Geography - World & Indian (Ocean currents):

An ocean current is any more or less permanent or continuous, directed movement of ocean water that flows in one of the Earths oceans. The currents are generated from the forces acting upon the water like the earths rotation, the wind, the temperature and salinity differences and the gravitation of the moon.

Ocean currents can flow for thousands of kilometers. They are very important in determining the climates of the continents,especially those regions bordering on the ocean.

Direction

Surface ocean currents are generally wind driven and develop their typical clockwise spirals in the northern hemisphere and counter-clockwise rotation in the southern hemisphere because of the imposed wind stresses. In wind driven currents, the Ekman spiral effect results in the currents flowing at an angle to the driving winds. The areas of surface ocean currents move somewhat with the seasons; this is most notable in equatorial currents.

Deep ocean currents are driven by density and temperature gradients. Thermohaline circulation, also known as the oceans conveyor belt, refers to the deep ocean density-driven ocean basin currents.

Ocean currents are measured in Sverdrup with the symbol Sv, where 1 Sv is equivalent to a volume flow rate of 106 cubic meters per second.

Warm ocean currents are corridors of warm water moving from the tropics poleward where they release energy to the air. **Cold ocean currents** are corridors of cold water moving from higher latitudes toward the equator. They absorb energy received in the tropics thus cooling the air above.

Geography - World & Indian (Ocean currents):

Major Ocean currents

Current	Ocean	Type
Agulhas Current	Indian	Warm
Alaska Current	North Pacific	Warm
Benguela Current	South Atlantic	Cool

Brazil Current	South Atlantic	Warm
California Current	North Pacific	Cool
Canaries Current	North Atlantic	Cool
East Australian Current	South Pacific	Warm
Equitorial Current	Pacific	Warm
Gulf Stream	North Altantic	Warm
Humboldt (Peru) Current	South Pacific	Cool
Kuroshio (Japan) Current	North Pacific	Warm
Labrador Current	North Atlantic	Cool
North Atlantic Drift	North Atlantic	Warm
North Pacific Drift	North Pacific	Warm
Oyashio (Kamchatka) Current	North Pacific	Cool
West Australian Current	Indian	Cool
West Wind Drift	South Pacific	Cool

El NiÃ±o and La NiÃ±a

Peruvian fisherman in the late 1800s named the seasonal swing of ocean water "El NiÃ±o" (Spanish for the "Christ Child") as it usually occurred around Christmas. A periodic weakening of the trade winds in the central and western Pacific allows warm water to invade the eastern Pacific. Along the Peruvian coast, the encroaching warm water displaces the nutrient-rich north-flowing cold ocean current causing a decline in fisheries. Today, the phenomenon is known as the " El NiÃ±o/Southern Oscillation" and we are coming to understand how this change in the seasonal wind and ocean circulation impacts global weather patterns (See December - February conditions; June - August conditions). Cooler than normal ocean temperature in this region is called "La NiÃ±a". It too has significant impacts on worldwide weather.

(Atmospheric Dynamics):

Global Wind Patterns

Wind is the rough horizontal movement of air caused by uneven heating of the Earths surface. The two major influences on the atmospheric circulation are the differential heating between the equator and the poles, and the rotation of the planet (Coriolis effect). Wind will always flow from low pressure to high pressure area, although these flows will be modified by the Coriolis effect in the extratropics.

Winds can be classified either by their scale, the kinds of forces which cause them (according to the atmospheric equations of motion), or the geographic regions in which they exist.

Winds can also shape landforms, via a variety of eolian processes.

Prevailing winds â€” the general circulation of the atmosphere

Prevailing winds are winds which come about as a consequence of global circulation patterns. These include

- **the Trade Winds**
- **the Westerlies**
- **the Polar Easterlies**
- **the jet streams.**

Trade Wind

The region of Earth receiving the Suns direct rays is the equator. Here, air is heated and rises, leaving low pressure areas behind. Moving to about thirty degrees north and south of the equator, the warm air from the equator begins to cool and sink. Between thirty degrees latitude and the equator, most of the cooling sinking air moves back to the equator. The rest of the air flows toward the poles. The air movements toward the equator are called trade winds meaning "path" or "track", - warm, steady breezes that blow almost continuously. The Coriolis Effect makes the trade winds appear to be curving to the west, whether they are traveling to the equator from the south or north. The trade winds coming from the south and the north meet near the equator. These converging trade winds produce general upward winds as they are heated, so there are no steady surface winds. This area of calm is called the doldrums. Sinking air creates an area of high area called horse latitudes. Here the winds are weak.

Geography - World & Indian (Atmospheric Dynamics):

Westerlies

Between thirty and sixty degrees latitude, the winds that move toward the poles appear to curve to the east. Because winds are named from the direction in which they originate, these winds are called prevailing westerlies. Prevailing westerlies in the Northern Hemisphere are responsible for many of the weather movements across the United States and Canada.

Easterlies

At about sixty degrees latitude in both hemispheres, the prevailing westerlies join with polar easterlies to reduce upward motion. The polar easterlies form when the atmosphere over the poles cools. This cool air then sinks and spreads over the surface. As the air flows away from

the poles, it is turned to the west by the Coriolis effect. Again, because these winds begin in the east, they are called easterlies. Many of these changes in wind direction are hard to visualize. Complete this exercise to see the pattern of the winds.

Jet Streams

Narrow belts of high speed winds that blow in the upper troposphere and lower stratosphere. The polar jet stream also marks the presence of Rossby waves, long-scale (4000 - 6000 km in wavelength) harmonic waves which perpetuate around the globe.

Seasonal winds

Seasonal winds are winds that only exist during specific seasons, for example, the Indian monsoon.

Synoptic winds are winds associated with large-scale events such as warm and cold fronts, and are part of what makes up everyday weather. These include the geostrophic wind, the gradient wind, and the cyclostrophic wind.

As a result of the Coriolis force, winds in the northern hemisphere always flow clockwise (when seen from above) around a high pressure area and counterclockwise around a low pressure area (the reverse occurs in the southern hemisphere).

Local winds

Some local winds blow only under certain circumstances, i.e. they require a certain temperature distribution. The following are the examples

- Sea Breeze --> A cool breeze blowing from the sea toward the land.
- land breeze --> A breeze that blows from the land toward open water.
- A katabatic wind --> derived from the Greek word katabatikos meaning "going downhill", is a wind that blows down a topographic incline such as a hill, mountain, or glacier. Such winds, particularly when they occur over a wide area, are sometimes called fall winds.
- Aanabatic wind --> The opposite of a katabatic wind is an anabatic wind, or an upward-moving wind.
- Mountain wind -->A breeze that blows down a mountain slope due to the gravitational flow of cooled air.
- Valley wind --> A gentle wind blowing up a valley or mountain slope in the absence of cyclonic or anticyclonic winds, caused by the warming of the mountainside and valley floor by the sun.

(Atmosphere):

Composition of the Atmosphere

The present atmosphere of the Earth is probably not its original atmosphere. The original atmosphere may have been similar to the composition of the solar nebula and close to the present composition of the Gas Giant planets. The earlier atmosphere was lost to space, and replaced by compounds outgassed from the crust or (in some more recent theories) much of the atmosphere may have come instead from the impacts of comets and other planetesimals rich in volatile materials.

The oxygen so characteristic of our atmosphere was almost all produced by plants (cyanobacteria or, more colloquially, blue-green algae). Thus, the present composition of the atmosphere is 79% nitrogen, 20% oxygen, and 1% other gases.

Layers of the Atmosphere

The atmosphere of the Earth may be divided into several distinct layers, as the following figure indicates.

Geography - World & Indian (Atmosphere):

The Troposphere

The troposphere is where all weather takes place; it is the region of rising and falling packets of air. The air pressure at the top of the troposphere is only 10% of that at sea level (0.1 atmospheres). There is a thin buffer zone between the troposphere and the next layer called the tropopause.

The Stratosphere and Ozone Layer

Above the troposphere is the stratosphere, where air flow is mostly horizontal. The thin ozone layer in the upper stratosphere has a high concentration of ozone, a particularly reactive form of oxygen. This layer is primarily responsible for absorbing the ultraviolet radiation from the Sun. The formation of this layer is a delicate matter, since only when oxygen is produced in the atmosphere can an ozone layer form and prevent an intense flux of ultraviolet radiation from reaching the surface, where it is quite hazardous to the evolution of life. There is considerable recent concern that manmade flourocarbon compounds may be depleting the ozone layer, with dire future consequences for life on the Earth.

The Mesosphere and Ionosphere

Above the stratosphere is the mesosphere and above that is the ionosphere (or thermosphere), where many atoms are ionized (have gained or lost electrons so they have a net electrical charge). The ionosphere is very thin, but it is where aurora take place, and is also responsible for absorbing the most energetic photons from the Sun, and for reflecting radio waves, thereby making long-distance radio communication possible. The structure of the ionosphere is strongly influenced by the charged particle wind from the Sun (solar wind), which is in turn governed by the level of Solar activity. One measure of the structure of the ionosphere is the free electron density, which is an indicator of the degree of ionization.

Geography - World & Indian (Earth - A quick look):

Latitude

Latitude, usually denoted symbolically the Greek letter phi, gives the location of a place on Earth north or south of the Equator. Latitude is an angular measurement in degrees (marked with Â°) ranging from 0Â° at the Equator to 90Â° at the poles (90Â° N for the North Pole or 90Â° S for the South Pole).

All locations of a given latitude are collectively referred to as a circle of latitude or line of latitude or parallel, because they are coplanar, and all such planes are parallel to the Equator. Lines of latitude other than the Equator are approximately small circles on the surface of the Earth;

Four lines of latitude are named because of the role they play in the geometrical relationship with the Earth and the Sun:

- Arctic Circle â€" 66Â° 33′ 39″ N
- Tropic of Cancer â€" 23Â° 26′ 22″ N
- Tropic of Capricorn â€" 23Â° 26′ 22″ S
- Antarctic Circle â€" 66Â° 33′ 39″ S

Only at latitudes between the Tropics is it possible for the sun to be at the zenith. Only north of the Arctic Circle or south of the Antarctic Circle is the midnight sun possible.

The reason that these lines have the values that they do lies in the axial tilt of the Earth with respect to the sun, which is 23Â° 26′ 22″.

As opposed to a degree of latitude, which always corresponds to exactly sixty nautical miles or about 111 km (69 statute miles, each of 5280 feet), a degree of longitude corresponds to a distance that varies from 0 to 111 km: it is 111 km times the cosine of the latitude, when the distance is laid out on a circle of constant latitude;

Longitude

Longitude, describes the location of a place on Earth east or west of a north-south line called the Prime Meridian. Longitude is given as an angular measurement ranging from 0Â° at the Prime Meridian to +180Â° eastward and −180Â° westward. In 1884, the International Meridian Conference adopted the Greenwich meridian as the universal prime meridian or zero point of longitude.

Each degree of longitude is further sub-divided into 60 minutes, each of which divided into 60 seconds. A longitude is thus specified as 23Â° 27′ 30" E.

Longitude at a point may be determined by calculating the time difference between that at its location and Coordinated Universal Time (UTC). Since there are 24 hours in a day and 360 degrees in a circle, the sun moves across the sky at a rate of 15 degrees per hour (360Â°/24 hours = 15Â° per hour). So if the time zone a person is in is three hours ahead of UTC then that person is near 45Â° longitude (3 hours Ã— 15Â° per hour = 45Â°).

The International Date Line

The International Date Line (IDL), also known as just the Date Line, is an imaginary line on the surface of the Earth opposite the Prime Meridian which offsets the date as one travels east or west across it. Roughly along 180Â° longitude, with diversions to pass around some territories and island groups, it corresponds to the time zone boundary separating +12 and -12 hours GMT (UT1). Crossing the IDL travelling east results in a day or 24 hours being subtracted, and crossing west results in a day being added.
In the north, the date line swings to the east through Bering Strait and then west past the Aleutian Islands in order to keep Alaska (part of the United States) and Russia on opposite sides of the line and their territories due north and south of each other in concert with the date of the rest of each respective country.

Structure of the Interior of Earth

Earth has a diameter of 12,756 km (7,972 mi). The Earths interior consists of rock and metal. It is made up of four main layers:

1) the inner core: a solid metal core made up of nickel and iron (1200 km diameter)

2) the outer core: a liquid molten core of nickel and iron

3) the mantle: dense and mostly solid silicate rock

4) the crust: thin silicate rock material

The temperature in the core is hotter than the Suns surface. This intense heat from the inner core causes material in the outer core and mantle to move around.

The movement of material deep within the Earth may cause large plates made of the crust and upper mantle to move slowly over the Earths surface. It is also possible that the movements generate the Earths magnetic field, called the magnetosphere

The core

The inner part of the earth is the core. This part of the earth is about 1,800 miles (2,900 km) below the earths surface. The core is a dense ball of the elements iron and nickel. It is divided into two layers, the inner core and the outer core. The inner core - the center of earth - is solid and about 780 miles (1,250 km) thick. The outer core is so hot that the metal is always molten, but the inner core pressures are so great that it cannot melt, even though temperatures there reach 6700Â°F (3700Â°C). The outer core is about 1370 miles (2,200 km) thick. Because the earth rotates, the outer core spins around the inner core and that causes the earths magnetism.

The Mantle

The layer above the core is the mantle. It begins about 6 miles(10 km) below the oceanic crust and about 19 miles(30 km) below the continental crust (see The Crust). The mantle is to divide into the inner mantle and the outer mantle. It is about 1,800 miles(2,900 km) thick and makes up nearly 80 percent of the Earths total volume.

The Crust

The crust lays above the mantle and is the earths hard outer shell, the surface on which we are living. In relation with the other layers the crust is much thinner. It floats upon the softer, denser mantle. The crust is made up of solid material but these material is not everywhere the same. There is an Oceanic crust and a Continental crust. The first one is about 4-7 miles (6-11 km) thick and consists of heavy rocks, like basalt. The Continental crust is thicker than the Oceanic crust, about 19 miles(30 km) thick. It is mainly made up of light material, like granite

- ography

Geography - World & Indian (World Geography - Facts at a Glance):

Earth

- Estimated Age 4.6 billion years
- Current Population 6,446,131,714
- Surface Area (510,066,000 sq km)
- Land Area (148,647,000 sq km) 29.1%
- Ocean Area (335,258,000 sq km)
- Total Water Area (361,419,000 sq km) 70.9%
- Type of Water (97% salt), (3% fresh)

CONTINENTS (by the number of countries)

1 Africa	53
2 Europe	46
3 Asia	44

4 North America	23
5 Oceania	14
6 South America	12

CONTINENTS (by population)

1 Asia	3,879,000,000
2 Africa	877,500,000
3 Europe	727,000,000
4 North America	501,500,000
5 South America	379,500,000
6 Australia/Oceania	32,000,000
7 Antarctica	0

COUNTRIES (Highest Density)

Monaco	16,205
Singapore	6,386
Malta	1,261
Maldives	1,164
Bahrain	1,035
Bangledesh	1,002
Vatican City	920
Barbados	648
Nauru	621
Mauritius	603

COUNTRIES (Lowest Density)

Countries	Population Density
Mongolia, Namibia	2
Australia, Botswana, Iceland, Suriname Libya Mauritania, Canada	3
Guyana	4

OCEANS OF THE WORLD (by size)

Pacific	155,557,000 sq km
Atlantic	76,762,000 sq km

Indian	68,556,000 sq km
Southern	20,327,000 sq km
Arctic	14,056,000 sq km

GREATEST DEPTHS IN OCEANS

Mariana Trench	Pacific Ocean
Puerto Rico Trench	Atlantic Ocean
Java Trench	Indian Ocean
Arctic Basin	Arctic Ocean

LARGEST COUNTRIES (by land mass)

Largest Countries	Approximate Area
Russia	17,075,400 sq km
Canada	9,330,970 sq km
China	9,326,410 sq km
USA	9,166,600 sq km
Brazil	8,456,510 sq km
Australia	7,617,930 sq km
India	32,87,263 sq. kms
Argentina	2,736,690 sq km
Kazakhstan	2,717,300 sq km
Sudan	2,376,000 sq km

SMALLEST COUNTRIES (by land mass)

Country	Approximate Area
Vatican City	0.44 sq km
Monaco	1.95 sq km
Nauru	21.2 sq km
Tuvalu	26 sq km
San Marino	61 sq km
Liechtenstein	160 sq km
Marshall Islands	181 sq km
Seychelles	270 sq km
Maldives	300 sq km
St. Kitts and Nevis	360 sq km

YOUNGEST COUNTRIES

Country	Year
East Timor	2002
Palau	1994
Czech Republic	1993
Eritrea	1993
Slovakia	1993
Bosnia/Hertzegovina	1992

RICHEST COUNTRIES

Country	GNP in USA Dollars
Luxembourg	$45,360
Switzerland	$44,355
Japan	41,010
Liechtenstein	$40,000
Norway	$34,515

POOREST COUNTRIES

Country	GNP in USA Dollars
Mozambique	$80
Somalia	$100
Eritrea	$100
Ethiopia	$100
Congo, DNC	$100

MAJOR SEAS (by size)

Sea	Approximate Area
South China	2,974,600 sq km
Caribbean	2,515,900 sq km
Mediterranean	2,510,000 sq km
Bering	2,261,100 sq km
Gulf of Mexico	1,507,600 sq km
Arabian Sea	1,498,320 sq km
Sea of Okhotsk	1,392,100 sq km
Japan East Sea	1,012,900 sq km
Hudson Bay	730,100 sq km

East China	664,600 sq km
Andaman	564,900 sq km
Black	507,900 sq km
Red	453,000 sq km

MAJOR ISLANDS (by size)

Island	Area
Greenland	2,175,600 sq km
New Guinea	792,500 sq km
Borneo	725,500 sq km
Madagascar	587,000 sq km
Baffin	507,500 sq km
Sumatra	427,300 sq km
Honshu	227,400 sq km
Great Britain	218,100 sq km
Victoria	217,300 sq km
Ellesmere	196,200 sq km
Celebes	178,650 sq km
New Zealand south 151,000 sq km	151,000 sq km
Java	126,700 sq km
New Zealand north	114,000 sq km
Newfoundland	108,900 sq km

Australia(7,617.930 sq km) is widely considered part of a continental landmass, not officially an island.

MAJOR RIVERS By Length

River	Length
Nile, Africa	6,825 km
Amazon, South America	6,437 km
Chang Jiang Yangtze, Asia	6,380 km
Mississippi, North America	5,971 km
Yenisey-Angara, Asia	5,536 km
Huang (Yellow), Asia	5,464 km
Ob-Irtysh, Asia	5,410 km
Amur, Asia	4,416 km
Lena, Asia	4,400 km
Congo, Africa	4,370 km

MAJOR LAKES (By Size)

Lake	Continent	Area
Caspian Sea	Asia-Europe	371,000 sq km
Superior	North America	82,100 sq km
Victoria	Africa	69,500 sq km
Huron	North America	59,600 sq km
Michigan	North America	57,800 sq km
Tanganyika	Africa	32,900 sq km
Baikal	Asia	31,500 sq km
Great Bear	North America	31,300 sq km
Aral Sea	Asia	30,700 sq km
Malawi	Africa	28,900 sq km
Great Slave	Canada	28,568 sq km
Erie	North America	25,667 sq km
Winnipeg	Canada	24,387 sq km
Ontario	North America	19,529 sq km
Balkhash	Kazakhstan	18,300 sq km

DEEPEST LAKES By Greatest Depth

Lake	Continent	Depth
Baikal	Russian Fed.	5,315 ft
Tanganyika	Africa	4,800 ft
Caspian Sea	Asia-Europe	3,363 ft
Malawi or Nyasa,	Africa	2,317 ft
Issyk-Kul	Kyrgyzstan	2,303 ft

TALLEST MOUNTAINS (Continent wise)

Mountain	Continent	Height
Mount Everest	Asia	8850m
Aconcagua	S. America	6959m
Mount McKinley	N. America	6194m
Mount Kilimanjaro	Africa	5963m

Mount Elbrus	Europe	5633m
Mt. Kosciusko,	AUSTRALIA (includes Oceania)	2,228 m
Vinson Massif	Antarctica	4897m

Languages spoken by the most people (Native speakers)

Chinese Mandarin ---> 1 billion +
English ---> 512 million
Hindi ---> 501 million
Spanish ---> 399 million
Russian ---> 285 million
Arabic ---> 265 million
Bengali ---> 245 million
Portuguese ---> 196 million
Malay-Indonesian ---> 140 million
Japanese ---> 125 million
German ---> 100 million
Korean ---> 78 million
French ---> 77 million
Chinese, Wu ---> 77 million
Javanese ---> 75 million
Chinese. Yue ---> 71 million

COUNTRIES WITH MOST LAND BORDERS

China --- > 14
Russian Federation --- > 14
Brazil --> 10
Congo, Germany and Sudan --- > 9
Austria, France, Tanzania, Turkey and Zambia --> 8

Geography - World & Indian (World Geography - Facts at a Glance):

COUNTRY POPULATION (largest as on Feb 2006)

China	1,306,313,800
India	1,080,264,400

USA	295,734,100
Indonesia	241,973,900
Brazil	186,112,800
Pakistan	162,419,900
Bangladesh	144,319,600
Russia	143,420,300
Nigeria	128,772,000
Japan	127,417,200

COUNTRY POPULATION (smallest as on Feb 2006)

Vatican City	920
Tuvalu	11,640
Nauru	13,050
Palau	20,300
San Marino	28,880
Monaco	32,410
Liechtenstein	33,720
St. Kitts	38,960
Marshall Islands	59,070
Antigua and Barbuda	68,720

LARGEST DESERTS OF THE WORLD

Sahara	North Africa	3,500,000 sq. miles
Arabian	Middle East	1,000,000 sq. miles
Great Victoria	Australia	250,000 sq. miles
Rubal Khali	Middle East	250,000 sq. miles
Kalahari	Southern Africa	225,000 sq. miles
Syrian	Middle East	200,000 sq. miles
Chihuahuan	Mexico	175,000 sq. miles
Thar	India/Pakistan	175,000 sq. miles
Great Sandy	Australia	150,000 sq. miles

Geography - World & Indian (Infrastructure):

Roads

India has 3.3 million km of road network and the second largest in the world. The road traffic accounts for about 80% of the passenger traffic and 60% of the goods. The Nagpur plan for road development gave 4 fold classification of roadways. These are National Highways, State Highways , District Roads , Rural roads . National Highways are the prime arterial routes span about 58,112 km. throughout the country and cater to about 45 percent of the total road transport demand. In addition, we have border roads, International Highways and Express Highways. The Express Highways built for the fast movment of traffic. As the road construction is a capital intensive work, the Government has created Central Road Fund (CRF) created under the Central Road Fund Act, 2000. This was a major milestone in obtaining user charges to fund road construction. This was the financial foundation of an important project, the National Highway Development Project (NHDP), which entails expansion of the existing two-lane highways to four/six-lanes and strengthening of existing lances on nearly 13,000 km. The overall project is one of the largest single highway projects in the world.

The project comprises of about 5,846 km Golden Quadrilateral (GQ), connecting the four metros of Delhi, Mumbai, Chennai and Kolkata, and East-West corridors connecting Srinagar-Kanyakumari and Silichar-Porbander. The National Highways Authority of India (NHAI), is the implementing agency for the project. Phase I of the NHDP, consisting of the GQ, commenced in December 2000, and is scheduled for substantial completion by end 2003

Control of National Highway (Land and Traffic) Bill, 2002 has been passed in Parliament recently and notified. The Bill aims in preventing unauthorized occupation of highway land, it seeks to control access points to National Highways and regulate traffic on them, and establishment of Highway Administrations to enforce the law and setting up tribunals to hear appeals against their orders.

National Highway	Route	Length(km)
1	Delhi â€“ Amritsar	456
2	Delhi â€“ Calcutta	1490
3	Agra â€“ Mumbai	1161
4	Thane â€“ Chennai	1235
5	Baharagora â€“ Chennai	1533
6	Dhule â€“ Calcutta	1645
7	Varanasi â€“ Kanyakumari (Longest)	2369
8	Delhi â€“ Mumbai (Raj-Guj)	1428
15	Pathankot â€“ Samakhiali	1526
17	Panvel â€“ Edappally	1269
24	Delhi â€“ Lucknow	438

Road Density

The first five states with highest density of surfaced roads in India are Goa, Punjab, TN, Kerala and Haryana in that order and in the case of UTâ€™s Chandigarh, Delhi and Pondichery. At the

end of 1997, the National Highway network had a length of 38,445 km, which amounted to less than 2% of the total road but carries 40% of the traffic.

Railways

India has the largest network in Asia and the 4th largest in the world. The first train ran between Bombay(Bori Bunder) and Thane in 1853 covered a distance of 22 miles. The total length consists of broad gauge(41,971 km) , metre gauge (17044) and narrow gauge 3,710 km.. The Northern Plains have highest density region of 40km line per 1000 sq. kms . The high density region includes areas of Gujarat and Tamil Nadu . There is no rail line in Tripura, Meghalaya, Mizoram, Nagaland, Manipur, and Arunachal Pradesh. To accelerate the development of Railways, in the first plan, a locomotive factory at Chittarangan in West Bengal and Coach building factory at perambur near chennai was set up. Indian Railway has been divided into 16 zones and 59 divisions for operational convenience . Indian Railways is one of the largest employers in the world with 1.6 million staff. Railways indirectly empoly large number of people. The Rail share in total freight traffic, presently, is 40%. Plans are afoot to increase it to 60%. Indian Railways are not only self reliant but also export its products to over 20 Countries in South Asia, Africa, Latin America, the Gulf and West Asia. The public sector undertakings - IRCON International and RITES - extend their operations to the world market.

Airways

Under the Air Corporation Act , 1953 , the Indian Airlines was set up to operate all internal air services and Air India was constituted for managing international air transport. A third airline Vayudoot was set up as private limited company to serve the remote areas. The Pawan Hans Limited was set up to provide helicopter services to petroleum sector and connects the inaccessible regions of North East. There are other agencies which provides civil aviation services in India. Airports

The Airports Authority of India(IAAI) is responsible for providing safe, efficient air traffic services and aeronautical communication services for effective control of air traffic in the Indian air space. The Directorate General of Civil Aviation(DGCA) is responsible for maintenance and development of civil aerodromes, civil enclaves and aeronotical communication stations. . The Civil Aviation Training Centre is located at Allabad and the Indira Ghandi Rashtriya Urban Academy is located at Fursatgunj(UP) to train commercial pilots.

India has five International Airports at Mumbai (Santa Cruz), Calcutta (Dum Dum), Delhi (Indira Ghandi International Airport), Chennai (Meenambakkam) and Thiruvanathapuram.

National waterway bill 2006

A bill has been introduced in the parliament in Dec, 2006 to declare the Kalkinada-Pondicherry stretch of canals comprising of Kalinada canal, Eluru canal, Commamur canal, Buckingham canal and the Kaluvelly tank, Bhadrachalam-Rajahmundry stretch of river Godavari and Wizirabad-Vijayawada stretch of river Krishna as National Waterway.

Waterways

India has 14,500 km of river channels are navigable, of which 3,700 km are usable by mechanised boats but actually 2000 km are used. Out of the 4,300 km canal length, 900 km is navigable but only 330 km is used.

The following are important navigable waterways

1) Ganga- Bhagirathi â€“ Hoogly
2) Brahmaputra and its tributaries
3) Deltaic Courses of Mahanadi, Krishna and Godavari
4) Barak river (North east)
5) Rivers of Goa-Mandovi and Zuari
6) backwater of Kerala
7) Cannals such as
   a) Buckingham canal from Kommanur canal of Krishna Delta to Marakkanam
   b) Cumberjua canal which links Mandovi and Zuari
   c) Vedarraniyam canal links Nagapattinam port with vedarraniyam.
8) Lower reaches of Narmada and Tapti 9) Creeks of west flowing rivers on the west coast, such as Kali, Netravati and Sharavati.

The Inland Waterways Authority of India is responsible for the development and maintenance of National waterways . India has four National waterways.

1) Allahabad â€“ Haldia stretch (1620km)

2) Dhuri â€“ Sadia stretch of Brahmaputra (891 km)

3) Kollam Kottapuram stretch (168 km)

4) The champakara canal in Kerala (14 km)

Ports

Major ports handle about 75 percent of Indias port traffic while minor ports handle the remaining. There are 12 major and 184 other (minor and intermediate) ports, which service the Indian coastline.

The major ports are Chennai, Cochin, Ennore, Jawahar Lal Nehru, Kandla, Kolkata, Mormugao. Mumbai, New Mangalore, Paradip, Tutocorin and Visakhapatnam. These are managed by the Port Trust of India under Central Government jurisdiction.

The minor ports are located in Gujarat (40), Maharashtra (53), Goa (5), Daman & Diu (2), Karnataka (9), Kerala (13), Lakshadweep (10), Tamil Nadu (14), Pondicherry (1), Andhra Pradesh (12), Orissa (2) and Andaman & Nicobar (23). State governments administer the minor ports.

There has been an improvement in terms of total cargo handled at major ports during April-December, 2002 cargo handled by major ports registered 8.7 percent growth compared with 1.6 percent the corresponding period of 2001-02. About 81 percent of the total volume of port traffic handled was in the form of dry and liquid bulk, while the remaining 19 percent consisted of general cargo and containers. There has been an impressive growth of container traffic in the last few years - with growth rates of over 10 per cent per annum over the last three years. The highest growth was, however, observed in respect of food grains followed by containerized cargo, and iron ore.

Major ports on western coast	Major ports on eastern coast
• Kandla (Gujarat) - Tidal Port • Mumbai(Maharastra) - Natural harbour and handles Max. Traffic • Marmagao(Goa) - 5th position in terms of	• Chennai (TN) â€“ second largest in terms of traffic • Tuticorin(TN) • Vishakapattanam(AP) â€“ Deepest

traffic • New Mangalore (Karnataka) â€“ Iron ore from Kudremugh exported • Jawaharlal(Nhava Sheva) near Mumbay has modern facilities for cargo and sevice berths	Port • Paradeep(Orissa) • Calcutta (WB) â€“ Riverine port • Haldia(WB)

Geography - World & Indian (Mineral Resources):

India is fairly rich in minerals and has sufficiently large reserves of ferrous metals, coals and mica, manganese, bazuxite and thorium. India has very little reserves of mercury, tungsten, molybdenum, silver, cobalt, nickel, tin and Zinc. The production of petroleum, phosphate and sulphur falls short of its requirements. The minerals of India is unevently distributed and are localised in few areas. More than 90% of our mineral wealth is concentrated in the chottanagpur plateau region.

Coal

India is the 4th largest coal producer in the world.

Distribution

State	Major Concentration
West Bengal	Raniganj
Bihar	Jharia
Jharkhand	Bokaro, Giridih, Karanpura
Madhya Pradesh	Singrauli, Pench valley
Chhattisgarh	Korba
Orissa	Talcher, Himgiri
Andhra Pradesh	Kantapalli, Singareni
Tamil Nadu	Neyveli (Lignite)
Assam	Namchik Namphuk, Makum , Najira, Janji
Meghalaya	Umralong, Darrangiri

Natural Gas

Natural gas is obtained in two ways.
A) Gas associated with along the crude Petroleum.
B)Free gas from the exclusive oil fields.
Distribution 1) Offshore fields in Bombay basin
2) Cambay basin in Gujarat
3) Tripura
4) Cauvery offshore basin in TN
5) Andhra Pradesh
6) Tanot in Jaisalmer district of Rajasthan The Gas Authority of India is responsible for the Planning and construction of pipelines for the movement of Gas , Oil and Petroleum products.

Major oil fields in India

1. Upper Assam or Naharkatia â€“ Moran region : Major oil wells in this region are Digboi, Naharkatia, Moran, Lakwa , Sibsagar and Rudrasagar.

2. Bombay High : An offshore source lying 167 km to the North West of Mumbai.

3. Cambay Basin : This basin lies in the state of Gujarat and Major oil wells are Ankhaleshwar, Kosamba ,Kalol, Dhalka , Mahasena, Nawagam and Sobhasan

There are 13 refineries are located at Digboi, Nunmati (smallest) and Bongaigaon in Assam , Barauni in Bihar , Haldia in West Bengal , Vishakapatanam in AP , Madras and Panangudi in TN , Cochin in Kerala , Trombay in Maharastra coast , Koyali in Gujrat (Largest) and Mathura in Utter Pradesh. The total refining capacity is 57.4 million metric tonnes per annum and the total demand is 79 MT at the end of 1995 .

Iron ore

India possess about 20% of the world total reserves . second largest after the reserves of CIS. The total reserves of India consists of haematite or the red ores (9.6 billion tonnes) and the magnetite or the black ores (3.1 billion tonnes). **Distribution**

Orissa	Gurumahisani and the badampahar group of mines in Mayurbhanj district, in Sundergarh districts.
Jharkhand	Barajamda mines, Singhbhum district
Chhattisgarh	Dallirajhara in Durg district and bailadila in Baster district
Maharashtra	Lohara,Pipalgaon,Surajgarh region & Ratnagiri district
Karnataka	Bellary-Chitradurga-Chikmaglur-Tumkur belt and magnetite in kudremukh
Tamil Nadu	Salem-Trichirapalli-North Arcot belt

Manganese

India is the worldâ€™s third largest producer, next only to the CIS and South Africa

Distribution

Orissa	The Gondite is found in Keonjhar and Sundergarh dt; Kodurite and Khondolite in Koraput and Kalahandi districts; Lateritic deposits In Bolangir and sambalpur districts
Jharkhand	Singhbhum dt
Karnataka	Bellary, Chitradurga, Shimoga, Tumkur and North Kanara
M.P	Balaghat and Chindwara
Maharastra	Bhandara and Nagpur
A.P	Srikakulam and Vishakapatanam

Copper

India is deficient in copper , depends mainly on imports of its copper use and produces only 30% indigenously.

Distribution

Jharkhand	Singhbhum, Santhal parganas ,Palamau
Bihar	Hazaribagh, Gaya
Rajasthan	Kherti belt,Udaipur and Bhilwara
M.P	Balaghat, Malanjkhand
A.P	Khammam,Guntur and Kurnool
Karnataka	Chitradurga and Hassan
Maharashtra	Chandrapur

Bauxite

India has adequate reserves of Bauxite reserves

Madhya Pradesh	Amarkantak plateau in shadot , Maikala Hills, Sarguja-Bilaspur-Raigarh-Kanti
Jharkhand	Ranchi and Palamau

Gujrat	Jamnagar, Kaira, Sabarkantha, Surat and Kachchh
Karnataka	Belgaum
Maharastra	Kolaba, Kolhapur and Ratnagiri
Tamil Nadu	Salem , Nilagiri , Coimbatore and Madurai
Utter Pradesh	Banda
Jammu and Kashmir	Poonch and Udhampur

Lead and Zinc

The reserves of lead and zinc is not adequate for domestic use.

Distribution

Rajasthan	Zarwar mines in Udaipur and Anguncha in Bhilwara districts
Andhra Pradesh	Cuddapah district
Gujarat	Banaskantha, Vadodara, Panchmahal and Surat

Meghalaya and Sikkim also have Lead and Zinc reserves.

Gold

Distribution

1. The entire production of Kolar gold fields in karnataka is sold to Reserve Bank of India
2. Hutti gold fields in Raichur (Karnataka) is used for industrial purpose through State Bank of India
3. Ramagiri gold fields in Anantpur (Andhra Pradesh)

Mica

India is the largest producer of Mica in the world.

Distribution

Bihar	Gaya â€“ Hazaribagh
Rajasthan	Beawar,Ajmir,Banswara â€“ Dungarpur belt,Bhilwara,Tonk and Kaunthal

Geography - World & Indian (Indian Agriculture):

Irrigation

Indian agriculture depends on the monsoon for its water requirement. Even if the monsoon is normal all the places need not get sufficient rainfall, some place may get high rainfall, or some places get very low rainfall as in Rajathan, Punjab, Haryana etc. The early or delayed withdrawal of monsoon affects the cropping pattern. In the dry period after monsoon, crops cannot be raised without irrigation. So irrigation becomes indispensable in India as many people directly or indirectly still depends on agriculture for their subsistence. The sources of irrigation can be divided into four categories viz. Canals, Wells, Tanks and other Channels

Wells: Wells and tube wells account about 55.9% of the total irrigation, derives water from underground sources, so it is a widely distributed source of irrigation. The major states where well irrigation is utilised are Punjab, UP, Rajasthan, Gujarat, Maharastra, MP and TN

Canals: Canals account 31.7% of the total irrigation, it uses surface water from rivers and becoming a principal source of irrigation in India. UP has a good network of canals followed by Punjab, Haryana and Andra Pradesh.

Tanks: Tanks account 5.9% of the total irrigation, mainly found in peninsular India, most of them are small in size and due to high evaporation, it supplies water only for one crop in year. TN, Karnataka, AP and Orissa tops in tank irrigation.

Other sources: The other sources of irrigation include as small dams like ahars and pynes in Bihar, spring channels of TN, water holes in flood plains etc account for 6.4 of the total irrigation.

Command Area Development (CAD):

It is very unfortunate that the irrigational potential created were not fully utilised. Do the government started Command Area Development (CAD) programme. The main objective of it is to reduce the gap between the irrigational potential created and its full utilisation.

Green Revolution

Green revolution played a major role in Indias self-reliance in food production. It is a combined work of fertilizers, irrigation, High yielding varieties and proper plant protection management. This type of modern farm technology was tried in 1960-61 and called Intensive Agricultural District Programme (IADP). The major achievements of green revolution include the increase in the production of cereals, employment, brought changes in the cropping pattern and brought growth in industry due to the production of fertilisers, pesticidies, farm equipments etc. However the green revolution has its own limitation. It helped affluent farmers due to the investment in the equipments, states with good irrigational facilities and its technology was initially limited to wheat, maize and Bajra.

Fertilizer and Manures

Chemical Fertilizer has an important role in Indian Agriculture as its soil is generally deficient in nitrogen and phosphorous. So to increase agricultural productivity, the addition of Fertilizers and manures is indispensable. The consumption of fertilizers in India per hectare in 1950-51 was only 0.5kg but now it is increased to 90 kgs in 2001-2002

Agricultural Sector has a vital place in the economic development of the country as it provides 26.7 per cent of Gross Domestic Product, provides employment to 65 percent of the total workforce in the country and accounts for 1/6th of the total value of the countys exports. India has achieved self-reliance in the foodgrain production. Per capita availability of food went up to 484.1 gms per day in 1998-99 as compared to 395 gms in early Fifties. The compound growth rate in agricultural production is 2.7 per cent per annum since independence. India has achieved this feat by multipronged strategies and technologies such as Green revolution, Blue revolution, white revolution and of course the latest yellow revolution and is now poised for Rainbow revolution.

Horticulture

Indias agro climatic diversity enables India to grow a large variety of horticultural crops which include fruits, vegetables, flowers, spices and plantation crops. India is the largest producer of vegetables, bananas, mangoes, coconuts and cashew. Horticulture accounts for 25% of the total agricultural exports of India.

Animal Husbandry and dairy development

It is vital sector in the rural economy and it provides self-employment opportunity in the employment generated in the agriculture livestock sector. India has one sixth of the cattle population and more than half of buffalo population in the world. The Operation Flood played major role in bringing the milk production to triple fold since its inception in 1970s and India became the largest producer of milk in 1997. At present India ranks fifth in egg production in the world.

Fisheries

Currently India is the sixth largest producer of fish in the world. Fisheries help in augmenting food supply, generating employment, raising nutritional level and earning foreign exchange. Fish Farmers Development Agencies (FFDA) provide a package of technical, financial and extension support to fish farmers, for the development in land fisheries. For the development of marine fisheries, apart from six major fishing harbours viz. Cochin, Chennai, Vishakhapatnam, Roychowk and Paradip, 41 minor fishing harbours and fish landing centres have been constructed to provide lending and berthing facilities to fishing craft.

Indian Council of Agricultural Research (ICAR), is the main organisation the Ministry of Agriculture.

HIGHLIGHTS OF INDIAN AGRICULTURE

- **Major kharif crops are rice, jowar, bajra, maize, cotton, sugarcane, soyabean and groundnut.**
- **Major rabi crops are wheat, barley, gram, linseed, rapeseed and mustard. Rice, maize and groundnut are grown in summer season also.**
- **Largest producer of Sugarcane(295.73 mt), fruits(41.5mt), coconut (13 billion nuts),arecanut, cashew nut, ginger, turmeric, black pepper**
- **second largest producer of vegetables (After China)**
- **occupies first position in the production of cauliflower, second in onion and third in cabbage in the world.**
- **Largest area in the world under pulse crops**
- **First to evolve a cotton hybrid (H-4,By Gujarat Agricultural University in 1970)**
- **Second in production of rice(88.5 mt)**
- **Maximum percentage of the geographical area is arable land.**
- **Possesses more than 56% of the buffaloes in the world (8.42 million) and ranks first in respect of cattle & buffalo, 2nd in goats, 3rd in sheep and 7th in poultry population.**
- **Largest producer of milk in the world**
- **Among various spices grown in the country, chilly is the most widely grown spice with a share in the total production of 33.7 per cent. Turmeric has a share of 21.6 per cent in the total production of spices.**
- **India is the third largest producer and consumer of fertilizers in the world after China and USA.**
- **India is 100 per cent self sufficient in respect of urea and about 95 per cent in case of DAP.**
- **All-India average fertilizer consumption is 89.9 kg./ha though there is wide variation from State to State. from 184 kg/ha in Punjab, 167 kg/ha in Haryana to less than 10 kg/ha in States like Arunachal Pradesh, Nagaland, Sikkim,**
- **India ranks fifth in egg production in the world.**

Important crops of India and Major Area of production

Crop	Climate	Major States in terms of production	Remarks
Rice	23°C,150 cm	West Bengal, TN, Bihar, Orissa, AP, MP, UP,Punjab and Haryana	Leading crop, 23% of cr
Wheat	10-15°C,5-15cm	UP, Punjab, Haryana ,Bihar, MP, and Rajasthan	2nd leading, 1/10th of
Jower	27-32°C,30-100 cm	Maharastra, Karnataka , MP, AP	Excessive moisture and hamful
Maize	35°C , 75 cm	UP, Bihar, Punjab, MP Rajasthan	Provides starch and Glu
Ragi	20-30°c, 100	S Karnataka, TN , AP,UP, Orissa, Maharastra	

Inspiring People

India ranks first in area and production

Barley	Rabi crop	UP and Rajasthan	Used in Beer and whisky
Pulses			Protein source,fixes Nitrogen
Gram	Mild cool,31-51	Rajasthan , Great plains in UP, Haryana , MP, Punjab	Cultivated in unirrigated areas in plains
Sugar cane	Tropical 100-150 cm	UP, Maharastra,TN, AP,Karnataka, Haryana	largest producer of sugarcane in the world
Cotton	20-35^{o}C, 50-80 cm	Gujarat, Maharastra, Punjab, Haryana, Karnataka,TN, MP,Rajasthan	Area wise US and India Production wise US, USSR, China, India
Jute	Requires large Quantity of water	West Bengal lead the production., Assam	India is 3rd in World Production
Tobacco	Introduced by Portuguese in 1508	AP, Gujarat, Karnataka, TN, UP, Orissa, WB,Rajasthan	China, U.S.A, Brazil, India
Ground Nut		Gujarat, TN, AP, Maharastra, and Karanataka	India has largest area but in prdn. China tops
Tea	Below 10^{o}C, 150-250 cm	Assam, West Bengal, TN, Kerala, Karnataka, HP, UP	India, China, Sri Lanka Largest producers
Coffee	Introduced in India by Bababudan sahib 17th cent.	Karnataka, Kerala, Tamil Nadu	
Coconut	Mostly confined to coastal area	Kerala, TN, Karnataka, AP,Goa, Daman & Diu, AN islands .	In terms of productivity TN tops the list.
Rubber	Brought by Sir Henry William	Kerala , TN, Karnataka, Andaman Nicobar islands	India holds 5th position in the world
Black Pepper		Almost entire prdn. From kerala, the spice state of India	80% of the prdn. is exported.
Cardomom	10-30^{o}C, 150 â€“ 600 cm	Kerala, TN, Karnataka, sikkim	2nd largest foreign exchange earner among spices
Sesamum	21^{o}C and Moderate Rainfall	UP, Orissa, TN, Rajasthan, Maharastra, Karnataka	India tops in the world areawise and production wise
Rape seed Mustard	Cool climate	UP, Rajasthan, MP, Haryana, Assam	

Geography - World & Indian (Vegitation):

Natural vegitation in India is divided into five types and fifteen sub types based on studies made by H.G.Champion, Schweinfurth, Carl Troll and G.S. Puri.

1. Moist Tropical Types a) Tropical wet evergreen b) Tropical Moist semi evergreen c) Tropical Moist deciduous d) Tidal

2. Dry Tropical Types a) Tropical Dry deciduous b) Tropical Dry evergreen c) Tropical Thorn 3 Montane Sub Tropical and Temperate types a)Wet Hill Forest (Southern) b)Wet temperate Forest (Southern) 4 Moutane Types (Himalayan) a) Wet Hill b) Sub Tropical Pine c) Sub Tropical Dry Evergreen d) Moist Temperate e) Dry Temperate 5 Alpine Types a) Alphine

1. Moist Tropical types

Tropical wet and moist semi evergreen forests: These forests occur in areas having more than 250-300cm of rainfall annually and a short dry season. This forests are bounded by semi evergreen forest on the drier margins. These are found on the Sahyadris (upto 1370) , large areas in north eastern India (1070 m) and Andaman and Nicobar Islands. Some of the important species include rosewood, aini, telsur , champa, toon and gujran ,ironwood, ebony, laurelwood etc.

Tropical Moist Deciduous Forest: These forest occur on areas which receives a rainfall of between 100cm to 200cm. These forest are found in Sahyadris, Eastern Madhya Pradesh, Chhotanagpur plateau and a strip along siwaliks.

Tropical Dry deciduous forests: These are found in those area which receives an annual rainfall of 100- 150 cm. Some of the well known varieties of trees include sal, teak, Shisham, sandalwood, rosewood, hurra, myrobalan, mahua and Khair.

Tidal forest: These are specialised tropical trees which grows in brackish as well as fresh water. Mangrove vegetation is found along seaward fringes, deltas of Ganga, Mahanadi,

Godavari and Krishna. Mangrove vegetation can with stand salinity. The Great sunderban delta is covered with Sundari tree. Other species such as screw pines, canes and palms are common in deltas and creeks.

2. Dry tropical types

Tropical Dry Deciduous Forest These forests are found along the drier side of moist deciduous forest and when the availability of water further decreases, it degenerates into thron forest.

Tropical Dry Evergreen Forests are found along the coasts of Tamil Nadu which receives about 100 cm of rainfall.

Tropical Thron forest covers an extensive area in the northern , north western parts and leeward side of Sahyadris. The trees common to this types are acacia, neem, shisham, Khair, papal, ber , babool, bamboo and Khardhai.

3. Montane Sub Tropical and Temperate types

Wet Hill Forest (Southern) This type of vegitation is found upto 1500 m ht in Nilgiri and Palni Hills, higher slopes of sahydris , and summits of satpura and Maikal hills.

Wet temperate Forest(Southern) occur above 1500m height on the South Indian Hills of Nilagiri, Annaimalai and Palni and locally known as Sholas. The common trees found here include Mognolia, Laurel, rhododendron, elm , prunus etc.

4. Montane (Himalayan)

The vegitation undergoes changes depending upon the altitude, latitude and slope aspect.

Wet Hill Forest found in Eastern Himalayas between 1000-2000m. evergreen oak,chestnut, ash & Peach are important tress.

Sub tropical pine forest occurs a little west of wet hill forest at similar altitudes between 73°E

and 88°E. Chir is most important varieties.

Sub Tropical Dry Evergreen Forest occurs in those areas which receives 50-100 cm of rainfall. Wild olives , Acacia modesta and pistacia are important tree varieties.

Moist Temperate Forest covers an extensive area receiving a rainfall of 100cm â€“ 250 cm at an altitude between 1500cm and 3000 cm. Important tree varieties include pine, cedar, silver fir, spruce, deodar etc. Dry temperate forest occurs in that region where the rainfall is below 100cm. It is open and xerophytic forest with deodar , Juniper and Chilgozah.

The Forest cover in the country is 675,538 Km2 and constitutes 20.55% of its geographical area. Of this, dense forest constitutes 416,809 Km2(12.68%)and open forest 258,729(7.87%). The declared objective of the government is to achieve a forest cover of 33% of the total area of the country. Madhya Pradesh with 77,265 Km2 of forest cover has the maximum forest cover amongst all states/ UTs, followed by A.P(68,045 sq. km) and Chattishgarh 56,448 sq km)

5. Alphine

Alphine forest are found in the Himalayan Ranges at an Altitude between 3000m and 3500m . The important trees include silver fir, juniper, pine, birch and rhododendron.

Social and Agro forestry:

Social forestry refers to planting of trees in the community lands, roadsides, canal bunks, tank buds, railway tracts, panchayat land etc with the active participation of the local community. The produce is shared with the local community. Agro forestry refers to the practice of growing trees with the agricultural produce in the fields, borders, waste lands etc

Famous wildlife sanctuaries and National Parks of India:

Sanctuary	State	Animals/Birds

Balpakram	Garo hills, Meghalaya	Tigers, Elephants, Bisons
Bandipur	Karnataka-TN border	Tigers, elephants , sambhars,bears, panthers ,deers
Corbet N.P	Nainital, UP	Tigers, elephants, chitals, sabhars,nilgais
Dudwa	Lakshmipur Kheri, UP	Tiger, nilgai, sambhars, panther
Ghana bird	Bharatpur, Rajasthan	Water birds, Siberian cranes, storks, herons
Hazaribagh N.P	Hazaribagh, Bihar	Leopards, tigers,sambhars, chitals
Jaldapara	West Bengal	Indian Rhinoceros
Kanha N.P	M.P	Panther, tiger, sambhars, nilgai, antelope
Mudumalai W.S	Nilgiris,TN	Elephants, deer and pig
Namdapha N.P	Tirap, Arunachal Pradesh	Elephants and tigers
Palamau	Daltenganj, Bihar	Tiger reserve
Parakal	Warangal, A.P	Tigers, Panthers, nilgais and chitals
Periyar	Idduki, Kerala	Elephants, sambhars, gaurs and wild boar
Ranganthitoo	River cauvery, Karnataka	Birds
Shivpuri N.P	Shivpuri, MP	
Sunderbans	Sunderbans, WB	Wild bear, crocodile , deer
Vedanthangal	Tamil Nadu	Bird sancuary

Geography - World & Indian (Soils):

Black Cotton Soils

These soils are also known as regur soils covers Maharashtra , Parts of Karnataka , TN,AP,MP and Gujarat. The black colour of this soil is attributed to the presence of titaniferrous magnetite, a compund of iron and aluminium. These soils derived from two types of rocks â€“ Basaltic Deccan and Rajmahal traps and ferrogeneous gneisses and schists in TN and AP. These soils are very

clayey (upto 50%) and therefore highly retentive of water. These soils are good for cotton and sugarcane.

Alluvial soil

Alluvial soils cover about 24% of the countries land surface and the largest share from agriculture comes from these soils. These soils cover 15 lakh square kilometres from the sutlej plain to the lower Ganga-Brahmaputra valley and along the east and west coast in the coastal plains. Alluvial soils in the northern plains are derived from the debris brought by rivers, in the coast plains by tides and in the desert by winds. Alluvial soils are deficient in Nitrogen and humus. With the use of fertilisers, these are highly used for agriculture.

Red Soils

Red soils are derived from the weathering of old crystalline and metamorphic rocks under dry conditions. The red colour is due to the presence of iron oxide. These are extensively found covering TN,Southern Maharastra, AP, South Bihar and western orissa. These lowlands are deep and fertile in lowlands and poor and thin in uplands.

Laterite Soil

These soils are formed under conditions of high rainfall and temperature with alternate wet and dry conditions. The high rainfall leaches away calcium and silica leaving behind iron with silica. These soils cover parts of Western Ghats in Kerala, coastal Orissa, coastal areas of WB , eastern Ghats and areas of high rainfall in North east and Bihar.

Forest Soil

Humus predominates in all forest soil but low in pH . These soils cover areas between 3000 m and 3100 m height in the coniferous region.

Arid and Desert Soil

These soils are formed under arid and semi arid conditions. The entire area west of the Aravelli Range has desert soils. These soil a high soluble salt content and a low humus content.

Mountain Soils

These soils are found in altitudes between 2000 m and 3000 m. They are poorly endowed in organic matter and moderately acidic. These soils are used for growing potatoes and subtropical fruits.

Saline and Alkaline Soils

These Soils cover arid and semi arid region of the northern plains and almost the whole of Maharastra. The salts of the soil get mixed with underground water and during the dry period , come up to the surface through capillary action. These are the salts of calcium, magnesium and sodium. These soils are called reh, usar, kallar, rakar, chopan etc.

Soil Erosion

Soil erosion is a process of detachment and transportation of soil by natural agencies such as water and wind. Rainfall, Slope, Vegitation, Nature of Soil, Wind Velocity are some of the factors that control Soil Erosion. The erosion caused by water can be classified as follows.

1) Splash Erosion occurs when raindrops splash on the soil thus loosens the top soil

2) Sheet Erosion occurs when the soil is removed uniformly as thin layer

3) Rill Erosion occurs when water run off forms a finger like channel along slopes

4) Gully Erosion occurs when the volume of water increases in the slopes, Rill erosion enlarges into Gully which result in Ravines

5) Slip Erosion is caused by landslides thus damaging the fields in the

foothills.

Deforestation, Shifting Cultivation, Overgrazing, lack of proper drainage are some of the main reasons for soil erosion. Some suggested remedies to check soil erosion are Strip cropping, Mulching, crop rotation , contour tillage, contour bunding, terracing etc.

Peaty Soil

These soils are developed under humid conditions as a result of accumulation of large amount of matter. These soils are found in the coastal areas of WB,Orissa and Kerala.

Geography - World & Indian (Climate):

The climate of India may be described as tropical monsoon. On the basis of variations of monsoon the year is divided into four seasons.

1) The Cold Weather Season.
2) The Hot Weather Season.
3) The South West Monsoon.
4) The Retreating South West Monsoon or North East Monsoon.

1) The Cold Weather Season.

The cold weather season starts in early December. January and February are the typical cold months in most parts of India. In this period, cyclonic depressions are developed in Mediterranean region and moves to the east. This disturbances known as Western Disturbances, bring rainfall to the North West India â€“ Punjab & Ganga plains, which is beneficial to the rabi crop. The TN coastlands also receive some rainfall during the season.

2) The Hot Weather Season:

The period March to May is a period of highest temperatures and low air pressure in Indian

subcontinent,which causes moisture laden winds to be blown to these area. In Kerala and the western coast, these pre monsoon showers are called mango showers. In Assam & Bengal receive rainfall during this season from thunderstorms called Kal baishakhi or Norâ€™ western, In the north west of India , hot & dry winds are blown, these are called loo.

3) The South West Monsoon

Monsoon is a wind regime that is characterised by the seasonal reversal of wind direction. Although it is a global phenomenon the real monsoon rain covers India, Myanmar , Sri Lanka, Bangladesh and parts of South East Asia. According to thermal concept, after the Spring Equinox, the sun starts it apparent northward movement. Thus a massive low pressure area is created in North India due to the vast expanse of land. Thus may May-June, the pressure gradient between this low trough and adjoining seas are so great that it attracts winds even from the south of equator. The northward migration of the Inter Tropical Convergence (ITC) and Upper air circulations also affect the monsoons. As these winds are blown above the sea, it picks up moisture and causes heavy rainfall. The winds south of equator are actually south east trade winds which blow from the south east towards the north east. But it deflect towards the right after passing the equator. Nearly 80% of rains in India are caused by the south west monsoon during June â€“ September. Except the east coast of Tamil Nadu , almost every part of India receives the N.W.monsoon rain. The S.W.monsoon strikes the Western Ghats at right angles causes Orographic precepitation on the windward side and the rainfall is scanty or even absent in the lee ward side . The Aravellis have an north south axis and fails to block the monsoon winds. This is the main reason for the absence of rainfall in Kachchh and Rajasthan region.

The Retreating South West Monsoon or North East Monsoon

The low pressure conditions of North India are transferred to the entire Bay of Bengal by the October - November. These winds pick up the moisture from the Bay of Bengal and cause rainfall in the coastal Orissa, TN and Karnataka. Some easterly depression occur in the Bay of Bengal , many of them crosses southern peninsula causes widespread rainfall and destruction of preoperties particularly in deltas of Godavary, Krishna and Cauvery.

The significance of Monsoon

Indiaâ€™s 70% of the population still depend on agriculture for their subsistence; About 70% of

the net sown areas in the country are rain fed; Nearly 80% of rains in India are caused by South West Monsoon. So any delay, early withdrawal or inadequate rainfall in monsoon creates havoc among Indian farmers and cause a severe blow to the economy. So Indian economy is often referred as gamble in the monsoon.

Geography - World & Indian (Drainage & Rivers):

Drainage

Over 90% of the Indiaâ€™s land surface drains into the Bay of Bengal and the rest drains into the Arabian Sea except a very small area in Rajasthan has inland drainage. On the basis of the origin of the rivers, Indian river systems can be classified as Himalayan System and the Peninsular system. The Himalayan Rivers are characterised by its Youthful and perennial nature, suited for the generation of hydro electricity and irrigation purposed. On the other hand, peninsular rivers acquired maturity and depend mainly on monsoon for water so it becomes dry in the summer.

River	Origin	Drainage sq km Length	Remarks
Indus	Tibet, near Manasarovar.	3,21,290 709 in India	Jhelum,Cenab, Ravi, Beas & satlej are well known t
Jhelum	Verinag at the Pir Panja	28,490	It flows through Kashmir valley and Wular lake
Chenab	Himachal mountains near Kulu	26,755 1180 km	It is the largest of Indus tributaries Chandra and Bha
Ravi	Rohtang pass	5,937 725 km	
Beas	Beas Kund near Rohtang	25,900 470 km	It joins satluj near Harike
Satluj	Rakas lake	24,087 1050 km	Bakra dam and Gobind sagar lake on it.
Ganga	Gangotri	8,61,404 2525 km	Main head streams Bhagiradhi and Alakananda meet as padma in Bangladesh
Yamuna	Yamnotri	3,59,000 1376 km	It meets Ganga at Allahabad. Delhi, Mathura and Ag banks. Chambal, betwa & ken are important tributa
Damodar	Chotanagpur Plateau	22,000 541 km	Formerly known as Sorrow of Bengal.
Brahmaputra	100 km South east of Manasarovar	2,40,000 2900 km	Before entering in India it is known as Tsang-po. It c Dihang. Frequent floods occur.
Mahanadi	Sihawa range	857 km	The largest dam Hirkud is built across this river

Godavari	Nasik	312812 1465 km	It is the 2nd largest River system in India & Known a
Krishna	Mahabaleswar	258,948 1400 km	2nd largest east flowing river. Important tributaries Koyana , Khataprabha
Cauvery	Brahmagir range	87900 800 km	Cauvery basin is the most developed in terms of pov
Narmada	Amarkantak,MP	98,796 1300 km	It is the longest west flowing river
Tapti	Betul, MP	65145 724 km	It is the 2nd largest west flowing river

Geography - World & Indian (Physiography of India):

Indian landmass can be divided into the following units:

- **Northern mountains or Himalays**
- **Northern plains**
- **peninsular plateau**
- **Western and Eastern coastal plains**
- **Islands**

Survey of the Himalayas

Longitudinally Himalayas can be divedinto the following 5 sections.

a) Kashmir Himalayas: The average height of this section is around 3000m. Pir panjal range and the valley of Kashmir lies in this section

b) Punjab Himayalas characterised by rugged northern slopes and forested southern slope. High peaks are rare, Likes like Manasarovar,Rakas, passes like Zojila, Rohtang,Bara Lapcha and valleys like Kangra,Lahul and spiti lies in this section.

c) Kumaon Himalayas extends from Sutlej to kali river. Pilgrimage centres like Badarinath and gangotri lies in this section

d) Central Himalayas extends from Kali to Tista and the highest peaks in the world including Himalayas situated here.

e) Assam Himalayas extend from Tista to Brahmaputra. Naga and the Patkai bum hills are included in this section forms a watershed between India and Myanmar.

Vertically the himalayan ranges can be classified into the following in the ranges from north to south.

a) Greater/ Outer Himalayas: The average height is 6000 m and the average width is 120 to

190 kms and these ranges are composed of archaen rocks like granite, gneisses and schists. These ranges have highest mountains in the world and several passes.

b) Lesser Himalayas/Himachal ranges has an average height of 3500-5000m and has a width of 50-80 km. These ranges are composed of metamorphic rocks and unfossiliferous metamorphic rocks. This range has the famous and beautiful hill stations which include Shimla, Mussoorie, Nainital, Ranikhet etc. Imporant ranges include Pir Panjal,Dhaula Dar, Nag Tiba.

c) Sub Himalayas or shivaliks ranges have an average height of 1000 to 1500 m. and have an average width of 15 to 50 kms. These ranges are made of clay, sand,gravel ,slate, boulders etc. The doon valleys are situated in the ranges which includes dehradoon, patlidoon, and Kothridon.

Significance of Himalayas

1) They are the source of perennial north Indian rivers
2) bring fertile soils
3) Blocks the cold wind from North and monsoon winds
4) rich variety of flora ,fauna and natural resources like petroleum, uranium, limestone, herbs etc

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1. Northern Mountains

These mountain systems are one of the youngest of Fold Mountains in the world, characterised by its youthfulness, tectonic origin, great erosive capacity. Northern mountain consists of Himalayan ranges and trans himalaya which lies north of the great Himalayas. Karakoram , ladak and zaskar ranges are the part of trans Himalayas. Mt. K2 (Godwin Austin) the highest mountain in India is situated on the karakoram range. These ranges converge on the Palmir plateau.

2. Northern Plains

It is formed by the sediments brought by rivers from the Northern and southern side covers an area of 7.5 lakhs sq. km and extends from Punjab to Assam.

Bhabar: These are porous and gravel ridden plain at the foothills of Himalaya. Streams disappear in this area except in the monsoon season

Terai: The streams reappear in this area and are poorly drainded and forested
Bhangar: The term used to refer older alluvium in the river beds **Khader:** It refers to the new alluvium in river beds in low lying zones.

North Indian plains have highly fertile soils, perennial water source and a good clime suited for agriculture. Although the North Indian plains cover 30% of the geographical area of India, it supports 40% of its population.

3. Peninsular plateau

It is the oldest part of India known as the Indian Plate. This division covers whole of the peninsula in the form of an irregular triangle. The peninsular plateau can be sub divided into the following

a) Aravallis are relict mountains lie to the north west of the peninsula. These are highly eroded and deeply worn down. Mt. Abu is an important peak of Aravallis.
b) Bundelkhand lies in the east of Aravallis, formed by the erosion of gneisses and quartizites which offers the natural sites for water storage.
c) Malwa is drained by chambal and betwa
d) Vindhyan Kaimur range is a escarpment between Narmada and son valleys.
e) Chhotanagpur plateau is the mineral rich area in India in the east of the son river
f) Shillong Plateau is the continuation of the Deccan Plateau
g) Deccan plateau is an elevated tableland consisting of horizontal lava beds and has a homogeneous sloping towards east and south east.
h) Karnataka Plateau composed of gneisses and schists and the two main sub divisions are Malnad and Maidan.
i) Western Ghats: It is also known as sahyadris stretch continuously to the southern tip have a general altitude 900-1100 kms. Dodabetta (2637m) is the highest peak inthe Nillagiri range. Anaimudi (2695 m) in annamalai is the highest peak in South India.
j) Eastern Ghats are broken hills with no well defined structure. The eatern ghat are called northern hills in the northern sector , cudappah ranges in the middle sector and Tamil nadu hills in the southern sector.

4. Coastal Plains:

This is the region between the coast and mountain ranges of the peninsular plateau. This can be divided into western and eastern coast. With the exception of Gujarat, the western coast is narrower than the eastern coast. It has characteristic lagoons or backwaters called kayals such as Asthamudi and vemband in the southern most stretch. The eastern coast has developed deltas of major rivers following through it.

5. The islands:

India has 247 islands of which 204 lie in the Bay of Bengal and the remaining in the Arabian sea and gulf of mannar. The Andamans and the Nicobars form two major groups in Bay of Bengal Group. These 2 major groups are separated by Ten degree channel which 121 km wide. This chain of islands are formed by the submergence of Arakan Yoma ranges . The Barren and Narcondam islands , situated north of Port Blair , are volcanic islands. Lakshadweep islands are a group 27 of coral origin and are surrounded by fringing reefs with a total area of only 32 square kilometers. The pamban island , situated between India and Sri Lanka , has a rocky surface, is an extension of the peninisular surface in Ramnad district of Tamil Nadu.

Geography - World & Indian (Introduction):

Land and The People

India with an area of 32,87,263 sq. kms, is 7th largest countries in the world. Lying entirely in the northern hemisphere, the mainland extends between latitudes 8o 4` to 37o 6` north and longitudes 68 o7` and 97 o25` east. The longest distance from north to south, is 3214 kms and 2933 kms from east to west. India, a subcontinent, has a land frontier of 15,200 kms and a coastline of 7516.6 kms (including island coastline).

Indian People

Indian people do not belong to a single racial or linguistic people. The population includes a harmonious blending various racial, linguistic and religious groups. The anthropologists divide Indian people into the following racial groups.

1. The Negritos: They are the oldest racial group of India. Tribal groups such as Kadars, Poligars, Irulas and some tribals from Rajmahall Hills and Andaman Nicobar Islands.

2. The Proto-Australoids: They are the 2nd oldest racial group in India. This racial group is represented by Oraons, Mundas, Santhals , Chenchus , Kurumbas , Bhils and Kols.

3. Mongloids: The mongloid racial stock in India is concentrated in the Himalayan borderlands , Particularly in Ladak, Sikkim, Arunachal Pradesh.

4. The Mediterraneans: These are long headed people, who brought high level of civilization and the bearer of earliest form of Hinduism. We can find three distinct groups of these racial stocks

- Palaeo Mediterraneans are represented by Tamil and Telugu Brahmins
- Mediterraneans were the builders of Indus valley civilization and are now they constitute the bulk of the population of lower castes in North India and are also represented by the Namboodiri , Allahabad and Bengal Brahmins.
- Oriental types are represented by Punjabi Kharties and Rajasthani Banias.

5. The Western Brachycephals: These groups consists of the three main types.

- Alphinoids represented by Gujarati Banias, Kathis of Kathiawar and Kayasthas of Bengal.
- Dinaric represented by populations of Bengal, Orissa and Coorg
- Armenoids represented by Parsis,Bengali Vaidyas

6. Nordics: They were the last to migrate into India. These people were called the Aryans. They were a predominant type in the North Western Frontier Province of Pakistan, Punjab , Haryana and Rajasthan.

Religion

Major religious groups in India on the Basis of 1991 population

Religion	Population	Percentage (%)
Hindus	67.26 Crores	82.41
Muslims	9.5 â€œ	11.67
Christians	1.89 â€œ	2.32
Sikhs	1.63 â€œ	2
Buddhist	63 Lakhs	0.77
Jain	34 Lakhs	0.41

Language

There are 187 languages spoken by different sections of our society . Of these 94 are spoken by less than 10,000 persons and 23 languages account for 97% of the total population of India. The languages spoken by the people of India belong to the four language family.

a) Austric Family (Nishada) includes the tribal languages, dialects of the central tribal belt, Khasi and Jaintia hills and Andoman and Nicobar islands.

b) Sino â€“ Tibetian Family (Kirata) languages are spoken by tribal groups of the North East , of the Himalayan and Sub Himalayan regions.

c) Dravidian Family (Dravida) are spoken by 20% of the population of India. Telgu,Kannada , Malayalam are the major groups of this family. The lesser groups are Tulu , Kurgi , Yerukala , Kui , Parji and Khond.

d) Indo-Aryan Family (Aryan) are spoken by 73% of the Indian people. These languages are mainly concentrated in the plains of India. Hindi, Urdu, Kachchhi, Sindhi and Marathi are the principal languages of this Family.