

**Textbook for**

# **Environmental Studies**

**For Undergraduate Courses  
of all Branches of Higher Education**

**Erach Bharucha  
for  
University Grants Commission**

*Natural Resources*

i

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## Vision

The importance of Environmental Studies cannot be disputed. The need for sustainable development is a key to the future of mankind. The degradation of our environment is linked to continuing problems of pollution, loss of forest, solid waste disposal, issues related to economic productivity and national as well as ecological security. The increasing levels of global warming, the depletion of the ozone layer and a serious loss of biodiversity have also made everyone aware of growing environmental concerns. The United Nations Conference on Environment and Development held in Rio De Janero in 1992, and the World Summit on Sustainable Development at Zoharbex in 2002 have drawn the attention of people around the globe to the developing condition of our environment. It is clear that no citizen of the earth can afford to be ignorant of environmental issues. Environmental management has become a part of the health care sector. Managing environmental hazards and preventing possible disasters has become an urgent need.

Human beings have been interested in ecology since the beginning of civilization. Even our ancient scriptures have included practices and values related with environmental conservation. It is now even more critical than ever before for mankind as a whole to have a clear understanding of environmental concerns and to follow sustainable development practices.

India is rich in biodiversity which provides various resources for people. It is also the basis for biotechnological development. Only about 1.8 million living organisms have been described and named globally. Still many more remain to be identified and described. Attempts are made to conserve them in ex-situ and in-situ situation. Intellectual Property Rights (IPRs) have become important in a biodiversity rich country like India to protect microbes, plants and animals that have useful genetic properties. Destruction of habitats, over use of energy resources and environmental pollution have been found to be responsible for the loss of a large number of life forms. It is feared that a large proportion of life on earth may get wiped out in the near future.

In spite of the developing status of the environment, the formal study of environment has so far not received adequate attention in our academic performances. Recognition thus the Hon'ble Supreme Court directed the UGC to introduce a basic course on environment for every student. Accordingly the matter was considered by the UGC and it was decided that a six months compulsory core module course in environmental studies may be prepared and compulsorily implemented in all the Universities/ Colleges in India.

The Expert Committee appointed by the UGC has looked into all the pertinent questions, issues and other relevant matters. This was followed by framing of the Core Module Syllabus for Environmental Studies for undergraduate courses of all branches of Higher Education. The Committee is deeply conscious that there are bound to be gaps between what is considered ideal and the present syllabus. The Committee has attempted to minimize the gaps by intellectual and material inputs. The success of this course will however depend on the initiative and drive of the teachers and their students.

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*Natural Resources*

iii

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# Six Months Compulsory Core Module Course in Environmental Studies: for Undergraduate Students

## Teaching Methodologies

The Core Module Syllabus for Environmental Studies includes classroom teaching and fieldwork. The syllabus is divided into eight units covering 50 lectures. The first seven units which will cover 45 lectures are classroom teaching based to enhance knowledge skilled and attitude to environment. Unit eight is based on field activities and would be covered over five lecture hours and would provide students with first hand knowledge on various local environmental aspects. Field experience is one of the most effective learning tools for environmental concerns. This moves out of the scope of the textbook mode of teaching, into the realm of real learning in the field, where the teacher acts as a catalyst to interpret what the student observes or discovers in his/her own environment. Field studies area as essential as class work and form an irreplaceable synergistic tool in the entire learning process.

The course material provided by UGC for class room teaching and field activities should be utilised.

The Universities/ colleges can draw upon expertise of outside resource persons for teaching purposes.

The Environmental Core Module shall be integrated into the teaching programs of all undergraduate courses.

Annual System: The duration of the course will be 50 lectures. The exam will be conducted along with the Annual Examination.

Semester System: the Environment course of 50 lectures will be conducted in the second semester and the examinations shall be conducted at the end of the second semester.

Credit System: The core course will be awarded 4 credits

Exam Pattern: In case of awarding the marks the question paper should carry 100 marks. The structure of the question paper being:

Part A, Short answer pattern	- 25 marks
Part B, Essay type built choice	- 50 marks
Part C, Field Work	- 25 marks

## Further Readings

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# Contents

<b>PREFACE</b>	<b>xiii</b>
----------------	-------------

<b>FOREWORD</b>	<b>xv</b>
-----------------	-----------

<b>ACKNOWLEDGEMENTS</b>	<b>xvi</b>
-------------------------	------------

## **UNIT 1: THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

<b>1.1 DEFINITION, SCOPE AND IMPORTANCE</b>	<b>3</b>
1.1.1 Definition	3
1.1.2 Scope	3
1.1.3 Importance	5
<b>1.2 NEED FOR PUBLIC AWARENESS</b>	<b>8</b>
1.2.1 Institutions in Environment	9
1.2.2 People in Environment	12

## **UNIT 2: NATURAL RESOURCES**

<b>2.1 INTRODUCTION</b>	<b>16</b>
<b>2.2 RENEWABLE AND NON-RENEWABLE RESOURCES</b>	<b>20</b>
2.2.1 Natural resources and associated problems	20
2.2.2 Non-renewable resources	22
2.2.3 Renewable resources	22
<b>a. Forest Resources:</b> Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people	23
<b>b. Water Resources:</b> Use and over-utilisation of surface and ground water, floods, drought, conflicts over water, dams – benefits and problems.	26
<b>c. Mineral Resources:</b> Use and exploitation, environmental effects of extracting and using mineral resources, case studies.	30
<b>d. Food Resources:</b> World food problems, Changes in landuse by agriculture and grazing, Effects of modern agriculture, Fertilizer/ pesticide problems, Water logging and salinity	32
<b>e. Energy Resources:</b> Increasing energy needs, Renewable/ non renewable, Use of Alternate energy sources, Case studies	35
<b>f. Land resources:</b> Land as a resource, land degradation, man-induced land-slides, soil erosion and desertification.	48

<i>Natural Resources</i>	<b>vii</b>
--------------------------	------------

<b>2.3 ROLE OF AN INDIVIDUAL IN CONSERVATION OF NATURAL RESOURCES</b>	<b>50</b>
---	-----------

<b>2.4 EQUITABLE USE OF RESOURCES FOR SUSTAINABLE LIFESTYLES</b>	<b>51</b>
--	-----------

### **UNIT 3: ECOSYSTEMS**

<b>3.1 Concept of an ecosystem</b>	<b>54</b>
------------------------------------	-----------

3.1.1 Understanding ecosystems	55
--------------------------------	----

3.1.2 Ecosystem degradation	55
-----------------------------	----

3.1.3 Resource utilisation	56
----------------------------	----

<b>3.2 Structure and functions of an ecosystem</b>	<b>56</b>
--	-----------

<b>3.3 Producers, consumers and decomposers</b>	<b>57</b>
---	-----------

<b>3.4 Energy flow in the ecosystem</b>	<b>58</b>
---	-----------

3.4.1 The water cycle	58
-----------------------	----

3.4.2 The Carbon cycle	59
------------------------	----

3.4.3 The Oxygen cycle	60
------------------------	----

3.4.4 The Nitrogen cycle	60
--------------------------	----

3.4.5 The energy cycle	61
------------------------	----

3.4.6 Integration of cycles in nature	62
---------------------------------------	----

<b>3.5 Ecological succession</b>	<b>62</b>
----------------------------------	-----------

<b>3.6 Food chains, Food webs and Ecological pyramids</b>	<b>62</b>
---	-----------

3.6.1 The food chains	62
-----------------------	----

3.6.2 The food webs	63
---------------------	----

3.6.3 The ecological pyramids	63
-------------------------------	----

<b>3.7 Introduction, Types, Characteristic features, Structure and functions</b>	<b>63</b>
--	-----------

3.7.1 Forest ecosystem	65
------------------------	----

3.7.2 Grassland ecosystem	70
---------------------------	----

3.7.3 Desert ecosystem	74
------------------------	----

3.7.4 Aquatic ecosystems (ponds, lakes, streams, rivers, estuaries, oceans)	75
---	----

### **UNIT 4: BIODIVERSITY AND ITS CONSERVATION**

<b>4.1 INTRODUCTION – DEFINITION: GENETIC, SPECIES, ECOSYSTEM DIVERSITY</b>	<b>82</b>
---	-----------

4.1.1 Genetic diversity	82
-------------------------	----

4.1.2 Species diversity	82
-------------------------	----

4.1.3 Ecosystem diversity	83
---------------------------	----

<b>4.2 BIOGEOGRAPHIC CLASSIFICATION OF INDIA</b>	<b>84</b>
--	-----------



<b>4.3 VALUE OF BIODIVERSITY: CONSUMPTIVE, PRODUCTIVE USE, SOCIAL, ETHICAL, AESTHETIC AND OPTION VALUES</b>	<b>84</b>
4.3.1 Consumptive value	85
4.3.2 Productive value	86
4.3.3 Social value	86
4.3.4 Ethical value	88
4.3.5 Aesthetic value	88
4.3.6 Option value	88
<b>4.4 BIODIVERSITY AT GLOBAL, NATIONAL AND LOCAL LEVELS</b>	<b>88</b>
<b>4.5 INDIA AS A MEGA DIVERSITY NATION</b>	<b>89</b>
<b>4.6 HOTSPOTS OF BIODIVERSITY</b>	<b>90</b>
<b>4.7 THREATS TO BIODIVERSITY: HABITAT LOSS, POACHING OF WILDLIFE, MAN-WILDLIFE CONFLICTS</b>	<b>91</b>
<b>4.8 ENDANGERED AND ENDEMIC SPECIES OF INDIA</b>	<b>94</b>
4.8.1 Common Plant species	94
4.8.2 Common Animal species	99
<b>4.9 CONSERVATION OF BIODIVERSITY: IN-SITU AND EX-SITU</b>	<b>104</b>
4.9.1 In-situ conservation	104
4.9.2 Ex-situ conservation	108
<b>UNIT 5: ENVIRONMENTAL POLLUTION</b>	
<b>5.1 DEFINITION</b>	<b>112</b>
<b>5.2 CAUSES, EFFECTS AND CONTROL MEASURES OF:</b>	<b>113</b>
5.2.1 Air Pollution	113
5.2.2 Water Pollution	123
5.2.3 Soil Pollution	131
5.2.4 Marine Pollution	135
5.2.5 Noise Pollution	140
5.2.6 Thermal Pollution	142
5.2.7 Nuclear hazards	143
<b>5.3 SOLID WASTE MANAGEMENT: CAUSES, EFFECTS AND CONTROL MEASURES OF URBAN AND INDUSTRIAL WASTE</b>	<b>145</b>
<b>5.4 ROLE OF INDIVIDUALS IN POLLUTION PREVENTION</b>	<b>150</b>
<i>Natural Resources</i>	ix

<b>5.5 POLLUTION CASE STUDIES</b>	<b>153</b>
<b>5.6 DISASTER MANAGEMENT: FLOODS, EARTHQUAKES, CYCLONES, LANDSLIDES</b>	<b>156</b>
<b>UNIT 6: SOCIAL ISSUES AND THE ENVIRONMENT</b>	
<b>6.1 FROM UNSUSTAINABLE TO SUSTAINABLE DEVELOPMENT</b>	<b>165</b>
<b>6.2 URBAN PROBLEMS RELATED TO ENERGY</b>	<b>167</b>
<b>6.3 WATER CONSERVATION, RAIN WATER HARVESTING, WATERSHED MANAGEMENT</b>	<b>168</b>
6.3.1 Water conservation	168
6.3.2 Rain water harvesting	170
6.3.3 Watershed management	171
<b>6.4 RESETTLEMENT AND REHABILITATION OF PEOPLE; ITS PROBLEMS AND CONCERNS. CASE STUDIES</b>	<b>172</b>
<b>6.5 ENVIRONMENTAL ETHICS: ISSUES AND POSSIBLE SOLUTIONS</b>	<b>173</b>
6.5.1 Resource consumption patterns and the need for their equitable utilisation	173
6.5.2 Equity – Disparity in the Northern and Southern countries	175
6.5.3 Urban – rural equity issues	175
6.5.4 The need for Gender Equity	175
6.5.5 Preserving resources for future generations	176
6.5.6 The rights of animals	177
6.5.7 The ethical basis of environment education and awareness	178
6.5.8 The conservation ethic and traditional value systems of India	181
<b>6.6 CLIMATE CHANGE, GLOBAL WARMING, ACID RAIN, OZONE LAYER DEPLETION, NUCLEAR ACCIDENTS AND NUCLEAR HOLOCAUST. CASE STUDIES</b>	<b>182</b>
6.6.1 Climate change	182
6.6.2 Global warming	183
6.6.3 Acid rain	184
6.6.4 Ozone layer depletion	185
6.6.5 Nuclear Accidents and Nuclear Holocaust	186
<b>6.7 WASTELAND RECLAMATION</b>	<b>187</b>
<b>6.8 CONSUMERISM AND WASTE PRODUCTS</b>	<b>189</b>
<b>6.9 ENVIRONMENT PROTECTION ACT</b>	<b>193</b>
<b>6.10 AIR (PREVENTION AND CONTROL OF POLLUTION) ACT</b>	<b>194</b>
<b>6.11 WATER (PREVENTION AND CONTROL OF POLLUTION) ACT</b>	<b>196</b>

<b>6.12 WILDLIFE PROTECTION ACT</b>	<b>197</b>
<b>6.13 FOREST CONSERVATION ACT</b>	<b>199</b>
<b>6.14 ISSUES INVOLVED IN ENFORCEMENT OF ENVIRONMENTAL LEGISLATION</b>	<b>201</b>
6.14.1 Environment Impact Assessment (EIA)	201
6.14.2 Citizens actions and action groups	202
<b>6.15 PUBLIC AWARENESS</b>	<b>204</b>
6.15.1 Using an Environmental Calendar of Activities	204
6.15.2 What can I do?	205
<b>UNIT 7: HUMAN POPULATION AND THE ENVIRONMENT</b>	
<b>7.1 POPULATION GROWTH, VARIATION AMONG NATIONS</b>	<b>214</b>
7.1.1 Global population growth	214
<b>7.2 POPULATION EXPLOSION – FAMILY WELFARE PROGRAM</b>	<b>215</b>
7.2.1 Methods of sterilization	217
7.1.2 Urbanization	217
<b>7.3 ENVIRONMENTAL AND HUMAN HEALTH</b>	<b>220</b>
7.3.1 Environmental health	221
7.3.2 Climate and health	223
7.3.3 Infectious diseases	224
7.3.4 Water-related diseases	227
7.3.5 Risks due to chemicals in food	231
7.3.6 Cancer and environment	232
<b>7.4 HUMAN RIGHTS</b>	<b>233</b>
7.4.1 Equity	233
7.4.2 Nutrition, health and human rights	234
7.4.3 Intellectual Property Rights and Community Biodiversity Registers	235
<b>7.5 VALUE EDUCATION</b>	<b>236</b>
7.5.1 Environmental Values	237
7.5.2 Valuing Nature	240
7.5.3 Valuing cultures	241
7.5.4 Social justice	241
7.5.5 Human heritage	242
7.5.6 Equitable use of Resources	242
7.5.7 Common Property Resources	242
7.5.8 Ecological degradation	242
<b>7.6 HIV/AIDS</b>	<b>243</b>
<i>Natural Resources</i>	xi

7.7 WOMEN AND CHILD WELFARE 244

7.8 ROLE OF INFORMATION TECHNOLOGY IN ENVIRONMENT AND HUMAN HEALTH 247

**UNIT 8: FIELD WORK**

8.1 VISIT TO A LOCAL AREA TO DOCUMENT ENVIRONMENTAL ASSETS,  
RIVER/FOREST/GRASSLANDS/HILL/MOUNTAIN 250

8.2 VISIT TO A LOCAL POLLUTED SITE 262

8.3 STUDY OF COMMON PLANTS, INSECTS, BIRDS 268

8.4 STUDY OF SIMPLE ECOSYSTEMS 270

## Preface

Perhaps no other country has moved so rapidly from a position of complacency in creating environmental awareness into infusing these newer pro environmental concepts into formal curricular processes as has happened in India over the last few years. This has undoubtedly been accelerated by the judgement of the Honorable Supreme Court of India that Environmental Education must form a compulsory core issue at every stage in our education processes.

For one who has fought to implement a variety of environment education programs for schools and colleges and for the public at large, this is indeed a welcome change. The author is currently constantly asked to provide inputs to 'environmentalise' textbooks and provide inputs at NCERT, SCERTs and at the UGC level to further the cause of formal environment education.

This textbook has been rapidly produced as an outcome of a UGC Committee that included the author and was set up to develop a common core module syllabus for environmental studies at the undergraduate level, to be used by every University in the country. This rush job invites comments from just about everyone who wishes to contribute towards its improvement in the coming years.

Environment Education can never remain static. It must change with the changing times which inevitably changes our environment.

Each of us creates waves around us in our environment that spread outwards like the ripples generated by dropping a stone in a quiet pond. Every one of us is constantly doing something to our environment and it is frequently a result of an act that we can hardly ever reverse. Just as once the stone has hit the water one cannot stop the ripple effect from disturbing the pond.

This textbook is written to bring about an awareness of a variety of environmental concerns. It attempts to create a pro-environmental attitude and a behavioral pattern in society that is based on creating sustainable lifestyles. But a textbook can hardly be expected to achieve a total behavioral change in society. Conservation is best brought about through creating a love for nature. If every college student is exposed to the wonders of the Indian wilderness, a new ethic towards conservation will emerge.

**Erach Bharucha,**  
Pune, 2004.



# Foreword

## Acknowledgements

I would like at the very outset to thank the residual wilderness of our country that has, since my childhood, excited in my consciousness a desire to protect nature. For me the wilderness is a throbbing, living place – the home of the goddess of nature, which is none other than Mother Earth. One can only bow to her and apologize for what humankind has done during a short span of time.

This textbook came about from my having been included in a Committee selected by the UGC to develop a practical and 'do-able' syllabus as a Core Module for Environmental Studies for all undergraduate courses. The Committee met several times and had enthusiastic rounds of discussion as to what should be included and what was unsuitable for a unique course of this nature. While hoping only to sensitize young people to our environment, it has also to be as comprehensive as feasible.

I wish to thank Prof. C Manoharachary, Prof. S Thayumanavan, Prof. DC Goswami, Shri R Mehta and Dr. NK Jain, who were the esteemed members of this Committee. All the inputs the Committee made during these deliberations have found a place in the current textbook. I thus take pleasure in thanking the Committee Members for their wholehearted participatory role in evolving the curriculum, which I have tried to translate into a textbook to uphold the spirit in which the curriculum was framed.

I have no words to thank the Chairman of the UGC, Dr. Arun Nighvekar, who has whole heartedly supported the Committee and gave freely of his valuable time to deliberate the nature of the course. He has always been as inspiration for me. Dr. (Mrs.) HK Chauhan began co-ordinating the work of the Committee during the early part of its tenure. This was further carried out due to the enthusiasm and constant support of Dr. NK Jain, Joint Secretary of the UGC. I cannot thank them enough for their cooperation and many kind gestures.

All my faculty at the BVIEER have helped in producing this output. Shamita Kumar wrote the chapter on pollution, which she has painstakingly developed to suit the needs of undergraduate students from different faculties. Her expertise as a highly innovative teacher in environment has given her the background that is necessary to draft a suitable Unit for this book. Shambhavi Joshi helped me to frame the final chapter on fieldwork. Prasanna Kolte and Jaya Rai did all the work to develop a CD ROM based on the text to make a more presentable version of the book. Prasanna also dug up several case studies included in the book. I must thank our artists Sushma Durve and Anagha Deshpande who have painstakingly made a large number of drawings. Without them the textbook would have been yet another drab textbook. One person who has done an excellent job of editing the English, rearranging bits of the book and removing redundant material is Chinmaya Dunster, a musician by profession, an editor by calling and an environmentalist at heart. He has spent many painful hours going over the text with a fine tooth English comb. I cannot thank him enough for his enormous contribution towards the completion of this book. Finally, for the one person who has put all her heart and soul into this book, working long hours, and cheerfully making the constant changes I demanded. I have no words to thank Ms. Behafrid Patel. She has been the patient, all round support system in this complex task. Without her it could not have been produced in this brief span of time.