

# APPOLO STUDY CENTRE



## ETHICS

### JAN WEEKLY TEST - 1

11 <sup>th</sup> - Geography	Unit -7	The Biosphere
12 <sup>th</sup> - Geography	Unit -1	Population Geography
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### 11<sup>th</sup> - Geography Unit - 7 The Biosphere

“Man’s attitude towards nature is today critically important simply because we have now acquired a fateful power to alter and destroy nature is inevitably a war against himself”.

**-Rachel Carson**

#### Introduction

The earth was formed 4.6 billion years ago. Geographers are concerned about the earth and its various spheres. These spheres did not exist on the primitive earth as they are today. They evolved over a long period of time after the earth was formed. There was no life on earth for a very long time. Scientists believe that the first life forms on earth came into existence about 3.5 billion years ago. Which marked, ‘The birth of the biosphere’.

Since then life has multiplied in numbers and varieties and evolved to the present biosphere that we are part of and which we are gifted with.

In the last 100 years, man has had used, overused and misused the natural resources of the earth. This has disturbed the ecological balance of the earth. The realization about the damage caused to earth by our action came when we began to experience global warming, desertification, increase in disease and distress and recurrence of severe natural disasters.

It was in 1962 that Rachel Carson published the book 'Silent Spring' which inspired an environmental movement that led International agencies to focus their attention on protecting and sustaining the biosphere.

In 1971, UNESCO launched the Man and the Biosphere Programme to study our impact on nature and how it could be minimized. Even after several decades the programme still continues to shape the future of sustainability of the earth.

## Biosphere

The word Biosphere originates from the Greek words bios = life and sphaira = sphere. Earth is the only planet in the solar system that supports life. There are many reasons that contribute to this and the most important being the earth's distance from the sun, the presence of oxygen in the atmosphere and the presence of water. The above factors, along with the existence and interaction of the three spheres of the earth (the lithosphere, hydrosphere and atmosphere) gives rise to the fourth sphere which is the life sphere or biosphere (Figure 7.1). The term Biosphere was coined by Eduard Suess in 1875. Later contributions to the study of biosphere were from, Charles Darwin and many other scientists.

Thus, in the biosphere, life exists on land, water and air and life forms range from microorganisms to plants, animals, birds, amphibians, reptiles and mammals including human beings. The biosphere is formed of biotic components. It consists of organisms, population, community and ecosystem.

## Ecosystem

**Organism** - includes animals, plants and micro-organisms.

**Population** - is a group of similar plants or animals living in an area.

**Community** - refers to all the plants and animals living in an area.

**Ecosystem**- all living and non-living things and their interaction within an area.

Life cannot exist in isolation. It flourishes in an environment which supplies and fulfills its material and energy requirements. A biotic community and its physical environment in which matter and energy flow and cycle is called as ecosystem.

The term ecosystem was first proposed by Arthur George Tansley in 1935. Tansley defined ecosystem as, 'the system resulting from the integration of all living and non-living factors of the environment'. The ecosystems can vary in size. It can be very small, extending to about a few square centimeters or it can extend over many square kilometres. Example; tropical forests.

## Major components of an ecosystem

The ecosystem is made up of two main components:

A. Abiotic Component and

## B. Biotic Component

- A. **Abiotic Component:** This component of the ecosystem includes the non-living substance of the environment. Example; light, air, soil, water, climate, minerals, etc. Sun is the main source of energy for the earth.
- B. **Biotic Component:** This includes a variety of living organisms such as microorganisms, plants and animals. The biotic component of an ecosystem can be further divided into producers, consumers and decomposers based on their capacity to sustain themselves (Figure 7.2).
- a. **Producers:** Organisms that can produce or manufacture their own food are known as producers. Plants that have green pigments or chlorophyll, produce their own food in the presence of CO<sub>2</sub> in the atmosphere, water from the soil and sunlight through a process called 'photosynthesis'. These green plants are called as 'autotrophs' (auto - self; trophs - nourishing) as they manufacture their own food.
- b. **Consumers:** Consumers are organisms that cannot manufacture their own food and get their food and nutrients from producers directly or from other organisms. They are called as 'heterotrophs' (hetero - others; trophs - nourishing).

Consumers can be divided into primary, secondary and tertiary consumers.

### 1. Primary Consumers

Organisms that feed on producers (green plants) are called primary consumers. They are also called as 'herbivores' or plant eating organisms. Examples of terrestrial herbivore are grasshopper, sheep, goats, cow, rabbit, deer, elephant etc. Examples of aquatic herbivores are zoo plankton, krill, squid, small fish, sea urchin, etc.

### 2. Secondary Consumers

Animals that kill and eat the herbivores or plant eating animals are called secondary consumers. They are also called as 'carnivores', Example; lion, tiger, foxes, frogs, snakes, spider, crocodiles, etc.

### 3. Tertiary Consumers

They are top predators in a food chain. They are carnivores at the topmost level in a food chain that feed on other carnivores or secondary consumers. Example: an owl eats a snake but an owl is eaten by a hawk, therefore a hawk is a tertiary consumer. Tertiary consumers that occupy the top trophic level, and are not predated by any other animals are called 'apex predators'. However, when they die their bodies will be consumed by scavengers besides the decomposers Example; alligator and hawk.

Some organisms eat both plants and animals. These animals are called as 'omnivores'. Example; cockroach, foxes, seagull and human. Some omnivores are 'scavengers', which eat food that other animals have left behind Example; hyena and vultures.

Plants and animals that live on or inside other plants or animals are called as Parasites. Example; mistletoe lives on other plants. Other examples are tapeworms, round worms, lice, ticks, flea etc. 'Detritivores' are consumers that feed on detritus. Detritus includes fallen leaves, parts of dead trees and faecal wastes of animals. Ants, termites, earthworms, millipedes, dung beetle, fiddler crabs and sea cucumbers are detritivores.

#### 4. Decomposers:

Decomposers are organisms that help decompose dead or decaying organisms. Decomposers are also heterotrophs. Decomposers are nature's built-in recycling system. By breaking down materials - decomposers return nutrients to the soil. They, in turn, create another food source for producers within the ecosystem. Mushrooms, yeast, mould, fungi and bacteria are common decomposers.

The earthworm is called as the friend of the farmer. Find out the reason why?

### Food Chain and Food Web

Every living creature in an ecosystem has a role to play. Without producers, the consumers and decomposers would not survive because they would have no food to eat. Without consumers, the populations of producers and decomposers would grow out of control. And without decomposers, dead producers and consumers would accumulate as wastes and pollute the environment.

All organisms of an ecosystem depend on one another for their survival. Each organism living in an ecosystem plays an important role in the flow of energy within the system. Organisms need energy for respiration, growth, locomotion, and reproduction. This movement of energy is usually understood through food chains or food webs. While a food chain shows one path along which energy can move through an ecosystem, food webs show all the overlapping ways that organisms live with and depend upon one another.

#### A. Food Chain

A food chain describes the flow of food in an ecosystem. This flow or feeding structure in an ecosystem is called 'trophic structure'. Each level in this structure is called a trophic level. A food chain starts the movement of energy from one trophic level to the next (Figure 7.3). Example; Plant (primary producer) is eaten by a rabbit (herbivores, primary consumer), rabbit is eaten by a snake (carnivores, consumer or primary carnivore) and the snake is eaten by a hawk (tertiary consumer).

## Food Web

A Food Web is a complex network of interconnected food chains. Food chains show a direct transfer of energy between organisms. A chain might involve a mouse eating some seeds on the forest floor, a snake eating the mouse and later an eagle eating the snake. With each step, some of the energy from the sun, which is trapped within the seeds, is getting passed on.

In a food web, the mouse might eat seeds, but it also might eat some grains, or maybe even some grass. The mouse might be eaten by a snake, or the eagle, or even a fox. The snake could be eaten by the eagle, but also might be eaten by a fox in the forest. Since each organism can eat multiple organisms and be eaten by multiple organisms, a food web is a much more realistic scheme of the transfer of energy within an ecosystem (Figure 7.4). Food chains and food webs are found in both terrestrial and aquatic ecosystems.

Organisms in a food chain or food web are linked and dependent on one another for survival. If organisms in one trophic level become threatened, it impacts the organisms in other trophic levels. Primary consumers get less food due to loss or destruction of habitat. This in turn means less primary consumers for secondary and tertiary consumers to feed on. The plant and animal species in such an environment could become endangered or even extinct. For this reason, it is vital that an ecosystem remains balanced containing an appropriate proportion of producers and consumers.

## Energy Flow in an Ecosystem

Energy in an ecosystem flows from producers to consumers. The available energy in a food chain decreases with each step or trophic levels up in the food chain. As such, there is less energy available to support organisms at the top of the food chain. That is why the tertiary and quaternary consumers are far less in number in an ecosystem than organisms at lower trophic levels.

## Energy Pyramids

Energy pyramids are another tool that ecologists use to understand the role of organisms within an ecosystem. As you can see, most of the energy in an ecosystem is available at the producer level. As you move up on the pyramid, the amount of available energy decreases significantly. It is estimated that only about 10% of the energy available at one trophic level gets transferred to the next level of the energy pyramid. The remaining 90 percent of energy is either utilized by the organisms within that level for respiration and other metabolic activities or lost to the environment as heat. The energy pyramid shows how ecosystems naturally limit the number of each type of organism it can sustain (Figure 7.5).

## Cycles in an Ecosystem

Nutrients move through the ecosystem in cycles is called 'biogeochemical cycles'. A biogeochemical cycle is a circuit or pathway by which a chemical element moves through the

biotic and the abiotic components of an ecosystem. All life processes are associated with the atmosphere by important cycles such as the Carbon, Oxygen, Nitrogen cycles etc. Through these cycles energy and materials are transferred, stored and released into various ecosystems. Let us discuss one of biogeochemical cycles in detail - the Carbon cycle.

## The Carbon Cycle

Carbon is exchanged, or cycled among all the spheres of the earth. All living organisms are built of carbon compounds. It is the fundamental building block of life and an important component of many chemical processes. Living things need carbon to live, grow and reproduce. Carbon is a finite resource that cycle through the earth in many forms.

Carbon is an essential element in all organic compounds and since there is only a limited amount available it must be recycled continuously. This takes place in the biosphere. Atmospheric carbon is fixed in green plants through photosynthesis.

This carbon is passed on to other living organisms through the food chain. The carbon food compound is utilized and later released to the atmosphere through the process of respiration. By-products of respiration are carbon-dioxide and water which are returned to the air.

A carbon cycle is completed by decomposers like bacteria and fungi which break down dead plants and animal tissues there by releasing some carbon to the air, water and soil.

All producers and consumers are not decomposed. The organic matter of some of them is preserved in fossil fuels such as coal and petroleum for millions of years. In a carbon cycle (Figure 7.6), carbon moves between reservoirs. Carbon reservoirs include the atmosphere, the oceans, vegetation, rocks, and soil.

Today, the carbon cycle is changing. Human activities have added more carbon into the atmosphere. More carbon is moving to the atmosphere when fossil fuels, like coal and oil, are burned. More carbon is moving to the atmosphere as humans destroy the forest. This increase in carbon in the atmosphere causes the earth to warm up more than the normal level, leading to climate change and many problems connected with it.

A carbon sink is a natural or artificial reservoir that accumulates and stores carbon for an indefinite period. The process by which carbon sinks remove carbon dioxide ( $\text{CO}_2$ ) from the atmosphere is known as carbon sequestration. The main natural carbon sinks are plants, the ocean and soil.

## Biomes

An ecosystem as already explained consists of a biological community and an abiotic environment. Ecosystem may be broadly divided into land or terrestrial ecosystem and water or aquatic ecosystem. The aquatic ecosystem can be further divided into freshwater and marine ecosystem. An ecosystem becomes a biome when it extends over a large area. According to I.G. Simmons (1982) the most extensive ecosystem unit which is convenient to designate is called a 'Biome'. It may be concluded that a biome is in fact a large ecosystem

where we study the total assemblage of plant and animal communities. Since vegetation is the most dominant component of a biome and as vegetation and climate are very intimately related, the world is divided into a number of biomes based on major world climatic types (Figure 7.7).

## Types of Biomes

World Biomes are mega ecosystems existing and operating over large areas. These divisions are based on climate pattern, soil types, and the animals and plants that inhabit an area. Basically, biomes are classified into two major groups such as Aquatic biomes and Terrestrial biomes. Wetlands are transition zones between aquatic and terrestrial biomes. To understand the earth biomes, it is necessary to understand the following:

1. The characteristics of regional climates.
2. Aspects of the physical environment.
3. The type of soil and the processes contributing to soil development.
4. The distribution of flora in the area.
5. The distribution of fauna in the area and their adaptation to the environment.

### A. Aquatic Biomes

The aquatic biomes are the most important of all the biomes as, the water forms the vital resource and is essential for any life form. Since many types of species live in the water, it is one of the most important natural resources that need to be protected.

#### Aquatic Biome is further divided into:

- a. Fresh Water Biome and
- b. Marine Biome

#### a. Fresh Water Biome

These biomes are spread over all parts of the earth and have different set of species depending on their location and climate. Fresh water biomes include areas of ponds, lakes, streams, rivers and wetlands. Lakes and ponds are stagnant water bodies and are smaller in their area. The diversity of life forms in river changes with increasing water volume. For example, Dolphins are found in the river Ganges, Brahmaputra and the Indus which carry huge volumes of water.

#### b. Marine Biome

Marine biome is an aquatic biome which is salt water biome occupying seas and oceans of the world. Marine biome plants have various roles, plants such as sea grasses and macro algae give shelter and nutrient for many animals.

Marine plants are sources of nutrients for the corals and help corals to build up reefs. The reefs are kept intact by plants like coralline algae.

Corals are marine invertebrates which live in compact colonies. They inhabit tropical oceans and seas. Corals cannot survive in waters below 20°C but grow optimally in temperatures between 23°–29° Celsius. Coral reefs are marine ecosystems which are held together by structures made of calcium carbonate secreted by the corals. Coral reefs are mainly classified into three types – Fringing reef, Barrier reef and Atoll.

Sea grasses are plants that live in saltwater. There are over 50 species of sea grasses. Sea grasses have flowers, roots, and specialized cells to transport nutrients within a plant. This makes them similar to land plants and different from algae or seaweeds.

**Fringing reefs** grow seaward from the shore along the coast forming a fringe. They are the common type of reefs.

**Barrier reefs** also border the shoreline but are separated from the coast by an expanse of water or lagoon.

**Atolls** are coral reefs that are circular in shape enclosing a lagoon with absence of an island in the center.

Marine biome includes fishes, whales, crustaceans, molluscs, sea anemones, fungi and bacteria. Marine species are continuously impacted by change in climatic condition and the oceans are frequently disturbed by ocean waves and currents.

### c. Wetlands:

A wetland is an area of land which is permanently or periodically saturated with water and exists as a distinct ecosystem. Wetlands play many roles in the environment, such as water purification, flood control, carbon sink and shoreline stability. Wetlands are home to a wide range of aquatic plants and animal life. Wetlands can be freshwater, brackish, or saltwater. Examples of aquatic vegetation that thrive in wetlands are milkweed, bald cypress trees, mangroves and cattails.

- **Crustaceans** are chiefly aquatic arthropods having a body covered with a hard shell or crust and several pairs of legs. Example: crab, lobsters, crayfish, barnacles shrimps, krill etc.
- **Molluscs** are organisms with soft bodies. Often their bodies are covered by hard shells. Example: snail, slug, squid, cuttlefish, mussel, clams, oysters, octopuses etc.

## B. Terrestrial Biome

Terrestrial biomes are very large ecosystems over land and they vary according to latitude and climate. They can be divided into numerous sub-types. In this lesson they are broadly divided into eight types.



- **A Bog** is a type of wetland ecosystem characterized by wet, spongy, poorly drained peaty soil formed from dead plants specially moss. Bogs have moss, sedges, grasses, such as cotton grass; insectivorous plants like pitcher plants; and many orchids. The gradual accumulation of decayed plant material in a bog functions as a carbon sink.
- **A Fen** is a low land that is covered wholly or partly with water. They receive nutrients from ground water and have peaty alkaline soil. Their characteristic floras are sedges and reeds.
- **Mangrove swamps** are coastal wetlands found in tropical and subtropical regions. These wetlands are often found in estuaries, where fresh water meets salt water. Mangrove trees dominate this wetland ecosystem due to their ability to survive in both salt and fresh water. The Sundarbans is the largest Mangrove region in the world and a UNESCO World Heritage Site.
- **Mangrove forests of Tamil Nadu:** Mangrove forests are found along the coast of Tamil Nadu in Pichavaram, Muthupet, Ramnad, Gulf of Mannar and Punnakayal.

### i. Tropical Evergreen Rain Forest Biome

Tropical Evergreen Rain Forest Biome extends between 10° North and South of the equator (Figure 7.8). This biome is seen in the Amazon Basin of South America, Congo Basin of Africa and the Indo Malaysian Region of Southeast Asia (Java, Sumatra, Borneo, Malaysia and Guinea). This biome receives direct sunlight throughout the year and so temperatures are high year round. The average annual temperature is 20°C to 30°C. The average annual rainfall of the tropical evergreen rain forest is 200cm.

The Tropical Evergreen Rain Forest Biome has the largest number of plant and animal species. Broad leaved, tall evergreen hard wood trees are found in this biome. Trees grow up to 20 to 35 meters high. The forest is characterized by thick undergrowth and creepers. The main trees in this biome are mahogany, rose wood, ebony, cinchona, rubber, coconut palm, cane, bamboo etc. This forest biome has innumerable insects, birds, reptiles and furless animals. At the edge of the forest animals like gorilla, and monkey are found.

Important tribes inhabit this biome, for example the Pygmies in the jungles of Africa and the Yanomani and Tikuna tribes of the Amazon region. Traditionally they live by hunting and gathering food. In the recent years in South East Asia, the tropical evergreen rainforest has been slowly replaced by rubber and sugarcane plantations. The human settlements in this biome are small and scattered.

The forests of the Silent Valley National Park in Kerala on the Western Ghats are the last remaining tropical evergreen forests in India. It is part of the Nilgiris Biosphere Reserve

## ii Tropical deciduous Forest/Monsoon Forest

Tropical deciduous forest is found in the regions experiencing monsoon climate. This biome is also called as the dry forest or monsoon forest biome.

This is found in South and South East Asia in parts of India, Myanmar, Vietnam, Thailand, Cambodia and southern coastal China. It is also found in eastern Brazil and in smaller areas in South and Central America, the West Indies, southeastern Africa, and northern Australia.

In this biome, the temperature varies from one season to another season. In summer the maximum temperature ranges from 38°C to 48°C. Summer season is warm and humid. In the dry winter season temperature ranges between 10°C to 27°C. The total amount of precipitation is 75 to 150 cm/year and this affects the natural vegetation of the tropical deciduous forest biome.

The plants shed their leaves during the dry season. Trees here have huge trunks with thick rough barks. The plants grow at three different levels. The common trees are teak, sal, sandalwood, mahua (illupai), Mango, Wattle, Bamboo, semal (Illavamaram), sheesham (Karuvellamaram) and banyan.

The animals of this biome are elephant, lion, tiger, leopards, bison, tapier, hippopotamus, wild boar, flying squirrel along with a wide variety of bird species. This biome faces rapid rate of deforestation and is, therefore, one of the most disturbed ecosystem in the world. Large tracts of forests have been destroyed for agriculture and urban development. Several species of precious animals have now become endangered Example: lions, tigers, leopards, etc.

## iii. Temperate Deciduous Forest Biome

The temperate deciduous forest is a biome that is always changing. This biome lies in the mid- latitude areas of the earth, between the tropics and Arctic Circle i.e., between 30° and 50° north and south of the equator. The temperate deciduous forest biome can be seen in the eastern United States, most parts of Europe, China, Japan, North and South Korea (Figure 7.9). The average annual temperature is 10°C.

These biomes have four seasons such as winter, spring, summer and fall. Winters are cold and summers are warm. As winter approaches, the duration of day light decreases. In this biome, deciduous trees shed their leaves in the fall. The production of chlorophyll in the leaves slows and eventually stops revealing leaves having bright red, yellow and orange colors. These forests are also known as broad leaved forest, because the trees have wide flat leaves. Some important trees found here are oak, maple, beech, hickory, cedar and chestnut. On the forest floor that receive very little sunlight are found mosses, azaleas and mountain laurels.

Inhabiting the temperate deciduous forest are ants, insects, flies, bees, wasps, cicadas, walking sticks, moths, butterfly, dragon flies, mosquitoes and praying mantises.

Frogs, toads, snakes and salamanders are some of the reptiles in this biome. Common birds found in this biome are woodpecker, robin, jays, cardinals, owls, turkeys, hawks and eagles. Small mammals like rabbits, otters, monkeys, beavers, squirrels and porcupine are also seen in this biome along with bears, grey fox, wolves, white tailed deer and moose. Animals that live in this biome adapt to the changing seasons. Some animals migrate or hibernate in winter.

Most of these forests on the earth are cleared for agriculture. The soil here is very fertile. This is one of the most important agricultural regions of the world.

## **Grasslands**

Grasslands are found bordering the deserts and make up for one fourth of the natural vegetation of the earth. Those that lie in the low latitudes are called tropical grasslands and the ones which lie in the mid-latitudes are called temperate grasslands.

### **iv. Tropical Grassland Biome or Savanna Biome**

The tropical grass land biome is generally referred to as the Savanna biome. A savanna is a rolling topography that features vast open grasslands scattered with small shrubs and isolated trees. It is found between the tropical rainforest and desert biome. Tropical grassland biomes are mainly found in Africa, South America and Australia. Tropical grasslands in Africa is known as the savannas. Tropical grasslands are called as llanos in Columbia and Venezuela and as Campos in Brazil of South America.

Savanna biomes experience warm temperature year around. It has very long and dry winter season and a very wet summer season. The grass here is very tall often one or two metres tall scattered with small shrubs and isolated umbrella shaped trees like the acacia and the baobab trees which store water in their trunks.

Most of the animals in the savanna have long legs, like the giraffe and kangaroo. The carnivorous animals like lions, leopards, cheetahs, jackal and hyenas live in this biome. Zebras and elephants are also found in this biome.

In many parts of the savannas of Africa people have started using the grassland for grazing their cattle and goats. Due to overgrazing in this region most of the tropical grasslands here are lost to the Sahara desert year after year.

### **v. Temperate Grassland Biome or Steppe**

The temperate grassland biomes are generally found in the interior of the continents in the mid-latitudes. These grassland biomes are found in the transitional zone between the humid coastal areas and the mid latitude deserts.

The temperate grasslands are known as Steppes in Europe and Asia, Prairies in North America (Canada and USA), Pampas in South America, Veldts in South Africa, Downs in Australia and Puszta in Hungary. The annual range of temperature is quite large with summer temperature reaching as high as 38°C and winter temperatures falling down to -40° C. The rainfall is moderate from 25 cm to 50 cm. Grasses form a major part of the vegetation in the temperate grasslands.

The height of the grasses depends upon the amount and distribution of rainfall. The animals in this area include the bison, wolves of the Prairies of North America. The other animals and birds are coyotes, prairie dog, foxes, mice, rabbits, badgers, rattle snakes, pocket gophers, weasel, grasshoppers, quails and hawks.

## **vi. Tropical Desert Biome**

A tropical desert is the hottest and driest place on earth where rainfall is very scanty and irregular. This biome is typically found in the western parts of the continents within the tropics.

In the northern hemisphere, the Afro - Asian deserts form the longest belt which includes the Sahara desert, Arabian desert and the That deserts. In North America the tropical deserts cover, California, Arizona and New Mexico states of USA and it further extends to Mexico. The deserts in the southern hemisphere are, the Atacama desert west of Andes mountains in South America, the Namibian and the Kalahari deserts in southern Africa and the Great Australian desert in the central and southern parts of Australia.

The tropical deserts are not conducive for the growth of vegetation due to shortage of water. The plants found here are the xerophytes which have their own moisture conserving methods such as long- roots, thick barks, waxy leaves, thorns and small leaves so as to avoid evapotranspiration.

The main trees and bushes found in this region are acacia, cacti, date palm, kikar, babul etc. The animals in this biome are limited in number. They are able to bear the drought and the heat of the desert. Animals like the camel, antelopes, fox, spotted hyena, fallow deer, cape hare, hedgehog etc., live in the desert.

The tropical desert biomes are agriculturally unproductive except in and near the oasis. In the oasis, cultivation is carried through irrigation either from streams or from underground sources. Date palms are widely grown here.

The people in the deserts are generally nomads living in tents and moving from place to place. They are the Berbers of North Africa, the Bedouins of the Arabian deserts, the Damara in Namibia, the Bushman of the Kalahari Desert and the Aborigines of Australia. They practice food gathering and hunting while some herd cattle, goats and camel and some of them practice very simple subsistence farming.

One of the toughest foot races in the world is held in Sahara every year in April. This race is called The Marathon des Sables (MDS) and participants have to cover a distance of 250km over Sahara desert in southern Morocco in a span of 7 days. About 1500 participants aged between 16 to 79 from all over the world participate in this race.

Source: Morocco World News

### **vii. Taiga or Boreal Forest Biome**

The taiga biome is the largest terrestrial biome and extends across Europe, North America and Asia. The taiga biome is also known as coniferous forest or boreal forest biome. It extends from about 50° to 55° North to 65° to 70° North latitudes. This region lies between the temperate grassland in the south and the polar tundra in the north. The taiga region is absent in the southern hemisphere mainly because of the narrowing of continents towards the South Pole.

This biome has short wet summer and long cold winters. The taiga region has low mean annual precipitation ranging between 35 cm and 60 cm and the rainfall occurs mostly in summer. It receives plenty of snow during winter. The taiga or boreal forest biome consists mainly of evergreen coniferous forests. The important coniferous trees in this biome are pines, spruces, firs, maples and cedars. During the short summer season snow melts and this helps lichens, mosses and short grasses to grow and cover the ground. These are called 'meadows'.

Taiga is the home of some larger animals like moose, deer, and bears, while smaller animals like bobcats, squirrels, chipmunks, ermine, and moles are also found. Animals of the taiga have specialised adaptation including lot of thick fur or feathers and the ability to change colours during different seasons example ermine. The ermine is a small mammal, which is covered with thick dark brown fur in summer. This changes to white in the winter, an adaptation which helps the ermine to blend into its surroundings and makes it more difficult for the predators to spot them.

Lumbering is the main occupation of the people in areas which are easily accessible. The softwood from the coniferous forests is widely used in the manufacture of wood pulp and paper, newsprint, matches, furniture and building materials.

The hunting of fur bearing animals like musk rats, ermine, and silver fox are important economic activities. The taiga forest is endangered due to logging and mining by humans. When trees are cut down in the taiga it takes a very long time to restore itself because of the very short growing season.

### **viii Tundra Biome**

Tundra is a Finnish word which means barren land. The tundra region is a vast bowl lying beyond the Arctic Circle (66.5° North latitude) in the northern hemisphere along the shores of the Arctic Ocean. The Arctic tundra extends southwards from North Pole to the Taiga forest. Tundra is also found in the high altitudes especially in the Alpine region. Due to long and severe cold winters, this region is treeless and has very little vegetation. The growing

season for plants is very short. Natural vegetation mainly consists of shrubs, sedges, grasses, mosses and lichens.

The main features of this climate in the tundra region are the general absence of insolation and presence of very low temperature throughout the year. The average annual temperature is about  $-12^{\circ}\text{C}$ . The ground surface is covered with snow for at least 8 to 9 months in a year. In this biome, the sub soil remains permanently frozen and is known as permafrost. Permafrost tundra covers vast barren areas of northern Russia and Canada. Algae and fungi are found on the rocky cliffs and rosette plants grow in rock and gravel beds. Spongy turf and lichen develop in the drier inland tundra.

Animals common to Arctic tundra are the polar bear, arctic wolf, arctic fox, arctic hare and arctic weasel. Large herbivores such as musk oxen, caribou and reindeer are found. Lemmings are also found in this Biome. Insects like moths, butterflies, beetles, mosquitoes and black flies are common in the Arctic tundra. Migratory birds include tundra swans, harlequin ducks, sand pipers, plovers, geese and gulls.

The Antarctic region is covered with ice sheets. It is too cold and dry to support vegetation. However, some portions of the continent have areas of rocky soil that support plant life. Vegetation comprises of mosses, lichens and liver worts. This area is referred to as Antarctic tundra. Seals and Penguins inhabit the shore areas of Antarctica.

## Biodiversity

The term biological diversity was used as early as 1968 by wildlife conservationist Raymond F. Dasmann. Later in 1988, entomologist E.O. Wilson used the term Biodiversity and this term has been used since then. Biodiversity refers to the variety of life on Earth. This includes the number of species of plants, animals and microorganisms along with the diversity of genes in these species. Moreover, it embodies the different ecosystems on the planet, for example forests, deserts, coral reefs and wetlands.

Biodiversity is the variability among living organisms. This includes diversity within species, between species, and between ecosystems. The variety of biodiversity or the number of species in a given area is referred to as species richness. Normally variety of life increases with size of area.

Biodiversity can be identified at three levels:

- A. Genetic diversity
- B. Species diversity
- C. Ecosystem diversity

- A. **Genetic diversity** refers to the total number of genetic characteristics in the genetic makeup of a species. Example: Each human being is very different from others. Genetic diversity helps the population to adapt to changes in the environment or adapt to different environments. Domestication of dogs can be taken as a common example.

- B. **Species diversity** is the number of different species of plants and animals that are present in a region. A community with more number of species enjoys species richness. Naturally undisturbed forests have greater species richness than reforested areas or plantations. There are three types of Species:
- Endemic species** - is one whose habitat is restricted only to a particular area because of which it is often endangered. It differs from “indigenous,” or “native,” which although it occurs naturally in an area, is also found in other areas.
  - Exotic Species** - is any species intentionally or accidentally transported and released by man into an environment outside its original range. These are often the most severe agents of habitat alteration and degradation, and a major cause of the continuing loss of biological diversity throughout the world.
  - Cosmopolitan Species** - It is a species that is found to be distributed over most regions of the earth example: cats, dogs, human beings. The killer whale is considered as the most cosmopolitan species in the world.
- C. **Ecosystem diversity** refers to the variety of life forms in a prescribed ecosystem. Ecosystems may be both terrestrial and aquatic. Distinctive terrestrial ecosystems include forests, grasslands, deserts, etc. while aquatic ecosystems are rivers, lakes, oceans etc.

In understanding biodiversity, the most common question that arises in our mind is how many different plant and animal species are there on earth? There can be no definite answer to this question. At present the conservation scientists have identified over 8.7 million species worldwide. Of this only about 2 million are known to us ranging from microorganisms to giant mammals and reptiles. New species are being discovered while many species are also disappearing from the face of the earth.

### **Biodiversity hotspots**

Areas that are rich in species diversity are called as “Hotspots”. The hottest spots for species diversity are the tropical rainforests. Tropical rainforests comprise of only 7% of all land on earth, yet are home to nearly 50% of all the species on Earth! India is among the World’s 17 nations that are exceptionally rich in species diversity.

The British biologist Norman Myers coined the term ‘biodiversity hotspot’ in 1988. According to him, a biodiversity hotspot is a biogeographic region characterised both by exceptional levels of plant endemism and by serious levels of habitat loss. Conservation International (CI) adopted Myers concept of ‘hotspots’ and it made an extensive global study of hotspots in 1999. According to CI, to qualify as a hotspot a region must meet two strict criteria: (i) It must contain at least 1,500 species of endemic plants, and (ii) It must have lost at least 70% of its original habitat. In 1999, CI’s book ‘Hotspots: Earth’s Biologically Richest and Most Endangered Terrestrial Ecoregions’, identified 34 biodiversity hotspots in the different countries of the world.

Currently there are 34 biodiversity hotspots that have been identified and, most of them occur in tropical forests (Figure 7.10). They represent just 2.3% of Earth’s land surface, but between them they contain around 50% of the world’s endemic plant species and 42% of all terrestrial vertebrates. India has 4 biodiversity hotspots: the Western Ghats, the Himalayas, the Indo-Burma region and the Sundaland [includes Nicobar group of Islands].

Norman Myers (born 24 August 1934) is a British environmentalist specialising in Biodiversity hotspots. Professor Norman Myers was the first to alert global community to tropical deforestation, the mass extinction underway and environmental security.

Endemism is an ecological word meaning that a plant or animal lives only in a particular geographical location, such as a specific island, habitat type, country or any defined zone. For example, The Asiatic Lion of the Gir forest of Gujarat. The Kashmir Stag known as Hangul, which is found in the riverine forests of Kashmir Valley and Chamba in Himachal Pradesh. The Lion Tailed Macaque is India’s most threatened monkey which is endemic to the Western Ghats of South India.

<b>The 34 biodiversity hotspots of the World</b>	
1. The Tropical Andes	18. The Philippines
2. Mesoamerica	19. Indo-Burma
3. The Caribbean Islands	20. The Mountains of Southwest China
4. The Atlantic Forest	21. Western Ghats and Sri Lanka
5. Tumbes-Chocó-Magdalena	22. Southwest Australia
6. The Cerrado	23. New Caledonia
7. Chilean Winter Rainfall-Valdivian Forests	24. New Zealand
8. Chilean Winter Rainfall-Valdivian Forests	25. Polynesia and Micronesia
9. Madagascar and the Indian Ocean Islands	26. The Madrean Pine-Oak Woodlands
10. The Coastal Forests of Eastern Africa	27. Maputaland-Pondoland-Albany
11. The Guinean Forests of West Africa	28. The Eastern Afromontane
12. The Cape Floristic Region	29. The Horn of Africa
13. The Succulent Karoo	30. The Irano-Anatolian
14. The Mediterranean Basin	31. The Mountains of Central Asia
15. The Caucasus	32. Eastern Himalaya
16. Sundaland	33. Japan
17. Wallacea	34. East Melanesian Islands

- **Conservation International (CI)** is an American non-profit environmental organization founded in 1987 in Virginia. Its goal is to protect nature as a source for food, fresh water, livelihood and a stable climate.
- CI has helped to support 1,200 protected areas across 77 countries, safeguarding more than 601 million hectares of marine and coastal areas.



## Endangered species

Rare, endangered or threatened plants and animals are elements of our natural heritage that are declining rapidly. If we cherish these species, like we do other rare and beautiful objects, these living organisms become treasures of the highest magnitude.

The International Union for the Conservation of Nature (IUCN) has identified and classified species based on the nature of their depleting numbers. The IUCN's Red List of Threatened Species, identified in 1964, is the world's most important inventory of the global conservation status of biological species. Species are classified by the IUCN Red List into nine groups specified through criteria such as rate of decline, population size, area of geographic distribution, and degree of population and distribution fragmentation (Figure 7.11).

- Extinct (EX) - The species has disappeared and no known individuals remaining
- Extinct in the wild (EW) - Known only to survive in captivity, or as a naturalized population outside its historic range
- Critically Endangered (CR) - Species that have drastically dwindled and are at extremely high risk of extinction in the wild
- Endangered (EN) - High risk of extinction in the wild
- Vulnerable (VU) - High risk of endangerment in the wild
- Near threatened (nt) - Likely to become endangered in the near future.
- Least concern (lc) - Lowest risk widespread and abundant
- Conservation dependent (cd) - This group has now merged with near threatened.
- Data deficient (dd) - Not enough data to assess the risk of extinction of the species.
- Not evaluated (ne) - Species not yet been evaluated against the criteria.

In the context of the IUCN Red List, 'threatened' embraces the three categories of Critically Endangered, Endangered, and Vulnerable. According to the IUCN those species that have dwindled drastically are called as Critically Endangered and are included as Red List. Species that have disappeared are called as extinct species. In the Red List of 2012 that was released on 19 July 2012 at Rio+20 Earth Summit 19,817 species were threatened with extinction.

The IUCN Red List of Threatened Species (also known as the IUCN Red List or Red Data List), founded in 1964, is the world's most comprehensive inventory of the global conservation status of biological species. The International Union for Conservation of Nature (IUCN) is the world's main authority on the conservation status of species. A series of Regional Red Lists are produced by countries or organizations, which assess the risk of extinction to species within a political management unit.

A Hawaiian plant species called Alula locally referred to as cabbage on a stick has moved from Critically Endangered to Extinct in the Wild. It is one of the 38 Red Listed Hawaiian plant species with less than five wild individuals remaining. It used to grow on the windy sea cliffs of Kauai. Alula was destroyed by hurricanes Iwa and Inki in 1982 and 1992 leaving only less than 10 plants alive.

The majority of the great ape species are now Critically Endangered. The Eastern Gorilla the largest living primate is endemic to the Eastern Democratic Republic of Congo, south western Uganda and Rwanda. This species which was listed as Endangered has moved to Critically Endangered in 2016 due to an on-going population decline. This decline is due to illegal hunting and destruction of forests for agriculture. If this trend continues, around 93% of Eastern Gorillas will be eliminated by 2054.

The Pygmy Hog: It is the smallest and rarest wild pig on earth and it is a Critically Endangered species previously spread across Bangladesh, Bhutan, India and Nepal. but now only found in Assam, India. In 1995, the Pygmy Hog Conservation Programme was started by Goutam Narayan of Ecosystems-India, with the help of the Assam government and now their numbers have increased to about 150. There are many other critically endangered species in India and some of them are listed below

### **Critically Endangered species in India 2016**

#### **Arthropod**

- Rameshwaram parachute spider
- Peacock tarantula

#### **Birds**

- White-bellied heron
- Great Indian bustard
- Forest owlet
- Spoon-billed sandpiper
- Siberian crane
- Indian vulture
- Himalayan quail
- Pink-headed duck

#### **Fish**

- Wayanadmahseer
- Pondicherry shark
- Ganges shark
- Pookode Lake barb
- Common sawfish

#### **Insects**

- Pygmy Hog Sucking Louse

#### **Reptiles and amphibians**

- Madras spotted skink
- Gharial
- Toad-skinned frog

- Charles Darwin's frog
- White-spotted bush frog
- Munnar bush frog
- Ponmudi bush frog
- Anaimalai flying frog

## Mammals

- Asiatic cheetah
- Namdapha flying squirrel
- Himalayan wolf
- Andaman shrew
- Nicobar shrew
- Northern Sumatran rhinoceros
- Chinese pangolin
- Pygmy hog
- Indian Javan rhinoceros
- Malabar large-spotted civet

The plant *Allium triouinum* of the Mediterranean, belonging to the onion family was added to the IUCN Red List as Critically Endangered (CR) in 2017. Currently this plant is known to exist only on Mount Ochi in the southern part of Evvia Island, Greece. It is understood that the threat was from the numerous wind parks and wind turbines developed in the area. An endemic species of small trees growing at low altitudes in New Caledonia called *Pittosporum brevispinium* has declined causing it to move from Endangered to Critically Endangered in 2017. The species decline has been attributed to conversion of dry forests to pasture land and degradation of forest by the Rusa deer.

The Red-legged Fire Millipede is found in the rainforests of Madagascar. It entered the IUCN Red List in 2017 as, Critically Endangered (CR). The degradation of its habitat due to slash and burn agriculture and cutting of trees for firewood by local communities has caused its decline. The IUCN Red List in 2017 declared the Christmas Island Whiptail-skink endemic to Christmas Island as Extinct. The last known individual died in captivity in 2014. This dramatic decline and extinction was due to the impact of the introduction of Yellow Crazy Ant, Indian Wolf Snake and other new species on Christmas Island along with deforestation due to mining.

The status of the Rodrigues Flying Fox moved from Critically Endangered to Endangered in 2017. This was due to a number of conservation measures taken, such as, captive breeding programme involving 46 zoos around the world, restoration of natural habitat, watershed protection, and awareness rising through education programmes. Its population has increased from 4,000 in 2003 to about 20,000 individuals in 2016. The future survival of this species will depend on continued conservation efforts.

## Causes of Extinction of Species

Extinction is defined as the permanent disappearance of an organism from the face of the earth. In other words, all members of a species have died. This means a loss of biodiversity. Extinction of species may take place (Figure 7.12) due to a variety of causes as given below:

Sudden and rapid changes of environmental conditions

1. The sudden outbreak of disease and pest infections.
2. Some sudden events like forest fires, volcanic eruption etc.
3. Direct hunting and persecution of species leading to 'selective mass extinction.
4. Ecological substitution by other species of large carnivorous animals which compete for the same food resources.
5. Climatic change accelerates the competition between large mammals for shelter and food.
6. Extinction of weak species during the course of competition with more powerful and stronger species.
7. Man-induced environmental changes also cause species extinctions.

Between 1600 and 1900 it is estimated that one species went extinct every four years. In modern times, the rate is soaring. The graph below (Figure 7.12.) shows how the rate of extinction of species has increased over the past 50 years. This could be attributed to the rapid increase in population during the same period of time. According to IUCN the rate of extinction of mammals and birds had started much earlier by 1700 itself at a much faster rate as shown in the graph below (Figure 7.13).

## Major Threats to Biodiversity

The following are some of the major threats to biodiversity:

- a. Habitat destruction and degradation
- b. Invasive alien species-these can destroy native species Example, lantana Camera plant in India.
- c. Climate Change- Example, bleaching and loss of coral reefs due to global warming
- d. Pollution of air, water and soil – Pollution can alter the growth and life of organisms in a great way.
- e. Over exploitation of one resource – Over exploitation through Hunting or Poaching, Deforestation etc., can influence the life of all the interdependent species.

Despite rapid efforts in protecting terrestrial and marine habitats, world's diversity of species is still dwindling. Since the 1960's over 100,000 'protected areas' have been established. This represents 11,265,408 sq.km of land and 1,609,344 sq.km of ocean. Yet, terrestrial and marine species have declined over the same period. This suggests that the common conservation strategy of protecting areas of land and sea is inadequate.

## Conservation of Biodiversity

Conservation of bio-diversity is the proper management of the biosphere by human beings in such a way that it gives maximum benefits for the present generation and also develops its potential to meet the needs of the future generations.

The three basic objectives of biodiversity conservation are :

- a. To maintain essential ecological processes and life supporting systems.
- b. To preserve the diversity of species.
- c. To make sustainable utilization of species and ecosystems.

There are two types of conservation methods (Figure 7.15) namely in-situ and ex-situ conservations. In-situ conservation means the conservation of species within their natural habitats. This strategy involves identification of species rich areas and adopting methods to protect it in the form of National Park or Wildlife Sanctuary or Biosphere Reserve etc. In this way biodiversity can be conserved in their natural habitat from human activities.

Ex-situ conservation involves maintenance and breeding of endangered plants and animals under partially or wholly controlled conditions in specific areas like zoo, gardens, nurseries etc. Other examples of ex-situ conservation include:

- i. Seed gene bank
- ii. Field gene bank
- iii. Botanical gardens

## Biodiversity conservation in India

India is one of the 17 mega bio-diverse countries of the world (according to Conservation International). With only 2.4% of the world's land area, 16.7% of the world's human population and 18% of livestock, it contributes about 8% of the known global biodiversity. India has a number of globally important endangered species like Asiatic lion, Asian elephant, one-horned rhinoceros, Gangetic river dolphin, snow leopard, Kashmir stag, dugong, gharial, great Indian bustard, lion tailed macaque etc. The following steps have thus been taken to protect and manage the wildlife of the country.

1. The Government of India enacted the Wild Life (Protection) Act 1972 with the objective of effectively protecting the wild life of this country and to control poaching, smuggling and illegal trade in wildlife and its derivatives.
2. The National Board for Wildlife (NBWL) chaired by the Prime Minister of India provides for policy framework for wildlife conservation in the country.
3. The National Wildlife Action Plan (2002–2016) was adopted in 2002, emphasizing the people's participation and their support for wildlife conservation.
4. The Indian Constitution lays the subject of forests and wildlife in the Concurrent list thus laying the responsibility of wildlife conservation on both the Centre and the State.
5. Specialised projects: To save the endangered species of animals, specialised projects are being implemented with international cooperation (WWF, UNDP, UNEP, IUCN) as well as on a stand-alone basis like the following: (Table 7.1) More recently, the Black

Buck (chinkara) the Great Indian Bustard and the snow leopard have been given full or partial legal protection against hunting and trade throughout India.

6. **The Protected Areas of India** Protected areas are those in which human occupation is small and exploitation of resources is limited. These are defined according to the categorization (Table 7.2).

There are 4 categories of the Protected Areas in India.

- National Parks,
- Wildlife Sanctuaries,
- Conservation Reserves, and
- Community Reserves.

Protected Areas	Number	Total Area in sq Km	% of the Country
National Parks (NPs)	103	40500	1.2
Wild life Sanctuaries (WLSs)	537	118005	3.6
Conservation Reserves (CRs)	67	2350	0.1
Community Reserves	26	47	0.01
Total Protected Areas (PAs)	733	160902	4.91
Source: ENVIS Centre on Wildlife & Protected Areas ( <a href="http://www.wiienvi.nic.in/Database/ConservationAreas_844.aspx">http://www.wiienvi.nic.in/Database/ConservationAreas_844.aspx</a> )			

### National Park

1. National parks in India are IUCN category II protected areas.
2. A National park is an area with ecological, geomorphological and natural significance with rich fauna and flora, designed to protect and to develop wildlife or its environment.
3. Activities like grazing, hunting, forestry or cultivation etc. are strictly prohibited.
4. No human activity is permitted inside the national park.
5. India's first national park was established in 1936 as Hailey National Park, now known as Jim Corbett National Park, Uttarkhand.
6. There are 103 national parks in India (National Wildlife Database, April 2015).

### Wildlife Sanctuary

1. The difference between a Sanctuary and a national park lies mainly in the rights of people living inside. In a Sanctuary, certain rights are allowed but in a national park, no rights are allowed for grazing of any livestock. In a wildlife Sanctuary, the Chief Wildlife Warden may regulate, control or prohibit certain activities.
2. There are a total of 537 wildlife sanctuaries in India.

## Conservation reserves and community reserves in India:

1. These terms denote the protected areas of India which typically act as buffer zones between established national parks, wildlife sanctuaries and reserved and protected forests of India.
2. They are called as 'Conservation Reserves' if they are uninhabited and completely owned by the Government of India but used for subsistence by communities.

They are called 'Community Reserves' if a part of the land is privately owned.

7. **Biosphere Reserves:** A biosphere reserve is an area of land or water that is protected by law in order to support, sustain and conserve ecosystems. Biosphere Reserves of India protect very large areas of natural habitat that are much bigger than national parks or wildlife sanctuaries. Biosphere reserves may cover multiple national parks, sanctuaries and reserves which are contiguous. example, the Nilgiri Biosphere covers: Bandipur National Park, Mudumalai Tiger Reserve, Silent Valley National Park, Nagarhole National Park and Mukurthi National Park. (Figure 7.16)
  - Biosphere reserves are traditionally organized into 3 interrelated zones, known as: Core area, Buffer zone, and Transition zone.
  - Presently, there are 18 notified biosphere reserves in India. Ten out of the eighteen biosphere reserves are a part of the World Network of Biosphere Reserves, based on UNESCO's Man and the Biosphere (MAB) Programmed list.
8. **Some Other Important Conservation Sites**
  1. **Tiger Reserves** - Project Tiger was launched by the Government of India in the year 1973 to save the endangered species of tiger in the country. Starting from nine (9) reserves in 1973 the number has now grown to fifty (50) in 2016. Table 7.2. gives a list of conservation sites and their numbers in India.
9. **Role of communities:** Communities are playing a vital role in the conservation and protection of wildlife in India, example:
  1. **Sariska Tiger Reserve:** In Sariska tiger reserve Rajasthan villagers have fought against mining by citing the wildlife protection act. In many areas, villagers themselves are protecting habitats and explicitly rejecting government involvement.
  2. **Bhairondev Dakav Sonchuri:** The inhabitants of five villages in the Alwar district of Rajasthan have declared 1200 hectares of forests as the Bhairondev Dakav Sonchuri declaring their own set of rules and regulation which do not allow hunting, and are protecting the wildlife against any outside encroachments.
  3. **Bishnoi villages:** In and around Bishnoi villages in Rajasthan, herds of blackbuck, nilgai and peacocks can be seen as an integral part of the community and nobody harms them.

## The Role of GIS in Conservation of Nature

Recently Geographic Information System (GIS) has been used as a tool to identify new areas that need to be conserved. In the last 15 years Remote Sensing and GIS has been used to developed gap analysis as a method to identify biodiversity (i.e., species, ecosystems and ecological processes) that is not adequately conserved within a protected area network or through other effective and long-term conservation measures. Gap analysis is a method of comparison of actual performance with potential or desired performance. It was thus developed in response to recognition that protected areas of all types and in all parts of the world do not fully protect biodiversity. Gap analysis is usually applied to fairly large areas of study.

Reserves/Conservation Sites	Numbers	Total Area in Sq km
Tiger Reserves	50	71027
Elephant Reserves	32	69583
Biosphere Reserves	18	87492
RAMSAR Wetland Sites	26	12119
Natural World Heritage Sites	07	11756
Important Coastal and Marine Biodiversity Areas	107	10773
Marine Protected Areas	131	9801
Potential/ Important Bird Areas	563	-
Source: ENVIS Centre on Wildlife & Protected Areas ( <a href="http://www.wiienvis.nic.in/Database/ConservationAreas_844.aspx">http://www.wiienvis.nic.in/Database/ConservationAreas_844.aspx</a> )		

**Highlight:** In 1798, in a small village called Vedanthangal near Chennai, the British soldiers shot some storks in the local wetland. The villagers stormed the Collector's office and made him issue an order not to harm the nesting birds. This took place long before the concept of conservation of biosphere entered our thoughts. India has experienced many such incidents only some of which have been recorded.

Biodiversity is necessary for our existence as well as valuable in its own right. This is because it provides the fundamental building blocks for the goods and services that provide us with a healthy environment. Biodiversity includes fundamental things to our health like fresh water clean air and food products, as well as many other products like timber, medicine and fibre.

Biodiversity also includes various other important things and services such as cultural, recreational and spiritual nourishment that play an important role in maintaining our personal life and social life. It is therefore the duty of every citizen to conserve this valuable life on earth, the most precious gift we can pass on to the future generations.



### **The Asiatic Cheetah of India Becomes Extinct**

- Cheetah is found in Africa and Asia. It is the fastest land animal on Earth. The Asiatic cheetah, is slightly smaller than the African cheetah. It has a fawn-coloured body with black spots and distinctive black “tear marks” running from the corner of each eye down the side of its nose.
- The Asiatic cheetah also known as the Iranian cheetah is a Critically Endangered subspecies surviving today only in Iran. It was once found in the Arabian Peninsula, Near East, Kyzyl-Kum desert, Caspian region, Pakistan and India.
- Asiatic cheetahs were once widespread across the continent but were eradicated in India, where they were hunted for sport. The spread of farming also greatly reduced their numbers in the 19th and 20th centuries. Eventually the animal was wiped out in Asia to which it was once native.
- Cheetah has been known to exist in India for a very long time. They were kept by Kings and princes, but hunting led to their extinction in the country. In 1948, Maharajah RamanujPratap Singh Deo shot three of the last cheetahs in India, in Surguja, State of Madhya Pradesh which is present day Northern Chhattisgarh.
- The Indian government had plans to reintroduce cheetahs back in India in 2009 but this project has not yet been taken up.

## 1. POPULATION GEOGRAPHY

### Introduction

Do you know that 3, 60, 000 persons born every day in the world? Four births take place every second in the world. 'Professor Stephen Hawking thinks the human species will have to populate a new planet within 100 years if it is to survive,' the BBC confirmed.

'With climate change, overdue asteroid strikes, epidemics and population growth, our own planet is increasingly precarious,' the news outlet continued.

Human being is an important element of the environment and is probably the latest occupant of the earth, as its evolution took place less than two million years ago. Although distribution and growth of human population are influenced greatly by the physical environment, they have tremendous capacity to modify the physical environment. **Demography** is the statistical study of human population. It includes the study of size, structure and distribution of population as well as changes in time and location in response to birth, migration, aging and death. '**Population explosion**' is one of the greatest challenges that we are facing today.

### Distribution of world population

People have inhabited the earth for several thousands of years, but for a long period of time, their numbers remained limited. It is only during last few hundred years that human population has increased at an alarming rate. Population is spread unevenly across the continents. Only a few areas support large concentration of people while vast areas support the factors influencing the distribution few people. A large number of factors influence the distribution and growth of population over the earth's surface.

### The factors influencing the distribution of population

#### 1. Relief

Rugged mountains pose various obstacles such as unsuitable conditions for the construction of rail-roads and highways, unfavorable conditions for agricultural crops because of short growing season, lack of cultivable land and snowy winters do not encourage large settlement areas. Hence, the mountainous areas support a few people. On the other hand, a large concentration of population is found in the fertile lowlands such as the Ganges and Brahmaputra in India, Hwang-Ho in China and plains of North-Western Europe and the USA. This is mainly due to flat level land which is fertile, favorable conditions for agriculture, long growing seasons and suitable condition for the settlement.

#### 2. Accessibility

Areas with well-developed transport infrastructure and links through road, rail, shipping, canals and air are likely to be more densely populated than areas which are poorly connected with transport network.

In earlier times, in the absence of water transport, all islands remained virtually uninhabited. One of the reasons why mountains are not inhabited by people is lack of accessibility.

### 3. Adequate water supply

Population distribution is affected very much by the presence or absence of water in any region. Water supply is essential for human survival and development. Areas which have sufficient water tend to have denser population than areas which are dry or suffer from regular drought. Well watered regions of the Great Northern plains of India are densely populated whereas drought prone areas of Sahara are sparsely populated.

### 4. Soil

Fertile alluvial soils of river valleys throughout the world have encouraged dense settlement of population because they support Agricultural activities. The high density of population in parts of East and South-East Asia is dependent mainly on fertile soil. For example, dense population is found in the Ganges valley of India, in Indus valley of Pakistan and Hwang-Ho valley of China. On the other hand, desert soil of Sahara region is sparsely populated.

### 5. Economic and political factors

Unfavorable economic condition, unemployment, religious intolerance, conflicts and wars do not favour more population.

### The patterns of Population Distribution

The analysis of the pattern of population distribution and density is fundamental to the study of demographic characteristics of any area. The population distribution refers to the way the people are spread over the earth's surface. The population distribution is uneven worldwide. Ten most populous countries of the world together make up nearly 60% of the world's population.

### Density of Population

Absolute numbers do not give any indication of the impact of population on the land and its resources. The number of persons living per unit of land areas gives a better picture. This is expressed in the form of density of population per sq.km of land area.

$$\text{Density of population} = \frac{\text{Total population}}{\text{Total area of the country}}$$

Total area of the country

It is obtained by dividing the total land area by the total population, the quotient being the number of people per square kilometer. Compared with simple arithmetic density, physiological or nutritional density is a more refined method of calculating man-land ratios.

**Physiological or Nutritional** density is the ratio between total population and total cropped area. The total arable land in the world is 13.3% and the nutritional density of the world is 325 per sq.km of land. The total percentage of arable land is 48.83 in India and its nutritional density is 753 per sq.km of land. Singapore has the highest nutritional density of population of 440,998 per sq.km of land the world. The areas of density of population can be divided into three as follows:

### 1. High density areas of population

Fertile plains with favorable climate and highly industrialised and urbanised areas are generally densely populated. There are four major areas of high density of population with more than 100 persons per sq.km. Areas include:

- a. Eastern Asia, including china, Japan and Republic of Korea.
- b. Southern Asia, comprising India, Bangladesh and Sri Lanka.
- c. North-Eastern part of the United States of America.
- d. Central and North-Western Europe. Of the four regions given, the first two i.e. Eastern Asia and South Asia have high density of population due to favourable environmental conditions such as favourable climate, fertile soil and large areas of plains which encourage the growth of agriculture. The plains and river valleys of India and China are densely populated. In the last two groups i.e. North Eastern United States of America and North - Western Europe which are densely populated due to the concentration of manufacturing industries.

### HOTS

Why has Singapore the highest physiological/nutritional density of population in the world?

### 2. Moderate density areas of population

The areas of moderate density of population have between 10 and 80 persons per sq.km. The areas of moderate density of population include Central part of the United States of America, Tropical Western Africa, Western blocks of Russia, Eastern Europe, Deccan Plateau of India, Central China, Southern portion of the Plateau of Mexico, North-Eastern Brazil and Central Chile, The above areas are characterized by the well-developed agricultural activities, favorable climate, fertile soils, fishing, etc.,.

### 3. Low density areas of population

About half the area of the world has population less than 10 persons per sq.km. Certain vast areas remain completely uninhabited. The main areas are

- a. Amazon forest region of South America and Congo forest region of Africa.
- b. Arctic area of Canada, Greenland and the Polar regions.
- c. Great deserts of the world i.e. Sahara, Kalahari, Arabia, Great desert of Australia, Atacama Desert of South America, desert regions of Western United States and Thar Desert of India.
- d. High mountainous regions in all continents.
- e. Antarctica.

**Australia** with an average density of population of 2 persons per sq.km is one of the most sparsely populated countries of the world. However, inhabitants of these areas have high standard of living. The reasons for low density of population are

- a. Bad and unfavorable Environment conditions for human settlement.
- b. Lack of economic activities.
- c. Lack of transport and communication.

d. Government policy.

### Terms related population

1. **Population:** A group of individuals of the same species occupying a particular geographic area.
2. **People:** The members of a particular nation, community, or ethnic group.
3. **Crude Birth rate (Natality Rate):** Number of live births per thousand people in a year.
4. **Crude Death Rate (Mortality Rate):** Number of deaths per thousand people in a year.
5. **Net Migration Rate:** the formula for net migration rate is simple:  

$$N = 1000 \times (I - E) / P$$
 N= net migration rate  
 E= number of people emigrating out of the country  
 I= number of people immigrating into the country  
 P= the estimated mid-year population
6. **Fertility Rate:** is the number of live births expected per 1000 women in their life times in a specified geographic area and for a specific point in time, usually a calendar year. Niger has the highest fertility rate of 6.49 while Singapore has the lowest fertility rate of 0.83. Can you guess why there is variation between these countries?
7. **Dependency ratio:** Number of dependents in a population divided by the number of working age people. It's a calculation which groups those aged under 15 with those over 65 years as the 'dependants' and classifying those aged 15-64 years as 'the working-age population'.
8. **Growth Rate:** = CBR - CDR +/- Net Migration Rate/ 1000

South Sudan has the highest population growth rate of 3.83% in 2017.

9. **Rate of Natural Increase (RNI)** = CBR-CDR (No Migration) CBR>CDR = ↑ population RNI usually expressed as % e.g., 2% = 2/100 = 20/1000 RNI ≠ population growth if migration significant
10. **Adult Literacy Rate:** The Adult literacy index (ALI) is a statistical measure used to determine how many adults can read and write in a certain area or nation. Adult literacy is one of the factors in measuring the Human Development Index (HDI) of each nation, along with life expectancy, education, and standard of living. Burkina faso has the lowest literacy rate of 21.8% (2015). How does literacy rate affect the standard of living of a country?
11. **Life expectancy rate:** Life expectancy equals the average number of years a person born in a given country is expected to live. As of 2015, the country with the highest life expectancy is Monaco at 89.52 years; the country with the lowest is Chad at 49.81 years.

### Growth of world population

After the introduction of agriculture about 8,000 to 12,000 years ago, the size of population was small, roughly 8 million. In the first century (C.E) it was below 300 million. The expanding world trade during the sixteenth and seventeenth Century set the stage for

rapid population growth. Around 1750, at the dawn of Industrial Revolution, the world population was 550 million. World population exploded in the eighteenth century after the Industrial Revolution. Technological advancement achieved so far helped in the reduction of birth rate and provided a stage for accelerated population growth.

The current world population of 7.6 billion is expected to reach 8.6 billion in 2030, 9.8 billion in 2050 and 11.2 billion in 2100, according to a new United Nations report being launched. With roughly 83 million people being added to the world's population every year, the upward trend in population size is expected to continue, even assuming that fertility levels will continue to decline.

The current world population, according to UN Department of Economic and Social Affairs, Feb, 2019, is 7,685,036,620.

The new projections include some notable findings at the country level. China (**with 1.4 billion inhabitants**) and India (**1.3 billion inhabitants**) remain the two most populous countries, comprising 19% and 18% of the total global population respectively. In roughly seven years, or around 2024, the population of India is expected to surpass that of China.

Among the ten largest countries worldwide, Nigeria is growing the most rapidly. Consequently, the population of Nigeria, currently the world's 7th largest, is projected to surpass that of the United States and become the third largest country in the world shortly before 2050.

Most of the global increase is attributable to a small number of countries.

From 2017 to 2050, it is expected that half of the world's population growth will be concentrated in just nine countries: India, Nigeria, Congo, Pakistan, Ethiopia, the United Republic of Tanzania, the United States of America, Uganda and Indonesia (ordered by their expected contribution to total growth).

The group of 47 least developed countries (LDCs) continues to have a relatively high level of fertility, which stood at 4.3 births per woman in 2010-2015. As a result, the population of these countries has been growing rapidly, at around 2.4 % per year. Although this rate of increase is expected to slow significantly over the coming decades, the combined population of the LDCs, roughly one billion in 2017, is projected to increase by 33 % between 2017 and 2030, world population will reach 9.7 billion in 2050.

Similarly, Africa continues to experience high rates of population growth. Between 2017 and 2050, the populations of 26 African countries are projected to expand to at least double their current size.

The concentration of global population growth in the poorest countries presents a considerable challenge to governments in implementing the 2030 Agenda for Sustainable Development, which seeks to end poverty and hunger, expand and update health and education systems, achieve gender equality and women's empowerment, reduce inequality and ensure that no one is left behind.

Population in the world is currently (2019) growing at a rate of around 1.09% per year (down from 1.12% in 2017 and 1.14% in 2016). It is estimated to reach 1% by 2023, less than 0.5% by 2052, and 0.25% in 2076. In 2100, it should be only 0.09% or an addition of only 10 million people to a total population of 11.2 billion. World population will, therefore, continue to grow in the 21st century.

### **Doubling Time of population**

**Doubling time** is the amount of time it takes for a given quantity of population to double in size at a constant growth rate. We can find the doubling time for a population undergoing exponential growth by using the Rule of 70. It is because the population of a country becomes double in 70 years if the growth rate is 1%. Thus, we divide 70 by the growth rate and we get the doubling time of population growth rate. For example if the growth rate is 2.08, divide 70 by 2.08 and we get 33.6 years as the doubling time of population.

World population has doubled in 40 years from 1959 ( 3 billion) to 1999 ( 6 billion). It is now estimated that it will take another nearly 40 years to increase by another 50% to become 9 billion by 2037. The latest world population projections indicate that world population will reach 10 billion persons in the year 2055 and 11 billion in the year 2088.

### **World Population Milestones**

According to the United Nations, the 6 billion figures were reached on October 12, 1999 (celebrated as the Day of 6 Billion). World population reached 7 Billion on October 31, 2011. The current world population is 7.7 billion as of Feb 2019 according to the most recent United Nations estimates. The United Nations projects world population to reach 8 billion in 2023 and 10 billion in the year 2056. ]

### **Regional division on the basis of growth rate**

On the basis of the growth rate of population the world can be divided into the following three types of areas:

#### **1. Areas of Low Growth Rate**

Developed countries like US, Canada, Japan, Australia, New Zealand and countries of western Europe have a low growth rate of population in these countries is due to low birth rates and low death rates. The difference between the birth rate and the death rate in these countries is the lowest.

#### **2. Areas of Moderate Growth Rate**

This category includes the developing countries like Pakistan, Afghanistan, Brazil, Bolivia, Mongolia, Indonesia and many other Africa and South American countries, where the growth rate of nearly 2 % is also included among these countries though the growth rate here has started declining.

### 3. Areas of High Growth Rate

Countries like Mexico, Iran, Colombia, Venezuela, Peru, Libya, Algeria, Sudan, Kenya and Kuwait make this category. In fact, most of the African countries with a growth rate of 3% fall in this category.

### Population Concepts

- i. **Over population:** situation whereby the population is considered too large for the available resources.
- ii. **Under - population:** a situation where the population is less than the available resources of a country.
- iii. **Optimum - population:** a situation where the number of people that can be supported is the same as the available resources.

#### FACT FILE

##### India - Population

- The current population of India is 1,363,413,725 as of Feb 19, 2019, based on the latest United Nations estimates.
- India population is 17.74% of the total world population.
- India ranks number 2 in the list of countries (and dependencies) by population.
- The population density in India is 455 per Km<sup>2</sup>.
- 33.6 % of the population is urban (460,249,853 people in 2019)

### Composition of Population

Composition of Population includes sex ratio, literacy rate, age pyramids etc.

### Sex Ratio

The sex ratio is the ratio of males to females in a population.

#### FACT FILE

##### Qatar-315 Males per 100 females (2019)

With an astounding ratio of 315 males to a 100 females, Qatar holds the number one spot among **countries with the highest male to female ratio in the world in 2018.**

As of 2014, the global sex ratio at birth is estimated at 107 boys to 100 girls (1000 boys per 934 girls).

**The sex ratio of India is 933 females for every 1000 males according to 2011.**

Kerala has the highest sex ratio in the country with 1084 females for 1000 males followed by Puducherry with 1037 females for 1000 males and Tamil Nadu with 996 females for 1000 males.



### Do you know?

**Cisgender** (often abbreviated to simply cis) is a term for people whose gender identity matches the sex that they were assigned at birth. It is the opposite of the term **transgender**.

### What Are Population Age Pyramids?

**Population pyramids** are graphical representations of the age and sex of a population. For this reason, population pyramids are also referred to as **age-sex pyramids**. We refer to these graphs as pyramids because they are usually shaped like triangles and population pyramids also take other shapes. Population pyramids usually have males on the left side and females on the right. There is also a vertical line in the middle of the graph that separates the males from the females.

### FACT FILE

#### **Latvia, country with the highest sex ratio in the world.**

Latvia is a former Soviet Union country and experienced a great decline in male population during World War two. By 2015, there were 84.8 males for every 100 females. The proportion of the female was 54.10% of the total population. Men in Latvia have a high mortality rate due to issues such as alcoholism, smoking, and careless car driving. Around 80% of suicides in Latvia are committed by men, often because of unemployment and unrealized financial goals. Women enjoy a longer life expectancy living 11 years more than men.

### Literacy Rate

Total number of literate persons in a given age group, expressed as a percentage of the total population in that age group.

Literacy rates continue to rise from one generation to the next. Yet according to new data from the UNESCO Institute for Statistics, there are still 750 million illiterate adults, two-thirds of whom are women. These numbers are a stark reminder of the work ahead to meet Sustainable Development Goals (SDGs) 4 and 5 and the Education 2030 targets.

#### **Literacy rate variations between states in India**

India's literacy rate is at 74.04%. **Kerala** has achieved a literacy rate of **93.91%**. **Bihar** is the least literate state in India, with a literacy of **63.82%**. Several other social indicators of the two states are correlated with these rates, such as life expectancy at birth (71.61 for males and 75 for females in Kerala, 65.66 for males and 64.79 for females in Bihar), infant mortality per 1,000 live births (10 in Kerala, 61 in Bihar), birth rate per 1,000 people (16.9 in Kerala, 30.9 in Bihar) and death rate per 1,000 people (6.4 in Kerala, 7.9 in Bihar).

**Six Indian states account for about 70% of all illiterates in India:** Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan, Andhra Pradesh and West Bengal. Slightly less

than half of all Indian illiterates (48.12%) are in the six Hindi-speaking states of Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh, Jharkhand and Chhattisgarh.

### Age - Sex pyramids

There are three types of Age - Sex pyramids: expansive, constrictive, and stationary

**Expansive Age - Sex pyramids** depict populations that have a larger percentage of people in younger age groups. Populations with this shape usually have high fertility rates with lower life expectancies. Many third world countries have expansive Age - Sex pyramids. Such a population pyramid is a characteristic of newly developing countries such as Afghanistan, Bangladesh, Kenya, and some countries of Latin America.

**Constrictive Age - Sex pyramids** are named so because they are constricted at the bottom. There are a lower percentage of younger people. Constrictive Age - Sex pyramids show declining birth rates, since each succeeding age group is getting smaller and smaller. **The United States has a constrictive Age - Sex pyramid.**

### Tripura Literacy success

Presently **Tripura** has the **highest** literacy rate in India, **94.65 percent**. According to the 2011 census, literacy level was 93.91 percent in Kerala and 91.58 percent in Mizoram, among the most literate states in the country. The national literacy rate, according to the 2011 census, was 74.04 percent. The Tripura success story is attributed to the involvement of local government bodies, including Gram panchayats, NGOs and local clubs under the close supervision of the State Literacy Mission Authority (SLMA) headed by the chief minister. Tripura attained 87.75 percent literacy in the 2011 census, from the 12th position in the 2001 census to the 4th position in the 2011 census. Among projects implemented by the state government to increase literacy in the state are

- 10,000 anganwadi centres have 100 percent enrollment.
- Policy of no fail till class VIII to prevent children from dropping out.
- Midday meals in all schools with an eclectic menu for all days of the week to attract more students.
- No tuition fee in government colleges.

The holistic education system, implemented with equal interest in Agartala, remote areas and the tribal autonomic areas makes sure that people in Tripura do not just become literate but educated, officials emphasized. One pointer to the government's interest in education is the near-total absence of child labor in Tripura.

### Stationary Age-sex pyramids

**Stationary Age - Sex pyramids** are those that show a somewhat equal proportion of the population in each age group. There is not a decrease or increase in population; it is stable. **Austria has a stationary Age - Sex pyramid.**

## The Purpose of the Age - Sex Pyramid

The purpose of making this Age - Sex pyramid is to find out the comparison between the number of men and women, the number of workers, and the structure of the population in a country quickly. In addition, the creation of the Age - Sex Pyramid also has a purpose to assist the government in taking development policies.

## Migration

Migration means the movement of people from one place to the other. It is an important control of population growth after fertility and mortality. Migration of people into an area from outside is called immigration or in-migration while movement out of an area to other regions is called emigration or out-migration.

Immigration leads to an increased growth rate of population, emigration lowers the growth rate of population in the source region. Mexico's emigration problem is a unique one, with more than 98% of all Mexican migrants living in the U.S.A, the country with which Mexico shares a border that runs 3110 km in length. The Mexican emigration rate increased substantially since the 1960s and, with more than 11% of Mexicans living abroad, **Mexico is the country with the largest number of emigrants in the world.** According to estimates from the UN 2015 report, in 2013, the **United States, Germany and Russia** had the largest number of immigrants of any country, while **Tuvalu and Tokelau** had the lowest immigrant.

## Types of migration

### 1 Net Migration

Net Migration is the difference between immigration (in-migration) and emigration (out-migration).

Positive value of net migration is that more people coming in and population growth, for example, 44% of North America and 88% of Europe. Negative value of migration is more people coming out and population decline.

### 2 International Migrations

Emigration is an indicator of economic and or social failures of a society. It is a crossing of a national boundary. It is easier to control and monitor. There are laws to control or inhibit these movements. Between 2 million and 3 million people emigrate each year. Between 1965 and 2000, 175 million people have migrated: it accounts for 3% of the global population.

### 3 Internal Migrations

It occurs within a country. It is crossing of population within domestic jurisdictional boundaries. It is the movement of people between states or provinces. There is little government control over internal migration.

### 4 Local Migrations

Local migrations are the migration of the people within state or district. No state boundaries are crossed in the local migration. It happens for several reasons such as buying a new house in the same town or city, difficult to research since they are usually missed in

census data. It is based on change of income or lifestyle. Americans change residence every 5 to 7 years.

### 5 Voluntary migrations

Voluntary migrations are where the migrant makes the decision to move. Most migration is voluntary.

### 6 .Involuntary migrations

It is a forced migration in which the migrant has no role in the decision-making process. It includes mostly slavery. It is estimated that about 11 million African slaves were brought to the Americas between 1519 and 1867. In 1860, there were close to 4 million slaves in the United States. People involved in the involuntary migration are refugees due to military conscription, children of migrants, people in the situations of divorce or separation.

### Brain Drain

Brain drain is related to educationally specific selective migrations. Some countries are losing the most educated segment of their population. It can be both a benefit for the receiving country and a problem to the country of origin.

**Receiving country:** it is getting highly qualified labor which is contributing to the economy right away. It promotes economic growth in strategic sectors: science and technology. It does not have to pay education and health costs, for example, 30% of Mexicans with a PhD are in the US.

**Country of origin:** Education and health costs are not paid back to the country of origin. It is losing potential leaders and talent: Between 15 and 40% of a graduating class in Canada will move to the US. It has long term impact on economic growth. It has the possibility of getting remittances. Many brain drain migrants have skills which they can't use at home: The resources and technology may not be available there. The specific labor market is not big enough.

### Causes of Migration

We can divide factors causing migrations into two groups of factors as push and pull Factors.

**Push and Pull factors** Push and pull factors are those factors which either forcefully push people into migration or attract them. A push factor is forceful, and a factor which relates to the country from which a person migrates. A pull factor is something concerning the country to which a person migrates. It is generally a benefit that attracts people to a certain place. Push and Pull factors are usually considered as north and south poles on a magnet.

**Push Factors:** Not enough jobs, few opportunities, desertification, famine/ drought, political fear/ persecution, poor medical care, loss of wealth, natural disasters, death threats, slavery, pollutions, poor housing, landlords, bullying and poor chances of finding courtship

**Pull Factors:** job opportunities, better living conditions, political and or religious freedom, enjoyment, education, better medical care, security, family links, industry, better chances of finding courtship.

## **Overpopulation**

Overpopulation is the state whereby the human population rises to an extent exceeding the carrying capacity of the ecological setting. In an overpopulated environment, the numbers of people might be more than the available essential materials for survival such as transport, water, shelter, food or social amenities. This regularly contributes to environmental deterioration, worsening in the quality of life, or even the disintegration of the population. Due to immigration, the decline in mortality rates, medical breakthroughs, and increased birth rates, populations will always increase and eventually gives rise to overpopulation.

## **Impacts of Overpopulation**

Overpopulation thus contributes to some of the most compelling environmental problems which encompass:

### **1. Depletion of Natural Resources**

As human population keeps on increasing, exhaustible natural resources such as arable land, coral reefs, fresh water, fossil fuels, and forests continue to drop sharply. This creates competitive demands on the vital life-sustaining resources and contributes to an incredible decline in the quality of life.

### **2. Accelerated Habitat Loss**

The increased loss of the ecosystems including wetlands, wildlife, rainforests, coral reefs, aquatic life forms, and grasslands are highly influenced by overpopulation. For example, rainforests originally covered 14% of the entire earth's surface. Today, rainforest only cover about 6% of the earth's surface and scientists' project it may even become less in the next four decades judged by the current rate of vegetation removal, logging, and deforestation. Besides, due to environmental pollution, 30% of the ocean reefs have been lost because of acidification and global warming since 1980. Also, more than half of the original wetlands have been lost.

### **3. Amplified Climate Change and Global Warming**

The more the number of people, the more the number of vehicles and industries would be. Furthermore, more population tends to increased use of energy sources such as coal and firewood which contributes to increased greenhouse gas emissions.

Hence, because of the accumulation of human generated greenhouse gases and carbon footprint in the atmosphere, the planet has continued to witness amplified global warming and climate change. The effects of climate change and global warming are resulting in extreme hunger, drought, flooding, and loss of habitat.

### **4. Loss of Biodiversity**

Overpopulation has caused encroachment into frontier forests and destruction of natural ecosystems that has led to the mass extinction of species. The number of threatened

species persists to multiply in number whereas some have completely gone extinct. This is because of human activities such as acidifying water, over exploitation of natural resources, pollution, over fishing, poaching, and destruction of natural systems which are necessary for the survival of different species.

### **5. Decrease of fresh water**

The unrelenting nature of overpopulation on the earth has destroyed most of the world's fresh systems. Most of the lakes, streams, rivers and ground water making up fresh water have been polluted. According to the global outlook of water resources, these activities influenced by over population have only left less than 1% of the planet's fresh water readily accessible for human utilization.

Water vulnerability is already affecting many overpopulated nations, especially in some developing countries, as the demands for water tend to be more than the accessible water. Millions of fish species from freshwater ecosystems are on the verge of extinction. Thus, as human inhabitants rise in number, so will the problem of quality freshwater accessibility.

### **6. Lower Life Expectancy and Diminished Quality of Life**

Overpopulation lowers the standards of living since it creates stress on the vital resources for survival and increases the difficulty of accessing the consistent supply of quality food, water, energy, health, security and shelter. Consequently, it makes the poor to become poorer, and they often opt for poor living conditions to survive.

Eventually, it gives rise to lower life expectancy. The situation is serious in developing nations such as southern Asia and sub-Saharan Africa where most of the poor populations submit to inadequate and poor diets.

### **7. Rise in Unemployment, Crime Rate, and Violence**

In overpopulated nations, the available jobs are fewer than the overall job seeking population. This contributes to high levels of unemployment. In turn, lack of unemployment leads to elevated crime rates because of theft, drug cartels, and militia groups which are exploited as options for attaining basic resources and necessities such as food, good living standards, and wealth. Violence and conflicts arise when people start competing for the available limited resources.

### **8. Increased Intensive Farming**

As population has grown over the years, farming practices have evolved to produce enough food to feed larger numbers of people. However, intensive farming methods also cause damage to local ecosystems and the land, which may pose problems in the future.

### **Measures to control overpopulation**

Here are some unique solutions to overpopulation:

#### **1. Creating Awareness Campaigns**

Using both social and mainstream media, we can clearly tell people around the world the truth about overpopulation crises and what must be done to solve them the right way.

## **2. Promotion of adopting child**

Adoptions become a consideration for family planning, particularly among socially conscientious communities. And today, it has become a de-facto solution for people who are interested in starting a family, yet having concerns about overpopulation.

## **3. Aiming for Single-Child Families**

According to statistics, hundreds of thousands of people are being added to the planet every day, which is an unsustainable rate. Hence, it is need of hour we should aim for single-child families.

## **4. National Security issue**

Over populated countries should treat population boom as an issue of national security. As you can see, similar to food insecurity and climate change, uncontrolled and rapid population growth can be a national security threat in a way that it results to instability.

## **5. Changing Social Norms**

Some couple chooses not to have children and we have to respect their decision. This way we will be able to help curb the problem of overpopulation.

## **6. Providing Tax Benefits or Concessions**

Governments of various countries can come up with various regulations and policies related to tax exemption to help solve overpopulation. For example, they can waive certain parts of income tax or lower income tax rates for couples who have one or two children.

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## 11<sup>th</sup> Economy

### 7. Indian Economy

#### Meaning of Growth and Development

A country's economic growth is usually measured by National Income, indicated by Gross Domestic Product (GDP). The GDP is the total monetary value of the goods and services produced by that country over a specific period of time, usually one year.

The level economic development is indicated not just by GDP, but by an increase in citizens' quality of life or well-being. The quality of life is being assessed by several indices such as Human Development Index (HDI), Physical Quality of Life Index (PQLI) and Gross National Happiness Index (GNHI).

#### Gross National Happiness Index (GNHI)

The term "Gross National Happiness" was coined by the fourth king of Bhutan, Jigme Singye Wangchuck, in 1972. It is an indicator of progress, which measures sustainable development, environmental conservation promotion of culture and good governance.

On the basis of the level of economic development, nations are classified as developed and developing economies.

Developed economies are those countries which are industrialised, utilise their resources efficiently and have high per capita income. The USA, Canada, U.K, France, and Japan are some of the developed economies. Developed economies are also termed as Advanced Countries. On the other hand, countries which have not fully utilized their resources like land, mines, workers, etc., and have low per capita income are termed as under developed economies. Examples of underdeveloped countries are Sub Saharan Africa, Bangladesh, Myanmar, Pakistan, Indonesia etc. They are also termed as Undeveloped Countries or Backward Nations or Third World Nations.

#### Indian Economy

Indian economy is the Seventh largest economy of the world. Being one of the top listed countries. In terms of industrialization and economic growth, India holds a robust position with an average growth rate of 7% (approximately).

Even though the rate of growth has been sustainable and comparatively stable, there are still signs of backwardness.

#### Features of a Developed Economy

1. High National Income
2. High Per Capita Income
3. High Standard of Living
4. Full Employment of Resources



5. Dominance of Industrial Sector
6. High Level of Technology
7. High Industrialisation
8. High Consumption Level
9. High Level of Urbanisation
10. Smooth Economic Growth
11. Social Equity, Gender Equality and Low Levels of Poverty
12. Political Stability and Good Governance

The diametrically opposite features of Indian Economy are discussed below in detail.

## Features of Indian Economy

### Strengths of Indian Economy

#### 1. India has a mixed economy

Indian economy is a typical example of mixed economy. This means both private and public sectors co-exist and function smoothly. On one side, some of the fundamental and heavy industrial units are being operated under the public sector, while, due to the liberalization of the economy, the private sector has gained importance. This makes it a perfect model for public – private partnership.

#### 2. Agriculture plays the key role

Agriculture being the maximum pursued occupation in India; it plays an important role in its economy as well. Around 60% of the people in India depend upon agriculture for their livelihood. In fact, about 17% of our GDP today is contributed by the agricultural sector. Green revolution, ever green revolution and inventions in bio technology have made agriculture self-sufficient and also surplus production. The export of agricultural products such as fruits, vegetables, spices, vegetable oils, tobacco, animal skin, etc. also add to foreign earning through international trading.

#### 3. An emerging market

India has emerged as vibrant economy sustaining stable GDP growth rate even in the midst of global downtrend. This has attracted significant foreign capital through FDI and FII. India has a high potential for prospective growth. This also makes it an emerging market for the world.

#### 4. Emerging Economy

WORLD NATIONS IN G _ 20			
1. Argentina	6. European Union	11. Italy	16. South Africa
2. Australia	7. France	12. Japan	17. South Korea
3. Brazil	8. Germany	13. Mexico	18. Turkey

4. Canada	9. India	14. Russia	19. United Kingdom
5. China	10. Indonesia	15. Saudi Arabia	20. United States

Emerging as a top economic giant among the world economy, India bags the seventh position in terms of nominal Gross Domestic Product (GDP) and third in terms of Purchasing Power Parity (PPP). As a result of rapid economic growth Indian economy has a place among the G20 countries.

### 5. Fast Growing Economy

India's economy is well known for high and sustained growth. It has emerged as the world's fastest growing economy in the year 2016-17 with the growth rate of 7.1% in GDP next to People's Republic of China.

### 6. Fast growing Service Sector

Top INTERNET COUNTRIES - 2017  
With the Highest Number of Internet Users

#	Country or Region	Population, 2018 Est.	Population 2000 Est.	Internet Users 31 Dec 2017	Internet Users 31 Dec 2000	Internet Growth
1	China	1,415,045,928	1,283,198,970	772,000,000	22,500,000	3,331 %
2	India	1,354,051,854	1,053,050,912	462,124,989	5,000,000	9,142 %
3	United States	326,766,748	281,982,778	312,322,257	95,354,000	227 %
4	Brazil	210,867,954	175,287,587	149,057,635	5,000,000	2,881 %
5	Indonesia	266,794,980	211,540,429	143,260,000	2,000,000	7,063 %
6	Japan	127,185,332	127,533,934	118,626,672	47,080,000	152 %

The service sector, contributes a lion's share of the GDP in India. There has been a high rise growth in the technical sectors like Information Technology, BPO etc. These sectors have contributed to the growth of the economy. These emerging service sectors have helped the country go global and helped in spreading its branches around the world.

### 7. Large Domestic consumption

With the faster growth rate in the economy the standard of living has improved a lot. This in turn has resulted in rapid increase in domestic consumption in the country. The standard of living has considerably improved and life style has changed.

### 8. Rapid growth of Urban areas

Urbanization is a key ingredient of the growth of any economy. There has been a rapid growth of urban areas in India after independence. Improved connectivity in transport and communication, education and health have speeded up the pace of urbanization.

## 9. Stable macro economy

The Indian economy has been projected and considered as one of the most stable economies of the world. The current year's Economic survey represents the Indian economy to be a "heaven of macroeconomic stability, resilience and optimism. According to the Economic Survey for the year 2014-15, 8%-plus GDP growth rate has been predicted, with actual growth turning out to be a little less (7.6%). This is a clear indication of a stable macroeconomic growth.

## 10. Demographic dividend

**232 million Youth Populatin of India is nearly equal the total Populatin of 18 western asian countries in 2011**

The human capital of India is young. This means that India is a pride owner of the maximum percentage of youth. The young population is not only motivated but skilled and trained enough to maximize the growth. Thus human capital plays a key role in maximizing the growth prospects in the country. Also, this has invited foreign investments to the country and outsourcing opportunities too.

### Weakness of Indian Economy

#### 1. Large Population

India stands second in terms of size of population next to China and our country is likely to overtake china in near future. Population growth rate of India is very high and this is always a hurdle to growth rate. The population growth rate in India is as high as 1.7 per 1000. The annual addition of population equals the total population of Australia.

#### 2. Inequality and poverty

There exists a huge economic disparity in the Indian economy. The proportion of income and assets owned by top 10% of Indians goes on increasing. This has led to an increase in the poverty level in the society and still a higher percentage of individuals are living Below Poverty Line (BPL). As a result of unequal distribution of the rich becomes richer and poor becomes poorer.

#### 3. Increasing Prices of Essential Goods

Even though there has been a constant growth in the GDP and growth opportunities in the Indian economy, there have been steady increase in the prices of essential goods. The continuous rise in prices erodes the purchasing power and adversely affects the poor people, whose income is not protected.

#### 4. Weak Infrastructure

Even though there has been a gradual improvement in the infrastructural development in the past few decades, there is still a scarcity of the basic infrastructure like power, transport, storage etc.

#### 5. Inadequate Employment generation

With growing youth population, there is a huge need of the employment opportunities. The growth in production is not accompanied by creation of job. The Indian economy is characterized by 'jobless growth'.

#### 6. Outdated technology

The level of technology in agriculture and small scale industries is still outdated and obsolete.

#### Demographic trends in India

Scientific study of the characteristics of population is known as Demography. The various aspects of demographic trends in India are:

- Size of population
- Rate of growth
- Birth and death rates
- Density of population
- Sex-ratio
- Life-expectancy at birth
- Literacy ratio

#### a. Size of Population

Table 7.1 Population Growth

Census Year	Population(in crores)	Average annual growth rate
1901	23.84	-
1911	25.21	0.56
1921	25.13	-0.03
1931	27.90	1.04
1941	31.87	1.33
1951	36.11	1.25
1961	43.92	1.96
1971	54.81	2.20
1981	68.33	2.22
1991	84.33	2.16
2001	102.70	1.97

2011	121.02	1.66
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(Source: Registrar General of India)

Over a period of 100 years, India has quadrupled its population size. In terms of, size of population, India ranks 2nd in the world after China. India has only about 2.4% of the world's geographical area and contributes less than 1.2% of the world's income, but accommodates about 17.5% of the world's population. In other words, every 6th person in the world is an Indian. Infact, the combined population of just two states namely, Uttar Pradesh and Maharashtra is more than the population of United States of America, the third most populous country of the world. Some of the states in India have larger population than many countries in the world.

The negative growth during 1911-21 was due to rapid and frequent occurrence of epidemics like cholera, plague and influenza and also famines. The year 1921 is known as the 'Year of Great Divide' for India's population as population starts increasing.

During 1951, population growth rate has come down from 1.33% to 1.25%. Hence it is known as 'Year of Small divide'.

In 1961, population of India started increasing at the rate of 1.96% i.e, 2%. Hence 1961 is known as 'Year of Population Explosion'. In the year 2001, the Population of India crossed one billion (100 crore) mark.

The 2011 census reveals growth of youth population which is described as 'demographic transition'.

**b. Birth rate and death rate**

**Crude Birth rate:** It refers to the number of births per thousand of population.

**Crude Death rate:** It refers to the number of deaths per thousand of population

Crude birth and death rates of India during various years

Table 7.2  
Birth rate and death rate

Year	C.B.R	C.D.R.
1951	39.9	27.4
2001	25.4	8.4
2011	21.8	7.11

(Source: Source: Registrar General of India)

Birth rate was 39.9 in 1951; it fell to 21.8 in 2011. Although the birth rate has declined, the decline is not so remarkable. The death rate has declined from 27.4 in 1951 to 7.1 in 2011. However, from the data it is clear that the fall in birth rates is less than that of death rates.

Kerala has the lowest birth rate (14.7) and Uttar Pradesh has the highest birth rate (29.5). West Bengal has the lowest death rate (6.3) and Orissa (9.2) has the highest. Among

States Bihar has the highest decadal (2001-11) growth rate of population, while Kerala has the lowest growth rate. The four states Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh called BIMARU states have very high population.

### c. Density of population

It refers to the average number of persons residing per square kilometre. It represents the man-land ratio. As the total land area remains the same, an increase in population causes density of population to rise.

$$\text{Density of population} = \frac{\text{Total population}}{\text{Land area of the region}}$$

Table 7.3 Density of population

Year	Density of population (No. of persons per sq. km)
1951	117
2001	325
2011	382

(Source: Registrar General of India)

Just before Independence, the density of population was less than 100. But after independence, it has increased rapidly from 117 in 1951 to 325 in 2001. According to 2011 census, the present Density of population is 382. Thus, the pressure of population on land has been rising. Kerala, West Bengal, Bihar and Uttar Pradesh have density higher than the India's average density. Bihar is the most densely populated state in the country with 1,102 persons living per sq.km followed by West Bengal with 880. Arunachal Pradesh has low density of population of only 17 persons.

### d. Sex ratio

It refers to the number of females per 1,000 males. It is an important indicator to measure the extent of prevailing equity between males and females at a given point of time.

Table 7.4 Sex Ratio

Census year	Sex ratio (Number of females per 1000 males)
1951	946
2001	933
2011	940

(Source: Source: Registrar General of India)

In India, the sex ratio is more favourable to males than to females. In Kerala, the adult sex ratio is 1084 as in 2011. The recent census (2011) shows that there has been a marginal increase in sex ratio. Haryana has the lowest sex ratio of 877 (2011) among other states, while

Kerala provides better status to women as compared to other States with 1084 females per 1000 males

### e. Life expectancy at birth

It refers to the mean expectation of life at birth. Life expectancy has improved over the years. Life expectancy is low when death rate is high and / or instances of early death are high. On the other hand, life expectancy is high when death rate is low and / or instances of early death are low.

Table 7.5 Life Expectancy

Year	Male	Female	Overall
1951	32.5	31.7	32.1
1991	58.6	59.0	58.7
2001	61.6	63.3	62.5
2011	62.6	64.2	63.5

(Source: Registrar General of India)

During 1901 - 11, life expectancy was just 23 years. It increased to 63.5 years in 2011. A considerable fall in death rate is responsible for improvement in the life expectancy at birth. However the life expectancy in India is very low compared to that of developed countries.

### f. Literacy ratio

It refers to the number of literates as a percentage of the total population. In 1951, only one-fourth of the males and one-twelfth of the females were literates. Thus, on an average, only one-sixth of the people of the country were literates. In 2011, 82% of males and 65.5% of females were literates giving an overall literacy rate of 74.04% (2011). When compared to other developed countries and even Sri Lanka this rate is very low.

Table 7.6 Literacy ratio

Census year	Literate persons	Males	Females
1951	18.3	27.2	8.9
2001	64.8	75.3	53.7
2011	74.04	82.1	65.5

(Source: Registrar General of India)

Kerala has the highest literacy ratio (92%) followed by Goa (82%), Himachal Pradesh (76%), Maharashtra (75%) and Tamil Nadu (74%). Bihar has the lowest literacy ratio (53%) in 2011.

### Natural Resources

Any stock or reserve that can be drawn from nature is a Natural Resource. The major natural resources are - land, forest, water, mineral and energy. India is rich in natural resources, but majority of the Indians are poor. Nature has provided with diverse climate, several rivers for irrigation and power generation, rich minerals, rich forest and diverse soil.

### **Types of Natural resources**

- a) Renewable Resources: Resources that can be regenerated in a given span of time. E.g. forests, wildlife, wind, biomass, tidal, hydro energies etc.
- b) Non-Renewable Resources: Resources that cannot be regenerated. E.g. Fossil fuels- coal, petroleum, minerals, etc.

### **Land Resources**

In terms of area India ranks seventh in the world with a total area of 32.8 lakh sq. km. It accounts for 2.42% of total area of the world. In absolute terms India is really a big country. However, land- man ratio is not favourable because of the huge population size.

According to Agricultural Census, the area operated by large holdings (10 hectares and above) has declined and area operated under marginal holdings (less than one hectare) has increased. This indicates that land is being fragmented and become ineconomic.

### **Forest Resources**

India's forest cover in 2007 is 69.09 million hectare which constitutes 21.02 per cent of the total geographical area. Of this, 8.35 million hectare is very dense forest, 31.90 million hectare is moderately dense forest and the rest 28.84 million hectare is open forest.

### **Important Mineral Resources**

#### **a. Iron-Ore**

India possesses high quality iron-ore in abundance. The total reserves of iron-ore in the country are about 14.630 million tonnes of haematite and 10,619 million tonnes of magnetite. Hematite iron is mainly found in Chhattisgarh, Jharkhand, Odisha, Goa and Karnataka. The major deposit of magnetite iron is available at western coast of Karnataka. Some deposits of iron ore are also found in Kerala, Tamil Nadu and Andhra Pradesh.

#### **b. Coal and Lignite**

Coal is the largest available mineral resource. India ranks third in the world after China and USA in coal production. The main centres of coal in India are the West Bengal, Bihar, Madhya Pradesh, Maharashtra, Odisha and Andhra Pradesh. Bulk of the coal production comes from Bengal-Jharkhand coalfields.

#### **c. Bauxite**

Bauxite is a main source of metal like aluminium. Major reserves are concentrated in the East Coast bauxite deposits of Odisha and Andhra Pradesh.

#### **d. Mica**



Mica is a heat resisting mineral which is also a bad conductor of electricity. It is used in electrical equipment's as an insulator. India stands first in sheet mica production and contributes 60% of mica trade in the world. The important mica bearing pegmatite is found in Andhra Pradesh, Jharkhand, Bihar and Rajasthan.

#### **e. Crude Oil**

Oil is being explored in India at many places of Assam and Gujarat. Digboi, Badarpur, Naharkatia, Kasimpur, Palliaria, Rudrapur, Shivsagar, Mourn (All in Assam) and Hay of Khambhat, Ankaleshwar and Kalol (All in Gujarat) are the important places of oil exploration in India.

#### **f. Gold**

India possesses only a limited gold reserve. There are only three main gold mine regions—Kolar Goldfeld, Kolar district and HuttiGoldfeld in Raichur district (both in Karnataka) and RamgiriGoldfeld in Anantpur district (Andhra Pradesh).

#### **g. Diamond**

As per UNECE the total reserves of diamond is estimated at around 4582, thousand carats which are mostly available in Panna(Madhya Pradesh),Rammallakota of Kurnur district of Andhra Pradesh and also in the Basin of Krishna River.

The new Kimberlile fields have been discovered in Raipur and Pastar districts of Chhattisgarh, Nuapada and Bargarh districts of Odisha, Narayanpet - Maddur Krishna areas of Andhra Pradesh and Raichur-Gulbarga districts of Karnataka.

### **Economic Infrastructure**

Infrastructural development means the development of many support facilities. These facilities may be divided into (a) economic infrastructure and (b) social infrastructure. Economic infrastructure includes - transport, communication, energy, irrigation, monetary and financial institutions. Social infrastructure includes - education, training and research, health, housing and civic amenities.

#### **Economic Infrastructure**

Economic infrastructure is the support system which helps in facilitating production and distribution. For instance, railways, trucks, posts and telegraph offices, ports, canals, power plants, banks, insurance companies etc. are all economic infrastructure of an economy. They help in the production of goods and services.

#### **Transport**

For the sustained economic growth of a country, a well-connected and efficientTransport system is needed. India has a good network of rail, road, coastal shipping,

and air transport. The total length of roads in India being over 30 lakh km, India has one of the largest road networks in the world. In terms of railroads, India has a broad network of railroad lines, the largest in Asia and the fourth largest in the world. The total rail route length is about 63,000 km and of this 13,000 km is electrified. The major Indian ports including Calcutta, Mumbai, Chennai, Vishakhapatnam and Goa handle about 90% of sea-borne trade and are visited by cargo carriers and passenger liners from all parts of the world. A comprehensive network of air routes connects the major cities and towns of the country. The domestic air services are being looked after by Indian Airlines and private airlines. The international airport service is looked after by Air India.

Indian Railways Provide Wi-Fi Facility First in India is Bangalore Railway Station

Air India and Indian Airlines were merged on August 27, 2007 to form National Aviation Company of India Ltd. (NACIL)

The National Harbour board was set up in 1950 to advise the Central and State Governments on the management and development of ports, particularly minor ports

## Energy

Electrical energy is one of the necessary components of our life. Nowadays, without electricity, we cannot survive in this world of technology. The energy sources are classified under two heads based on the availability of the raw materials used, while generating energy.

1. Non-renewable energy source
2. Renewable energy sources

### 1. Non-renewable energy sources

As the name suggests, the sources of energy which cannot be renewed or re-used are called non-renewable energy sources. Basically these are the energy sources which will get exhausted over a period of time. Some of the examples of this kind of resources are coal, oil, gas etc.

### 2. Renewable energy sources

These are the kind of energy source which can be renewed or reused again and again. These kinds of materials do not exhaust or literally speaking these are available in abundant or infinite quantity. Example for this kind include **1. Solar energy 2. Wind energy 3. Tidal energy 4. Geothermal energy 5. Biomass energy** Sometimes renewable sources are also called non-conventional sources of energy since, these kinds of materials or these ways of energy production were not used earlier or conventionally.

## Social Infrastructure

Social infrastructure refers to those structures which are improving the quality of manpower and contribute indirectly towards the growth of an economy. These structures are

outside the system of production and distribution. The development of these social structures help in increasing the efficiency and productivity of manpower. For example, schools, colleges, hospitals and other civic amenities. It is a fact that one of the reasons for the low productivity of Indian workers is the lack of development of social infrastructure. The status and developments in the social infrastructure in India are discussed below.

## **Education**

### **a. Education in India**

Imparting education on an organized basis dates back to the days of 'Gurukul' in India. Since then the Indian education system has flourished and developed with the growing needs of the economy. The Ministry & Human Resource Development (MHRD) in India formulates education policy in India and also undertakes education programs.

### **b. Education system in India**

Education in India until 1976 was the responsibility of the State governments. It was then brought under concurrent list (both Centre and State). The Centre is represented by the Ministry of Human Resource Development decides the India's education budget. The education system in India consists of primarily six levels: **1. Nursery Class, 2. Primary Class, 3. Secondary Level, 4. Higher Secondary Level, 5. Graduation, 6. Post-Graduation**

### **c. Education Institutions in India:**

Education in India follows the 10+2 pattern. For higher education, there are various State run as well as private institutions and universities providing a variety of courses and subjects. The accreditation of the universities is decided under the University Grant Commission Act. The Education Department consists of various schools, colleges and universities imparting education on fair means for all sections of the society. The budget share of the education sector is around 3% of GDP, of this largest proportion goes for school education. However, per pupil expenditure is the lowest for school students.

## **Health**

### **a. Health in India**

Health in India is a state government responsibility. The Central Council Of Health and Welfare formulates the various health care projects and health department reform policies. The administration of health industry in India as well as the technical needs of the health sector are the responsibility of the Ministry Of Health And Welfare.

Health care in India has many forms. These are the ayurvedic medicine practice, unani or galenic herbal care, homeopathy, allopathy, yoga, and many more. Each different healthcare form has its own treatment system and practice patterns. The medical practicing in India needs a proper licensing from the Ministry of Health. All medical systems are now under one ministry viz AYUSH.

## **b. Health Care Services in India:**

The health care services in India are mainly the responsibility of the Ministry of Health. State wise, health status is better in Kerala as compared to other States. Compared to other developed countries, India's health status is not satisfactory. India's health status is poor compared to Sri Lanka.

## **Contributions of Indian Economic Thinkers**

### **Tiruvalluvar**

The economic ideas of Tiruvalluvar are found in his immortal work, Thirukkural, a book of ethics. Even though scholars differ widely over the estimation of the period of Tiruvalluvar, it is generally believed that, he belongs to the Sangam age in Tamil Nadu around third century A.D. Tiruvalluvar's work is marked by pragmatic idealism.

A large part of Valluvar's economic ideas are found in the second part of Tirukkural, the porutpal. It deals with wealth. Tiruvalluvar is a fundamental thinker. He believes that rains are the basic support of life. Since rain provides food, it forms the basis for stable economic life. Agriculture which is the most fundamental economic activity depends on rain, "It is rain that both ruins and aids the ruined to rise".

### **a. Factors of Production**

Tiruvalluvar has made many passing references about the factors of production viz., Land, Labour, Capital, Organisation, Time, Technology etc. He says, "Unfailing harvest, competent body of men, group of men, whose wealth knows no diminution, are the components of an economy". (Kural 61)

### **b. Agriculture**

According to Tiruvalluvar, agriculture is the most fundamental economic activity. They are the axle-pin of the world, for on their prosperity revolves prosperity of other sectors of the economy, "The ploughmen alone", he says "live as the freemen of the soil; the rest are mere slaves that follow on their toil" (Kural 1032). Valluvar believes that agriculture is superior to all other occupation.

### **c. Public Finance**

Tiruvalluvar has elaborately explained Public Finance under the headings Public Revenue, Financial Administration and Public expenditure. He has stated these as 1) Creation of revenue, 2) Collection of revenue, 3) Management of revenue 4) Public expenditure

### **d. Public Expenditure**

Valluvar has recommended a balanced budget. "It is not a great misfortune for a state if its revenues are limited, provided the expenditure is kept within bounds." He has given certain guidelines for a budgetary policy. "Budget for a surplus, if possible, balances the

budget at other times, but never budget for a deficit." Valluvar advocates the following main items of public expenditure: 1) Defence 2) Public Works and 3) Social Services.

#### **e. External Assistance**

Valluvar was against seeking external assistance. According to Kural No. 739, countries taking external assistance are not to be considered as countries at all. In other words, he advocated a self-sufficient economy.

#### **f. Poverty and Begging**

Valluvar considers freedom from hunger as one of the fundamental freedoms that should be enjoyed by every citizen. According to him 'poverty' is the root cause of all other evils which would lead to ever-lasting sufferings. It is to be noted that the number of people living below poverty line, begging, sleeping on the roadsides and rag picking in India has been increasing.

#### **g. Wealth**

Valluvar has regarded wealth as only a means and not an end. He said, "Acquire a great fortune by noble and honourable means." He condemned hoarding and described hoarded wealth as profitless richness. To him industry is real wealth and labour is the greatest resource.

#### **h. Welfare State**

Tiruvalluvar is for a welfare state. In a welfare state there will be no poverty illiteracy, disease and industry. The important elements of a welfare state are 1) perfect health of the people without disease 2) abundant wealth, 3) good crop 4) prosperity and happiness and 5) full security for the people.

#### **Mahatma Gandhi**

Gandhian Economics is based on ethical foundations. In 1921, Gandhi wrote, "Economics that hurts the moral well-being of an individual or a nation is immoral, and therefore, sinful." Again in 1924, he repeated the same belief: "that economy is untrue which ignores or disregards moral values".

#### **Salient Features of Gandhian Economic Thought**

##### **1. Village Republics:**

To Gandhi, India lives in villages. He was interested in developing the villages as self-sufficient units. He opposed extensive use of machinery, urbanization and industrialization.

##### **2. On Machinery:**

Gandhi described machinery as 'Great sin'. He said that "Books could be written to demonstrate its evils... it is necessary to realize that machinery is bad. Instead of welcoming machinery as a boon, we should look upon it as an evil. It would ultimately cease.

**3. Industrialism:**

Gandhi considered industrialism as a curse on mankind. He thought industrialism depended entirely on a country's capacity to exploit.

**4. Decentralization:**

He advocated a decentralized economy, i.e., production at a large number of places on a small scale or production in the people's homes.

**5. Village Sarvodaya:**

According to Gandhi, "Real India was to be found in villages and not in towns or cities." So he suggested the development of self-sufficient, self-dependent villages.

**6. Bread Labour:**

Gandhi realized the dignity of human labour. He believed that God created man to eat his bread by the sweat of his brow. Bread labour or body labour was the expression that Gandhi used to mean manual labour.

**7. The Doctrine of Trusteeship:**

Trusteeship provides a means of transforming the present capitalist order of society into an egalitarian one. It gives no quarter to capitalism. However, now India experiences both casino capitalism and crony capitalism

**8. On the Food Problem:**

Gandhi was against any sort of food controls. He thought such controls only created artificial scarcity. Once India was begging for food grain, but India tops the world with very large production of foodgrains, fruits, vegetables, milk, egg, meat etc.,

**9. On Population:**

Gandhi opposed the method of population control through contraceptives. He was, however, in favour of birth control through Brahmacharya or self-control. He considered self-control as a sovereign remedy to the problem of over-population.

**10. On Prohibition:**

Gandhi advocated cent per cent prohibition. He regarded the use of liquor as a disease rather than a vice. He felt that it was better for India to be poor than to have thousands of drunkards. But ,now many states depend on revenue from liquor sales.

## **Jawaharlal Nehru**

Jawaharlal Nehru, one of the chief builders of Modern India, was the first Prime Minister of Independent India and he was there in that post till his death in 1964. He was a great patriot, thinker and statesman. His views on economics and social problems are found in the innumerable speeches he made and in the books he wrote.

### **a. Democracy and Secularism**

Jawaharlal Nehru was a firm believer in democracy. He believed in free speech civil liberty, adult franchise and the Rule of Law and Parliamentary democracy. Secularism, is another signal contribution of Nehru to India. In our country, there are many religions - Hinduism, Islam, Christianity, Buddhism, Jainism, Zoroastrianism, Sikhism and so on. But there is no domination by religious majority. Secularism means equal respect for all religions.

### **b. Planning**

Jawaharlal Nehru was responsible for the introduction of planning in our country. To Jawaharlal Nehru, the Plan was essentially an integrated approach for development. Initiating the debate on the Second Plan in the Lok Sabha in May 1956, Nehru spoke on the theme of planning. He said, "the essence of planning is to find the best way to utilize all resources of manpower, of money and so on." Planning for Nehru was essentially linked up with industrialization and eventual self-reliance for the country's economic growth on a self-accelerating growth. Nehru carried through this basic strategy of planned development. Nehru's contribution to the advancement of science, research, technology and industrial development cannot be forgotten. It was during his period, many IITs and Research Institutions were established. He always insisted on "scientific temper".

### **c. Democratic Socialism**

Socialism is another contribution of Nehru to India. He put the country on the road towards a socialistic pattern of society. But Nehru's socialism is democratic socialism.

## **B. R. Ambedkar**

B.R. Ambedkar (1891-1956) was a versatile personality. He was the architect of the Indian Constitution, a custodian of social justice and a champion of socialism and state planning. Ambedkar's writings included "Ancient Indian Commerce" (a thesis submitted to the Columbia University for the award of the Master of Arts Degree in 1915), 'National Dividend of India: A Historical and Analytical Study (a thesis for which he was awarded Ph.D). His thesis was published as 'The Evolution of Provincial Finance in British India: A Study of the Provincial Decentralization of Imperial Finance'.

Ambedkar's thesis on "Provincial Decentralization of Imperial Finance in British India" was accepted for the M. Sc degree in 1921. And his thesis "The Problem of the Rupee" was accepted for the award of the D.Sc degree by the London School of Economics in 1923. It is a

miracle that RBI was conceptualized as per the guidelines presented by Ambedkar in his book, "The Problem of the Rupee; Its origin and its solution". The main economic ideas of Ambedkar may be studied under four broad headings:

### **1. Financial Economics**

Much of the work done by Ambedkar during his stay abroad mostly during the period 1913-1923, was in the field of Finance Economics. Ambedkar divided the evolution of provisional finance into three stages: (i). Budget by Assignment (1871-72 to 1876-77); (ii) Budget by Assigned Revenue (1877-78 to 1881-82); and (iii) Budget by Shared Revenues (1882-83 to 1920-1921).

### **2. Agricultural Economics**

In 1918, Ambedkar published a paper "Small Holding in India and their Remedies". Citing Adam Smith's 'Wealth of Nations', he made a fine distinction between "Consolidation of Holdings" and "Enlargement of Holdings".

### **3. Economics of Caste**

Ambedkar believed that caste was an obstacle to social mobility. It resulted in social stratification. He was of the firm view that individuals must be free to change their occupations. Moreover, the caste system caused social tensions. The caste system has resulted in the absence of social democracy in India as distinct from political democracy.

### **4. Economics of Socialism**

Ambedkar was a socialist. He was a champion of state socialism. He advocated the nationalization of all key industries and suggested state ownership of land and collective farming. He was for state monopoly of insurance business. Not only that, he advocated compulsory insurance for every citizen.

There is no doubt that Ambedkar was a great economist. But his academic work as an economist was eclipsed by his greater contributions in the field of law and politics. Above all he was a great social reformer.

### **J. C. Kumarappa**

Joseph Chelladurai Kumarappa was born on 4 January 1892 in Tanjavur, Tamil Nadu. A pioneer of rural economic development theories, Kumarappa is credited for developing economic theories based on Gandhism - a school of economic thought he coined "Gandhian Economics".

### **Gandhian Economics**

J.C.Kumarappa strongly supported Gandhi's notion of village industries and promoted Village Industries Associations. Kumarappa worked to combine Christian and Gandhian values of "trusteeship", nonviolence and a focus on human dignity and development in place



of materialism as the basis of his economic theories. While rejecting socialism's emphasis on class war and force in implementation, he also rejected the emphasis on material development, competition and efficiency in free-market economies. Gandhi and Kumarappa envisioned an economy focused on satisfying human needs and challenges while rooting out socio-economic conflict, unemployment, poverty and deprivation.

Kumarappa worked as a Professor of economics at the Gujarat Vidyapith in Ahmedabad, while serving as the editor of Young India during the Salt Satyagraha. He founded the All India Village Industries Association in 1935; and was imprisoned for more than a year during the Quit India movement. He wrote during his imprisonment, *Economy of Permanence: The Practice and Precepts of Jesus* (1945) and *Christianity: Its Economy and Way of Life* (1945).

Several of Gandhi's followers developed a theory of environmentalism. Kumarappa took the lead in a number of relevant books in the 1930s and 1940s. Historian Ramachandra Guha calls Kumarappa, "The Green Gandhian," portraying him as the founder of modern environmentalism in India.

Kumarappa worked for the Planning Commission of India and the Indian National Congress to develop national policies for agriculture and rural development. He also travelled to China, Eastern Europe and Japan on diplomatic assignments and to study their rural economic systems.

### **V.K.R.V. Rao**

According to P.R. Brahmananda, "the great trinity of pre-independent and post-independent Indian economists consisted of D.R. Gadgil, C.N. Vakil and V.K.R.V. Rao. These scholars were imbued with a missionary zeal and analysed the Indian economic problems with a view to designing and propagating economic policies/programmes and plans to India's national advantage." V.K.R.V. Rao was a prolific writer.

V.K.R.V. Rao was deeply interested in three large themes. They were:

- i. National Income,
- ii. Food, nutrition and the distribution of good; and
- iii. Employment and occupational distributions.

### **1. National Income Methodology**

As an applied economist, Rao's name is remembered for his pioneering work on the enumeration of national income of India. Rao was a pupil of J.M. Keynes and he worked with Colin Clark. H.W. Singer considered V.K.R.V. Rao as "the best equipped of all Keynes' pupils. He attempted (i) to develop the national income concepts suited to India and developing countries generally; (ii) to analyse the concepts of investment, saving and the multipliers in an underdeveloped economy; and (iii) to study the compatibility of the national incomes of industrialized and underdeveloped countries. Rao's paper on "Full Employment and

Economic Development” was one of the earliest contributions in the field of development towards employment.

## **2. International Food Aid**

Rao was influential in creating ideas and shaping policy in the international attack on world poverty, not only through his contributions to the question of international aid and improved flows of external resources, but also through his activities in the field of food aid.

## **3. Support for Socialism**

During the early phases of planning in India, Rao supported the case of a socialist India, where the state would control the commanding heights of the economy and the public sector would play a dominant role in economic development.

## **4. Rao’s Views on Industrialization**

In his pamphlet “what is wrong with Indian Economic Life?” (1938), Rao gave the following reasons for low per capita income and low levels of per capita nutrition in India.

- i. Uneconomic holdings with subdivisions and fragmentation;
- ii. Low levels of water availability for crops;
- iii. Excess population pressure on agriculture due to the absence of a large industrial sector;
- iv. Absence of capital;
- v. Absence of autonomy in currency policy, and in general in monetary matters encouraging holding of gold.

## **5. Village Clusters**

Rao felt that rural communities had to be given a viable base. Therefore he suggested that a cluster of villages should form a unit for rural development, so that both social and economic interactions between villages could develop, and they could effectively generate and fashion their own development with a more meaningful participation by people.

## **6. Investment, Income and Multiplier**

Rao’s examination of the “interrelation between investment, income and multiplier in an under developed economy” (1952) was his major contribution to macroeconomic theory. As a thinker, teacher, economic adviser and direct policy maker, V.K.R.V. Rao followed the footsteps of his great teacher, John Maynard Keynes.

## **7. Institution Builder**

He founded three national level research institutes namely Delhi School of Economics, Institute of Economic Growth (both at Delhi) and Institute for Social and Economic Change (Bangalore)

## **Amartya Kumar Sen**

The Nobel citation refers to Sen's contributions to social choice theory, development economics, study on poverty and famines and concept of entitlements and capability development (1998).

### **1. Poverty and Famines**

Sen's Poverty and Famines: An Essay on Entitlement and Deprivation" (1981) is both a theoretical and an applied work. In the book, several famines have been studied in the working of a general theoretical framework from an original angle. He examined various meanings of poverty and drew attention to the incidence of absolute and relative deprivation.

### **2. Poverty and Inequality**

Sen has carried out massive work on poverty and inequality in India. Sen's major point has been that the distribution of income/ consumption among the persons below the poverty line is to be taken into account.

### **3. The Concept of Capability**

The concept of capabilities developed by Sen has been cited as a better index of wellbeing than commodities or utilities. Capability, as defined by Sen, is the ability to transform Rawlsian primary goods to the achievement of wellbeing.

### **4. Entitlement**

Sen has included the concept of entitlement items like nutrition, food, medical and health care, employment, security of food supply in times of famine etc. He considered famine as arising out of the failure of establishing a system of entitlements.

### **5. Choice of Technique**

Sen's 'Choice of Technique ' was a research work where he argued that in a labour surplus economy, generation of employment cannot be increased at the initial stage by the adaptation of capital- intensive technique. Conclusively, Amartya Sen, more than just an economist, is an ethical philosopher. He is a lover of freedom and a humanist. He has focused on the poor, viewing them not as objects of pity requiring charitable hand-outs, but as disempowered folk needing empowerment, education, health, nutrition, gender equality, safety net in times of distress; all are needed to empower people.

## **Conclusion**

This lesson mainly focused on some of the aspects of the Indian Economy and its resources, infrastructure facilities and energy, It also discussed the principles of Indian Economic thinkers to motivate the students to read good books on Economics Written by the great economists.

## 8. Indian Economy Before and After Independence

### Introduction

This chapter discusses the major events that took place in India before and after Independence. India was a colony for long. Colonialism refers to a system of political and social relations between two countries, of which one is the ruler and the other is its colony. The ruling country not only has political control over the colony but it also determines the economic policies of the subjugated country. Thus, the people living in a colony cannot take independent decisions in respect of utilisation of the country's resources and important economic activities. India had the bitter experience of colonialism.

### Indian Economy during the British Period

Indian's sea route trade to Europe started only after the arrival of Vasco da Gama in Calicut, India on May 20, 1498. The Portuguese had traded in Goa as early as 1510. In 1601 the East India Company was chartered, and the English began their first inroads into the Indian Ocean. In 1614 Sir Thomas Roe was successful in getting permission from Jahangir for setting up factories and slowly moved all parts of India.

#### History of British Period

##### During the British period

Before the advent of the British, Indian practically lived in village. Thus the economy of the village was self-sufficient. But under the British rule only industries were allowed to develop. These economic and organization change brought down the economic condition of Indians. All the problems are chiefly related with health, housing, child and woman welfare and labour, recreation, crime and social disorganization. Due to these problems, the need for organized social work was realised.

Hundred years after Battle of Plessey the rule of the East India Company finally did come to an end. In 1858, British Parliament passed a law through which the power for governance of India was transferred from the East India Company (EIC) to the British crown. Even the transfer of power from the East India Company to the British Crown did not materially alter the situation.

Britain had exploited India over a period of two centuries of its colonial rule. On the basis of the form of colonial exploitation, economic historians have divided the whole period into three phases: namely the period of merchant capital, the period of industrial capital, the period of finance capital.

##### Period of Merchant Capital

- The period of merchant capital was from 1757 to 1813.
- The only aim of the East India Company was to earn profit by establishing monopoly trade in the goods with India and the East India's.

- During this period, India had been considered as the best hunting ground for capital by the East India Company to develop industrial capitalism in Britain.
- When Bengal and South India came under political control of the East India Company in 1750s and 1760s, the objective of monopoly trade was fulfilled.
- The company administration succeeded in generating huge surpluses which were repatriated to England, and the Indian leaders linked this problem of land revenue with that of the drain.
- Above all, the officers of the company were unscrupulous and corrupt.

### **Period of Industrial Capital**

- The period of Industrial capital was from 1813 to 1858.
- During this period, India had become a market for British textiles.
- India's raw materials were exported to England at low price and imported finished textile commodities to India at high price. In this way, Indians were exploited.
- India's traditional handicrafts were thrown out of gear.

### **Period of Finance Capital**

- The third phase was the period of finance capital starting from the closing years of the 19th century and continuing till independence. During this period, finance imperialism began to entrench itself through the managing agency firms, export - import firms, exchange banks and some export of capital.
- Britain decided to make massive investments in various fields (rail, road, postal system, irrigation, European banking system, and a limited field of education etc.) in India by plundering Indian capital.
- Railway construction policy of the British led to unimaginable as well as uneconomic. The poor Indian taxpayers had been compelled to finance for the construction of railways. The political power was handed over to the British Government by the East India Company in 1858.

### **Decline of Indian Handicrafts**

- The Indian handicrafts products had a worldwide market. Indian exports consisted chiefly of hand woven cotton and silk fabrics, calicoes, artistic wares, wood carving etc.
- Through discriminatory tariff policy, the British Government purposefully destroyed the handicrafts.
- With the disappearance of nawabs and kings, there was no one to protect Indian handicrafts.
- Indian handicraft products could not compete with machine-made products.
- The introduction of railways in India increased the domestic market for the British goods.

## **The Land Tenure Systems in India**

Land Tenure refers to the system of land ownership and management. The features that distinguish a land tenure system from the others relate to the following:

- (a) Who owns the land;
- (b) Who cultivates the land;
- (c) Who is responsible for paying the land revenue to the government.

Based on these questions, three different types of land tenure existed in India before Independence. They were Zamindari system, Mahalwari system and Ryotwari system.

### **Zamindari System or the Land lord-Tenant System**

This system was created by the British East India Company, when in 1793, Lord Cornwallis introduced 'Permanent Settlement Act'. Under this system the landlords or the Zamindari were declared as the owners of the land and they were responsible to pay the land revenue to the government. The share of the government in total rent collected was fixed at 10/11th, the balance going to the Zamindars as remuneration.

### **Mahalwari System or Communal System of Farming**

After introduction of this system, it was later extended to Madhya Pradesh and Punjab. The ownership of the land was maintained by the collective body usually the villagers which served as a unit of management. They distributed land among the peasants and collected revenue from them and pay it to the state.

### **Ryotwari System or the Owner-Cultivator System**

This system was initially introduced in Tamil Nadu and later extended to Maharashtra, Gujarat, Assam, Coorg, East Punjab and Madhya Pradesh. Under this system the ownership rights of use and control of land were held by the tiller himself. There was the direct relationship between owners. This system was the least oppressive system before Independence.

## **Process of Industrial Transition and Colonial Capitalism**

This process of industrial transition in India during the British period can be broadly classified into two as given below:

### **(a) Industrial growth during the 19th century**

During the 19th century, British investors started to pioneer industrial enterprises in India as they had experiences of running industries at home. British enterprises also received maximum state support. Although the Britishers initiated industrialisation process in the 19th century, they were primarily interested in making profit and not in accelerating the economic growth in India. At the end of 19th century, there were about 36 jute mills, 194 cotton mills and a good number of plantation industries. The production of coal had risen to over 6 million tonnes per annum.

## **(b) Industrial progress during the 20th century**

During the first part of 20th century, Swadeshi movement stimulated the industrialisation process in India. The existing industries and new industries had maintained a slow but steady growth till the outbreak of the First World War in 1914. By this time more than 70 cotton mills and 30 jute mills were set up. Coal production was doubled. The foundation of iron and steel industry was laid. Railway network was extended.

During the period 1924-39, various major industries like iron and steel, cotton textiles, jute, matches, sugar, paper and pulp industry etc. were brought under protection scheme. This led to rapid expansion of protected industries in India. These protected industries captured the entire Indian market and eliminated foreign competition totally.

Thus in the early part, British rule tried to transform the Indian economy as the producer of industrial raw materials and tried to capture Indian market for their industrial finished goods and thus started exploiting Indian economy in a different way. Later on, British capitalists gradually developed various industries like, jute, tea, coffee, cotton and textiles, paper and paper pulp, sugar etc, in India for locational advantages and exploited Indian labourers extensively.

### **Problems of British Rule**

1. The British rule stunted the growth of Indian enterprise.
2. The economic policies of British checked and retarded capital formation in India.
3. The drain of wealth financed capital development in Britain.
4. Indian agricultural sector became stagnant and deteriorated even when a large section of Indian population was dependent on agriculture for subsistence.
5. The British rule in India led the collapse of handicraft industries without making any significant contribution to development of any modern industrial base.
6. Some efforts by the colonial British regime in developing the plantations, mines, jute mills, banking and shipping, mainly promoted a system of capitalist forms that were managed by foreigners. These profit motives led to further drain of resources from India.

### **Important Industrial Policies Prior to 1991**

India is the Asia's third largest economy. The 70 years of Independence have brought a remarkable change in the socio - economic landscape of India.

#### **Industrial Policy of India 1948, 1956, 1977, 1980, 1990 & 1991**

Economic development of a country particularly depends on the process of industrialisation. At the time of Independence, India inherited a weak and shallow industrial base. Therefore during the post-Independence period, the Government of India took special emphasis on the development of a solid industrial base. The Industrial Policy Resolutions of

1948 and 1956 clearly stated the need for developing both small scale industries and large scale industries.

### **Industrial Policy Resolutions 1948**

The Government of India recognized the significant contribution of industrialization. Therefore the Government of India declared its first Industrial Policy on 6th April 1948. The main importance of this policy was that it ushered in India the system of mixed economy.

#### **Industrial Policies**

##### **Industrial Policy 1948 -**

**Center's Monopoly:** Government of India's Monopoly shall include Railways. Arms and ammunition, Atomic Energy, Postal Department.

**State's Monopoly:** State Monopoly shall include natural resources like coal, steel, manufacture of aircraft, cement, rubber automobile, wireless apparatus (Radio Receiving Sets) and mineral oil.

**Unregulated Private Enterprises:** It was kept open to private enterprises of individuals and co-operative societies to also involve.

1. Industries were classified into four groups such as public sector (strategic industries), public-cum-private Sector (key industries), and controlled private sector, private and co-operative sectors.
2. This policy endeavoured to protect cottage and small scale industries.
3. The central and state governments had a virtual monopoly in rail roads and exclusive rights to develop minerals, iron ore etc.
4. The Government encouraged the significance of foreign capital for industrialization but the government decided that the control should remain with Indian hands.

### **Industrial Policy Resolution 1956**

1. The Industrial Policy of 1956 sought to give a dominant role to public sector. At the same time, it assured a fair treatment to the private sector.
2. The Government would support and encourage cottage and small scale enterprises by restricting volume of production in the large scale sector by differential taxation or by direct subsidies.
3. This industrial policy emphasized the necessity of reducing the regional disparities in levels of development.
4. The Government recognized the need for foreign capital for progressive Indenisation of foreign concerns.

#### **Industrial Resolution Policy - 1956**

Shaped by the Mahalanobis Model of growth which suggested that emphasis on heavy industries would lead the economic towards a long term higher growth path. The Industrial Policy Resolution - 1956 classified industries into three categories;

##### **17 Industries:**

Exclusively under the domain of the Government. These included inter alia, railway, air



transport, arms and ammunition, iron and steel and atomic energy.

### **12 Industries:**

Which were envisaged to be progressively State owned by Private Sector was expected to supplement the efforts of the State. The third category contained all the remaining industries and it was expected that private sector would initiate development of these industries but they would remain open for the state as well.

## **Green Revolution**

The term Green Revolution refers to the technological breakthrough in of agricultural practices. During 1960s the traditional agricultural practices were gradually replaced by modern technology and agricultural practices in India. Initially the new technology was tried in 1960-61 as a pilot project in seven districts. It was called as the High Yielding Varieties Programme (HYVP).

### **Achievement of Green Revolution**

1. The major achievement of the new strategy was to boost the production of major cereals viz., wheat and rice. India was depending on the US for the food grain. The US by using Public Law 480 (PL480) exported wheat to India. Indians were waiting for the ships to sip their food. On the other hand, India lost lots of minerals. The US could strategically exploit Indian mineral resources at cheapest price for manufacturing missiles and weapons, which gave job opportunity for larger US youth and largely contributed to US GDP. But now India is food surplus, exporting food grains to the European countries.
2. The Green revolution was confined only to High Yielding Varieties (HYV) cereals, mainly rice, wheat, maize and jowar.
3. This Strategy was mainly directed to increase the production of commercial crops or cash crops such as sugarcane, cotton, jute, oilseeds and potatoes.
4. Per hectare productivity of all crops had increased due to better seeds.
5. Green Revolution had positive effect on development of industries, which manufactured agricultural tools like tractors, engines, threshers and pumping sets.
6. Green Revolution had brought prosperity to rural people. Increased production had generated employment opportunities for rural masses. Due to this, their standard of living had increased.
7. Due to multiple cropping and more use of chemical fertilizers, the demand for labour increased.
8. Financial resources were provided by banks and co-operative societies. These banks provided loans to farmer on easy terms.

The New Agricultural strategy was also called by various names. Modern agricultural technology, seed - fertilizer - water technology, or simply green revolution.

### **Weaknesses of Green Revolution**

1. Indian Agriculture was still a gamble of the monsoons.
2. This strategy needed heavy investment in seeds, fertilizers, pesticides and water.

3. The income gap between large, marginal and small farmers had increased. Gap between irrigated and rain fed areas had widened.
4. Except in Punjab, and to some extent in Haryana, farm mechanization had created widespread unemployment among agricultural labourers in the rural areas.
5. Larger chemical use and inorganic materials reduced the soil fertility and spoiled human health. Now organic farming is encouraged.

<b>Rainbow Revolution</b>	
1. Green revolution - Agriculture (Food grains productions)	7. White Revolution - Milk
2. Blue Revolution - Fish	8. Yellow Revolution - Oilseeds
3. Golden Revolution - Fruits / Apple	9. Black Revolution - Petroleum
4. Silver Revolution - Egg	10. Round Revolution - Potato
5. Red Revolution- Meat/Tomato	11. Grey Revolution - Fertilizers
6. Pink Revolution - Shrimp	12. Brown Revolution - Leather

### **Second Green Revolution**

The Government of India had implemented 'Second Green revolution' to achieve higher agricultural growth. The target of Second Green Revolution was to increase 400 million tons of food grain production as against about 214 million tons in 2006-07. This is to be achieved by 2020. In agricultural sector, the growth rate of 5% to 6% has to be maintained over next 15 years. There may be changes in these statistics.

#### **Requirements of Second Green revolution:**

- Introduction of Genetically Modified (GM) seeds which double the per acreage production.
- Contribution of private sector to market the usage of GM foods.
- Government can play a key role in expediting irrigation schemes and managing water resources.
- Linking of rivers to transfer surplus water to deficient areas.

### **Large Scale Industries**

The term "Large scale industries" refers to those industries which require huge infrastructure, man-power and a have influx of capital assets. The term 'large scale industries' is a generic one including various types of industries in its purview. All the heavy industries of India like the iron and steel industry textile industry automobile manufacturing industry fall under the large scale industrial arena. However in recent years due to the IT boom and the huge amount of revenue generated by it the IT industry can also be included within the jurisdiction of the large scale industrial sector. Indian economy is heavily dependent on these large industries for its economic growth, generation of foreign currency and for providing job opportunities to millions of Indians. The following are the major large scale industries in India.

## 1. Iron and steel industry

- First steel industry at Kulti, Near Jharia, West Bengal - Bengal iron works company in 1870.
- First large scale steel plant TISCO at Jamshedpur in 1907 followed by IISCO at Burnpur in 1919. Both belonged to private sector.
- The first public sector unit was “Vishveshvaraya Iron and Steel works” at Bhadravati.
- All these are managed by SAIL (at present all important steel plants except TISCO, are under public sector)
- Steel Authority of India Ltd (SAIL) was established in 1974 and was made responsible for the development of the steel industry.
- Presently India is the eighth largest steel producing country in the world.

### Public sector steel plants

Location	Assistance
Rourkela (Odissa)	Germany
Bhilai (MP)	Russia
Durgapur (WB)	UK
Bokaro (Jharkhand)	Russia
Burnpur (WB)	Acquired from private sector in 1976
Vishakhapatnam(AP)	Russia
Salem (Tamil Nadu)	Government of India (No external assistance)
Vijai Nagar Karnataka)	Government of India
Bhadravati (Karnataka)	Nationalisation of Vishveshvarayya Iron and Steel Ltd(owned by Centre and State government)

## 2. Jute industry

- Jute industry is an important industry for a country like India, because not only it earns foreign exchange but also provides substantial employment opportunities in agriculture and industrial sectors.
- Its first modernised industrial unit was established at Reshra in West Bengal in 1855.
- The jute industry in the country is traditionally export oriented. India ranks number one in the raw jute and jute goods production and number two in export of jute goods in the world.

## 3. Cotton and textile industry

- Oldest industry of India, and employs largest number of workers.
- It is the largest organised and broad-based industry which accounts for 4% of GDP, 20% of manufacturing value-added and one third of total export earnings.
- The first Indian modernised cotton cloth mill was established in 1818 at Fort Gloaster near Calcutta. But this mill was not successful. The second mill named “Mumbai’s Spinning and Weaving Co.” was established in 1854 at Bombay by KGN Daber.

#### 4. Sugar industry

- Sugar industry is the second largest industry among agriculture-based industries in India.
- India is now the largest producer and consumer of sugar in the world. Maharashtra contributes over one third of the Indian total sugar output, followed closely by Uttar Pradesh.

#### 5. Fertiliser industry

- India is the third largest producer of nitrogenous fertilisers in the world.

#### 6. Paper industry

- The first mechanised paper mill was set up in 1812 at Serampur in West Bengal.
- The paper industry in India is ranked among the 15 top global paper industries.

#### 7. Silk industry

- India is the second-largest (first being China) country in the world in producing natural silk. At present, India produces about 16% silk of the world.
- India enjoys the distinction of being the only country producing all the five known commercial varieties of silk viz Mulberry, Tropical Tussar, Oak Tussar, Eri and Muga.

#### 8. Petroleum and natural gas

- First successful Oilwell was dug in India in 1889 at Digboi, Assam.
- At present a number of regions with oil reserves have been identified and oil is being extracted in these regions
- For exploration purpose, Oil and Natural Gas Commission (ONGC) was established in 1956 at Dehradun, Uttarakhand

#### Small Scale Industries

Small scale industries play an important role for the development of Indian economy in many ways. About 60 to 70 percent of the total innovations in India comes from the SSIs. Many of the big businesses today were all started small and then nurtured into big businesses. The role of SSIs in economic development of the country is briefly explained in forthcoming paragraphs.

#### Role of SSIs in Economic Development

##### 1. Provide Employment

- SSIs use labour intensive techniques. Hence, they provide employment opportunities to a large number of people. Thus, they reduce the unemployment problem to a great extent.

- SSIs provide employment to artisans, technically qualified persons and professionals, people engaged in traditional arts, people in villages and unorganized sectors.
- The employment-capital ratio is high for the SSIs.

## **2. Bring Balanced Regional Development**

- SSIs promote decentralized development of industries as most of the SSIs are set up in backward and rural areas.
- They remove regional disparities by industrializing rural and backward areas and bring balanced regional development.
- They help to reduce the problems of congestion, slums, sanitation and pollution in cities. They are mostly found in outside city limits.
- They help in improving the standard of living of people residing in suburban and rural areas in India.
- The entrepreneurial talent is tapped in different regions and the income is also distributed instead of being concentrated in the hands of a few individuals or business families.

## **3. Help in Mobilization of Local Resources**

- SSIs help to mobilize and utilize local resources like small savings, entrepreneurial talent etc., of the entrepreneurs, which might otherwise remain idle and unutilized.
- They pave way for promoting traditional family skills and handicrafts. There is a great demand for handicraft goods in developed countries.
- They help to improve the growth of local entrepreneurs and self-employed professionals in small towns and villages in India.

## **4. Pave for Optimisation of Capital**

- SSIs require less capital per unit of output. They provide quick return on investment due to shorter gestation period. The payback period is quite short in SSIs.
- SSIs function as a stabilizing force by providing high output-capital ratio as well as high employment-capital ratio.
- They encourage the people living in rural areas and small towns to mobilize savings and channelize them into industrial activities.

## **5. Promote Exports**

- SSIs do not require sophisticated machinery. Hence, import the machines from abroad is not necessary. On the other hand, there is a great demand for goods produced by SSIs. Thus they reduce the pressure on the country's balance of payments. However, with recent past large scale industries are able to borrow large funds with low interest rate and spend large sums on advertisements. Hence SSSs are gradually vanishing.
- SSIs earn valuable foreign exchange through exports from India.

## **6. Complement Large Scale Industries**

- SSIs play a complementary role to large scale sector and support the large scale industries.
- SSIs provide parts, components, accessories to large scale industries and meet the requirements of large scale industries through setting up units near the large scale units.
- SSIs serve as ancillaries to large scale units.

## 7. Meet Consumer Demands

- SIs produce wide range of products required by consumers in India.
- Hence, they serve as an anti-inflationary force by providing goods of daily use.

## 8. Develop Entrepreneurship

- SSIs help to develop a class of entrepreneurs in the society. They help the job seekers to become job givers.
- They promote self-employment and spirit of self-reliance in the society.
- SSIs help to increase the per capita income of India in various ways.
- They facilitate development of backward areas and weaker sections of the society
- SSIs are adept in distributing national income in more efficient and equitable manner among the various participants of the society.

## Micro, Small and Medium Enterprises (MSMEs)

As on now, the following monetary limits have been used for defining different kinds of industrial service units. However, these limits are subject to changes over time.

### Manufacturing Enterprises

- Micro Manufacturing Enterprises:** The investment in plant and machinery does not exceed Rs.25 lakhs.
- Small Manufacturing Enterprises:** The investment in plant and machinery is more than twenty five lakh rupees but does not exceed Rs.5 crores.
- Medium Manufacturing Enterprises:** The investment in plant and machinery is more than Rs.5 crores but not exceeding Rs.10 crores.

### Service Enterprises

- Micro Service Enterprises:** The investment in equipment does not exceed Rs. 10 lakh
- Small Service Industries:** The investment in equipment is more than Rs.10 lakhs but does not exceed Rs. 2 crores.
- Medium Service Enterprises:** The investment in equipment is more than Rs.2 crores but does not exceed Rs.5 crores.

## **Public Sector and Private sector banks**

### **Public Sector Banks**

Public sector bank is a bank in which the government holds a major portion of the shares. Say for example, SBI is public sector bank; the government holding in this bank is 58.60%. Similarly PNB is a public sector bank; the government holds a stake of 58.87%. Usually, in public sector banks, government holdings are more than 50 percent. Public sector banks are classified into two categories: 1. Nationalised Banks 2. State Bank and its Associates.

In case of nationalized banks, the government controls and regulates the functioning of the banking entity. Some examples are SBI, PNB, BOB, OBC, Allahabad Bank etc. However, the government keeps reducing the stake in PSU banks as and when they sell shares. So, to that extent they can also become minority shareholders in these banks. This is in accordance with the privatization policy.

### **Private Sector Banks**

In these banks, most of the equity is owned by private bodies, corporations, institutions or individuals rather than government. These banks are managed and controlled by private promoters. Of the total banking industry in India, public sector banks constitute 72.9% share while the rest is covered by private players. In terms of the number of banks, there are 27 public sector banks and 22 private sector banks. As part of its differentiated banking regime, RBI, the apex banking body, has given license to Payments Bank and Small Finance Banks (SFBs). This is an attempt to boost the government's Financial Inclusion drive. (But, there may be other problems).

As a result, Airtel Payments Bank and Paytm Payments Bank Limited have come up. How far these banks would help the poor people is not known.

### **Nationalisation of Banks**

After Independence, the Government of India adopted planned economic development. For this purpose, Five Year Plans came into existence since 1951. The main objective of the economic planning aimed at social welfare. Before Independence commercial banks were in the private sector. These commercial banks failed in helping the Government to achieve social objectives of planning. Therefore, the government decided to nationalize 14 major commercial banks on 19 July 1969. In 1980, again the government took over another 6 commercial banks.

### **Objectives of Nationalization**

The Government of India nationalized the commercial banks to achieve the following objectives.

1. The main objective of nationalization was to attain social welfare. Sectors such as agriculture, small and village industries were in need of funds for their expansion and further economic development.

2. Nationalisation of banks helped to curb private monopolies in order to ensure a smooth supply of credit to socially desirable sections.
3. In India, nearly 70% of population lived in rural areas. Therefore it was needed to encourage the banking habit among the rural population.
4. Nationalisation of banks was required to reduce the regional imbalances where the banking facilities were not available.
5. Before Independence, the numbers of banks were certainly inadequate. After nationalization, new bank branches were opened in both rural and urban areas.
6. Banks created credit facilities mainly to the agriculture sector and its allied activities after nationalization.

<b>Nationalization</b>	
<p><b>1969 14 banks with deposits above Rs.50 crores were nationalized.</b></p> <p style="text-align: center;"><b>19 July 1969</b></p> <ol style="list-style-type: none"> <li>1. Allahabad Bank</li> <li>2. Bank of Baroda</li> <li>3. Bank of Maharashtra</li> <li>4. Canara Bank</li> <li>5. Central Bank of India</li> <li>6. Dena Bank</li> <li>7. Indian Bank</li> <li>8. Indian Overseas Bank</li> <li>9. Punjab National Bank</li> <li>10. Syndicate Bank</li> <li>11. Union Bank</li> <li>12. United Bank of India</li> <li>13. UCO Bank</li> <li>14. Bank of India</li> </ol>	<p><b>1980 6 banks with deposits above Rs. 200 crores were Nationalized</b></p> <p style="text-align: center;"><b>15 April 1980</b></p> <ol style="list-style-type: none"> <li>1. Andhra Bank</li> <li>2. Corporation Bank</li> <li>3. New Bank of India</li> <li>4. Oriental Bank of Commerce</li> <li>5. Punjab &amp; Sindh Bank</li> <li>6. Vijaya Bank</li> </ol>

After New Economic Policy 1991, the Indian banking industry has been facing the new horizons of competitions, efficiency and productivity. With all these developments people in villages and slums depend largely on local money lenders for their credit need. This is unfortunate.

### **Performance of India's Five Year Plans**

Economic planning is the process in which the limited natural resources are used skillfully so as to achieve the desired goals. The concept of economic planning in India or five year plan is derived from Russia (then USSR). India has launched 12 five year plans so far. Twelfth five year plan will be the last one. The government of India has decided to stop the launching of five year plans and it was replaced by NITI Aayog.



### **First Five Year Plan (1951-1956)**

- It was based on the Harrod-Domar Model.
- Its main focus was on the agricultural development of the country.
- This plan was successful and achieved the GDP growth rate of 3.6% (more than its target)

### **Second Five Year Plan (1956-1961)**

- It was based on the P.C. Mahalanobis Model.
- Its main focus was on the industrial development of the country.
- This plan was successful and achieved the growth rate of 4.1%

### **Third Five Year Plan (1961-1966)**

- This plan was called 'Gadgil Yojana' also.
- The main target of this plan was to make the economy independent and to reach self-propelled position overtake off.
- Due to Indo -China war, this plan could not achieve its growth target of 5.6%

### **Plan Holiday (1966-1969)**

- The main reason behind the plan holiday was the Indo-Pakistan war & failure of third plan.
- During this plan, annual plans were made and equal priority was given to agriculture, its allied sectors and the industry sector.

### **Fourth Five Year Plan (1969-1974)**

- There are two main objectives of this plan i.e. growth with stability and progressive achievement of self reliance.
- This plan failed and could achieve growth rate of 3.3% only, against the target of 5.7%.

### **Fifth Five Year Plan (1974-1979)**

- In this plan top priority was given to agriculture, next came industry and mines.
- Overall this plan was successful, which achieved the growth rate of 4.8% against the target of 4.4%.
- The draft of this plan was prepared and launched by D.P. Dhar. This plan was terminated in 1978.

### **Rolling Plan**

This plan was started with an annual plan for 1978-79 and as a continuation of the terminated fifth year plan.

### **Sixth Five Year Plan (1980-1985)**

- The basic objective of this plan was poverty eradication and technological self-reliance. Garibi-Hatao was the motto.
- It was based on investment yojana.
- Its growth target was 5.2% but it achieved 5.7%.

### **Seventh Five Year Plan (1985-1990)**

- Objectives of this plan included the establishment of the self-sufficient economy and opportunities for productive employment.
- For the first time, due to the pressure from private sector the private sector got the priority over public sector.
- Its growth target was 5.0% but it achieved 6.0%.

### **Annual Plans**

Eighth five year Plan could not take place due to volatile political situation at the centre. So two annual programmes are formed in 1990-91 & 1991-92.

### **Eighth Five Year Plan (1992-1997)**

- In this plan the top priority was given to development of the human resources i.e. employment, education and public health.
- During this plan, New Economic Policy of India was introduced.
- This plan was successful and got annual growth rate of 6.8% against the target of 5.6%.

### **Ninth Five Year Plan (1997-2002)**

- The main focus of this plan was “growth with justice and equity”.
- This plan failed to achieve the growth target of 7% and Indian economy grew only at the rate of 5.6%.

### **Tenth Five Year Plan (2002-2007)**

- This plan aimed to double the per capita income of India in the next 10 years.
- It aimed to reduce the poverty ratio to 15% by 2012.
- Its growth target was 8.0% but it achieved only 7.2%.

### **Eleventh Five Year Plan (2007-2012)**

- Its main theme was “faster and more inclusive growth”.
- Its growth rate target was 8.1% but it achieved only 7.9%

### **Twelfth Five Year Plan (2012-2017)**

- Its main theme is “Faster, More Inclusive and Sustainable Growth”.
- Its growth rate target is 8%.

Here it can be concluded that since the Indian Independence the five year plans of India played a very prominent role in the economic development of the country. These plans had guided the Government as to how it should utilise scarce resources so that maximum benefits can be gained. It is worthy to mention here that Indian Government adopted the concept of five year plans from Russia.

### **NITI Aayog**

The Planning Commission has been replaced by the NITI Aayog on 1st January, 2015. NITI (National Institution for Transforming India) Aayog will monitor, coordinate and ensure implementation of the accepted sustainable development goals. NITI Aayog serves as a knowledge hub and monitors progress in the implementation of policies and programmes of the Government of India. It includes the matters of national and international importance on the economic front, dissemination of best practices from within the country and from other nations, the infusion of new policy ideas and specific issue-based support. In order to understand the achievements of the NITI Aayog, researches need to be done then and there.

## **Development Indicators**

### **Human Development Index (HDI)**

United Nations Development Programme has been publishing Human Development Report annually since 1990. HDI helped the government to the real uplifting of standard of living of the people.

### **Human Development Index (HDI)**

HDI was developed by the Pakistani Economist MahbubulHaq and the Indian Economist Amartya Kumar Sen in 1990 and was published by the United Nations Development Programme (UNDP). It is constructed based on Life Expectancy Index, Education Index and GDP Per Capita.

HDI is based on the following three indicators

1. Longevity is measured by life expectancy at birth,
2. Educational attainments,
3. Standard of living, measured by real GDP per capita (PPP\$).

Before calculating HDI, the fixed minimum and maximum values of each indicator are chosen.

The performance in each dimension is expressed as a value between 0 and 1 by applying the following formula  $\text{Dimension Index} = \frac{(\text{Actual value} - \text{Minimum value})}{(\text{Maximum value} - \text{Minimum value})}$  According to Planning Commission's National Human Development Report 2011, HDI has improved significantly between 1980 and 2011. That is, The HDI went up from 0.302 in 1981 to 0.472 score in 2011.

As per latest Human Development Report (2016) by the United Nations Development Programme (UNDP), India has been ranked 131st out of 188 countries. Out of 188 countries, India lies in Medium Human Development bracket. The other nations such as Bangladesh, Bhutan, Pakistan, Kenya, Myanmar and Nepal attained the medium human development. The HDR 2016 stated that regional disparities in education, health and living standards within India has caused India's downfall to 27 % on HDI score. India's HDI rank value in 2015 stood at 0.624, which had increased from 0.580 in 2010. India's rank in 2014 was 131.

**Top three countries of HDI**

Norway (0.949)      Australia (0.939)      Switzerland (0.939)

Human Development Index (HDI)		
Dimensions	Indicator	Dimensions Index
Long and Healthy Life	Life Expectancy at Brith	Life Expectancy Index
Knowledge	Adult Literacy rate	Education Index
Decent Standard of Living	Cross enthralment ratio	GDP Index
	GDP Per capita (PPP US\$)	

Biswajeet Guha has stated that the calculation of HDI neglected many important aspects of human development. He has created four indices of HDI as HDI<sub>1</sub>, HDI<sub>2</sub>, HDI<sub>3</sub>, and HDI<sub>4</sub>. HDI<sub>1</sub> is based on UNDP methodology as given in Human Development Report. He has enlarged the scope of HDI by adding three more dimensions such as quality of life, poverty eradication, and urbanization. Various countries including India are continuously making efforts to improve and enlarge the scope of available statistical information.

**Physical Quality of Life Index (PQLI)**

Morris D Morris developed the Physical Quality of Life Index (PQLI). The PQLI is a measure to calculate the quality of life (well-being of a country). For this, he included three indicators such as life expectancy, infant mortality rate and literacy rate. A scale of each indicator ranges from the number 1 to 100. Number 1 represents the worst performance by any country. 100 is the best performance. For example, in case of life expectancy, the upper limit of 100. This was assigned to 77 years which was achieved by Sweden in 1973. The lower limit of 1 was assigned to 28 years which was achieved by Guinea-Bissau in 1960. The main difference between the two is the inclusion of income in HDI and exclusion of income from PQLI. HDI represents both physical and financial attributes of development and PQLI has only the physical aspects of life.

**Conclusion**

To conclude, the British were more focused on the money from Indians than good governance. Some positive things happened during British Rule. They eradicated systems like 'sati', introduced railway services, English language and education, infrastructure and basic principle of capitalist economy. After Independence, the Government of India formulated many policies with the help of Five year plans to achieve the growth target in various sectors.

Among the other things, the major challenges that still continue are: poor health standard, female foeticide, declining child sex ratio, open defecation, social & economic inequalities, increasing slumming, urban congestion and declining qualities of basic environmental resources namely air, land and water

## Glossary

- **Zamindari:** The owner of the land who pays the land revenue to the Government.
  - **Mahalwari:** The collective body usually the villagers which serve as a unit of management.
  - **Ryotwari:** The ownership rights of use and control of land were held by the tiller himself.
  - **Green Revolution:** The renovation of agricultural practices through modern technology.
  - **Public Sector Banks:** A bank in which the government holds a major portion of the shares.
  - **Private Sector Banks:** Most of the equity is owned by private bodies, corporations, institutions and individuals rather government.
  - **Nationalization:** The process of transforming private assets ownership into government ownership.
  - **Human Development Index:** It is a composite statistic of life expectancy, education and per capita income indicators.
  - **Physical Quality of Life Index:** It is a measure to calculate the quality of life (well-being of a country).
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## 9. Development Experiences in India

### Introduction

At the time of Independence in 1947, India was a typically backward economy. Owing to poor technological and scientific capabilities, industrialization was limited and lop-sided. Agricultural sector exhibited features of feudal and semi-feudal institutions, resulting into low productivity. Means of transport and communications were underdeveloped. Educational and health facilities were grossly inadequate and social security measures were virtually non-existent. In brief, the country suffered from the twin problems of rampant poverty and widespread unemployment, both resulting in low standard of living.

The year 1991 is an important landmark in the economic history of post-independent India. The country went through a severe economic crisis in the form of serious Balance of Payments problem. Indian economy responded to the crisis by introducing a set of policies known as Structural Reforms. These policies were aimed at correcting the weaknesses and rigidities in the various sectors of the economy such as Industry, Trade, Fiscal and Agriculture.

### Meaning of Liberalization, Privatization and Globalization (LPG)

The triple pillars of New Economic Policy are Liberalization, Privatization and Globalization (LPG)

<b>Impacts of Liberalisation</b>	
<b>Positive Effects</b>	<b>Negative Effects</b>
Increase In Foreign investment	Increase in Unemployment
Increase In production	Decrease in Tax Receipt
Technological advancement	
Increase in GDP growth rate	

#### Liberalization:

Liberalization refers to removal of relaxation of governmental restrictions in all stages in industry. Delicensing, decontrol, deregulation, subsidies (incentives) and greater role for financial institutions are the various facets of liberalization.

#### Privatization:

Privatization means transfer of ownership and management of enterprises from public sector to private sector. Denationalization, disinvestment and opening exclusive public sector enterprises to private sector are the gateways to privatization.

#### Globalization:

<b>Impacts of Globalisation</b>
---------------------------------

Positive Effects	Negative Effects
Expansion of market	But thought Completion
Development of infrastructure	Rise in Monopoly
Higher living Standards	Discourage Domestic Forms
International Co-operations	Increase in inequality

Globalization refers to the integration of the domestic (Indian) economy with the rest of the world. Import liberalization through reduction of tariff and non-tariff barriers, opening the doors to Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI) are some of the measures towards globalization.

### Arguments in favour of LPG

- a. Liberalization was necessitated because various licensing policies were said to be deterring the growth of the economy.
- b. Privatization was necessitated because of the belief that the private sector was not given enough opportunities to earn more money.
- c. Globalization was necessitated because today a developed country can grow without the help of the under developed countries. Natural and human resources of the developing countries are exploited by the developed countries and the developing economies are used as market for the finished goods of the developed countries. The surplus capital of the developed countries are invested in backward economies. Obsolete and outdated technologies of the developed countries can be easily sold to poor under developed countries. Ultimately, the rich countries can grow further at the cost of developing economies.

### Arguments against LPG

- a. Liberalization measures, when effectively enforced, favour an unrestricted entry of foreign companies in the domestic economy. Such an entry prevents the growth of the local manufacturers.
- b. Privatization measures favour the continuance of the monopoly power. Only the powerful people can sustain in business markets. Social justice cannot be easily established and maintained. As a result, the disparities tend to widen among people and among regions.
- c. As globalization measures tend to integrate all economies of the world and bringing them all under one umbrella; they pave the way for redistribution of economic power at the world level. Only the already well-developed countries are favoured in this process and the welfare of the less-developed countries will be neglected. The economic crises of the developed countries are easily spread to the developing economies through trade.

### The following are the major changes after 1991:

1. Foreign exchange reserves started rising.
2. There was a rapid industrialization.

3. The pattern of consumption started improving (or deteriorating).
4. Infrastructure facilities such as express highways, metro rails, flyovers and airports started expanding (but the local people were thrown away).

The benefits of this growth in some sectors have not reached the marginalized sections of the community. Moreover, the process of development has generated serious social, economic, political, demographic and ecological issues and challenges. Development brings benefits, but which section gets this benefit depends on socioeconomic structure of the society.

Despite all these initiatives in the Indian economy, a large section of the people of India continue to face basic economic problems such as poverty, unemployment, discrimination, social exclusion, deprivation, poor healthcare, rising inflation, agricultural stagnation, food insecurity and labour migration. However, for these problems, Government policies alone cannot be blamed. As new institutional economists suggest, the values, beliefs, norms etc. of the individuals also matter.

### **Disinvestment**

Disinvestment means selling of government securities of Public Sector Undertakings (PSUs) to other PSUs or private sectors or banks. This process has not been fully implemented.

### **Relative Position of on Indian Economy**

(This discussion is suitable for a particular period only, there may be changes afterwards)

- According to International Monetary Fund, World Economic Outlook (October-2016), GDP (nominal) of India in 2016 at current prices was 42,251 billion. India contributed 2.99% of total world's GDP in exchange rate basis. India shared 17.5 percent of the total world population and 2.4 percent of the world surface area. India was now 7th largest economy of the world in 2016.
- India was at 3rd position after China and Japan among Asian countries. India shared 8.50% of total Asia's GDP (nominal) in 2016.

### **Industrial Sector Reforms**

The Prime Minister of India announced the new industrial policy on July 24, 1991. The new policy radically liberalized the industrial policy itself and de-regulated the industrial sector substantially. The primary objectives of the industrial policy were to promote major industries from the clutches of bureaucrats, to abolish restrictions on foreign direct investment, to liberate the indigenous enterprise from the restrictions of MRTP Act, to maintain a sustained growth in productivity and employment and also to achieve international competitiveness.

### **Important Initiatives by the Government towards Industrial Policy**

The policy has brought changes in the following aspects of industrial regulation:

1. Industrial Delicensing
2. De reservation of the industrial sector
3. Public sector policy (dereservation and reform of PSEs)



4. Abolition of MRTP Act
5. Foreign investment policy and foreign technology policy.

<b>Industrial De regulation</b>	
<b>Before 1991</b>	<b>After 1991</b>
Industrial licensing for all commodities	Licensing restricted to alcohol, drugs etc.,
Private Sector not allowed in many industries	Only defence, energy, railway for public sector large scale privatization, disinvestment
Controls on price fixation and distribution	Market allowed to determine prices

1. **Industrial Delicensing policy:** the most important objective of the new industrial policy of 1991 was the end of the industrial licensing or the license raj or red tapism. Under the industrial licensing policies, private sector firms had to secure licenses to start an industry.
2. **Dereservation of the industrial sector:** Previously, the public sector was given reservation especially in the capital goods and key industries. Under industrial deregulation, most of the industrial sectors were opened to the private sector as well. Under the new industrial policy, only three sectors viz., atomic energy, mining and railways will continue as reserved for public sector. All other sectors have been opened for private sector participation.
3. **Reforms related to the Public sector enterprises:** Reforms in the public sector were aimed at enhancing efficiency and competitiveness of the sector. The government identified strategic and priority areas for the public sector to concentrate. Loss making PSUs were sold to the private sector.
4. **Abolition of MRTP Act:** The New Industrial Policy of 1991 has abolished the Monopoly and Restrictive Trade Practices Act 1969. In 2010, the Competition Commission has emerged as the watchdog in monitoring competitive practices in the economy. The policy caused big changes including emergence of a strong and competitive private sector and a sizable number of foreign companies in India.
5. **Foreign investment policy:** Another major feature of the economic reform was red carpet welcome to foreign investment and foreign technology. This measure has enhanced the industrial competition and improved business environment in the country. Foreign investment including FDI and FPI were allowed. In 1991, the government announced a specified list of high-technology and high-investment priority industries wherein automatic permission was granted for foreign direct investment (FDI) upto 51 % foreign equity. The limit was raised to 74 percent and subsequently to 100 percent for many of these industries. Moreover, many new industries have been added to the list over the years. Foreign Investment Promotion Board (FIPB) has been

set up to negotiate with international firms and approve foreign direct investment in select areas.

### Impact of LPG on Agricultural Sector Reforms

Since the inception of economic reforms, Indian economy has achieved a remarkable rate of growth in industry and service sector. However, this growth process bypassed the agricultural sector, which showed sharp deceleration in the growth rate (3.62 % during 1984/85 - 1995/96 to 1.97 percent in 1995/96 - 2004/05). The sector has recorded wide variations in yield and productivity and there was a shift towards cash crop cultivation. Moreover, agricultural indebtedness pushed several farming households into poverty and some of them resorted to extreme measures like suicides.

### Crop Insurance

Agriculture in India is highly prone to risks like droughts and floods. It is necessary to protect the farmers from natural calamities and ensure their credit eligibility for the next season. For this purpose, the Government of India introduced many agricultural schemes throughout the country. The Pradhan Mantri Fasal Bima Yojana (Prime Minister’s Crop Insurance Scheme) was launched on **18 February 2016**. It envisages a uniform premium of only 2 % to be paid by farmers for Kharif crops and 1.5 % for Rabi crops. The premium for (annual) commercial and horticultural crops will be 5 %

### Cold Storage

India is the largest producer of fruits and second largest producer of vegetables in the world. In spite of that per capita availability of fruits and vegetables is quite low because of post-harvest losses which account for about 25% to 30% of production. Besides, quality of a sizable quantity of produce also deteriorates by the time it reaches the consumer. Most of the problems relating to the marketing of fruits and vegetables can be traced to their perishability. Perishability is responsible for high marketing costs, market gluts, price fluctuations and other similar problems. In order to overcome this constraint, the Government of India and the Ministry of Agriculture promulgated an order known as “Cold Storage Order, 1964” under Section 3 of the Essential Commodities Act, 1955. However, the cold storage facility is still very poor and highly inadequate.

### Post Harvest measures

The annual value of harvest and post-harvest losses of major agricultural produce at national level was of the order of Rs.92,651 crores, calculated using production data of 2012-13 at 2014 and wholesale prices, estimated by the Indian Council of Agricultural Research (ICAR).

Food Items Waste (%)	
Crops	Cumulative wastages (%)
Cereals	5-6

Pulses	6 - 8
Oil seeds	3-10
Fruits &Vegetables	5-16
Milk	1
Fisheries (in land)	5
Fisheries (Marine)	10
Meat	3
Poultry	7

Source: Ministry of Food Processing Industries, GoI, 2016

### **Kisan Credit Card Scheme**

A Kisan Credit Card (KCC) is a credit delivery mechanism that is aimed at enabling farmers to have quick and timely access to affordable credit. It was launched in 1998 by the Reserve Bank of India and NABARD. The scheme aims to reduce farmer dependence on the informal banking sector for credit - which can be very expensive and suck them into a debt spiral. The card is offered by cooperative banks, regional rural banks and public sector banks. Based on a review of the working of the KCC, the government has advised banks to convert the KCC into a smart card cum debit card.

In order to reduce wastage of agricultural produce and minimize post-harvest losses, the Ministry of Food Processing Industries (MoFPI) has implemented various components of Central Sector Schemes, namely: Mega Food Parks; Integrated Cold Chain; Value Addition Preservation Infrastructure; Modernization of Slaughter house Scheme for Quality Assurance; Codex Standards; Research and Development and Other promotional activities.

Further, the GoI extended support to arrest post harvest losses of horticulture and non-horticulture produce and to provide integrated cold chain and preservation infrastructure facilities from the farm gate to the consumer or from the production site to the market since 2008-09. However, the improvement is not visible for it is not substantial.

### **Agricultural Produce Market Committee**

Agricultural Produce Market Committee (APMC) is a statutory body constituted by state government in order to trade in agricultural or horticultural or livestock products.

### **Functions of APMC**

1. To promote public private partnership in the ambit of agricultural markets.
2. To provide market led extension services to farmer.
3. To bring transparency in pricing system and transactions taking place in market in a transparent manner.
4. To ensure payments to the farmers for the sale of agricultural produce on the same day.
5. To promote agricultural activities.
6. To display data on arrivals and rates of agricultural produce from time to time into the market.

## Agrarian Crisis after Reforms

- a. High input Costs: The biggest input for farmers is seeds. Before liberalisation, farmers across the country had access to seeds from state government institutions. The institutions produced their own seeds and were responsible for their quality and price. With liberalization, India's seed market was opened up to global agribusinesses. Also, following the deregulation many state government institutions were closed down in 2003. These hit farmers doubly hard: seed prices shot up, and fake seeds made an appearance in a big way.
- b. Cutback in agricultural subsidies: Farmers were encouraged to shift from growing a mixture of traditional crops to export oriented 'cash crops' like chill, cotton and tobacco. Liberalisation policies reduced the subsidies on pesticide, fertilizer and electricity. As a result prices have increased by 300%. However, the prices of agricultural goods have not increased to that extent.
- c. Reduction of import duties: With a view to open India's markets, the liberalization reforms also withdrew tariffs and duties on imports. By 2001, India completely removed restrictions on imports of almost 1,500 items including food. As a result, cheap imports flooded the market, pushing prices of crops like cotton and pepper down.
- d. Paucity of credit facilities: After 1991 the lending pattern of commercial banks, including nationalised banks, drastically changed. As a result, loans were not easily available. This has forced the farmers to rely on moneylenders who charge exorbitant rates of interest.

## Trade Reforms:

- Trade Policy Reforms: The main features of the new trade policy as it has evolved over the years since 1991 are as follows:
  - Free imports and exports: Prior to 1991, in India imports were regulated. From 1992, imports were regulated by a limited negative list. For instance, the trade policy of 1 April 1992 freed imports of almost all intermediate and capital goods. Only 71 items remained restricted. This would affect the domestic industries.
  - Rationalization of tariff structure and removal of quantitative restrictions: The Chelliah Committee Report had suggested drastic reduction in import duties. It had suggested a peak rate of 50 percent. As a first step towards a gradual reduction in the tariffs, the 1991-92 budget had reduced the peak rate of import duty from more than 300 percent to 150 percent. The process of lowering the customs tariffs was carried further in successive budgets. This also affected the domestic industries.

## Export and Import Policy

The Government of India, Ministry of Commerce and Industry announced New Foreign Trade Policy on 01st April 2015 for the period of 2015-2020.

### Salient Features of "EXIM POLICY (2015-2020)"

The new EXIM policy has been formulated focusing on increasing in exports scenario, boosting production and supporting the concepts like Make in India and Digital India.

- Reduce export obligations by 25% and give boost to domestic manufacturing supporting the “Make in India” concept.
- As a step to Digital India concept, online procedure to upload digitally signed document by CA/CS/Cost Accountant are developed and further mobile app for filing tax, stamp duty has been developed.
- Repeated submission of physical copies of documents available on Exporter Importer Profile is not required.
- Export obligation period for export items related to defence, military store, aerospace and nuclear energy to be 24 months.
- EXIM Policy 2015-2020 is expected to double the share of India in World Trade from present level of 3% by the year 2020. This appears to be too ambitions.

### Special Economic Zones

With a view to overcome the shortcomings experienced on account of the multiplicity of controls and clearances, absence of world-class infrastructure, and an unstable fiscal regime and with a view to attract larger foreign investments in India, the Special Economic Zones (SEZs) Policy was announced in April 2000.

As part of the economic reforms, the system of taking over land by the government for commercial and industrial purposes was introduced in the country. As per the Special Economic Zones Act of 2005, the government has so far notified about 400 such zones in the country. Since the SEZ deprives the farmers of their land and livelihood, it is harmful to agriculture. In order to promote export and industrial growth in line with globalisation the SEZ was introduced in many countries

### History of SEZ in India

<p>First ever export processing zone (EPZ) in Asia was set up by government of India in Kandla in 1965.</p>	<p>Based on the success of Kandle EPZ in the beginning of eighties, seven more EPZs were set up in Bombay, Noida Surat, Madras, Falta, Visakapattinam</p>	<p>To invite larger foreign investments in India, these EPZs were converted into special Economic Zones (SEZs) in the year 2000 under a new policy announced by the Government of India.</p>
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India was one of the first in Asia to recognize the effectiveness of the Export Processing Zone (EPZ) model in promoting exports, with Asia’s first EPZ set up in Kandla in 1965. The broad range of SEZ covers free trade zones, export processing zones, industrial parks, economic and technology development zones, high-tech zones, science and innovation parks, free ports, enterprise zones, and others.

## Major Objectives of SEZs

1. To enhance foreign investment, especially to attract foreign direct investment (FDI) and thereby increasing GDP.
2. To increase shares in Global Export (International Business).
3. To generate additional economic activity.
4. To create employment opportunities.
5. To develop infrastructure facilities.
6. To exchange technology in the global market.

## Main Characteristics of SEZ

- a. Geographically demarked area with physical security
- b. Administrated by single body/ authority
- c. Streamlined procedures
- d. Having separate custom area
- e. Governed by more liberal economic laws.
- f. Greater freedom to the firms located in SEZs. As a result, they need not respect the Government's rules and regulations. The social and environmental impacts were disastrous.

## Fiscal Reforms

A key element in the stabilization effort was to restore fiscal discipline. It means reduction of fiscal deficit to the extent of just 3% of GDP, as suggested by Fund Bank Policies. In this way, the budget aimed at containing government expenditure and augmenting revenues; reversing the downtrend in the share of direct taxes to total tax revenues and curbing conspicuous consumption. Some of the important policy initiatives introduced for correcting the fiscal imbalance were: reduction in fertilizer subsidy, abolition of subsidy on sugar and disinvestment of a part of the government's equity holdings in select public sector undertakings. Gradually expenditures on welfare measures were reduced; taxes on corporate sectors were reduced; and taxes on poor people were increased.

## Goods and Services Tax (GST)

Goods and Services Tax (GST) is defined as the tax levied when a consumer buys a good or service. It is proposed to be a comprehensive indirect tax levied on manufacture, sale and consumption of goods as well as services. GST aims to replace all indirect taxes levied on goods and services by the Indian Central and State governments. GST would eliminate the cascading effect of taxes on the production and distribution of goods and services. It is also a "one-point tax" Unlike VAT which was a multipoint tax.

The Goods and Service Tax Act was passed in the Parliament on 29th March 2017. The Act came into effect on 1st July 2017. Te motto is one nation, one market, one tax.

## Current GST Rates in India

### Advantages of GST

- Removing cascading tax effect
- Single point tax
- Higher threshold for registration
- Composition scheme for small business
- Online simpler procedure under GST
- Defined treatment for e-commerce
- Increased efficiency in logistics
- Regulating the unorganized sector

### Monetary and Financial Sector Reforms

Monetary reforms aimed at doing away with interest rate distortions and rationalizing the structure of lending rates. The new policy tried in many ways to make the banking system more efficient. Some of the measures undertaken were:

- a. **Reserve Requirements:** Reduction in statutory liquidity ratio (SLR) and the cash reserve ratio (CRR) were recommended by the Narasimham Committee Report, 1991. It was proposed to cut down the SLR from 38.5 percent to 25 percent within a time span of three years. Similarly it was proposed that the CRR be brought down to 3 to 5% over a period of four years.
- b. **Interest Rate Liberalisation:** Earlier, RBI controlled (i) the interest rates payable on deposits, (ii) the interest rates which could be charged for bank loans.
- c. Greater competition among public sector, private sector and foreign banks and elimination of administrative constraints.
- d. Liberalisation of bank branch licensing policy in order to rationalize the existing branch network.
- e. Banks were given freedom to relocate branches and open specialized branches
- f. Guidelines for opening new private sector banks.
- g. New accounting norms regarding classification of assets and provisions of bad debt were introduced in tune with the Narasimham Committee Report.

### Conclusion

There is no doubt that the Indian economy recorded ample achievements in some sectors after new economic policy. If the size of an economy provides the first impression of a country's political and economic strength, then India has indeed grown since 1991. In dollar terms, India's GDP crossed the \$2-trillion mark in 2015-16. Currently, the country is ranked ninth in the world in terms of nominal GDP. Once India was rebuked for its "Hindu rate of growth", a term used by Rajkrishna to refer to low rate of economic growth. The GDP growth rate of India is very much appreciated. This growth is also due to changes in accounting system. That is why the increased GDP growth rate has failed to alleviate the miseries of the common people and to reduce the socio, economic and environmental imbalances. The basic problems of unemployment, poverty, ill-health and inequalities remain unsolved.

## 10. Rural Economics

### Introduction

Rural Economics deals with the application of economic principles in understanding and developing rural areas. In general, rural areas are geographical areas located outside towns and cities. According to the Census of India, the basic unit for rural areas is the revenue village. Rural economy refers to villages, and rural community refers to people living in villages. Rural areas have problems like backwardness of agriculture, low income, low employment opportunities, poverty, low infrastructural development, low illiteracy, low labour productivity, lower prices of agricultural products, surplus labour force, larger population, high level of migration and high dependency on natural resources and nature. According to the 2011 Population Census, there are 6,40,867 villages in India and 68.84 percent of the 121 crore total population live in rural areas.

### Features of Rural Economy

Main characteristics of rural economy are:

1. **Village is an Institution:** The Village is a primary institution and it satisfies almost all the needs of the rural community. The rural people have a feeling of belongingness and a sense of unity towards each other.
2. **Dependence on Agriculture:** The rural economy depends much on nature and agricultural activities. Agriculture and allied activities are the main occupation in rural areas.
3. **Life of Rural People:** Lifestyles in villages are very simple. Public services like education, housing, health and sanitation, transport and communication, banking, roads and markets are limited and unavailable. Rural people rely much on faith, superstitions and traditional cultural practices. The standards of living of majority of rural people are poor and pitiable. In terms of methods of production, social organization and political mobilization, rural sector is extremely backward and weak. In recent years, the incidence of alcohol drinking has gone up.
4. **Population Density:** Population density, measured by number of persons living per sq. km is very low and houses are scattered in the entire villages.
5. **Employment:** There exists unemployment, seasonal unemployment and underemployment in rural areas. Unemployment refers to the situation of people with willingness and ability to work but is not getting employed. Underemployment also called disguised unemployment is the situation of people employed in excess, over and above the requirement. Disguised unemployment is a situation where people work but no increase in production. Both the situations are common in rural areas.
6. **Poverty:** Poverty is a condition where the basic needs of the people like food, clothing and shelter are not being met. According to the 2011-12 estimates, About 22 crores of people in rural areas are poor and live below the poverty line.
7. **Indebtedness:** People in rural areas are highly indebted owing to poverty and underemployment, lack of farm and non-farm employment opportunities, low wage employment, seasonality in production, poor marketing network etc. A famous British



writer Sir Malcolm Darling (1925) stated that 'A n Indian farmer is born in debt, lives in debt, dies in debt and bequeaths debt'. Since formal loan facilities are not available to the villagers, they depend on local money lenders who, like a parasite, squeeze the villagers. Hence the villagers commit suicide frequently.

8. **Rural Income:** The income of the rural people is constrained as the rural economy is not sufficiently vibrant to provide them with jobs or self - employment opportunities. Large proportion of labourers and skilled persons are underemployed and the scope for increasing their income is limited.
9. **Dependency:** Rural households are largely dependent on social grants and remittances from family members working in urban areas and cities.
10. **Dualism:** Dualism means the co existence of two exteremely different features like developed and underdeveloped, organised and unorganised, traditional and modern, regulated and unregulated, poor and rich, skilled and unskilled and similar contradicting situations in a region. These characteristics are very common in rural areas.
11. **Inequality:** The distributions of income, wealth and assets are highly skewed among rural people. There are number of historical, social, economic and political reasons behind the existence of inequality. Landlords and landowners dominate the rural activities. Land, livestock and other assets are owned by a few people
12. **Migration:** Rural people are forced to migrate from villages to urban areas in order to seek gainful employment for their livelihood. Tis character of the development gives rise to the formation of cities. Enmity and Lack of basic amenities in rural areas also push the people to migrate to urban areas. Tis is called' double poisoning' by Schumacher, one side villages are empty, on the other side towns are congested. His book is " Small is Beautiful "describes the dangers of the present kind of development.

### Meaning of Rural Development

Rural Development is defined as an overall improvement in the economies and social well-being of villagers and the institutional and physical environments in which they live. According to the World Bank, 'Rural Development is a strategy designed to improve the economic and social life of a specific group of people - rural poor'. In short, rural development is a process of improving the rural areas, rural people and rural living.

### Need for Rural Development

Rural development is very urgent in the context of the overall growth and development of Indian economy due to the following reasons.

1. A major share of population lives in rural areas, and their development and contributions are very much supportive for the nation building activities. India cannot be developed by retaining rural as backward.
2. The rural economy supports the urban sectors by way of supplying drinking water, milk, food and raw materials. Hence, the backwardness of the rural sector would be a major impediment to the overall progress of the economy.
3. Improvements in education, health and sanitation in villages can help avoid many urban problems namely, begging, rack picking and road side slumming.

4. Development of agriculture and allied activities are necessary for providing gainful employment in rural areas and improving overall food production.
5. The evils of brain-drain and rural-urban migration can be reduced if rural areas are developed.
6. In order to better utilise the unused and under-utilised resources, there is a need to develop the rural economy.
7. Rural development should minimise the gap between rural and urban areas in terms of the provision of infrastructural facilities. It was called as PURA by former President Abdul Kalam.
8. In order to improve the nation's status in the global arena in terms of the economic indicators like Human Development Index (HDI), Women Empowerment Index (WEI), Gender Disparity Index (GDI), Physical Quality of Life Index (PQLI) and Gross National Happiness Index (GNHI) should be given due attention.

### Problems of Rural Economy

Rural areas are facing number of problems relating to, 1) People, 2) Agriculture, 3) Infrastructure, 4) Economy, 5) Society and Culture, 6) Leadership and 7) Administration.

The problems of rural economy are discussed below.

1. **People Related Problems:** The problems related to individuals and their standard of living consist of illiteracy, lack of technical knowhow, low level of confidence, dependence on sentiments and beliefs etc.
2. **Agriculture Related Problems:** The problems related to agriculture include 1.Lack of expected awareness, knowledge, skill and attitude, 2.Unavailability of inputs, 3.Poor marketing facility, 4.Insufficient extension staff and services, 5.Multidimensional tasks to extension personnel, 6.Small size of land holding, 7.Sub-division and fragmentation of landholdings, 8.Absence of infrastructure to work and stay in rural areas, 9.Primitive technology and low adoption of modern technologies 10. Reduced public investment and absence of role for farmers in fixing the prices for their own products.
3. **Infrastructural Related Problems:** Poor infrastructure facilities like, water, electricity, transport, educational institutions, communication, health, employment, storage facility, banking and insurance are found in rural areas.
4. **Economics related Problems:** The economic problems related to rural areas are: inability to adopt high cost technology, high cost of inputs, under privileged rural industries, low income, indebtedness and existence of inequality in land holdings and assets. In fertile areas, a few absentee landlords own large area and they do not evince greater Interest in improving the performance of agriculture.
5. **Leadership Related Problems:** The specific leadership related problems found in rural areas are: Leadership among the hands of inactive and incompetent people, self-interest of leaders, biased political will, less bargaining power and negation skills and dominance of political leaders.
6. **Administrative Problems:** The rural administrative problems consist of political interference, lack of motivation and interest, low wages in villages, improper utilization

of budget, and absence of monitoring and implementation of rural development programme.

Rural poverty, rural unemployment, rural industries, micro finance, rural health and sanitation and rural infrastructures are the issues that are considered for detailed discussion.

## Rural Poverty

Rural poverty refers to the existence of poverty in rural areas. Poverty in India has been defined as the situation in which an individual fails to earn sufficient income to buy the basic minimum of subsistence. Poverty line is a hypothetical line based on income or consumption levels that divides the population as people below poverty line and above poverty line. On the basis of recommended nutritional intake, persons consuming less than 2,400 calories per day in rural areas are treated as they are under rural poverty.

As per the Planning Commission estimates, the percentage of people living below poverty in rural areas was 54.10 which accounted for 33.80 per cent during 2009-10. Poverty is deepest among members of scheduled castes and tribes in the rural areas. In 2005 these groups accounted for 80 per cent of rural poor, although their share in the total rural population is much smaller. In 2015, more than 80 crores of India's people lived in villages. One quarter of village population (22 crores people) list below the poverty line. India is the home to 22 per cent of the world's poor. It is needless to state that the country has been successful in reducing the proportion of poor people, in spite of increasing of population.

### Causes for Rural Poverty

Various forces responsible for rural poverty are highlighted below:

1. The distribution of land is highly skewed in rural areas. Therefore, majority of rural people work as hired labour to support their families.
2. **Lack of Non-farm Employment:** Non-farm employment opportunities do not match the increasing labour force. The excess supply of labour in rural areas reduces the wages and increases the incidence of poverty.
3. **Lack of Public Sector Investment:** The root cause of rural poverty in our country is lack of public sector investment on human resource development.
4. **Inflation:** Steady increase in prices affects the purchasing power of the rural poor leading to rural poverty.
5. **Low Productivity:** Low productivity of rural labour and farm activities is a cause as well as the effect of poverty.
6. **Unequal Benefit of Growth:** Major gains of economic development are enjoyed by the urban rich people leading to concentration of wealth. Due to defective economic structure and policies, gains of growth are not reaching the poor and the contributions of poor people are not accounted properly.
7. **Low Rate of Economic Growth:** The rate of growth of India is always below the target and it has benefited the rich. The poor are always denied of the benefits of the achieved growth and development of the country.

8. **More Emphasis on Large Industries:** Huge investment in large industries catering to the needs of middle and upper classes in urban areas are made in India. Such industries are capital-intensive and do not generate more employment opportunities. Therefore, poor are not in a position to get employed and to come out from the poverty in villages.
9. **Social Evils:** Social evils prevalent in the society like custom, believes etc. increase unproductive expenditure.

### Remedial Measures to Rural Poverty

Since rural unemployment and rural poverty are interrelated, creation of employment opportunities would support elimination of poverty. Poverty alleviation schemes and programmes have been implemented, modified, consolidated, expanded and improved over time. However, unemployment, begging, rag picking and slumming continues. Unless employment is given to all the people poverty cannot be eliminated. Who will bell the cat?

Poverty Eradication Schemes	
Schemes	Year of launch
20 Point Programme	1975
Integrated Rural development Programme(IRDP)	1976
Training Rural Youths for Self- Employment (TRYSEM)	1979
Food for Work Programme (FWP)	1977
National Rural Employment Programme (NREP)	1980
Rural Landless Employment Guarantee Programme(RLEGP)	1983
JawaharRozgarYojana(JRY)	1989
Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)	2006

Development Schemes	
Pradhan MantriAdarsh Gram SadakYojana (PMAGSY)	2010
Bharat NirmanYojana	2005
Indira AwasYojana	1985
Jawaharlal Nehru National Urban Renewal Mission (JNNURM)	2005
Rajiv AwasYojan (RAY)	2009
National Rural Health Mission	2005
National Rural Livelihood Mission	2011
National Food Security Scheme	2013

### Rural Unemployment

Unemployment is a situation in which a person is actively searching for employment but unable to find work at the prevailing wage rate. It is a tragic waste of manpower and underutilisation of human resources. As long as there is unemployment, social problems cannot be stopped; and, economy cannot achieve development.

Peter Diamond, Dale Mortensen and Christopher Pissarides shared 2010 Economics Nobel prize for jobs study. Their model, called DMP model, helps us understand how regulation and economic policies affect unemployment, job vacancies and wages.

As on 4th October 2016, rural unemployment was 7.8 per cent which is less than urban unemployment (10.1 per cent) and all India unemployment rate (8.5 per cent). Rural unemployment in India are categorised into three classes: (i) Open Unemployment (ii) Concealed Unemployment or Under employment and (iii) Seasonal Unemployment. In **Open Unemployment**, unemployed persons are identified as they remain without work. This type of unemployment is found among agricultural labourers, rural artisans and literate persons. In **Concealed Unemployment**, it is difficult to identify who are under employed; for many are employed below their productive capacity and even if they are withdrawn from work the output will not diminish. It is also called Disguised Unemployment or Under employment. This type of unemployment is found among small and marginal farmers, livestock rearers and rural artisans. This kind of unemployment situation is more serious in villages than in urban areas. Disguised unemployment in rural India is 25 per cent to 30 per cent. In **Seasonal Unemployment**, employment occurs only on a particular season supported by natural circumstances and the remaining period of a year the rural people are unemployed or partially employed. In seasons like ploughing, sowing, weeding and harvesting there is scarcity of labour and in the rest of the year there is unemployment. It is pathetic to note that a farmer who cultivates one crop in a year usually goes without a job for almost 5 to 7 months and ultimately commit suicide.

According to the Agricultural Labour Enquiry Committee Report, "the extent of under employment is on the average, 82 days of unemployment in a year for 84 per cent of agricultural labours."

### **Causes for Rural Unemployment**

Causes for rural unemployment in India are discussed below:

1. **Absence of skill development and employment generation:** Lack of Government initiatives to give required training and then to generate employment opportunities.
2. **Seasonal Nature of Agriculture:** Agricultural operations are seasonal in nature and depend much on nature and rainfall. Therefore, the demand for labour becomes negligible during off-season. So, non-farm employment opportunities must be created.
3. **Lack of Subsidiary Occupation:** Rural people are not able to start subsidiary occupations such as poultry, rope making, piggery etc. due to shortages of funds for investment and lack of proper marketing arrangements. This restricts the employment opportunity and rural family incomes. Government must arrange funds for these people. However, as now they pay huge interest to the local money lenders, for they are unable to get loans from formal sources.
4. **Mechanization of Agriculture:** The landlords are the principal source of employment to the farm labour. Mechanization of agricultural operations like

ploughing, irrigation, harvesting, threshing etc. reduces employment opportunities for the farm labour.

5. **Capital-Intensive Technology:** The expanding private industrial sector is largely found in urban areas and not creating additional employment opportunities due to the application of capital intensive technologies. Government must establish firms to absorb surplus labour power.
6. **Defective System of Education:** The present system of education has also aggravated the rural unemployment problem. Large number of degree-producing institutions has come in the recent years. Students also want to get degrees only, not any skill. Degrees should be awarded only on the basis of skills acquired. The unemployed youth should get sufficient facilities to update their skills.

### Remedies for Rural Unemployment

In order to reduce rural unemployment in the country there is a need to take integrated and coordinated efforts from various levels. A few remedial measures are listed below:

1. **Subsidiary Occupation:** To reduce the seasonal unemployment rural people should be encouraged to adopt subsidiary occupations. Loans should be granted and proper arrangements should be made for marketing their products.
2. **Rural Works Programme:** Rural Works Programme such as construction and maintenance of roads, digging of drains, canals, etc should be planned during off-season to provide gainful employment to the unemployed.
3. **Irrigation Facilities:** Since rainfall is uncertain irrigation facilities should be expanded to enable the farmers to adopt multiple cropping. The increased cropping intensity creates additional demand for labour.
4. **Rural Industrialization:** To provide employment new industries should be set up in rural areas. This will open new fields of employment and also change the attitude of rural people towards work. For this, government has to do something. Private sector would not take up this responsibility.
5. **Technical Education:** Employment oriented courses should be introduced in schools and colleges to enable the literate youth to start their own units.

### Rural Industries

Rural industries embrace all industries which are run by rural people in rural areas. These industries are based primarily on the utilization of locally available raw materials, skills and small amount of capital. The rural industries can be broadly classified into a) cottage industries, b) village industries, c) small industries, d) tiny industries and e) agro-based industries.

**Cottage Industries:** Cottage industries are generally associated with agriculture and provide both part-time and full-time jobs in rural areas. The important characteristics of this type of industries are as follows:

1. These industries are carried out by artisans in their own homes at their own risk and for their own benefit. Artisans may combine this work with another regular job.
2. No or little outside labour is employed. Normally, the members of the household provide the necessary labour.
3. These industries are generally hereditary and traditional in character.
4. No or little power is used.
5. These industries usually serve the local market and generally work on the orders placed by other industries.

Examples of cottage industries are mat, coir and basket making industries. The principal cottage industries of India are hand-loom weaving (cotton, silk, jute, etc.) pottery, washing soap making, conch shell, handmade paper, horn button, mother-of-pearl button, cutlery, lock and key making industries.

**Village Industries:** Village industries are traditional in nature and depend on local raw-material. They cater to the needs of local population. Examples of village industries are gur and khandsari, cane and bamboo basket, shoe making, pottery and leather tanning. These are almost similar to the cottage industries.

**Small Scale Industries (SSIs):** Most small scale industries are located near urban centres. They produce goods for local as well as foreign markets. Examples of such small scale industries are manufacture of sports goods, soaps, electric fans, foot wear, sewing machines and handloom weaving.

SSIs are also known as Micro, Small & Medium Enterprises (MSMEs). They are defined and categorized by the Micro, Small & Medium Enterprises Development Act, 2006. The Act categorizes different scale of industries on the basis of investment in plant and machinery in case of manufacturing industries and on the basis of investment in equipment in case of service sector industries.

**Agro-based Industries:** These industries are based on the processing of agricultural produce. Agro-based industries may be organised on a cottage-scale, small-scale and large-scale. These industries tend to develop household settlements around them as they employ more labour on a regular basis. Examples are textile, sugar, paper, vegetable oil, and tea and coffee industries.

### **Rural Indebtedness**

Rural indebtedness refers to the situation of the rural people unable to repay the loan accumulated over a period. Existence of the rural indebtedness indicates the weak financial infrastructure of our country, in reaching the needy farmers, landless people and the agricultural labourers.

The farmers borrow loan for various purposes like agricultural operations, supporting the family in the lean season or purchase of equipment's in the recent years, expenses on celebrations, liquor consumption and medicines go on increasing without any limit. Due to

lower income, the villagers are unable to repay the loans or pay the pending interest on the principal amount.

According to the Government of India's Socio Economic and Caste Census (SECC), 2015, around 73 per cent of households in India are rural. Of these, 18.5 per cent are scheduled caste households and 11 per cent belong to the scheduled tribe category.

The data of the National Sample Survey Organisation (NSSO, 2002-03) reveals that only about 30 per cent of the poor borrowers get credit from the formal banks. According to the All India Debt and Investment Survey (AIDIS) 2002, the share of institutional credit has declined from 66.3 per cent in 1991 to 57.1 percent in 2002, with a corresponding increase in informal channels of credit (RBI, 2006).

### **Features of Rural Indebtedness**

Nearly three fourth of rural families in the country are in debt. The amount of debt is heavier in the case of small farmers. Cultivators are more indebted than the non-cultivators. Most of the debts taken are short term and of unproductive nature. The proportion of debts having higher rates of interest is relatively high. Most of the villagers are indebted to private agencies particularly money lenders.

### **Causes for Rural Indebtedness**

The causes for rural indebtedness may be summarized as below:

1. **Poverty of Farmers:** The vicious circle of poverty forces the farmers to borrow for consumption, cultivation and celebrations. Thus, poverty, debt and high rates of interest hold the farmer in the grip of money lenders.
2. **Failure of Monsoon:** Frequent failure of monsoon is a curse to the farmers and they have to suffer due to the failure of nature. Therefore, farmers find it difficult to identify good years to repay their debts.
3. **Litigation:** Due to land disputes litigation in the court compels them to borrow heavily. Being uneducated and ignorant they are caught in the litigation process and dry away their savings and resources.
4. **Money Lenders and High Rate of Interest:** The rate of interest charged by the local money lenders is very high and the compounding of interest leads to perpetuate indebtedness of the farmer.

### **Measures to Remove Rural Indebtedness**

Several remedial measures have been introduced to reduce rural indebtedness. It includes regulation of money lenders, development of rural banks, Regional Rural Banks (RRBs), Micro Finance, formation of Self Help Groups (SHGs), Primary Cooperative Banks and Land Development Banks, Crop Loan Schemes, Lead Bank Schemes, Micro Units Development and Refinance Agency Bank (MUDRA), promotion of subsidiary occupation, of farm employment opportunities, skill development programmes and so on. However, the



interest rate charged plus transaction cost for poor people and Self-Help Groups are much higher as compared to that for rich people. For instance, education loan is costlier than car loans.

### **Regional Rural Banks (RRBs)**

Regional Rural Banks came into existence based on the recommendation made by a working group on rural banks appointed by the Government of India in 1975. RRBs are recommended with a view to developing rural economy by providing credit and other facilities particularly to the small and marginal farmers, agricultural labourers, artisans and small entrepreneurs. RRBs are set up by the joint efforts of the Centre and State Governments and commercial banks. At present, there are 64 Regional Rural Banks in India. The RRBs confine their lending's only to the weaker sections and their lending rates are at par with the prevailing rate of cooperative societies.

### **Micro Finance**

Micro finance, also known as micro credit, is a financial service that offers loans, savings and insurance to entrepreneurs and small business owners who do not have access to traditional sources of capital, like banks or investors. The goal of micro financing is to provide individuals with money to invest in themselves or their business. Microfinance is available through micro finance institutions, which range from small non-profit organizations to larger banks. In India, Non-Government Organizations (NGOs) play a pivotal role in the development of micro finance service. Microfinance industries in India have grown vastly in the last two decades. In 2009, the total number of micro finance institutions in India was around 150 (Tripathi, 2014).

### **Self-Help Groups (SHGs)**

Self Help Groups are informal voluntary association of poor people, from the similar socio-economic background, up to 20 women (average size is 14). They come together for the purpose of solving their common problems through self-help and mutual help. The SHG promotes small savings among its members. They save small amounts Rs.10 to Rs.50 a month. The savings are kept with a bank. After saving regularly for a minimum of 6 months, they lend small amounts to their members for interest. Based on their performance, they are linked with the bank for further assistance under SHG Bank Linked Programme (SBLP) started in 1992. It is a holistic programme of micro-enterprises covering all aspects of self-employment, organization of the rural poor into self Help groups and their capacity building, planning of activity clusters, infrastructure build up, technology, credit and marketing.

In 2009-10, the number of new SHGs having credit-linked with banks was 1.59 million and a bank loan of Rs.14,453 Crores was disbursed to these SHGs. Further, the number of SHGs which maintained savings accounts with banks at the end of March 2010 was 6.95 million.

The main objective of this programme is to bring the beneficiaries above the poverty line by providing income generating assets to them through bank credit and government

subsidy. NABARD estimates that there are 2.2 million SHGs in India, representing 33 million members that have taken loans from banks under its linkage program to date. The SHG Banking Linkage Programme since its beginning has been predominant in certain states, showing spatial preferences especially for the southern regions like Andhra Pradesh, Tamil Nadu, Kerala and Karnataka. These SHGs have helped the Banks to accumulate more funds. Actually the banks charge higher interest for the SHGs than car owners.

Under NABARD SHG Linkage Programme, SHGs can borrow credit from bank on showing their successful track record of regular repayments of their borrowers. It has been successful in the states like Andhra Pradesh, Tamil Nadu, Kerala and Karnataka during 2005-06. These States received approximately 60 per cent of SHG linkage credit (Taruna and Yadav, 2016).

### **Major Features of SHGs are**

1. SHG is generally an economically homogeneous group formed through a process of self-selection based upon the affinity of its members.
2. Most SHGs are women's groups with membership ranging between 10 and 20.
3. SHGs have well-defined rules and by-laws, hold regular meetings and maintain records and savings and credit discipline.
4. SHGs are self-managed institutions characterized by participatory and collective decision making.

### **Micro Units Development and Refinance Agency Bank (MUDRA Bank)**

It is a public sector financial institution which provides loans at low rates to micro-finance institutions and non-banking financial institutions which then provide credit to Micro, Small and Medium Enterprises (MSMEs). It was launched on 8th April 2015.

Mudra Bank  
Micro Units Development and Refinance Agency  
Regulate and Refinance and Micro finance Institutions

### **The principal objectives of the MUDRA Bank are the following**

1. Regulate the lender and the borrower of microfinance and bring stability to the microfinance system.
2. Extend finance and credit support to Microfinance Institutions (MFI) and agencies that lend money to small businesses, retailers, self-help groups and individuals.
3. Register all MFIs and introduce a system of performance rating and accreditation for the first time.
4. Offer a Credit Guarantee scheme for providing guarantees to loans being offered to micro businesses.
5. Introduce appropriate technologies to assist in the process of efficient lending, borrowing and monitoring of distributed capital.

## **Rural Health, Nutrition and Sanitation**

Health is an important component for ensuring better quality of life. Large masses of the Indian poor continue to fight hopeless and constantly losing the battle for survival and health. Indian rural people are suffering with various epidemics such as small pox, cholera, malaria, typhoid, dengue, chicken guniyya, etc. This is mainly due to lack of medical facilities, deep ignorance and poverty. Indian Constitution clearly lays down that "States shall regard the rising of the level of nutrition and standard of living of its people and improvement of public health as among its primary duties". To meet this constitutional directive. Several programmes for nutrition have been implemented. These include Supplementary Feeding Programmes including Mid Term Meal Programme, Nutrition Education through Printed Media and Television and Compulsory Fortification of Common Salt with Iodine. Still in terms of health standard, Sri Lanka is better than India, and in India, Kerala is better than Tamil Nadu.

## **National Rural Health Mission**

The National Rural Health Mission (NRHM) was launched on 12th April 2005, to provide accessible, affordable and quality health care to the rural population, especially the vulnerable groups. NRHM seeks to provide equitable, affordable and quality health care to the rural population, especially the vulnerable groups.

NRHM focuses on Reproductive, Maternal, New-born, Child Health and Adolescent (RMNCH+A) Services. The emphasis here is on strategies for improving maternal and child health through a continuum of care and the life cycle approach.

## **Rural Infrastructure**

### **Rural Housing**

House is one of the basic needs of every family. Provision of better housing facilities increases the productivity of labour. The housing problem is getting aggravated due to rapid adaptation of nuclear families. Housing does not mean provision of house alone but also proper water supply, good sanitation, proper disposal of sewage etc. The problem of housing can be tackled by the development of low cost technology in house construction, provision of adequate housing finance and provision of land sites to landless workers in rural areas. As per the NSSO data, 38 per cent of the households lived in with one room while another 36 per cent lived with two rooms.

## **Rural Market**

Road Market refers to the infrastructure created to buy and sell the products produced in rural areas and also to purchase the needed products and farm inputs produced in urban and other regions. The rural marketing is still defective as farmers lack bargaining power, long chain of middlemen, lack of organisation, insufficient storage facilities, poor transport facilities, absence of grading, inadequate information and poor marketing arrangements.

Rural roads in India constitute 26.50 lakh kms, of which 13.5 percent of the roads are surfaced.

India's road network is one of the world's largest. The road length of India increased from about 4 lakh kms in 1950-51 to 34 lakh kms at present (2018).

## Rural Roads

Road transport is an important constituent of the transport system. Rural roads constitute the very life line of rural economy. A well-constructed road network in rural area would bring several benefits including the linking of remote villages with urban centres, reduction in cost of transportation of agricultural inputs and promotion of marketing for rural produces. It helps the farmers to bring their produce to the urban markets and to have access to distant markets and other services.

## Rural Electrification

Rural Electrification refers to providing electrical power to rural areas. The main aims of rural electrification are to provide electricity to agricultural operations and to enhance agricultural productivity, to increase cropped area, to promote rural industries and to lighting the villages. In order to improve this facility the supply of electricity is almost free for agricultural purpose in many states and the electricity tariff charged in rural areas is kept very low. In India 99.25% of villages were electrified at the end of March 2017. As on 31.03.2017, 100 percent electrification was achieved in villages of 20 States/UTs namely, Chandigarh, Delhi, Haryana, Himachal Pradesh, Punjab, Rajasthan, Daman & Diu, D & N Haveli, Goa, Gujarat, Maharashtra, Andhra Pradesh, Kerala, Lakshadweep, Puducherry, Tamil Nadu, Telangana, Andaman & Nicobar Island, Sikkim and Tripura.

The factors hindering the progress of rural electrification in India are:

1. Lack of Funds: The generation and transmission of power involves huge expenditure and the fund allocation is low.
2. Inter-state Disputes: As there are inter-state disputes in managing power projects, power distribution is affected.
3. Uneven Terrain: As rural topography is uneven without proper connection, developing new lines are costlier and difficult.
4. High Transmission Loss: Transmission loss in power distribution is almost 25 per cent in rural areas.
5. Power Theft: Unauthorized use and diversion of power are evil practices adopted by affluent people that hinder the rural electrification process.

## Requirements for Rural Development

Slater Villages: Gilbert Slater, the first professor of economics at Madras University, published his book, Some South Indian Villages, in 1918 following a survey of some villages like Vadamalaipuram (Ramnad), Gangaikondan (Tirunelveli), Palakkuurichi (Tanjore) and

Dusi (North Arcot) in Tamil Nadu by his students. It was subsequently done by different groups of researchers in the 1930s, 1950s, 1960s, and two of the villages only in the early 21st century. The resurveys became an important historical record. They provided a baseline for several later revisits to his villages, and have inspired many successors. Much of our knowledge of rural change depends on these studies.

1. Efforts need to be made to raise farm and non-farm rural real incomes.
2. Investment in basic infra-structure and social services need to be increased.
3. Coordinated and integrated programmes for solving the present problems and to achieve sustainable development need to be designed.
4. Persons and leaders with an understanding of reality of rural problems and with the required foresight vision should be consulted while designing development programmes.

### Conclusion

Crucial steps to strengthening the rural economy are already being taken through various policies. These steps include investments in areas ranging from health, information technology, education, infrastructure and small business. The Administration is committed to building on these unprecedented measures in the months and years to come. PURA (Provision of Urban facilities for Rural Areas) needs to be given due emphasis, without which Indian villages cannot prosper.

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