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Concept based notes
GEOGRAPHY OF INDIA
(Bachelor of Arts)

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Preface

I am glad to present this book, especially designed to serve the needs of the students. The book has been written keeping in mind the general weakness in understanding the fundamental concepts of the topics. The book is self-explanatory and adopts the “Teach Yourself” style. It is based on question-answer pattern. The language of book is quite easy and understandable based on scientific approach.

Any further improvement in the contents of the book by making corrections, omission and inclusion is keen to be achieved based on suggestions from the readers for which the author shall be obliged.

I acknowledge special thanks to Mr. Rajeev Biyani, *Chairman* & Dr. Sanjay Biyani, *Director (Acad.)* Biyani Group of Colleges, who are the backbones and main concept provider and also have been constant source of motivation throughout this endeavour. They played an active role in coordinating the various stages of this endeavour and spearheaded the publishing work.

I look forward to receiving valuable suggestions from professors of various educational institutions, other faculty members and students for improvement of the quality of the book. The reader may feel free to send in their comments and suggestions to the under mentioned address.

Author

Syllabus

PAPER-II : Geography of India

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India in the context of Southeast and South Asia. India : a land of diversities, unity within diversities.

Major terrain elements of India and their role in shaping physical Land-landscape of India. Drainage systems of India and their functional significance. The morphological regions of India.

Unit-II

Regional and Seasonal variations of climate—the monsoon, western disturbance, norwesters. Climatic regions of India. Soil types of India—the distribution and characteristics. Vegetation types and their distribution.

Forests, minerals and power resources—The status of their use and need for conservation.

Unit-III

Spatial distribution of population and density; socio-economic implications of population explosion, urbanization, changing nature of Indian economy. Agricultural growth during the plan period. Green Revolution vis-a-vis traditional farming. Regionalisation of Indian agriculture and topology of agricultural regions and their relevance in agricultural development planning.

Industrial development and Indian economy- Industrial regions of India and their industrial structure, composition of domestic and international trade.

Unit-IV

Basis of regional divisions of India-macro, meso and micro-regions of India-their comparative analysis. Resource regions of India. Regional planning of rural and urban regions.

Unit-V

Contemporary issues regional disparity, poverty, population explosion, globalization. Impact of development on Environment—social and ethnic tension, gender discrimination and empowerment of women.

Chapter 1

Physiography of India

Q. 1: Explain the Himalayan division of India.

Ans

The Himalayan mountain system developed in a series of stages 30 to 50 million years ago. Himalayas are the young fold mountains. The extreme cold, snow and rugged topography discourage the neighbors to enter India through Himalayas. Himalayas mountain system forming a broad continuous arc for nearly 2600 km (1600 mi) along the northern fringes from the bend of the Indus River in the northwest to the Brahmaputra River in the east. The Himalayas range, averaging 320 to 400 km (200 to 250 mi) in width. For most of its length, the Himalayas comprise two nearly parallel ranges separated by a wide valley in which the Indus and Sutlej rivers flow westward and the Brahmaputra flows eastward. The Himalayas form the earth's highest mountain region, containing 9 of the 10 highest peaks in the world. The Himalayan range was developed from powerful earth movements that occurred as the Indian plate pressed against the Eurasian continental plate. Even today the mountains continue to develop and change, and earthquakes and tremors are frequent in the area. The highest mountain system in the world, located in the territories of India, China, Nepal, and Pakistan, between the Tibetan Plateau on the north and the Indo-Gangetic Plain on the south. The Himalayas are the world's greatest mountain system, with the tallest peaks, the greatest differences in elevation over short distances, and the deepest gorges (as much as 4-5 km).

The Hmalayas may be divided into three parallel ranges: (1)the Great Himalayas, (2) the Inner Himalayas also known as Middle or lesser Himalayas and (3) the Sub-Himalayan foothills which includes the Siwalik Range and the Tarai and Duars *piedmont*.

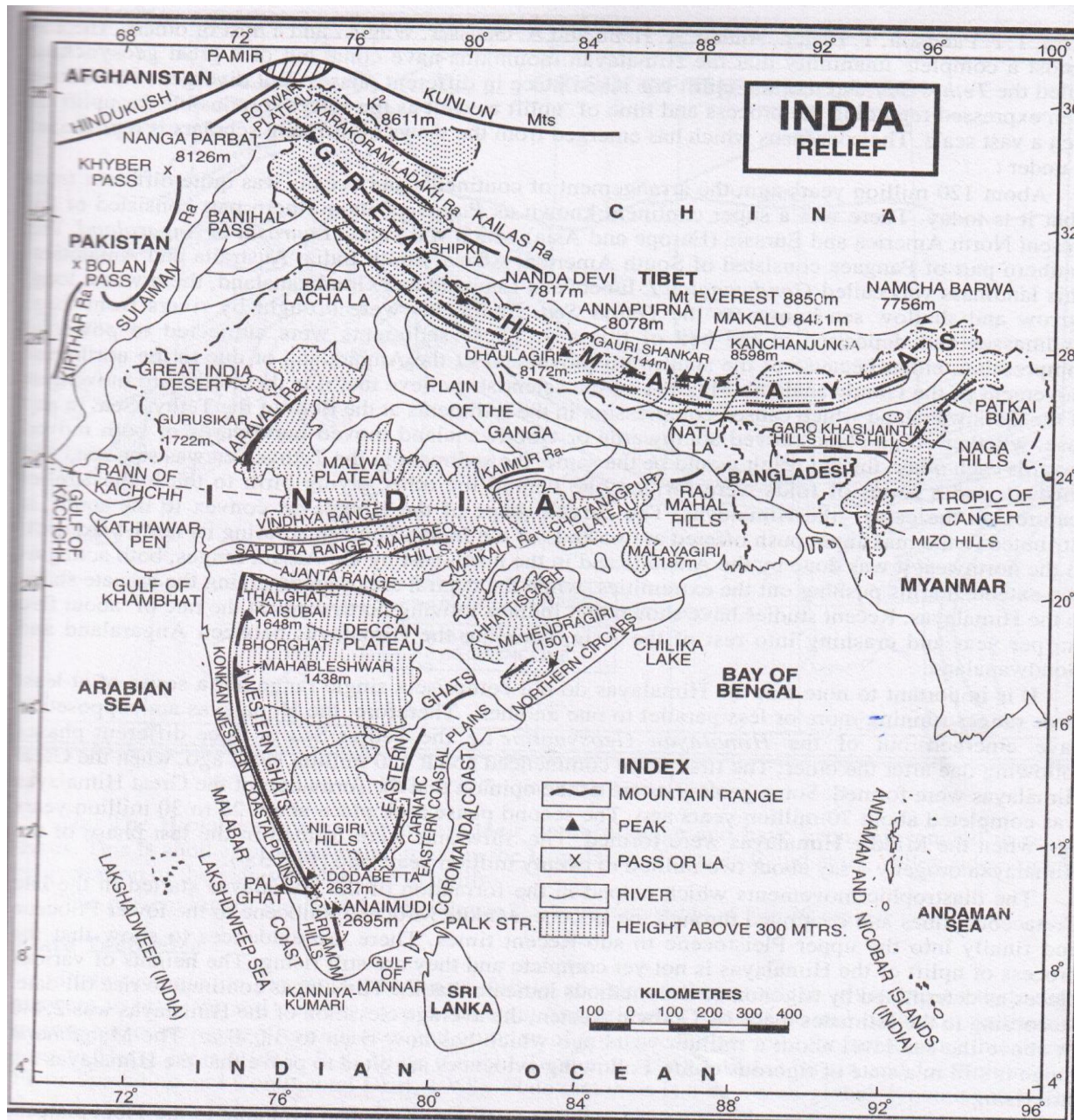
1. The Great Himalayas:

The Great Himalayas, the highest zone, contains vast snowy peaks with an average height exceeding 20,000 ft. The width of this zone, composed largely of gneiss and granite, is about 15 miles. It is the most continuous range. It is snow bound and many glaciers come down from this range. The Nepal and Sikkim portion of the Great Himalayas contains the greatest number of high peaks. Great

Himalaya is least highest in Assam. The snow line on the southern slopes of the Great Himalayas varies from 4480 m (14,700 ft) in the eastern and central Himalayas of Nepal and Sikkim to 5180 m (17,000 ft) in the western Himalayas. To the north of the Great Himalayas are several ranges such as the Zaskar, Ladakh, and the Kailas. The Karakoram Range lies on the Tibetan side of the Great Himalayas. High Mountain passes also exist in this range, namely, Bara Lacha-La, Shipki-La, Nathu-La, Zoji-La, Bomidi-La etc. The Ganga and Yamuna rivers originates from this Himalayas. The Great Himalayan region is one of the few remaining isolated and inaccessible areas in the world today. Some high valleys in the Great Himalayas are occupied by small clustered settlements.

2. The Middle Himalayas:

The Middle Himalayas has a width of about 80 km (about 50 mi), borders the Great Himalayan range on the south. Some of the ranges of the Middle Himalayas are the Mahabharat, the Nag Tibba, the Pir Panjal and the Dhaola Dha. It consists principally of high ranges issuing diagonally from the Great Himalalaya range at point where the latter changes its path and several outer disconnected ranges.



Source: D.R. Khullar

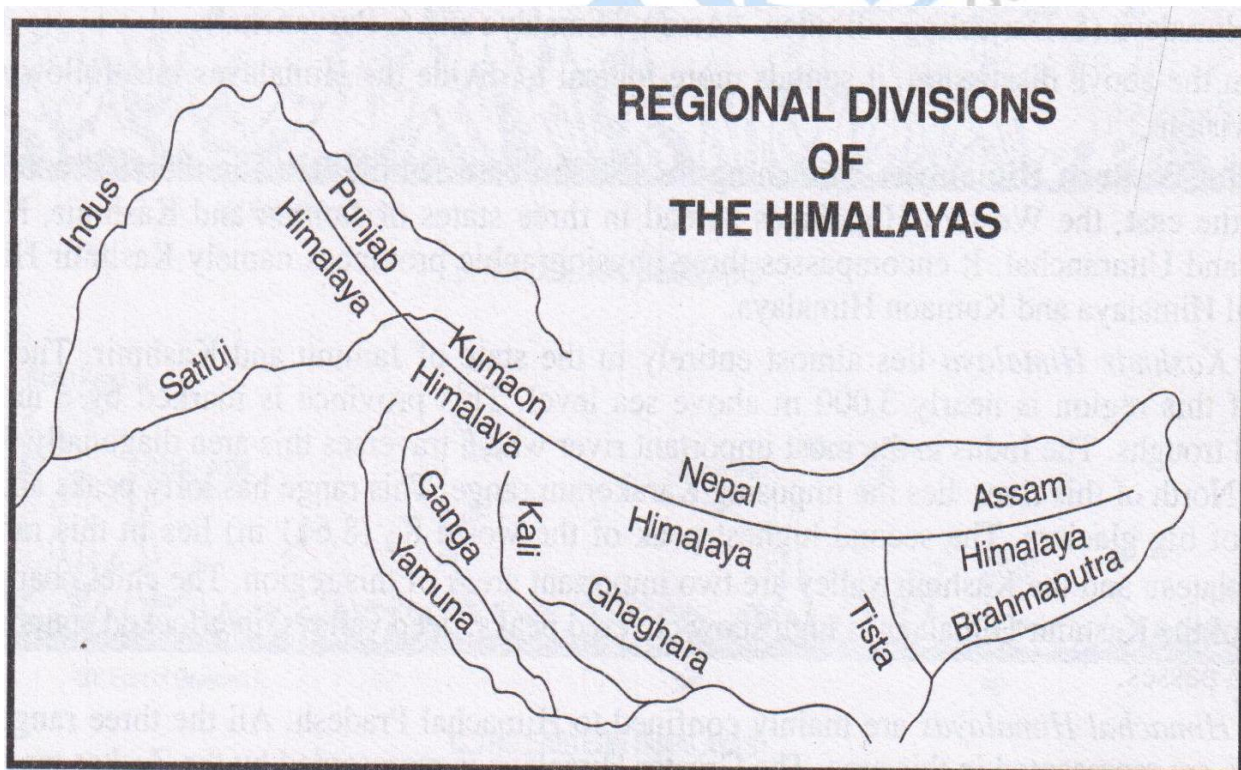
These comprises Nag Tibba given off from Dhaulagiri, the Dhauladhar range from the neighborhood of Badrinath, the Pir Panjal range and the north Kashmir range from the Zoji La, separating the Jhelum and Kishanganga rivers. The Middle Himalayas possess a remarkable uniformity of height; most are between 1830 and 3050m. The Middle Himalayas region is a complex variety of forest-covered ranges and fertile valleys. Except for the major valley centers such as Srinagar, Kangra, and Kathmandu, and hill towns such as Simla, Mussoorie, and Darjiling (Darjeeling), the region is moderately populated. Within the Middle

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Himalayas the intervening mountain ranges tend to separate the densely populated valleys. The several gorges and rugged mountains make surface travel not easy in any direction. Only major population centers are linked by air and roads with principal cities in India and Pakistan.

3. The Sub-Himalayas:

It is the outer most range of the Himalayas which is, borders the plains of North India and Pakistan. It comprises the Siwalik Range and foothills as well as the narrow piedmont plain at the base of the mountains. The width of the Sub-Himalayas gradually narrows from about 48 km. A characteristic feature of the Sub-Himalayas is the large number of long, flat-bottomed valleys known as *duns*, like DehraDun, Kotli Dun and Patli Dun, which are usually spindle-shaped and filled with gravelly alluvium. South of the foothills lies the Tarai and Duars plains. The southern part of the Tarai and Duars plains is heavily farmed. Most of the forests of this region have been damaged, and much of the land has been cultivated for agriculture.



Source: D.R. Khullar

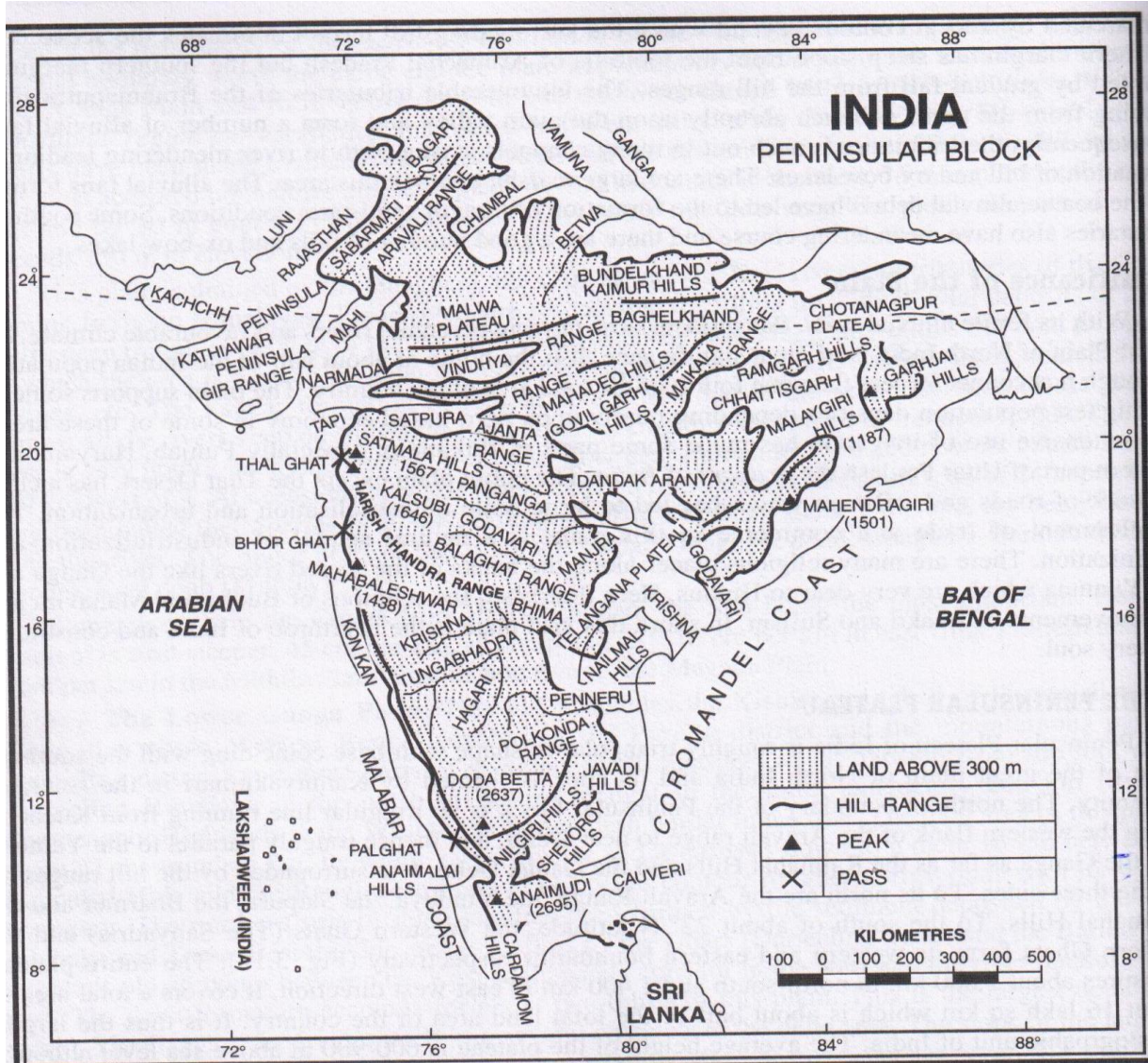
Regional Section of the Himalaya

Region wise, the Himalaya consist of (a) the Kashmir Himalaya, (b) the Punjab Himalaya, (c) the Kumaon Himalaya, (d) the Central Himalaya, (e) the Eastern Himalaya

- (a) The Kashmir Himalaya covering an area of 350000 km^2 . They are about 700km. long and 500km. wide with an average elevation of 3000 m. in the Pirpanjal range exist two passes, Pirpanjal and Banihal. vale of Kashmir lies in this region.
- (b) The Punjab Himalaya stretches from Sutlej for about 570 km. and covers an area of 45000 km^2 . the southern slopes of this range are bare and rugged and northern slopes are covered with forests. In this section Lahul and Spiti valleys are situated.
- (c) The Kumaon Himalaya extends from the river Sutlej to the Kali and covers about 38000 km^2 areas. The highest peak is Nanda Devi. This section of Himalayas has great significance for the Hindus due to the Bhagirathi, the Ganga and the Jamuna, which have their source in this zone.
- (d) The Central Himalaya stretches from river Kali to river Tista for about 800 km. covering an area of about 116800 km^2 . It has the distinction of carrying the highest peaks in the world, Dhaulagiri, Annapurna, Mansalu, Gosainthan, Mt. Everest, etc, this range is known as the Sikkim Himalaya in Sikkim ; Darjeeling Himalaya in West Bengal ; and Bhutan Himalayas in Bhutan.
- (e) The Eastern Himalaya known as the Assam Himalaya stretches from Tista to the Bramputra to a distance of about 720 km. it covers about 67500 km^2 area. It rises over 800 m. above the Bramputra Valley.

Q. 2 Write the note on the Peninsular Plateau of India.

Ans This is an elevated plateau seprated from the Indo-Gangetic plain by the Vindhyan, the Satpura, Mahadeo, Maikal and Sarguja ranges, the elevation varying from 300 to 900 m. The Peninsular plateau is a triangular shaped stand land. It is division of ancient land mass called Gondwana level. The plateau covers $4, 22,000 \text{ km}^2$., 43 [percent](#) of India's landmass It is spread over the states of Gujarat, Maharashtra, Bihar, Karnataka and Andhra PradeshThe [uplands](#), areas of higher land, make up a triangle nested within the familiar downward-pointing triangle of the Indian sub-continent's coastline. In the south of India the plateau is mostly over 1,000 m above [sea level](#). In the north it is mostly about 500 m above sea level. . River Narmada divides the peninsular plateau into two parts: The central highlands and Deccan Plateau.



Source: D.R. Khullar

(i) The Central Highlands:

It spread out from Narmada River and the northern plains. Aravallis is the important mountain which extends from Gujrat through Rajasthan to Delhi. The highest peak of the Aravallis hills is Gurushikhar (1722m) near Mt. Abu. The Malwa Plateau and Chhota Nagpur plateau are division of the central highlands. The Malwa plateau in Madhya Pradesh occurs to the north of the Vindhya and is composed of extensive lava flows. The broken areas are known as the ravines, which are more numerous in the valleys of the Chambal, the Banas and the Jamuna. To the west and north-west of the Malwa plateau are the worn – down Aravalli ranges. At the south west extremely they are over 1000 m above the sea level.

The area between Jamuna and Vindhyan plateau is known as the Bundelkhand Uplands.

In the north east of the Malwa plateau lie the eastern plateau, consisting of the Baghelkand, Chota Nagpur plateau and the Mahanadi Basin.

The Chota Nagpur plateau lies to the west of the Bengal basin, the largest and most typical part of which is the Ranchi plateau. At the end of Chota Nagpur plateau are the Rajmahal hills, which are covered by the lava flows. The dissected southern edge of the Malwa plateau is formed by the Vindhyan upland. It forms an important watershed and constitutes the northern boundary of Deccan. The valley of Narmada lies between the Vindhyas and the Satpura which flows east to west and joins the Arabian sea. Narmada valley has rightly been regarded as the ethnic boundary between the two different people, viz., the Indo Aryans in the northern part with their Indo Aryan language and the Dravidian with Dravidian language in the southern part.

(ii) The Deccan Plateau:

The Deccan Plateau is a largest [volcanic](#) features located on west-central [India](#). It covers an area of 700,500 km². It lies between the eastern and the western ghats and south of the line of the Satpuras, Maikal and Hazaribag ranges. The peninsula is triangular in shape. The Deccan plateau is separated by a fault, from Chhota Nagpur plateau. Towards the north are the Satpura hills rising to a height of 1200 m. The Mahadeo and Maikall hills lie further eastwards. The part of Deccan plateau in Maharashtra is formed of basalts. The valleys of the Godavari, the Bhima and the Krishna are flanked by flat-topped, steep-sided hills. Ajanta and Ellora hills lie south of the Tapi and are noted for their caves. The middle belt of Deccan plateau consists of Karnataka plateau, which has an elevation of 600 m above sea level. The plateau is divided into Malnad and Maidan. The Malnad is hilly and dissected into deep valleys covered with dense forests; while the Maidan is formed of rolling plains with low granitic hills. The black soil area in the Deccan plateau is known as Deccan trap. It is formed due to volcanic eruptions. This soil is good for cotton & sugarcane cultivation.

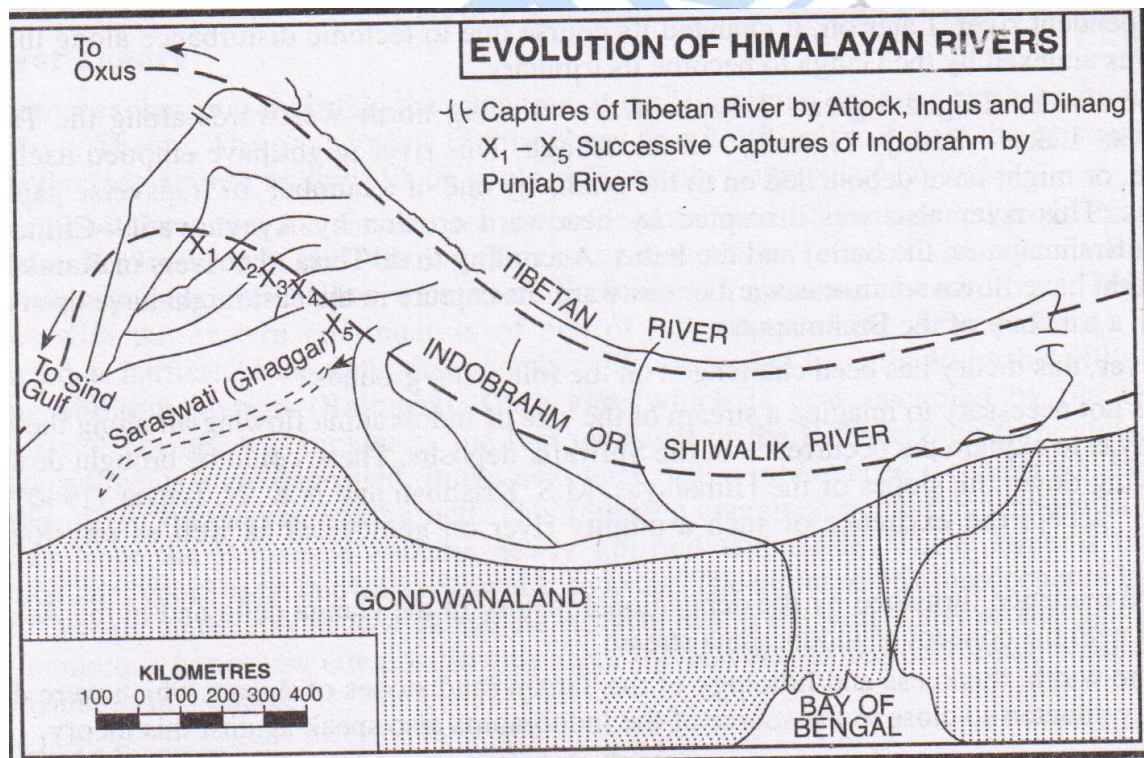
Chapter 2

Drainage

Q. 1: Explain the Drainage Pattern of India.

Ans

The direct source of rivers is rain and the melting snow. During the monsoon season the rivers carry very heavy flows, which dwindle down to negligible quantities in the fair weather. The great Himalayas range is the gathering ground of snow. India is fortunate in having a large number of big rivers with numerous tributaries spread over the whole country. The rivers of India can be divided into two main groups: the Himalayan Rivers and the rivers of Peninsula.



Source: D.R. Khullar

The Himalayan Rivers:

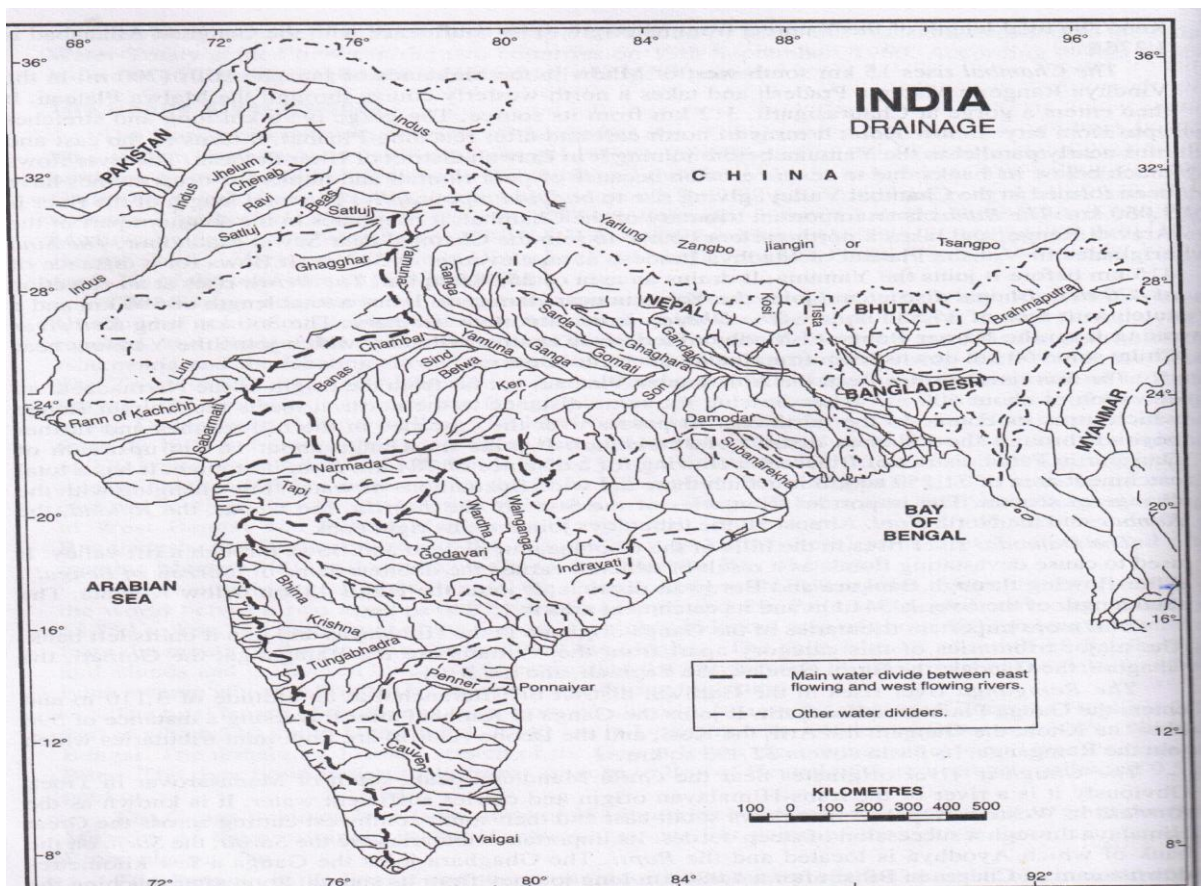
The Himalayan Rivers (the Bhagirathi, the Alaknanda, the Bramputra, the Sutlej, the Indus) were in existence even before the uplift of the Himalaya. These rivers originate in the Tibetan side beyond the high mountain peaks of the Himalaya. The Himalayan rivers fall into four broad groups: the pre Himalayan group like the arun, Indus, the Sutlej, the Bramputra: (b) the Great Himalayan rivers like the Ganga, The Ghagra and the Teesta, they are believed to have been formed after the second upheaval of the Himalaya: (c) the Lesser Himalayan rivers such as the Beas, the Ravi, the Chenab and the Jhelum and (d) the Siwalik rivers like the Hindon and the Solani.

On account of the extensive cover over the Himalaya, the rivers are perennial in nature. The Himalayan rivers rise from the the Great Himalaya, Karakoram, Ladakh, Zaskar, Kailas and the Trans-Himalayan ranges and ultimately join together to form the three great river system (the Indus, the Ganga, the Brahmaputra).

The Indus river system was developed for irrigation purposes and for the canals that were taken out from these, the irrigated area produced very large quantities of wheat and cotton in the undivided Punjab. The total length of this river in India is 709 km. and it covers an area about 117844 km². An important tributary of this river is Shyok, Skardu, Shigar, Gilgit, Jhelum, Chenab, Ravi and Beas.

The Ganga system consists of the Ganga and a large number of its tributaries. It gathers the waters of Ramganga, the Yamuna, the Ghaghra, the Son and the Kosi etc. the Ganga has a large number of spill channels running into the Bay of Bengal. The most important of these are Bhagirathi – Hooghly, the Gorai, the Bhairab. The Damodar flows into Hooghly. In plains a large number of canals have been taken out from the Ganga, Yamuna and Gomati etc.

The Bramputa system consists of the Brahmaputra (known as Tsangpo in Tibet) and a large number of its tributaries – the Manas, the Tista, the Ngang Chu, the Lohit, the Kyi Chu, the Kameng, the Kopili etc. it rises from the snout of Chemayungdung glacier about 100 km. S.W. of Mansarovar lake at an elevation of 5150 m. Its total length in India is 885 km. and drained area is 240000 km².



Source: D.R. Khullar

Rivers of Peninsular India:

The peninsular rivers fall into two categories, viz., the coastal rivers and the inland rivers. The West Coast Rivers are of great importance. Although only 3 per cent of the total extent of the basins of India is drained by these rivers as much as 14 per cent of the country's water resources are contained in them.

The drainage of the peninsular India is towards the east and south – east:

(A). The Mahanadi system consists of the Mahanadi, the Brahmani, the Baitarni, the Subarnarekha, the Godawari, the Wardha, the Irawadi, the Sabari. The Mahanadi rises from Sihawa in Raipur district at an elevation of 442 m. its length is 858 km. and drained area is 132090 km². These all rivers drain to the Bay of Bengal. These rivers are wide, fan-shaped with conspicuous delta. They are less turbulent and capricious than the rivers of the Indus and the Ganga – Brahmaputra.

(B). Rivers Narmada, Tapi, Sharavati and a large number of small rivers flow to the Arabian Sea. The first two rivers flow in the fault created by them during the Himalayan

upliftment. It was this movement which was also followed by the peninsular block tilting eastwards slightly resulting into east and south – east drainage pattern. These rivers have narrow, elongated catchments.

(C). Besides these, there are many rivers (the Chambal, Kali Sind, Parbati, The Betwa, The Ken. etc.) which originates in the Vindhya and Satpuras, but flow north – east towards the Ganga. These rivers are characterized by seasonal flows. They are large in the rainy season but become insignificant during the dry season.

The peninsular rivers originate at much lower altitudes than the Himalayan ones. The channels have reached base levels and have low gradients. Large delta are formed by larger rivers at their mouths.



Chapter 3

Climate

Q.1: Explain the different Monsoon theory of India.

Ans Climate of a country includes the study of temperature, rainfall, atmospheric pressure, as well as the direction and velocity of winds over a long period of time. These elements of climate are largely influenced by latitudinal extent, relief, and areal distribution of land and water. The whole of India, south of the Himalayas is climatically treated as a tropical country. In the south, the Indian coasts are washed by the Arabian Sea and the Bay of Bengal branches of the Indian Ocean which give it a typical tropical monsoon climate.

Factors influencing the climate of India

1. Location and Latitudinal Extent. The northern parts on the other hand lie in the warm temperature zone. Hence they experience comparatively low temperatures. Some places record considerably low temperatures particularly in winter. Water bodies comprising the Arabian sea and the Bay of Bengal surround the peninsular India and make climatic conditions mild along the coastal areas.
2. The Northern Mountain Ranges. India is separated from the rest of Asia by the impenetrable wall of the Himalayan mountain ranges. These ranges protect India from the bitterly cold and dry winds of Central Asia during winter.
3. Physiography. Physiography of India has a great bearing on major elements of climate. The physiographic control of the mighty Himalayas over the climate of the country goes without saying. The monsoon winds from the Bay of Bengal are bifurcated into two branches by the physiographic features. One branch goes to the Brahmaputra valley through the Meghalaya plateau. The other branch of monsoons from the Bay of Bengal enters the Ganga valley. Its northward-movement is obstructed by the Himalayan ranges and it advances westwards up the Ganga plain. Initially this branch causes heavy rainfall but the amount of rainfall decreases as the monsoons lose much of the moisture content while advancing westwards.
4. Tropical Cyclones and Western Disturbances. Tropical cyclones originate in the Bay of Bengal and Arabian sea and influence large parts of the peninsular India. Majority of the cyclones originate in the Bay of Bengal and influence the weather conditions during the south-west monsoon season.
5. El-Nino Effect. El-Nino is a narrow warm current which occasionally appears off the coast of Peru in December. This current is responsible for wide spread floods and droughts in the tropical regions of the world. Meteorologists believe that the severe drought of 1987 in India was caused by El-Nino.

6. La Nina. After an E1-Nino, weather conditions return to normal. However, some times trade winds become so strong that they cause abnormal accumulation of cold water in the central and eastern Pacific region. This event is called La Nina, which in effect is the complete opposition of E1- Nino.
7. Southern Oscillation. It has been noticed that whenever the surface level pressure is high over the Indian Ocean, there is low pressure over the Pacific Ocean and vice-versa. This interrelation of high and low pressure over the Pacific and the Indian Ocean is called Southern Oscillation.

The Monsoon winds

The terms monsoon has been derived from the Arabic word 'mausam' meaning 'season'. In other words, the monsoon is a double system of seasonal winds, that is, the sum of summer and winter winds. According to A.A. Rama Sastry, "Monsoons are large scale seasonal wind systems flowing over vast areas of the globe, persistently in the same direction, only to be reversed with the change of season. Koppen (1923), Hann (1932) and Angot (1943) believe that the "monsoons represents simply a land and sea breeze on a large scale, and that the annual period of the monsoon corresponds to the diurnal period of the breezes."

While discussing the monsoon winds C.S. Ramage (1971) suggested four features of monsoon winds:

1. The prevailing wind direction should shift by at least 120 degree between January and July.
2. The average frequency of prevailing wind directions in January and July should exceed 40 per cent.
3. The mean resultant wind velocity in at least one of the months should exceed 3 m/s.
4. There should be fewer than one cyclone-anticyclone alternation every two years, in either month, over a five degree latitude/longitude grid.

Mechanism of the Monsoons

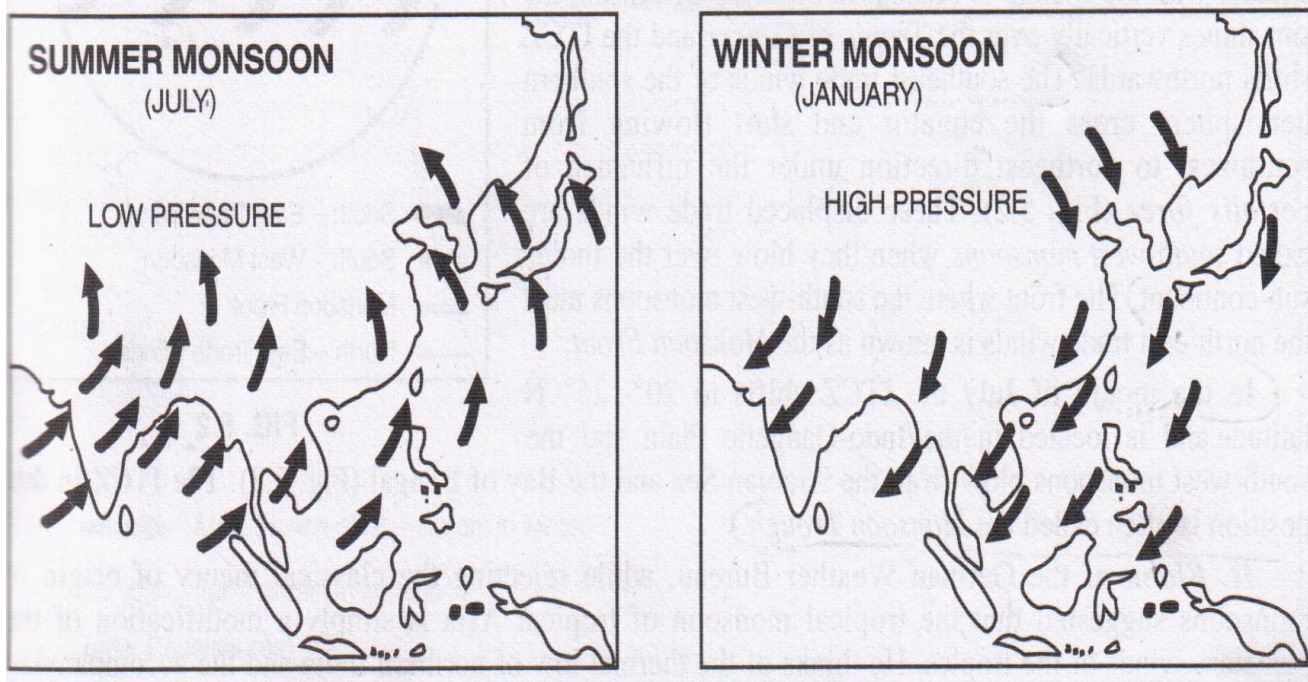
The origin of monsoons is still shrouded in mystery. The theories regarding the monsoons are generally divided into following two broad categories:

(i) Classical Theory and (ii) Modern Theories.

1. Classical Theory. In 1686 the famous Englishman Sir Edmund Halley explained the monsoon as resulting in thermal contrasts between continents and oceans due to their differential heating. Accordingly, Halley conceived summer and winter monsoons depending upon the season.

(a) Summer Monsoon. In summer the sun shines vertically over the Tropic of Cancer resulting in high temperature and low pressure in Central Asia while the pressure is still sufficiently high over Arabian Sea and Bay of Bengal. This induces air flow from sea to land and brings heavy rainfall to India and her neighbouring countries.

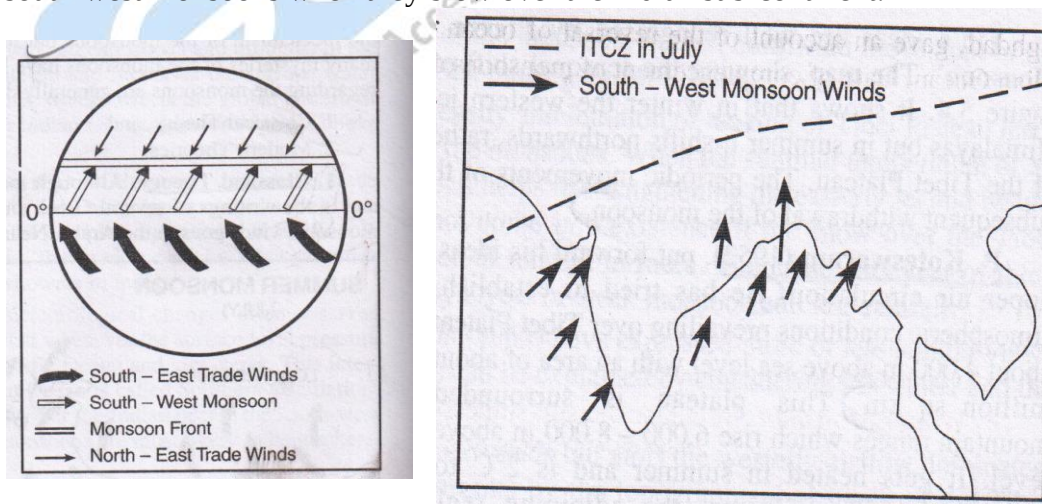
(b) Winter Monsoon. In winter the sun shines vertically over the Tropic of Capricorn. The north western part of India grows colder than Arabian Sea and Bay of Bengal and the flow of the monsoon is reversed.



Source: D.R. Khullar

2. Modern Theories. Air Mass Theory.

The southeast trade winds in the southern hemisphere and the northeast trade winds in the northern hemisphere meet each other near the equator. The meeting place of these winds is known as the Inter-Tropical Convergence Zone (ITCZ). The location of ITCZ shifts north and south of equator with the change of season. The southeast trade winds of the southern hemisphere cross the equator and start flowing from southwest to northeast direction under the influence of coriolis force. These displaced trade winds are called south-west monsoons when they blow over the Indian sub-continent.

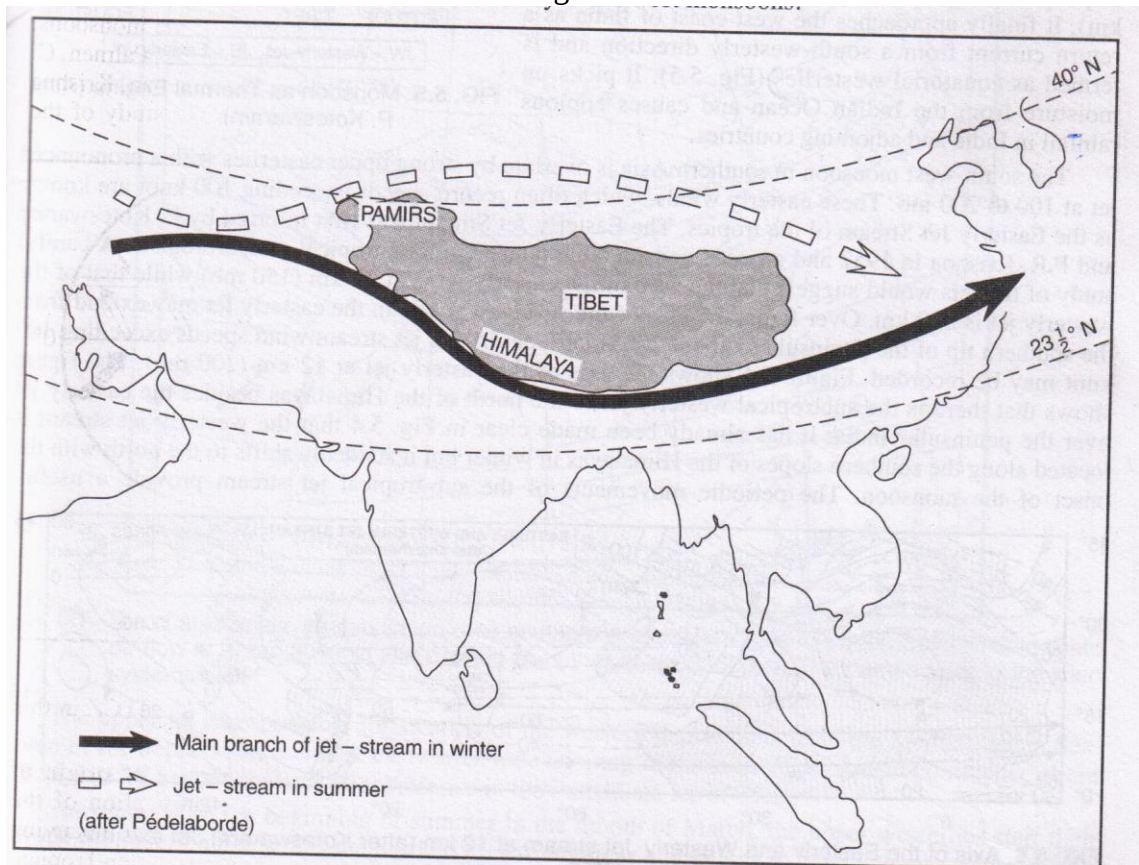


Source: D.R. Khullar

In the month of July the ITCZ shifts to 20 degree – 25 degree N latitude and is located in the Indo-Gangetic Plain and the south-west monsoons blow from the Arabian Sea and the Bay of Bengal. The ITCZ in this position is often called the Monsoon Trough.

Jet Stream Theory.

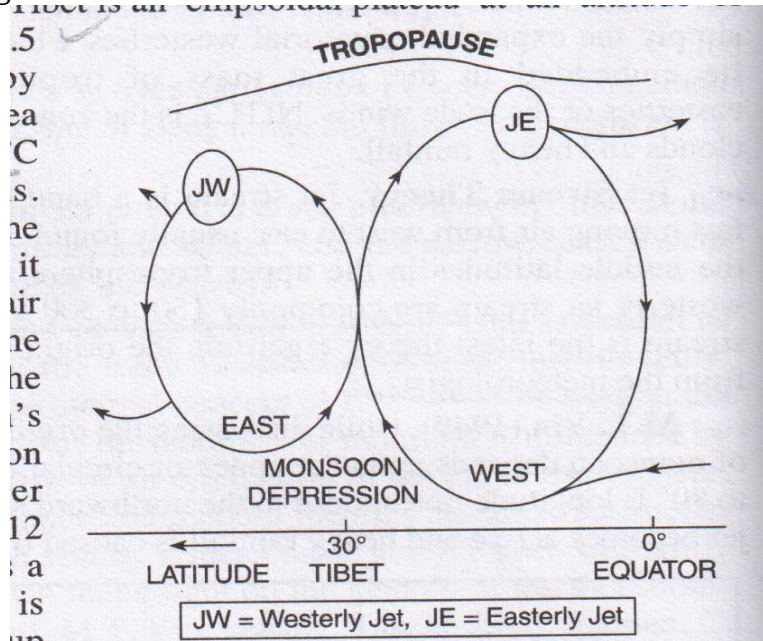
Jet stream is a band of fast moving air from west to east usually found in the middle latitudes in the upper troposphere at a height of about 12 km. The wind speeds in a westerly jet stream are commonly 150 to 300 km p.h. with extreme values reaching 400 km p.h. Jet stream is the latest theory regarding the origin of the monsoons and has earned world wide acclaim from the meteorologists.



Source: D.R. Khullar

In winter the western jet stream flows along the southern slopes of the Himalayas but in summer it shifts northwards, rather dramatically, and flows along the northern edge of the Tibet Plateau. The periodic movements of the Jet stream are often indicators of the onset and subsequent withdrawal of the monsoon.

P. Koteswaram has tried to establish a relationship between the monsoons and the atmospheric conditions prevailing over Tibet Plateau. Tibet is an ellipsoidal plateau at an altitude of about 4000 m above sea level with an area of about 4.5 million sq km. It gets heated in summer and is 2 degree C to 3 degree C warmer than the air over the adjoining regions.



Source: D.R. Khullar

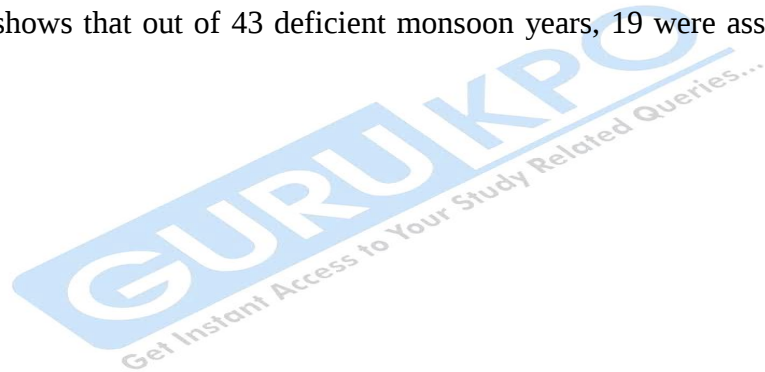
During its ascent the air spreads outwards and gradually sinks over the equatorial part of the Indian Ocean. At this stage, the ascending air is deflected to the right by the earth's rotation and moves in an anti-clockwise direction leading to anticyclonic condition in the upper troposphere over Tibet around 300-200 mb (9 to 12 km). It finally approaches the west coast of India as a return current from a south-westerly direction and is termed as equatorial westerlies.

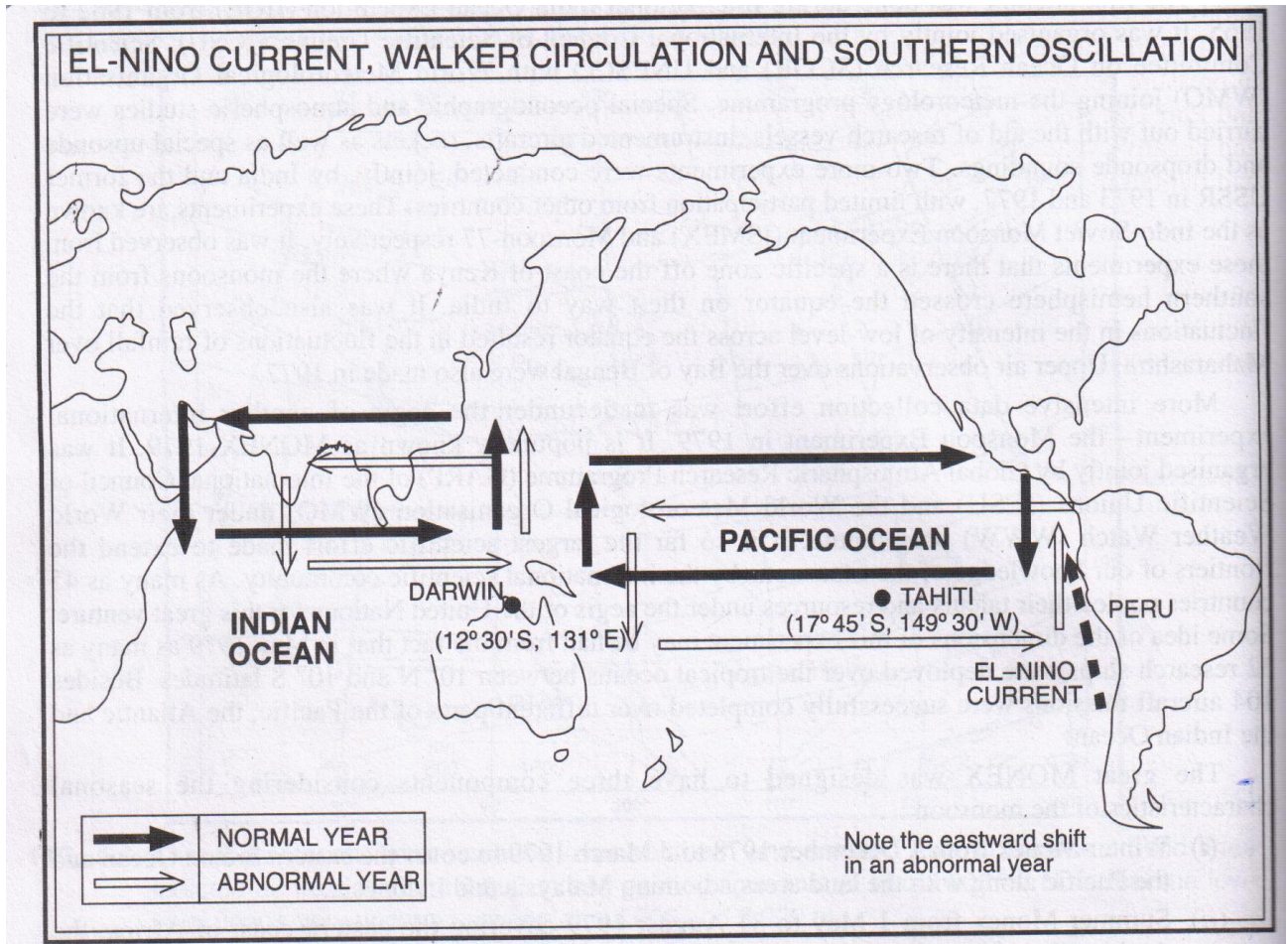
Recent observations have revealed that the intensity and duration of heating of Tibet Plateau has a direct bearing on the amount of rainfall in India by the monsoons. When the summer temperature of air over Tibet remains high for a sufficiently long time, it helps in strengthening the easterly jet and results in heavy rainfall in India. The easterly jet does not come into existence if the snow over the Tibet Plateau does not melt. This hampers the occurrence of rainfall in India. Therefore, any year of thick and widespread snow over Tibet will be followed by a year of weak monsoon and less rainfall.

Teleconnections, the Southern Oscillation and the E1 Nino:

Recent studies have revealed that there seems to be a link between meteorological events which are separated by long distances and large intervals of time. They are called meteorological teleconnections. The one which has aroused considerable interest among the meteorologists is the difference between an E1 Nino and the Southern Oscillation. E1 Nino (EN) is a narrow warm current which appears off the coast of Peru in December. In Spanish, it means The Child Christ because it appears around Christmas. In some years this warm current is more intense than usual.

The E1 Nino phenomena, which influences the Indian monsoon, reveals that when the surface temperature goes up in the southern Pacific Ocean, India receives deficient rainfall. However, there had been some years during which the E1 Nino phenomena did not occur, but India still got deficient rainfall, and conversely, India received sufficient rainfall during an E1 Nino year. A study of the last one hundred years of the Indian monsoons shows that out of 43 deficient monsoon years, 19 were associated with an E1 Nino.





Source: D.R. Khullar

Southern Oscillation.

Is the name ascribed to the curious phenomena of sea-saw pattern of meteorological changes observed between the Pacific and Indian Oceans. This great discovery was made by Sir Gilbert Walker in 1920. While working as the head of the Indian Meteorological service, he noticed that when the pressure was high over equatorial south Pacific, it was low over the equatorial south Indian Ocean and vice versa. The pattern of low and high pressures over the Indian and Pacific Oceans gives rise to vertical circulation along the equator with its rising limb over low pressure area and descending limb over high pressure area. This is known as Walker circulation. The location of low pressure and hence the rising limb over Indian Ocean is considered to be conducive to good monsoon rainfall in India.

Chapter 4

Soil

Q. 1 Describe the different soil type of India.

Ans Soil is the thin surface-layer on the earth, comprising mineral particles formed by the break-down of rocks, decayed organic materials, living organisms, water and air. Soil is a very important natural resource of India because agricultural production is basically dependent on the fertility of soil.

In Indian conditions, there is wide diversity with respect to geographical setting, physiography, climate and vegetation. Animals, insects and man also play an important role in soil formation. Some of the important factors of soil formation are mentioned below.

1. Parent Material. The material for soil formation is mainly derived from the rocks and is termed as the parent material by soil scientists. India possesses a great variety of parent material which is generally categorized into following six classes:

- (i) Ancient crystalline and metamorphic rocks
- (ii) Cuddapah and Vindhyan rocks
- (iii) Gondwana rocks
- (iv) Deccan basalts
- (v) Tertiary and Mesozoic sedimentary rocks of extra peninsular India
- (vi) . Recent and sub-recent rocks.

The soils of the Northern Plain of India have been largely derived from the depositional work of the Himalayan rivers. On the other hand, the soils of peninsular plateau are generally coarse-grained and are closely related to the parent rocks. The peninsular soils are generally less fertile.

2. Relief. Steep slope encourages the swift flow of water and hinders the process of soil formation. The areas of low relief or gentle slope generally experience deposition and have deep soils. The degree of slope also largely determines the fertility of soil.

3. Climate. Climate is the single most important factor in soil formation. Most important climatic factors affecting soil formation are the amount and seasonal distribution of temperature and rainfall. Climate controls the type and effectiveness of weathering of the parent material, the quantity of water seeping through the soil and the type of micro-organisms present therein. In cold climates of the Himalayan region, the process of vegetation decay is very low and the soils formed under such circumstances are acidic in nature. The crystalline granites produce laterite soil in relatively moist parts of

the monsoonal region and non-laterite in drier areas. Hot summer and low rainfall develops black soil as is found in some parts of Tamil Nadu irrespective of the parent rock. In Rajasthan, both granite and sandstone give birth to sandy soil under arid climate. This soil is poor in organic matter.

4. Natural Vegetation. Natural vegetation reflects the combined effects of relief and climate. The formation and development of soil is very much influenced by the growth of vegetation. The decayed leaf material adds much needed humus to soil thereby increasing its fertility. The densely forested areas contain some of the best soils in India.

Major soil groups of India

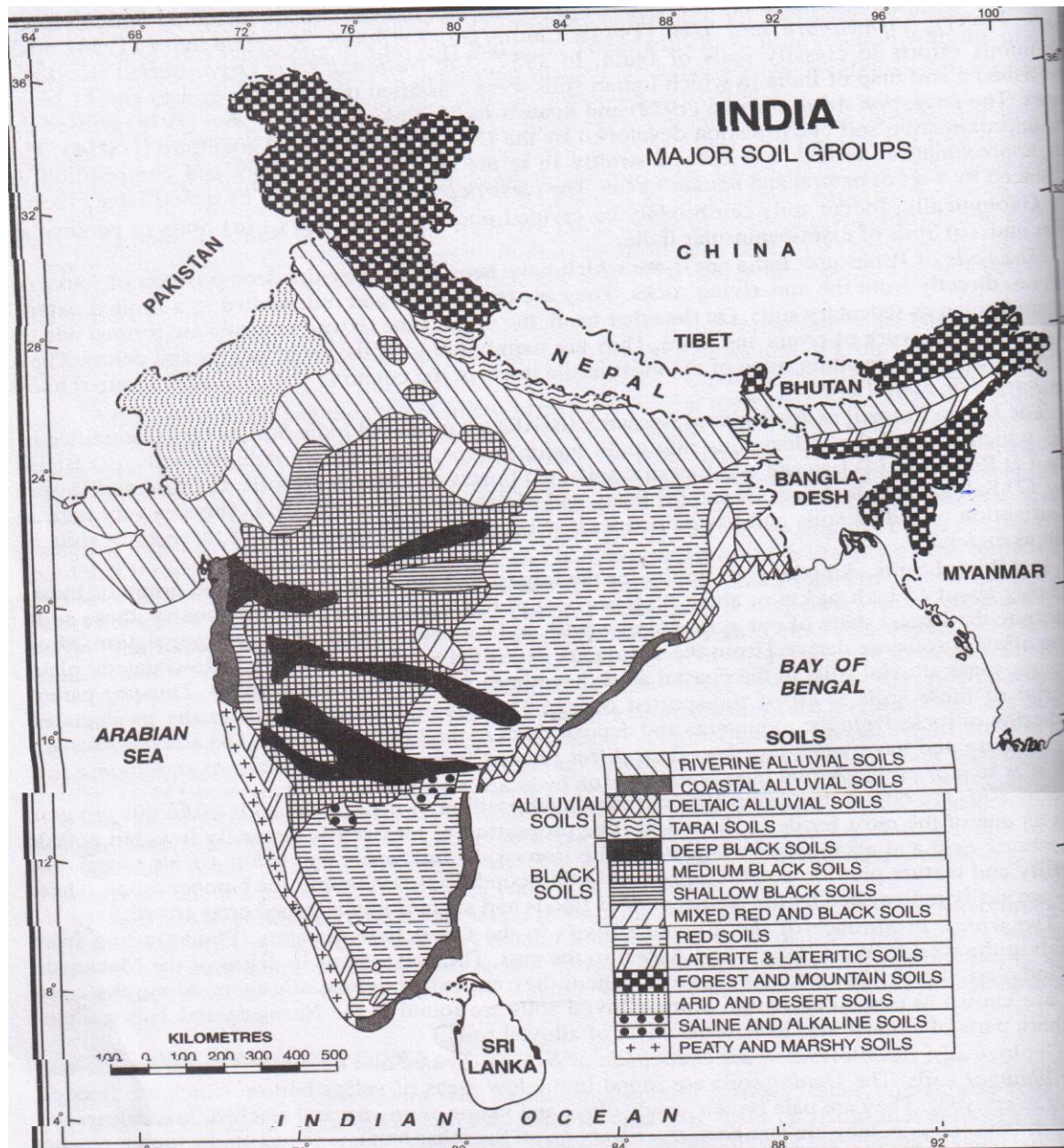
India is a country of vast dimensions with varied conditions of geology, relief, climate and vegetation. Therefore, India has a large variety of soil groups, distinctly different from one another. The Indian Council of Agricultural Research (ICAR) set up an All India Soil Survey Committee in 1953 which divided the Indian soils into eight major groups. They are (1) Alluvial soils, (2) Black soils, (3) Red soils, (4) Lateritic soils, (5) Forest and Mountain soils, (6) Arid and Desert soils, (7) Saline and Alkaline soils and (8) Peaty and Marshy soils. This is a very logical classification of Indian soils and has gained wide acceptance. A brief account of these eight soils is given as under.

1. Alluvial Soils. Alluvial soils are by far the largest and the most important soil group of India. Most of the alluvial soils are derived from the sediments deposited by rivers as in the Indo-Gangetic plain. The parent material of these soils is all of transported origin. The chemical composition of the alluvial soils make this group of soils as one of the most fertile in the world. The proportion of nitrogen is generally low, but potash, phosphoric acid and alkalies are adequate, while iron oxide and lime vary within a wide range.

The widest occurrence of the alluvial soils is in the Great Indo-Gangetic Plain starting from Punjab in the west to West Bengal and Assam in the east. They also occur in deltas of the Mahanadi, the Godavari, the Krishna and the Cauvery, where they are called deltaic alluvium. Along the coast they are known as coastal alluvium. Some alluvial soils are found in the Narmada and Tapi valleys. Northern parts of Gujarat also have some cover of alluvial soils. Due to their softness of the strata and fertility the alluvial soils are best suited to irrigation and respond well to canal and well/tube-well irrigated, the alluvial soils yield splendid crops of rice, wheat, sugarcane, tobacco, cotton, jute, maize, oilseeds, vegetables and fruits.

2. Black Soils. The black soils are also called regur and black cotton soils because cotton is the most important crop grown on these soils. Most of the black soils are derived from two types of rocks, the Deccan and the rajmahal trap, and ferruginous gneisses and schists occurring in Tamil Nadu. The former are sufficiently deep while the later are generally shallow.

In some parts of Gujarat and Tamil Nadu, the origin of black cotton soils is ascribed to old lagoons in which the rivers deposited the materials brought down from the interior of Peninsula covered with lava.



Source: D.R. Khullar

Geographically, black soils are spread over 5.46 lakh sq km. This is the region of high temperature and low rainfall. It is, therefore, a soil group of the dry and hot regions of the Peninsula. These soils are mainly found in Maharashtra, Madhya Pradesh, parts of Karnataka, Andhra Pradesh, Gujarat and Tamil Nadu.

The black soil is very retentive of moisture. It swells greatly and becomes sticky when wet in rainy season. In the hot dry season, the moisture evaporates, the soil shrinks and is seamed with broad and deep cracks. This soil has been used for growing a variety of crops

for centuries without adding fertilizers and manures, or even fallowing with little or no evidence of exhaustion.

A typical black soil is highly argillaceous with a large clay factor, 62 per cent or more, without gravel or coarse sand. It also contains 10 per cent of alumina, 9-10 per cent of iron oxide and 6-8 per cent of lime and magnesium carbonates. Potash is variable (less than 0.5 per cent) and phosphates, nitrogen and humus are low. As a general rule, black soils of uplands are of low fertility but they are darker, deeper and richer in the valleys. Because of their high fertility and retentivity of moisture, the black soils are widely used for producing several important crops. Some of the major crops grown on the black soils are cotton, wheat, jowar, linseed, Virginia tobacco, castor, sunflower and millets. Large varieties of vegetables and fruits are also successfully grown on the black soils.

3. Red Soils. Most of the red soils have come into existence due to weathering of ancient crystalline and metamorphic rocks. The main parent rocks are acid granites and gneisses, quartzitic and felspathic. The red soils occupy a vast area of about 3.5 lakh sq km which is about 10.6 per cent of the total geographical area of the country. These soils are spread on almost the whole of Tamil Nadu, parts of Karnataka, south-east of Maharashtra, eastern parts of Andhra Pradesh and Madhya Pradesh, Chhattisgarh, Orissa and Chota Nagpur in Jharkhand.

In their chemical composition they are mainly siliceous and aluminous, with free quartz as sand, the alkali content is fair, some parts being quite rich in potassium. The red soils respond well to the proper use of fertilizers and irrigation and give excellent yields of cotton, wheat, rice, pulses, millets, tobacco, oil seeds, potatoes and fruits.

4. Laterite and Laeritic Soils. The latrite soil is formed under conditions of high temperature and heavy rainfall with alternate wet and dry periods. We have numerous varieties of laterite which have bauxite at one end and an indefinite mixture of ferric oxides at the other. Almost all laterite soils are very poor in lime and magnesia and deficient in nitrogen. At some places, there may be higher content of humus. They are mainly found on the summits of Western Ghats. Eastern Ghats, the Rajamahar Hills, Vindhya, Satpuras and Malwa Plateau. Some laterites and lateritics are suitable for growing plantation crops like tea, coffee, rubber, cinchona, coconut, arecanut, etc. In some areas, these soils support grazing grounds and scrub forests. Laterite and lateritic soils have a unique distinction of providing valuable building material.

5. Forest and Mountain Soils. Such soils are mainly found on the hill slopes covered by forests. These soils are heterogeneous in nature and their character changes with parent rocks, ground-configuration and climate. In the Himalayan region, such soils are mainly found in valley basins, depressions, and less steeply inclined slopes. The forest soils are very rich in humus but are deficient in potash, phosphorus and lime. They are especially suitable for plantations of tea, coffee, spices and tropical fruits in Karnataka, Tamil Nadu and Kerala and wheat, maize, barley and temperate fruits in Jammu and Kashmir, Himachal Pradesh and Uttaranchal.

6. Arid and Desert Soils. A large part of the arid and semi-arid region in Rajasthan and adjoining areas of Punjab and Haryana lying between the Indus and the Aravalis, covering an area of 1.42 lakh sq km (ir 4.32% of total area) and receiving less than 50 cm of annual rainfall, is affected by desert conditions.

The phosphate content of these soils is as high as in normal alluvial soils. Nitrogen is originally low but its deficiency is made up to some extent by the availability of nitrogen in the form of nitrates. Thus, the presence of phosphates and nitrates make them fertile soils wherever moisture is available in large areas of desert soils, only the drought resistant and salt tolerant crops such as barley, rape, cotton, wheat, millets, maize and pulses are grown. Consequently, these soils support a low density of population.

7. Saline and Alkaline Soils. These soils are found in Andhra Pradesh and Karnataka. These soils are liable to saline and alkaline efflorescences and are known by different names such as reh, kallar, usar, thur, rakar, karl, and chopan. Some of the salts are transported in solution by the rivers, which percolate in the sub-soils of the plains.

The accumulation of these salts makes the soil infertile and renders it unfit for agriculture. Vast areas comprising the estuaries of the Narmada, the Tapi, the Mahi and the Subarnati have thus become infertile.

8. Peaty and Marshy Soils. Peaty soils originate in humid regions as a result of accumulation of large amounts of organic matter in the soils. These soils contain considerable amount of soluble salts and 10-40 per cent of organic matter. Marshy soils with a high proportion of vegetable matter also occur in the coastal areas of Orissa and Tamil Nadu, Sunderbans of West Bengal. The peaty soils are black, heavy and highly acidic. They are deficient in potash and phosphate.

Characteristics of Indian Soils:

Following are the chief characteristics of Indian soils:

- The Indian soils have been formed under varied geographical conditions and differ widely in their physical properties, chemical composition and fertility level.
- Most soils are old and mature. Soils of the peninsular plateau are much older than the soils of the great northern plain.
- Indian soils are largely deficient in nitrogen, mineral salts, humus and other organic materials.
- Plains and valleys have thick layers of soils while hilly and plateau areas depict thin soil cover.
- Some soils like alluvial and black soils are fertile while some other soils such as laterite, desert and alkaline soils lack in fertility and do not yield good harvest.
- Indian soils have been used for cultivation for hundreds of years and have lost much of their fertility. As such there is urgent need of giving scientific treatment to our soils.

- Indian climate is characterized by seasonal rainfall and our soils need irrigation during the dry period.
- Indian soils suffer from soil erosion and other allied problems.

Problems of Indian Soils

Some of the important problems faced by Indian soils are (i) soil erosion, (ii) deficiency in fertility, (iii) desertification, (iv) waterlogging (v) salinity and alkalinity.

Soil Erosion

Soil erosion is the removal of soil by the forces of nature, particularly wind and water, more rapidly than the various soil forming processes can replace it. Soil erosion is a serious menace which is adversely affecting our agricultural productivity and the economy of the country as a whole.

Type of Soil Erosion

Two natural agents' water and wind are constantly at work indulging in soil erosion.

Water Erosion. During heavy rains, water removes a lot of soil. Run off water is responsible for much soil erosion, moving the soil particles by surface creep, saltation and suspension. Water erosion consisting of rilling, gullying sheet-wash and rain peeling process mainly confirmed to the mountains, hills and upper slopes of the piedmont zone. If one cubic metre of soil be lost from one hectare of land each week for a period of 30 years, the loss would amount to 15 cm from the entire surface.

The slope of the land is a potent factor in determining the velocity of water and the consequent soil erosion. Other things being equal, the steeper the slope the more rapidly does water run down resulting in more soil erosion. In the coastal areas, tidal waves dash along the coast and cause heavy damage to soil. This is called sea erosion. In the higher reaches of the Himalayan region, soil erosion on a large scale is caused by glaciers. This is called glacial erosion.

Wind Erosion. In arid and semi arid lands with little rainfall, the wind acts as a powerful agent of soil erosion causing heavy loss to agricultural land. Winds blowing at considerable speed, remove the fertile, arable, loose soils leaving behind a depression devoid of top soil. Very fine, fine and medium sands are moved by wind in a succession of bounds and leaps, known as saltation. Coarse sand is not usually airborne but rather is rolled along the soil surface. This type of erosion is called surface creep.

Human Factors of Soil Erosion

Soil erosion is the result of a number of factors, working in isolation or in association with one another. Apart from the natural factors such as torrential rainfall, resulting in swift flow of water, strong winds in dry areas, nature of soil and the physiography, man is an important factor responsible for soil erosion. Man's ill guided activities such as

deforestation, overgrazing and faulty method of agriculture have made soil erosion a serious national problem. It is rightly said that soil erosion is essentially a problem created by man and also faced by man himself.

1. Deforestation. With the increase in population, the pressure on forest resources is increasing with each passing day. This has resulted in reckless cutting of forests which has led to the problems of soil erosion. The large scale damage to soil in Shiwalik range, the Chos of Punjab, parts of Haryana and the ravines of Madhya Pradesh, Uttar Pradesh and Rajasthan is largely due to deforestation.

2. Overgrazing. Forests and grasslands provide much needed fodder for animals during the long dry period, there is shortage of fodder and the grass is grazed to the ground and torn out by the roots by animals. This leads to loose structure of the soil and the soil is easily washed away by rains.

3. Faulty Methods of Agriculture. Much of the soil erosion in India is caused by faulty methods of agriculture. The most outstanding are wrong ploughing, lack of crop rotation and practice of shifting cultivation. In some parts of the country, the same crop is grown year after year which spoils the chemical balance of the soil. The soil becomes unfit for cultivation and the tribes move to another piece of land after 2-3 years, returning to the earlier one after a gap of 10-15 years. In this way, the whole of the forest area is adversely affected by shifting cultivation resulting in intensive soil erosion in vast areas.

Effects of Soil Erosion

The adverse effects of soil erosion are reflected in the following points :

- Top soil is eroded which leads to loss of soil fertility and fall in agricultural productivity.
- Flooding and leaching result in loss of mineral nutrients.
- Ground water level is lowered and there is decrease in soil moisture.
- Natural vegetation cover dries up and arid lands expand.
- Frequency and intensity of floods and drought increase.
- Rivers, canals and tanks are silted and their water holding capacity decreases.
- The incidence and damaging power of landslides increases.
- Economy as whole suffers a great setback.

Soil Salinity and Soil Alkalinity. Soil salinity and soil alkalinity are the results of over irrigation in canal irrigated areas. In canal irrigated areas plenty of the water is available and the farmers indulge in over irrigation of their fields. Salinity means the predominance of chlorides and sulphates of sodium, calcium and magnesium in the soils in sufficient quantity to be able to seriously interfere with the growth of most plants. Alkalinity implies the dominance of sodium salts, specially sodium carbonate. Increasing salinity and alkalinity always indicate extension of waterlogging salt encrustation.

Vast tracts of canal irrigated areas in Uttar Pradesh, Punjab and Haryana; arid regions of Rajasthan, semi-arid areas of Maharashtra, Gujarat, Andhra Pradesh and Karnataka and

coastal areas of Orissa, Gujarat and West Bengal are facing this problem. Indira Gandhi canal in Rajasthan has turned the sandy desert into granary, it has given birth to serious problem of salinity and to alkalinity.

Soil salinity and alkalinity has many adverse effects, some important effects are as under

- Soil fertility is reduced which results in crop failure. Cultivation is not possible on saline soils unless they are flushed out with large quantities of irrigation water to leach out the salts.
- Choice of crops is limited because some crops are sensitive to salinity and alkalinity. Only high salt tolerant crops such as cotton, rape, barley etc. and medium salt tolerant crops like wheat, rice, linseed, pulses, millets etc. can be grown.
- Quality of fodder becomes poor.
- Salinity and alkalinity create difficulties in building and road construction.
- It causes floods due to reduced infiltration, leading to crop damage in the adjoining areas.

Following steps are necessary to treat salinity and alkalinity and restore the fertility of soil.

- Providing outlets for water to drain out excess water and lower water table. Efforts should also be made to seal all points and strips of the leakage from canals, tanks and ponds by lining them.
- Minimising the use of water. Making judicious use of irrigation facilities.
- Planting salt tolerant vegetation and crops such as cotton, rape, barely, date palm, linseed etc. and certain grasses as fodder crops can be helpful.
- It has been found that crop rotation involving dhaincha (green fodder) – cotton, in the Deccan plateau, dhaincha-rice in the Uttar Pradesh and dhaincha-rice-barseem in Punjab and Haryana have been very helpful.

Desertification. Desertification can be defined as spread of desert like conditions in arid or semi-arid areas due to man's influence or climatic change. Desert soils suffer maximum erosion by wind. The sand carried by wind is deposited on the adjoining fertile lands whose fertility dwindles and sometimes the fertile land merges with the advancing desert. It has been estimated that the Thar Desert is advancing at an alarming rate of about 0.5 km per year. Semi arid conditions prevail in large parts of Rajasthan, Gujarat, Punjab, Haryana, Maharashtra, Andhra Pradesh, Karnataka, Jammu and Kashmir, Uttar Pradesh, Tamil Nadu and Madhya Pradesh.

The process of desertification is attributed to various causes of which more important are uncontrolled grazing, reckless felling of trees and growing population. Climate changes have also contributed to the spread of deserts.

Desertifications has several ecological implications. Some important implications are listed below.

- Drifting of sand and its accumulation on fertile agricultural land.

- Excessive soil erosion by wind and to some extent by water.
- Deposition of sand in rivers, lakes and other water bodies thereby decreasing their water containing capacity.
- Lowering of water table leading to acute water shortage.
- Increase in area under wastelands.
- Decrease in agricultural production.
- Increase in frequency and intensity of droughts.

Measures of Controlling Desertification

- Intensive tree plantation programme should be initiated.
- Central Arid Zone Research Institute, Jodhpur has suggested mulching them with different plant species.
- Grazing should be controlled and new pastures should be developed.
- Indiscriminate felling of trees should be banned.
- Alternative sources of fuel can reduce the demand for fuel wood and save the trees from destruction hence checking the onward march of the desert.
- Sandy and wastelands should be put to proper use by judicious planning.

Water logging. Waterlogged soils are soaked or saturated with water. It has been estimated that extent of waterlogged soils is about 12 millions hectares in India; half of which lies long its coast and the other half in the inland area under existing or newly created irrigation command areas.

Water logging is believed to be one of the chief causes of salinity. The problems of land reclamation under water logging conditions is a complex one and must therefore, be tackled with great care as the scheme involves huge expenditure. The basic methods of removing excess water from waterlogged soils are (a) surface drainage and (b) vertical drainage.

- (a) Surface Drainage. Surface drainage involves the disposal of excess water over ground surface through an open drainage system with an adequate outlet. Surface drainage is helpful where (i) soils are deep with low infiltration rates, where (ii) intensity of rainfall is high, where (iii) terrain is level or nearly level and where (iv) the water table is high.
- (b) Vertical Drainage. Any bore or well from which the underlying water is extracted is defined as vertical drainage. The success of vertical drainage depends upon the presence of favorable aquifer and water table for lifting the ground water on sustainable basis and the favorable quantity of water that could be re-utilised for irrigation purpose.

Soil conservation

Soil Conservation includes all those measures which help in protecting the soil from erosion and exhaustion. Soil erosion has been continuing over such a large part of India for such a long time that it has assumed alarming proportions. According to Prof. S.P. Chatterjee, "Soil erosion is the greatest single evil to Indian agriculture and animal husbandry". Soil is our most precious asset and no other gift of nature is so essential to human life as soil. An urgent need to

conserve soil for the sake of prosperity of our masses. Following methods are normally adopted for conserving soil:

1. Afforestation. The best way to conserve soil is to increase area under forests. A minimum area of forest land for the whole country that is considered healthy for soil and water conservation is between 20 to 25 per cent but it was raised to 33 per cent in the second five year plan; the proportion being 20 per cent for the plains and 60 per cent for hilly and mountainous regions.
2. Checking Overgrazing. Overgrazing of forests and grass lands by animals, especially by goats and sheep, should be properly checked. Separate grazing grounds should be earmarked and fodder crops should be grown in larger quantities. Animals freely move about in the fields for grazing and spoil the soil by their hoofs which leads to soil erosion. This should be avoided.
3. Constructing Dams. Much of the soil erosion by river floods can be avoided by constructing dams across the rivers. This checks the speed of water and saves soil from erosion.
4. Changing Agricultural Practices. We can save lot of our valuable soil by bringing about certain changes in our agricultural practices such as Crop rotation, Strip cropping, Use of Early Maturing Varieties, Contour Ploughing, Terracing and contour Bunding, Checking shifting Cultivation and Ploughing the Land in Right Direction.

Chapter 5

Population

Q.1 Describe the Population of India.

Ans India is the second most heavily populated country in the world. About every sixth person in the world there is an Indian. Population distribution means the pattern of where people live. Population of the world or of any country is not consistently distributed. The same is correct about India also. World population distribution is uneven. Some parts of the country are densely populated, some parts moderately populated and some parts are sparsely populated.

Population density is an amount of the number of people in an area. Population density is shown as the number of people per km^2 . The amount of population of different areas can be compared in various ways. One of the method can be to compare the complete size of the population. But it does not provide any idea about the association of population with the area or resource base of the country. This type of comparison is therefore not sufficient. The population of countries is compared in terms of density of population. This is a way of comparing the man-land ratio of different areas. For this reason, the population of an area is assumed to be distributed evenly in all its parts and the number of people per km^2 is thus calculated. This is called arithmetic density of population. Which calculate by dividing the total population of a region by the total area. Therefore the density of population is expressed as the number of persons per km^2 .

Factors Influencing Distribution and Density of Population:

Physical Factors	High Density	Low Density
Relief & Altitude	Low land which is flat e.g. Indo-Ganges Plain in India	A highly mountainous state of Arunachal Pradesh
Mineral Resources	Areas full of resources (e.g. coal, oil, wood, fishing etc.) tend to densely populated e.g. The Chhota Nagpur plateau of Jharkhand	Resources with low amount tend to be sparsely populated e.g. The Sahel

Climate

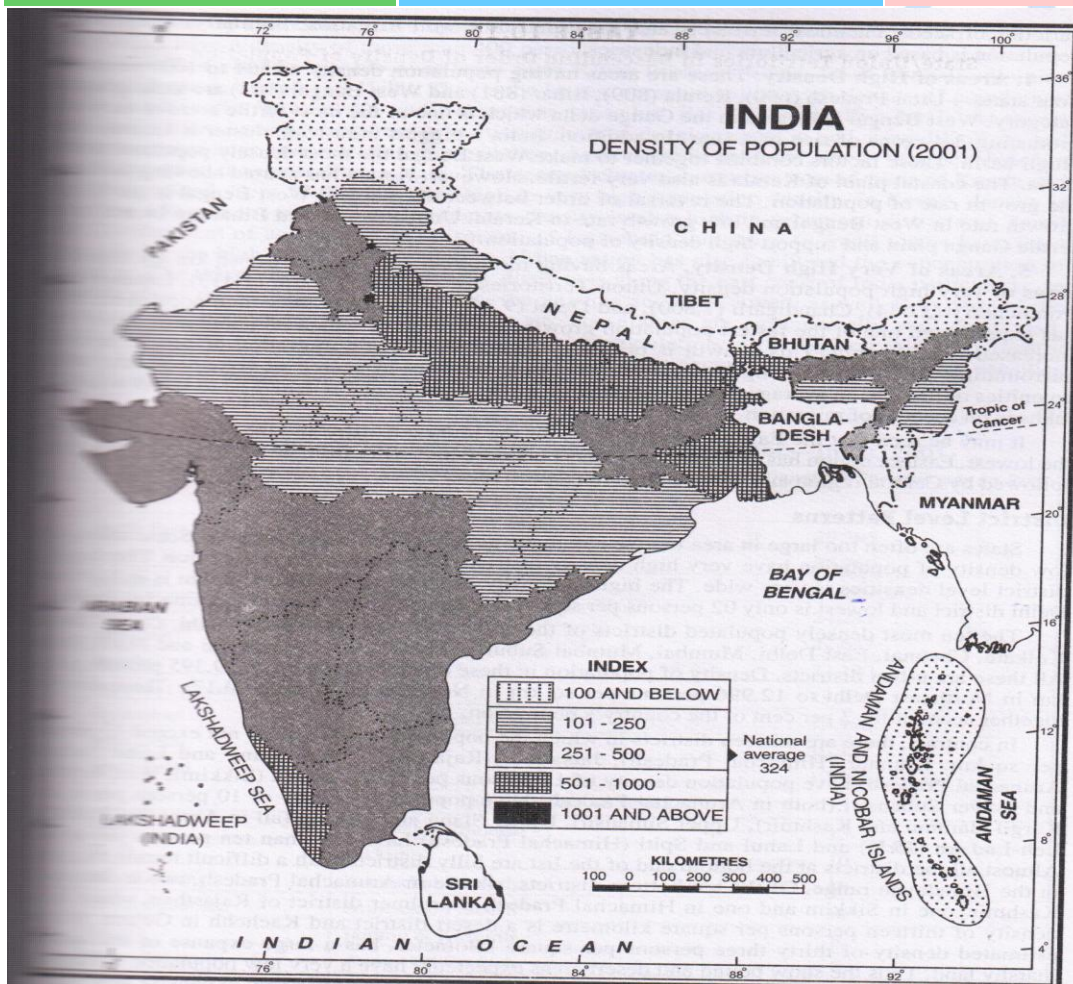
Areas with moderate climates tend to be densely populated as there is enough rain and heat to grow crops e.g. Kerala and West Bengal

Areas with extreme climates of hot and cold tend to be sparsely populated e.g. hot and dry deserts of Rajasthan

Soil

Fertile soil support higher population density e.g. the Indus river basin

Infertile soil leads to low density e.g. desert soils and mountain soil areas.



Source: D.R. Khullar

Density of Population:

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Density of population is a better measure of understanding the variation in the distribution of population. It is the ratio of total population to the total area of the country or a part thereof. Therefore the density of population in India in 2001 is :

$$\frac{\text{Total population}}{\text{Total Area}} = \frac{1028.73}{3.166} = 325 \text{ persons per sq km}$$

With an average density of 325 persons per sq km in 2001, India is considered to one of the most thickly populated countries of the world. The most striking feature of India's density of population is that it has been consistently increasing since 1901.

Increase in density of population of India show in below table

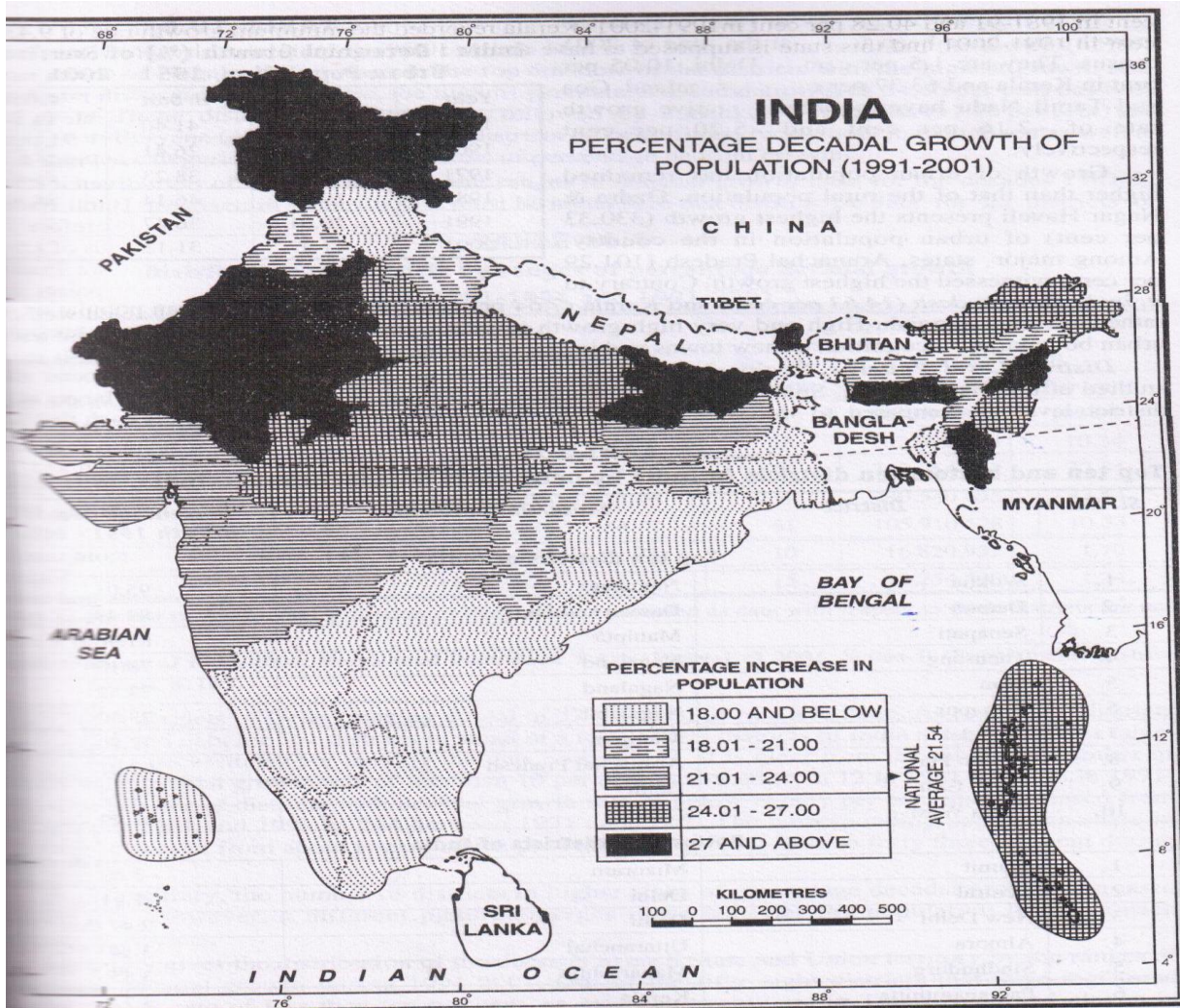
Census Year	Density of Population (persons per sq km)
1901	77
1911	82
1921	81
1931	90
1941	103
1951	117
1961	142
1971	177
1981	216
1991	267
2001	325

Population density at state level:

There are large scale variations in the population density from one state to another. For the sake of convenience, the spatial distribution of population density is classified into following categories:

1. **Area of Extremely Low Density:** Area having 100 persons per sq km and less than that are included in this class. Arunachal Pradesh and Mizoram are located in a remote and inaccessible part of north east India. Jammu and Kashmir has vast areas devoid of population. Only some parts of Jammu region and Kashmir valley are thickly populated.
2. **Area of Low Density:** Area having population density of 101 to 250 persons per sq km are included in this class. Rajasthan is the largest state of India. There are obviously large variations in the density of population in different parts of the state depending upon the local conditions. H.P. and Uttaranchal are parts of the north western Himalayan region and very little level land to support high population density.

3. **Area of Moderate Density:** This class includes those areas which are having 251 to 500 persons per sq km. The average for whole of India also falls in this class. These areas are wide apart from one another and there are different reasons for moderate density of population in different areas. Assam has tea estates whereas Andhra Pradesh, Karnataka and Jharkhand have agriculture and mineral resources. Punjab and Haryana have highly developed agriculture based on heavy inputs in the form of high yielding varieties of seeds, chemical fertilizers and canal and tube well irrigation.
4. **Area of High Density:** these are areas having population density of 501 to 1000 per sq km. West Bengal is the Ganga delta which is one of the most fertile areas of the world, producing 3-4 crops of rice in a year. Uttar Pradesh and Bihar are located in the fertile Ganga plain and support high density of population.
5. **Areas of Very high Density:** Areas having more than 1000 persons per sq. km are termed as areas of very high population density. Delhi has experienced one of the fastest population growths as a result of which its population density has increased considerably. This growth is primarily due to large scale migration of people from the surrounding areas.
It may be seen that the Eastern region has by far the highest density and the North Eastern region the lowest. Eastern region has recorded the highest increase in highest from 431 in 1991 to 525 in 2001 followed by Central region and Western region respectively.



Source: D.R. Khullar

Chapter 6

Foreign Trade

Q.1: Explain the structure of foreign trade of India?

Ans The exchange of goods or merchandise or their sale-purchase is known as trade. Trade is of three types Local trade, Regional trade, Foreign or International or Overseas trade. International Trade of a country is rightly known as its Economic Barometer. With the establishment of British rule in India, our trade ties became stronger with Britain. India used to export raw materials such as cotton, tea, iron-ore, etc. to Britain and import manufacture goods, machinery, medicines, etc. from that country.

Basis of overseas trade

Overseas trade depends upon several factors. Some important factors are discussed as under.

1. **Differences in Natural Resources:** The fundamental base of international trade is the difference in natural resources of different countries. There are variations in relief, structure, geology, climate and soil from one country to the another.
2. **Marketable Surplus:** Some countries are capable of producing certain things more than their internal consumption. For example, tea from India, coffee from Brazil, paper and pulp from Norway are available for export.
3. **Scarcity of Goods:** there is not even a single country in the world which does not have scarcity of one commodity or the other. Japan and Britain do not have raw material.
4. **Transport and Communication:** Trade involves exchange of goods which requires proper arrangement for transportation and communication. Countries with poor transport system have not been able to develop international trade. India has launched an ambitious programme to improve surface transport.
5. **Disparities in Economic Growth:** There are disparities in the economic growth in different parts of the world. Some countries are still engaged in primary activities. These countries mainly export minerals and agriculture raw materials.
6. **Trade Policy:** free trade policy encourages international trade whereas restrictions of the trade discourage it.
7. **War and Peace:** Peace is the most important condition for the development of international trade. International trade gets disrupted during the time of war.
8. **Political Relations:** Countries having cordial political relations have better exchange of goods which encourage international trade. For example, India and Russia have good political relations and trade between these two countries has increased. On the other hand, U.S.A. and Russia have strained political relations and trade between these two big countries is at low level.

Composition of export trade of India

India has been a traditional exporter of raw material since time immemorial. At present, Indian exports cover a wide range of items of agricultural, handicrafts, handlooms and cottage sector Rs.

1. **Tea:** India is a traditional exporter of tea in the world market. Our percentage of tea and mate export in the world market has decreased from 33.4 per cent in 1970 to 27.7 per cent in 1980 and to 12.6 per cent in 2002, primarily, due to increased exports from other countries. Britain has been the traditional buyer of our tea.
2. **Leather and Leather Goods:** India has the largest population of livestock in the world which provide large quantity of leather in the shape of hides and skins. India exported leather goods worth Rs. 28 crore in 1960-61 which rose to Rs. 9938 crore in 2003-04. France and Japan are the main importers of our leather and leather goods.
3. **Ores and Minerals:** India imports gems and precious stones in their raw form and export them after proper cutting and polishing. India exports were worth Rs. 7 crore only in 1960-61 which increased to Rs. 48,586 crore in 2003-04. Israel and Belgium have emerged as our main competitors in the recent years. Iron Ore is the single largest metal exported by India. India exported iron ore worth Rs. 5173 crore in the 2003-04. India holds monopoly in the productions of mica and is the largest exporter of mica in the world. In 2003-04, India exported mica valued at Rs. 106 crore. Chemical and allied products account for about 3.5 percent of our exports. The value of chemical and allied products was Rs. 34,915 crore in 2003-04.
4. **Engineering goods:** As a result of industrial progress, India is in a position to export engineering goods even to some of the advanced countries. In 1950-51, the Indian engineering goods exports were just Rs. 3 crore which jumped to Rs. 47,853.28 crore in 2003-04. Exports of engineering goods grew on the back of rising demands from countries in South East Asia and China.
5. **Cotton and textiles and yarn:** India now exports both inferior and superior quality cloth and yarn to the different countries. In the year 2003-04 India exported cotton yarn worth Rs. 15,600 crore.
6. **Readymade garments:** Readymade garments have become a very important item of export during the last few years. The total earnings from the exports of readymade garments were Rs. 1067 crore in 1985-86 which increased to Rs. 28634 crore in 2003-04.
7. **Jute manufactures:** India exported jute manufactures including twist and yarn valued at Rs. 9938 crore in 2003-04. Eight countries purchase about two third of our jute exports.
8. **Marine products:** The main items of marine products exports are fish, dried prawn and shrimps. India exports these products to over 80 countries. Japan and USA purchase about 90 per cent of our exports.
9. **Coffee:** In 2003-04, 188 thousand tones of coffee worth Rs. 1066 crore was exported.
10. **Spices:** The total quantity of spices exported in 2003-04 was 267 thousand tones and the total earning from the export of spices in that year was Rs. 1544 crore.

Performance of Exports, Imports and Balance of Trade

Value in Rs. Crores

S. No.	Year	Exports	%Growth	Imports	%Growth	Trade Balance
1.	2004-2005	375,340	27.94	501,065	39.53	-125,725
2.	2005-2006	456,418	21.60	660,409	31.80	-203,991
3.	2006-2007	571,779	25.28	840,506	27.27	-268,727
4.	2007-2008	655,864	14.71	1,012,312	20.44	-356,448
5.	2008-2009	840,755	28.19	1,374,436	35.77	-533,680
6.	2009-2010	845,534	0.57	1,363,736	-0.78	-518,202
7.	2009-10 (Apr-Dec)	608,882		991,605		-382,723
8.	2010-11 (Apr-Dec)	751,633	23.44	1,126,513	13.61	-374,880

Composition of import trade of India

1. Petroleum and Petroleum Products. This is the largest single item of import by India these days. There is great demand for petroleum and petroleum products and this demand is increasing at an accelerated rate. In 2003-04, 99.5 million tonnes of petroleum, oil and lubricants worth Rs. 94,520 crore were imported which accounted for 26.3 per cent of our total imports. Iran, Saudi Arabia, UAE, Iraq, Kuwait, Venezuela, Indonesia and Malaysia are the main sources of oil supply to India.
2. Machines. Textile machinery, electrical machines, farm implements and mining machines are the main items of import. These machines are mainly imported from the USA, Britain, Germany, Russia, France, Japan, Belgium, Poland, Italy. The Netherlands, Canada, Australia, etc.
3. Iron and Steel. Although there has been a considerable increase in the production of iron and steel in India, yet out production always falls short of our demand.
4. Minerals. Apart from iron and steel, India imports a large variety of minerals including copper, lead, tin, zinc, brass, aluminum, etc. These minerals are imported from the USA, Britain, Japan, Germany, Switzerland, Australia, Myanmar and Malaysia, etc.
5. Fertilizers. The increasing demand for fertilizers for agricultural growth has to be met by imports. India imported 5,756.3 thousands tonnes of fertilizers worth Rs. 2,916 crore in 2003-04. The USA, Germany and Japan are the main sources of fertilizers.
6. Pearls and Precious Stones. India imports a large quantity of pearls and precious stones in their raw form and exports them after cutting and polishing.
7. Gold and Silver. Gold and Silver have also become a very important items of import. After a decline of 6.4 per cent in 2002-03, the gold and silver imports (excluding imports through passenger baggage), picked up sharply by 59.9 per cent in 2003-04, not withstanding a rise in international bullion market.

8. Edible Oils. The production of edible oils has always been falling short of our demand which is met by imports. The USA, Brazil and Malaysia are the main sources of edible oils for India. These three countries supply about three fourths of our edible oils.
9. Chemicals. India imports a large variety of chemicals including ammonia, sulphate, super phosphate, nitric acid, soda ash, bleaching powder and potash. India imported chemical elements and components worth Rs. 21,429 crore in 2003-04. The main sources of our chemicals are the USA, Japan, Germany, the Netherlands, Belgium, France, Britain, Italy, Kuwait and Korea.
10. Medicines. Large quantities of medicines are required to provide increasing medical treatment to the fast-growing population of India. India spent Rs. 1,358 crore in 1995-96 to import medicinal and pharmaceutical products. About half the imports are from Germany, Italy, China, Switzerland, Spain, Belgium and Poland.
11. Paper. With the increase in literacy and publication, India is finding it hard to meet her requirements from the indigenous production and has to import paper. The shortage of newsprint is badly felt. Pulp and scrap paper are also imported to manufacture paper. India imported 1,758.8 thousand tonnes of pulp and waste paper worth Rs. 1,880 crore and 1,075.5 thousand tonnes of paper, paper board and manufactures thereof worth Rs. 3,022 crore in 2003-04. Russia, Sweden, Germany, Bangladesh, Brazil, China, Czech Republic, Slovakia and Korea are the main suppliers of these items.



Chapter 7

Agriculture

Q.1 Explain the different agriculture feature of India.

Ans It plays a vital role in the economy of India. The relative importance of agriculture has reduced considerably since then due to rapid development of other occupations such as mining, manufacturing, transport and trade. In addition to providing food and fodder to large population of human beings and livestock, respectively, agriculture is the main source of raw materials for several key industries.

Agriculture has double relation with industry. It acts as a supplier of raw materials to the industries and as consumer of industrial products. Prosperity of the entire nation depends upon the prosperity of agriculture.

Salient features of Indian agriculture.

1. Subsistence agriculture. Most parts of India have subsistence agriculture. The farmer owns a small piece of land, grows crops with the help of his family members and consumes almost the entire farm produce with little surplus to sell in the market.

2. Pressure of population on agriculture. The population in India is increasing at a rapid pace and exerts heavy pressure on agriculture. Agriculture has to provide employment to a large section of work force and has to feed the teeming millions. It is now estimated that about 4 lakh hectares of farm land is now being diverted to non-agriculture uses each year.

3. Importance of animals. Animals force has always played a significant role in agricultural operations such as ploughing, irrigation, threshing and transporting the agriculture products.

4. Dependent upon Monsoon. Indian agriculture is mainly dependent upon monsoon which is uncertain, unreliable and irregular.

5. Variety of crops. India is a vast country with varied types of relief, climate and soil conditions. Therefore, there is a large variety of crops grown in India. Both the tropical and temperate crops are successfully grown in India.

6. Insignificant place to given fodder crops. Although India has the largest population of livestock in the world, fodder crops are given a very insignificant place in our cropping pattern. Only four percent of the reporting area is devoted to permanent

pastures and other grazing lands.

Problems of Indian Agriculture and their Solution

1. Small fragmented land-holdings. The average size of holdings was 2.28 hectares in 1970-71 which was reduced to 1.82 hectares in 1980-81 and 1.50 hectares in 1995-96. The problems of small and fragmented holdings is more serious in densely populated and intensively cultivated states like Kerala, West Bengal, Bihar and eastern part of Uttar Pradesh where the average size of land holdings is less than one hectare and in certain parts it is less than even 0.5 hectare.

Sub-division and fragmentation of the holdings is one of the main causes of our low agricultural productivity and backward state of our agriculture. Irrigation becomes difficult on such small and fragmented fields, Further, a lot of fertile agricultural land is wasted in providing boundaries. Under such circumstances, the farmer cannot concentrate on improvement.

The other solution to this problem is cooperative farming in which the farmers pool their resources and share the profit.

2. Seeds. Seed is a critical and basic input for attaining higher crop yields and sustained growth in agriculture production. In order to solve this problem, the Government of India established the National Seeds Corporation (NSC) in 1963 and the State Farmers Corporation of India (SFCI) in 1969. The Indian seed industry had exhibited impressive growth in the past and is expected to provide further potential for growth in agricultural production.

The policy statements are designed towards making available to the Indian farmer, adequate quantities of seed of superior quality at the appropriate time and place and at an affordable price so as to meet the country's food and nutritional security goals. Production of breeder and foundation seeds, and certified seeds distribution have gone up at an annual average rate of 3.4 per cent, 7.5 per cent and 9.5 per cent respectively, between 2001-02 and 2005-06.

3. Manures, Fertilizers and Biocides. Indian soils have been used for growing crops over thousands of years without caring much for replenishing. This is a serious problem which can be solved by using more manures and fertilizers. Manures and fertilizers play the same role in relation to soils as good food in relation to body. It has been estimated that about 70 per cent of growth in agricultural production can be

attributed to increased fertilizer application. Cow used as kitchen fuel in the shape of dung cakes. The fertilizer problem is, therefore, both acute and complex. The country has a potential of 650 million tonnes of rural and 160 lakh tonnes of urban compost which is not fully utilized at present.

In order to maintain the quality of the fertilizers, 52 fertilizer quality control laboratories have been set up in different parts of the country. In addition, there is one Central Fertilizer Quality Control and Training Institute at Faridabad with its three regional centers at Mumbai, Kolkata and Chennai.

4. Irrigation. Although India is the second largest irrigated country of the world after China, only tropical monsoon country like India where rainfall is uncertain, unreliable and erratic. Large tracts still await irrigation to boost the agricultural output. In the Indira Gandhi Canal command area also intensive irrigation has led to sharp rise in sub-soil water level, leading to waterlogging, soil salinity and alkalinity.

5. Lack of mechanization. Most of the agricultural operations in larger parts are carried on by human hand using simple and conventional tools and implements like wooden plough, sickle, etc. This is specially the case with small and marginal farmers. It results in huge wastage of human labour and in low yields per capita labour force.

There is urgent need to mechanise the agricultural operations so that wastage of labour force is avoided and farming is made convenient and efficient. The share of mechanical and electrical power has increased from 40 per cent in 1971 to 84 per cent in 2003-04. Strenuous efforts are being made to encourage the farmers to adopt technically advanced agricultural equipments in order to carry farm operations timely and precisely, and to economise the agricultural production process.

6. Soil erosion. Large tracts of fertile land suffer from soil erosion by wind and water. This area must be properly treated and restored to its original fertility.

7. Agricultural Marketing. Agricultural marketing still continues to be in a bad shape in rural India. In the absence of sound marketing facilities, the farmers have to depend upon local traders and middlemen for the disposal of their farm produce which is sold at throw-away price. According to an estimate 85 per cent of wheat and 75 per cent of oil seeds in Uttar Pradesh, 90 per cent of Jute in West Bengal, 70 per cent of oilseeds and 35 per cent of cotton in Punjab is sold by farmers in the village itself.

The Rural Credit Survey Report rightly remarked that the producers in general sell their produce at an unfavorable place and at an unfavorable time and usually they get

unfavorable terms. Many market surveys have revealed that middlemen take away about 48 per cent of the price of rice, 52 per cent of the price of groundnuts and 60 per cent of the price of potatoes offered by consumers. In order to save the farmer from the clutches of the money lenders and the middle men, the government has come out with regulated markets.

8. Inadequate storage facilities. Storage facilities in the rural areas either totally absent under such condition the farmers are compelled to sell their produce immediately after the harvest at the prevailing market prices which are bound to be low. Scientific storage is, therefore, very essential to avoid losses and to benefit the farmers and the consumers alike. At present there are number of agencies engaged in warehousing and storage activities. The Food Corporation of India, the Central Warehousing Corporation and State Warehousing Corporation are among the principal agencies engaged in this task. The working group on additional storage facilities in rural areas has recommended a scheme of establishing a network of Rural Storage Centers to serve the economic interests of the farming community.

9. Inadequate transport. One of the main handicaps with Indian agriculture is the lack of cheap and efficient means of transportation. Even at present there are lakhs of villages which are not well connected with main roads or with market centers. Linking each village by metal led road is a gigantic task and it needs huge sums of money to complete this task.

10. Scarcity of capital. Agriculture is an important industry and like all other industries it also requires capital. The role of capital input is becoming more and more important with the advancement of farm technology. Since the agriculturists' capital is locked up in his lands and stocks, he is obliged to borrow money for stimulation the tempo of agricultural production. The main suppliers of money to the farmer are the money-lenders, traders and commission agents who charge high rate of interest and purchase the agricultural produce at very low price. Rural credit scenario has undergone a significant change and institutional agencies such as Central Cooperative Banks, State Cooperative Banks, Commercial Banks, Cooperative Credit Agencies and some Government Agencies are extending loans to farmers on easy terms.

Agricultural Regions

An agricultural region is defined as an area having homogeneity in relief, soil type, climatic conditions, farming practices, crops produced and crop association. India is a vast country and is endowed with diverse geographical conditions which are bound to bring in regional variations in agriculture. India can be divided into following agricultural regions :

1. Rice-Jute-Tea Region.

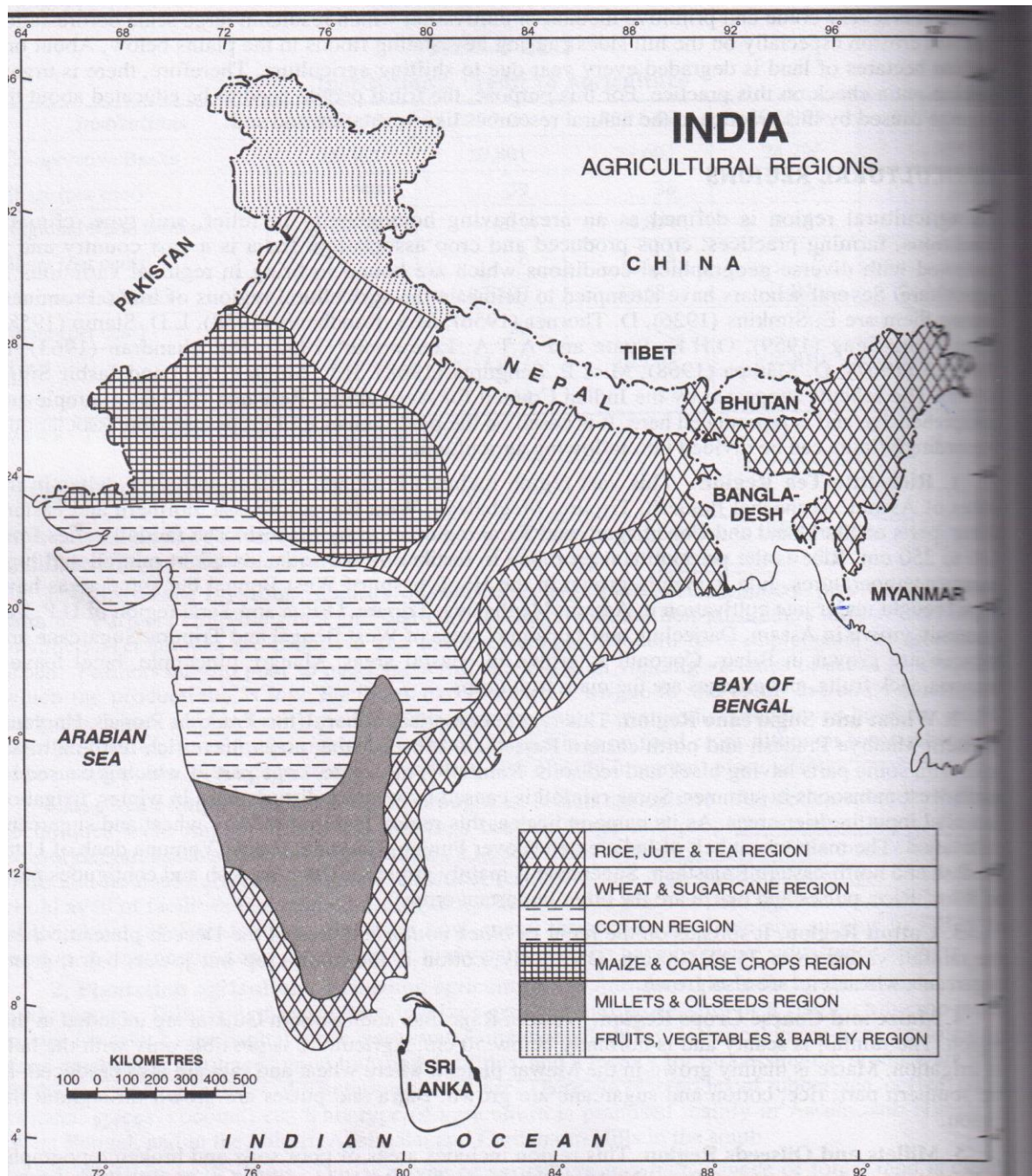
This vast region includes lowlands, valleys and river deltas in the states of Assam, Arunachal Pradesh, Tripura, Meghalaya, West Bengal, Orissa, northern and eastern Bihar parts of Jharkhand and Chhattisgarh and Tarai region of Uttar Pradesh. The rainfall varies from 180 to 250 cm. Rice is the predominant crop due to fertile alluvial soils, abundant rainfall and high summer temperatures. Jute is mainly grown in the Hugli basin of West Bengal but some areas have been brought under jute cultivation in Assam, Meghalaya, Tripura, Orissa and Tarai region of U.P. Tea is mainly grown in Assam, Darjeeling and Jalpaiguri areas of West Bengal and Tripura. Coconut is grown in coastal areas. Mango, Pineapple, betal leaves, bananas, jack fruits, and oranges are the main fruit crops.

2. Wheat and Sugarcane Region.

This region comprises Bihar, Uttar Pradesh, Punjab, Haryana, Western Madhya Pradesh and north eastern Rajasthan. Irrigation is a vital input in drier areas. The main wheat belt of India extends over Punjab, Haryana, Ganga-Yamuna doab of Uttar Pradesh and north-eastern Rajasthan. Sugarcane is mainly grown in Uttar Pradesh and contiguous parts of Bihar. Rice, pulses and maize are the other important crops.

3. Cotton Region.

It spreads on the regur or black cotton soil area of the Deccan plateau, where the rainfall varies from 75 to 100 cm. Obviously, cotton is the main crop but jowar, bajra, gram, sugarcane, wheat, etc. are also grown.



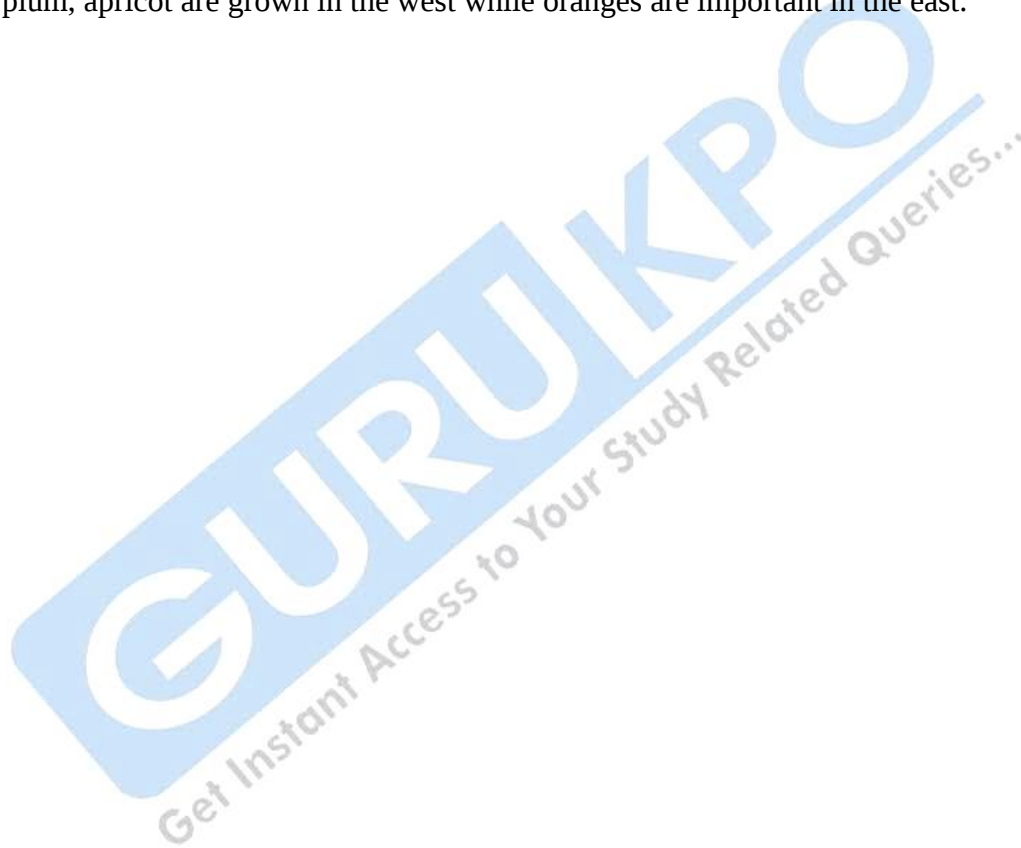
Source: D.R. Khullar

4. Maize and Coarse Crops Region. Western Rajasthan and Northern Gujarat are included in this region. Maize is mainly grown in the Mewar plateau where wheat and ragi are also produced. In the southern part, rice, cotton and sugarcane are grown. Bajra and pulses are

grown throughout the region.

5. Millets and Oilseeds Region This region includes areas of poor soils and broken topography in Karnataka plateau, parts of Tamil Nadu, southern Andhra Pradesh and eastern Kerala. The rainfall varies from 75 to 125 cm. The millets include bajra, ragi and jowar while the oilseeds grown are groundnut and castor. Pulses are also grown. Mangoes and bananas are important fruit crops.

6. Fruits and Vegetable Region This region extends from Kashmir Valley in the West to Assam in the east. The rainfall varies from 60 cm in the west to 200 cm in the east. Apple, peach, cherries, plum, apricot are grown in the west while oranges are important in the east.



Chapter 8

Industry

Q.1 Explain the iron and steel industry on India.

Ans We live essentially in an age of iron and steel. Its hardness, strength and durability, iron is the most important and widely used metal in the service of man. Most of the subsidiary industries such as automobiles, locomotives, rail tracks, ship building, machine building, bridges, dams and a host of other industrial and commercial activities depend upon iron and steel industry. The real beginning of modern iron and steel industry was made in 1907 only when Tata Iron and Steel Company (TISCO) was set up at Jamshedpur. The development of iron and steel industry was envisaged during the first Five-year Plan, but it was during the Second Five-year plan, that the three integrated steel projects were started at Bhilai, Rourkela and Durgapur.

Steel Authority of India (SAIL) Established in 1973, SAIL is a government undertaking and is responsible for the management of steel plants at Bhilai, Durgapur, Rourkela, Bokaro and Burnpur and also the Alloy Steel Plant at Durgapur and Salem Steel Plant. Visweswarya Iron and Steel Limited was also taken over by SAIL in August 1989.

Locational Factors

Iron and steel industry uses large quantities of heavy and weight losing raw materials and its localization is primarily controlled by the availability of raw materials. Coal and iron ore are the two basic raw materials used by iron and steel industry and on the basis of minimum transportation cost most of the steel plants are located at three distinct places viz. (i) near coal fields, (ii) near iron ore mining centers and (iii) at places between areas of coal and iron ore production. Most of the iron and steel plants of India such as Jamshedpur, Burnpur, Durgapur, Rourkela, Bhilai and Bokaro are located in Jharkhand, West Bengal, Orissa and Chhattisgarh. The other raw materials used in this industry are manganese, limestone, dolomite, chromite, silica, etc.

Steel products of an integrated steel plant are quite bulky and it has been estimated that the transport cost per tonne-kilometre of steel product is about three times more than that of coal or iron ore. Thus, following the theory of minimum transportation cost many centres of iron and steel production tend to be attracted by market. The use of scrap as raw material on a large scale is yet to pick up in India. The geographical coincidence of any

two of the three factors would easily determine the site of the steel plant's.

Large Integrated Iron and Steel Plants

1. Tata Iron and Steel Company (TISCO). This is the oldest iron and steel centre of India. It was established in 1907 by Jamshed ji Tata at Sakchi in Singhbhum district of Jharkhand. Currently it produces about 3 million tonnes of saleable steel. Following facilities are available to this centre.

1. Coal is available from Jharia and Raniganj coal mines located 160 to 200 km from Jamshed ji Tata.
2. Manganese comes from Joda mines of Kendujhar district in Orissa.
3. Sufficient water for cooling purpose is obtained from Subarnrekha river.
4. Jamshedpur is well connected with Kolkata, Mumbai and Chennai by road and rail and enjoys good transport facilities.
5. Densely populated regions of Jharkhand, Bihar and Orissa provide cheap labour.

Dubari Steelworks. TISCO to locate a second steelworks at Gopalpur in Orissa, about 170 kms south-east of Bhubaneshwar. The favourable factors are coastal location, proximity to a rich iron ore belt, availability of sparsely settled land for the project, a nearby source of fresh water in the form of a rivulet. Consequently the Tata Steel decided to build a six million tonne plant at Duburi. The project is a part of Tata Steel's plan to reach 15 million tonne capacity by 2010.

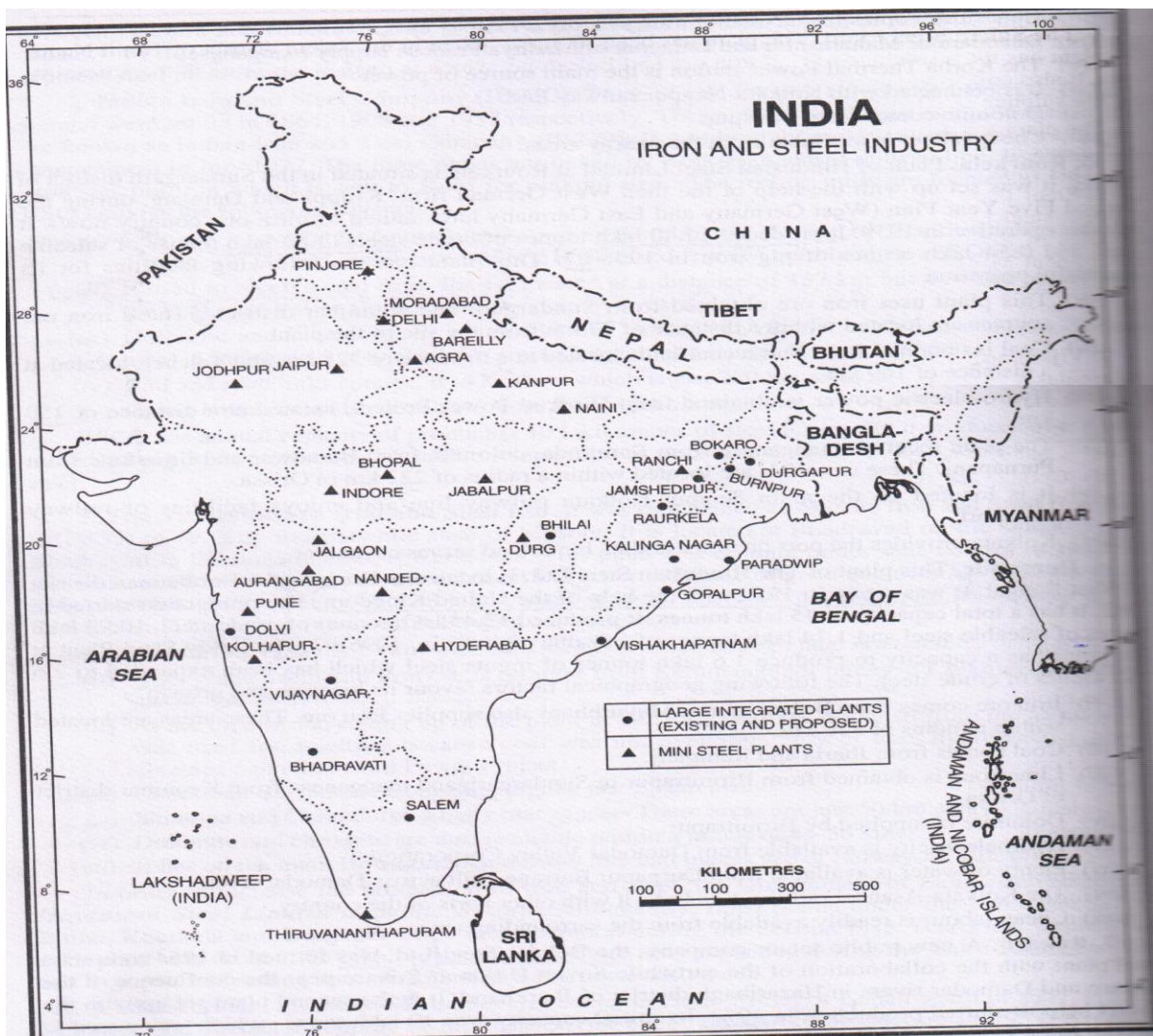
2. Indian Iron and Steel Company (IISCO). Three plants at Kulti, Hirapur and Burnpur in West Bengal were set up in 1864, 1908 and 1937 respectively. These plants have been merged together and are known as Indian Iron and Steel company (IISCO). The three plants are linked by Kolkata-Asansol railway line. IISCO enjoys the following advantages :

- (i) Iron ore is available from Guna mines in Singhbhum.
- (ii) It used to receive coal from Jharia.
- (iii) Dolomite and limestone are obtained from Sundargarh.
- (iv) Cheap labour is readily available from the neighbouring areas. Currently it produces over 4 lakh tonnes of pig iron.

3. The Visweswaraya Iron and Steel Ltd. It was established as Mysore Iron and Steel company (MISCO) in 1923. This plant was brought under state control in 1962 and was renamed as Visveswaraya Iron and Steel Ltd. This centre enjoys the following advantages.

- (i) Bhadravati valley is 13 km wide as a result of which enough land is available.
- (ii) High grade haematite iron ore is brought from Kimmangundi mines in Chikmagalur.
- (iii) Limestone is available from Bhundiguda just 25 km away.
- (iv) Shimoga and Chitradurga supply manganese.
- (v) Dolomite and Chromite are also available within a radius of 45-50 km.

The Hindustan Steel Limited in public sector consequently, three plants under the public sector, i.e. Bhilai, Rourkela and Durgapur came into operation during the Second Five year Plan.



Source: D.R. Khullar

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4. Bhilai. Bhilai iron and steel centre was set up in Durg District of Chhattisgarh in 1957. This plant produced 41.87 lakh tonnes of crude steel, 38.32 lakh tonnes of saleable steel and 2.43 lakh tonnes of pig iron in 1996-97. It enjoys following geographical advantages

- (i) It procures rich haematite iron ore from Dalli-Rajhara range.
- (ii) Coal is obtained from Korba and Kargali fields of Chhattisgarh.
- (iii) Limestone comes from Nandini mines.
- (iv) The Korba Thermal power station is the main source of power.
- (v) It is connected with Kolkata-Nagpur railway line.
- (vi) Cheap labour is available from the nearby areas.

5. Rourkela. Plant of Hindustan steel ltd at Rourkela is situated in the Sundargarh district of Orissa. It produced 12.40 lakh tonnes of crude steel, 11.80 lakh tonnes of saleable steel and 0.54 lakh tonnes of pig iron in 1996-97. This plant has the following facilities for its successful operation:

- (i) This plant uses iron ore obtained from Sundargarh and Keonjhar districts.
- (ii) Coal is obtained from Jharia coalfields.
- (iii) Hydro-electric power is obtained from Hirakud Power Project.
- (iv) The plant receives manganese from Barajmda, dolomite from Baradwar and limestone from Purnapani.
- (v) It is located on the main Nagpur-Kolkata railway line.
- (vi) Kolkata provides the port facilities and its hinterland serves as market.

6. Durgapur. This plant of The Hindustan Steel ltd. is located at Durgapur. It was set up in 1959 with the help of the United Kingdom. The Alloy Steel plant at Durgapur has a capacity to produce 1.6 lakh tonnes of ingots steel which has been expanded to 2.6 lakh tonnes of crude steel. The following geographical factors are favorable for its location and growth.

- (i) Iron ore comes from Bolani mines.
- (ii) Coal comes from Jharia and Raniganj.
- (iii) Limestone is obtained from Birmitrapur in Sundargarh.
- (iv) Dolomite is supplied by Birmitrapur.
- (v) Hydroelectricity is available from Damodar Valley Corporation.
- (vi) The Kolkata-Asansol railway line links it with other parts of the country.
- (vii) Cheap labour is readily available from the surrounding areas.

7. Bokaro. The Bokaro Steel Ltd. Started production in 1972. It is the second plant set up with the Soviet help. It produced 36.44 lakh tonnes of crude steel, 30.46 lakh tonnes of saleable steel and 2.6 lakh tonnes of pig iron in 1996-97. This achievement has been made possible due to following few geographical factors :

- (i) It receives iron ore from Kiriburu mine in Orissa.
- (ii) Coal is obtained from Jharia coalfields located at a distance of 65 km.
- (iii) Limestone comes from Palamu district of Jharkhand.
- (iv) Hydroelectricity is obtained from Damodar Valley Corporation.
- (v) Kolkata is just 300 km from here and provides port facilities.

8. The Salem Steel Plant. The plant has been set up at Salem. The plant has the advantage of rich iron ore and limestone. The iron ore available here has low sulphur and phosphorus content and is suitable for producing special grade iron and steel.

Today the Salem Steel Plant is a major producer of world class stainless steel and is in a position to export stainless steel to some of the advanced countries such as the USA, Mexico, Australia and some countries of South-East Asia. This plant produced 48 thousands tonnes of saleable steel in 1995-96.

9. Vishakhapatnam Steel Plant (VSP). This integrated steel plant has a unique location on the sea port. In fact, it is the first shore based steel plant in the country. The project has been completed in two stages: the first stage was completed by March 1992 and the second and final stage by July 1992. This is the most sophisticated modern integrated steel plant in the country. It exported 10.23 lakh tonnes of iron and steel worth Rs. 702 crore, mainly to China and South-east Asian countries. Presently it is the second largest producer of iron and steel in the country and the present annual capacity of three million tonnes of liquid steel can be raised to 5 million by 2006-07 and to 10 million tonnes by 2010. The natural gas requirement is placed at one billion cubic metres (BCM) a year and negotiations are in progress with the Reliance Group in this connection. The plant has the following advantages:

- (i) The coastal location facilitates import of coal and export of iron and steel.
- (ii) It is well connected to coal fields of Damodar valley in Jharkhand.
- (vii) High quality rich iron ore deposits are available in the Bailadila area of Chhattisgarh.
- (viii) Most of the requirements of limestone, dolomite and manganese are met by suppliers from Chhattisgarh: Madhya Pradesh and Orissa.

Problems of Indian Iron and Steel Industry

1. Capital: Iron and steel industry requires large capital investment which a developing country like India cannot afford. Many of the public sector integrated steel plants have been established with the help of foreign aid.

2. Lack of Technology: Throughout the 1960s and up to the oil crisis in mid-1970s,

Indian steel industry was characterized by a high degree of technological efficiency. This technology was mainly from abroad. But during the following two decades after the oil crisis, steep hike in energy costs and escalation of costs of other inputs, reduced the margin of profit of the steel plants. This resulted in lower levels of investment in technological developments. Consequently, the industry lost its technology edge and is now way behind the advanced countries in this regard. Material value productivity in India is still very low. In Japan and Korea, less than 1.1 tonnes (and in several developed countries 1.05 tonnes) of crude steel is required to produce a tonne of saleable steel. In India, the average is still high at 1.2 tonnes. Improvement in the yield at each stage of production, particularly for value added products will be more important in the coming years.

3. Low productivity. The per capita labour productivity in India is at 90-100 tonnes which is one of the lowest in the world. The labour productivity in Japan, Korea and some other major steel producing countries is about 600-700 tonnes per man per year. At Gallatin steel a mini mill in the U. S. there are less than 300 employees to produce 1.2 million tonnes of hot rolled coils. A comparable facility in India employs 5,000 workers. Therefore, there is an urgent need to increase the productivity which requires retraining and redevelopment of the labour force.

4. Inefficiency of public sector units. Most of the public sector units are plagued by inefficiency caused by heavy investment on social overheads, poor labour relations, inefficient management, underutilization of capacity, etc. This hinders proper functioning of the steel plants and results in heavy losses.

5. Low potential utilization. The potential utilization in iron and steel is very low. Rarely the potential utilization exceeds 80 per cent. For example, Durgapur steel plant utilizes only 50 per cent of its potential. This is caused by several factors, like strikes, lockouts, scarcity of raw materials, energy crisis, inefficient administration, etc.

6. Heavy Demand. Even at low per capita consumption rate, demand for iron and steel is increasing with each passing day and large quantities of iron and steel are to be imported for meeting the demands. Production has to be increased to save precious foreign exchange.

7. Shortage of metallurgical coal. Although India has huge deposits of high grade iron ore, her coal reserves, especially high grade cooking coal for smelting iron are limited. Many steel plants are forced to import metallurgical coal. For example, steel plant at Vishakhapatnam has to import coal from Australia. Serious thought is now being given to replace imported coal by natural gas from Krishna-Godavari basin.

8. Inferior quality of products. Lack of modern technological and capital inputs and weak infrastructural facilities leads to a process of steel making which is more time

consuming, expensive and yields inferior variety of goods. Such a situation forces us to import better quality steel from abroad. Thus there is urgent need to improve the situation and take the country out of desperate position.

Q.2 Write short note on 'House Building Materials'?

Ans The material used for the construction of houses varies with the natural environment conditions and the resources available in the _____ of the construction site. Those vary from dried grass & leaves, to _____ wood, soil, Bricks, stones, cement, Iron etc. following are the house type depending upon the used material.

House of Mud & Soil

Soil is available almost everywhere except mountain and snow-covered areas. It is considered as a easily available and cheap material for the purpose. Clayey soils are best suitable for house making purposes. It is also used for making bricks. The clayey soils are less prone to erosion in comparison of other soil types. The bricks used for house construction are of two types i.e., fire baked and sun-baked bricks. Clay is available in each type of climate and the house walls are made up of clay. Bricks are used in drier part of the world, because those bricks are less prone to solution effects. Due to the abundant quantity and low cost, these types of houses are found from Morocco (Africa) to the western India (Rajasthan).

In the areas receiving high rainfall, the house walls are made by clay. In the rural areas from Punjab to the Bengal, the _____ walls are made up of clay. Now a day, the trend is changing. In order to construct strong and durable houses.

Stone Material

Stones and rock pieces are an important material used for the construction of houses. These types of houses are stronger and durable in comparison to the rural house. The use of various stones depends upon the quality and specification, for e.g. Sandstone, Granite and marble, etc. Sandstone is widely used for house constructions, due to its availability, durability and the characteristic of being layered. Marble is used in temples because of its beauty. The buildings which were made a thousand years ago are intact due to its durability and care. The temples of Ajanta and Ellora are carved out from the rocks of the mountains. These types of houses and building remains are playing an important role in understanding the past and history of particular place. Likewise, the remains of ancient civilization tells us the near about picture or account of nature and structure of the above mentioned civilization.

Stone is a heavy material and it is difficult to carry or transport to another site so, in most of the cases, the type of the building material used in the construction, depends on the availability.

Wooden Material

Wood is also used as a house building material and it is lighter than other source that is why it is abundantly used in the areas, situated far from the source of material. The strong and long wooden pillars and poles are used in roof making and for support purpose. In

modern houses doors, windows and ventilators are made up of wooden materials. At some places the entire house is being made up of wooden materials. These types of houses are commonly found in Amazon Basin, Congo Basin, Sri Lanka and several South Asian countries. The climate and environment in these places is more suitable for wooden houses. In Japan, the Cyprus wood is locally available and the earthquake prone area led to the extensive use of wooden house building materials because of the harmful after effects of an earthquake. In mountain areas, the wooden material is extensively used with the stone and other house building materials.

Modern House Building Material

The growing use of technological knowledge and scientific discoveries led to the less dependency on traditional house building materials. Now, iron, steel, cement, glass, bricks, etc are more commonly use as house building material. These resources are used in the urban areas, where the need of durable and multi-level strong building in more than the rural areas. Now a days, the high multi story and strong buildings are made up of the modern house building materials. In rural areas the houses are made up of traditional and other sources, but in present times the use of modern building materials is not uncommon.



Multiple Choice Question

1. By which name does the Brahmaputra enter into India?

- (a) Manas
- (b) Dhansiri
- (c) Dihang
- (d) Tsangpo

Answer (c)

2. Near the lake Mansarovar in Tibet, the river which has its source is/are:

- (a) Indus
- (b) Sutlej
- (c) Brahmaputra
- (d) All of these

Answer (d)

3. The river basin which is called 'Ruhr of India' is:

- (a) Damodar
- (b) Hooghly
- (c) Godavari
- (d) Swarnarekha

Answer (a)

5. The longest river of peninsular India is:

- (a) Narmada
- (b) Godavari
- (c) Mahanadi
- (d) Cauvery

Answer (b)

6. Which of the following river is known as India's River of Sorrow?

- (a) Hooghly
- (b) Damodar
- (c) Ghaghara
- (d) Kosi

Answer (d)

7. In which state is Jog Falls located?

- (a) Maharashtra
- (b) Karnataka
- (c) Tamil Nadu
- (d) Kerala

Answer (b)

8. The correct sequence of the eastward flowing rivers of the peninsular India from north to south is:

- (a) Subarnarekha, Mahanadi, Godavari, Krishna, Pennar, Cauvery and Vagai
- (b) Subarnarekha, Mahanadi, Krishna, Godavari, Cauvery, Vagai and Pennar
- (c) Mahanadi, Subarnarekha, Godavari, Krishna, Cauvery, Pennar and Vagai
- (d) Mahanadi, Subarnarekha, Krishna, Godavari, Cauvery, Vagai and Pennar

Answer (a)

10. The second largest river basin in India is of the river:

- (a) Brahmaputra
- (b) Narmada
- (c) Krishna
- (d) Godavari

Answer (d)

11. Which of the following rivers existed before the uplift of the Himalaya?

- (A) Brahmaputra
- (B) Sutlej
- (C) Indus
- (D) Bhagirathi
- (a) A and C
- (b) B and C
- (c) A, B and C
- (d) A, B, C and D

Answer (c)

12. Match the following:

City River passing through the city

- A. Nasik 1. Krishna
- B. Surat 2. Cauvery
- C. Ujjain 3. Godawari
- D. Vijayawada 4. Shipra
- 5. Tapi

A B C D

- (a) 3 5 4 1
- (b) 4 1 3 2
- (c) 3 1 4 2
- (d) 4 5 3 1

Answer (a)

14. Arrange the following rivers from South to North:

- 1. Cauvery
- 2. Krishna

3. Godavari
4. Mahanadi
- (a) 1, 3, 2, 4
- (b) 3, 4, 1, 2
- (c) 2, 4, 3, 1
- (d) 1, 2, 3, 4

Answer (d)

15. Consider the following pairs:

Tributary River Main River

1. Chambal - Narmada
2. Sone - Yamuna
3. Manas - Brahmaputra

Which of the pairs given above is/are correctly matched?

- (a) 1, 2 and 3
- (b) 1 and 2
- (c) 2 and 3
- (d) 3 only

Answer (d)

16. In the decreasing order of the length of the rivers, the correct sequence is:

- (a) Brahmaputra – Ganga – Godavari - Narmada
- (b) Ganga – Godavari – Brahmaputra - Narmada
- (c) Brahmaputra – Narmada - Godavari - Ganga
- (d) Ganga – Brahmaputra – Godavari – Narmada

Answer (a)

17. By what name is the Ganga known in Bangladesh?

- (a) Padma
- (b) Bhagirathi
- (c) Rupnarayan
- (d) Nubra

Answer (a)

18. Which of the following peninsular rivers is westward flowing?

- (a) Mahanadi
- (b) Godavari
- (c) Tapi
- (d) Cauvery

Answer (c)

19. Two Volcanic islands in Indian territory are—

- (A) Kavaratti and Newmoor

- (B) Great Andaman and Little Nicobar
 - (C) Pambam and Barren
 - (D) Narcondam and Barren
- Ans: (D)

20. The Neveli thermal power plant is led by

- (A) Gondwana Coal
- (B) Teritary Coal
- (C) Quartemary
- (D) Cambrian Coal

Ans: (A)

21. Where are iron-ore mines located?

- (A) Jaduguda, Singhbhum, Kundremukh, Tharia
- (B) Singhbhum, Bastar, Mayurbhanj, Keonjhar
- (C) Nevely, Bastar, Tharia, Khetri
- (D) Bhadravati, Barauni, Nevely, Singhbhum

Ans: (B)

22. Where are the important plants of BHEL located?

- (A) Bhopal, Hyderabad, Pinjor
- (B) Haridwar, Tiruchirapalli, Srinagar
- (C) Delhi, Bombay (Mumbai), Calcutta (Kolkata)
- (D) Bhopal, Hyderabad, Tiruchirapalli

Ans: (D)

23. ISRO is in—

- (A) Thumba
- (B) Bangalore (Bangaluru)
- (C) Trivandrum
- (D) Sriharikota

Ans: (B)

24. Which is the group of languages spoken by largest number of people in India?

- (A) Indo-Aryan
- (B) Dravidian
- (C) Austro-Asiatic
- (D) Sino Tibetan

Ans: (A)

25. Match the List-I with List-II and select the correct answer using the codes given below:

List-I (Industries)	List-II (Industries Centre)
1. Pune	(A) Pearl fishing
2. Tuticorin	(B) Automobiles
3. Pinjor	(C) Ship building
4. Marmagao	(D) Engineering goods

Codes:

(A)	(B)	(C)	(D)
(A)	2	1	4 3
(B)	2	1	3 4
(C)	1	2	4 3
(D)	1	2	3 4

Ans: (A)

26. To which group do most of the Indians belong?

- (A) Caucasoid
- (C) Australoid
- (B) Negroid
- (D) Mongoloid

Ans: (A)

27. For what is Philadelphia well known?

- (A) Ship-building
- (B) Dairy industry
- (C) Locomotives
- (D) Silk textile

Ans: (C)

28. Which are the twin cities?

- (A) Delhi and Faridabad
- (B) Bombay (Mumbai) and Pune
- (C) Hyderabad and Secunderabad
- (D) Bangalore (Bengaluru) and Mysore

Ans: (C)

29. Alluvial Soil is fertile mainly because—

- (A) It is rich in humus
- (B) It is rich in lime
- (C) It contains minerals in fine particles which can be absorbed easily by plants
- (D) It can be used for both rabi and kharif cropping

Ans: (C)

30. Where is home of the Asiatic Lion?

- (A) Gir National Park
- (B) Dudhwa National Park
- (C) Kanha National Park
- (D). Corbett National Park

Ans: (A)

31. What is jhoom?

- (A) A type of cultivation
- (B) A type of swinging basket
- (C) A river valley in a dry region
- (D) A tribal dance of MP

Ans: (A)

32. Where is the largest amount of manganese produced?

- (A) Madhya Pradesh
- (B) Orissa
- (C) Bihar
- (D) Assam (Asom)

Ans: (B)

33. The largest amount of saffron comes from

- (A) Uttar Pradesh
- (B) Tamil Nadu
- (C) Kerala
- (D) Jammu and Kashmir

Ans: (D)

34. What is true about the Second Green Revolution?

- I. It aims at increasing production of wheat and rice in the area which have already benefited from green revolution.
- II. It aims at extending the technology of high yielding seeds and chemical fertilisers to those areas which did not benefit-from the green revolution.
- III. It aims at increasing the yield of crops other than those which were used for the green revolution in the beginning.

- (A) I and II
- (B) I and III
- (C) III only
- (D) II and III

Ans: (D)

35. Which one among the following is a major Tobacco-growing state ?

- A. Andhra Pradesh
- B. Chhattisgarh
- C. Kerala
- D. Madhya Pradesh

Ans: A

36. Next to Hindi, the largest speaking language in India is:

- A. Bangla
- B. Marathi
- C. Urdu
- D. Telugu

Ans: A

37. The State/UT having lowest Sex ration in India is:

- A. Haryana
- B. Delhi
- C. Dadra & Nagar Haveli
- D. Daman and Diu

Ans: D

38. Which one of the following is the first state to have fully privatized its power distribution network ?

- A. Maharashtra
- B. Rajasthan
- C. Orissa
- D. West Bengal

Ans: A

39. Very high grade iron ore found in India is limited and restricted mainly to:

- A. Anantpur district of AP
- B. Degana in Rajasthan
- C. Hospet area of Karnataka
- D. Bailadila Mines of MP

Ans:

C

40. Which one of the following states has the world's largest fresh water island ?

- A. UP
- B. Karnataka
- C. Bihar
- D. Assam

Ans: D

41. Which of the following city do not have refinery ?

- A. Chennai
- B. Kochi
- C. Mangalore
- D. Bangalore

Ans: D

42. Tyanyang Gyastso biosphere reserve is located in:

- A. Arunachal Pradesh
- B. Assam
- C. Mizoram
- D. Sikkim

Ans: A

43. Which one of the following pair is not correctly Matched:

- A. Miri Hills - Arunachal Pradesh
- B. Mikir Hills - Assam
- C. Lushai Hills - Mizoram
- D. Abor hills - Tripura

Ans: D

44. Which one of the following Indian states does not share border with Bhutan

- A. Sikkim
- B. Meghalaya
- C. West Bengal
- D. Arunachal Pradesh

Ans: B

45. Indian railways factory - Diesel Component Works (DCW) is located at:

- A. Varanasi
- B. Perambur
- C. Patiala
- D. Kapurthala

Ans: C

46. The water of which one of the following lakes is used for producing salt ?

- A. Barapani
- B. Kolleru
- C. Lagtak
- D. Sambhar

Ans: D

47. Which one of the following rivers originates in Brahmagiri range of western Ghats ?

- A.Penneru
- B.Kaveri
- C.Krishna
- D.Tapti

Ans:B

48. Baglihar Hydropower Project is located on which one of the following rivers ?

- A.Beas
- B.Chenab
- C.Ravi
- D.Sutlej

Ans:B

49. Who among the following tribes live in the UT of Andaman and Nicobar Island ?

- A.Apatani
- B.Jarawa
- C.Munda
- D.Santhal

Ans:B

50.How many India states border Myanmar ?

- A.3
- B.4
- C.5
- D.6

Ans:B

51.Which among the following are the southern-most hills ?

- A.CardamomHills
- B.JavadiHills
- C.NallamalaiHills
- D.NilgiriHills

Ans:A

52.Which among the following is the western-most city ?

- A.Delhi
- B.Jhansi
- C.Gwalior
- D.Agra

Ans:A

51. Which one of the following rivers does Chambal river merge ?

- A. Banas
- B. Narmada
- C. Ganga
- D. Yamuna

Ans: D

52. Indus river originates in?

- A. Kinnur
- B. Ladakh
- C. Nepal
- D. Tibet

Ans: D

53. Nandadevi park is located in:

- A. Himachal Pradesh
- B. Uttarakhand
- C. Jammu & Kashmir
- D. Sikkim

Ans: B

54. Gandhi Sagar Reservoir is of the river ?

- A. Chamba
- B. Narmada
- C. Rihand
- D. Sutlej

Ans: A

55. Which one of the following district is well known for the cultivation of coffee ?

- A. Balasore
- B. Chikmagalur
- C. Solapur
- D. Guntur

Ans: B

56. For which spice is Kashmir famous?

- A. Cinnamon
- B. Cloves
- C. Saffron
- D. Black Pepper

Ans: C

57. Which city of India stands on the River Hooghly?

A.Kolkata(Calcutta)

B.Ahmedabad

C.Agra

D.Lucknow

Ans:A

58. Largest capacity Solar power plant of India is:

A.Dhirubhai Ambani Solar Park, Rajasthan

B.Chranka Solar Park, Gujarat

C.Bitta Solar Power Plant, Gujarat

D.Mahindra & Mahindra Solar Plant, Rajasthan

Ans:B



Key Terms

The Bhabar – is a narrow belt about 8-16 km wide running in East-west direction along the foot of the

Shiwaliks with a remarkable continuity from the Indus to the Tista.

The Tarai – is a 15-30 km wide morshy tract in the south as Bhabar running barallel to it.

The Bhangar – is composed of old alluvium of the Middle Pleistocene age & forms the alluvial terrace above the level as flood plains.

The Khadar – is composed as newer alluvium & forms the flood plains along the river banks.

Climate – as a country includes the study of temperature, rainfall, atmospheric pressure, as well as the direction & velocity as winds over a large period as time.

Monsoon – is a double system as seasonal winds, that is the sum as summer & winter winds.

E1-Nino – is a narrow warm current which occasionally appears off the coast as Peru in December.

La-Nino – after an E1-Nino, weather conditions return to normal.

Soil – is the thin surface layer on the earth, comprising mineral particals formed by the break-down as rocks, decayed organic materials, living organisms, water & air.

Soil Erosion – is the removal as soil by the force as nature, particularly wind & water, more rapidly than the various soil forming processes can replace it.

Desertification – A process by which the biological productivity as the land is so reduced as to lead to the spread as desert-like conditions in arid & semi-arid reorions.

Hazards – Phenomena that pose a threat to people structures or economic assets & which may cause a disaster. They could be either man made or naturally occurring in our environment.

Disaster – A serious disruption or the functioning as a society, causing widespread human, material or environmental losses which exceed the ability or the affected society to cope using its own resources.

Density of population = $\text{Total population} / \text{Total Area} \times 100$

Sex ratio = $\text{Number as females} / \text{Number of males} \times 100$

Migration – is a from of spatial mobility of population between one geographical unit and another involving a permanent change as residence.

Urbanisation – The process of society's transformation from a predominantly rural to a predominantly urban population is known as urbanization.

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