formation is extremely slow, they can not be replenished within a time frame meaningful to human-beings. Though these resources are normally found in large quantities, they are distributed most unevenly. Their economic use is viable only when they are found in sufficiently large concentrations and are extractable. Some of these resources like gold, silver and iron are recyclable in nature. It means that the metal content obtained from the ore may be used again and again after necessary processing. Fossil fuels such as coal, mineral oil and natural gas get exhausted. Hence, they are non-recyclable.

MINERAL RESOURCES

A mineral is an aggregate of two or more than two elements. A mineral has a definite chemical composition, atomic structure and is formed by inorganic processes. In economic geography, the term mineral is used for any naturally occurring material that is mined and is of economic value.

Minerals generally occur in the earth's crust in the form of ore. It is extracted, processed and utilised for the economic benefits of society. The availability and per capita consumption of minerals is taken as an important indicator to assess the economic development of a country.

India is fairly rich in mineral resources but their distribution is highly uneven. The distribution of minerals in India has been described in the following section:

Distribution of Minerals

The mineral wealth of India is largely confined to the igneous and metamorphic rocks of Peninsular India, while the Great Plains of India and the Himalayan region are almost devoid of the metallic minerals. The states which are rich in the metallic and non-metallic minerals are Jharkhand, Chhattisgarh, Orissa, Bihar, West Bengal, Madhya Pradesh, Karnataka, Maharashtra, Tamil Nadu, Gujarat, Uttarakhand, Andhra Pradesh, and Assam. The states of Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, Jammu and Kashmir, and Gangetic West Bengal are, however, poor in mineral resources.

Mineral Belts of India

The following mineral belts may be identified in India (**Fig. 7.1**):

1. The Chotanagpur Belt This belt stretches over, Jharkhand, Chhattisgarh, Orissa, Bihar and West Bengal. This region is rich in coal, mica, manganese, chromite, ilmenite, bauxite, iron, phosphate, copper, dolomite, china-clay, and limestone. The important mineral producing districts are Dhanbad, Hazaribagh, Palamu, Ranchi, Santhal, Pargana, and Singhbhum in Jharkhand; Cuttack, Dhankenal, Keonjhar, Koraput, Mayurbhanj, Sambhalpur, and Sundargarh in Orissa; and Bankura, Birbhum, Medinipur and Purulia in West Bengal. Cuttack region contains almost 100% of kyanite reserves, 93% of iron ore, 84% coal, and 70% of chromite of the country.

2. The Midland Belt This belt sprawls over the states of Chhattisgarh, Madhya Pradesh, Andhra Pradesh, and Maharashtra. This belt is rich in manganese ore, bauxite, mica, copper, graphite, limestone, lignite, marble, and limestone.

3. The Southern Belt It stretches over the states of Andhra Pradesh, Karnataka and Tamil Nadu. This belt is rich in gold, iron ore, chromite, manganese, lignite, mica, bauxite, gypsum, asbestos, dolomite, ilmenite, china-clay, and limestone.

1. **Karnataka**: Karnataka is the leading producer of iron ore accounting for about one-fourth of the total ironore production of the country. The high grade deposits belonging to the haematite and magnetite categories are found in *Kemmangundi* in Bababudan Hills of the Chikmagalur District. The other important iron ore producing districts of Karnataka are Chitradurga, Dharwar, North Kannad, Shimoga, Bellary and Tumkur.
   (i) ***Bababudan Hills*:** Lying in Chikmagalur District of Karnataka they stretch over 22 km in length and 20 km in width. They are rich in haematite deposits with ferrous content of 60 to 65 per cent. The iron ore is mainly exported to Iran through the port of Mangalore.
   (ii) ***Kudermukh Deposits*:** The Kudermukh iron ore deposits lie in the Chikmagalur District of Karnataka. They contain iron ore of the magnetite category with a metal content of 50 to 65 per cent. The Kudermukh deposits were developed under an export agreement with Iran. The iron ore is exported through the seaport of Mangalore.
   (iii) ***Sandur Range*:** The Sandur Range stretches in the Bellary and Hosepet districts of Karnataka. The iron ore of this range is generally hard, compact and steel-grey. The ferrous content varies between 50–65 per cent. Its ore is supplied to the Vijayanagar Steel Plant.
2. **Orissa:** The contribution of Orissa in the total production of iron ore in the country is about 22 per cent. The most important deposits are found at Mayurbhanj (Badampahar), Banspani and Toda in Keonjhar, Tomka Range in Cuttack, Kandadhar Pahar in Sundargarh, Sambalpur, and Hirapur Hills of Koraput district.
   (i) ***Badampahar:*** Situated in the Mayurbhanj District of Orissa, Badam Pahar has rich deposits of iron ore. Its height is about 825 metres above sea level. It has 30 million tonnes of iron ore. Iron-ore from Badampahar is supplied to Bokaro, Durgapur, Jamshedpur, and Rourkela.
   (ii) ***Bonaigarh Range:*** Situated in the district of Sundergarh, it is one of the most important iron ore bearing ranges. Iron ore is of haematite category which is supplied to Bokaro, Durgapur, Jamshedpur, and Rourkela.
   (iii) ***Mayurbhanj:*** Situated in Orissa, it is well known for the iron ore deposits of haematite type. The metal content is more than 65 per cent. Iron ore from Mayurbhanj mines is sent to the iron and steel plants of Bokaro, Durgapur, Jamshedpur, and Rourkela.
3. **Chhattisgarh**:. This state has about 20 per cent of the total iron ore deposits of the country. Bailadila in the Bastar District and Dalli-Rajhara in the Durg district are the main iron ore producing regions of Chhattisgarh state. The iron ore belongs to the haematite and magnetite categories in which the metal content varies between 60 to 70 per cent. The Bailadila mine is the largest mechanized mine in India. A 270-km long slurry pipeline has been constructed to bring the ore from Bailadila to Vishakhapatnam Plant. The Bailadila iron ore is largely exported to Japan through the port of Vishakhapatnam.

   The Dalli Rajhara range is about 32 km long with iron ore reserves of about 125 million tonnes. The ferrous content is about 70 per cent. The deposits of this range are being worked by the Hindustan Steel Plant of Bhilai. Bilaspur, Jagdalpur, Raigarh, and Surguja are the other iron ore producing districts of Chhattisgarh State.
   (i) ***Dalli Rajhara**:* The Dalli Rajhara Range, well known for the iron ore depsoits, lies in the Durg District of Chhattisgarh. It is 32 km long with an estimated iron ore deposit of 120 million tonnes. The iron ore is supplied to the Hindustan Steel Plant at Bhilai.

***Chilpi Series*:** It stretches over parts of Balaghat, and Chhindwara districts of Madhya Pradesh. The series consists of quartzite, copper-pyrite, mica schist, and marble. The copper obtained from this series is used in the Malanjkhand Copper Plant.

Ghatsila: Located in Jharkhand, it is a copper smelting plant. It is an electrolytic refinery. It manufactures brass sheets. It also obtains gold, silver, and nickel in the processing of copper.

Khetri: It is an integrated copper mining-cum-ore refining plant in the Jhunjhunu District of Rajasthan. It was established in 1967. It also obtains copper ore from the Malanjkhand copper mines of Madhya Pradesh. It also has a sulphuric acid plant, and a fertiliser plant.

Korba: Bharat Aluminium Company Limited (BALCO) has an aluminium plant located at Korba, Bilaspur District of Chhattisgarh. It obtains bauxite deposits from the Amarkantak region and electricity from the Korba Thermal Power Plant. The government has disinvested its share to a private company, Sterlite.

Malanjkhand: It is an open cast copper mine in Balaghat District of Madhya Pradesh. A copper plant has been established at Malanjkhand. The copper ore is also sent to the Khetri Copper Plant of Rajasthan.

Rakha Project: The Rakha copper Plant is located in the Rakha District of Singhbhum of Jharkhand. It obtains copper ore from the mines of Rakha.

Tajola: The Tajola Copper Plant is located in the Raigadh town in Maharashtra. The plant has imported copper cathodes. It manufactures copper rods.

Chromite Chromite is an oxide of iron and chromium. It is widely used in metallurgical and chemical industries. Orissa, accounting for about 99 per cent of the total production, is the largest producer of chromite. It is mined in Cuttack, Dhenkanal and Keonjhar districts. Karnataka is the second largest producer. In Karnataka, it is mined in Hassan district. Some chromite has been discovered in the Krishna District of Andhra Pradesh and the Tamenglong and Ukhrul districts of Manipur.

Lead Lead is widely used because of its heaviness, malleability, softness and bad conductivity of heat. It is used in alloys, cable cover, lead-sheeting, ammunition, paints, glass making, paints making, automobiles, aeroplanes, type-writers, calculating machines, printing and rubber industry. Lead does not occur free in nature. It is obtained from galena which is found in association with limestone, sandstones and calcareous slates.

Table 7.7 *Production of Lead in India (1950–2006)*

Year	*Production in thousand tonnes*
1950–51	1.81
1960–61	5.53
1970–71	4.26
1980–81	19.95
1990–91	44.23
2000–01	54.49
2005–06	63.50

Source: ***Statistical Abstracts of India,*** 2007.

Fig. 7.4 Metallic Minerals

Table 7.11 *India: Distribution of Mica (2005–06)*

State	*Production in tonnes*	*Percentage of all India*	*Districrts/Mining centres*
1. Andhra Pradesh	910	71.15	Nellore, Krishna. Khamma, Vishakhapatnam, West Godavari.

(*Contd.*)

Asbestos: Asbestos has great commercial value due to its fibrous structure, and its resistance to fire. It is widely used for making fire-proof clothes, rope, paper, sheeting, belt, fireproof safes, insulators, felts, aprons, gloves, curtains, brake linings in automobiles, and insulating mats. Asbestos cement products like sheets, slates, pipes and tiles are used for building purposes. Mixed with magnesia, it is used for making 'magnesia bricks' used for heat insulation.

Rajasthan is the leading producer accounting for about 95 per cent of the total asbestos production of India. It is mined in Ajmer, Alwar, Dungarpur, Pali and Udaipur districts. Andhra Pradesh is the second largest producer. It is produced in Cuddapah District. It is also mined in Karnataka, Jharkhand, Madhya Pradesh, Chhattisgarh, Tamil Nadu, Uttarakhand, and Nagaland.

Magnesite: Magnesite is used for manufacturing refractory bricks, special type of cement, tiles, fire-proof flooring and for extraction of the metal magnesium, and in steel industry. Its major deposits are found in Uttarakhand, Tamil Nadu, and Rajasthan. Its deposits have also been found in Jammu and Kashmir, Karnataka, Himachal Pradesh, and Kerala.

Tamil Nadu is the largest producer accounting for over 74 per cent of the total magnesite production, followed by Uttarakhand (20 per cent) and Karnataka (6 per cent).

Kyanite: Found in the metamorphic rocks, kyanite is used in metallurgical, ceramic, refractory, glass and electrical industries. India is the largest producer of kyanite in the world. Kyanite deposits are located in Jharkhand, Maharashtra, and Karnataka. These three states contribute almost the whole production of kyanite of the country.

Gypsum: Gypsum is a hydrated sulphate of calcium which occurs as a white opaque mineral in beds of bands of sedimentary rocks like limestone, sandstone and shale. It is mainly used in making ammonia sulphate, fertilisers and in cement industry. It is also used in making plaster of Paris, ceramic industry, nitrogen-chalk, partition-blocks, sheets, tiles, and plastics.

Rajasthan is the leading producer of gypsum accounting for about 99 per cent of the total production of the country. It is obtained mainly from the districts of Barmer, Bikaner, Churu, Ganganagar, Jaisalmer, Jodhpur, Nagaur, and Pali. The remaining one per cent is mined in Tamil nadu, Jammu and Kashmir, Gujarat, and Uttarakhand, Andhra Pradesh, Himachal Pradesh, Karnataka, and Madhya Pradesh.

Sillimanite: Sillimanite is used is ceramics, metallurgy, glass, refractory, automobiles and cement manufacturing industries. Its main characteristic is that it can withstand high temperatures.

Orissa, contributing about 57 per cent of the total production, is the largest producer of sillimanite in India. Kerala is the second largest producer accounting for about 33 per cent of the total production. It is also produced in Maharashtra, Rajasthan, Meghalaya, Assam (Karbi-Anglong), Madhya Pradesh, (Sidhi), West Bengal (Darjeeling, Bankura and Purulia), and Tamil Nadu (Kanniyakumari, Tirunelveli, and Tiruchirappalli).

Diamond: Diamond is a precious stone. It is known for its brilliance, luster, transparency and hardness. Diamond is mainly found in the Vindhyan formations of Bundelkhand, (M.P.), Andhra Pradesh (Anantapur), and Karnataka (Raichur). Panna District of Madhya Pradesh is the main diamond producing district in India.

Cutting and polishing of diamond is mainly carried on in Surat, Ahmedabad, Navasari, Palanpur, Bhavnagar, Mumbai, Khambat, Jaipur, Trichur, and Goa.

Saanen and Angora (Turkey) have been used for cross-breeding with the indigenous breeds so as to improve the quantity of milk and meat production.

Sheep Rearing

India has about 4 per cent of the total population of sheep in the world. They are an important source of mutton, wool and hide in the country. There were about 39 million sheep in the country in 1951 which increased to 55 million in 2005–06. The total production of raw wool in 2005-06 was 45 thousand tonnes.

Sheep rearing in India is done mainly in Rajasthan (25%), follwed by Andhra Pradesh (16%), Tamil Nadu (12%), Karnataka (11%), and Maharashtra (6%) of the total sheep of the country. The important breeds of sheep are *Lohi, Kutchi, Bikaneri, Marwari, Kathiawari, Jaisalmeri, Sonadi, Malpuri, Magra, Shekhawati, Pugal, Deccani, Nellori, Bellary, Gureji, Karna, Bakkarwal, Gaddi.* The Indian wool is, however, inferior to that of Australia and South Africa in quality and is called the coarse carpet wool. India exports wool to USA and UK.

The sheep breeds in India are generally poor. Efforts are being made to improve sheep breeds by crossing local breeds with the imported quality breeds like Australian Merino, Russian Merino, Spanish Merino, Cheviot, Leicester, and Lincoln (UK).

Poultry Farming

Poultry includes domestic fowls like chickens, ducks, geese, and turkey. These are kept to obtain meat, eggs, and feathers. Poultry farming requires small capital investment and provides good additional income and job opportunity to the rural population. There are over 300 million hens in the country which laid 32 billion eggs in 2005–06.

The poultry sector, with a total value of output exceeding Rs.15,000 crore and providing direct and indirect employment to over three million people, produced around 1.9 million tonnes of chicken meat in 2005.

Andhra Pradesh has the largest number of poultry population follwed by Bihar, West Bengal, Tamil Nadu, Assam, Maharashtra, Karnataka, Kerala, Orissa, Madhya Pradesh, and Uttar Pradesh. Poultry farms have been developed around almost all the important urban centres like Mumbai, Kolkata, Delhi, Chennai, Hyderabad, Pune, Bangalore, Nagpur, Bhubaneswar, Shimla, and Ajmer.

The Indian fowls belong to two categories: (i) Desi, and (ii) Exotic or imported. The Desi breed include Chittagong, Punjabi, Brown, Chagas, Lolab, Naked-neck, Titre, Bursa, Tillicherry, etc. The imported breeds include White Leghorn, Rhode Island Red, Black Minorca, Plymouth Rock, New Hampshire, Light Sussex, Brown Leghorn and Australorp, etc.

The Central Poultry Farms are located at Mumbai, Hassarghatta (near Bangalore), Chandigarh and Bhubaneswar. These farms are established to improve poultry breed to produce more eggs.

Export of products such as live poultry, eggs, hatching eggs, frozen eggs, egg-powder, and poultry meat are made to Bangladesh, Sri Lanka, South West Asian countries, Japan, Denmark, Poland, USA, and Angola.

The bird influenza has created numerous problems for poultry development in India. The first outbreak was in 2006 in a small area in Maharashtra. The bird-flu adversely affected the poultry farms in 2007, especially those of West Bengal, Orissa, Assam, Maharashtra and Tripura. The second outbreak was also reported from Maharashtra a few months later. In order to overcome