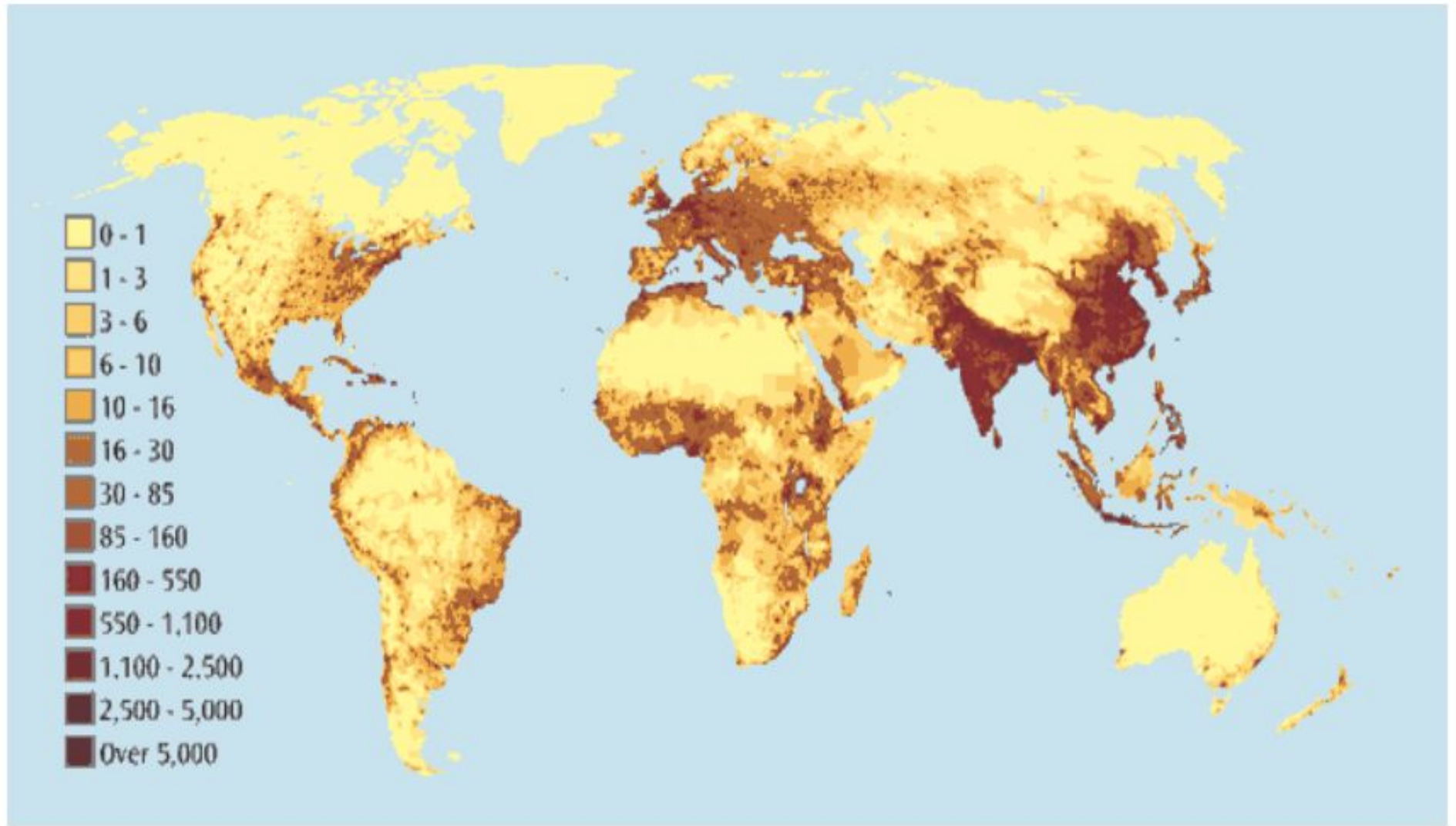


Unit 7: Human Communities and the Environment

- **Human population growth:** Impacts on environment, human health and welfare.
- **Resettlement and rehabilitation of project affected persons:** case studies.
- **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 (e.g., CNG vehicles in Delhi).

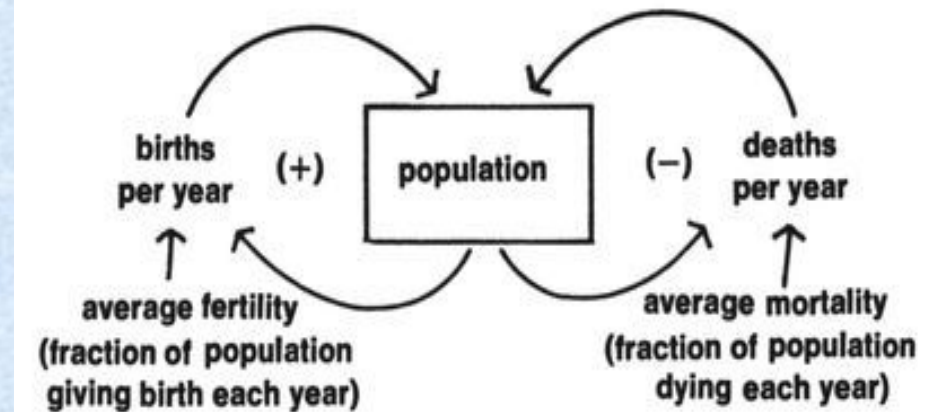
Human Population Density



Human Population and the environment

Population

It is defined as a group of individuals of the same species living in the same area in a given time.



Population density

It is expressed as a no. of individuals of the population per unit area or per unit volume



Parameters affecting population size

1. **Birth rate or Natality** : It is the no. of birth per 1000 people in a population in a given year
2. **Death rate**: It is the no. Of deaths per 1000 people in a population in a given year
3. **Immigration** : It denotes the arrival of individual from neighboring population
4. **Emigration**: It denotes the dispersal of individuals from the original population to new areas.

Migration

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



Population Growth

- The rapid growth of the global's population for the past 100 years results from the difference between the rate of birth and death.
- In 1800 the global population was about 1 billion people. It took 130 years (1930) to reach 2 billion. But the population reached to 4 billion with in 45 years (1975)
- Now we have already crossed 7 Billion and may have to reach about 10 billion by 2050 as per the World Bank calculations.



Population Growth Curves

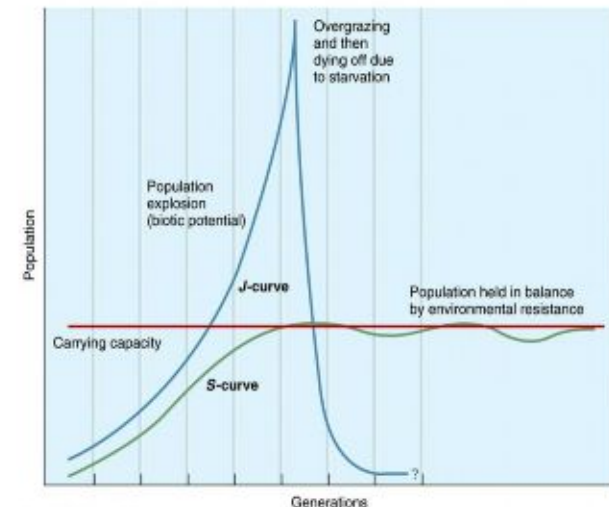
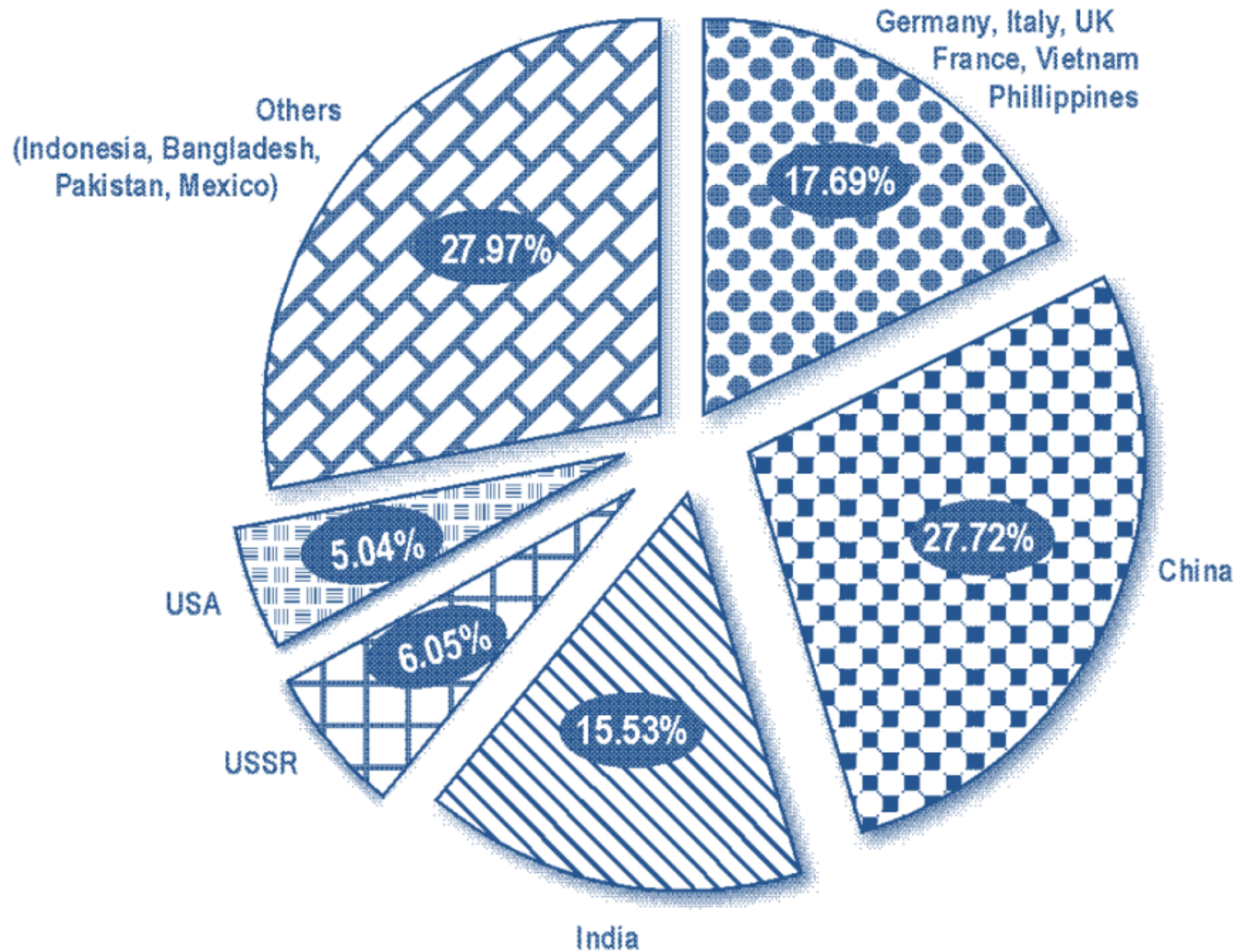


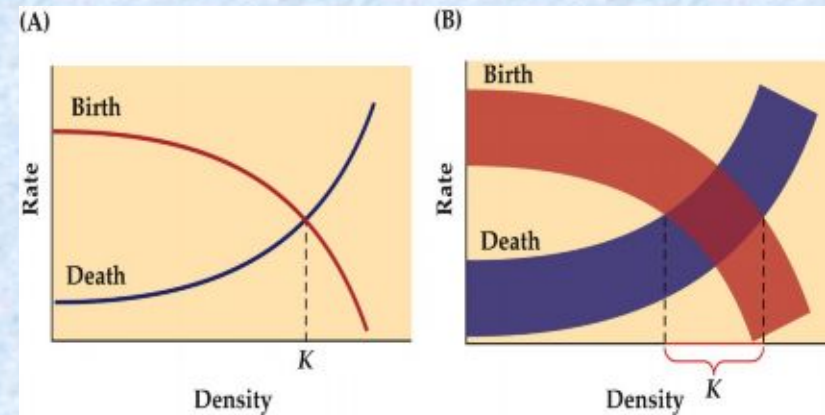
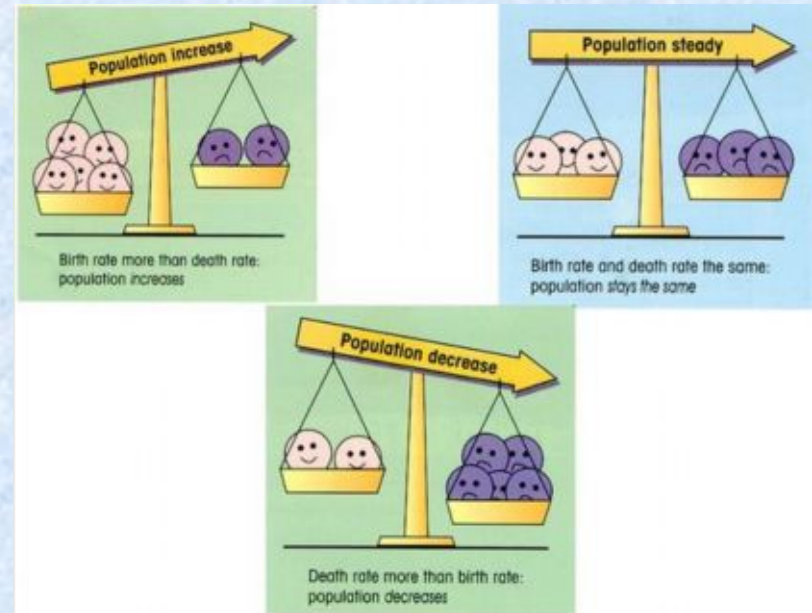
Figure 4-3 Environmental Science, 18/e
© 2008 Pearson Education, Inc.

Trends of Global Population



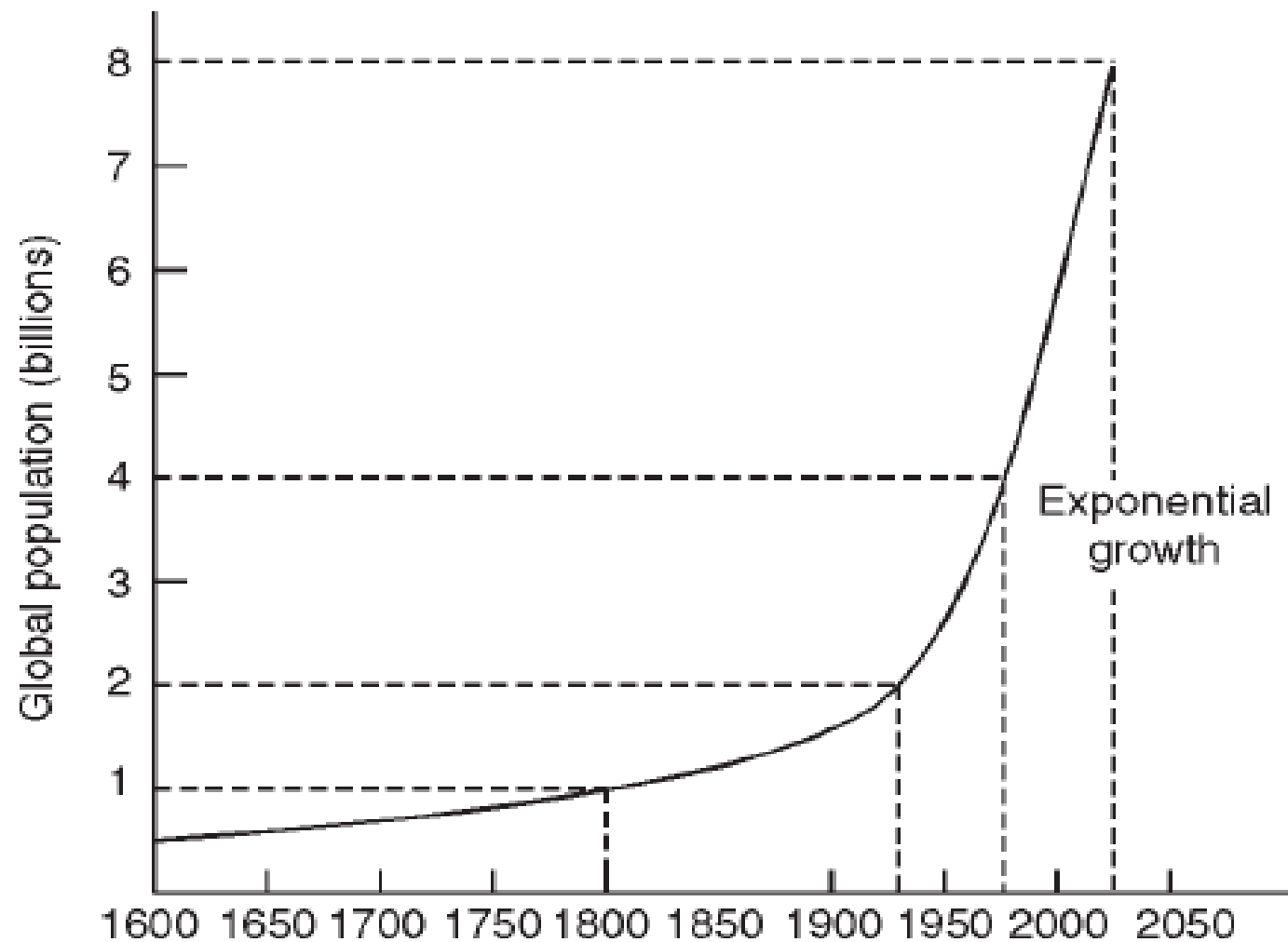
Causes of Rapid population growth

1. It is due to the decrease in death rate and increase in birth rate
2. Availability of antibiotics, immunization, increased food production, clean water, air etc decreases the famine related deaths and infant mortality
3. In agricultural based countries the children's are required to help their parents in the field.
4. decrease in death rate, maternal mortality rate (MMR) and infant mortality rate (IMR) as well as increase in longevity which are two primary factors for the increase in human population.
5. The increase in birth rate has not led to the increase in population.



ECOLOGY 2e, Figure 10.5
© 2011 Sinauer Associates, Inc.

Global population growth trends



Global population growth trends in the last four centuries.

Characteristics of Population growth

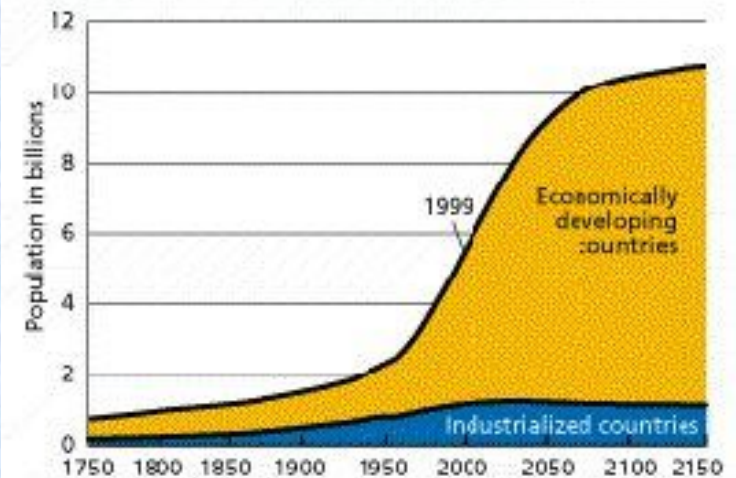
1. **Exponential growth:** Now population growth occurs exponentially like 10 , 10^2 , 10^3 , 10^4 etc, which shows the dramatic increase in global population in the past 100 years
2. **Doubling time:** It is the time required for a population to double its size at a constant annual rate. It is calculated as follows

$$Td (\text{doubling time}) = 70/r$$

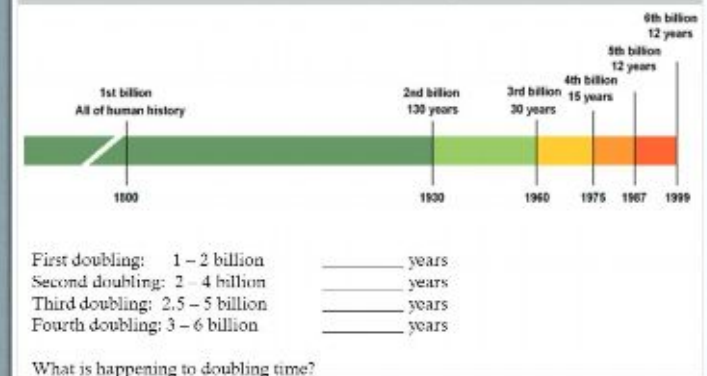
Where, r = annual growth rate

3. If a nation has 2% annual growth rate, its population will double in next 35 years.

World Population Growth, 1750–2150



World Population Doubling Time Change



❖ 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

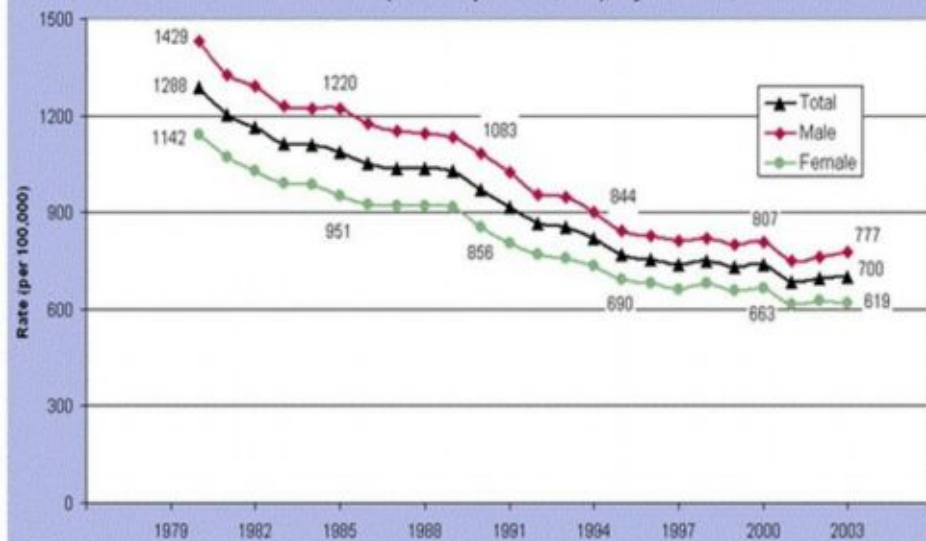
Rate of Birth (Fertility)

Countries with the Most Births Per Year

million births



Death Rates for Infants (deaths per 100,000), by Gender.

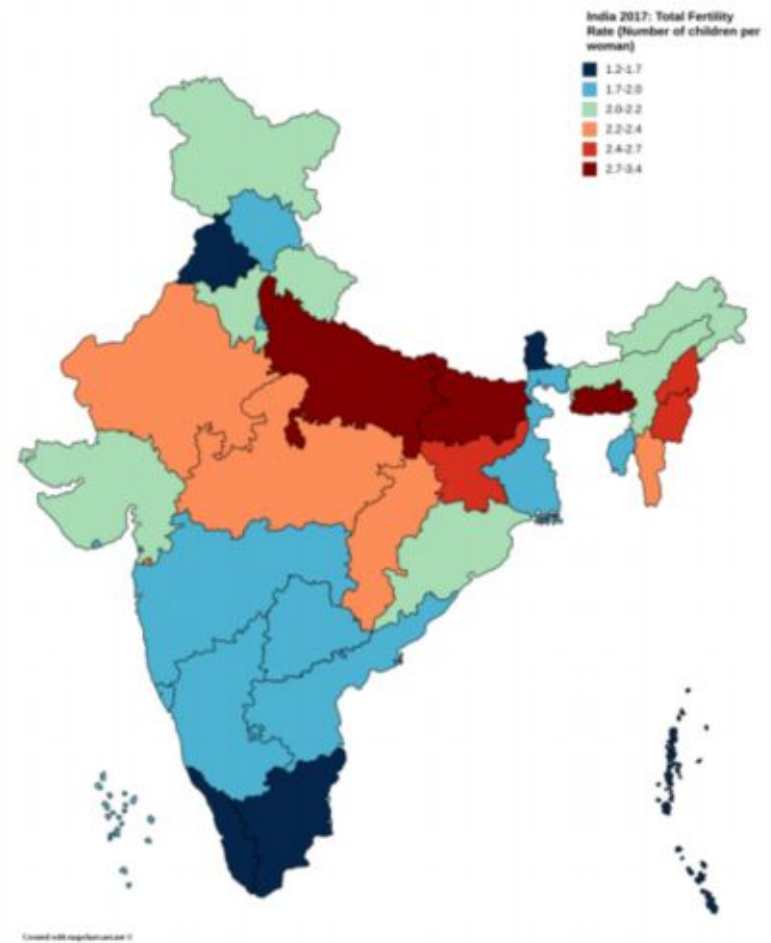
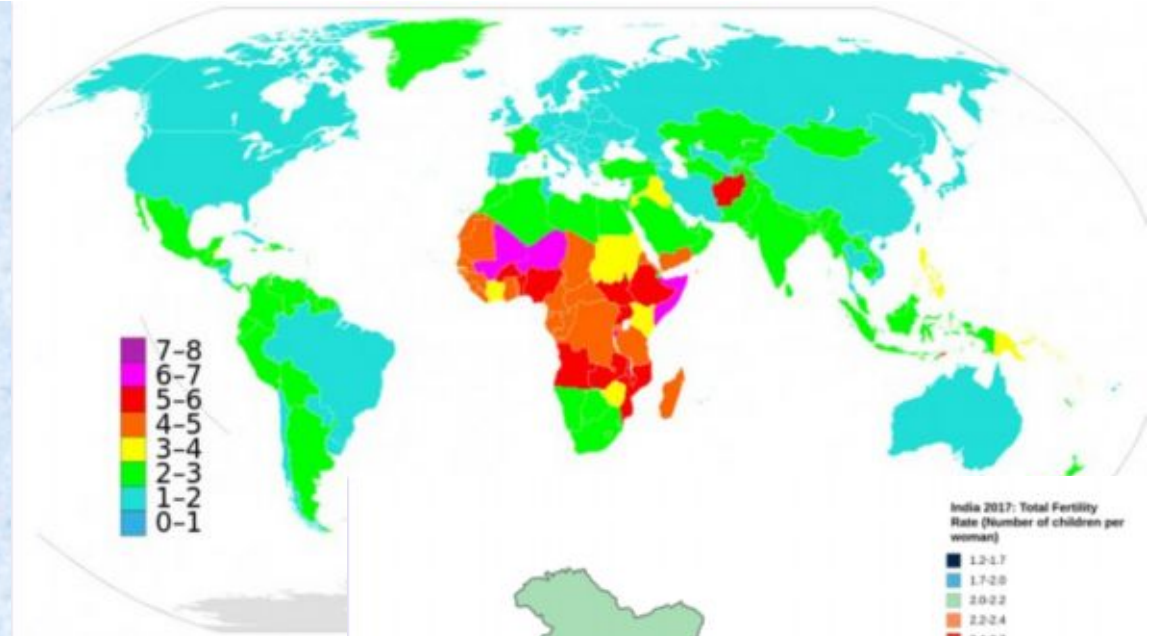


First 10 largest countries (**Projected for 2050**)

Sr. 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

Total Fertility Rates

- It is one of the key measures of a nation's population growth.
- TFR is defined as the average number of children that would be born to a woman in her lifetime if the age specific birth rates remain constant.
- The value of TFR varies from 1.9 in developed nations to 4.7 in developing nations.



Infant mortality rate

- It is an important parameter affecting future growth of a population
- It is the percentage of infants died out of those born in a year
- Although this rate has declined in the last 50 years, but the pattern differs widely in developed and developing countries

Mortality

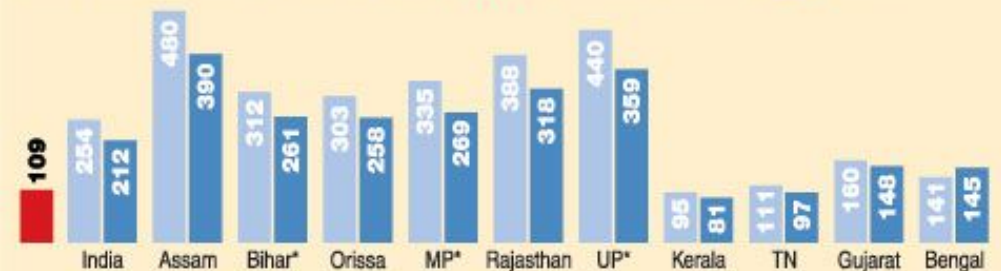
- Death Rate per thousand individuals.
- Reduction in mortality rate because of industrial revolution, Improved personal Hygiene, Modern medicines etc.



WHERE WE STAND

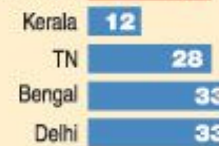
Maternal mortality ratio: Number of women aged between 15 and 49 dying from maternal causes. India's millennium development target for 2015 is to bring down the mortality ratio to **109** per 100,000 live births

■ 2015 target
■ 2004-06
■ 2007-09

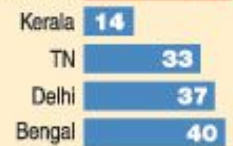


*Bihar figures include that of Jharkhand, MP that of Chhattisgarh and UP that of Uttarakhand

Infant mortality ratio: 2015 target **28**
Number of children aged below 1 dying per 1,000 live births. India's 2015 target is to bring the ratio down to **28** per 1,000 live births



Under-5 child mortality ratio: 2015 target **42**
India's 2015 target is to bring the ratio down to **42** per 1,000 live births



■ 2009 figures

THE GRIM STATISTICS

IMR in both Telangana and Andhra Pradesh is close to **41** per thousand births

More than half of all married women are anaemic and one-third of them are malnourished

Infant mortality rate is **89** for mothers below the age of **20**



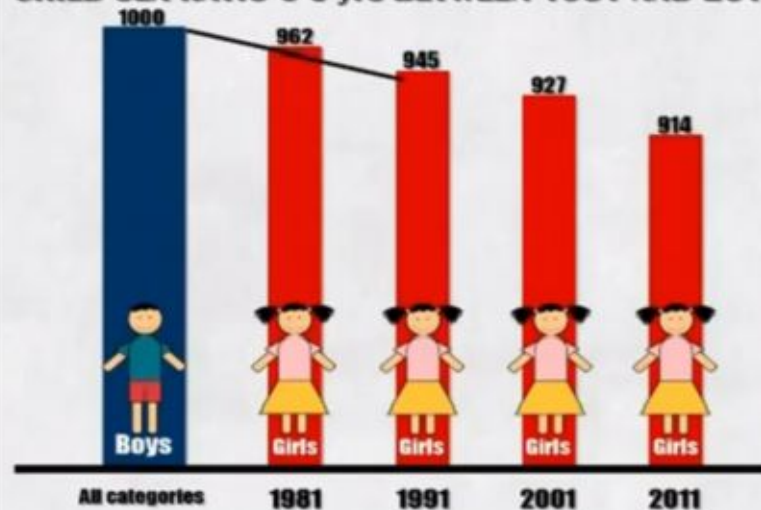
Almost **13** % of girls aged between **15-19** years have begun childbearing

Male - female ratio

The ratio of girls and boys should be fairly balanced in a society to flourish. But the ratio has been upset in many countries including China and India. In China the ratio of girls and boys is 100:140

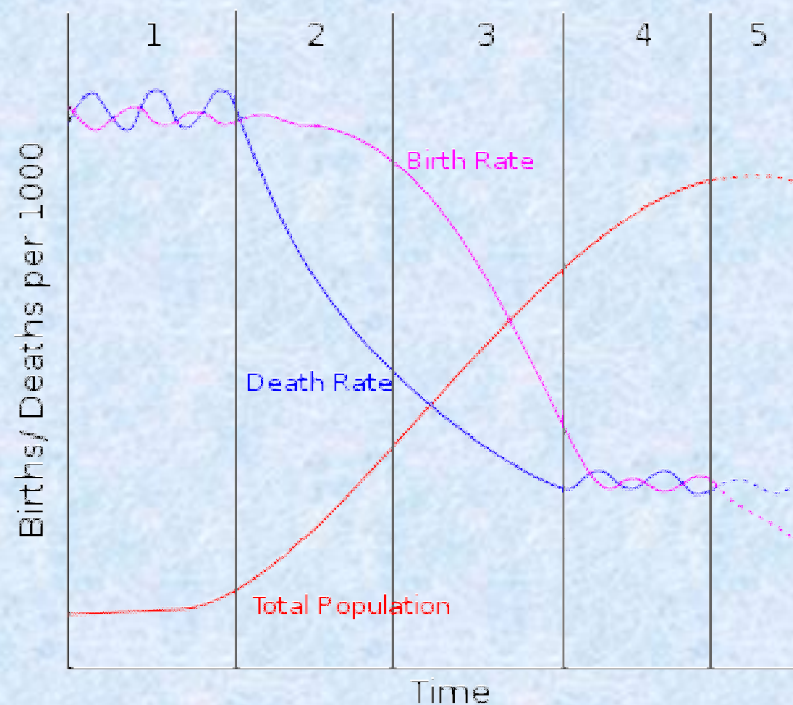


CHILD SEX RATIO 0-6 yrs BETWEEN 1981 AND 2011



Demographic transition

Population growth is generally related to be economic development. The death rates and birth rates fall due to improved living conditions. This results in the population growth. This phenomenon is referred as demographic transitions.



Problems of Population growth

- 1. Increasing demands for food and natural resources**
- 2. Inadequate housing and health service**
- 3. Loss of agricultural land**
- 4. Unemployment and socio-political unrest**
- 5. Environmental pollution**

4. Age and sex structure

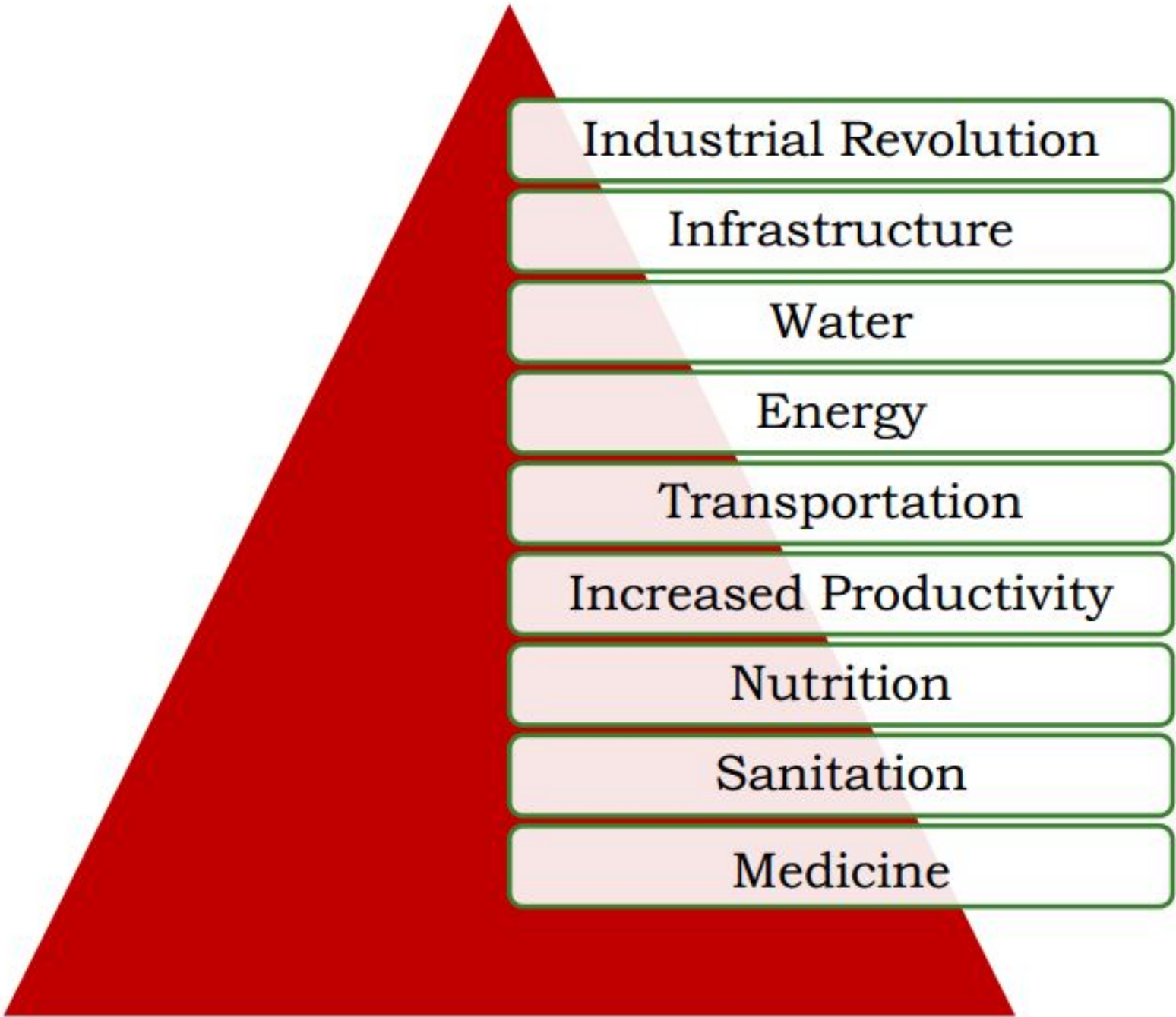
- Proportion of individuals of different ages within that population is age structure.
- Proportion of active males and females in a population influence population growth.

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.



Industrial Revolution

Infrastructure

Water

Energy

Transportation

Increased Productivity

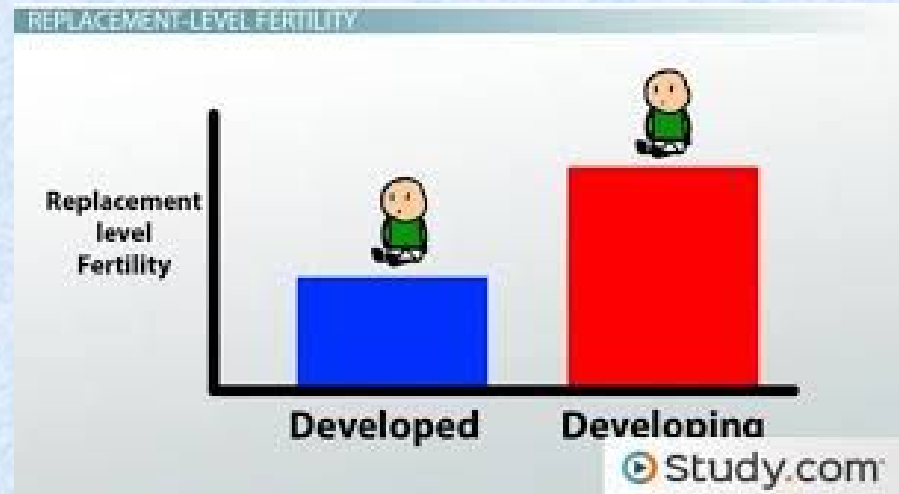
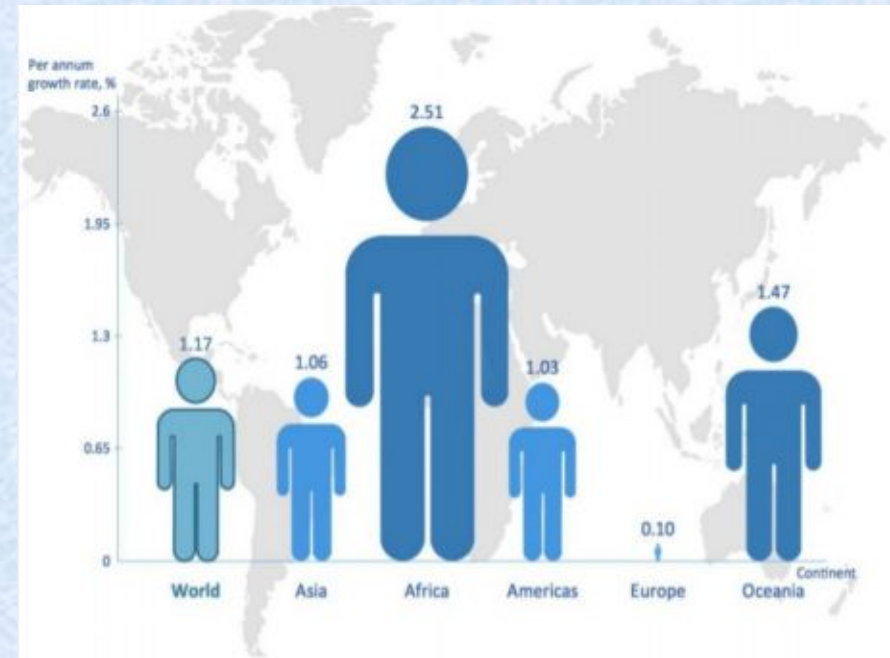
Nutrition

Sanitation

Medicine

Variation of population among nations

- At present the world's population has crossed 6 billions. The existing population is also not evenly distributed, less developed countries have 80% population while the developed countries have only 20%.
- LDC (Africa, Asia, South America) have 80% of the total population and occupy less than 20% of the total land area.
- In the MDC like USA, Canada, Australia the population increases at the rate of less than 1% per year, but in the LDC's it is greater than 1% per year.



Variation of population among nations

- Kenya is the fastest population growing country, where 20 million people are residing.
- China and India's population was above 1000 million in 2000 years. Its share is about one-third of world's population. Europe and North America accounts for 14% of the world

Half the World's Population Live in 6 Countries



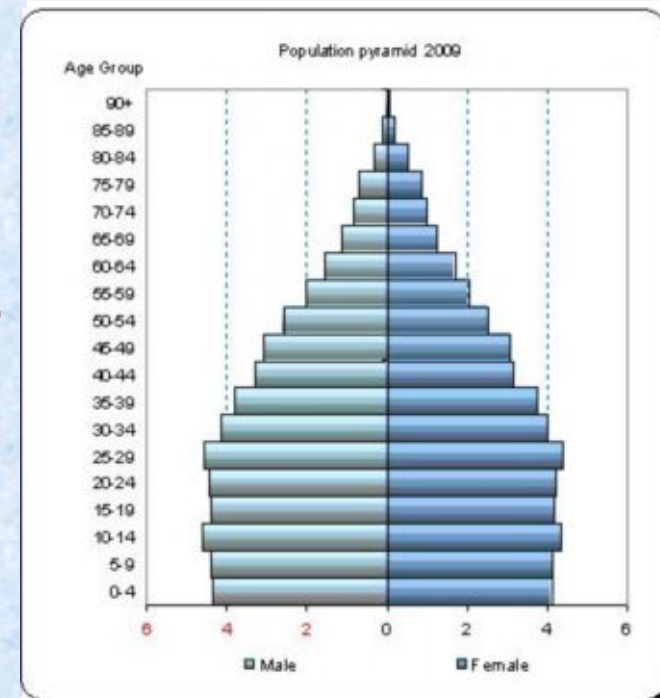
Note: 2014 Medium fertility variant estimates.

Source: UN Population Division's World Population Prospects: The 2012 Revision

PEW RESEARCH CENTER

Variation of Population based on age structure

1. Pre –productive population (0-14 years)
2. Reproductive population (15-44 years)
3. Post reproductive population (above 45 years)



The enormous increase in population due to low death rate and high birth rate is termed as population explosion. The human population is not increasing at a uniform rate in all parts of the world.

Population Explosion

Population Explosion

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

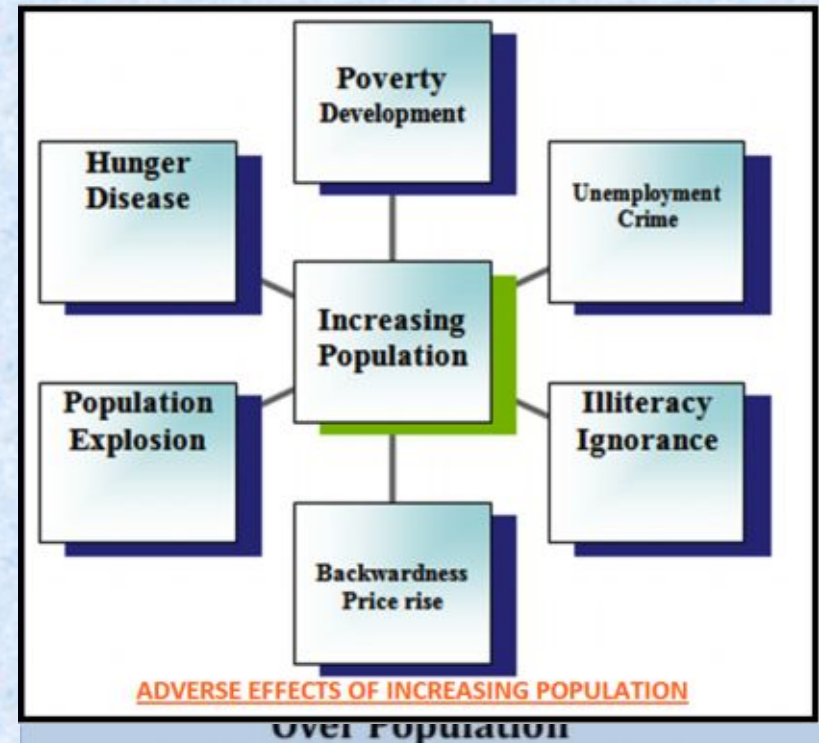
Causes

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

Less Developed Country		Developed country	
Country	Doubling Time	Country	Doubling Time
India	28 years	USA	87 years
Turkey	28	UK	231
Nigeria	27	Italy	99
Saudi Arabia	25	France	117
Pakistan	21	Japan	58

Effect of population explosion

1. **Poverty:** Infant mortality is one of the most tragic indicators of poverty. There are still 34 developing countries where more than 1 in 10 children die before she reaches the age of five.
2. Population explosion leads to environmental degradation
3. Pop. Exp. Causes over exploitation of natural resources. So shortage of resources for future generation
4. Increase in pop. increases the diseases
5. Over crowding of cities lead to development of slums
6. Unemployment
7. Lack of basic amenities like water supply and sanitation, etc



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

Reasons...

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

Family Welfare Programme

It was implemented by the Govt. of India as a voluntary programme.

Objectives of family welfare programme

1. Slowing down the population explosion by reducing the fertility
2. Pressure on the environment due to overexploitation of natural resources.
3. It provides educational and clinical services that help couples to choose how many children to have and when to have them?
4. It provides information on birth spacing, birth control and health care for pregnant women and infants
5. It also has reduced the no. of illegal abortions per year and decreased the risk of death from pregnancy



Urbanization

*the shift from rural to urban living
and the increased concentration of the
human population in densely populated cities*



RURAL

URBAN



Environment and Human health

Human health and environment are two inseparable entities. Generally a physically fit person, not suffering from any disease is called a healthy person.

Factors influencing human health

1. Nutritional factor
2. Biological factors
3. Chemical factors
4. Psychological factors

The environmental degradation is caused by dramatic increase in the world population. Millions of people die every year due to the illness caused by environmental pollution

Important Hazards and their health effects

1. Physical hazards and their health effects

Sl. No	Physical Hazard	Health Effect
1`	Radio active radiations	Affects body cells, organs, glands Causes cancer
2	UV radiations	Skin cancer
3	Global warming	Temperature increase causing famine, mortality
4	Noise	Painful and irreparable damage to human ears

Chemical hazard and their health effects

Sl. No	Chemical hazard	Health effects
1	Ox. of Sulfur and nitrogen, CO ₂ and SPM	Asthma, bronchitis and other lung diseases
2	Industrial effluent	Kills cells and cause cancer and death
3	DDT and chlorinated pesticides	Affects the food chain
4	Heavy metals like Hg, Cd, Pb, fluoride and nitrate	Contaminates water causing various diseases
5	CFC	Damages Ozone layer – skin cancer

Biological hazard and their health effect

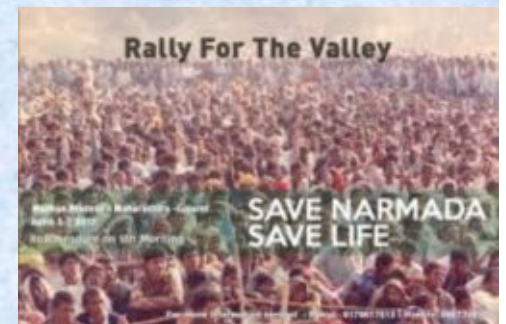
Bacteria, viruses and parasites - Diarrhoeas, malaria, parasitic worms, anemia, respiratory diseases, chorea

Preventive measures

1. Always wash your hands before sitting for food
2. Cut short and clean your nails systematically
3. Maintaining the skin, teeth, hair of our body
4. Drinking chemically treated and filtered water
5. Eat food always while it is in hot condition
6. Before cooking wash the raw vegetables and fruits with clean water
7. Do physical exercise to have proper blood circulation in the body

Resettlement and rehabilitation

- People are forced to move out of their land due to both natural and man made disasters.
- Natural disasters like earthquakes, cyclones, tsunami etc. render thousands of people homeless and sometime even force them to move and resettle in other areas.
- Similarly, developmental projects like construction of roads, dams, canals and flyovers displace people from their home.
- Recent nuclear leakage in Japan due to which millions of people were forced to leave the area for their safety.
- Thus, resettlement refer to the process of settling again in a new area. Rehabilitation means restoration to the former state.



Rehabilitation issues

- Displacement of tribal's increases poverty
- Breakup of families
- Communal ownership of property
- Vanishing social and cultural activities
- Loss of identity between the people.

Examples: Sardar Sarovar Dam, the Theri dam Project, Pong Dam.

Resettlement and Rehabilitation issues

- Construction of Mega dams
- Mining Projects
- Starting of Big Industries
- Rehabilitation
- Agri lands to Housing



Displacement due to dams

- Need space for such huge project.
- Locals, tribals and natives are affected.
- Families have to leave the ancestral place and need to settle elsewhere.
- Hirakund dam: 20000 people in 250 villages
- Bhakra Nangal : not even half of displaced resettled.
- Sardar Sarovar: 41,000 families will get displaced due to reservoir.
- Tehri dam: 10000 people of Tehri town

Displacement due to mining

- Several thousand hectares of land are covered in Mining operations
- Mining accidents also cause displacement.
- Jharia Coal Mines, Jharkhand: 0.3 million people asked to leave the place
- Reason: Underground fires
- No alternative provided yet.
- Cost of R& R: 18000 crores

Rehabilitation- issues and policies

- Right to housing a basic human right
- Government acquires land for various reasons
- Already poor tribals most affected.
- Loss of land, food, home, jobs, property assets, social isolation
- Cash compensation not enough, Tribals are unaware so might be a case of cheating.
- Communal settlement does not happen.

Natural Disasters

Meteorological Disasters

- Floods
- Tsunami
- Cyclone
- Hurricane
- Typhoon
- Snow storm
- Blizzard
- Hail storm

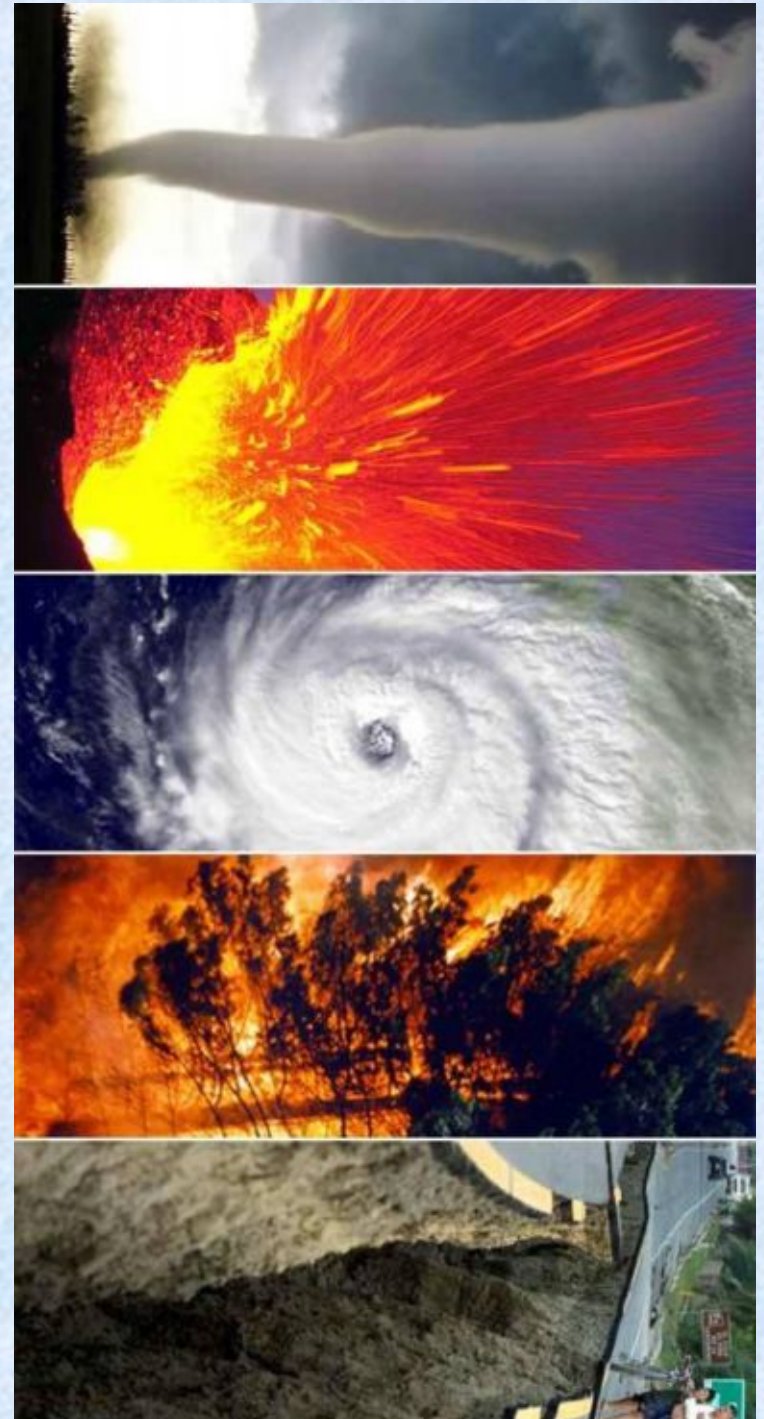
Topographical Disasters

- Earthquake
- Volcanic Eruptions
- Landslides and Avalanches
- Asteroids
- Limnic eruptions

Environmental Disasters

- Global warming
- El Niño-Southern Oscillation
- Ozone depletion-UVB Radiation
- Solar flare

- A disaster can be defined as “A serious disruption in the functioning of the community or a society causing wide spread material, economic, social or environmental losses which exceed the ability of the affected society to cope using its own resources”.
- A disaster is a result from the combination of hazard, vulnerability and insufficient capacity or measures to reduce the potential chances of risk.



Components of Disaster

Three major components of Disaster, namely

- Hazard,
- Vulnerability and
- Capacity

Hazard may be defined as “a dangerous condition or event, that threat or have the potential for causing injury to life or damage to property or the environment.”

Vulnerability may be defined as “The extent to which a community, structure, services or geographic area is likely to be damaged or disrupted by the impact of particular hazard, on account of their nature, construction and proximity to hazardous terrains or a disaster prone area.”

Capacity can be defined as “resources, means and strengths which exist in households and communities and which enable them to cope with, withstand, prepare for, prevent, mitigate or quickly recover from a disaster”

Major Disasters in India (last 40 years)

S. N	Event	Year	State & Area	Effects
1	Drought	1972	Large part of country	200 million affected
2	Cyclone	1977	Andhra Pradesh	10,000 people & 40,000 cattle died
3	Drought	1987	15 states	300 million affected
4	Cyclone	1990	Andhra Pradesh	967 died. 435,000 acres land affected
5	Earthquake	1993	Latur, Maharashtra	7,928 people died.30,000 injured
6	Cyclone	1996	Andhra Pradesh	1000 people died.5,80,000 houses destroyed
7	Super cyclone	1999	Orissa	Over 10,000 deaths
8	Earthquake	2001	Bhuj, Gujrat	13,805 deaths,6.3 millions affected

History of tsunami's in India

Date	Location	Impact
1524	Near Dabhol, Maharashtra	Sufficient data not available
02 April 1762	Arakan Coast, Myanmar	Sufficient data not available
16 June 1819	Rann of Kachchh, Gujarat	Sufficient data not available
31 October 1847	Great Nicobar Island	Sufficient data not available
31 December 1881	An earthquake of 7.9 in the Richter scale in Car Nicobar Island	Entire east coast of India and Andaman & Nicobar Islands; 1m tsunamis were recorded at Chennai.
26 August 1883	Explosion of the Krakatoa volcano in Indonesian.	East coast of India was affected; 2m tsunamis were recorded at Chennai.
26 June 1941	An 8.1 Richter scale earthquake in the Andaman archipelago.	East coast of India was affected but no estimates of height of the tsunami is available
27 November 1945	An 8.5 Richter scale earthquake at a distance of about 100km south of Karachi	West coast of India from north to Karwar was affected; 12m tsunami was felt at Kandla.
26 December 2004	Banda Aceh, Indonesia; Tamil Nadu, Kerala, Andhra Pradesh, Andaman and Nicobar Islands, India; Sri Lanka; Thailand; Malaysia; Kenya; Tanzania	The East cost of India was affected. The waves measured around 10 m high killing more than 10,000 precious lives.

Death associate with noteworthy Tropical Cyclones (1970 – 2005)

SI No	Year	Area	Death toll
1	1971	Eastern Coast	9658
2	1972	Andhra Pradesh and Orissa	100
3	1977	Chennai, kerala & Andhra Pradesh	14,204
4	1979	Andhra Pradesh	594
5	1981	Gujarat	470
6	1982	Gujarat & Maharashtra	500
7	1984	Tamil Nadu & Andhra Pradesh	512
8	1985	Andhra Pradesh	5000
9	1990	Andhra Pradesh	957
10	1990	Orissa	250
11	1999	Orissa	8913

Table 1.2: Various types of hazards

Types	Hazards	
Geological Hazards	1. Earthquake 2. Tsunami 3. Volcanic eruption	4. Landslide 5. Dam burst 6. Mine Fire
Water & Climatic Hazards	1. Tropical Cyclone 2. Tornado and Hurricane 3. Floods 4. Drought 5. Hailstorm	6. Cloudburst 7. Landslide 8. Heat & Cold wave 9. Snow Avalanche 10. Sea erosion
Environmental Hazards Biological	1. Environmental pollutions 2. Deforestation 1. Human / Animal Epidemics 2. Pest attacks	3. Desertification 4. Pest Infection 3. Food poisoning 4. Weapons of Mass Destruction
Chemical, Industrial and Nuclear Accidents	1. Chemical disasters 2. Industrial disasters	3. Oil spills/Fires 4. Nuclear
Accident related	1. Boat / Road / Train accidents / air crash Rural / Urban fires Bomb /serial bomb blasts 2. Forest fires	3. Building collapse 4. Electric Accidents 5. Festival related disasters 6. Mine flooding





India : Environmental Movements



Environmental Movements: Definition

- An environmental movement can be defined as a social or political movement, for the conservation of environment or for the improvement of the state of the environment
- The terms 'green movement' or 'conservation movement' are alternatively
- Environmental movements favour the sustainable management of natural resources. The movements often stress the protection of the environment via changes in public policy
- Many movements are centred on ecology, health and human rights.
- Environmental movements range from the highly organized and formally institutionalized ones to the radically informal activities
- The spatial scope of various environmental movements ranges from being local to national to global.

Types of Movements

- Forest Based
- Land Degradation Based
- Water Issues and Dams
- Pollution Issues – Bhopal gas tragedy

Bishnoi Movement

- Year: 1700s; Place: Khejarli, Marwar region, Rajasthan state.
- Amrita Devi, a female villager could not bear to witness the destruction of both her faith and the village's sacred trees. She hugged the trees and encouraged others to do the same
- 363 Bishnoi villagers were killed in this movement. The Bishnoi tree martyrs were influenced by the teachings of Guru Maharaj Jambaji, who founded the Bishnoi faith in 1485 and set forth principles forbidding harm to trees and animals
- The king who came to know about these events rushed to the village and apologized, ordering the soldiers to cease logging operations. Soon afterward, the maharajah designated the Bishnoi state as a protected area, forbidding harm to trees and animals
- This legislation still exists today in the region

Chipko Movement

- Year: 1973; Place: In Chamoli district and later at Tehri-Garhwal district of Uttarakhand.

- Leaders:

Gaura Devi, Sudesha Devi, Bachni Devi, Sunderlal Bahuguna, Chandi Prasad Bhatt, Govind Singh Rawat, Dhoom Singh Negi, Shamsheer Singh Bisht and Ghanasyam Raturi.



Chipko....

- The women of Advani village of Tehri-Garhwal tied the sacred thread around trunks of trees and they hugged the trees, hence it was called 'Chipko Movement' or 'hug the tree movement'
- Main demand of the people in these protests was that the benefits of the forests (especially the right to fodder) should go to local people
- The Chipko movement gathered momentum in 1978 when the women faced police firings and other tortures
- This became a turning point in the history of eco-development struggles in the region and around the world.



What Chipko did

Success of Chipko movement

- The movement has spread to many states in the country.
- It stopped felling of trees in the Western Ghats and the Vindhyas.
- Generated pressure for formulation of a natural resource policy.
- Achieved a major victory in 1980 with a 15-year ban on green felling in the Himalayan forests
- More than 1,00,000 trees have been saved from excavation.
- Started protecting forest slopes and Restoring bare ones.

Silent Valley

- Year: 1978; Place: Silent Valley, an evergreen tropical forest in the Palakkad district of Kerala, India.
- The Kerala Sastra Sahitya Parishad (KSSP) an NGO



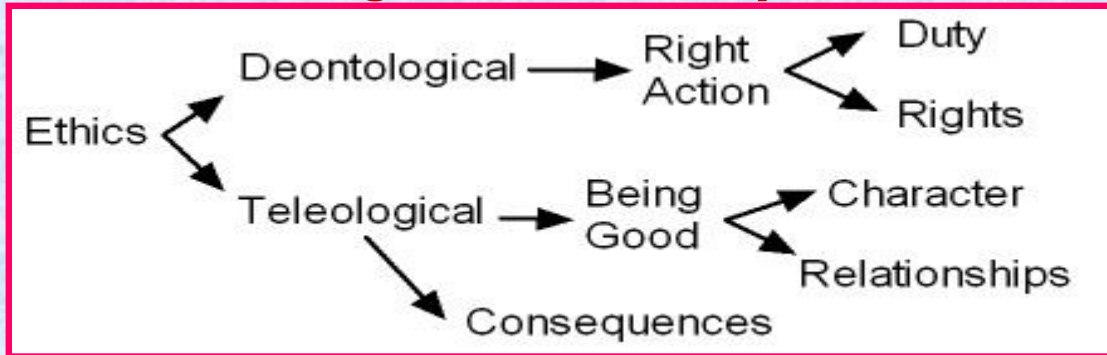
Silent Valley....

- The Kerala State Electricity Board (KSEB) proposed a hydroelectric dam across the Kunthipuzha River that runs through Silent Valley
- In February 1973, the Planning Commission approved the project
- Many feared that the project would submerge 8.3 sq km of untouched moist evergreen forest
- Several NGOs led by KSSP, strongly opposed the project and urged the government to abandon it
- In January 1981, bowing to unrelenting public pressure, Indira Gandhi declared that Silent Valley will be protected
- In 1985, Prime Minister Rajiv Gandhi formally inaugurated the Silent Valley National Park



Environmental Ethics

- Environmental Ethics deals with morals and values of environment
- Humans are members of earth's living community
- Humans and other species are inter dependent
- Human beings are not superior to other organisms



3 Principles

- We should not harm any natural entity
- We should not try to manipulate, control, modify, manage any ecosystems
- We should not exploit and mislead other organisms



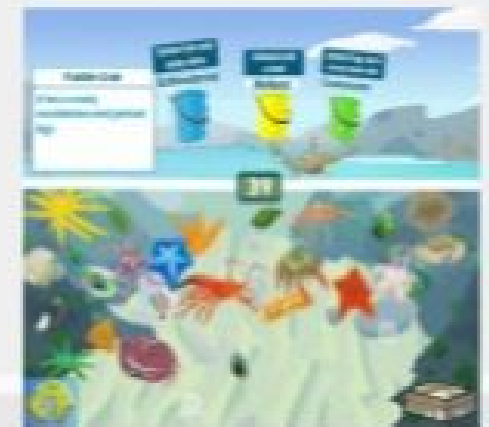
Environmental communication: what's about

Information

50' – 60'



Information and Education 70'-80'



Information, Education
and Communication

90'- currently



Why **environmental** communication is needed?

Apocalyps is closer than we think:

“a billion and a half more people are using and abusing the environment. In the coming three decades this number will approximately double....”



Why **environmental** communication is needed?

Although the public's concern for the **environment** is significant, considerable differences exist among individuals over how society should solve environmental problems

Global Warming, for example:

A poll conducted by the WWF in the U.S.A. found that 74% of the public felt that the problem of warming of the Earth's atmosphere was either 'somewhat serious' or 'extremely serious'

Differences were revealed, however, when people were asked what actions the U.S.A. should take to reduce the major cause of **global warming**



ENVIRONMENTAL AWARENESS IS ESSENTIAL FOR

- Protection of the atmosphere
- Protection of land resources
- Conservation of biological diversity
- Environmentally sound management of biotechnology and hazardous wastes
- Prevention of illegal traffic in toxic products and wastes
- Improvement in living and working conditions of the poor by eradicating poverty and stopping environmental degradation.

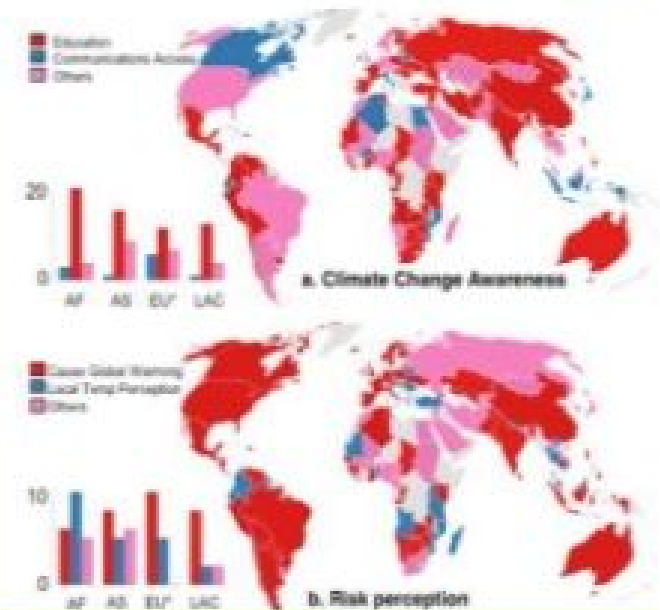


Public Awareness



Environmental sensitivity in our country can only grow through a major public awareness campaign. This has several tools.

The electronic media, the press, school and college education, adult education, are all essentially complementary to each other. Let us study some relevant tools for public awareness.



ANALYSIS OF 119 COUNTRY SURVEY

OBJECTIVES OF ENVIRONMENTAL EDUCATION

i. Awareness

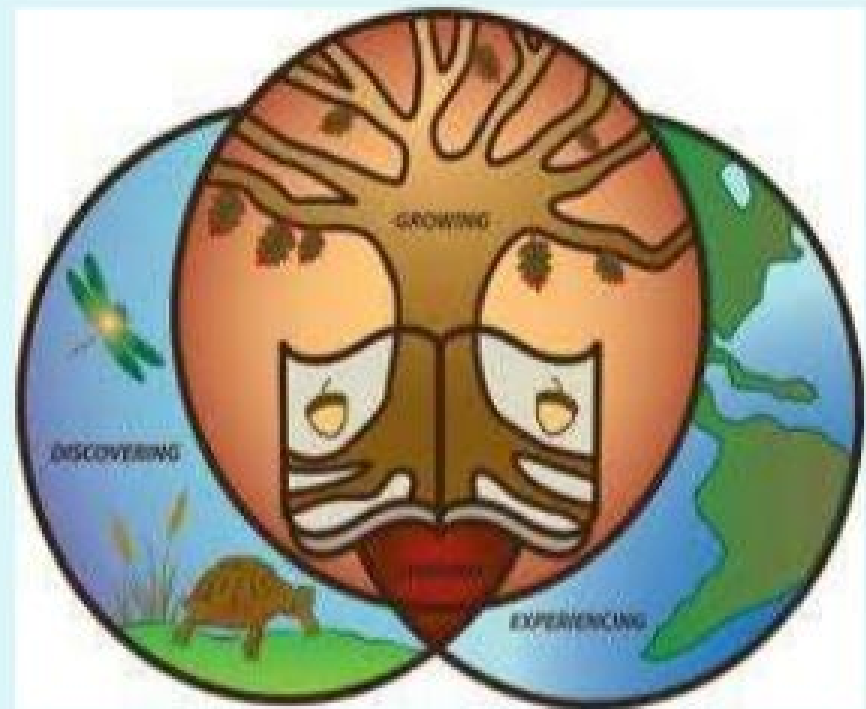
ii. Knowledge

iii. Attitudes

iv. Skills

v. Evaluation ability

vi. Participation



We all have the right and duty, as citizens, to know,
understand, participate in what concerns us as
community

We all are stakeholders of such community called
human species

We all are, somehow and at some extent,
environmental communicator

