awareness among the readers increased. Some of the environmentalists wrote columns in the newspapers analysing problems and offering solutions. Specialisation in environmental reporting did not grow to the extent it had grown in Northern America and Europe. Except The Hindu, no other mainstream newspaper appointed 'environmental reporters'.

Much of the reporting in the daily newspapers is done by non-specialists. But, specialisation has developed in magazine journalism. Many environmental magazines were launched in the

1990s. 'Down to Earth', published by the Centre for Science and Environment is a popular magazine with wide circulation that provides in-depth analysis of environmental issues. The magazine has exposed the hazardous contents in the soft drinks and water sold by multinational companies like Coca Cola and Pepsi. The magazine's exposes forced the government to introduce new norms for soft drinks and bottled water. There are many magazines in the Indian languages that are devoted to subjects related to the environment.

Since specialised magazines reach only those who have special interest in environmental issues the role of daily newspapers is vital in informing the general readers about the environmental issues. Popular opinion about the environmental problems and policies can only be built through the daily press as it reaches all sections of the society.

Though environmental coverage in the daily newspapers has increased over the years it has often been on disasters and dramatic developments. Activists and groups may be involved in creating awareness for a long period of time but it becomes newsworthy only when there is a controversy or confrontation. The press has seldom taken initiative in reporting environmental issues. Newspapers have reported environmental issues only after the pressure groups have taken them up and highlighted them. They are usually reported after the grassroots campaigns take off. Another trend noticed is that the newspaper focuses on personalities who lead the environmental movements rather than on the innumerable men and women who contribute to the movement. Notwithstanding these trends, press coverage of environmental issues seems to have grown both in volume and scope.

Radio and television in India have also been reporting on several environmental issues. All India Radio has broadcast programmes aimed at creating awareness among the listeners, especially about gober gas and organic farming. Since radio news and current affairs programming is still under the control of the government controversial issues are not usually covered. Environmental information was included in many of the programmes telecast by Doordarshan. One of the important programmes aimed at popularising science was 'Turning Point'. The programme reported on issues like global warming, ozone depletion, water pollution, oil spill and resource depletion. The environmental content in media increased after the arrival of the satellite television channels in the early 1990s. The channels devoted to wildlife and geography telecast several programmes bring the attention of the viewers to the serious threats to flora and fauna. They have also introduced eco-friendly practices and values of the communities around the world to the audiences.

There are some independent organisations that produce programme on the environment for broadcast media. One such organisation is the Television Trust for the Environment (TVE). It is an independent, non-profit organisation, which promotes global awareness of the

environment, development, human rights and health issues through the platforms of broadcast television and other audio-visual media. A UK-registered charity, TVE fulfils an international remit in association with offices and networks of partner organisations in Africa, Asia Pacific and Latin America and the Caribbean. TVE works above all to promote informed debate, public awareness and practical solutions to the growing challenges of human development. TVE was set up in 1984 with the support of WWE, the United Nations Environment Programme (UNEP) and Central Television (now part of ITV). TVE is not affiliated to any pressure group and all its films for broadcast are made on a strictly editorially independent basis. The Center for Science and Society that publishes *Down to Earth* magazine sell the films of TVE in India.

Although environmental coverage in television has been increasing it is argued that since the medium is devoted to material growth, progress and fun it may not promote pro-environment values. It has been found that the coverage on television has been confined primarily to environmental catastrophes. The environmental story has been told in ways which emphasize simplistic themes and has not adequately covered significant environmental topics which are less visual. Environmental stories covered on the news are routinely covered the way all news is, in small quantities and for short amounts of times.

5.4 Objectivity Vs advocacy

Objectivity or play an advocacy role with regard to environmental reporting has been a subject of debate for decades. While most media organisations want to address the environmental problems through objective reporting, some of them have proclaimed themselves environmental advocates. The concept of objectivity in journalism first arose during the nineteenth century as part of the sweeping intellectual movement towards scientific detachment and the culture-wide separation of fact from value. Objectivity is still viewed as the cornerstone of journalistic profession. Objectivity in environmental reporting means that reporters often attempt to distance themselves and their readers from the environmental struggle to effect a shift in public consciousness, taking refuge instead in the objectivism of science. Journalists thus see themselves as neutral and ironic voice, willing to produce news only if the scientific evidence concerning environmental problems is sufficiently powerful and unambiguous. But some scholars have found that very few environmental reporters are sufficiently well informed to be able to evaluate the 'scientific standing' of evidence.

Reporting objectively also means that journalists rarely express the content of environmental stories in overtly political terms, opting instead for news frames that emphasise conservation, civic responsibility and consumerism. Presenting events in historical and social context would take too much time or space. A major attraction of environmental issues for the media is that they can be depicted in non-partisan terms, allowing journalists to subversively foster environmental protest at the same time as appearing to maintain a politically balanced

stance. This means that environmentalists and their opponents are given equal space or time in the media without attempting to resolve who is right. In such a situation it becomes difficult for the environmentalists to convince the public that an 'issue' in fact is a 'problem'.

Those who argue that journalists should take an active part in environmental protection say that reporting accurately what their sources say can effectively remove responsibility for their stories onto their sources. The ideal of objectivity is rejected on the ground that it encourages uncritical reporting of official statements and those of authority figures. In this way, the individual biases of journalists are avoided but institutional biases are reinforced. Objective reports represent society's dominant values, largely agreed upon by government, commerce and other institutions including the media. The word 'objectivity' is used defensively by some reporters as a strategic ritual protecting them from mistakes as well as critics.

The idea that a reporter would openly espouse a point of view on a public issue violates the accepted canons of journalistic practice. While many in the public distrust the media and see their interests as profitability and sensationalism rather than public service and effective communication, the press sees itself as an instrument of public communication that separates fact from opinion and tries to present its audiences with impartial reports.

Because of the concern by some activists and scientists that the media are not doing an adequate job, a few have called on the media to abandon their traditions of "objective" reporting. They argue that journalists must become "advocates" if society is to prevent global warming, the continued decay of the life-protecting ozone shield, the conditional loss of topsoil and forests, the degradation of the oceans, and the projected loss of one million species of plants and animals by 2020.

Those who favour advocacy journalism argue that the time is running out and that one can't afford to wait for the audience to come to their own conclusions. Lester Brown has said: *"We don't have time for the traditional approach to education—training new generations of teachers to train new generations of students—because we don't have generations, we have only years. The communications industry is the only instrument that has the capacity to educate on the scale needed and in the time available."* (cited in Detjen, 1991, p.94). Advocacy is strongly recommended as the media have the ability to educate millions of people. Advocacy is considered as a means through which further damage to the environment can be prevented.

But, Detjen (1991) argues that though the media coverage of environmental issues is often lacking, advocacy journalism is not an answer. He says, *"I believe that advocacy journalism, if it means one-sided and unfair reporting, is misguided and in the long run counterproductive. If major newspapers, magazines and broadcast stations adopt an advocacy philosophy, the media will be treading on dangerous ground that could alienate readers and viewers and cause them to stop trusting the media. Journalists who have spent their careers*

establishing reputations for fairness and accuracy could suddenly find their credibility evaporating” (p.94). His argument is in complete defence of the objective of International Federation of Environmental Journalists (IFEJ) which clearly says that environmental journalists should not advocate any cause. Detjin who was the founder president of the IFEJ believes that advocacy will lead to erosion of credibility. He prefers traditional approaches of media—such as investigative reporting, agenda setting and mass education—to advocacy.

Journalists consider it important to maintain their tradition of healthy scepticism, continuing to question government, corporations and even environmental groups. The code of Asian Forum of Environmental Journalists (AFEJ) adopted in 1998 says, *“The journalist should not be influenced on environmental issues by vested interests—whether they are commercial, political and governmental or non-governmental. The journalist ought to keep a distance from such interests and not ally with them. As a rule, journalists should report all side in any environmental controversy”* (Asian Mass Communication Bulletin, 1998, p.2). It is clear that support to any group in reporting environmental controversies is considered an unjournalistic practice.

Many argue that media embrace of professional objectivity leads to lack of public debate and may result in inadequate information reaching the audience. But, the mainstream media seldom advocate environmental causes; as such a policy is a deviation from the accepted professional norms.

One of the indicators of the environmental advocacy is publication of mobilising information. Information through newspapers becomes important in mobilising people for a cause. ‘Mobilising information’ is information that allows people to act. The information may be about what to do, where to go, and whom to contact. Studies have shown that mobilising information was missing in negative and controversial contexts. Mobilising information helps environmental groups or citizens groups in appealing to readers to take part in their programmes of environmental action. Frequency of appearance of mobilising information is an indication of importance or support newspapers give to a cause. The quantity of news carrying mobilising information in India has been negligible.

5.5 Let Us Sum Up

The environment emerged as an issue in the in the West in the 1970s. With the celebration of the Earth Day in 1970 the environment received instant and widespread recognition media recognition. Activists, public interest groups and the communities affected by the environmentally destructive projects were the first to raise the issues, which were later picked up by the media. The Indian media initially did not show interest in covering the environment as they considered environmentalism as a Western fad irrelevant to India. But by the time the Rio Summit was held there was realisation that to deal with environmental problems global

action was needed. Environmental news in the Indian media increased in the 1980s as some major disasters occurred in that decade. The Bhopal gas tragedy is considered as a turning point in Indian environmental journalism. Covering environmental issues is complicated as they are linked to economic, scientific and social factors. The media tend to focus events and personalities rather than on long term effects. Whether media should promote environmental causes has been a subject of debate. While some argue that media should play advocacy role with regard to serious environmental problems others argue that they should follow the professional norm of distancing themselves from the issue in order to provide objective coverage.

5.6 Check Your Progress

1. Outline the emergence of the environment as an issue in the media
2. What are the difficulties involved in covering environmental news?
3. Do you think that media objectivity with regard to environmental news coverage leads to lack of public debate? Explain your view.
4. Make a comparative analysis of the environment content in any two leading newspapers of Your Choice.

5.7 For Further Readings

- Akhileshwari, R. (1989). Environment and the Media. *Vidura*, 26(3), 11-13.
- Chapman, G., Kumar, K., Fraser, C., & Gaber, I. (1997). *Environmentalism and the Mass Media: The North-South Divide*. London. Routledge.
- Cox, R. (2006). *Environmental Communication and the Public Sphere*. Thousand Oaks: Sage.
- Detjen, J. (1991). The Traditionalist's Tools (And a fistful of new ones). In C.L. LaMay & E.E. Dennis (Eds.), *Media and the Environment* (pp. 91-101). Washington, DC: Island Press.
- Gadgil, M., & Guha, R. (1995). *Ecology and Equity*. New Delhi: Penguin.
- Hansen, A. (1993). Geenpeace and Press Coverage of Environmental Issues. In A.Hansen (Ed.), *The Mass Media and Environmental Issues* (pp.150-178). London: Leicester University Press.
- LaMay, C.L. & Dennis, E.E. (Eds.), *Media and the Environment*. Washington, DC: Island Press.
- Lowe, P., & Morrison, D. (1984). Bad News or Good News: Environmental Politics and the Mass Media. *The Sociological Review*. 32 (1), 75-90.

- Mazur, A. (1985). The Mass Media in Environmental Controversies. In A. Brannegan & S. Golderberg (Eds.), *Social Response to Technological Change* (pp. 135-151). Westport, CT: Greenwood Press.
 - Sandman, P.M., Sachsman, D.B., Greenberg., Gochfeld, M. (1987). *Environmental Risk and the Press*. New Brunswick: Transaction Books.
- Wicker, T. (1971). The Greening of the Press. *Columbia Journalism Review*, May/June, 7-10.

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Student Support Services of KSOU:

For the benefit of over 45,000 students who enroll to various academic programmes every year, the university has established eight regional centers and seventy eight study centers across the state. These study centers act as extension centers of the university and provide a platform for the learners to interact with the counselors and experts. They provide academic counseling and liaison in the matters related to academics, examination and administration. Regional centers oversee the functioning of the study centers and act as a link between the university headquarter and the study centers.

Counseling and personal contact programme are an integral part of teaching and learning process. Counseling at KSOU is distinctly different from the conventional classroom teaching and is much an interactive session. These sessions are conducted at the convenience of the students. In certain specialised subjects, experts from the profession are invited for interaction. Gyanvani, the dedicated FM radio channel airs educational programmes on various subjects regularly to augment information needs. Radio counseling provides an opportunity for the students to interact live with the experts.

Role of ODL in a Knowledge Society

Open and Distance Learning (ODL), an innovation started off four decades ago has now grown into a powerful force creating opportunities to thousands who are in search of skills, knowledge and challenging openings. ODL today is such an effective tool and it has challenged many long held beliefs and traditions of conventional educational processes. At present, open and distance education has a crucial role to play in the process of human development. Greater emphasis on ODL has made many poorly resourced and managed institutions to give way to quality and sophistication of educational facilities, that are offered by professionally managed open universities like KSOU. In this context, KSOU aspires to be on par with the global best practice and benchmarks. It has taken serious note of the roles and responsibilities it shoulders.

ODL is now the most influential educational phenomenon. New technologies that are emerging have changed the very nature of teaching learning process. Institutional experience world over so far has led to the fine tuning of the ODL process. As the society is moving fast in the first phase of knowledge era, it has become necessary to know how the ODL system works in a knowledge society. Trends in global economy and resource crunch have led to new methods in education and training. Life long learning has become a necessity as people have to remain competitive in order to survive and increase the opportunities that are rewarding.

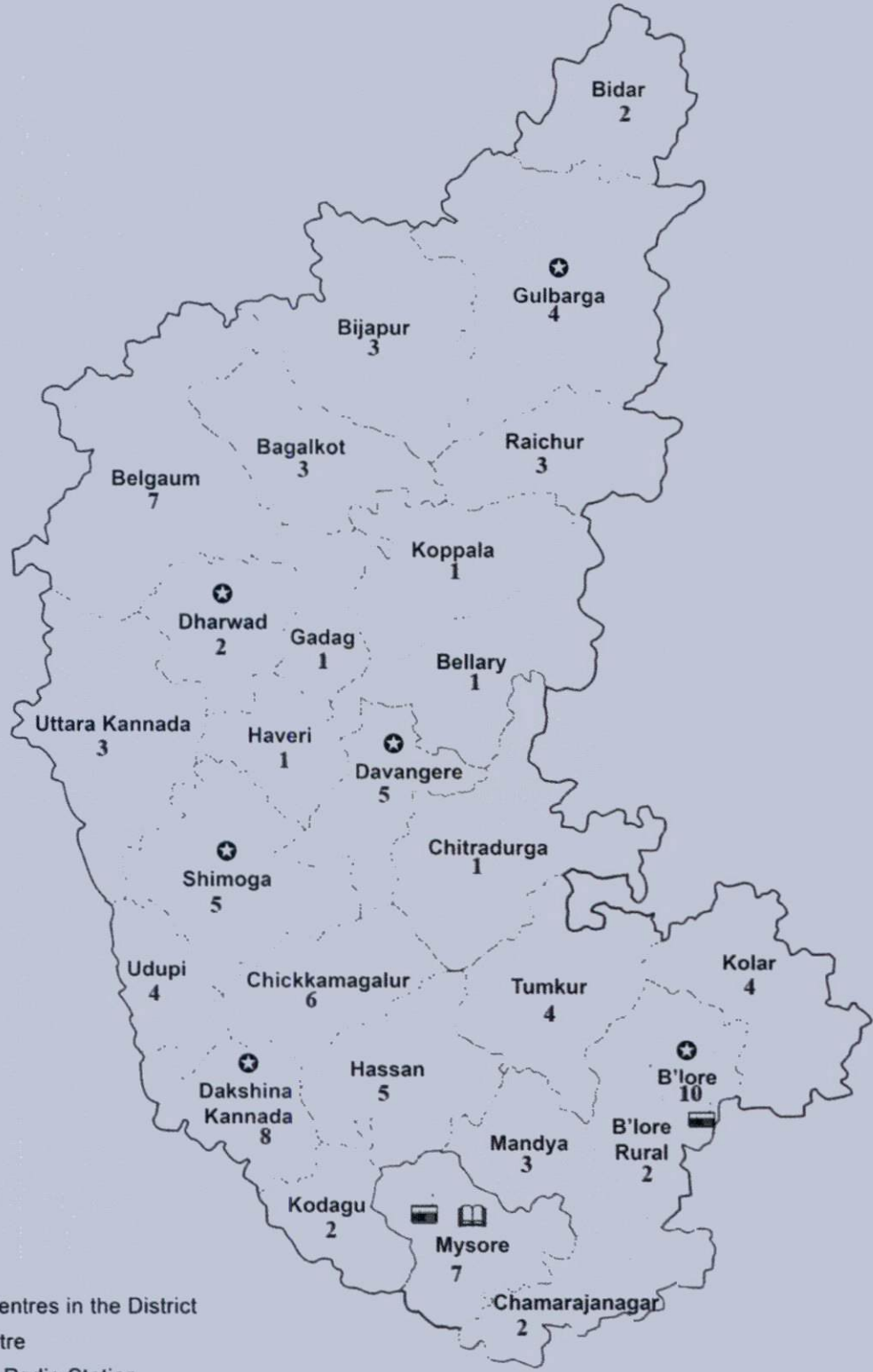
ODL is always linked to technology particularly to those of multimedia. Integrating the knowledge media into ODL system is another revolution that is in the forefront. Convergence of computing, telecommunications and cognitive sciences will allow more equitable access to resources that are supported by new age technology rather than human resources. Also, the distinction between conventional students in traditional education process and the ODL learners is increasingly blurred. Competitive pressures faced by educational institutions, absence of government funding, commoditization of knowledge market and increased demands for quality inputs and services are the main factors responsible for the rapid change.

Hence, ODL education is gaining momentum as the demand for learning is enormous. The present day trends show a clear shift in approach. Higher education is now a mass system rather than an elite one. Academic work produced by a team is emphasized rather than that of individuals. One can also notice that more and more distance education techniques are being adopted in the conventional institutions of higher education in instructional and delivery systems. Use of technology in instructional design and material preparation has made the teacher to don a new role as a mediator, a resource manager to facilitate learning rather than being a mere instructor. Also, interest in the areas of communication and information technology is gaining momentum.

Though collaboration within and outside educational sectors is rapidly increasing technological gap between developing and developed countries still exists. As the new technologies provide new ways of processing and distributing information, new kinds of learning products are being created, element of interactivity among students themselves and with new teachers is increasing. Distance has died down as new methods enable to deliver on demand multimedia education and training services directly to home and offices. Mediated process of communication and learning combined with face to face and virtual human interaction will be the new paradigm. New possibilities in communication technologies and their application have given rise to new trends in ODL process. Drift from mass produced self instructional packages towards collaborative and interactive learning is amply seen. Access to information from multiple sources and multiple formats is now possible. Working collaboratively with peer group and instruction at different sites either synchronously or asynchronously has made work and learning inseparable. Post experience courses are becoming important courses that are being offered by the universities and institutions. With the application of digital technology new forms of literacy has emerged which is distinctly verbal and visual than literary.

In this context, the Department of Mass Communication and Journalism, KSOU has understood the need of the media professionals in India and is striving hard to impart quality training through its programmes. This course is one such sincere effort to serve the needs of the nation.

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- Gyanvani FM Radio Station

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