

# Human Population and the Environment

In context of solar system, it took nearly 4000 million years for the earth, after the delicate adjustment of chemical elements in its various spheres, to finally reach to a state to sustain life. Hence origin of life was not a simple phenomenon, rather it was a very complicated process involving number of chemical complex reactions, conditions of temperature and pressure over a period of 4000 million years. The period of 600 million years from the present era witnessed tremendous explosion of life forms through evolutionary process with man at the apex of the evolution, appearing only a few million years ago.

At present, it is estimated that earth has about 10 to 30 million life forms of which man is one of the life form. But, because of the ability of the man to change the environment according to his needs, he has acquired a supreme status among the existing life forms. However, of fate, perhaps his ability to change environment as desired has now posed a real question to him, as how to plan his future survival.

This question has emerged because of his over indulgence with natural resources in order to satisfy the need of his ever growing population and more so the unquenchable desire for more comforts which in real terms is energy intensive life style. It needs to be understood clearly that natural resources are limited. They have limited carrying capacity and with continued interference beyond tolerance limits they will exhaust sooner or later.

## POPULATION GROWTH

Each population has a characterized pattern of increase which is termed as its growth form. It increases in size in a characteristic S-Shaped or sigmoid fashion. When a population starts growing, first the growing is slow, then it becomes rapid and finally slows down until an equilibrium is reached. If we plot time on x-axis and number of organisms on y-axis, on a graph paper, we should get a s-shaped sigmoid curve. Human population shows a s-shaped growth. However, if the growth stops abruptly, a J-shaped growth curve is obtained.

The level beyond which no major increase can occur is called the saturation level or carrying capacity the following states have been ruined to occur in the population growth form.

**The Period of Positive Growth :** The curve representing this period (Fig. 7.1) is usually sigmoid or S-shaped in form.

**The Equilibrium Position :** Equilibrium state can be defined as the one of numerical stability i.e. the average size helped by a population over a

considerable period of time. Since human population's have not yet attained their maximum growth, it has not been possible to report on their equilibrium state.

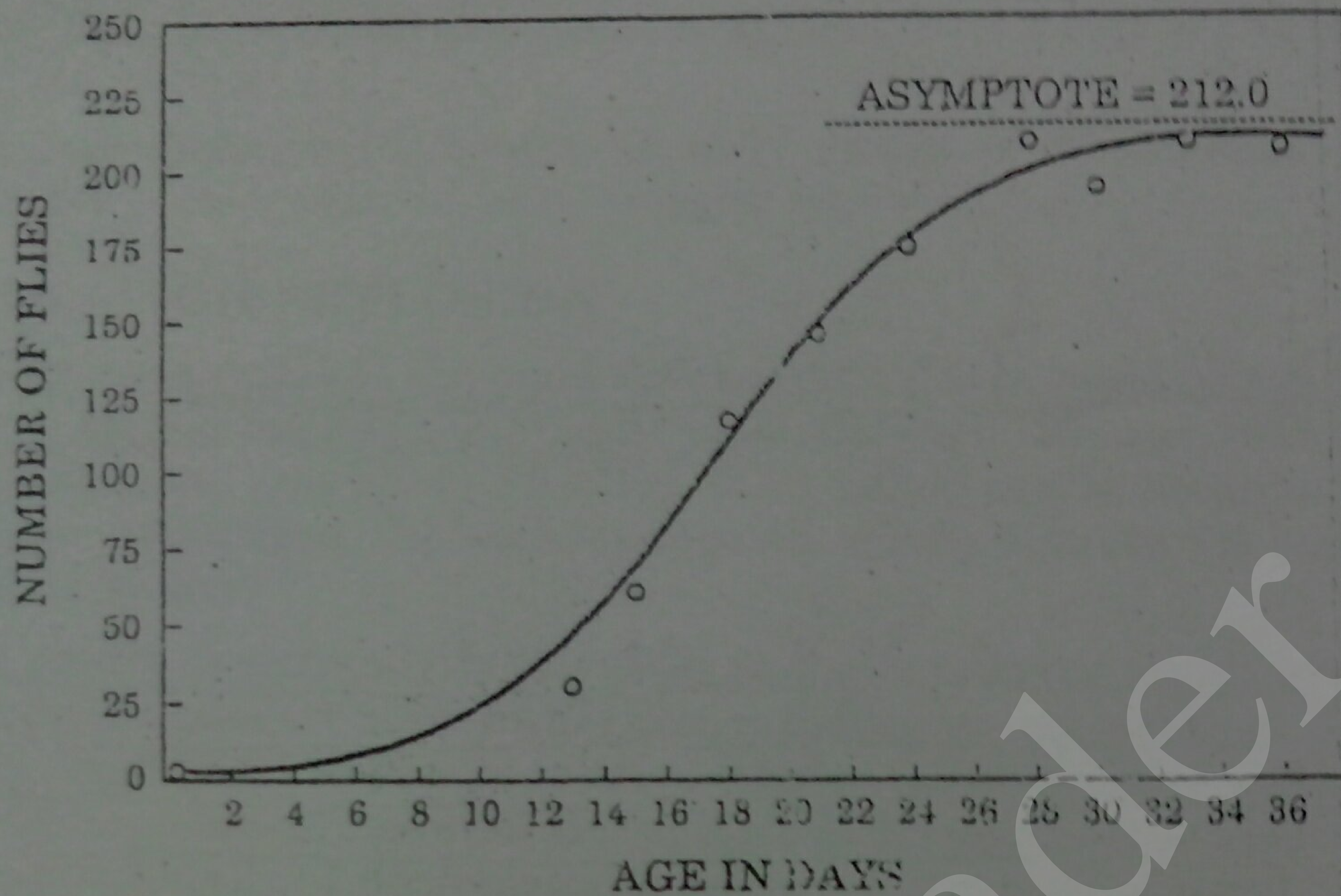


Fig. 7.1. The Logistic Growth of a Laboratory Population of *Drosophila Melanogaster*

(3) Oscillations and Fluctuations: Oscillations and the symmetrical departures from equilibrium whereas asymmetrical departures constitute population fluctuations.

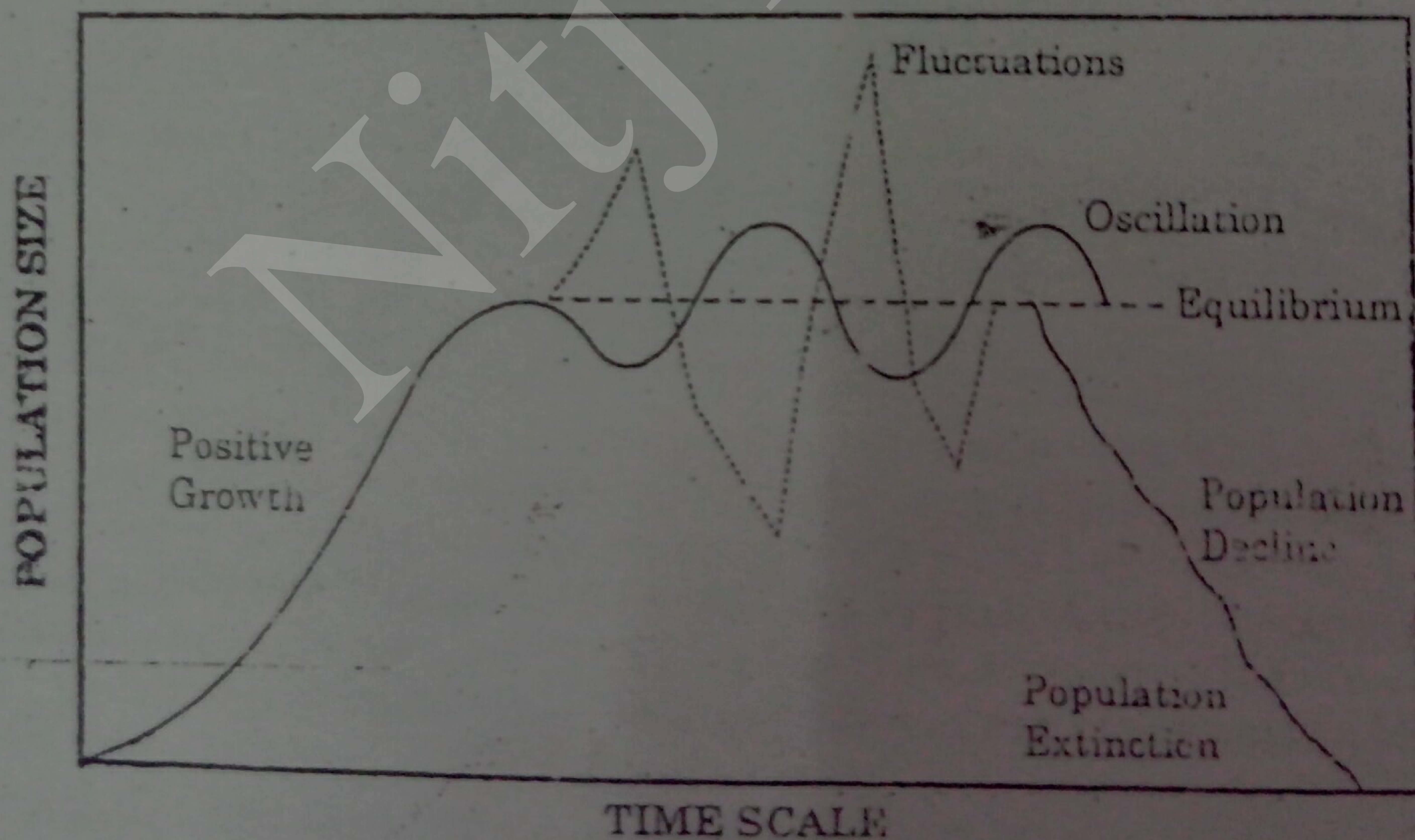


Fig. 7.2. Stylized Representation of the Various Phases of Population Growth for *n* in Yeast.

**Decline and Extinction:** A decline in the population shows consistent and progressive reduction of the populations below the equilibrium or lower than the usual average of fluctuations or oscillation whereas, extinction can be defined as the final dying out of the group. Although these two terms are separable by definition they actually belong to each other.

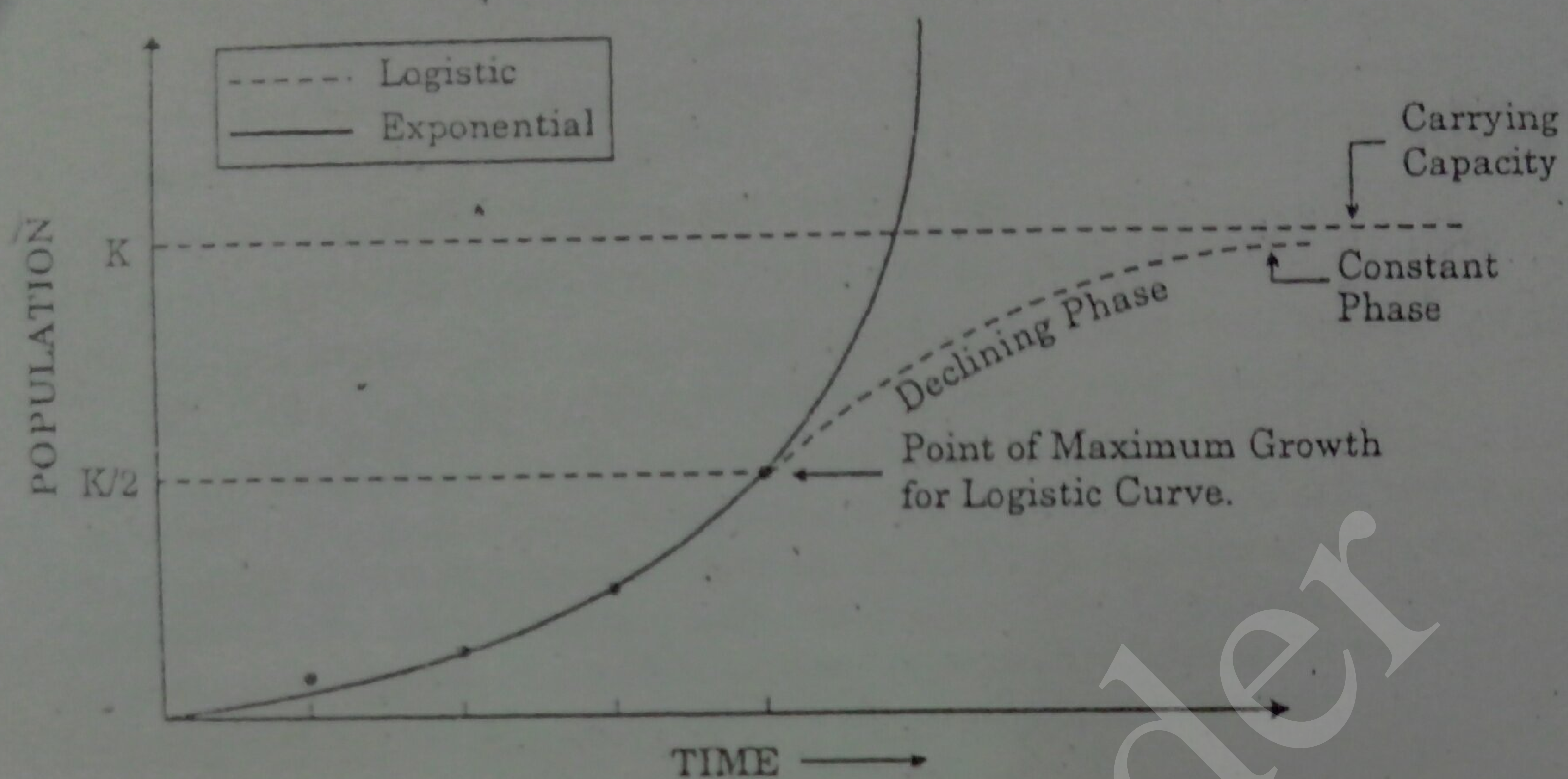


Fig. 7.3. Exponential Growth or J-shaped Curve  
(Characteristics of Unchecked Population)

#### 7.1.1. Variations Among Nations

The world's population is not properly balanced, more than half of the world's people live in Asia (approx. 3.7) billion), which accounts for only one fifth of the world's land area. While north, central and south America together occupy more than a quarter of the land surface and have only one-fifth of the population (1.3 billion). The African continent also accounts for a quarter of the land surface but has just over one eighth (840 million) of the world population. On the other hand Europe whose area is only one twenty fifth of the total has about one-ninth (728 million) of the world's people.

The distribution within the continents is also uneven. In Asia, China alone, with about 1.28 billion people, accounts for one-third Asian and one-fifth of the world population. The Indian subcontinent has a further 1.3 billion people — India, 1.05 billion; Pakistan, 143.5 million; Bangladesh, 133.6 million; Nepal, 23.9 million; Sri Lanka, 18.9 million; Bhutan, 0.9 million; and Maldives, 0.3 million. In Europe too, the population is unevenly distributed. Far less people live in Northern European countries than in other European countries. The most populous European countries are Russia (143.5 million), Germany (82.4 million), United Kingdom (60.2 million), France (59.5 million); Italy (58.1 million), Ukraine (48.2 million), Spain (41.3 million) and Poland (38.6 million).

The distribution of population depends to a large extent on the quality of land. Thus population density (i.e. the number of people living in unit area) varies widely, the densely populated areas include western Europe, the Indian subcontinent, the plains and river valleys of China and north eastern USA.

The factors encouraging settlement are good land, flat or undulating terrain, the existence of renewable resources, a good climate suitable for wide range of crops or a less equable climate suitable for cultivation of specialized cash crops. Other factors include extension of roads, railways and other modes of transportation.

The factors discouraging settlement are usually climate or relief factors; the main factors are — cold, altitude, heat, drought, poor soils etc.

## 7.2. POPULATION EXPLOSION

Population explosion refers to the rapid and dramatic rise in world population that has occurred over the last few hundred years. Between 1959 and 2000, the world's population increased from 2.5 billion to 6.1 billion people. According to United Nations projections, the world population will be between 7.9 billion and 10.9 billion by 2050.

Most of the growth is currently taking place in the developing world, where rates of natural increase are much higher than in industrialized countries. Concern that this might lead to over population has led some countries to adopt population control policies. However, since people in developing countries consume far less, especially of non-renewable resources, per head of population than people in industrialized countries, it has been argued that the West should set an example in population control instead of giving, for example, universal child benefit.

### 7.2.1. The Definition of Over Population

In the past, infant and childhood deaths and short life spans used to limit population growth. In today's world, thanks to improved nutrition, sanitation, and medical care, more babies survive their first few years of life. The combination of a continuing high birth rate and a low death rate is creating a rapid population increase in many countries in Asia, Latin America and Africa and people generally lived longer. Over-population is defined as the condition of having more people than can live on the earth in comfort, happiness and health and still leave the world a fit place for future generations. But some people now believe that the greatest threat to the future comes from over-population.

It took the entire history of humankind for the population to reach 1 billion around 1810. Just 120 years later, this doubled to 2 billion people (1930); then 4 billion in 1975 (45 years). The number of people in the world has risen from 4.4 billion people in 1980 to 6.3 billion in 2005. And it is estimated that the population could double again to nearly 11 billion in less than 40 years. This means that more people are now being added each day than at any other time in human history.

According to a report by the United Nation Population fund, total population is likely to reach 10 billion by 2025 and grow to 14 billion by the end of the next century unless birth control use increases dramatically around the world within the next two decades.

Both death rates and birth rates have fallen, but death rates have fallen faster than birth rates. There are about 3 births for each death with 1.6 births for each death in more developed countries (MDCs) and 3.3 births for each death in less

developed countries (LDCs). The world's population continues to grow by 1 billion people every dozen years.

### 7.2.2. THE CAUSES OF RAPID POPULATION GROWTH

Until recently, birth rates and death rates were about the same, keeping the population stable. People had many children, but a large number of them died before age of five. During the Industrial Revolution, a period of history in Europe and North America where there were great advances in science and technology, the success in reducing death rates was attributable to several factors:

- 1. increases in food production and distribution,
- 2. improvement in public health (water and sanitation), and
- 3. medical technology (vaccines and antibiotics), along with gains in education and standards of living within many developing nations.

Without these attributes present in many children's lives, they could not have survived common diseases like measles or the flu. People were able to fight and cure deadly germs that once killed them. In addition, because of the technology, people could produce more and different kinds of food. Gradually, over a period of time, these discoveries and inventions spread throughout the world, lowering death rates and improving the quality of life for most people.

### 7.2.3. The Consequences of Rapid Population Growth

Rapid human population growth has a variety of consequences. Population grows fastest in the world's poorest countries. High fertility rates have historically been strongly correlated with poverty, and high childhood mortality rates. Falling fertility rates are generally associated with improved standards of living, increased life expectancy, and lowered infant mortality. Overpopulation and poverty have long been associated with increased death, and disease. People tightly packed into unsanitary housing are inordinately vulnerable to natural disasters and health problems.

However, most of the world's 1.2 billion desperately poor people live in less developed countries (LDCs). Poverty exists even in MDCs. One in five Soviet citizens reportedly lives below the country's official poverty line. In the United States, 33 million people — one in eight Americans are below the official poverty line. The rapid expansion of population size, observed since the end of World War II, in the world's poorest nations has been a cause of their poverty.

Poverty is a condition of chronic deprivation and need at the family level. Poverty is a major concern of humankind, because poverty everywhere reduces human beings to a low level of existence. Poor people lack access to enough land and income to meet basic needs. A lack of basic needs results in physical weakness and poor health. Poor health decreases the ability of the poor to work and put them deeper into poverty.

Instead of allowing poverty to persist, it is important to limit our number because in dense populations too many lack adequate food, water, shelter, education and employment. High fertility, which has been traditionally associated with prosperity, prestige, and security for the future, now jeopardizes chances for many to achieve health and security.

(3)

Rich and poor countries alike are affected by population growth, though the population of industrial countries are growing more slowly than those of developing one. At the present growth rates, the population of economically developed countries would double in 120 years. The Third World, with over three quarters of the world's people, would double its numbers in about 33 years. This rapid doubling time reflects the fact that 37 percent of the developing world's population is under the age of 15 and entering their most productive childbearing years. In the Third World countries (excluding China), 40 percent of the people are under 15; in some African countries, nearly half are in this age group.

The world's current and projected population growth calls for an increase in efforts to meet the needs for food, water, health care, technology and education. In the poorest countries, massive efforts are needed to keep social and economic conditions from deteriorating further; any real advances in well-being and the quality of life are negated by further population growth. Many countries lack adequate supplies of basic materials needed to support their current population. Rapid population growth can affect both the overall quality of life and the degree of human suffering on Earth.

#### 7.2.4. Actions and Strategies for Solving these Problems

There is controversy over whether population growth is good or bad. Over-population and continuing population growth are making substantial contributions to the destruction of Earth's life support systems. In the past, human populations have rarely been subject to explosion. The powerful long-term momentum that is built into the human age structure means that the effects of fertility changes become apparent only in the future. For these reasons, it is now conventional practice to use the technology of population projection as a means of better understanding the implications of trends.

Population projections represent the playing out into the future of a set of assumptions about future fertility and mortality rates. More public education is needed to develop more awareness about population issues. Facts like the size or the growth rate of the human population should be in the head of every citizen. Schools should inform students about population issues in order for them to make projections about the future generations.

Action plans and strategies can be developed to increase public understanding of how rapid population growth limits chances for meeting basic needs. The spirit of open communication, and empowerment of individual women and men will be key to a successful solution to many population problems. Collective vision about health care, family planning and women's education at the community level build a basis for action. The creation of action plans help to meet challenges to find cooperative solutions. Free and equal access to health care, family planning and education are desirable in their own right and will also help reduce unwanted fertility.

Individual choice, human rights and collective responsibility are key to allowing families to plan the size and spacing of their children. It is essential to achieve a balance between population and the available resources. Teachers, parents, community workers and other stakeholders should extend the range of choices about available resources to individuals, especially women, and by equalizing opportunities between the genders from birth onwards.

at the facility level, is helping to improve the running of primary health centres and referral hospitals. A large number of health functionaries and rural people including women are being trained as part of awareness building. So far over 30 first referral hospitals have been refurbished to provide services on a regular basis.

The programme is also supporting the improvement of existing government policies and procedures at national and state levels to facilitate the delivery of quality health care in the rural and semi-urban areas. Several policy reviews have been undertaken focusing on human resource management and rational use of infra-structure. With a view to involving the community and private sector, the programme is associated with over 40 NGOs and institutions as well as a number of Panchayati Raj institutions which are supporting activities at different levels. A part of the assistance to the Family Welfare sector, Euro 40m, is utilized to support the post-earthquake redevelopment of health service facilities in Gujarat. Nearly 100 temporary health facilities have already been established in the earthquake affected areas.

A number of nationally important interventions that include improving the logistics and distribution of drugs, social marketing of family planning devices and strengthening of financial and accounting services are being undertaken across the country. Apart from budgetary support to the central, state and district levels, the programme also provides technical assistance and resources for developing partnerships between India and European institutions and with civil society for implementing various reform initiatives. The scope of reform is immense. The EC support marks the beginning of much-needed qualitative improvements in the sector.

### 7.3. ENVIRONMENT & HUMAN HEALTH

Human well being is closely linked with the well being of environment. However, over the years, there has been progressive pressure on the environment and the natural resources, the consequences of which are becoming increasingly evident in the form of environmental damage & health risks, thus reducing the benefits of development. The underlying belief has been that nature's bounty is endless and meant only for conversion into more and better utilities that would add to man's physical comfort. This has resulted in an ecological backlash which has not only deteriorated the quality of the biotic environment but has adversely affected health & well being of our biotic resources (including man). But, it is now being realized that the well being of humankind depends upon development which is sustainable not only in the present context but for future generations also. Population growth and intensification of man's activities through agricultural development, urbanization and industrialization all over the world have created various environmental problems. The environment is under constant interference by man.

The effects of environment on human health can be measured in the following terms:

- (a) The extent to which environmental conditions lead to shortening of life.
- (b) The extent to which such conditions create disability or impairment among those who are exposed to it; and

- (d) The extent to which the full biological potential of an organism is not realized.

Various environmental factors which affect human health are:

### 1. Over Population

Increase in population is recognised as the most important cause of all environmental problems as it leads to poverty, over exploitation of resources due to increase in demand of goods & services and hence, environmental degradation. The alarming impact of people on the ecosystem is evident from the rate of consumption of resources given in Table 7.2.

Table 7.2. : Consumption of Resources by Developing and Developed Countries

World mineral consumption  
In million tonnes

Consumption estimates for  
selected energy types (m. tonnes,  
of oil equivalent)

| Year                        | Aluminium | Copper | Iron    | Lead  | Zinc  | Coal   | Crude Petroleum | Natural Gas |
|-----------------------------|-----------|--------|---------|-------|-------|--------|-----------------|-------------|
| <b>Developing Countries</b> |           |        |         |       |       |        |                 |             |
| 1975                        | 1.0       | 0.46   | 24.11   | 0.28  | 0.49  | 107.4  | 513.2           | 66.7        |
| 1980                        | 1.37      | 0.07   | 34.84   | 0.41  | 0.76  | 139.6  | 634.9           | 103.1       |
| 1990                        | 3.42      | 1.57   | 83.82   | 1.03  | 1.91  | 278.4  | 1315.5          | 201.4       |
| 2000                        | 8.53      | 3.97   | 211.51  | 2.53  | 4.76  | 610.4  | 2703.7          | 527.3       |
| 2025                        | 41.24     | 18.53  | 1003.95 | 12.36 | 23.09 | 2324.2 | 11245.9         | 2855.4      |
| <b>Developed Countries</b>  |           |        |         |       |       |        |                 |             |
| 1975                        | 13.58     | 6.7    | 443.37  | 4.07  | 4.35  | 1779.2 | 2070.5          | 933.6       |
| 1980                        | 18.41     | 8.77   | 435.68  | 4.71  | 5.45  | 2011.1 | 2249.3          | 1092.2      |
| 1990                        | 26.44     | 12.71  | 578.67  | 5.66  | 6.55  | 2621.6 | 3282.7          | 1491.9      |
| 2000                        | 40.76     | 19.61  | 718.51  | 7.02  | 8.13  | 3441.5 | 4508.0          | 2065.2      |
| 2025                        | 122.25    | 58.9   | 1245.88 | 12.18 | 14.10 | 6913.0 | 11163.2         | 4752.6      |

### 2. Pollution

Of the various environmental problems facing mankind, pollution of air, water and soil are of prime concern. Increasing industrialisation and urbanisation have created demand to use the atmosphere as a waste disposal medium. Thus the accumulation of waste gases and particles from combustion, production and other economic activities exceeds the natural dispersion capacity of the atmosphere. The atmosphere is polluted by harmful gases and industrial dust. The common gaseous pollutants include sulphur dioxide, nitrogen oxide, carbon monoxide, hydro carbons, ozone, aerosols, and suspended particulate matter. These pollutants attack human health primarily through the respiratory system. Toxic substances enter the human body by inhalation or absorption through skin or eyes.



### Urbanisation

Increase in urbanization has adversely affected the ecological balance by depleting both renewable and non-renewable resources faster because of the high energy requirement of urbanities. It also results in creation of slums which leads to deteriorating life quality, poor health services and flourishing of communicable diseases. In many big cities (like Mumbai & Kolkata), slum population accounts for about 40% of the total city population resulting in filthy surroundings, lack of basic amenities and hence a disease prone life.

### Degradation of Natural Resources

Besides the direct negative impact of deteriorating environmental quality on human health, loss of natural resources has also adversely affected life quality. Deforestation has resulted in biodiversity loss which is essential for maintaining the basic life supporting process. Flora & fauna is the source of a large number of medicines which are essential for maintaining human health.

The situation is definitely gloomy but can still be tackled by promoting environmentally compatible development. We still have time to take corrective steps. What is required is a recognition of the needed for both development and proper management of the environment. Also needed is a new concept of development that emphasizes the relation between human beings & nature being mutually supportive & sustainable from the long term point of view so that it is conducive to human life & health.

## 7.4. HUMAN RIGHTS

Many have realized that advances in technology and changes in social structures had rendered war a threat to the continued existence of the human race. Large numbers of people in many countries lived under the control of tyrants, having no recourse but war to relieve often intolerable living conditions. Unless some way was found to relieve the lot of these people, they could revolt and become the catalyst for another wide-scale and possibly nuclear war. For perhaps the first time, representatives from the majority of governments in the world came to the conclusion that basic human rights must be protected, not only for the sake of the individuals and countries involved, but to preserve the human race.

On December 10, 1948 the General Assembly of the United Nations adopted and proclaimed the Universal Declaration of Human Rights. The Assembly called upon all Member countries to publicize the text of the Declaration.

### Important Articles of "Declaration of Human Rights"

Article 1: All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood.

Article 2: Everyone is entitled to all the rights and freedoms, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.

Article 3: Everyone has the right to life, liberty and security of person.

- Article 4: No one shall be held in slavery or servitude; slavery and the slave trade shall be prohibited in all their forms.
- Article 5: No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment.
- Article 6: Everyone has the right to recognition everywhere as a person before the law.
- Article 7: All are equal before the law and are entitled without any discrimination to equal protection of the law.
- Article 8: Everyone has the right to an effective remedy by the competent national tribunals for acts violating the fundamental rights granted him by the constitution or by law.
- Article 9: No one shall be subjected to arbitrary arrest, detention or exile.
- Article 10: Everyone is entitled in full equality to a fair and public hearing by an independent and impartial tribunal, in the determination of his rights and obligations and of any criminal charge against him.
- Article 11: Everyone charged with a penal offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defence.
- Article 12: No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation.
- Article 13: (1) Everyone has the right to freedom of movement and residence within the borders of each state.  
(2) Everyone has the right to leave any country, including his own, and to return to his country.
- Article 14: Everyone has the right to seek and to enjoy in other countries asylum from persecution.
- Article 15: (1) Everyone has the right to a nationality.  
(2) No one shall be arbitrarily deprived of his nationality nor denied the right to change his nationality.
- Article 16: Men and women of full age, without any limitation due to race, nationality or religion, have the right to marry and to found a family. They are entitled to equal rights as to marriage, during marriage and at its dissolution.
- Article 17: (1) Everyone has the right to own property alone as well as in association with others.  
(2) No one shall be arbitrarily deprived of his property.
- Article 18: Everyone has the right to freedom of thought, conscience and religion; this right includes freedom to change his religion or belief, and freedom, either alone or in community with others and in public or private, to manifest his religion or belief in teaching, practice, worship and observance.
- Article 19: Everyone has the right to freedom of opinion and expression; this right includes freedom

to seek, receive and impart information and ideas through any media and regardless of frontiers.

- Article 20: Everyone has the right to freedom of peaceful assembly and association.
- Article 21: Everyone has the right to take part in the government of his country, directly or through freely chosen representatives. The will of the people shall be the basis of the authority of government.
- Article 22: Everyone, as a member of society, has the right to social security and is entitled to realization of the economic, social and cultural rights indispensable for his dignity and the free development of his personality.
- Article 23: (1) Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment.  
(2) Everyone, without any discrimination, has the right to equal pay for equal work.
- Article 24: Everyone has the right to rest and leisure, including reasonable limitation of working hours and periodic holidays with pay.
- Article 25: Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control.
- Article 26: Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit.
- Article 27: Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.
- Article 28: Everyone is entitled to a social and international order in which the rights and freedoms set forth in this Declaration can be fully realized.
- Article 29: Everyone has duties to the community in which alone the free and full development of his personality is possible.
- Article 30: Nothing in this Declaration may be interpreted as implying for any State, group or person any right to engage in any activity or to perform any act aimed at the destruction of any of the rights and freedoms set forth herein.

#### 7.4.1. Case Study

The National Human Rights Commission, India (New Delhi, 10th June 2005) issued notices to the IG (Prisons) and Chief Secretary, Assam asking them to submit reports of 5 undertrial prisoners presently lodged at the LGB Regional Institute of Mental Health, Tezpur, Assam. They were given 2 weeks to reply.

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The 5 cases are that of Machang Lalung who has been a undertrial prisoner for 54 years, Khalilur Rehman who has been lodged in the Mental Hospital for 35 years, Anil Kumar Burman a undertrial prisoner for 33 years, Sonaman Deb a undertrial prisoners for 32 years, and a woman Parbati Mallik who has been a undertrial prisoner for 32 years. The plight of these undertrial prisoners were reported to the NHRC by its Special Rapporteur Shri Chaman Lal who had visited the LGB Regional Institute of Mental Health on 31st March and 1st April 2005.

Such like cases of Human rights are taken care of National Human Rights commission in India.

### 7.5. VALUE EDUCATION

Value education to prevent erosion of values in public life has been a matter of concern, since independence. The values embedded in the Indian philosophy, cultural heritage and literature need to be nurtured. A number of legendary books have highlighted the desirable values and the procedures for inculcation of values. Literature in different Indian languages is a rich repository of value oriented education. A number of Education Commissions and Committees set up by Government of India have made recommendations about the need for formulation of programmes on education in human values. The Preamble to the Constitution, the Fundamental Duties enshrined in the Constitution and National Policy of Education 1986/1992 highlighted the need for inculcation of values. The S.B. Chavan Committee Report (1999) submitted to the Indian Parliament emphasized the need to nurture core universal values like truth, peace, love, righteous conduct, and non-violence in students. These universal values have been emphasised by all religions.

Gandhi Ji once said: "Education means all-round drawing out of the best in child and man-body, mind, and spirit." As such, education becomes the basis of personality development in all dimensions- moral, mental, and emotional. Therefore it can be said that in the long run education forms the foundations on which the castles of peace and prosperity can be built. Since ancient times, it is said "Sa Vidya Ya Vimuktaye," which means that with education we finally attain salvation. This small Sanskrit phrase essentially contains the thought and essence of Value Education that is relevant in all perspectives.

Any education system that lacks moral and ethical education cannot be termed as good. The reason behind such a thought is that, without morality and without ethics, no student, in a real sense, can be considered to be healthy in mental and physical terms because for it, self-control and good character is essential. A person who is not a moralist and who does not differentiate between right and wrong cannot rise to the essential level of a true student.

Mahatma Gandhi laid down some rules for students. He said that, on the one hand, where students should gain education under the strict regimen of high morals, self-control, and right thinking; on the other, they should also be expected to provide service to the society in general.

In our country apart from NCERT, a large number of institutions, NGOs and individuals across the country have been working for nurturing values. A number

and is required to approach the judiciary for issuing writs. Even when found guilty, a management can be punished with imprisonment and fine, but there is no provision to enable a court to direct any industries to close down. The court's procedures are time consuming and the inherent delays prevent quick and effective action.

### Air

1948. Indian Factories Act—Protection to workers against hazardous processes.

1981. Air (Prevention and Control of Pollution Act) Act—Ambient air quality specified.

■ Monitoring stations established.

1987. Air Act—Empowers the Government to close down polluting industries and stop their supply line of water and electricity.

1989. Motor Vehicles Act—Emission standards of carbon monoxide and hydrocarbons specified.

Air Act. Even though no attempt was made till recently to enact comprehensive legislation for prevention and control of air pollution, India has had laws on air pollution for the last 79 years. The Bengal Smoke Nuisance Act came into being as early as in 1905 and Bombay and Kanpur followed the suit in 1912 and 1958. Many other state legislatures extended the application of the Bengal Smoke Nuisance Act to their states also. These acts are mainly concerned with the smoke coming out of industries. But the still numerous new industries which came into being were not touched by them at all.

The laws dealing with automobile emissions also provide a similar picture. The Motor Vehicles Act, 1969 confers legal powers on state governments to make rules regarding "emission of smoke, visible vapour, sparks, ashes, grit or oil". This provision did not help improve the situation because of the absence of criteria and standards in regard to exhaust fumes and noxious gas, monitoring and surveillance and an enforcement agency.

The Government of India appointed an expert committee on air pollution in 1970 to suggest suitable means to control and draft an air pollution control bill. This committee prepared a draft bill in which "the best possible means of control", in contrast to the "air quality criteria" approach was recommended. The framework of the Air Act almost follows the one set by the Water Act. With that framework, the anomalies also continue. However, there are certain provisions which deserve attention. Section 20 of the act empowers the state government to give instructions to the concerned authorities in charge of registration of motor vehicles under the Motor Vehicles Act, 1969.

for ensuring standards for emission from automobiles, Section 52 lays down that, save as otherwise provided under the Atomic Energy Act, 1962, in relation to radioactive air pollution, the provisions of this act shall have overriding effect in case of inconsistency with any other enactment.

The government's view is that there should be an integrated approach for tackling the environmental problems, particularly related to pollution. It is, therefore, proposed that the Central Board for the Prevention and Control of Water Pollution constituted under the Water (Prevention and Control of Pollution) Act, 1974, will also perform the functions of the Central Board for the prevention and control of air pollution and of state boards for the prevention and control of air pollution in the Union territories. It is also proposed that the state boards constituted under the said act will perform the functions of state boards in respect of prevention, control and abatement of air pollution. As the air act is designed to be extended to the whole of India and as the water act is so far not acceded to by some states, it is proposed to constitute separate state boards for the prevention and control of air pollution.

The characteristic feature with the enactment of the water and air pollution laws is that they took more than 10 years to take final shape. While this in itself is damaging, the time taken to begin implementation under the act is highly depressing. In the case of the air act more than 18 months had to lapse before the rules under which the act could be enforced were accepted by the government. This brings us to the question of political will to enforce the laws without which no amount of legislation can improve the situation.

### **Environmental Impact Assessment (EIA)**

Analysis of any possible change in the environmental quality, adverse or beneficial, caused by a developmental project of Government or private company is known as Environmental Impact Assessment (EIA).  
As a matter of Government policy, it is compulsory for any enterprise (Government/private) to include EIA in the planning stage of any developmental project and submit it to the Central Government for clearance. All major and minor irrigation projects and all highly polluting industries are subjected to EIA for their initiation.

### **ENVIRONMENTAL MOVEMENTS IN INDIA**

#### **Chipko Movement**

In 1973, the Chipko Movement (Chipko means to hug or stick to) was launched by Chandi Prasad Bhatt and Sunder Lal Bahuguna against

hills of Uttar Pradesh (UP). The starting point was Chamoli district of Garhwal region in UP. A unique feature was that local hill women from villages were organized and made aware of the ecological threat in the hills. They took active part in the campaign they embraced trees when the timber contractors reached and compelled them to leave. This novel campaign of saving hill forests and greenery soon spread all along the hill region and to Karnataka in the South in 1983 where it was named "Appiko".

In course of time the Chipko Movement crossed geographical boundaries and observed as Chipko Day at New York, USA on April 29, 1983. A group of school children assembled and hugged a big tree in Union Square Park, followed by some adults.

### Appiko Movement

A group of youth in Balegadde village, protesting against moves to establish teak plantations, wrote to forest officials asking them to stop clearing the natural forest. But this appeal was ignored. Then the villagers decided to launch a movement. They invited S.L. Bhatnagar, the architect of Chipko Movement and gathered local people to take up oath to protect trees by embracing them. In September 1983, when the axe-men came for felling in the Kalase forests, people embraced the trees and thus the "Appiko Movement" was launched. This simple, non-violent action then became popular statewide and people joined this movement spontaneously in many forest areas of the Western Ghats. Appiko activists trekked along the Western ghats from Coorg to Goa, spreading the movement's message. Padayatras, slide shows and street plays created mass awareness. 'Yakshagana'—a form of folk dance—was used effectively to convey the message of conservation. The Appiko Movement has three main objectives:

- Ullu (to conserve)
- Belu (to grow) and
- Balidu (to make rational use).

But it can hardly be denied that the Appiko Movement has created a mass awakening about conservation in South India and particularly in Karnataka, emphasizing the need to involve the local people in saving the Western Ghats.

### Tehri Dam Conflict

The 260.5 metre high Tehri Dam on the Bhagirathi in the Garhwal Himalayas is being publicized as one of the most promising projects—a symbol of the country's prosperity and prestige. It will bring prosperity by generating 2400 MW peaking power, which according to

the builders of the dam, will help in establishing 40 industrial cities such as Modinagar (near Delhi), provided 300 cusec of water to meet the water supply needs of Delhi and irrigate 2.7 lakh hectares of land in Western Uttar Pradesh. The project has generated controversy since its inception. In spite of objections of several scientists of national and international repute, the project is yet to be modified, stopped and accepted.

#### Tehri Dam—At a Glance

|  |  |
|--|--|
| 1. Location of river:  | Tehri town of Uttaranchal at the confluence of Bhagirathi and Bhilganga                        |
| 2. Height of Dam:  | 260.5 metres   |
| 3. Electricity generation capacity:                                  | 1,000 megawatt   |
| 4. Irrigation facility available:                                    | 9,10,000 hectare   |
| 5. Drinking water facilities available:                              | 500 cusec  |
| 6. Water cover area of reservoir:                                    | 4,250 hectare  |
| 7. Downstream electricity generation capacity (at Koteshwar):        | 400 megawatt   |
| 8. Expected area under inundation:                                   | 1,600 hectares cultivated land, 2,000 hectare forest area, 3 villages with over 50,000 people. |
| 9. Tehri dispute onset (By Tehri dam opposition struggle committee): | 1977   |

#### Silent Valley Movement

Silent Valley occupies an area of 2,450 hectares at an altitude of 3000 ft. in Palaghat district, Kerala. It is surrounded by the Nilgiri forests to the north and Athappadi forests to the east—together they comprise 40,000 hectares of pristine (i.e. primitive) forest. This tropical rain-forest in the Western Ghat is a precious reservoir of genetic diversity which has not been fully exploited—here plant species and other forms of life have survived for centuries in the forest. It is this gene pool to which man has to turn in future for new materials for agriculture, for life-saving drugs, etc.

The Kerala State Government decided to construct a dam in the Silent Valley for generation of 120 MW (megawatts) of electricity in 1976 at an estimated cost of Rs. 25 crores (revised in 1984 to Rs. 51 crores). The proposed dam would store 270 million cubic feet water in a reservoir spreading over 700 hectares. In order to save the Silent Valley from destruction in the process of Government dam project, the Kerala based NGO, Kerala Sastra Sahitya Parishad (KSSP) launched



the Silent Valley Movement, supported by students, teachers and people of Kerala.

Soon the apex policy making bodies NCEPC, DOEn and Switzerland-based IUCN (International Union for Conservation of Nature and Natural Resources) strongly supported the cause of Silent Valley. Finally the Prime Minister (Indira Gandhi) in 1983 accepted the recommendation of top scientists and environmentalists and declared the Silent Valley as the Biosphere Reserve by cancelling the hydel project proposal of the State Government. This is the success story of an environmental movement for protection of an important biosphere reserve.

### Narmada Bachao Andolan

Narmada is the largest west flowing river arising from the Amarkantak Plateau in Shahdol district of Madhya Pradesh and travels 1300 km draining 9.88 million hectares between the Vindhya and Satpura ranges. This vast basin with average annual flow of 41 billion cubic metres is mostly untapped because of inter-state (Gujrat, MP) water disputes. The MP Government undertook a gigantic plan—Narmada Basin Development Programme which involves construction of 31 large dams for Narmada and its tributaries, 450 medium-sized projects and several thousand minor structures at a cost of about Rs. 18,000 crores. The benefits were projected several million hectares of land irrigated; water supply to thousands of industries; several thousand megawatts of power etc.

But according to environmentalists and environment action groups massive damming of the Narmada River could be a blueprint for disaster. The basin is one of the most densely forested areas in India. The project would imply displacement of over 1 million people, mostly tribals, submerging of over 1000 villages and over 50,000 hectares of agricultural land and also loss of forests in the region. The damage to the environment and people far outweighs the projected benefits. The environmental action groups, led by the environmentalist, Smt. Medha Patkar, organized sustained movement to stall the projects of Sardar Sarovar and Narmada Sagar dams and partly succeeded.

### REVIEW QUESTIONS

1. Write briefly on the following environmental agencies/institutions.
  - (a) United Nations Environmental Programme (UNEP)
  - (b) International Union for Conservation of Nature and Natural Resources (IUCN)