CHAPTER-6

Social Issues and the Environment

From Unstable to Sustainable Development

It is well recognized now that rich nations of the world consume resources, especially non-renewable natural resources like coal and oil at a break-neck pace. The consequence of this resource use is the promotion of unfettered consumption and greed which, in turn, has begun to create global energy shortages, pollution, global warming, among other myriad problems.

It is now recognised that this model of growth and development is unsustainable and must be addressed. The World Commission on Environment and Development defines Sustainable Development as Development that meets the needs of the present generation without compromising the needs of the future generation to meet their needs.

Sustainable development requires that for any activity that brings about economic growth, the corresponding environmental impact must be studied and negative aspects addressed. Especially major projects like large dams, mining industries and major highways should be restrained. This, in turn, requires that unfettered consumption by people be checked. Further, Environmental Impact Assessment (EIA) must be conducted on every major public and industrial or commercial project before proceeding.

Urban Problems Related to Energy

Mankind has designed cities as a marker of development, but by their very design the energy needs in urban agglomerations are typically very high. For example, in India, housing made out of traditional material like mud and straw can handle hot temperature better but such material are routinely discarded in favour of brick and mortar as soon as some development takes place.

In modern housing, the use of brick, concrete, aluminum and glass makes buildings hot and requires large number of fans or huge air–conditioning units. High-rise buildings also consume huge amount of electricity to operate lifts, pump water and for illumination.

Modern cooking is done with kerosene, natural gas, LPG or electricity. This consume large amount of fossil fuels. Urban transport requires that large number of cars to be on the road thereby creating, congestion, and waste of time, air pollution and respiratory diseases. Instead, efficient public transit systems like metros should be used so that transportation is fuel-efficient.

Water Conservation, Rain Water Harvesting and Watershed Management

It is often said nowadays that water will be the focus of the next global crisis. Clean, usable water has become a scarce item in the 21st century. There are several reasons for this. Modern agriculture based on HYV seeds require massive amount of irrigation water. This has, in turn, required the building of very large dams on important rivers and massive water reservoirs. Dams and irrigation tamper with river courses leaving downstream areas nearly dry.

This has coupled with increasing deforestation. Deforestation increases surface run offs decreasing recharging of ground water. Agricultural needs have also caused much withdraw log ground water. Excessive use of ground water for irrigation and urban use causes the water table to drop.

Urban and industrial effluents have often not been cleaned up. Instead they have been discharged indiscriminately. These effluents pollute water bodies, lake and rivers. In addition, urban agglomerations generate massive amount of waste water from sewage, washing and other urban uses. All this is leading to a rising demand and falling supplies of usable water and massive water shortage.

The solution lies in conserving water, water recycling, harvesting of rain water and managing local watersheds more efficiently. For example, one can use drip irrigation to supply water directly to the root of plants so one needs less water to grow food.

Urban life wastes lots of water. Water wastage should be prevented. We all can do a little bit. The Pani Panchayet movement initiated by Vilasrao Salunkhe can be used to manage local watersheds better. Also, collecting rainwater in terraces and roofs and using them at source should be encouraged.

Resettlement and Rehabilitation of people: Its problems and Concerns:

Large public and private projects like mines, highways or even the notification of a National Park will displace large number of people. It is expected that such people would be given good, arable land for resettlement. In an overpopulated country such as ours there is never enough arable land available.

Also, resettlements seldom take place in practice and may sometimes take decades. Often only wasteland is offered in place of arable land to the displaced people.

Large Dams have been one of the greatest causes behind the eviction of people. Tehri Dam, when finished will submerge Tehri town and 100 villages. The building of the dam has been opposed by the local people. Tribal people are often the most significant victims of eviction. Narmada Bachao Andolon is the greatest example of a battle by indigenous people over land for a large dam.

Environmental Ethics: Issues and Possible Solutions:

Environmental ethics deal with rights of people and other living beings that are fundamental to their existence. We pose the question: Should there be huge disparity in the use of natural resources between rich nations and poor nations and between rich people and poor people? Many of us would like to answer “no”.

Incomes and consumptions must be made more equitable through the sharing of Gross National Products. Tribal persons and women are particularly vulnerable when it comes to the control of natural resources for individual use.

People with traditional life styles like fishermen and artisans have a right to live in the way they choose. Even when nature is "recreated" the poor are often excluded. All creatures big and small, living on land or in water animals, and plants have a right to exist and should not be slaughtered to serve human needs.

Climate Change and Global Warming

About seventy percent of solar energy reaching the earth's surface is absorbed. The rest is reflected back. This keeps the earth warm and fit for life. Green house Gases such as Carbon Dioxide traps heat. As we burn more fossil fuels like oil and coal to make electricity, the amount of carbon dioxide in air rises. This traps more heat and the temperature of the earth rises. This results in melting of polar caps and glaciers. Average sea level rises and low-lying land goes under water.

Sudden changes in climate may also happen. Hurricanes and typhoons may suddenly occur in regions where they are unexpected. This increases desertification, food shortage and vector-borne diseases. Human activities involving industrialisation and population growth has greatly increased energy demand in the last 100 years. This has resulted in massive increase in fossil fuel consumption, petroleum and coal.

Burning of fossil fuels result in Carbon Dioxide emissions. CO_2 and other Green House Gases have increased by 31% in this period. The only way this carbon dioxide can be sequestered in the forest, but with increasing deforestation, this CO_2 has nowhere to go. This is the main reason behind Global Warming and rise in earth's temperature.

Acid Rain

Burning of fossil fuels result in the release of Oxides of Sulphur (SO_X) and Nitrogen (NO_X). These react with water vapour in the air to form Sulphuric or Nitric Acid. They are carried up in the atmosphere and return to the earth in the form of Acid Rain. Acid rain dissolves and washes away nutrients in the soil. It also washes away the nutrients needed by plants. Acid rain affects rivers and wetlands, aquatic life, disrupts food chains and destroys entire ecosystems.

Depletion of Ozone Layer

Ozone (O_3) is a poisonous gas and a dangerous pollutant at ground level. A layer of ozone (in a mixture with oxygen) exists in the stratosphere 20 to 50 km above earth's surface. Ozone molecules reflect the Ultraviolet rays (UV) coming from the sun and protects life on earth.

Chemical such as Chlorofluorocarbons (CFC) from refrigerators and aerosol propellants release chlorine that combines with ozone. Thus only oxygen is left in the ozone layer and there is nothing to stop the UV rays. This causes skin cancer, cataracts and other diseases.

Thinning of the ozone layer has been noticed over Antarctica and Australia. Mankind agreed at Montreal (1987) to ban CFC as a result of which the ozone layer is being regenerated.

Nuclear Accidents and Holocausts

Nuclear energy is a clean and cheap substitute to energy from fossil fuels. Though greatly beneficial to mankind this form of energy has many problems. When accidents happen at Nuclear power plants massive radioactivity is released. This can causes huge loss of human life, long term illness like cancer, thyroid disorders, tumours, etc.

Accidents at Three Mile Island (USA-1979) and Chernobyl (USSR-1986)

are important examples. Disposal of Nuclear Waste also remains a major problem. Nuclear weapons used in war cause holocausts. Hiroshima and Nagasaki (Japan 1945) are examples.

Wasteland Reclamation

Loss of trees and vegetation cover causes soil to erode. Cultivable land can turn into wasteland in this way. Reclaiming wasteland for cultivation and other good uses remain a priority. Wasteland can be reclaimed by reducing the salt content. This can be done by leaching and flushing using Gypsum, Urea, Potash, and Compost. Agriculture can be mixed with forestry through an integrated system. Certain indigenous tree species that adopt to alkaline soil can be used to reclaim wasteland.

Consumerism & Waste Products:

Current consumption patterns involving high degree of consumerism and this is very wasteful. Goods produced for one time use create massive amounts of solid waste. Packaging material for white goods are resource intensive, wasteful and contribute to solid waste. For example, two hundred billion plastic cups, cartons, cans and bottles are thrown away every year. Clearly, reduction or ban on certain types of plastic items can be a solution. Therefore, recycling as much as we can must be practiced. Reduction of gross consumerist life styles must be encouraged.

Environmental Laws:

The Environmental (Protection) Act -1986

This Act was passed to give Government a comprehensive power to take action in environmental matters. It gave power to the Central Pollution Control Boards (CPCB) and State Pollution Control Boards (SPCBs) to set permissible limits for air pollution, water pollution and release of hazardous substances.

Other important laws in this area are Air (Prevention and control of pollution) Act 1981and the water (Prevention and control of pollution) Act 1974.

The earliest law was the Wildlife (Protection) Act 1972. This act established National Park and Wildlife Sanctuaries. This act launched Project Tiger and prevented trade in animal body parts. Forest (conservation Act)1980/1988 is also important.

Enforcement of Environmental Legislation:

All major Development projects- government or private – need an Environmental Impact Assessment by a competent organisation. It lists local flora, fauna, people and ecosystems that may be affected. Citizens' actions and action groups can act as watch-dogs against willful environmental damage by resorting to prayers, petitions, media publicity, dharnas or Public Interest Litigation (PIL). Public awareness at the local level is extremely important. Events commemorating World Environment Day, Earth Day, Wet land Day contribute to this end.

CHAPTER-7

HUMAN POPULATION AND THE ENVIRONMENT

Things to be learned

- Population growth, variations among nations
- Population explosion
- Family welfare program
- Environment and human health
- Human rights
- Value education
- Women and child welfare
- Role of information technology in environment
- Case studies

Introduction

Population :-

Group of individuals of species occupying a definite geographic area at a given time.

Population Growth

Global Population Growth-

Year	Population (in billions)
1700	0.6
1850	1
1930	2
1960	3
1987	5
2000	6.1
2050	9.1

- The population will continue to grow till equilibrium is .i.e.

Number of births = Number of deaths

- Population growing by 90 million/year.
- Of which 93 % in developing countries.

Reasons for growth-

- Spread of public health programmes in developing countries.
- Rise in food production after World War II
- Every second 4-5 children are born and 2 people die.
- Nearly 2.5 persons gets added every second.

First 10 largest countries:

SL. No.	Country	Population (In Millions)
1	India	1628
2	China	1369
3	United States	404
4	Indonesia	312
5	Nigeria	304
6	Pakistan	285
7	Brazil	244
8	Bangladesh	211
9	Ethiopia	188
10	Congo	182

Maximum Carrying Capacity

The maximum population size that can be supported by environment.

- Carrying capacity increased by clever use of science and technology.
- Limit to max population size in given space and resource base.
- Population has been able to maintain Exponential Growth during past 100 years.

Population Growth Rate

Human population growth rate is measured as annual average growth rate.

Avg annual growth rate (%)= $\frac{(P2-P1)}{P1\times N} \times 100$

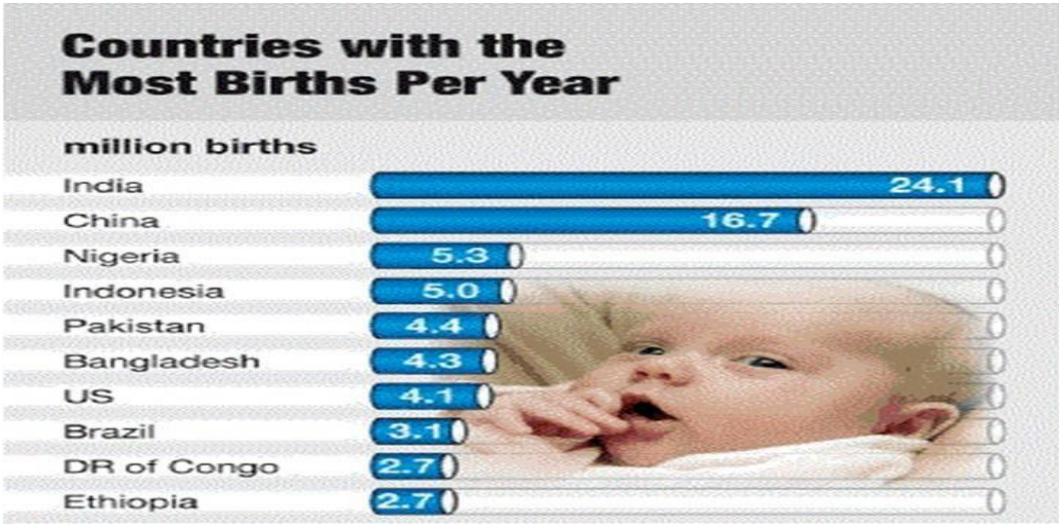
Where, P_1 = Population size in previous Census

P_2 = Population size in present Census

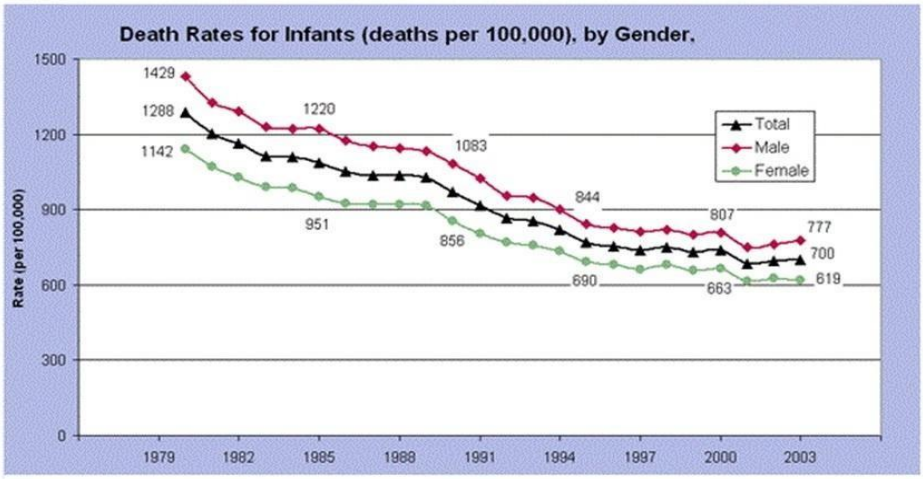
N = No of years between two Census

Growth rate depends on several factors

1. **Rate of Birth (Fertility)**



- Birth Rate- Number of babies produced per 1000 individuals
- Total Fertility Rate- Avg number of children that would be born to women in her lifetime
- Replacement Level- Number of children a couple must produce to replace themselves.
  - It is always higher than 2.0.Since some children die before reaching reproductive age.



2. Mortality

- Death Rate per thousand individuals.
- Reduction in mortality rate because of industrial revolution, Improved personal Hygiene, Modern medicines etc

3. Migration

- Movement of individuals into or out of place/ country (within country)

4. Age and sex structure

- Proportion of individuals of different ages within that population is age structure.
- Proportion of active males and females in a population influence population growth.

Population Explosion

An enormous growth of human beings is called as population explosion.

Causes

1. Fertility
2. Reduced Infant Mortality Rate
3. Increased food production
4. Longevity

Impacts

Pollution – increase in cars and emission of greenhouse gases into atmosphere

Deforestation –to build houses for increasing population

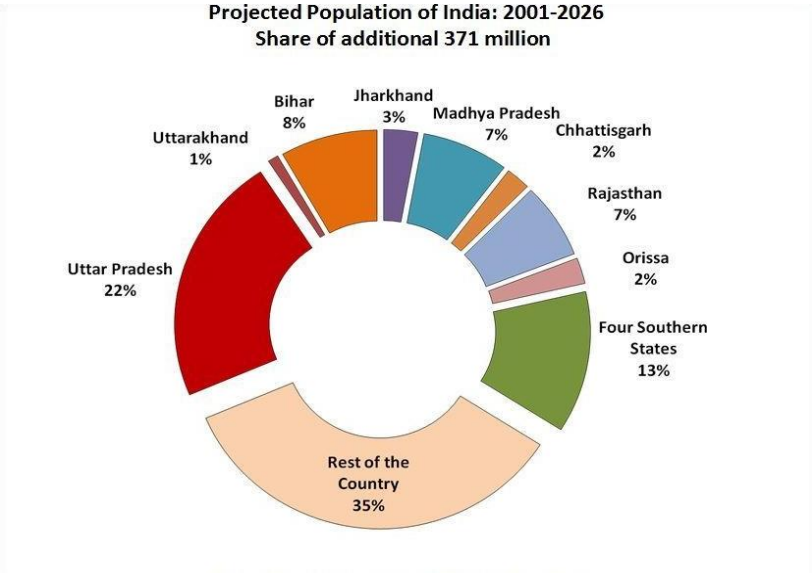
Freshwater Availability– increase in waste production and contamination of water

Natural Resources – increase burning of fossil fuels, excessive use of coal

Global Warming – overall increase in temperature and chances of natural disasters

Habitat Loss – change in ecosystems affecting tropic levels

Population Explosion in India



Reasons…

- Higher fertility rate due to failure of family planning
- Predominating religious or superstitious nature
- Importance of male child
- Social insecurity
- Poverty and backwardness

Urbanizations and its Implications

Urbanization:

- In 1950, 29 % people lived in urban areas
- By 2000, 47 % people lived in urban areas
- By 2030, estimates show that this will grow to 61 %

Causes:

- Rural problems like drought, discrimination, unemployment
- All major developments in cities
- Better life in cities
- Standard of living

Family Welfare Programmes

- Basic training of Multi Purpose Health Worker
- Village health guides schemes
- Rural Health Training Center

- Family welfare Training and Research Centre, Mumbai

Human Health and Environment

- The huge population pressurizes and degrades the environment physically, chemically and biologically.
- The state of health of people depends on clean environment.
- The changes in human environment increases the incidence of many diseases.

- Various diseases-
  - HIV/ AIDS, TB, Malaria, Water borne diseases
- Climate and Health
  - Bhopal Gas Tragedy, Hazardous chemicals like pesticides, DDT, endosulfan etc
- Infectious diseases
- Water related diseases
- Risks due to chemicals in food
- Cancer and the environment

Human Rights

- The universal declaration of human rights adopted by UNO on 10^{th} Dec 1948
- On May 16, 1994 the United Nations drafted declaration of Human Rights and Environment
  - The principles
  - Significance

- Equity-Wealth, resources, energy distribution
- Nutrition, Health and Human rights
- Intellectual property rights

Fundamental Rights Include:

- Rights of life liberty and security of a person
- Right to own property
- Right to freedom of opinion and expression
- Right to an adequate standard of living
- Right to education freedom of thought, conscience and religion.
- Right to freedom from torture and degrading treatment.

Value Education

Values deal with ones own principles and standards from which we judge what is right and wrong behaviour.

- Environmental values-Preservation of Environment
- Valuing nature-Ecologist view
- Valuing cultures-Tribal people closeness
- Social justice-Traditional things
- Human heritage-Protection of wilderness
- Equitable use of resources
- Common property resources-Government taking over
- Ecological degradation

Women and Child Welfare

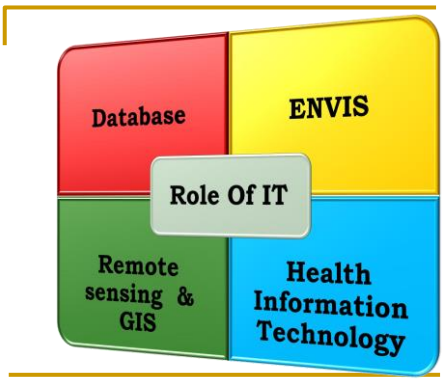
"You can tell the condition of a nation by looking at the status of its women" – Jawaharlal Nehru.

- Women and children constitute three fourth of human population
- Usually the soft targets
- Suffer mainly because they are weaker, helpless and economically dependent.
- **Collection and burning of household fuel by women**
- Women's problems with regard to water supply and sanitation
- Women and children in hazardous occupation
- Problem of cookstove pollution

Women and Child Welfare in India

- Sarva Shikshan Abhiyan
- Balika Samridhi Yojana
- Integrated Child development service.
- Special programs for development of women and children in rural area

Role of IT in Environment And Health:



❖ Database

- Ministry of Environment & Science
- Wildlife database
- Forest cover database
- Diseases database

❖ Environmental Information Systems (ENVIS)

- Network in pollution control
- Clean / Green Technologies
- Renewable energy

❖ Remote sensing and Geographical Information Systems (GIS)

- Resource mapping
- Environmental Conservation
- Water logging
- Deforestation

❖ Health Information Technology

- Audio, visual and data communication for medical diagnosis, Treatment.
- MRI (Magnetic Resonance Imaging)
- Testing DNA
- Creating DNA database
- Finger prints
- Medical records
- X ray
- Laser Treatments