

# Environmental Science Syllabus

There is one paper of two hours duration carrying 80 marks and Internal Assessment of 20 marks. The paper has two Sections: Section A (Compulsory) contains short answer questions covering the entire syllabus. Section B contains six questions. You are required to answer any four questions from this section.

## 1. Controlling Air Pollution

### (a) From domestic combustion.

Reducing pollution from domestic cooking; clean cooking - kerosene as a desirable cooking fuel in rural areas.

### (b) From industries.

Measures for controlling industrial air pollution - technological measures (energy efficient devices, clean technologies), meteorological controls; zoning strategy; penalties and subsidies; Case Study: the Taj Trapezium.

### (c) From vehicles.

Vehicle emission control - modify engine design (catalytic converters, four stroke engines), clean fuels, public transport options, traffic management, economic policy measures.

## 2. Addressing Population

### (a) The link between growing population and environmental degradation.

UN's population projections for 2050, the climate link, the choice of alternative futures. Growing population in the developing countries and rising consumption in the developed countries.

### (b) The demographic transition.

Stages of transition, transition stages of certain developed nations and developing nations (such as India, China, Korea, Malaysia). Not to be tested, for knowledge and understanding only.

### (c) Strategies for controlling growth of population.

Strategies to include family planning and birth control, health care, education, economic development; women-centered human development.

### (d) Development framework for poverty alleviation.

Social mobilisation, agricultural development, small-scale industries, human development. Not to be tested, for knowledge and understanding only.

### **3. Managing the Urban environment**

#### **(a) Urbanisation - a challenge to the future.**

Sustainable cities: the need of the hour.

#### **(b) Planning environmental improvement.**

Efficient land use, planning energy, shelter and transport; water supply management, wastewater and sanitary waste management, construction activities.

#### **(c) Rural development to counter migration.**

Self-explanatory.

#### **(d) Development of secondary cities to counter migration.**

Self-explanatory.

#### **(e) Community participation and contribution of private enterprises.**

Community participation in keeping surroundings clean, participation of private enterprises in city improvement, measures to increase private enterprise participation.

### **4. Managing Soil and Land**

#### **(a) Conserving soil.**

Erosion control techniques - terracing, contour ploughing, dry farming, tree planting, bunds, gullies, wind-breaks, use of organic fertilizers.

Soil conservation techniques - land-use management, vegetative and mechanical practices, conserving soil and water together; appropriate cropping systems – cropping patterns (strip cropping), tree crops, foliage crops.

#### **(b) Land reforms.**

Meaning, measures enforced in India to give land to the landless.

#### **(c) Integrated rural development.**

Objectives, self-help schemes like social and community forestry.

#### **(d) Role of women and community in conservation.**

Self-explanatory.

### **(e) Combating deforestation.**

Reforestation, energy plantations, forest harvesting of non-timber forest products, exploring alternative sources of livelihood, change in consumption patterns.

### **(f) Managing forest grazing.**

Causes and consequences of overgrazing, controlled forest grazing as in National Forest Policy, 1988.

### **(g) Alternatives to timber.**

Recycling of timber and paper.

## **5. Food**

### **(a) Sustainable agriculture.**

Integrated pest management – understanding the term, aims, advantages, disadvantages.

Genetically modified organisms, application in plants and animals and environmental risks.

New crop strains – high yielding varieties and their viability, hybrid varieties.

Mixed cropping – advantages and disadvantages; regenerative farming techniques - intercropping, crop rotation, agro forestry, polyvarietal cultivation and polyculture.

Conservation tillage farming - meaning of conservation tillage, advantages and disadvantages.

Trickle drip irrigation – need for a trickle drip irrigation system; operation of a drip irrigation system; advantages and disadvantages.

New organic fertilizers – integrated nutrient supply programme, organic fertilizers - bulky organic manures, green manures, bio-fertilizers, and sewage sludge.

Gene banks – what are gene banks; objectives of maintaining gene banks.

### **(b) Problem of global food security, food aid.**

Global food imbalance, distributional inequality; role of food aid in achieving global food security.

## **6. Biodiversity**

### **(a) Biodiversity at risk due to human actions.**

Reasons for loss of biodiversity; Man - the super consumer: impact of his actions on the earth's resources; reasons for concern: economic, ecological and aesthetic.

**(b) Conserving our genetic resource:** in-situ and ex-situ; harvesting wildlife.

In-situ - wildlife sanctuaries, national parks and biosphere reserves.

Ex-situ – zoological parks, botanical gardens, gene banks in agricultural research centres and forestry institutions.

Harvesting wildlife to meet commercial needs.

**(c) Conservation strategies at national and international levels.**

Wildlife (Protection) Act 1972, Project Tiger 1973, IUCN, The Ramsar Convention on Wetlands, 1971, CITES, The Convention on Biological Diversity.

## 7. Energy

**(a) Fossil fuels used to produce electricity.**

Electricity: energy on demand; dwindling supplies of fossil fuels; renewable and nonrenewable energy resources. Not to be tested, for knowledge and understanding only.

**(b) Nuclear energy.**

Nuclear fission, advantages and disadvantages of nuclear energy; safety concerns (the Chernobyl disaster); nuclear fusion.

**(c) A sustainable energy future.**

Energy conservation; alternative energy sources - solar energy, wind energy, hydroelectricity, geothermal energy, biomass, liquid fuels from biomass- methanol, ethanol, gasohol, CNG, hydrogen.

## 8. Waste

**(a) Solid waste: the throwaway society.**

Solid waste, biodegradable and non-biodegradable materials; where does the trash go - landfills and incinerators.

**(b) Solid waste: options for the future.**

Producing less waste, reusing, recycling, composting, vermiculture, biotechnology; finding alternatives to materials we use.

## 9. Environment and Development

**(a) Global environmental pollution.**

Who is responsible - developed or developing countries? Need for mutual cooperation.

**(b) Economic development and environmental degradation.**

Role of developed and developing countries; contrasting views of developed and developing countries; debt trap.

**(c) International trade.**

Its link to environmental deterioration – unfair trade practices.

**(d) Role of multinational corporations.**

Definition of MNCs, their contribution to development and debatable contribution to environment; case study - Bhopal gas tragedy; measures to regulate activities of MNCs in developing countries.

## **10. Towards a Sustainable Future**

**(a) Global interdependence – economic and environmental.**

Concept of economic and environmental global interdependence; global environmental health – the shared responsibility of nations; trade and aid as ways of reducing world inequalities.

**(b) International cooperation.**

The Montreal Protocol; the Global Environmental Facility (GEF) support; the Earth Summit, UN's International Conference on Population and Development (Cairo); the Kyoto Treaty.

**(c) Sustainable development.**

The concept of sustainable development, sustainable development and developed countries; sustainable development and developing countries.

**(d) Role of non-governmental organisations.**

Self-explanatory.

**(e) Technology that sustains.**

Satellite imagery as a means of monitoring the global environment: satellite remote sensing, advantages in collecting environmental data, applying data in areas of environmental damage as deforestation, desertification, land degradation, wastelands, mining, ozone layer depletion and predicting droughts and floods.

The concept of alternate technology, adopting alternate technology to create self-sustaining societies in the developed and developing world.

Role of biotechnology in achieving global food security.