Land, Soil and Vegetation Resources in India Objectives, Land Resource, Land Use, Land Problems, Solution of Land Problems, Soil Resources

- The strength of a nation is it social, economic or political depends mostly on the available resources and their proper utilisation. Resource is the matter or substance which satisfies human wants at a given time and space. Before any element can be designated as resource three basic pre-conditions must be satisfied. They are the knowledge, technical skills and demand for the material or services produced. For example, from time immemorial, water is present on the earth. But it becomes a source of energy when people gained the knowledge and technical skills for hydel power generation. It is, therefore, human ability and need which create resource value and not their sheer physical presence. So, the basic concept of resource is also related to human well-being.
- India has rich endowment of resources. An integrated effort is now being made by our country to make the best use of the existing resource potential. It helps to meet the demands of growing population and also provide opportunities for employment. Simultaneously, it acts as indicator for the levels of development.

Objectives

The major objectives of this chapter are:

- To recognise the significance of land as a resource
- To identify the main uses of land
- To explain some of the problems in land resource and their solutions
- To recognise the significance of soil as a resource
- To recall the main characteristics of each major soil type in India
- To identify different factors that are responsible for the soil erosion in different parts of India
- To explain the problems created as a result of soil erosion
- To establish the relationship between measures adopted for soil conservation with types of erosion in different parts of India
- To identify major constituents of vegetation
- To recognise major vegetation types

Land Resource

Throughout history, we have drawn most of our sustenance and much of our fuel, clothing and shelter from the land. It is useful to us as a source of food, as a place to live, work and play. It is a productive economic factor in agriculture, forestry, grazing, fishing, and mining. It is considered as a foundation for social prestige and is the basis of wealth and political power. It has many physical forms like mountains, hills, plains, lowlands, and valleys. It is characterised by climate from hot to cold, and from humid to dry. Similarly, land supports many kinds of vegetation. In a wider sense, land includes soil and topography along with the physical features of a given location. It is in this context that land is identified closely with natural environment. It is also regarded as space, situation, factor of production in economic processes, consumption goods, property, and capital.

Availability of Arable Land

- India is well endowed with cultivable land which has long been a key factor in the country's socio-economic development. India ranks seventh in terms of area in the world, while it ranks second in terms of population. Arable land includes net sown area, current fallow, other fallow and land under tree crops. Arable land covers a total area of 167 million hectares which is 51% of the total area of the country.
- However, the arable land-man ratio is not as favourable as in many other countries like Australia, Canada, Argentina, the USA, Chile, Denmark, and Mexico. Conversely, the land-man ratio is more favourable in India than Japan, the Netherlands, Egypt, United Kingdom, Israel, and China. Land-man ratio is defined as the ratio between the habitable area and the total population of a country.
- The physical features in India are diverse and complex. About 30% of India's surface area is covered by hills and mountains. These are either too steep or too cold for cultivation. About 25% of this land is topographically usable which is scattered across the country. Plateaus constitute 28% of the total surface area but only a quarter of this is fit for cultivation. The plains cover 43% of the total area and nearly 95% of it is suitable for cultivation. Considering the differences in proportion of surface area, this allows us to conclude that taking the country as a whole, about two-third of it is usable. Moreover, soils, topography, moisture and temperature determine the limits of cultivability and the quality of arable land is determined by these factors. As a result of this, half of the surface area is cultivated. This proportion is one of the highest in the world.

Land Use

Out of the total geographical area i.e.. , 328 million hectares, land utilisation statistics are available for 305 million hectares only. The balance 23 million hectares remains not surveyed and inaccessible. The significant features of land utilisation are:

- high percentage of area suitable for cultivation
- limited scope for further extension of cultivation
- small area under pastures despite a large bovine population

Presently, more than 40 million hectares of land is not available for cultivation. Area under this category has shown a decline from 50.7 million hectares in 196061 to 40.8 million hectares in 1990 - 91. There has been a marginal decline in fallow land from 9.9% in 1950 - 51 to 7.5% in 1990 - 91. Cultivable wastelands also witnessed an appreciable decline of 34% between 1950 - 51 and 1990 - 91. During 1950 - 51 and 1990 - 91, the net sown area has witnessed notable increase of about 20% . This area in 1950 - 51 was 118.7 million hectares which increased to 142.4 million hectares in

1990 - 91. Only 14% of the net sown area or 41.7 million hectares produced two or more crops in 1990 - 91. Only 5% of the land is under permanent pastures and grazing in a country with the largest bovine population of the world. Land under non-agricultural use has increased with the accelerated growth in economy. The process of industrialisation and urbanisation demands more land under roads, railways, airports, human settlements and industries not excluding huge multi-purpose dams. Essentially, on the limited total area all the cultural uses of land must be accommodated. Obviously, it can be realised mainly at the cost of land under agriculture. In 1950 - 51, the total area under non-agricultural use was 9.3 million hectares which increased to 21.2 million hectares in 1990 - 91. But the percentage of land under forest is one of the lowest in the world. Forests occupy not more than 22% of the total geographical area of the country, while the world average is 30% . According to the land use statistics, area under forests has increased from 40 million hectares in 1950 - 51 to 68 million hectares in 1990 - 91. It is much below the desired national goal of one third of the total area.

Thus, land use is a dynamic process. It changes over time due to a number of factors, including increasing population, changes in cropping system and technology. As the various sectors of the economy develop, there may be a shift in the pattern of land use. However, the bulk of the land continues to be used for raising crops. With unabated population growth, the pressure of population on arable land is bound to grow. Indeed, it should be a matter of great national concern.

Land Problems

Out of the total land area, as many as 175 million hectares suffer from degradation. Land degradation is caused largely by soil erosion, water logging, and excessive salinity. The most serious threat to the soil is posed by deforestation. Steep slopes encourage rapid runoff leading to soil erosion especially on the southern slopes of the Himalayas and the western slopes of the Western Ghats. Major portions of the Himalayas are prone to landslides and erosion. Wind erosion is prevalent in Rajasthan, gully erosion in Chambal Valley, Chotanagpur, Gujarat, Sub-montane Punjab Himalaya. Water logging and salinization which constitute the second major threat to soil have already consumed 13 million hectares. The lands affected are mostly situated in canal irrigated areas. They have suffered because of the absence of adequate drainage. Land is also degraded due to mining operations in many parts of the country. The total land area affected is about 80 thousand hectares by mining. Urban encroachment on good quality agricultural land is another problem by which the amount of land used for agriculture is steadily declining. There are social conflicts that are arising out of the rights to occupy and transfer of land. The tenant cultivators face major disincentives such as the fear of eviction, the insecurity of tenure, high rents, and inadequate surplus to invest. Land ceiling laws have not been implemented with adequate strictness.

Solution of Land Problems

- Physical reclamation of land is achieved through chemical treatment of waterlogged soils and is followed with scientific rotation of crops. Land rendered useless by river action and river floods are also reclaimed after necessary treatment to restore their fertility and texture. Physical reclamation of desert lands calls for more sustained efforts. It requires introduction of suitable natural vegetation and canal or well irrigation or even both. It helps to raise water table. On the other hand, social approach is reflected through state legislation aiming at overall rural reconstruction, promoting agriculture, and its productivity in particular. Consolidation of land holdings provides necessary motivation and empowerment of a tiller by confirming on him the rights of land tenure or ownership. Legislation is used to ensure social justice.

- Remote sensing data have shown that about 200 square kilometres of the Gulf of Kachchh have been covered by sedimentation. The National Remote Sensing Agency has estimated 53 million hectares (16%) as wasteland in the country. Among the states, the highest incidence of wastelands is recorded in Jammu and Kashmir (60%) , followed by Rajasthan (38%) , Sikkim and Himachal Pradesh (37% each) , and Gujarat (17%) . The Government of India constituted the National Wasteland Development Board in 1985 with a view to enhancing productivity of wastelands. It includes the program of afforestation of 5 million hectares per year.

Soil Resources

Soil is defined as upper layer of the earth composed of loose surface material. It is a mixture of many substances including endless variety of minerals, remnants of plants and animals, water and air. It is the end product of continuing interaction between the parent material, local climate, plant and animal organisms, and elevation of land. Since each of the elements varies over space, soils also differ from place to place. Soil is an important segment of our ecosystem. Soil is the seat, the medium, and fundamental raw material for plant growth. Through its relative fertility, it affects the economic activities of man and shapes the destiny of our country. It is a valuable national and fundamental earth resources of the country.

Major Soil Groups of India