

CHE110 : Environmental Studies



Lecture #0



Course details



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PUNJAB (INDIA)

Course Code: CHE110

Course title: Environmental Studies

L-T-P: 2-0-0

Credit: 2

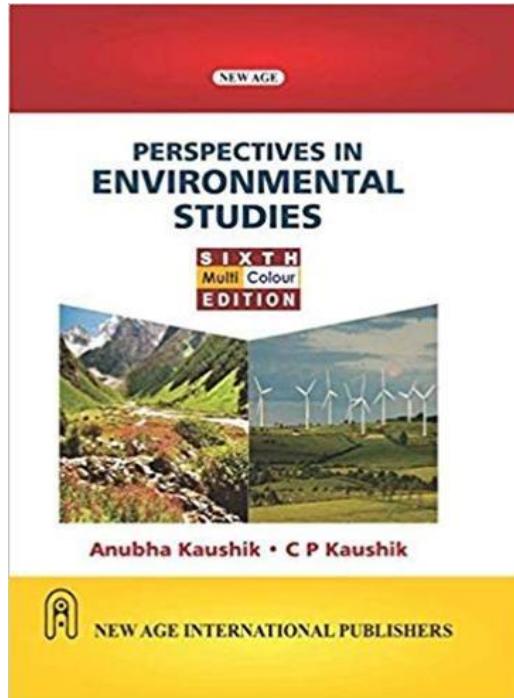




Text & Reference Books



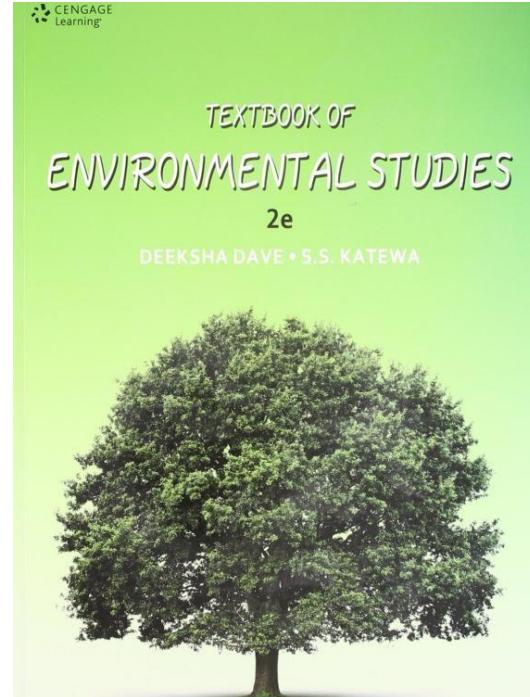
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PERSPECTIVE IN ENVIRONMENTAL STUDIES

by

ANUBHA KAUSHIK, C P KAUSHIK
NEW AGE INTERNATIONAL PUBLISHERS



TEXT BOOK OF ENVIRONMENTAL STUDIES

by

D. DAVE AND S. S. KATEWA
CENGAGE LEARNING





Course Assessment Model



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- Marks break up

▪ Attendance	05
▪ CA	40
▪ MTE	20
▪ ETE	35
▪ Total	100





Continuous Assessment



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- CA category: 0202
- Number of CAs: 2
- Both CAs are mandatory
- Weightage:
 - CA1: 50%
 - CA2: 50%





CA1 details



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- **Activity based** (Group activity: **3 students per group**)
- The topics should be related to both **environmental studies** and the **disciplines of the students**. Only **1set** of work plan, final report and School specific deliverables is required to be submitted by each group.
- Work plan and final report **must be handwritten** and strictly as per the format.
- **Topic allocation:** 2nd week
- **Work plan:** before MTE
- **Final submission:** 10th week





CA1 details



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- **Full marks: 100**
 - **Work plan: 15**
 - Brief plan of your
 - **Final report: 35**
 - Full write-up of the task
 - **School Specific Deliverable: 50**
 - E.g.,
 - Computer Science: App/Program/website development
 - Journalism: Documentary
 - Arts: Painting etc.





CA2 details



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- **Class Test**
 - **Question type: MCQ**
 - **Full Marks: 30**
 - **Units: Unit 1 to Unit 5**
 - **Time: 40 minutes**
 - **No negative marking**





Why EVS as a Course?



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Unprecedented Environmental Effects

Unprecedented Pace of Urbanization





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MAJOR GLOBAL ENVIRONMENTAL PROBLEMS

From http://www.pref.kyoto.jp/intro/21cent/kankyo/contents_e/globe_prob/index.html

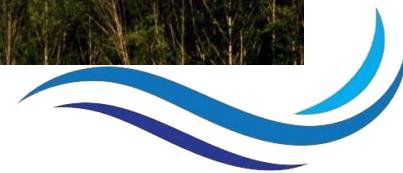
- Global Warming
- Ozone Layer Depletion
- Acid Rain
- Deforestation
- Loss of Biodiversity
- Water Pollution
- Desertification
- Waste disposal
- Rapid population growth
- Depletion of non-renewable energy sources
- Food and Water shortage





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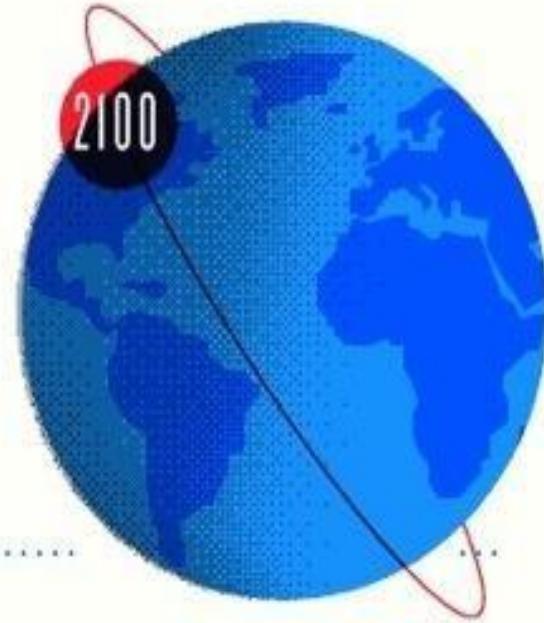
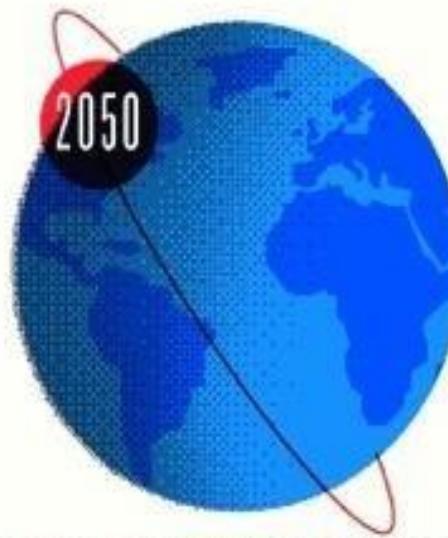
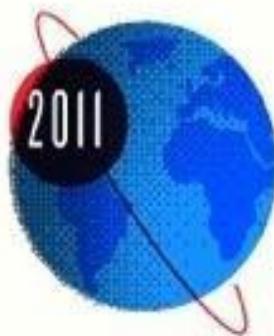
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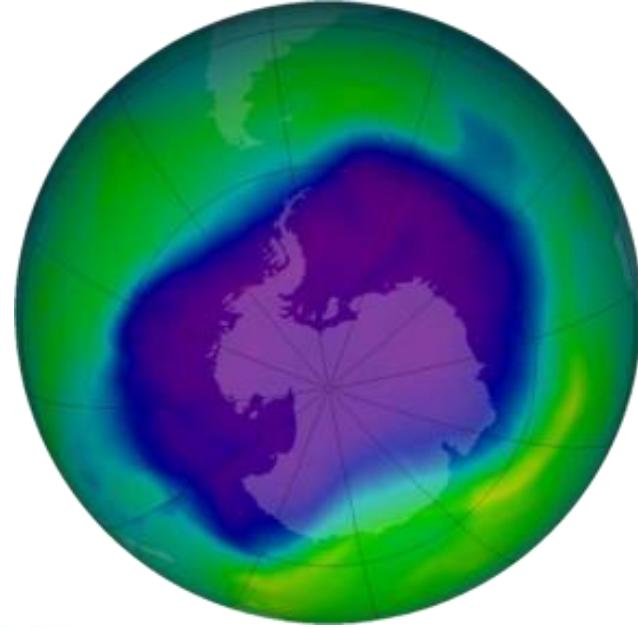
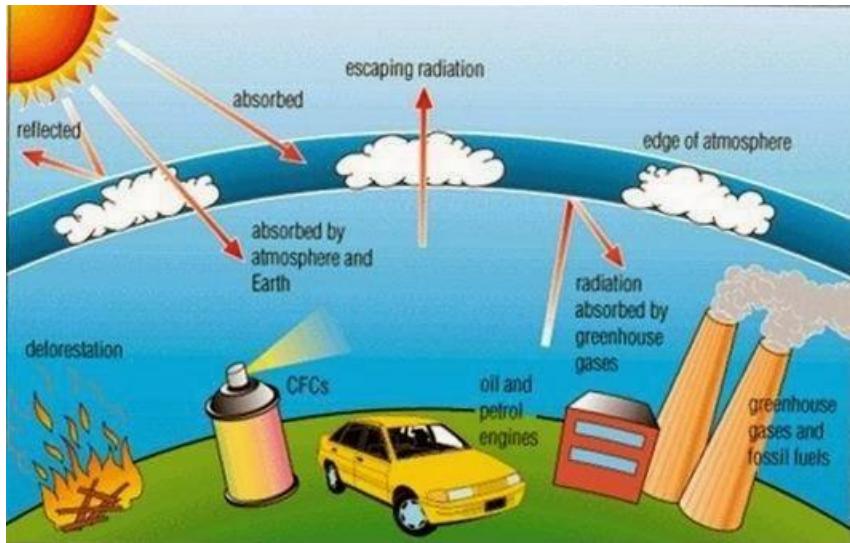
To feed everyone, the world will need to produce 70% more food by 2050

a 100% more food by 2100, when the world population is expected to hit 10 billion.





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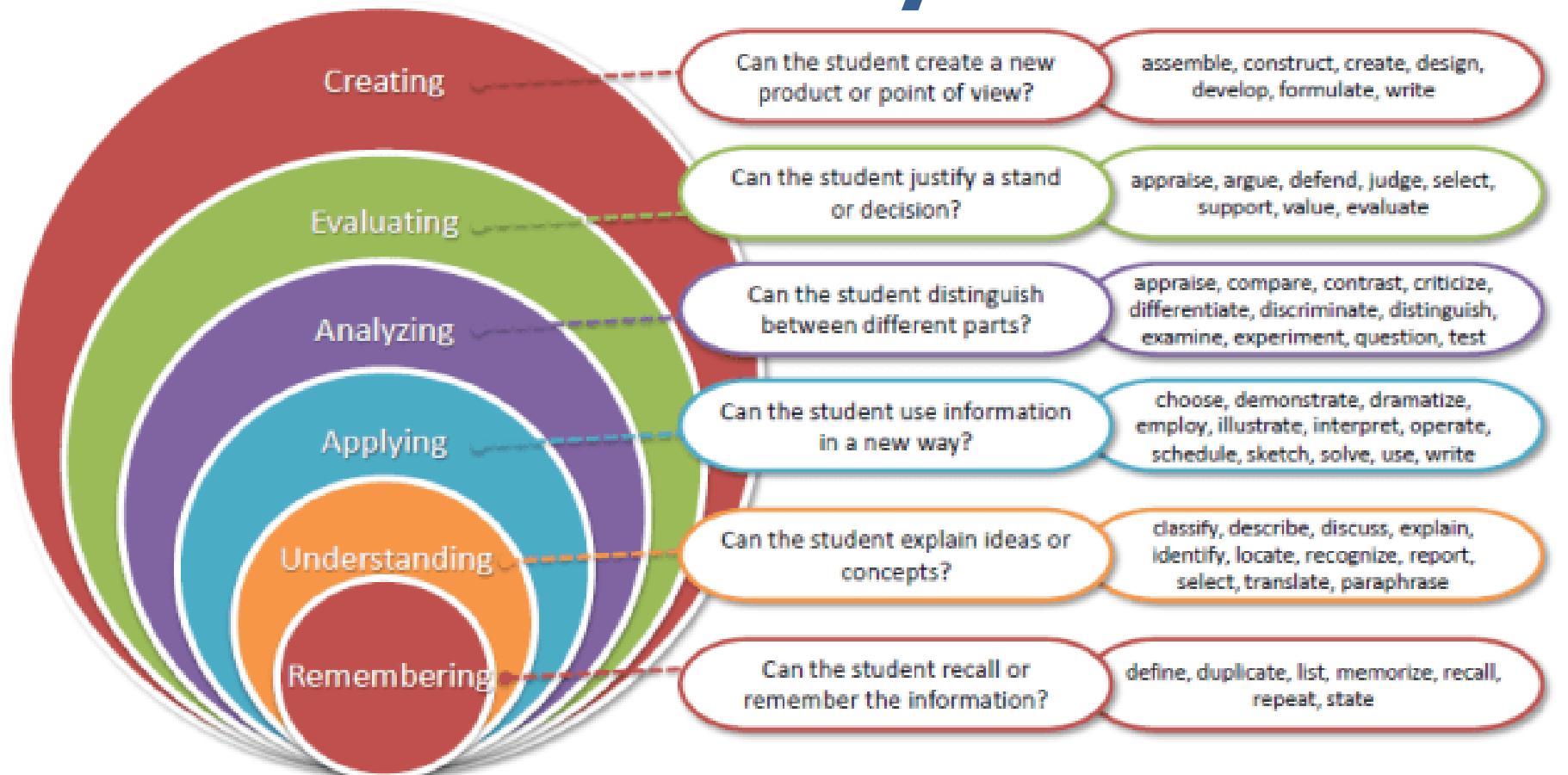




Revised Bloom's Taxonomy



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Course details



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Course Outcomes: Through this course students should be able to:

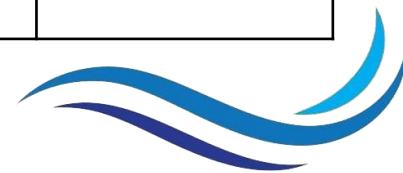
- describe the current environmental issues and associated problems.
- understand various environmental issues through basic knowledge of environment and its various components.
- outline various environment policies and practice
- explore new approaches to reduce various types of environmental pollution





Program Outcomes as specific to the particular course (PO mapped with the relevant course)

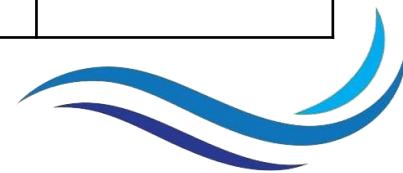
Outcomes	CO1 :: describe the current environmental issues and associated problems.	CO2 :: understand various environmental issues through basic knowledge of environment and its various components.	CO3 :: outline various environment policies and practices.	CO4 :: explore new approaches to reduce various types of environmental pollution.
PO1: Engineering knowledge:: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.				3
PO2: Problem analysis:: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	2			
PO3: Design/development of solutions:: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			2	3
PO4: Conduct investigations of complex problems:: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	1	2		





Program Outcomes as specific to the particular course (PO mapped with the relevant course)

Outcomes	CO1 :: describe the current environmental issues and associated problems.	CO2 :: understand various environmental issues through basic knowledge of environment and its various components.	CO3 :: outline various environment policies and practices.	CO4 :: explore new approaches to reduce various types of environmental pollution.
PO5: Modern tool usage:: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.				1
PO6: The engineer and society:: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.			2	
PO7: Environment and sustainability:: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	3	3	3	3
PO8: Ethics:: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	1		2	
PO9: Individual and team work:: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.				





Program Outcomes as specific to the particular course (PO mapped with the relevant course)

Outcomes	CO1 :: describe the current environmental issues and associated problems.	CO2 :: understand various environmental issues through basic knowledge of environment and its various components.	CO3 :: outline various environment policies and practices.	CO4 :: explore new approaches to reduce various types of environmental pollution.
PO10: Communication:: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			1	
PO11: Project management and finance:: Demonstrate knowledge and understanding of the engineering, management principles and apply the same to one's own work, as a member or a leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economic and financial factors.				
PO12: Life-long learning:: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	2	2	2	2





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Syllabus at a Glance

After Mid Term

Human Communities and the Environment

To get inspired by historical movements to protect the environment and to realize our duties towards nature

Environmental Policies & Practices

To understand how far the damages have been done and ways to undo them

Environmental Pollution

To identify the harmful substances around us and knowing how to deal with them



Before Mid Term

Introduction and natural resources

To recognize the nature as the provider

Ecosystems

To realize the integrity of the nature and to feel connected to the environment

Biodiversity and conservation

To appreciate the variation in living beings and learning to protect it





Detailed Syllabus



Unit –1 (Introduction and natural resources)

- Multidisciplinary nature of environmental studies
- Scope and importance: Concept of sustainability and sustainable development.
- Land resources: Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water.
- Energy resources: Renewable and nonrenewable energy sources, use of alternate energy sources, growing energy needs, case studies.

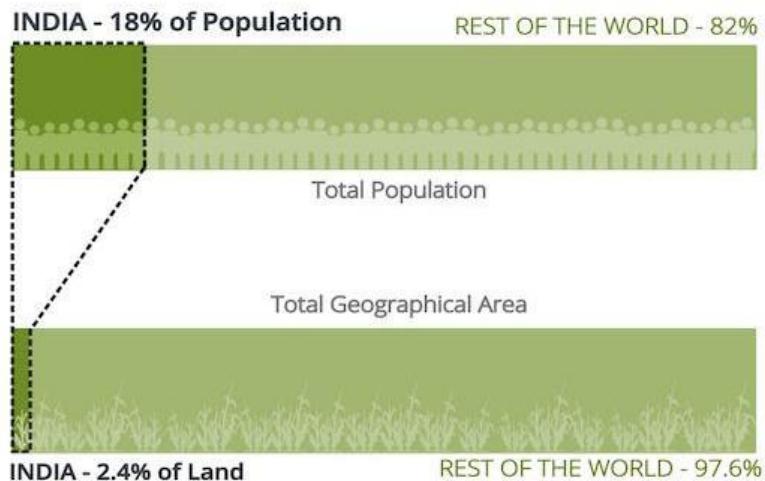




Ground reality of natural resources

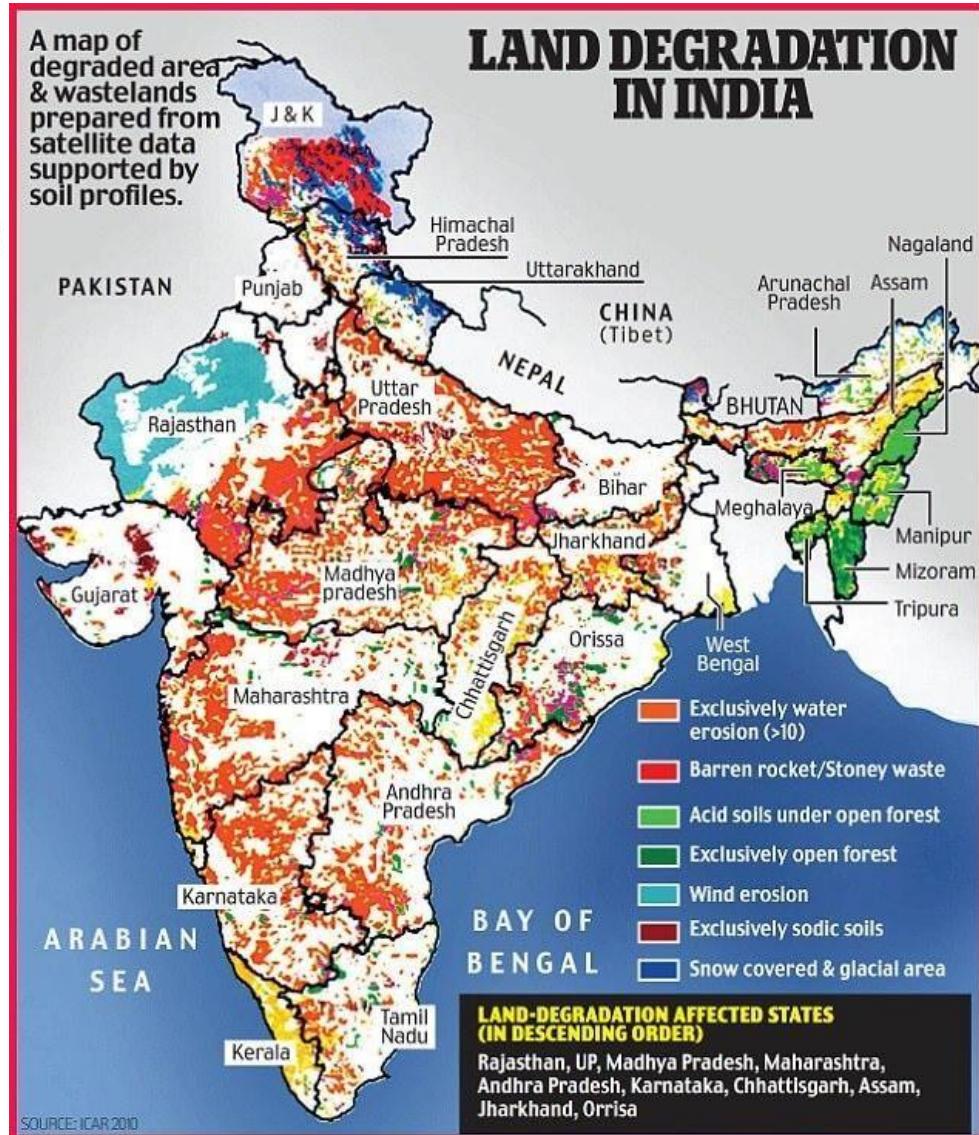


India supports 18% of the world's population with only 2.4% of the world's land area



iS. IndiaSpend

Source: Food And Agriculture Organization



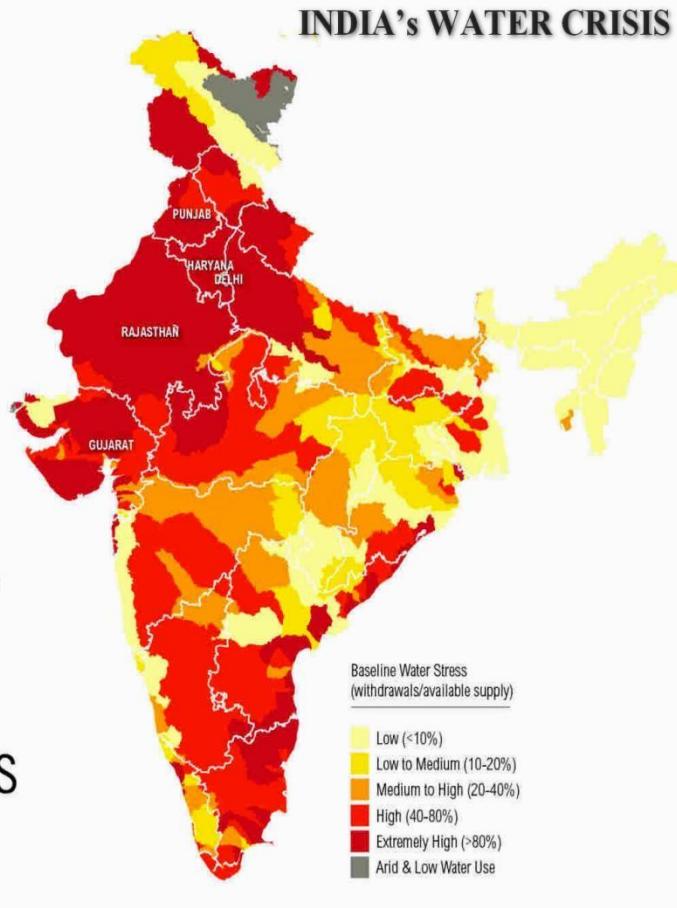


Ground reality of natural resources



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54%
of India
Faces
High to
Extremely
High
Water Stress





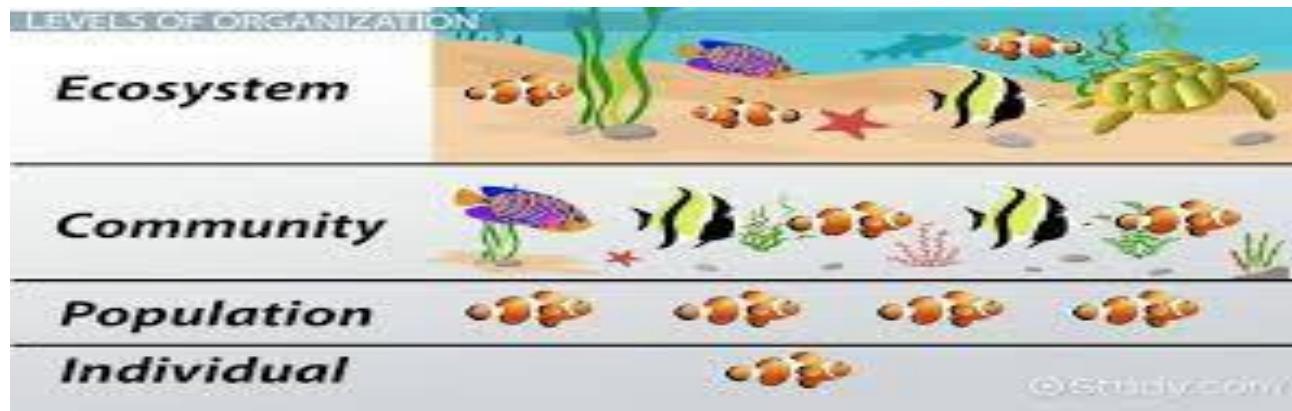
Detailed Syllabus



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Unit – 2 (Ecosystems)

- What is an ecosystem? structure and function of ecosystem, Energy flow in an ecosystem: food chains, food webs and ecological succession, ecological pyramids,
- Case studies of the following ecosystems :
 - a)forest ecosystem b) grassland ecosystem
 - c) desert ecosystem d) aquatic ecosystem





Ecosystems in India



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Forest: Gir



Desert: Thar



Grassland: Serengeti



Aquatic: Chilika

... and countless more.





Detailed Syllabus



Unit III-Biodiversity and conservation :

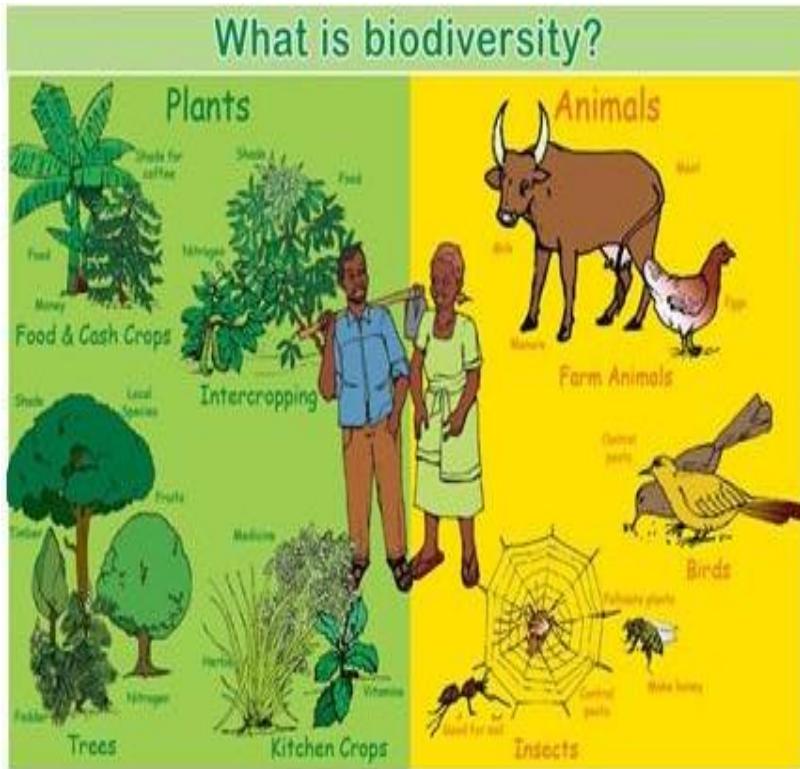
- Levels of biological diversity : genetic, species and ecosystem diversity, Biogeographic zones of India, Biodiversity patterns and global biodiversity hot spots, India as a mega diversity nation, Endangered and endemic species in India,
- Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions, Conservation of biodiversity: In situ and ex-situ conservation of biodiversity, Ecosystem and biodiversity services: ecological, economic, social, ethical, aesthetic and Informational value





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Biodiversity at a glance





Some Endangered animals in India



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Red Panda



Royal Bengal Tiger



Lion-tailed macaque



Tahr





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Detailed Syllabus

Unit – 4 (Environmental pollution)

Environmental pollution: types, causes, effects and controls; Air, Ill effects of Fireworks, water, soil and noise pollution, Nuclear hazards and human health risks, Pollution case studies, ill-effects of Fireworks





Air Quality Statistics

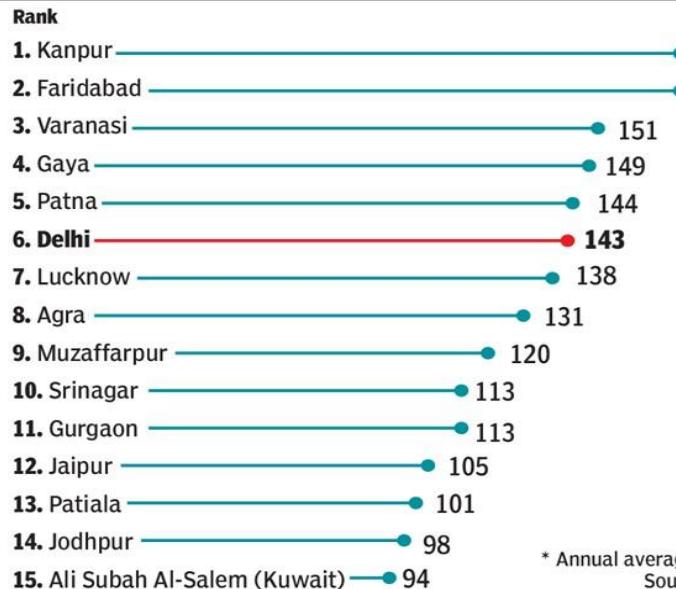


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WORLD'S MOST POLLUTED CITIES ARE IN INDIA

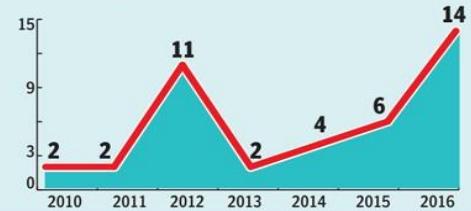
TOI

PM2.5*



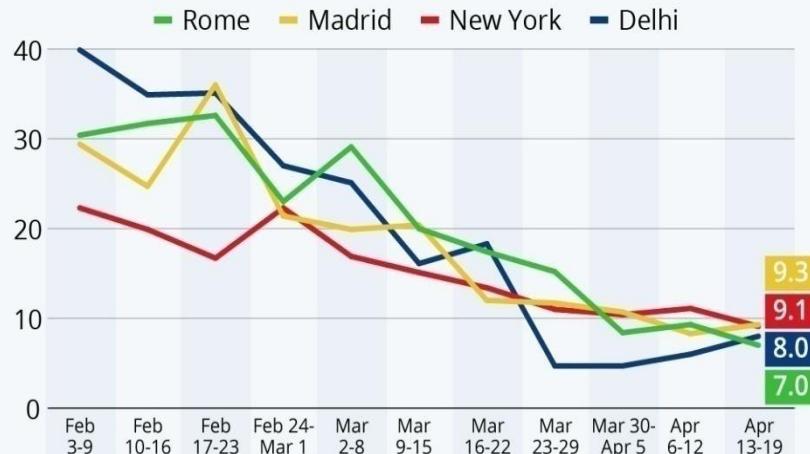
* Annual average in 2016
Source: WHO

Number of Indian cities among 15 most polluted



COVID-19 Improves Air Quality in Just Three Months

Weekly average concentration of NO₂ in the air in selected cities (Feb-Apr 2020)*



Central locations

* 95 percent of NO₂ in the air is caused by fossil fuel combustion
Source: World Air Quality Index (WAQI)



statista



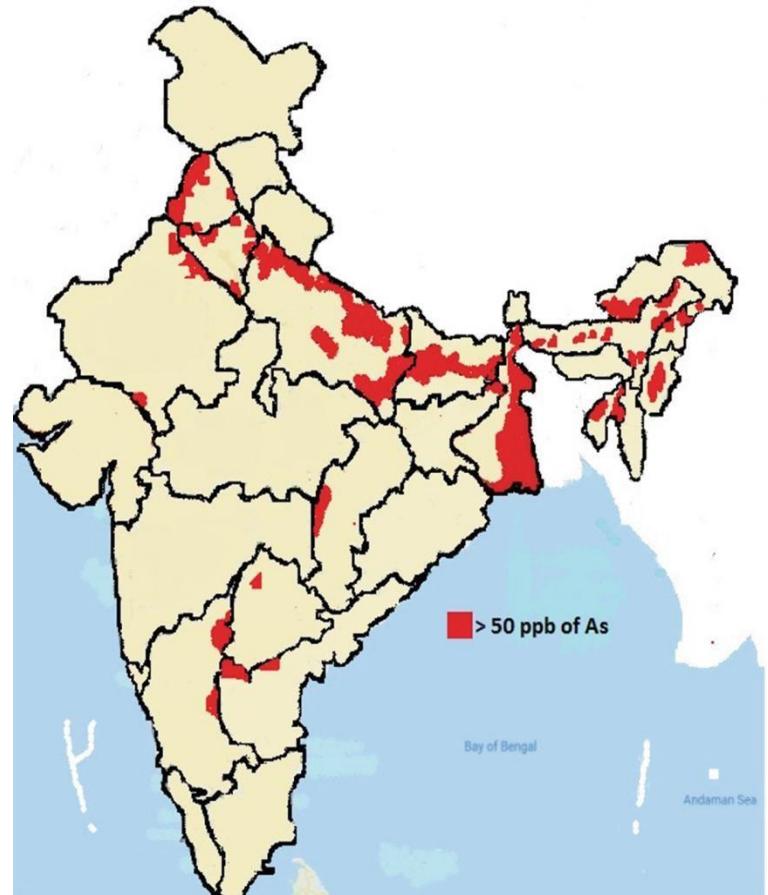
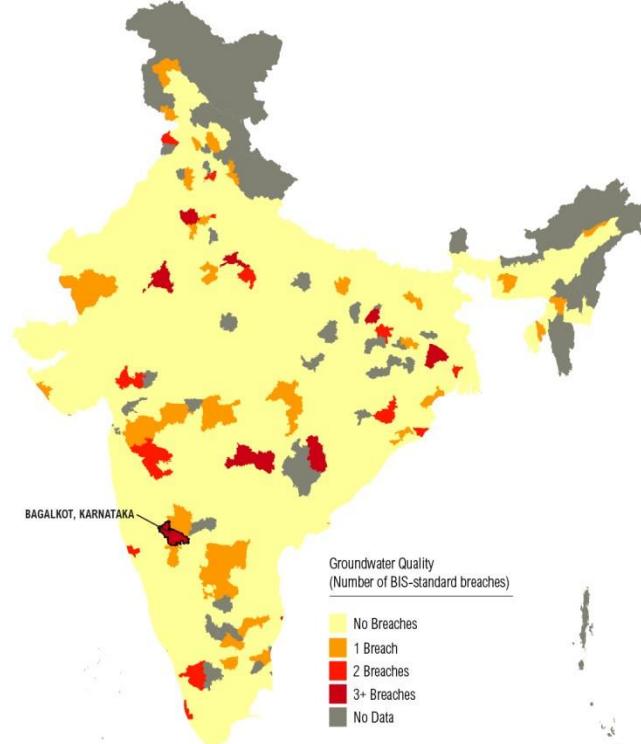


Water Quality Statistics



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More than
100
MILLION
People Live
in Areas of
Poor Water
Quality





Pesticide usage statistics

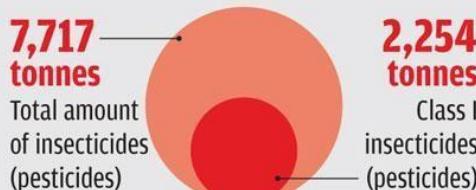


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Grave danger

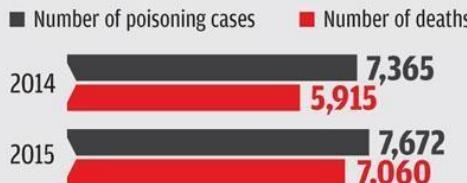
Farmers are in peril due to lack of regulation of hazardous pesticides

Consumption of Class I pesticides in India (2015-16)



Source: Directorate of Plant Protection, Quarantine & Storage. Calculations have been done based on pesticides produced domestically and imported

Cases of accidental intake of pesticides and deaths (other than suicides)



Source: Accidental Deaths & Suicides in India by the National Crime Records Bureau (2015)

Examples of Class I pesticides used extensively in India but banned in other countries

- Banned in countries, including EU*
- Consumption during 2015-16# (tonnes)

Monocrotophos

60 ■ 371

Triazophos

40 ■ 315

Phosphamidon

49 ■ 90

Carbofuran

49 ■ 337

Methyl Parathion

59 ■ 674

Phorate

37 ■ 455

Source: *Consolidated list of banned pesticides by Pesticide Action Network (May 2017); # Directorate of Plant Protection, Quarantine & Storage

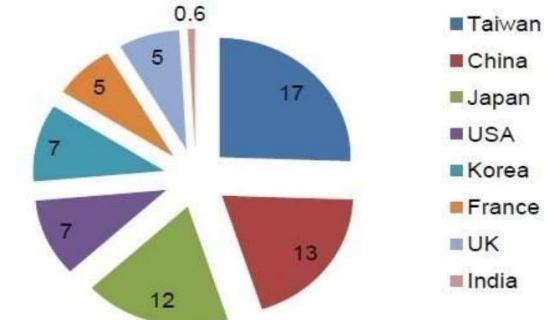


Fig. 2 Per capita usages of pesticide by country (Kg/Ha)

Source : http://www.agriphotonics.com/UserFiles/CE0101/2015-16/03_1-540x360.jpg





Detailed Syllabus



Unit – 5 (Environmental Policies & Practices):

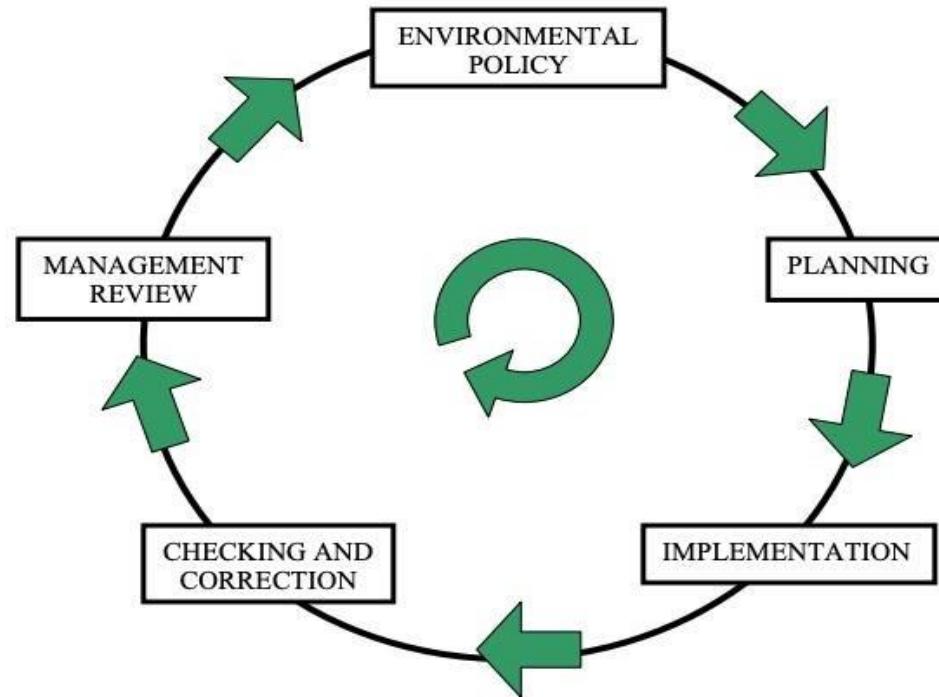
- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture,
- Environment Laws: Environment Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD), Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context, Solid waste management: Control measures of urban and industrial waste





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Environmental Policies & Practices





Some International Environmental Agencies



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NATURAL
RESOURCES
DEFENSE
COUNCIL

GREENPEACE





Some Indian Environmental Agencies



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cpcb

teri

The Energy and Resources Institute



Centre for Science
and Environment



Ministry of Environment,
Forest and Climate Change
Government of India





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Detailed Syllabus

Unit – 6 : Human Communities and the Environment)

- Human population growth: Impacts on environment, human health and welfare, Disaster management : floods, earthquake, cyclones and landslides
- Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan, Environmental ethics: Role of Indian and other religions and cultures in environmental conservation, Environmental communication and public awareness, case studies

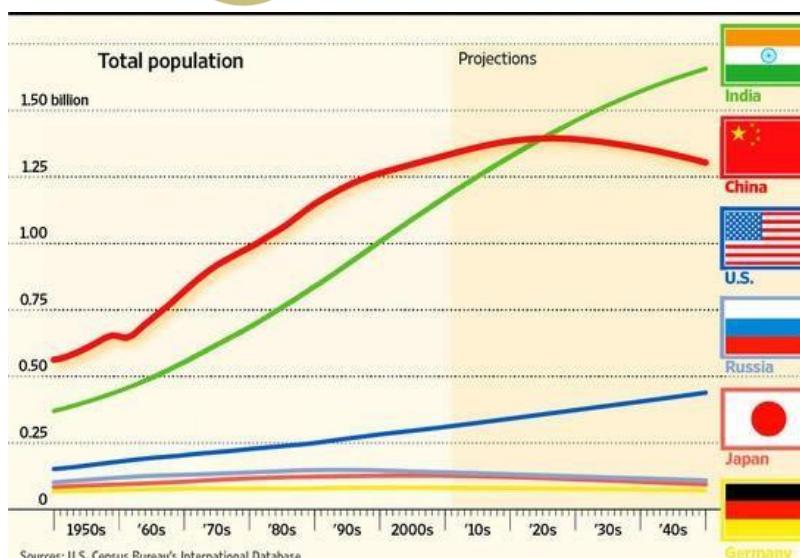
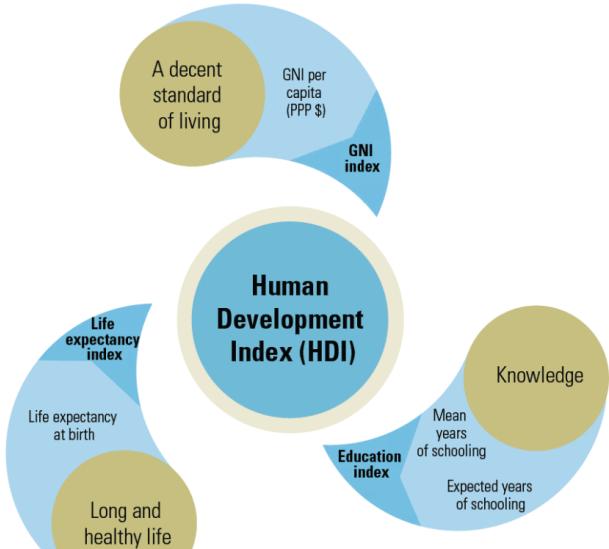




Population Growth and its Effects

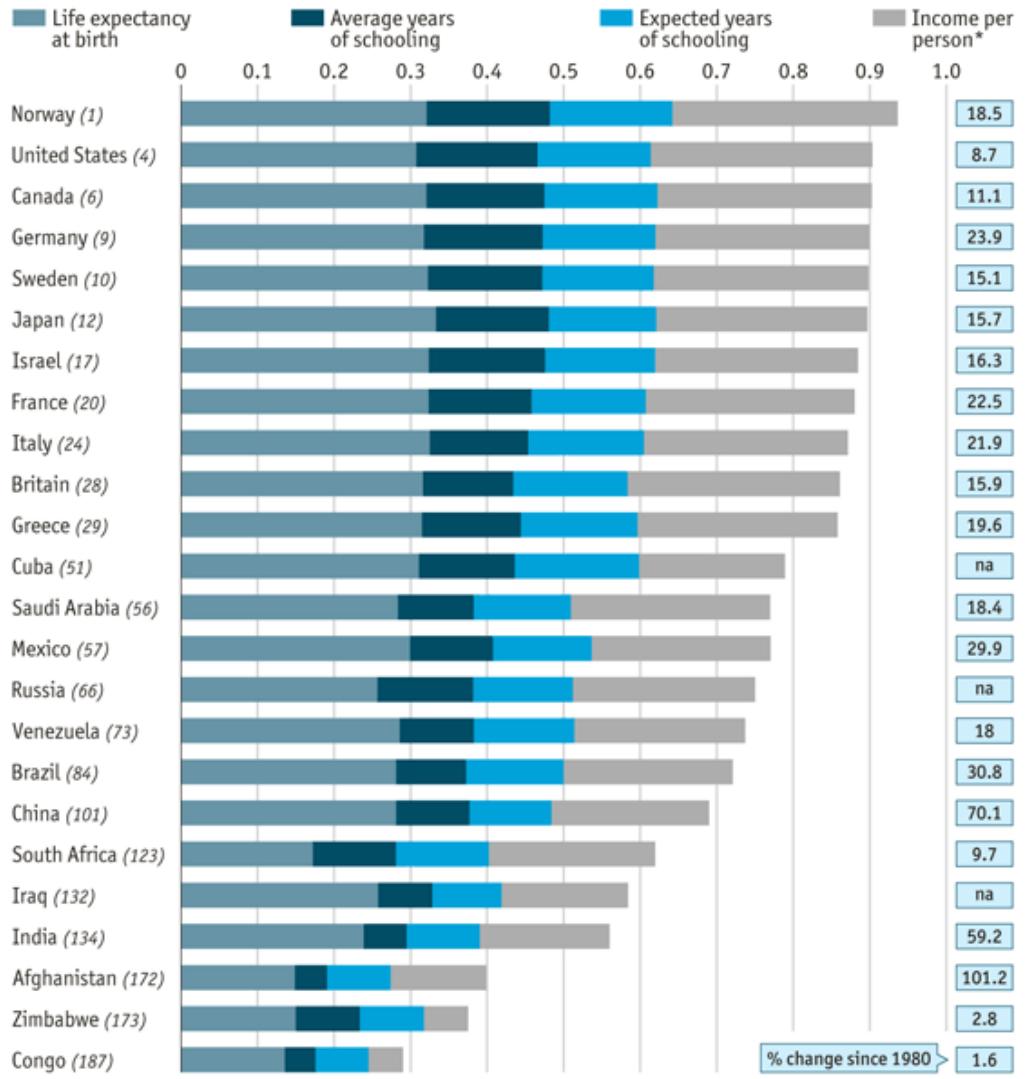


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U N I V E R S I T Y



Human Development Index

1=best (*rank out of 187*)



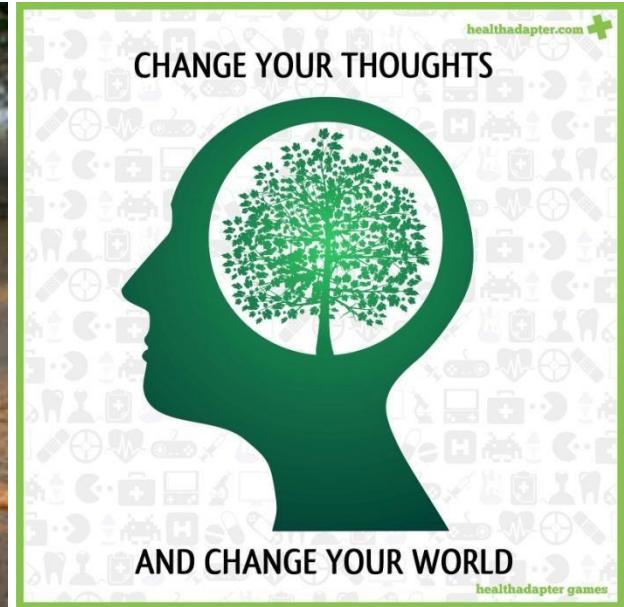
Source: UN Human Development Report



Environmental Awareness



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- **Knowledge can help**
 - With proper knowledge and wisdom we can make the world a better place.





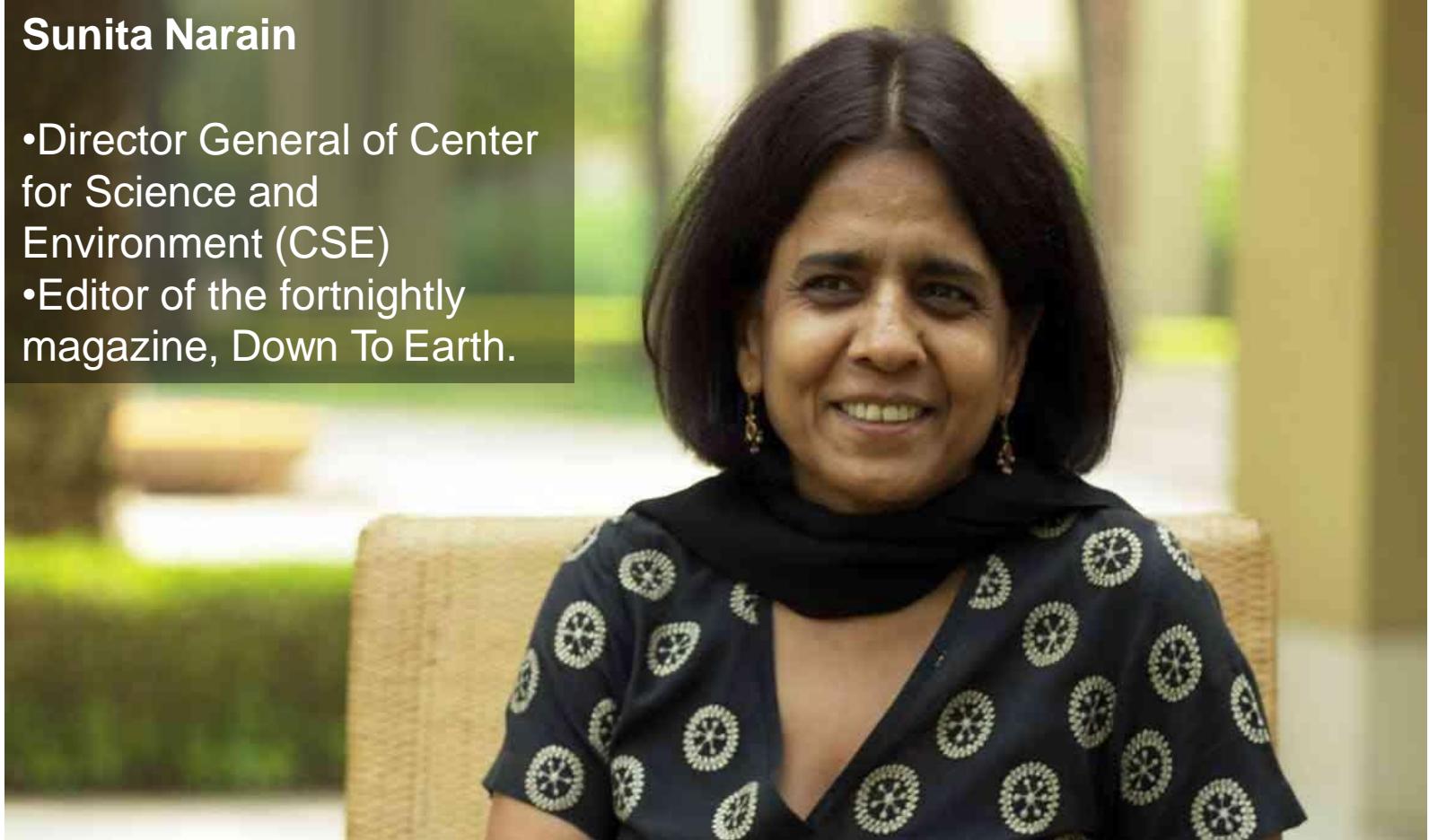
Environmental Activism



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Sunita Narain

- Director General of Center for Science and Environment (CSE)
- Editor of the fortnightly magazine, Down To Earth.





Environmental Activism



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Vandana Shiva

Indian scholar,
environmental activist, food
sovereignty advocate,
ecofeminist and anti-
globalisation author.





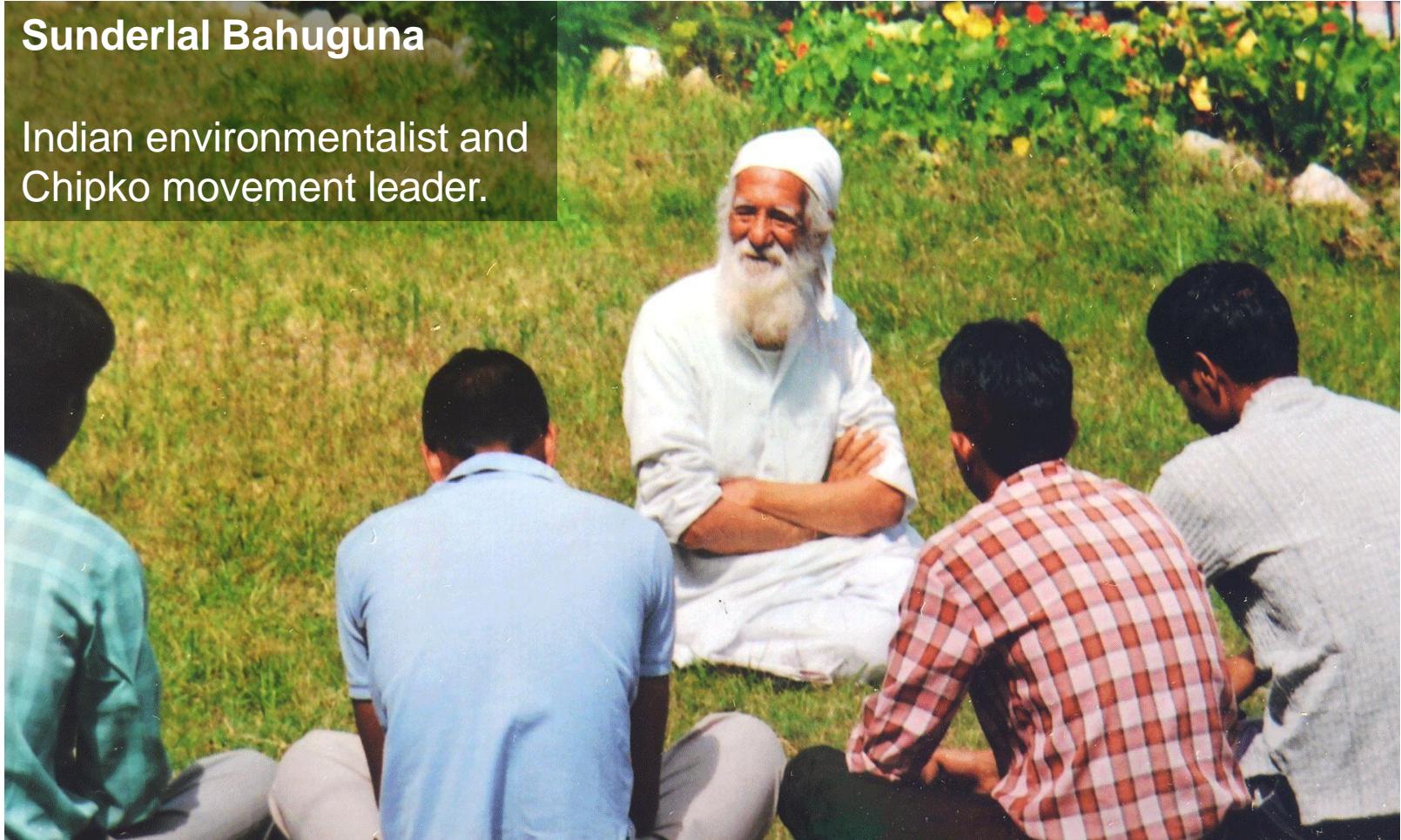
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Sunderlal Bahuguna

Indian environmentalist and Chipko movement leader.





Environmental Activism



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Medha Patkar

Central organizer and
strategist for Narmada
Bachao Andolan (NBA)





Environmental Activism



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- Many more-----





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OPEN EDUCATIONAL RESOURCE

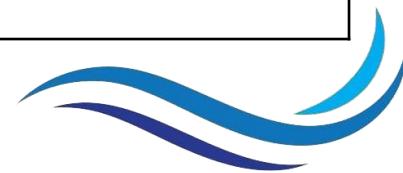
Course Code: CHE110

Course Title: ENVIRONMENTAL STUDIES

L.T.P: 2.0.0

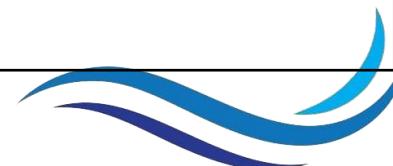
Credit: 2

Course Code	Course Title	Unit mapped	Broad topic/Sub Topic	OER Type	Title of OER	*%age unit mapped with OER (approx)	Source URL
CHE110: Environmental Studies		Unit 1	Introduction and natural resources	Reading material	Environmental Science/ Natural Resources	40%	http://www.nmffa.org/181.html
		Unit 2	Ecosystems	Reading material	Ecology I: The Earth System	62%	https://ocw.mit.edu/courses/1-018j-ecology-i-the-earth-system-fall-2009/pages/calendar/





CHE110: Environmental Studies	Unit 3	Biodiversity and conservation	Video Lectures	Biodiversity.now	75%	https://www.youtube.com/playlist?list=PLGoV7yzGLvNchVRuADXxXMI2NHesfUIBO
	Unit 4	Environmental pollution	Reading material	ENVIRONMENTAL ISSUES	42%	https://pressbooks.bccampus.ca/environmentalissues/chapter/10-1-atmospheric-pollution/
	Unit 5	Environmental Policies & Practices	Reading material	Major Environment Policies and Legislations	33%	https://iced.cag.gov.in/?page_id=256
	Unit 6	Human Communities and the Environment	Reading material	Community Population Ecology	25%	https://openoregon.pressbooks.pub/envirobiology/part/chapter-4/
**Average % age of total syllabus mapped					46%	





Examples of environment related questions in competitive exams



Q : Who propounded the term ecology?

- (A) Charles Darwin
- (B) Robert Whitaker
- (C) Arthur Tansley
- (D) Ernest Hackle

D

[Show Answer](#)

Q : Which of the following is not a greenhouse gas?

- (A) methane
- (B) nitrous oxide
- (C) Sulfur Hexa Fluoride
- (D) carbon monoxide

D

[Show Answer](#)

Q : Which of the following is not an area of coral reef?

- (A) Gulf of Mannar
- (B) Gulf of Cambay
- (C) Lakshadweep
- (D) Andaman and Nicobar Islands

B

[Show Answer](#)

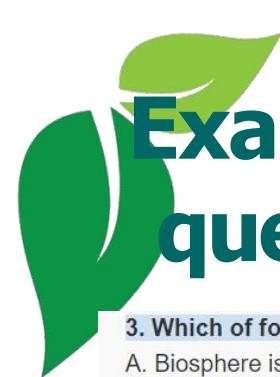
Q : Biological indicator of pollution of sulfur dioxide is: -

- (A) moss
- (B) smoke
- (C) Braophyta
- (D) None of these

A

[Show Answer](#)





Examples of environment related questions in competitive exams



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3. Which of following statement is incorrect about the Biosphere?

- A. Biosphere is combination of lithosphere, hydrosphere and Atmosphere
- B. Biosphere is missing at extreme of north and south pole
- C. Organisms are uniformly present in Biosphere
- D. All of the above

C

4. What is the carbon credit?

- A. It is the difference between the carbon emission allowed and actually emitted carbon
- B. It is the loan amount by IMF for reducing pollution
- C. It is loan given to poor people for buying Modern Stoves
- D. All of the above

A

5. What is the meaning of coral bleaching?

- A. Paling of coral colour or decline in zooxanthellae due to climate change
- B. Impacts of excessive sea trade on fishing industry
- C. Both a and b
- D. None of the above

A

6. Relative contributions of CO₂, CH₄, CFCs and N₂O towards global warming are:

- A. 50 %, 30 %, 10 % , and 10 % respectively
- B. 60%, 20%, 14%, and 6% respectively
- C. 40 %, 30%, 20% and 10% respectively
- D. None of the above

B

7. Which of following can be used for controlling Gaseous Pollutant?

- A. Arrestor
- B. Incineration
- C. Absorption
- D. None of above

C

8. What does the high Biological Oxygen Demand (BOD) indicates?

- A. High level of Microbial Pollution
- B. Low level of Microbial Pollution
- C. Absence of Microbial Pollution
- D. Water is fully pure

A

9. What percent of area in the plain should be under forest?

- A. 21 %
- B. 25%
- C. 17%
- D. 33%

D

10. Biodiversity Hotspot are characterized on the basis of:

- A. Endemic flowering plant and threat perception
- B. Endemic flowering plant
- C. Species of flowering plants
- D. None of above

A





Examples of environment related questions in competitive exams



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- 6 Kyoto Protocol of 1997 introduced the concept of carbon trading in the year of

- 1 2000
- 2 2004
- 3 2001
- 4 2002

[View Answer](#)

D

- 7 Citizen's Charter on Environment in the Constitution of India is embodied in

- 1 Article 48
- 2 Article 48A
- 3 Article 49A
- 4 Article 51A

[View Answer](#)

D

- 8 United Nation's Conference on Environment and Development was held in

- 1 December, 1993
- 2 June, 1992
- 3 December, 1995
- 4 November, 1996

[View Answer](#)

B

- 3 A developmental project requires both environmental clearance as well as approval under

- 1 Water Act, 1974
- 2 Forest (Conservation) Act, 1980
- 3 National Environmental Tribunal Act, 1995
- 4 Air Act, 1981

[View Answer](#)

B

- 4 The best practice of disposal of construction and demolition (C & D) debris is

- 1 Incineration
- 2 Recycling
- 3 Land fills
- 4 Solidification

[View Answer](#)

C





**NO QUESTION IS SILLY IF
IT IS A QUESTION.**



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Thank You

