

6

INDIA - RESOURCES

What we have learnt

- Resources are substances found in nature, which are useful to human beings.
- Resources are classified as renewable and non-renewable, perishable and non-perishable & biotic and abiotic.
- Various agricultural resources are produced in different parts of India.
- Many multi-purpose river valley projects are established in India.
- Different types of mineral resources are present in India.
- Different types of soils and natural vegetation are seen in India.

Resources are the basis for the development of any country. India, one of the largest countries in the world, is blessed with diverse and abundant resources. Only a judicious use of resources will help the development of a country. Over exploitation and unscientific land-use practices will lead to environmental problems and to resource depletion. We shall learn about the various resources and their distribution in our country.

Water Resources

Water plays an equally crucial role as air in sustaining life on earth. With a population of over 100 crores and lakhs of hectares of cultivable land, the importance of water resources in India is immeasurable. Some information about the water resources in India is given below.

Water obtained from rain and melting of ice is stored in various surface sources and underground aquifers. Human beings use this water for various purposes. You have learnt that the amount of rainfall received in different places of India is not same. Seasonal and regional variation in the distribution of rainfall is the peculiarity of India. Due to this the agriculture sector in India has to depend more on irrigation.

Irrigation

84% of the water resources of India is used for irrigation. Irrigation facilities are

established based on the surface as well as underground sources of water. Various sources of irrigation in India are:

- Ponds
- Wells
- Canals
- Springs

Multipurpose River Valley Projects

Several river valley projects, aimed at agricultural and industrial development, were set up after independence. Most of them were multipurpose projects.

The objectives of multipurpose projects:

- Irrigation
- Flood control
- Soil conservation
- Supply of drinking water
- Water transport
- Tourism
- Pisciculture
- Electricity generation
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Table 6.1 gives information about the important multipurpose projects in India.

Project	River	Beneficiary States
Damodar Valley Project	Damodar	Jharkhand, West Bengal
Bhakra Nangal	Sutlej	Punjab, Haryana, Rajasthan
Hirakud	Mahanadi	Orissa
Kosi River Valley Project	Kosi	Bihar
Chambal River Valley Project	Chambal	Madhya Pradesh, Rajasthan
Thungabhadra River Valley Project	Thungabhadra	Karnataka, Andhra Pradesh
Nagarjuna Sagar	Krishna	Andhra Pradesh
Narmada River Valley Project	Narmada	Madhya Pradesh, Gujarat, Rajasthan
Indira Gandhi Canal	Beas, Sutlej	Punjab, Haryana, Rajasthan

Table 6.1

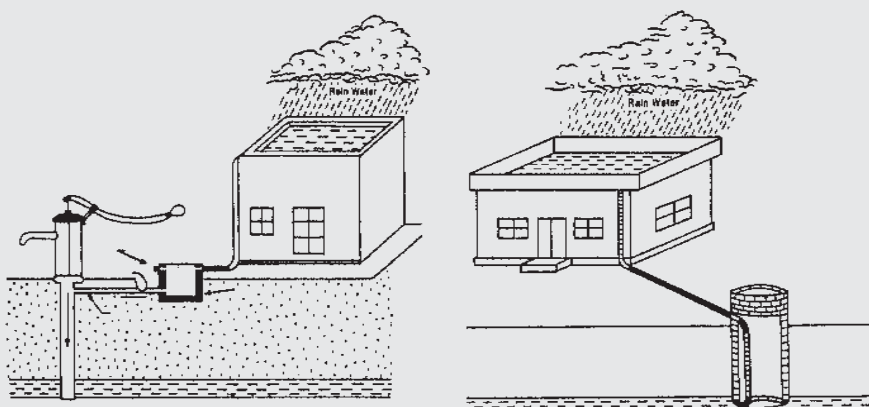
You have learnt about the various water conservation methods in previous classes.

A major portion of fresh water available in India is lost due to the unscientific ways of usage and improper conservation methods.

Water conservation attains prime importance in a country like India where agricultural and domestic needs of water are solely dependent on rainfall. Water conservation can be made possible to a certain extent through watershed management and rain harvesting programmes.

Rainwater Harvesting

You have learnt about the various measures taken to increase the amount of underground water. Rainwater harvesting is a technique to store the rainwater without being wasted. Rainwater collected on the terraces of concrete buildings is diverted to the subsurface soil through pipelines. Water thus collected in the soil becomes part of underground water.



Soils

Soil is one of the most important natural resources. It is indispensable for the existence of plants and animals. Soils are formed by the combined work of rocks, topography, climate and plants. Soils of India are classified based on their colour, structure and place where they are found. Find out those soil types and their characteristics from the following table (Table 6.2).

Based on the table 6.2 and the map (fig. 6.1) find out the various types of soils and the states where they are found, through the superimposition technique, and prepare notes.

Natural Vegetation

Vegetation evolved according to the environmental conditions of a region is known as natural vegetation. Factors that influence natural vegetation are

- Topography
- Soil
- Amount of rainfall
- Temperature.
-

Observe the map (fig. 6.2). What are the various natural types of vegetation in India?

Soil Type	Characteristics
Alluvial Soil	<ul style="list-style-type: none"> ● High fertility. ● Newly formed alluvial soils are called 'Khader' and old soils are called 'Bhangar'. ● Found mostly in flood plains and deltas.
Black Soil (Cotton soil)	<ul style="list-style-type: none"> ● Black in colour. ● Suitable for cotton cultivation. ● Also known as 'Regur'. ● Formed due to the disintegration of lava rocks. ● Highly fertile and moisture holding capacity is high.
Red Soil	<ul style="list-style-type: none"> ● Formed due to disintegration of metamorphic and igneous rocks. ● Comparatively less fertile. ● Presence of iron gives the red colour.
Laterite	<ul style="list-style-type: none"> ● Very low fertility. ● Formed in the monsoon climatic regions. ● Mixture of clay and red soil.
Desert Soil	<ul style="list-style-type: none"> ● Moisture content very low. ● Able to give more yield if water is available. ● Insoluble salts are seen.
Mountain Soil	<ul style="list-style-type: none"> ● Rich in humus content. ● Dark brown or black in colour. ● Comparatively high fertility

Table 6.2

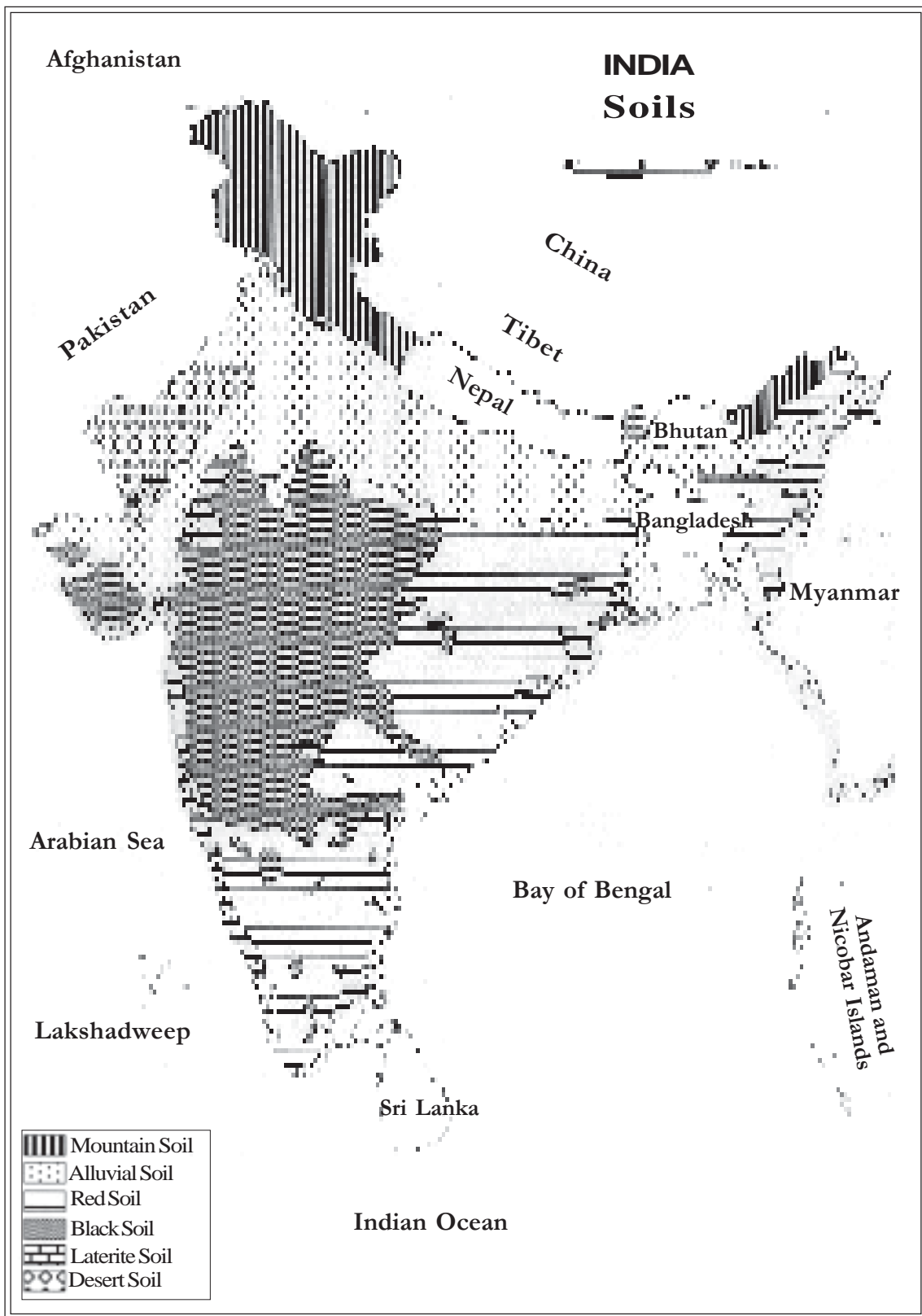


figure 6.1

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The following are the common characteristics of various types of natural vegetation of India.

Tropical Rain Forests

Our tropical rain forests include tropical evergreen forests and tropical semi-evergreen forests. They are mostly found in places where there is plenty of rainfall and sunshine throughout the year.

Observe maps and find out the topography of the places where the tropical rain forests are found. In which of the states these are distributed? Prepare notes.

Tropical Deciduous Forests

You have learnt in the previous classes about the characteristics of tropical deciduous forests, major trees types and the places where they are found in Kerala. Teak, sal, and sandalwood are some of the important trees found in the tropical deciduous forests of the eastern slopes of Western Ghats as well as in the northeastern parts of the peninsular plateau and in the valleys of the Himalayas.

Thorn Forests and Shrubs

Thorn and Shrubs are found in dry places where the annual rainfall is less than 70 cms. Major plant species found are babul, kikar and coarse grasses. Observe the map (figure 6.2) and find out the places where these types of vegetation are found.

Temperate Forests and Grasslands

Various types of plants are found in the Himalayas in relation to the varying altitudes. Broad-leaved evergreen trees grow between altitudes 1000 metres and 2000 metres. Oak, chestnut and maple belong to this category.

Coniferous trees such as pine, deodar, silver fir and spruce are seen between altitudes 1500 metres and 3000 metres. They are found in the southern slopes of the Himalayas. Temperate grasslands are commonly seen at higher altitudes in these regions.

Alpine and Tundra Vegetation

Vegetation growing at altitudes above 3600 meters MSL is known as alpine vegetation. It can be noticed that as the altitude increases plants show stunted growth. Silver fir, pine, juniper and birch belong to this category. Alpine grasslands are found at higher altitudes in this region. People belonging to Gujjar and Bakarwal tribal groups, whose main occupation is sheep grazing, make use of this region. The vegetations like lichen and mosses are found in high altitudinal regions.

Mineral Resources

As one of the most important resources, minerals have a decisive influence on the economic development of a country. They are seen in solid, liquid and gaseous forms. Minerals can be classified into metallic and non-metallic minerals. Table 6.3 gives the major minerals of India.

Metallic Minerals		Non Metallic Minerals
Ferrous	Non-ferrous	
Iron Ore	Gold	Sand stone
Manganese	Silver	Nitrate
Pyrite	Copper	Potash
Nickel	Lead	Dolomite
Tungsten	Bauxite	Mica
Cobalt	Tin	Gypsum
		Coal
		Petroleum

Table 6.3

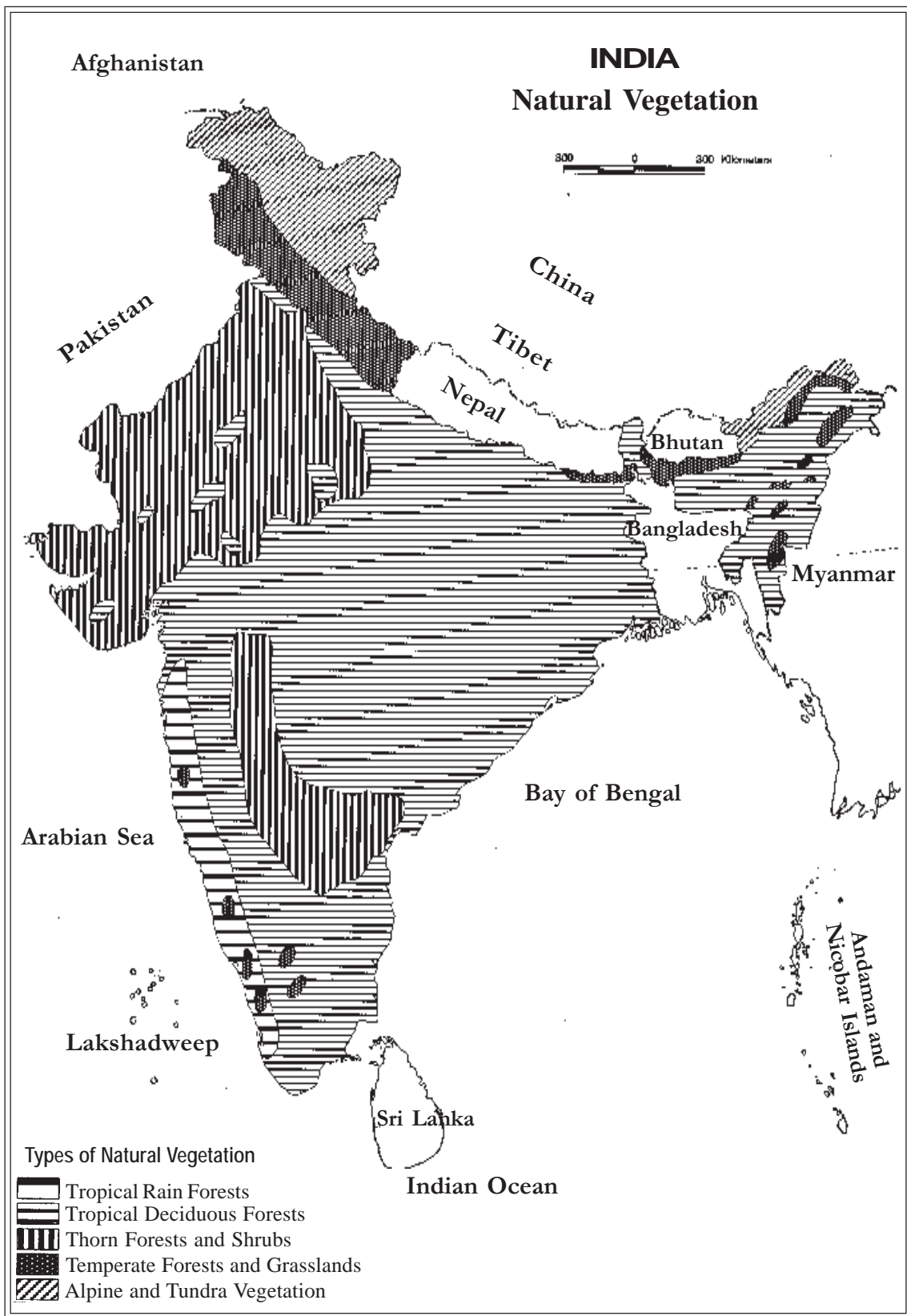


figure 6.2

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Iron Ore

Iron ore is the basic resource for a nation’s development. Iron is described as the backbone of civilization. As the major raw material for the iron and steel industry, iron ore is found in four varieties.

- Magnetite
- Limonite
- Hematite
- Siderite

20% of the iron ore deposits of the world is found in India. Major iron ore deposits of India are given in the Table. 6.4.

Producing Centres	State
Durg, Dandiwarra Districts	Chattisgarh
West Singhbhum, East Singhbhum Districts	Jharkhand
Sundergarh, Kendujhar, Mayurganj Districts.	Orissa
North Goa District	Goa
Chickmagalore, Bellari Districts	Karnataka

Table 6.4

Find out from the map (Fig. 6.3) other states where iron ore deposits are found.

About half of the iron ore produced in India is exported to Japan, Korea and Western Europe.

Manganese

It is estimated that about 20% of the manganese deposits of the world are in India. India has the fifth position in the production of manganese. Manganese is used in the manufacture of many items. Let us see what they are.

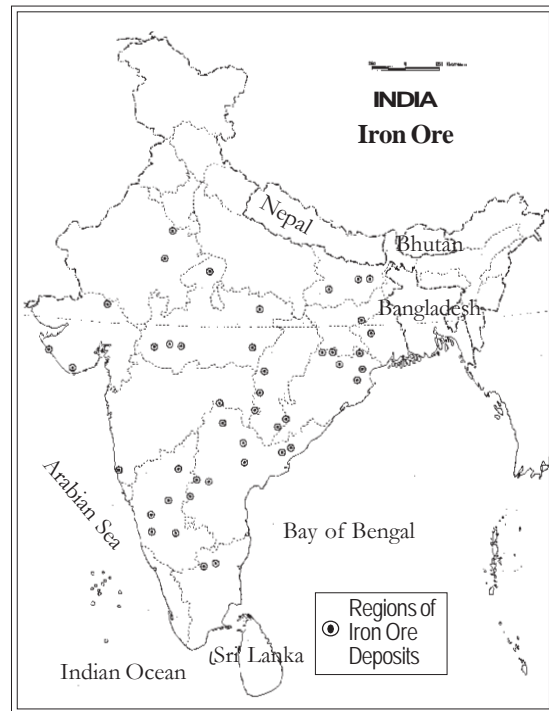


figure 6.3

- Iron and Steel
- Bleaching powder
- Pesticides
- Paint
- Batteries

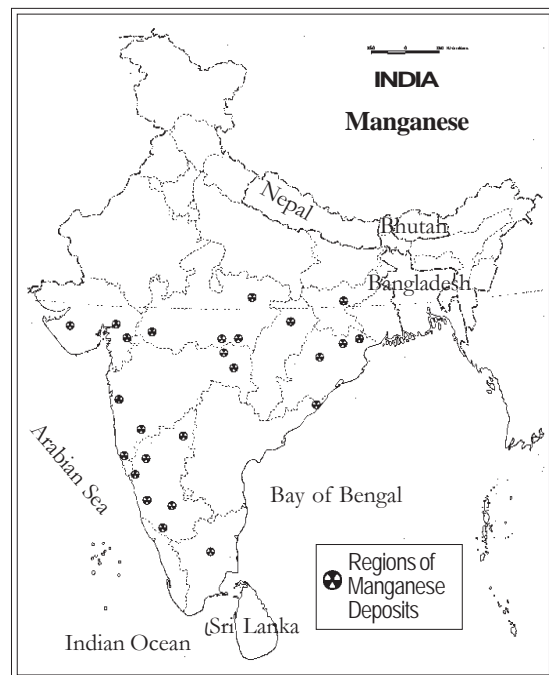


figure 6.4

Find out from the map (Fig. 6.4) major manganese producing centres of India.

Bauxite

Bauxite is the ore of aluminium. Since aluminium is a light metal it has enormous industrial importance. Find out from Table 6.5, the major bauxite producing centres of India.

Producing Centres	States
Bilaspur	Chhattisgarh
Mandila, Shaktol	Madhya Pradesh
Vishakhapatnam	Andhra Pradesh
Ranchi	Jharkhand
Ratnagiri, Raigarh	Maharashtra
Sambhalpur, Kalahandi	Orissa
Sancune	Goa
Salem, Madurai, Nilgiris	Tamil Nadu
Jam Nagar, Surat	Gujarat
Belgaum	Karnataka

Table 6.5

Copper

Copper is another metal seen in nature. As a good conductor of heat and electricity copper has an important role in the electrical goods industry. Copper is mixed with other metals to form alloys. Find out from Table 6.6, the major copper producing centres.

Producing Centres	State
Sighbhum	Jharkhand
Jun Jun, Alwar districts	Rajasthan
Chitradurga, Gulbarga	Karnataka
Guntur, Nellore	Andhra Pradesh
Balaghat	Madhya Pradesh

Table 6.6

Mica

Mica is a bad conductor of electricity and is used in the manufacture of electrical goods. India contributes about 60% of the mica produced in the world. Major mica producing states of India are Jharkhand, Bihar, Andhra Pradesh and Rajasthan.

Lead

Lead is a soft and heavy metal. Its ore is known as 'Galena'. It is a metal with very low heat conductivity. It is used in the manufacture of paint, glass and rubber products. Lead is mainly produced in Rajasthan, Gujarat, Maharashtra, West Bengal, Orissa, Uttar Pradesh, Meghalaya, Madhya Pradesh, Andhra Pradesh and Tamil Nadu states.

Agricultural Resources

India is one of the countries where agriculture has got a very important place. Like other resources, agricultural resources have significant influence on Indian economy. Three fourths of her population depend on agriculture. Agriculture sector is the source of raw materials for many industries. It makes the food basket richer for a nation like India which stands second in the world in terms of population.

Agricultural sector in India is dynamic throughout the year. Variety in seasonal crops is the peculiarity of our agricultural sector.

What are the factors that influence the agricultural sector?

- Climate
-

Agricultural crops are classified into three, based on seasonal changes. Observe table 6.7.

Name	Sowing Period	Harvest Period	Major Crops
Kharif	June (Beginning of monsoon)	Early days of November (End of monsoon)	Paddy, maize, cotton, millets, jute, sugarcane groundnut
Rabi	November (Beginning of winter)	March (Beginning of summer)	Wheat, tobacco, mustard, pulses, linseed
Zaid	March (Beginning of summer)	June (Beginning of Monsoon)	Fruits, vegetables, water melon

Table 6.7

India has the first position in the production of many crops.

Since India is an extensive country the diverse agricultural crops can also be classified as shown below.

- **Tropical Crops:** Paddy, coffee, sugar cane, jute, rubber, spices, mango, pineapple.
- **Sub-tropical Crops:** Cotton, tea
- **Temperate Crops:** Wheat, maize, barley

Let us understand the major food crops of India and their characteristics.

Food Crops

Diversity of food crops of India should be ascertained according to the factors of temperature, rainfall and soil. Paddy, wheat, millets and pulses are the major food crops of India.

❑ PADDY



Paddy is the most important food crop of India. India stands second in the production of paddy. India and China together produce about 90% of the total world production of paddy.

Geographical Requirements

Temperature: 16°C to 20°C of temperature in the early stages of growth. 18°C to 32°C of temperature is essential during the harvesting period.

Rainfall: Paddy is cultivated in places where rainfall is between 150 cm. to 300 cm. If irrigation facilities are available paddy can be cultivated in places where the rainfall is low.

Soil: Even though paddy can be cultivated in variety of soils, alluvial soil is the most suited for its cultivation.

If required temperature is available, the altitude of a place is not at all a problem for the cultivation of paddy. It grows at an altitude of over 2000m in Kashmir and at Kuttanad in Kerala, which is below sea level.

Find out the major rice growing states from the map (figure 6.5).

❑ WHEAT



Wheat is another important food grain, after paddy. It is the staple food of the people in the states of Punjab, Haryana and Uttar Pradesh. Even though wheat is

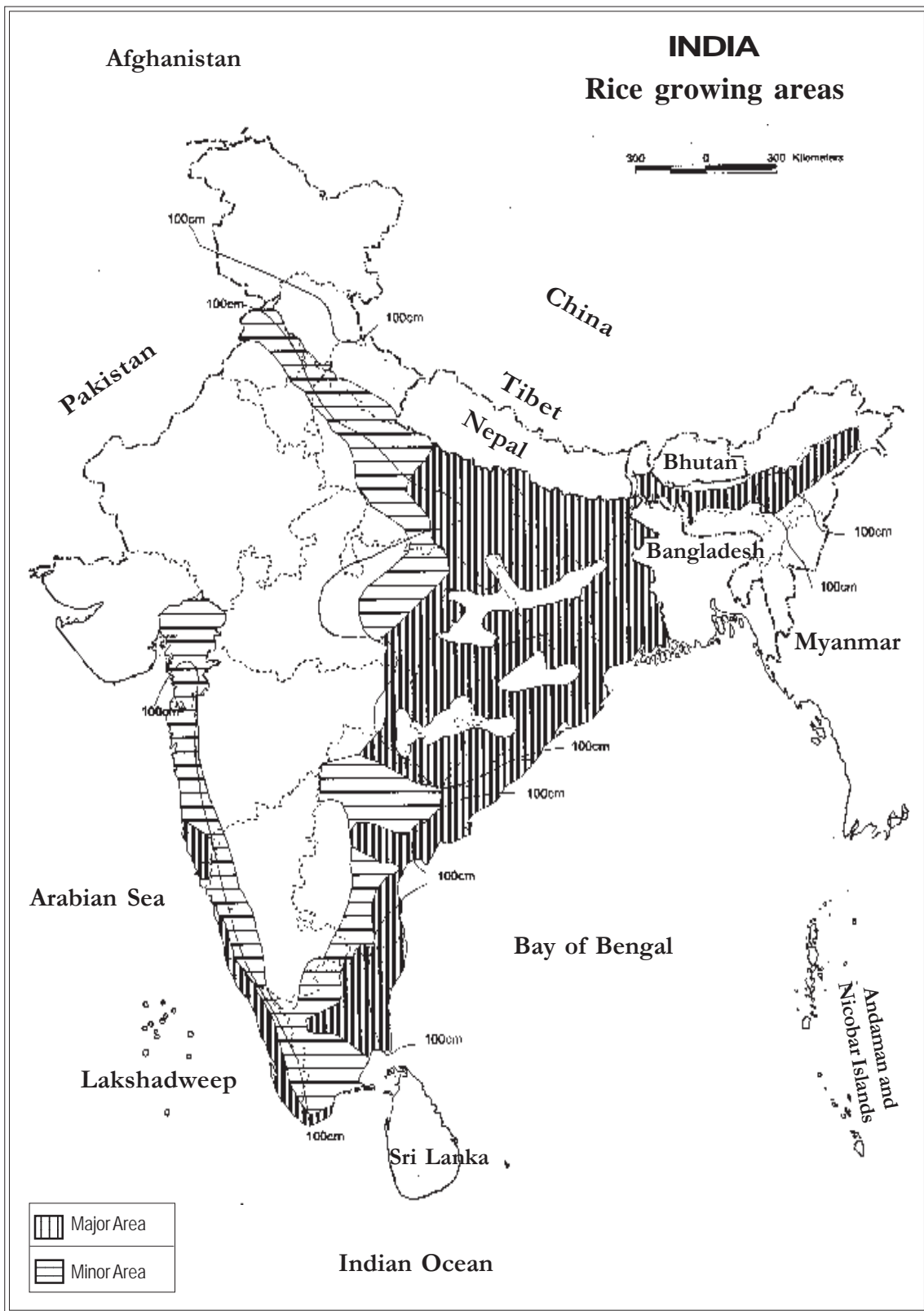


figure 6.5

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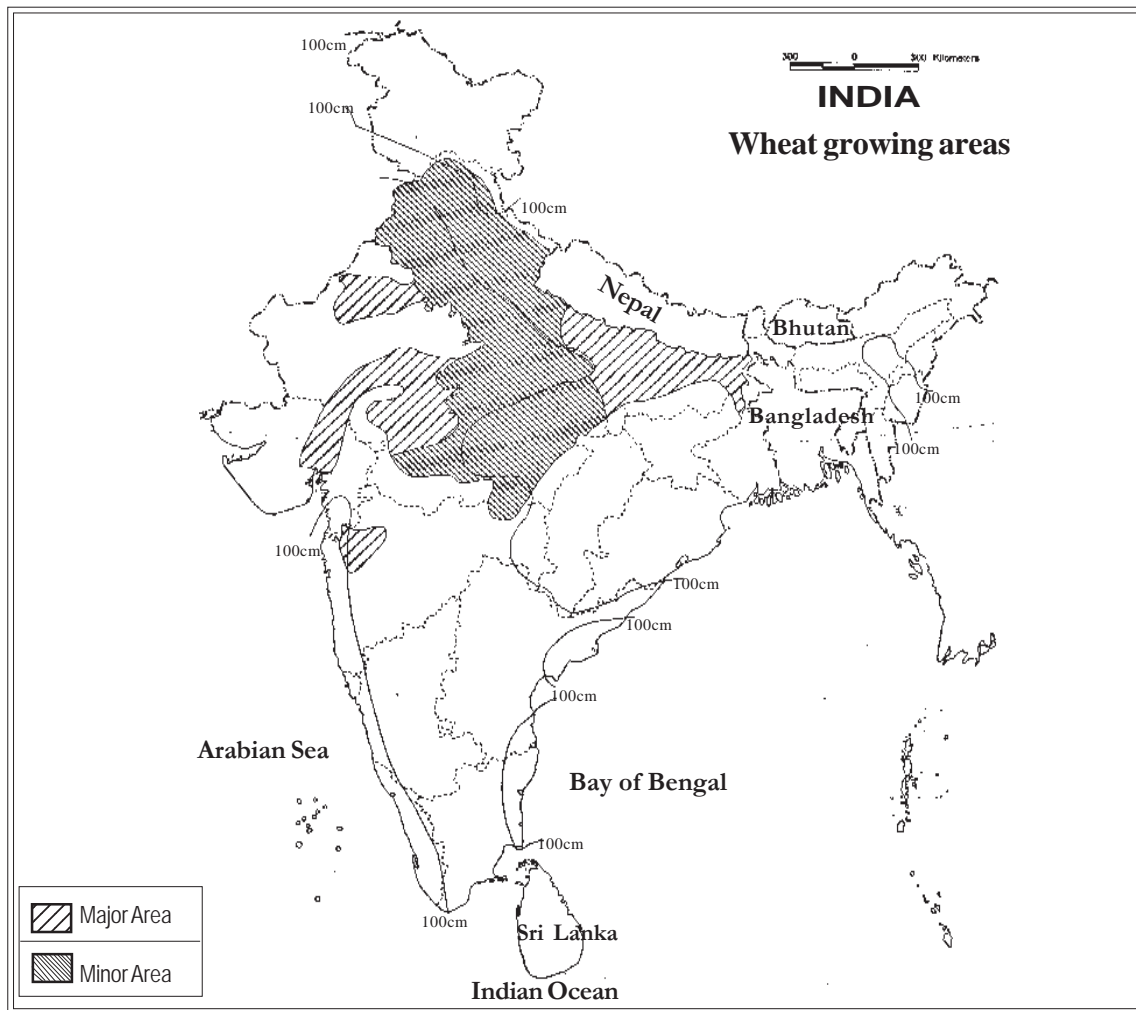


figure 6.6

a temperate crop it is considered a rabi crop in India. It is cultivated in those places in northern India where the temperature in winter does not exceed 15°C .

Geographical Requirements

Temperature: During the growing season 10°C to 15°C and during the harvest season 25°C to 28°C is required.

Rainfall: 150 cm to 300 cm of rainfall during the growing season is good for wheat. Excess rainfall is harmful for the cultivation of wheat. If irrigation is available wheat can be grown in places where the rainfall is low.

Soil: Porous soil with content of lime is suitable for wheat cultivation. It is cultivated in the Ganga Plain and in the Deccan Plateau.

Find out from the map (Fig. 6.6) the places where wheat is grown in India.

Note from table 6.8 other food crops cultivated in India and their geographical requirements.

- *Colour out the various food crops producing states in India in the map shown at the end of this textbook.*




Crops	Temperature	Rainfall	Soil	Producing States
Maize 	Between 20°C and 27°C. Snow fall is harmful.	50-100 cm. Sun shine after the rain is good for the growth of the plant	Soil with high nitrogen content.	Uttaranchal, Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan, Jharkhand, Punjab
Millets <i>(Jowar, Bajra, Ragi)</i> 	27°C – 32°C (These plants can withstand high temperature and drought)	50 cm – 120 cm	Need not necessarily have high fertile soil. Grows in alluvial soil with less salt content and in black soil.	Maharashtra, Karnataka, Andhra Pradesh, Madhya Pradesh, Tamil Nadu, Gujarat, Rajasthan and Uttar Pradesh.
Pulses <i>(Black gram, Thur Dal, Green gram, Groundnut)</i> 	20°C – 30°C	25 cm - 50 cm	Dry silty soil	Punjab, Haryana, Uttar Pradesh, Maharashtra, Madhya Pradesh, Jharkhand, Chhattisgarh, Rajasthan and Bihar

Table 6.8

Many other crops are also cultivated in our country in addition to the above food crops. They are mainly produced as raw materials for industries. Sugarcane, cotton, jute, tea, coffee, oil seeds, tobacco and rubber are some among them. They are known as cash crops cultivated in plantations. Besides being the raw materials for industries, they are also export items that can earn foreign exchange. Hence





they have great influence on the Indian economy. Cash crops are classified as follows.

Fibre crops. - Cotton, jute.

Oil Seeds. - Groundnut, mustard, coconut, gingelly, linseed, Castor seed.

Beverage crops - Tea, coffee, cocoa.

Some of the important cash crops of India are shown in the following table (table 6.9).
Find out the geographical conditions congenial to their cultivation and the states producing these crops.

Crops	Climatic Conditions	Soil	Major Producing States	Remarks
Sugarcane 	20°C - 30°C of temperature, 75 cm - 150 cm of rainfall. Plenty of water is required during the growing season	Well drained alluvial soil	Uttar Pradesh (50% of the total production)	<ul style="list-style-type: none"> India is the birth place of sugarcane. In production India has the second position after Brazil. It is the raw material for the production of sugar.
Cotton 	21°C - 25°C of temperature 50 cm - 80 cm rainfall	Black soil Alluvial soil	Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, Madhya Pradesh	<ul style="list-style-type: none"> It is a major fibre crop in India. India has the fourth position in the world in the production of cotton. Short staple variety is mainly cultivated in India
Jute 	27°C - 34°C of temperature, 170 cm - 200 cm of rainfall	Alluvial soils of flood plains and deltas	West Bengal (Ganga-Brahmaputra Plain)	<ul style="list-style-type: none"> India has the second position after Bangladesh in the production of jute This fibre has an important position in earning foreign exchange. A fibre called mestha is used in place of jute. This low quality fibre is cultivated in Bihar, Assam and Orissa.
Tobacco 	20°C - 30°C of temperature, 75 cm - 150 cm of rainfall	Sandy soil containing potash, iron and phosphorous	Andhra Pradesh, Karnataka and Tamil Nadu ($\frac{2}{3}$ of total production)	<ul style="list-style-type: none"> Third place in the production of tobacco. The Portuguese were the first to cultivate tobacco in India in 1588. Tobacco is injurious to health.




<p>Tea</p> 	<p>13°C – 35°C of temperature, 150 cm – 250 cm of rainfall. Frost is harmful</p>	<p>Well drained soil with iron content</p>	<p>Assam (50%) occupies the first position, West Bengal – second and Tamil Nadu – third.</p>	<ul style="list-style-type: none"> • India is the largest producer of tea in the world. • Tea cultivation was started in India in 1823. • It is a major beverage crop
<p>Coffee</p> 	<p>18°C – 28°C of temperature, 125 – 200 cm of rainfall. Wind and frost are harmful</p>	<p>Well drained saline alluvial soil</p>	<p>Karnataka (60% of total production) Kerala</p>	<ul style="list-style-type: none"> • It is the most important beverage crop in the world. • The British were the first to introduce coffee in India (Karnataka) in the year 1830. • Arabica, Robusta and Liberica are the three varieties of coffee.
<p>Rubber</p> 	<p>21°C – 35°C of temperature, 175 cm – 300 cm of rainfall</p>	<p>Alluvial soil</p>	<p>Kerala (91%) Tamil Nadu (5%)</p>	<ul style="list-style-type: none"> • In 1902 the British established the first rubber plantation on the banks of Periyar in Kerala. • The sap obtained from rubber tree is known as latex. • Rubber is used in the production of tyres, chappals, sports goods, mattresses, cables etc.

Table 6.9

You have found out from the table (6.9) the states that are leading producers of cash crops. Find out the other important cash crops and producing states from the map and reading materials.

- Prepare a report on the cash crops based on Table 6.9. Using colours and symbols show the distribution of cash crops on the map given at the end of this book.

Fruits and Vegetables

India has the second position in the production of fruits and vegetables. Banana

and mango are important among them. India contributes about 13% of the world's production of vegetables. Apple is an important temperate fruit. Apple is mostly produced in Himachal Pradesh, Kashmir and Uttaranchal. Production of banana, a subtropical fruit, is concentrated in Tamil Nadu and Maharashtra. Orange is cultivated in Maharashtra, Uttaranchal, Himachal Pradesh, Tamil Nadu and Kerala. Grape is another subtropical fruit. It's cultivation is concentrated mainly in Uttaranchal, Himachal Pradesh, Jammu and Kashmir, Maharashtra, Andhra Pradesh, Tamil Nadu and Karnataka.

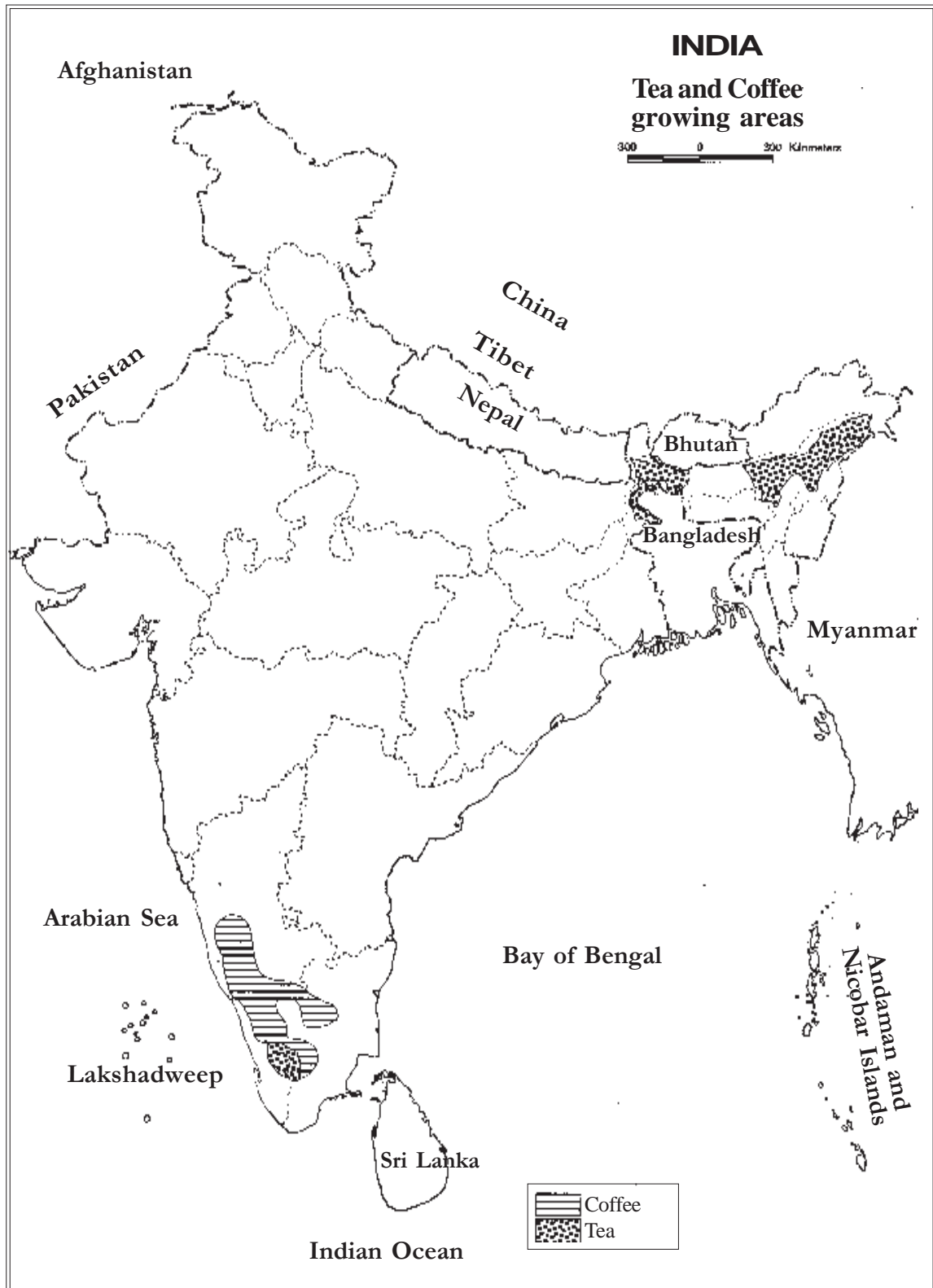


figure 6.7

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Energy Resources

Energy is an inevitable resource for existence. It has an important position in our day-to-day life. It is an indispensable component in economic as well as technological development. Coal, petroleum, natural gas solar energy and electricity from wind etc. are some of the sources of energy. Some of these are renewable and others are non-renewable. You have learnt about them in previous classes. Energy resources can be further classified into conventional and non- conventional categories. Find out what these resources are and complete the following table.

Conventional Energy Resources	Non Conventional Energy Resources
<ul style="list-style-type: none">• Coal••	<ul style="list-style-type: none">• Solar energy••

Conventional Energy Resources

Coal

Coal is the major energy resource in India. 67% of the energy requirement of the country is met from coal. It is mainly used in industries such as iron and steel. Coal, also known as 'Black Gold', is classified into many varieties based on its quality and the amount of carbon content in it. Find out from the following table (6.10) the types of coal, their characteristics and the states in India where they are found.

India, which has about 214000 million tons of coal deposits, produces about 330 million tons annually. Many coalfields of India are located in the northeastern region of the sub-continent. About two thirds of the total production of coal is made from Jharkhand, Madhya Pradesh, Chhattisgarh and Orissa. One third of the total production is obtained from Andhra Pradesh, Maharashtra, West

Variety	Characteristics	Places were found
Anthracite	<ul style="list-style-type: none">• Hard and black in colour• 80% carbon• Highest quality	<ul style="list-style-type: none">• Jammu & Kashmir
Bitumen	<ul style="list-style-type: none">• 60-80% carbon• Widely used	<ul style="list-style-type: none">• Jharkhand• Orissa• West Bengal• Madhya Pradesh
Lignite	<ul style="list-style-type: none">• 60% carbon• Low quality• Known as brown coal.	<ul style="list-style-type: none">• Rajasthan• Tamil Nadu• Assam
Peat	<ul style="list-style-type: none">• Less than 50% carbon• High in smoke and less in heat	<ul style="list-style-type: none">• Wetlands, marshy places

Table 6.10

Bengal and Uttar Pradesh. Coal mining in India gives employment to about seven lakh people.

Petroleum

Petroleum, known as 'Mineral Oil', is mined from the layers of sedimentary rocks. India has a reserve of about 4000 million tons, but only 25% of it is possible to be excavated. About 33 million tons of petroleum is mined in India annually. 63% of this is from Mumbai High, 18% from Gujarat and 16% from Assam. The remaining 3% is rigged from Arunachal Pradesh, Andhra Pradesh and Tamil Nadu.

Petroleum (crude oil) is purified at the oil refineries to produce various by-products. There are eighteen oil refineries in India, which can purify about 112.54 million tons of crude oil annually. Now a days the demand for petroleum products in India is increasing and about 102 million tones of petroleum is needed annually. There is no doubt that this demand will increase in the future too. Our country imports about 60 million tones of petroleum and petroleum products annually.

Natural Gas

Deposits of natural gas are seen in the crust of the earth either independently or along with petroleum. About 23 billion cubic metres of natural gas is used in India. India's natural gas reserve is only 700 billion cubic metres. Most of the deposits of natural gas is found in Andhra Pradesh, Maharashtra, Gujarat, Assam and Andaman-Nicobar islands. Andaman alone has about 47.6 million cubic metres of natural gas reserve. Recently it has been found out that Krishna-Godavari delta

has large reserves of natural gas. India's annual natural gas production is about 27860 million cubic metres.

Electricity

The role of electricity in the growth and development of a nation is very large. Electricity is mainly produced in three ways. They are thermal electricity, hydro electricity and nuclear electricity.

Thermal Electricity

Thermal electricity is produced using coal, petroleum, natural gas etc. India has 310 thermal power stations. The state of Assam, Jharkhand, Uttar Pradesh, West Bengal and Tamil Nadu depend mainly on thermal electricity. It is also produced in Punjab, Haryana, Rajasthan, Karnataka, Kerala, Orissa and Delhi. Seventy percent of the total production of electricity in India is from thermal power stations.

Hydroelectricity

In India the hydro electric power generation started with the installation of a power station in 1897 for the supply of electricity to Darjeeling. In 1902 another power station was established at Sivasamudram waterfall in river Cauvery. At present twenty five percent of the electricity produced in India is from hydropower. It highly influences the economic development of India. India has the capacity to produce 150000 MW of hydroelectricity but only 25000 MW is generated. Hydroelectricity is mainly produced in Himachal Pradesh, Karnataka, Kerala, Jammu & Kashmir, Meghalaya, Tripura and Sikkim. Kerala depends mainly on hydroelectric projects for the generation of electricity.

Nuclear Electricity

Nuclear electricity is produced from minerals such as uranium and thorium. They are mined mainly from the state of Jharkhand and the Aravalli ranges of Rajasthan. Uranium is separated from the coastal sands of Kerala containing monazite. Fifty percent of the world's thorium deposit is found in India. Tharapur (Maharashtra), Kalpakkam (Tamil Nadu), Rawath Bhatta (Kota-Rajasthan), Narora (Uttar Pradesh), Kakrapara (Gujarat) and Kaiga (Karnataka) are the nuclear power stations in India. India produces 272 MW of nuclear energy annually. This constitutes only about 3.4 percent of the total production of electricity in the country. What are the possibilities of nuclear power production in Kerala? Discuss.

Non-Conventional Energy Sources

As the demand for energy increases the importance for non-conventional sources of energy such as sun, wind, tide, biogas etc. is increasing. What are the peculiarities of these sources of energy?

- Easily available
- Renewable
- Environment friendly
- Pollution free
-

Solar Energy

India, located in the tropical region, has immense potential for the conversion of solar energy. Sunlight can be directly converted to electricity through the photo voltaic technology. It is possible to generate 20 MW of electricity through this method from 1 sq. km. area. Solar

energy is most commonly used for the following purposes now.

- Cooking
- Lighting
-

The largest solar energy conversion centre in India is located at Madhapuri, near Bhuj in Gujarat.

Wind Energy

Wind energy producing centres are established in many parts of the country. The initial expenses for erecting the wind mills are huge. Tamil Nadu, Andhra Pradesh, Karnataka, Gujarat, Kerala, Madhya Pradesh, Maharashtra and Lakshadweep have wind energy producing centres. The largest centre is located at Tamil Nadu.

Bio gas

Bushes, wastes from crops, human and animal wastes are used to produce biogas. These materials are allowed to decay in order to produce the gas. This gas is used for domestic purposes in rural areas. Biogas can give higher temperature compared with kerosene and charcoal.

Geothermal energy, tidal energy, wave energy etc. are other non-conventional sources of energy. In future they will also be developed and used more.

Conservation of Energy Resources

A law is enacted in India as 'Energy Conservation Act' for the conservation of energy resources. It came into effect in March 2002. It is aimed at the judicious use and conservation of energy. In order to conserve energy we have to:

- Switch off electrical appliances when not in use.
- Use appliances that need very little energy for functioning.
- Follow periodic maintenance of appliances.
- Give importance to non-conventional sources of energy.
- Depend more on public transport and use of private vehicles to be reduced.



SUMMARY

- India is blessed in resource potential and resource diversity.
- India has many multi-purpose river valley projects.
- The soils of India are classified into various categories based on its colour, structure and places where they are found.
- India has different types of natural vegetation.
- Variety of crops cultivated according to seasons is the speciality of India.



QUESTIONS

1. Which are the multi-purpose projects in India? Prepare a report.
2. Which are the states in India where the different soil types are distributed?
3. What are the geographical conditions required for the cultivation of paddy?
4. Make notes on the distribution, production and utilisation of important mineral resources and energy resources in India.
5. Energy crisis is one of the challenges posed by us today. Make your suggestions to manage this crisis faced by the humanity.
6. Even though India is an agricultural country, poverty is still prevailing in many parts of India. What may be the reasons for it. What are your suggestions to solve this problem?

