

# CHE110 : Environmental Studies



## Lecture #0



# Course details



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**Course Code: CHE110**

**Course title: Environmental Studies**

**L-T-P: 2-2-0**

**Credit: 4**

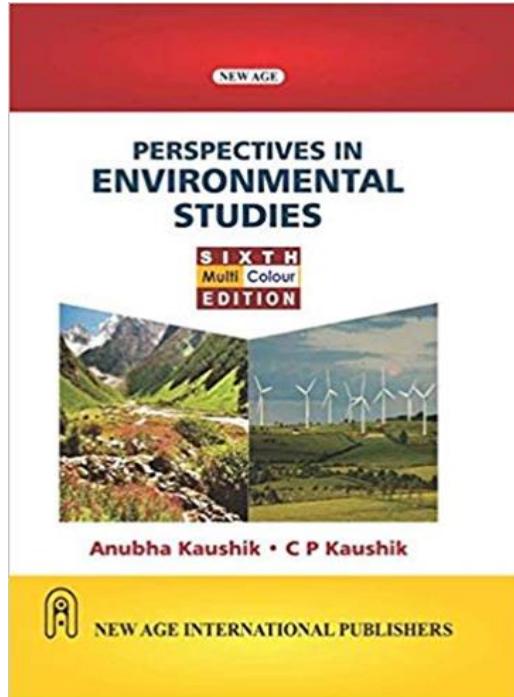




# Text & Reference Books



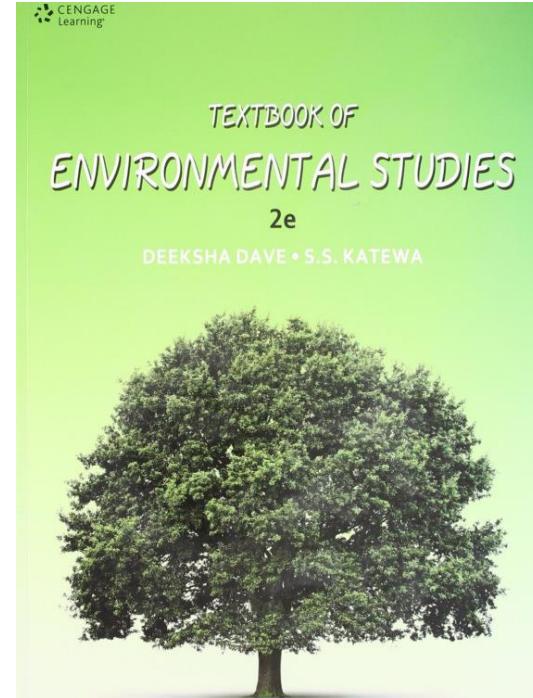
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## PERSPECTIVE IN ENVIRONMENTAL STUDIES

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





# CA 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 1 set of work plan, final report, PPT and working model (discipline-wise) is required to be submitted by each group.
- Work plan and final report must be handwritten and strictly as per the format.
- Topic allocation: 2<sup>nd</sup> week
- Work plan: before MTE
- Final submission: 10<sup>th</sup> week
- PPT presentation: After MTE onwards 20 minutes of the lecture class can be used for PPT presentation by the students. The duration of PPT presentation by each group can be decided accordingly.





# CA details



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- Full marks: 100
  - Work plan: 10
    - Brief plan of your
  - Final report: 20
    - Full write-up of the task
  - School Specific Deliverable: 50
    - E.g.,
      - Computer Science: App/Program/website development
      - Journalism: Documentary
      - Arts: Painting etc.
  - PPT Presentation/viva: 20
    - Each of the member in the group must present their work





# Why EVS as a Course?



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Unprecedented Environmental Effects

Unprecedented Pace of Urbanization





# MAJOR GLOBAL ENVIRONMENTAL PROBLEMS

From [http://www.pref.kyoto.jp/intro/21cent/kankyo/contents\\_e/globe\\_prob/index.html](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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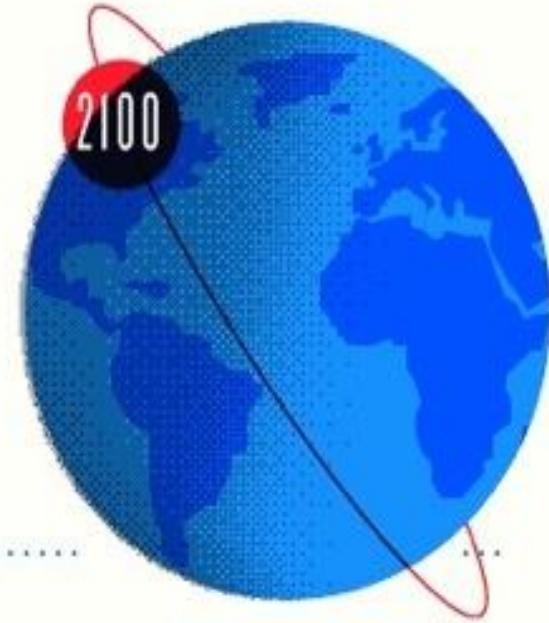
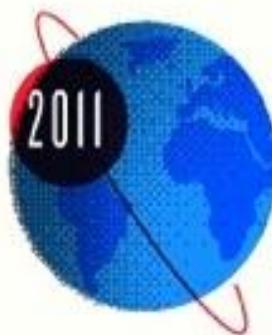




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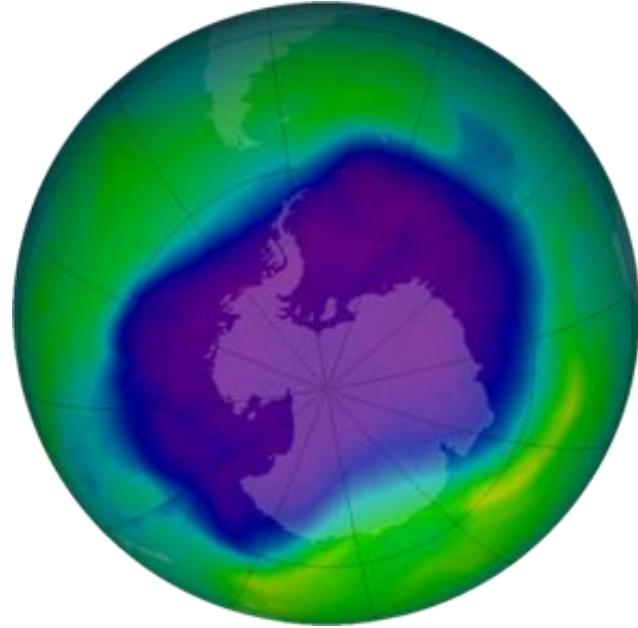
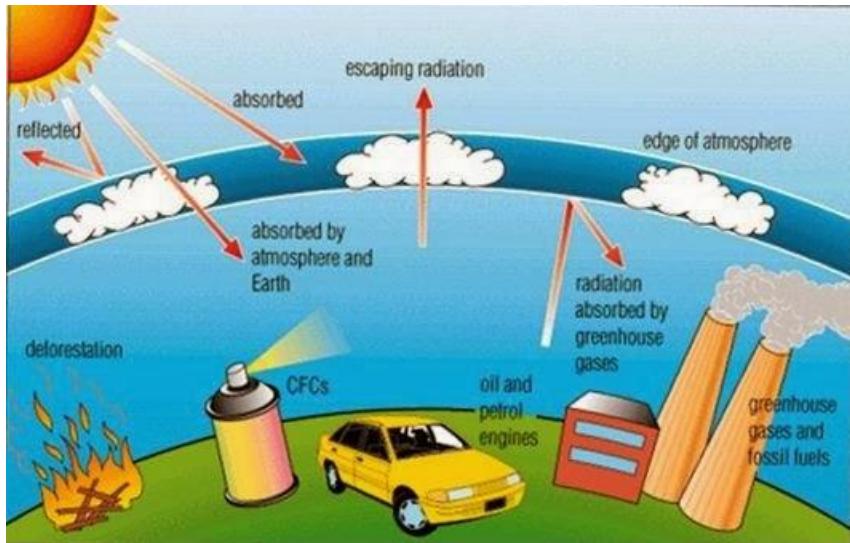
To feed everyone, the world will need to produce 70% more food by 2050

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





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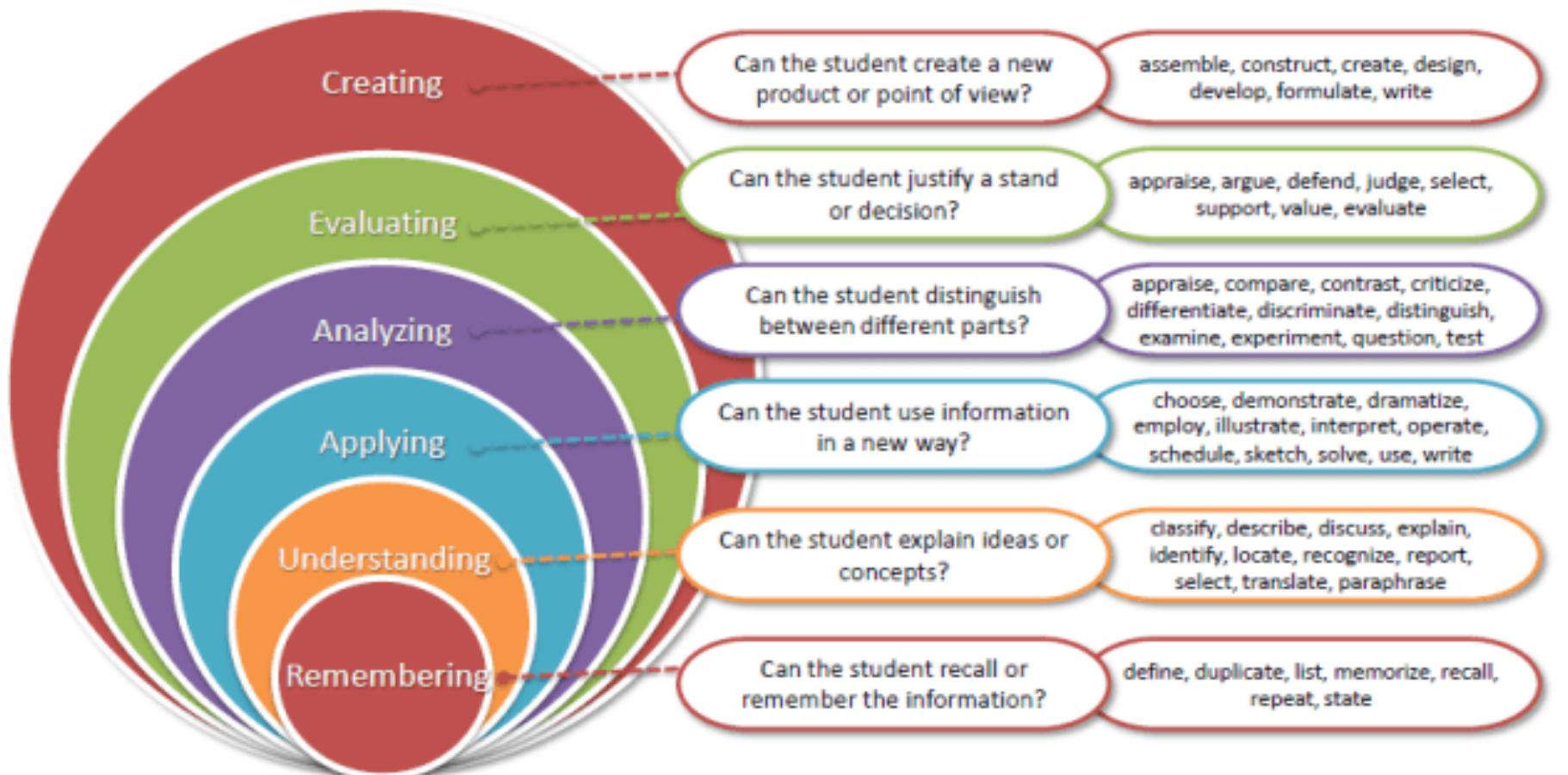




# Revised Bloom's Taxonomy



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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.
- 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



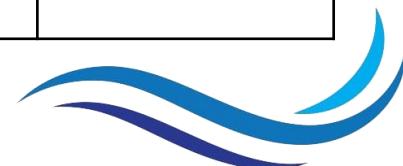


# Program Outcomes as specific to the particular course (PO mapped with the relevant course)



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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.
<b>PO1: Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.				3
<b>PO2: Problem analysis:</b> Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	2			
<b>PO3: Design/development of solutions:</b> 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
<b>PO4: Conduct investigations of complex problems:</b> 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		



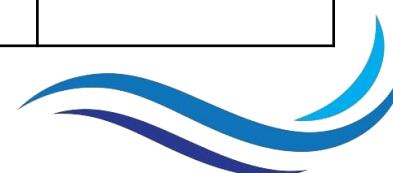


# Program Outcomes as specific to the particular course (PO mapped with the relevant course)



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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.
<b>PO5: Modern tool usage::</b> 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
<b>PO6: The engineer and society::</b> 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	
<b>PO7: Environment and sustainability::</b> 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
<b>PO8: Ethics::</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	1		2	
<b>PO9: Individual and team work::</b> 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)



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PUNJAB (INDIA)

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.
<b>PO10: Communication::</b> 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	
<b>PO11: Project management and finance::</b> 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.				
<b>PO12: Life-long learning::</b> 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

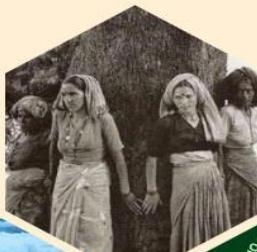
To get inspired by historical movements to protect the environment and to realize our duties towards nature

### 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



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## 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.



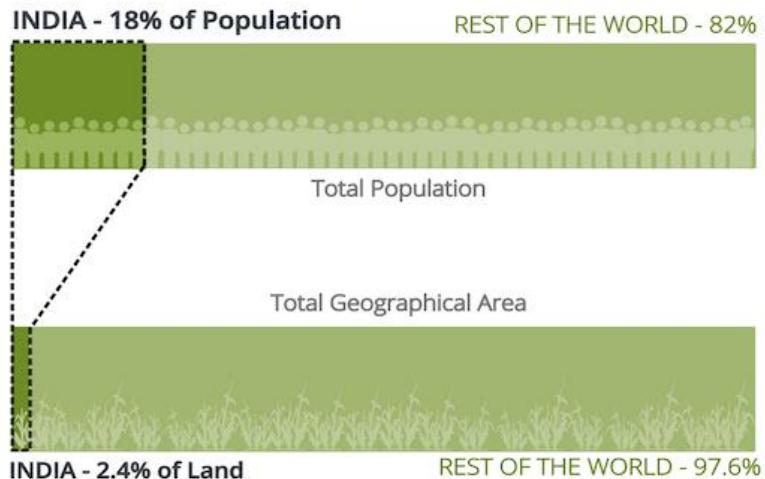


# Ground reality of natural resources



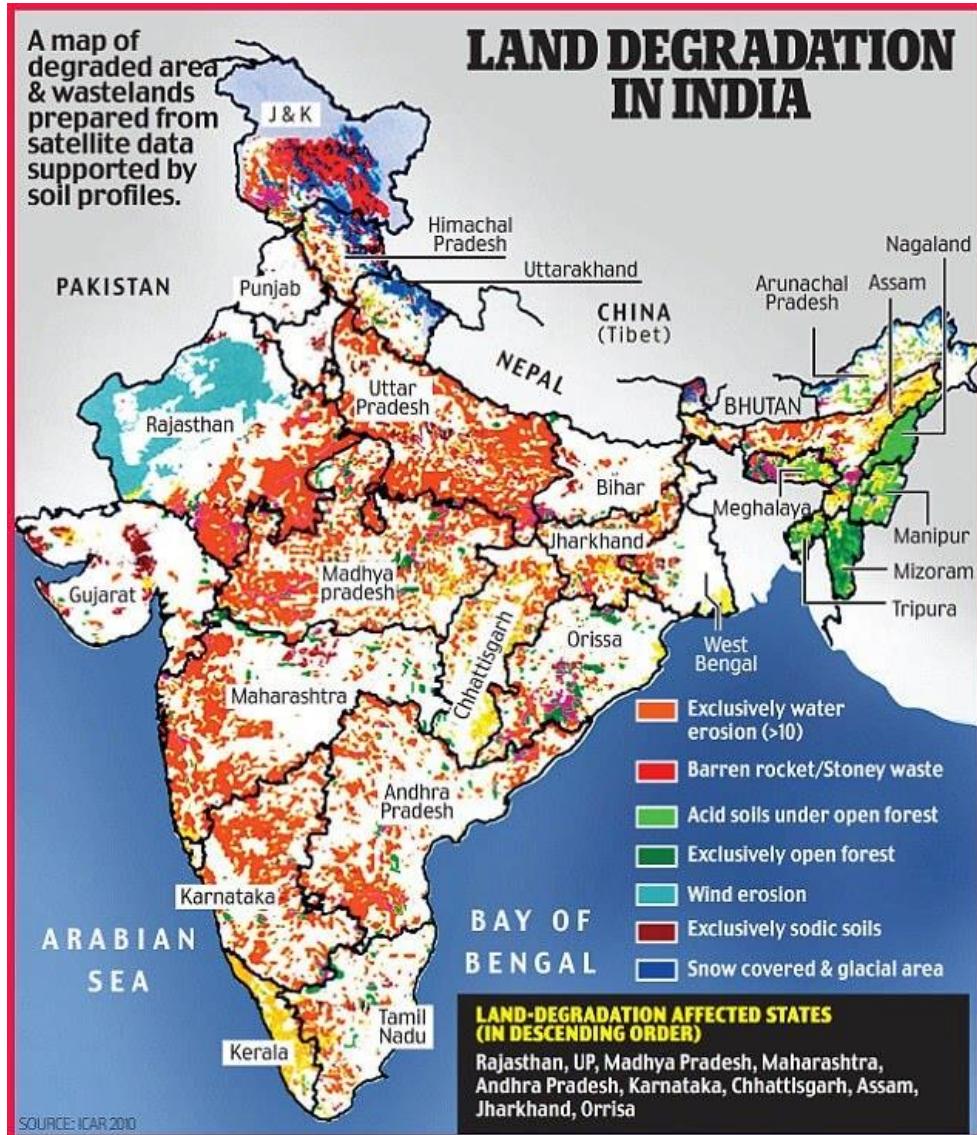
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India supports 18% of the world's population with only 2.4% of the world's land area



iS. IndiaSpend

Source: Food And Agriculture Organization

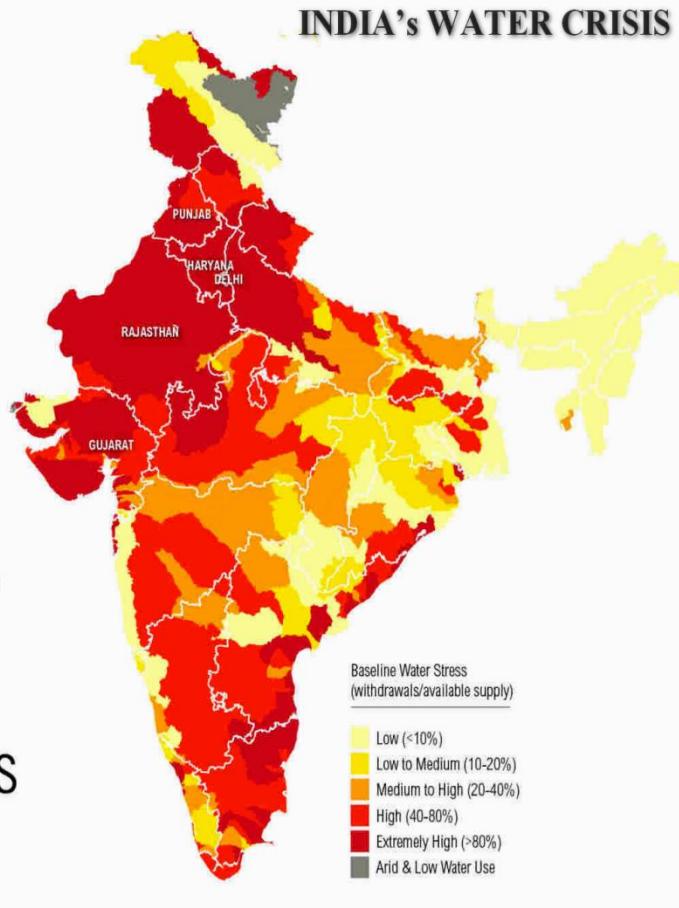




# Ground reality of natural resources



**54%**  
of India  
Faces  
**High** to  
**Extremely**  
**High**  
Water Stress





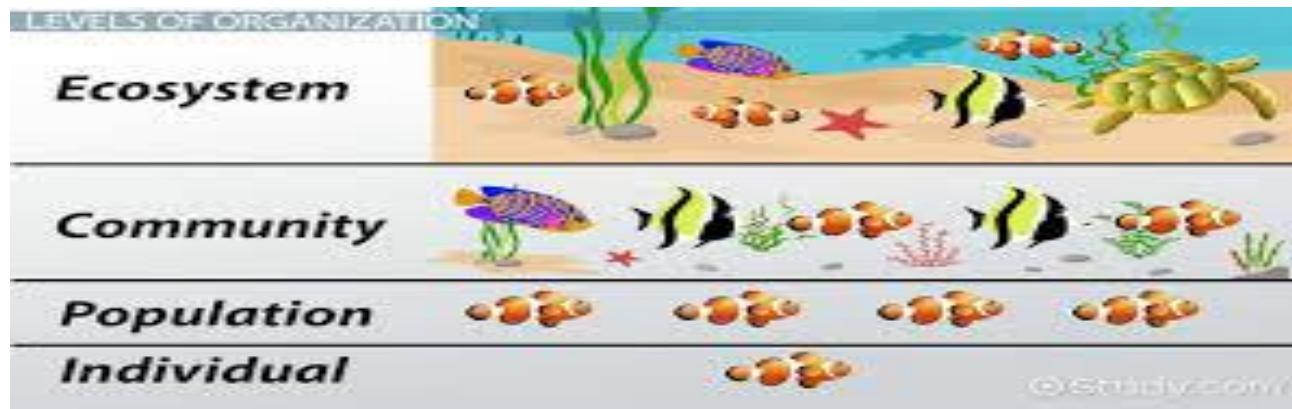
# Detailed Syllabus



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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 :

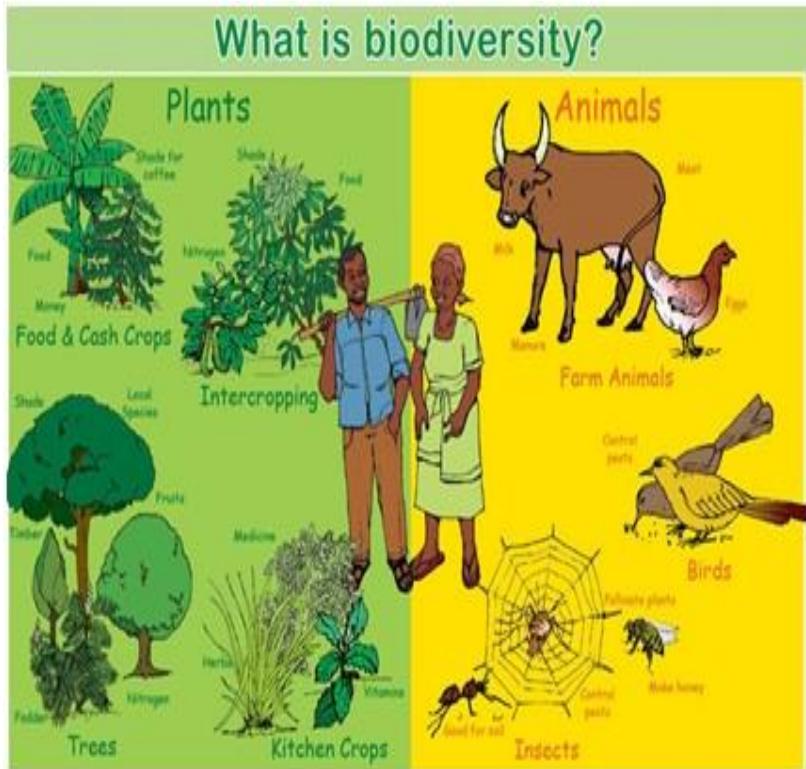
- Levels of biological diversity : genetic, species and ecosystem diversity, Biogeographic zones of India, Biodiversity patterns and global biodiversity hot spots, India as a mega diversity nation, Endangered and endemic species in India,
- Threats to biodiversity: Habitat loss, poaching of wildlife, 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



**Red Panda**



**Royal Bengal Tiger**



**Lion-tailed macaque**



**Tahr**





# 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





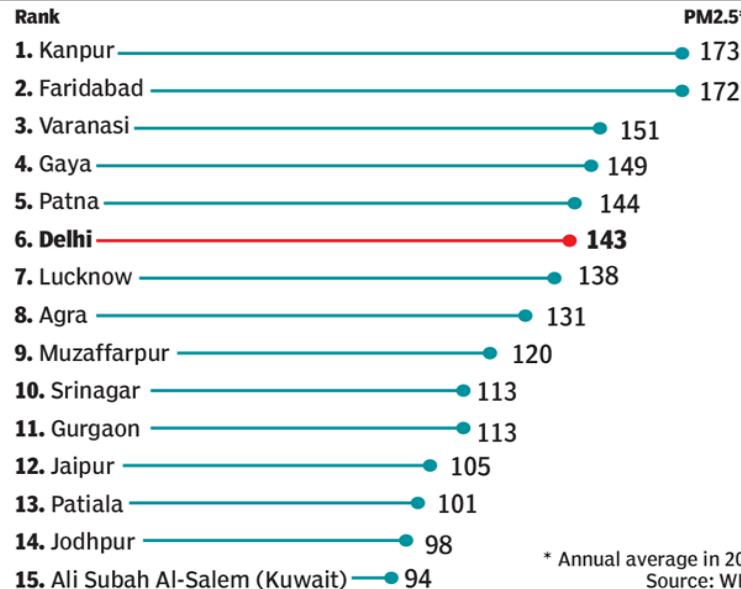
# Air Quality Statistics



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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 NO<sub>2</sub> in the air in selected cities (Feb-Apr 2020)\*



Central locations

\* 95 percent of NO<sub>2</sub> in the air is caused by fossil fuel combustion  
Source: World Air Quality Index (WAQI)



statista



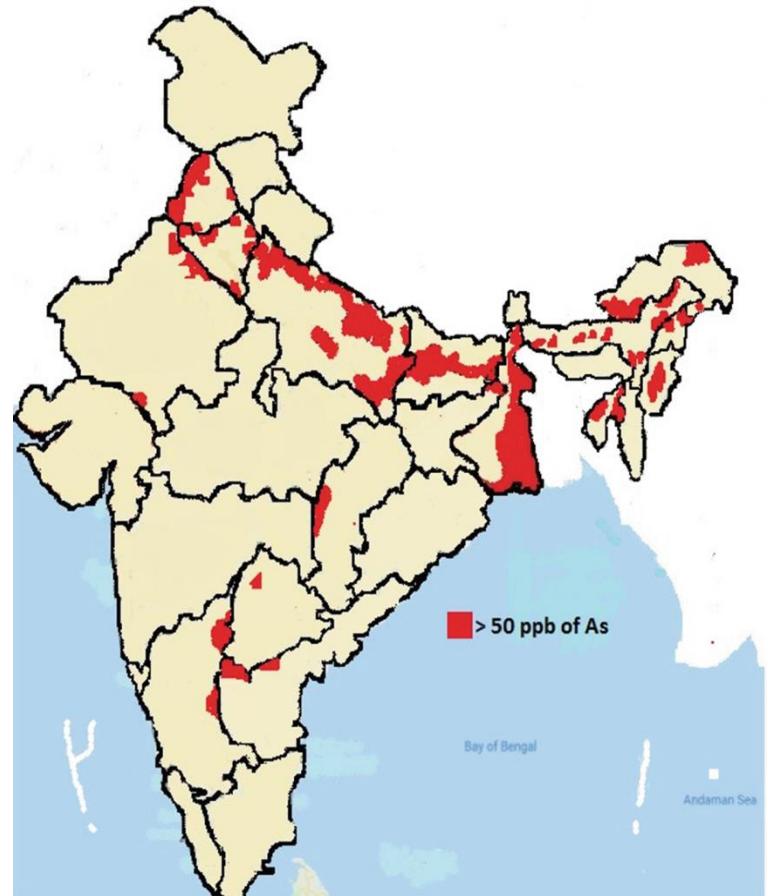
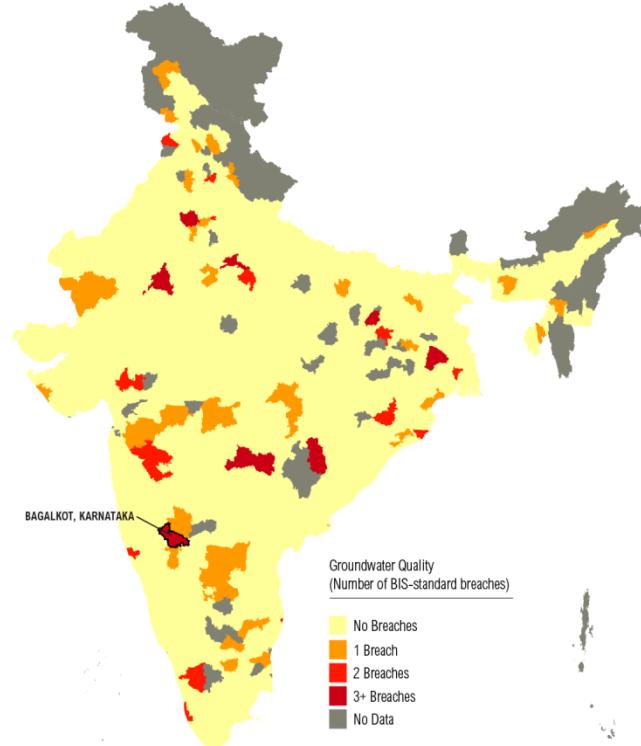


# Water Quality Statistics



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



[www.indiawatertool.in](http://www.indiawatertool.in)

 WORLD RESOURCES INSTITUTE





# Pesticide usage statistics

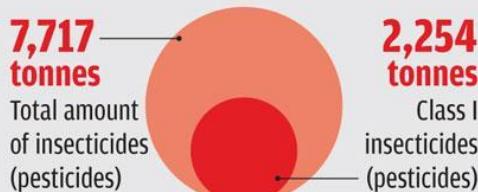


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## Grave danger

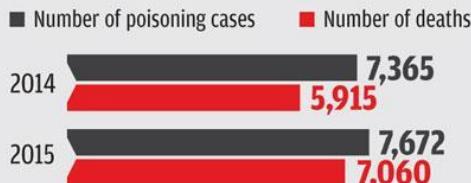
Farmers are in peril due to lack of regulation of hazardous pesticides

### 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

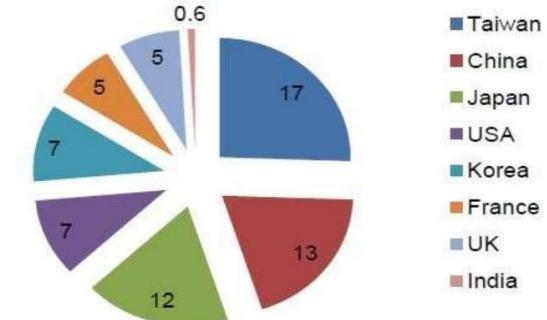


Fig. 2 Per capita usages of pesticide by country (Kg/Ha)

Source : [http://news.eurpean.com/UserFiles/CE0110/2015-06-01\\_EU-5340\\_365.jpg](http://news.eurpean.com/UserFiles/CE0110/2015-06-01_EU-5340_365.jpg)





# Detailed Syllabus



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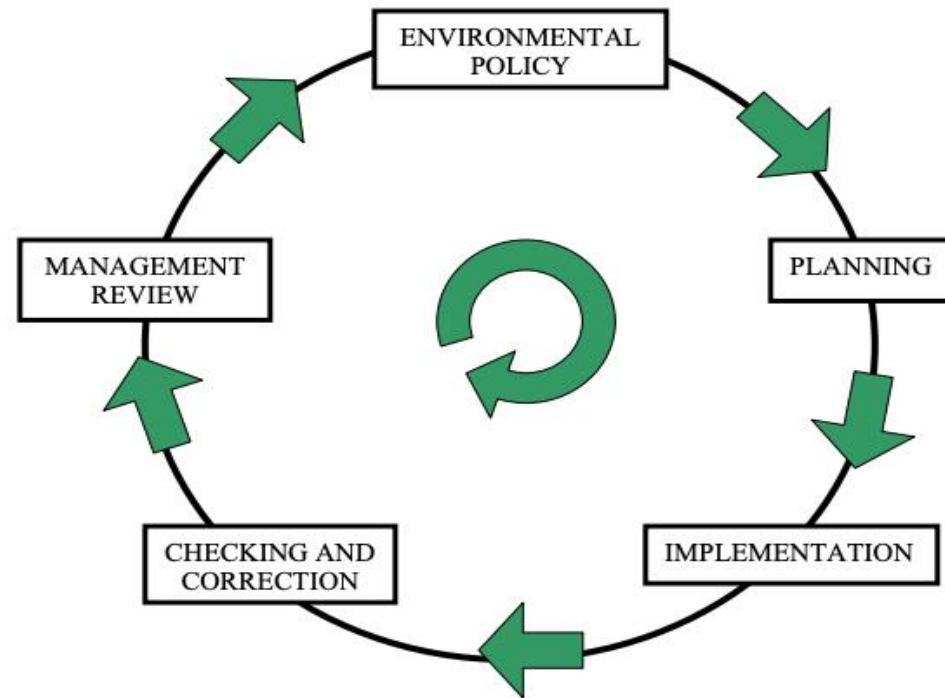
## Unit – 5 (Environmental Policies & Practices):

- 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





# Environmental Policies & Practices





# Some International Environmental Agencies



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NATURAL  
RESOURCES  
DEFENSE  
COUNCIL

GREENPEACE





# Some Indian Environmental Agencies



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**Centre for Science  
and Environment**



The Energy and Resources Institute



**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

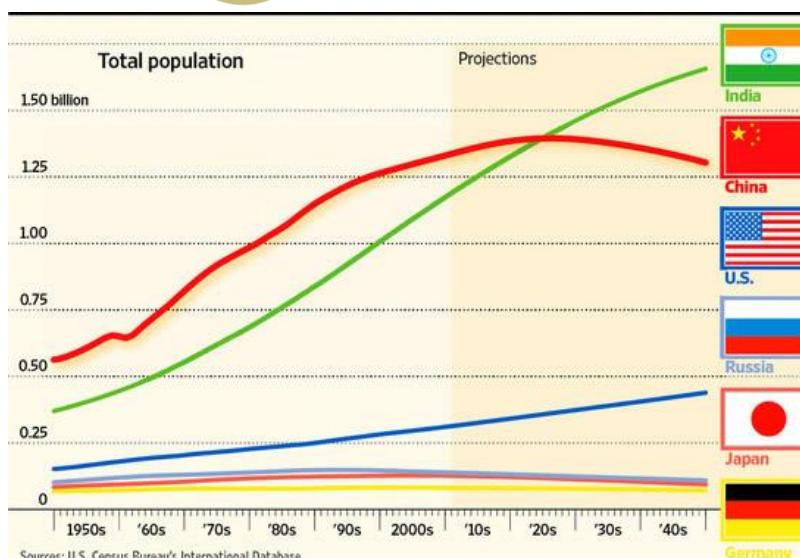
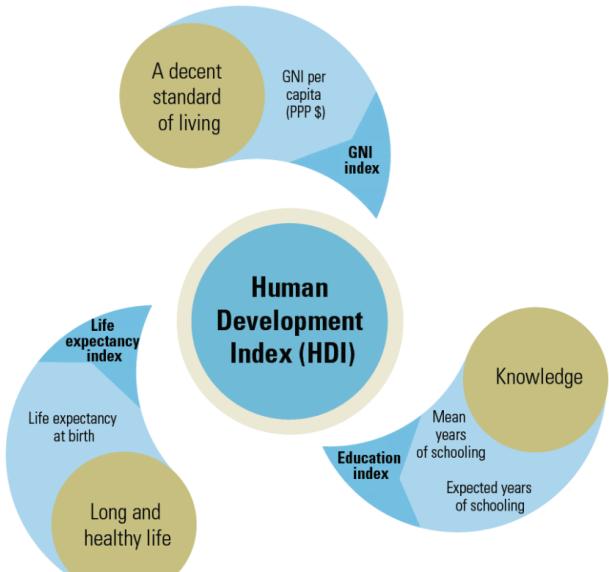




# Population Growth and its Effects

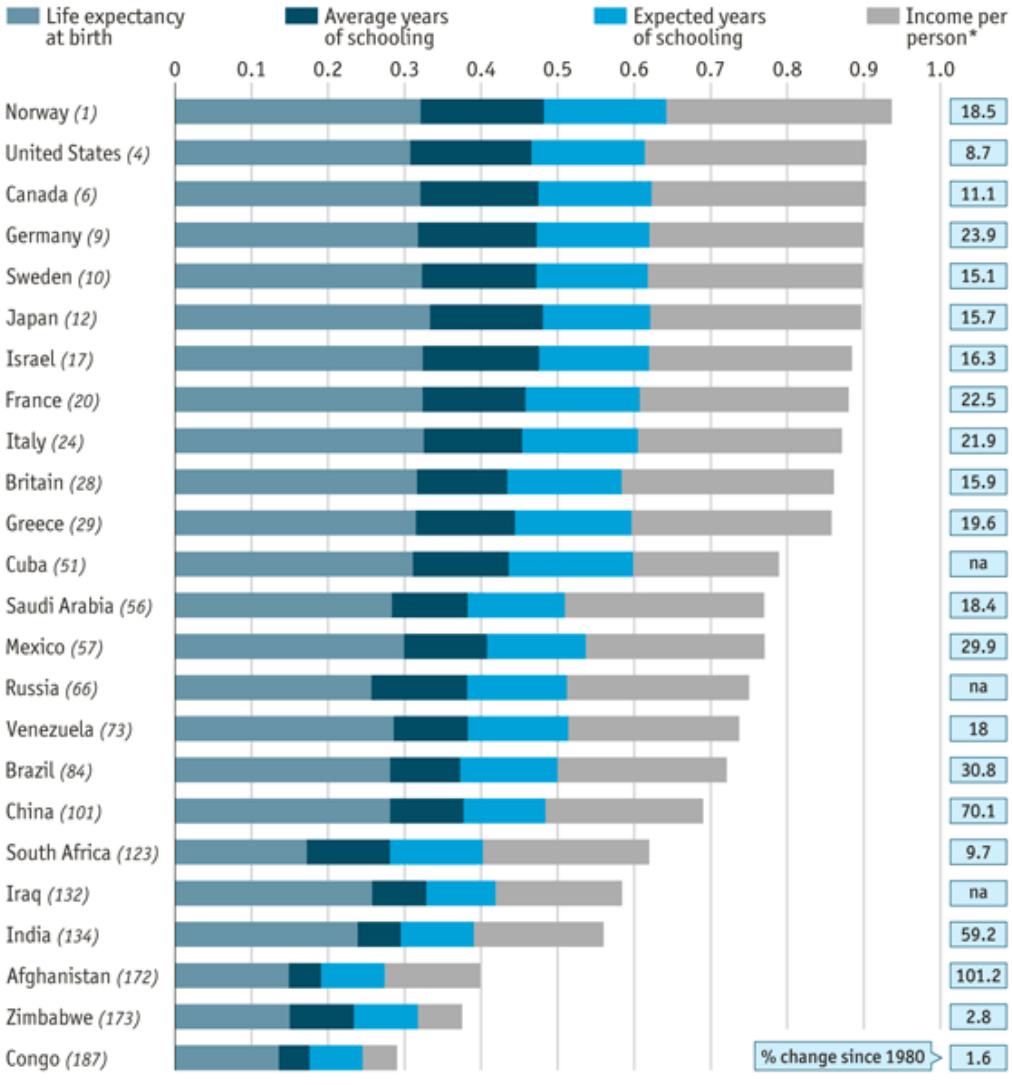


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## Human Development Index

1=best (rank out of 187)





# Environmental Awareness



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





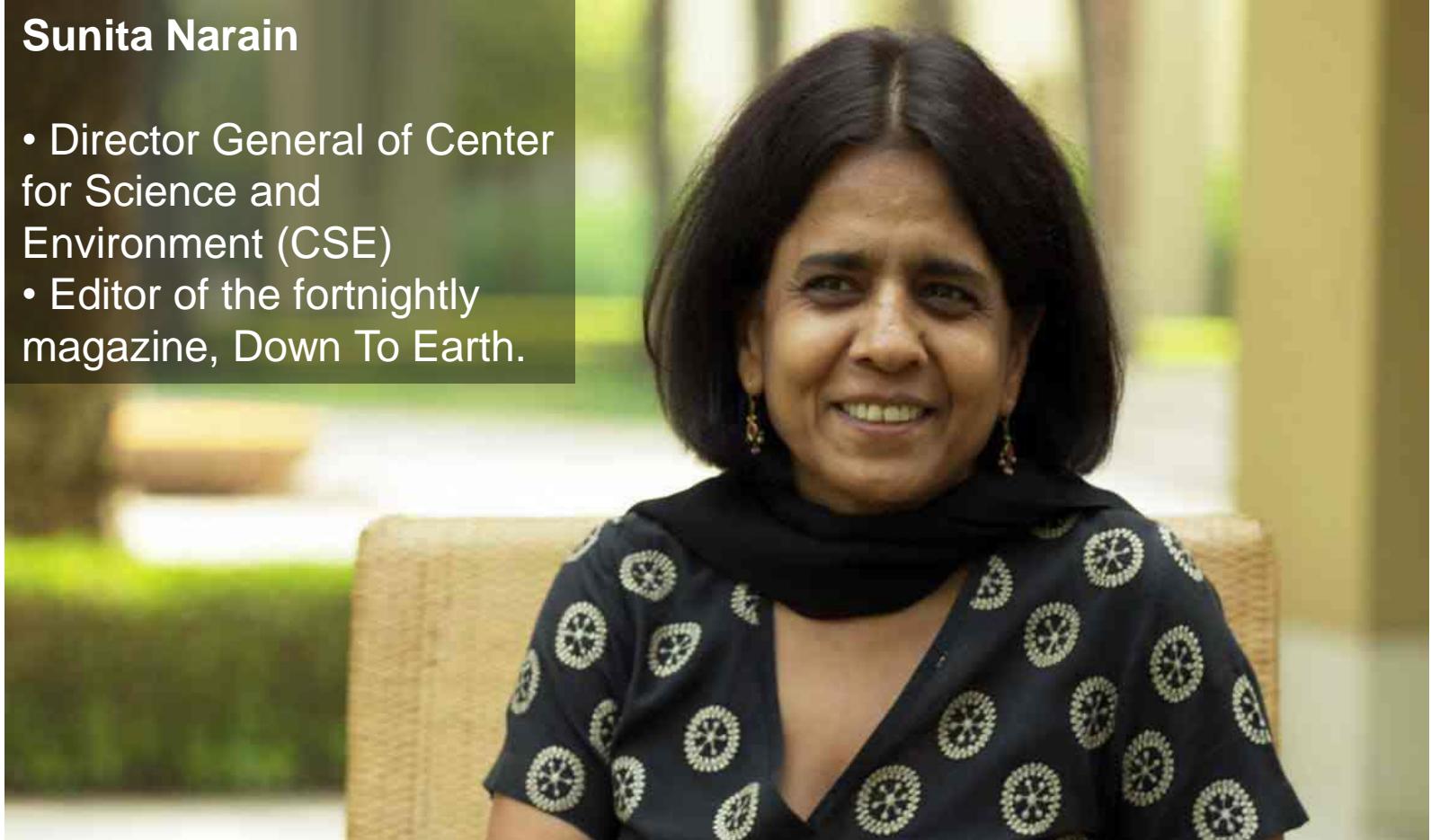
# Environmental Activism



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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.





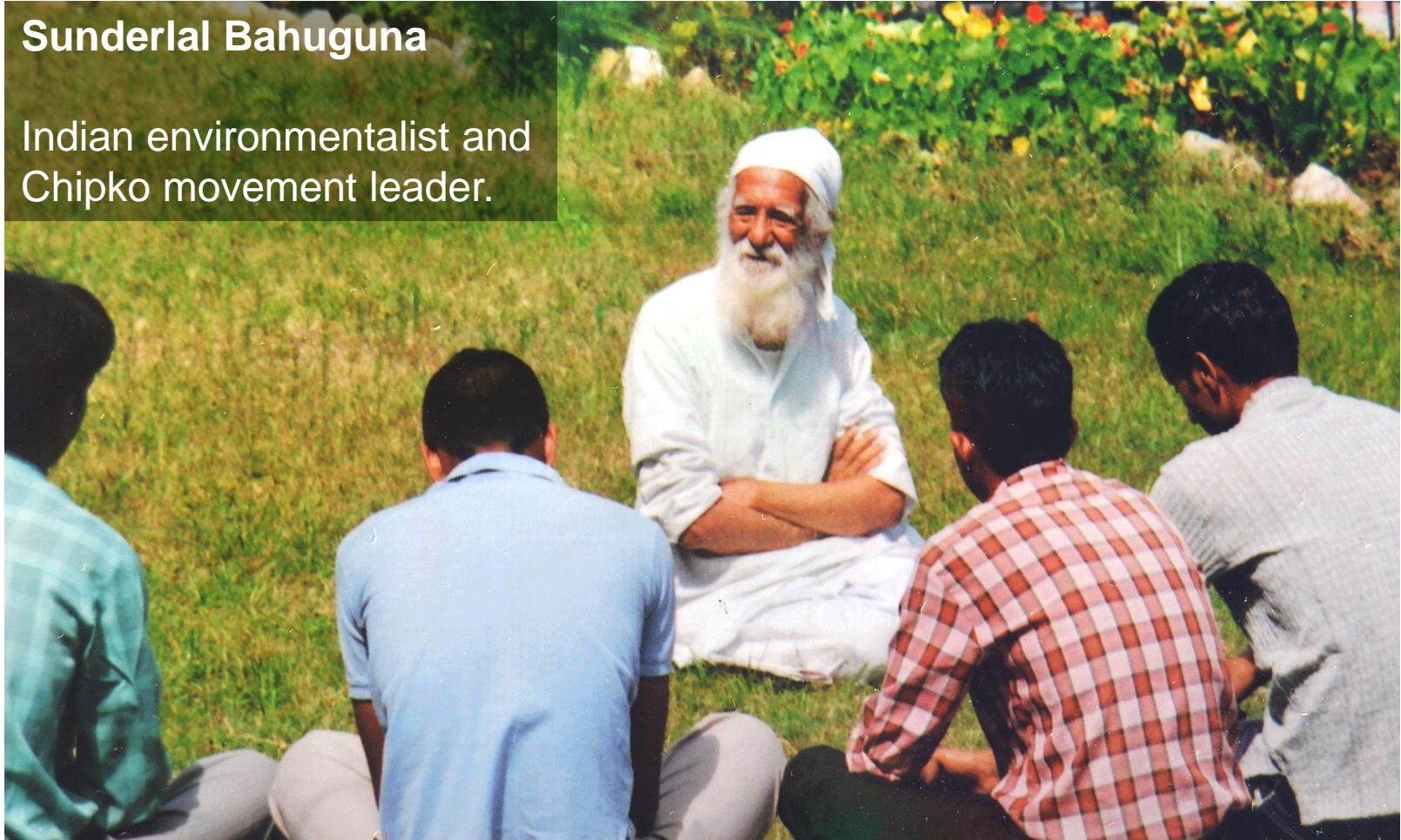
# Environmental Activism



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**Sunderlal Bahuguna**

Indian environmentalist and Chipko movement leader.





# Environmental Activism



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PUNJAB (INDIA)

**Medha Patkar**

Central organizer and  
strategist for Narmada  
Bachao Andolan (NBA)





# Environmental Activism



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- Many more-----





# 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](#)

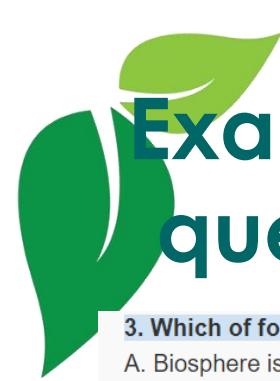
Q : Biological indicator of pollution of sulfur dioxide is: -

- (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 CO<sub>2</sub>, CH<sub>4</sub>, CFCs and N<sub>2</sub>O 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





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Thank You

