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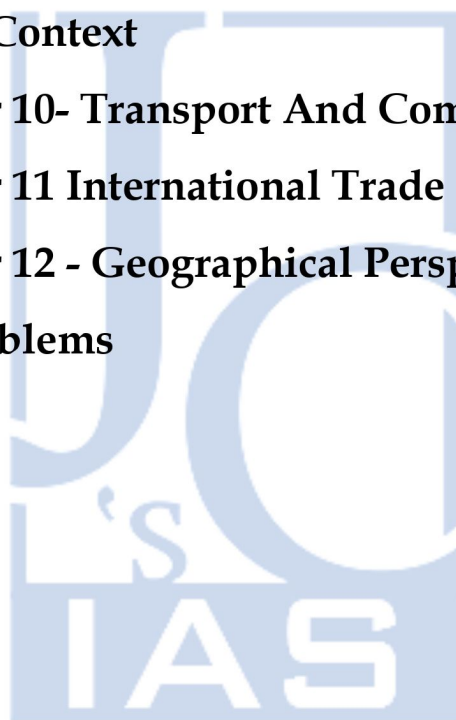
INDIA PEOPLE AND ECONOMY

**Chapter 9 - Planning and Sustainable Development in
Indian Context**

Chapter 10- Transport And Communication

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**Chapter 12 - Geographical Perspective on Selected Issues
and Problems**



Chapter 9 - Planning and Sustainable Development in Indian Context

Approaches of Planning

There are two approaches of planning which are as follows:

- **Sectoral Planning Approach** In this approach, the development of various sectors of economy, e.g. agriculture, irrigation, anufacturing, power, construction, transport, communication, social infrastructure and services, etc, are taken into consideration to which various sets of schemes or programmes are to be formulised and implemented.
- **Regional Planning Approach** In this approach, the main emphasis is on to draw such plans which may help to reduce regional disparities and bring uniform economic evelopment.

Target Area Planning

- Core focus of planning process is in promoting economically backward areas. It is important that for proper economic velopment of a region, there is a need of resource base as well as technology
- and investment simultaneously, because sometimes resources rich regions also remain backward.
- After having about one and half decade planning experience, it is realised that our economic development is still facing the regional imbalances. In order to encounter both regional and social disparities, the Planning Commission introduced the 'Target area' and 'target group approaches' to planning.
- Some of the programmes which are directed towards the development of these two approaches are as follows:

Target Area Programmes

Target area has the following programmes such as:

- Command Area Development programme
- Drought Prone Area Development Programme
- Desert Development Programme
- Hill Area Development Programme

Target Group Programmes

- Target groups has the following programmes such as:



- The Small Farmers Development Agency (SFDA)
- Marginal Farmers Development Agency (MFDA)

In the Eighth Five Year Plan, hill areas, North-Eastern states, tribal areas and backward areas were taken into consideration in order to develop special area programmes.

Planning Related to Area Development Programme

Hill Area Development Programme

- It covers 15 districts comprising all the hilly districts of Uttar Pradesh (present Uttarakhand), Mikir hill and North Cachar hills of Assam, Darjiling district of West Bengal and Nilgiri district of Tamil Nadu. It was stated in Fifth five year plan.
- It was recommended in 1981, by the National committee on the Development of Backward Area, that the hill areas having a height above 600 m and not covered under tribal sub-plan be treated as backward hill areas.

The aims of Hill Area Development Programmes are as follows:

- Development of horticulture, plantation agriculture, animal husbandry, poultry, forestry and small scale and village industry were the main objectives of the programme through which exploitation of local resources may become possible.
- The detailed plans were based on topographical, ecological, economic and social conditions of the hill areas.

Drought Prone Area Programme (DPAP)

This programme was started during the Fourth Five Year Plan. The main objectives of Drought Prone. Area Programme are as follows:

- This plan mainly emphasised on generating employment opportunities to the people of drought prone areas along with creating productive assets.
- Besides, irrigation projects, land development programmes, afforestation, grassland development and creation of basic rural infrastructure such as rural electrification, roads, market, credit and services were also its main priorities.
- The National Committee on Development of Backward Areas found that this programme was mostly confined to the development of agriculture and allied sectors along with restoration of ecological balance.



- The society due to burden of population was bound to utilise the marginal lands for agriculture and as a result led ecological degradation.
- Thus, it was observed that there is an urgent need to generate alternative employment opportunities in these regions.

Drought Prone Regions

- There are 67 districts (entire or partly) in India identified by planning commission (1967) as drought prone regions.
- Irrigation commission (1972), demarcated the drought affected areas and also introduced the criterion of 30% irrigated land.
- These areas are semi-arid and arid tract of Rajasthan, Gujarat, Western Madhya Pradesh, Marathwada, region of aharastra, Rayalseema and Telangana plateaus of Andhra Pradesh, Karnataka plateau and Higlands and interior parts of Tamil Nadu.
- Due to the advancement in irrigation facilities, Haryana, Punjab and Northern Rajasthan have become protected regions.

Integrated Tribal Development Project in Bharmaur Region

- The region lies between 32° 11' N and 32° 41' N latitudes and 76° 22' E and 76° 53' E longitudes. Spread over an area of about 1818 sq km, the region mostly lies between 1500 m to 3700 m above the mean sea level.
- This region popularly known as the homeland of Gaddis and is surrounded by lofty mountains on all sides. It has Pir Panjal in the North and Dhaula Dhar in the South. In the east, the extension of Dhaula Dhar converges with Pir Panjal near Rohtang pass.
- The river Ravi and its tributaries, the Budhil and the Tundahen, drain this territory and carve out deep gorges.
- These rivers divide the region into four physiographic divisions called Holi, Khani, Kugti and Tundah areas. Bharmaur experiences freezing weather conditions and snowfall in winter. It means monthly temperature in January remains 4°C and in July 26°C.

Area and Life of People in Bharmaur

The area and life of people of Bharmaur region are as follows:

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- The tribal area covers Bharmaur and Holi tehsils of Chamba district of Himachal Pradesh.
- It is one of the most backward area economically as well as socially in Himachal Pradesh and also a notified tribal region since 21st November, 1975. The area is occupied by a tribal group of community named 'Gaddi', who practised transhumance and speak 'Gaddiali' dialect.
- According to 2001 census, the total population of the area was 39113 i.e. 21 persons per sq km.
- People of the area face major problems as the economy is mostly affected by its harsh climate, low resource base and fragile environment.

Economy in the Area of Bharmaur

- Traditionally, subsistence agriculture-cum-pastoral activities such as growing food grains and animal husbandry like sheep and goat are the main activities of these people.

Integrated Tribal Development Project (ITDP)

- In 1970s, Gaddis were included in the list of scheduled tribes and in the same period the development process of tribal area of this region started.
- Later in 1974 under the Fifth Five Year Plan, the tribal sub-plan was introduced and Bharmaur was designed as one of the five Integrated Tribal Development Project (ITDP) in Himachal Pradesh.

Aims and priorities of the Intergrated Tribal Development Project are as follows:

- Improving the quality of life of the Gaddis.
- Narrowing the gap in the level of development between Bharmaur and other districts of Himachal Pradesh.
- The highest priority was on development of transport and communications, agriculture and allied activities as well as social and community services.

The main achievements of the tribal sub-plan are as follows:

Infrastructural Facilities

Infrastructural facilities of tribal sub-plan are as follows:



- Development of infrastructure i.e schools, health care facilities, potable water, roads, communications and electricity supply.
- Villages located along the river Ravi in Holi and Khani areas are main beneficiaries infrastructural development.

Social Benefits

Social benefits of tribal sub-plan are as follows:

- There are tremendous increase in literacy rate, e.g, the female literacy rate in the region increased from 1.88% in 1971 to 65% in 2011.
- Decline in gender inequality i.e. between male and female literacy rate.
- Improvement in sex-ratio.
- Decline in child marriage.

Economic Benefits

- As the Gaddis had practiced traditionally, subsistence agriculture cum-pastoral economy, later on during the last three decades of twentieth century, pulses and other cash crops became one of the main crops of the region.

Some Shortcomings to ITDP

- In terms of infrastructural facilities, the remote villages in Tundah and Kugti areas are still remained unaffected.
- The technology is still traditional in nature.
- The importance of pastoralism has been decreasing day-by-day as only about one tenth of the total households practice transhumance.
- But, still a sizeable portion of the Gaddis migrate to Kangra and its Fringing Zone in order to earn living from wage labour during cold season.

Overview of Planning Perspective in India

- India has centralised planning and the Planning Commission has been assigned to administer the functions of planning in India.
- Being a statutory body, Planning Commission is headed by the Prime Minister and has a Deputy Chairman and members. Five year plans are responsible to carry out the planning in India which are as follows:



- The First Five Year Plan launched in 1951 and covered the period, 1951-52 to 1955-56.
- Second and Third Five Year Plans covered the period from 1956-57 to 1960-61 and 1961-62 to 1965-1966, respectively.
- Two successive droughts during mid sixties (1965-66 and 1966-67) and war with Pakistan in 1965 forced plan Holiday in 1966-67 and 1968-69. This period was covered by annual plans which are also termed as rolling plans.
- The Fourth Five Year Plan began in 1969-70 and ended in 1973-74.
- Following this the Fifth Five Year Plan began in 1974-75, but it was terminated by the government one year earlier i.e. in 1977-78.
- The Sixth Five Year Plan took off in 1980.
- The Seventh Five Year Plan covered the period between 1985 and 1990.
- Once again, due to the political instability and initiation of liberalisation policy, the Eighth Five Year Plan got delayed. It covered the period from 1997 to 2002.
- The Tenth Five Year Plan began in 2002 and ended in 2007.
- The Eleventh Five Year Plan started in 2007 and ended in 2012. It was entitled "Towards faster and more inclusive growth".
- The Twelfth Five Year Plan in 2012 and it is still in progress. It will come to an end in 2017.

Sustainable Development

- In the 1960, this was the period when people throughout the world were much concerned about the environmental issues because of undesirable effects of industrial development and thus, the concept of sustainable development emerged in western world.
- This level of fear among environmentalists and common people reached at its peak with the publication of 'The population Bomb' by Ehrlich in 1968 and 'The Limits to Growth' by Meadows

Aims of Sustainable

Development



- The main aim of sustainable development is to take care of economic, social and ecological spheres of development during the present times as well as conserve all the resources in such a manner that these can be retained for future generations.
- So, there is a need of changing our attitude towards nature as well as economic development.

Concept of Development

- Development is a dynamic concept and has evolved in the second half of twentieth century, used to describe the state of particular societies and the process of changes experienced by them.
- In early human history, the main criteria of determination of a society's state was the interaction process between human societies and their bio-physical environment.
- Societies helped in the development of various levels of technology and institutions upon which human-environment process depends.
- These have helped in increasing the pace of human environment interaction, therefore, the momentum generated and facilitated technological progress and transformation and creation of institutions.
- After the period of World War II, the two important terms i.e. development and economic growth considered as one concept. But due to unequal distribution, a faster rate of growth in poverty is experienced by even the developed nations having high economic growth.
- Then, redistribution with growth and 'growth and equity' broadened the term development in 1970s. Now, the concept of development not only restricted to economic sphere alone, also incorporates balance and equality among people in terms of welfare and quality of life of people, health education and other facilities, equal opportunity to all and ensuring political and civil rights.
- Hence, the concept of development has become multi-dimensional and stands for positive, irreversible transformation of the economy, society and environment.

World Commission on Environment and Development (WCED)



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- The United Nations established a World Commission on Environment and Development (WCED), after concerning the opinion of world community on the environmental issues.
- The WCED was headed by the Norwegian Prime Minister, Gro Harlem Brundtland. The commission gave its report entitled 'Our Common Future' in 1987, also known as Brundtland Report.
- In this report, 'sustainable development' took into consideration and defined as 'A development that meets the needs of the present without compromising the ability of future generations to meet their own needs'.

Measures for Promotion of Sustainable Development

- As we have seen that this project has affected the ecological sustainability and physical environment of the region badly. So, attaining the goal of sustainable development in command area requires such measures that can achieve ecological, social and economic sustainability, simultaneously. Hence, five of the seven measures have been proposed in this respect such as:
 - Rigorous implementation of water management policy is the first and foremost requirement of this project. Stage I and Stage II comprising of protective irrigation and extensive irrigation for crops and pasture development, respectively according to the canal project.
 - By and large water intensive crops shall be avoided and plantation crops such as fruits shall be encouraged by folks.
 - In order to reduce the conveyance loss of water, few important programmes shall be taken into account such as the CAD (Command Area Development) programmes i.e.
 - Lining of water courses.
 - Land development and levelling.
 - Warabandi system (means equal distribution of canal water in the command area of outlet).
 - The areas should be reclaimed that got affected by water logging and soil salinity.



- The eco-development is a must, especially in the fragile environment of Stage II, through afforestation, shelterbelt, plantation and pasture development activities.
- By providing a decent financial and institutional support for cultivation of the land, allottees who have poor economic background, can be prove a positive step towards achieving the social sustainability in the region.
- The economic sustainability can be attained through expanding the economic sector which must include agriculture and allied activities along with other economic sectors, as a whole. Hence, we will then find diversification of economic base and establishment of unctional linkages between basic villages, agro-service centres and market centres.

Promotion of Sustainable Development in Indira Gandhi Canal Command Area

- It is one of the largest canal systems in India, conceived by Kanwar Sain in 1948. This project was launched on 31st March 1958 that transformed a desert into green land.
- The origin place of the canal is at Harike barrage in Punjab state and goes parallel to Pakistan Border at an average distance of 40 km in Thar Desert of Rajasthan (Marusthali).
- 9060, km is the total planned length of the system catering to the irrigation needs of a total culturable command area of 19.63 lakh hectares.
- The canal has two irrigation system such as 'flow system' and 'lift system'. Around 70% land of the command area is irrigated by flow system and rest 30% land by lift system.
- There are tw'O stages through which the construction work of the canal system has been done such as:

Stage I of Indra Gandhi Canal Command Area

1. This command area covers Ganganagar, Hanumangarh and Northern part of Bikaner districts.
2. Its culturable command area is 5.53 lakh hectares along with gentle undulating topography.
3. In this stage, the irrigation system was introduced in early 1960s.

Stage II of Indira Gandhi Canal Command Area



This stage covers 14.10 lakh hectares culturable area of Bikaner, Jaisalmer, Barmer, Jodhpur, Nagpur and Churu districts.

The main characteristics of the area are:

- Hot desert with shifting sands dunes.
- Summer temperature upto 50°C.

Irrigation system was introduced in this stage in mid- 1980s. In the lift canal, water is lifted to make it to flow against the slope of the land. All the lift canals of this system originate at the left bank of main canal while all the canals on the right bank of main canal are flow channels.

Effects of Indira Gandhi Canal Irrigation

There are various effects of Indira Gandhi Canal irrigation on environment and on agricultural economy:

Effects on Environment

The environment of the areas is influenced by this project both positively and negatively:

- **Positive Effect** Now, there is sufficient soil moisture availability for a longer duration. Various afforestation and pasture development programme came into being. A considerable reduction in wind erosion and siltation of canal systems have also been recorded.
- **Negative Effect** Due to intensive irrigation and excessive use of water, an alarming rate of water logging and soil salinity have been recorded.

Effects on Agriculture

There are some positive and negative effect on agriculture:

- **Positive Effect** This canal irrigation led to increase in cultivated land and intensity of cropping. Main commercial crops i.e. wheat, rice, cotton, groundnut replaced the drought resistant crops like gram, bajra, and Jowar.
- **Negative Effect** Intensive irrigation has also become a cause of water logging and soil salinity. So, in the near future it may hampers the sustainability of agriculture.



Chapter 10- Transport And Communication

Means of Transport

- There are various ways means of transportation by which human beings move goods, commodities, ideas etc from one place to another place. Major means of transportation are as follows:

Land Transport

- Transportation of people and goods by road transport is not new in India. Since ancient times, pathways and unmetalled roads have been in use for this purpose. With the technological advancement, there are now metalled roads, railways, cableways and pipelines for movement of large volume of goods and passengers.

Road Transport

- India has its count in countries which is having largest road networks worldwide. India has a total road length of 42.3 lakhs km that places it among the countries which has largest road network.
- Road transport carries about 85% of passenger and 70% of freight traffic every year. Road transport is preferable for short distance travel. The first attempt to improve and modernise road network was made in 1943 with 'Nagpur Plan.' But due to lack of coordination among princely states and British
- India, it remained unimplemented.
- The second attempt was made after independence with twenty year road plan (1961) to improve the conditions of roads in India but still roads continue to concentrate in and around urban centres and rural and remote areas remained less connected by road. To construction and maintenance, roads are classified as **National Highways (NH), State Highways (SH), Major District Roads and Rural Roads:**

National Highways

- NH referred to roads which are constructed and maintained by central government.
- National Highways are meant for inter-state transport and movement of defence men and material in strategic areas



- In 2008-09, total length of National Highways was 70934 km which was 19700 km in 1951.
- These highways connect the state capitals, major cities, important ports, railways junctions, etc and carry' about 40% of the road traffic despite they constitute only 1.67% of total road length.
- The National Highways Authority of India (NHAI - 1^95) is an autonomous body, under the Ministry of Surface Transport which is entrusted with the responsibility of development, maintenance, operation and for the improvement of the quality of national Highways.

National Highways Development Projects

- **Golden Quadrilateral** It is 5846 km long 4/6 lane, high density corridor. It was meant to connect India's four big metro cities of Delhi-Mumbai- Chennai-Kolkata. It will deduct the time-distance and cost of movement among the mega cities of India. Its construction help ip reducing the time distance and cost of movement among mega cities considerably.
- **North-South and East-West corridors** The North-South corridor is a 4076 km long highway which is meant to connect Srinagar in Jammu and Kashmir with Kanyakumari in Tamil Nadu including Kochchi-Salem Spur. The East-West corridor is 3640 km long road which aims to connect Silchar in Assam with the port town of Porbandar in Gujarat.
- **State Highways**
- These roads are connected to the National Highways and join the state capitals with district headquarters and other important towns. Their share in the total road length is about 4%. State governments are responsible to construct and maintain these highways.
- **District Roads**
- These roads connect district headquarters and other important nodes in the district. They account for 60.83% of the total road length of the country.
- **Rural Roads**
- These roads provide links in the rural areas. About 33.86% of the total road length in India are categorised as rural roads.



- **Other Roads**

- These include Border Roads and International highways:
- **Border Roads** These are strategically important roads along the Northern and North-Eastern boundary of the country. Border Road Organisation (BRO) is responsible for construction and maintenance of these roads. It was established in May 1960 with the aim to accelerate economic development and strengthening defence preparedness through rapid and coordinated improvement
- of strategically important border roads.
- BRO's major achievement is construction of roads in high altitude mountainous terrain joining Chandigarh with Manali (Himachal Pradesh) and Leh (Ladakh). This road is located at the average
- height of 4270 meters above mean sea level. The total length of border roads was 40450 km in 2005 which was constructed by BRO. Besides the construction and maintenance of roads in strategically sensitive areas. The BRO also undertakes snow clearance in high altitude area.

International Highways They are constructed with the aim to promote harmonious relationship with neighbouring countries and provide an effective connection with India.

Density of Roads

- The distribution of roads is not uniform in the country. Density of roads (length of roads per 100 sq km of area) is the method to compare the network of roads of one area to another area. The national average road density is 125.02 km (2008).
- The density of roads is influenced by nature of terrains, and level of economic development.
- As most of the Northern states and major Southern states have high density of roads (e.g. Uttar Pradesh has highest road density of 532.27 km), whereas Himalayan region, Northeastern region, Madhya Pradesh and Rajasthan have low density of roads (e.g. Jammu and Kashmir has lowest road density of 10.04 km).
- Quality of roads, besides density, is also better in plains as compared to high altitude areas, rainy and forested regions.

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Rail Transport

- India has one of the longest railway network in the world. On one hand, it facilitates the movement of freight and passengers and on the other hand, it contributes to the growth of economy. Mahatma Gandhi said, the Indian railways, "brought people of diverse cultures together to contribute to India's freedom struggle
- In 1853, the first Indian railway was started from Bombay to Thane covering 34 km.
- Being the largest Government undertaking in India, Indian Railways network is 64460 km long (31st March, 2011).
- To reduce the pressure of this large size railway from a centralised railway management system, Indian Railway system has been divided into seventeen zones.

These are as follows: Railway Zone Headquarters

1.	Central	Mumbai CST
2.	Eastern	Kolkata
3.	East Central	Hojipur
4.	East Coast	Bhubaneswar
5.	Northern	New Delhi
6.	North-Central	Allahabad
7.	North-Eastern	Gorakhpur
8.	North East Frontier	Maligaon (Guwahati)
9.	North-Western	Jaipur
10.	Southern	Chennai
11.	South Central	Secunderabad
12.	South-Eastern	Kolkata
13.	South East Central	Bilaspur
14.	Western	Kolkata
15.	West Central	Jaipur
16.	Western	Mumbai (Church gate)
17.	South-Western	Hydli

Gauges in Indian Railways

Indian Railways has been divided into three categories. On the basis of the width of the track of Indian railways as follows:



- **Broad Gauge** In broad gauge, the distance between rails is 1.676 metre. The total length of broad gauge lines is 55188 km in 2011.
- **Metre Gauge** In metre gauge, the distance between the rails is 1 metre. The total length of metre gauge is 6809 km in 2011.
- **Narrow Gauge** In narrow gauge, the distance between the rails is 0.762 metres or 0.610 metres. The total length of narrow-gauge line is 2463 km in 2011. This category of railway lines is mostly found in the hilly areas.

Indian Railways has taken major steps to improve the performance of this means of transport like:

- To convert the metre and narrow gauges to broad gauge.
- Replacement of steam engine by diesel and electric engines which may help in keeping the environment clean.
- Introduction of metro rail in Kolkata and Delhi, etc.
- Development of railways in India was started by the Britishers and after the independence, scenario has been changed by extending railway routes to other areas. Konkan railways along the western coast which provides a direct line between Mumbai and Mangalore was a significant development in this regard.
- Konkan Railway is one of the important achievements of Indian Railways which was constructed in 1998. It is a 760 km long rail route which connects Roha in Maharashtra to Mangalore in Karnataka. It is considered an engineering marvel. Railway is still the most important means of transport for the masses. In the hill states, North-Eastern states, central part of India and Rajasthan, railway network is relatively less dense.

Water Transport

Water transport is the cheapest means of transport for carrying heavy and bulky material as well as passenger services. It is a fuel efficient and eco-friendly mode of transport. The water transport is of two types:

- Inland Waterways



- Oceanic Waterways

Inland Waterways

Before the introduction of railways, inland waterways was the chief mode of transport. But, now it is losing its significance due to:

- Tough competition from road and railway transport.
- Diversion of river water for irrigation purposes made them non-navigable in large parts of their courses.
- India has 14500 km of navigable waterways which accounts for about 1% of country's transportation.
- It includes rivers, canals backwater, creeks etc. At present 3700 km of major rivers are navigable by mechanised flat bottom vessels, but out of it only 2000 are actually used. Similarly, out of 4800 km
- of the network of navigable canal, only 900 km is navigable by mechanised vessels.
- The Inland Waterways Authority which was setup in 1986 is responsible for the development, maintenance and regulation of national waterways in the country. Currently, there are three inland waterways which are considered as national waterways by the authority. Description of these waterways are as follows:

National Waterways of India

Waterways Stretch	Specification	Date of Declaration
NW1 Allahabad-Haldia Stretch (1620 km)	It is one of the most important waterways in India which is navigable by mechanical boats upto Patna and by ordinary boats upto Haridwar. It is divided into three parts for developmental purposes: (i) Haldia Farakka (560 km) (ii) Farakka Patna (460 km) (iii) Patna -Allahabad (600 km)	27.10.1986
NW2 Sadiya-Dhubri Stretch (891 km)	Brahmaputra is navigable by steamers up to Dibrugarh (1384km), which is shared by India and Bangladesh.	26.10.1988
NW3 Kottapuram-Kollam Stretch (205 km)	It includes 168 km of west coast canal along with Champakara canal (23 km) and Udyogmandal canal (14 km).	01.02.1991
NW 4 Kakinada Puduchery (1995 km)	Stretch of canal and Kallurelly Tank stretches of river Godavari and Krishna.	2008
NW 5 Talcher Dhamra (623 km)	Stretch of river Brahmani Geonkhali Cherlatia stretch of East coast canal, Chertectia Dharma, stretch of Matai river alongwith Mahanadi delta river system	2008



Oceanic Routes Ten other inland waterways have been identified by inland waterways authority. The backwaters (Kadal) of Kerala has special significance which not only provides transport but also

attract tourists here. The famous Nehru Trophy Boat Race (Vallamkali) is also held in the backwaters.

- These play an important role in the transport sector of India's economy.
- India's vast coastline of about 7,517 km (including islands) easily facilitates this type of transport. There are twelve major and 185 minor ports which provide infrastructural support to these routes.
- About 95% of India's foreign trade by volume and 70% by value moves through ocean routes.
- These routes give international trade service as well as provide transportation between the islands and the rest of the country.

Air Transportation

- Air transport facilitates the fastest movement of goods and passengers from one place to another place. It is good for long distances and areas which have uneven terrain and climatic conditions. Air transport in India was started in 1911 with a short distance, (10 km) airmail operation from Allahabad to Nain.
- Airport Authority of India is responsible for providing safe, efficient air traffic and aeronautical communication services in the Indian Air space. Now it manages 126 airports including 11 international, 86 domestic and 29 civil enclaves at defence air fields. There are two corporations, Air India and Indian Airlines which manage air transport in India. Both corporations were nationalised in 1953. Now many private companies have also started passenger services.

Air India

- It is a corporation of India which provides International Air Service for both passengers and cargo traffic. It connects all the continents of the world through its services.

Indian Airlines

- Indian Airlines, the largest state owned domestic carrier changed its names to 'Indian' by dropping word 'Airlines' in 8th



December, 2005. The new brand name 'Indian' now appears on both sides of

- the fuselage. The logo depicting IA which was used to be display on orange tail is now replaced by a new logo. New logo is a partly visible blue wheel and is inspired by the Sun Temple at Konark
- (Odisha), symbolising timeless motion, convergence and divergence. It also represents strength as well as trust that has stood the test of time.

History of Indian Airlines

- 1911-Air transport in India was launched between Allahabad and Naini.
- 1947-Air transport was provided by four major companies namely Indian National Airways, Tata Sons Limited, Air Services of India and Deccan Airways.
- 1951-Four more companies joined the services i.e. Bharat Airways, Himalayan Aviation Limited, Airways India and Kalinga Airlines.
- 1953-Air transport was nationalised and two corporations, Air India international and Indian Airlines were formed. Now, Indian Airlines is known as Indian.
- Pawan Hans is the major organisation in India which provides helicopter services in hilly areas, for tourism in North-Eastern sector and mainly to petroleum sector and tourism.

Oil And Gas Pipelines

- Pipelines are convenient and best means of transporting liquids and gases over long distances. These can also transport solids after converting them into slurry. Oil India Limited (OIL) is responsible for exploration, production and transportation of crude oil and natural gas.
- Its one of the major achievement is the construction of Asia's first cross country pipeline. This pipeline covers a distance of 1157 km from Naharkatiya oil field in Assam to Barauni refinery in Bihar. In 1966, this pipeline was further extended to Kanpur, Uttar Pradesh.
- In Western region of India, OIL also constructed extensive network of pipelines – Ankleshwar-Koyali, Mumbai High-Koyal and Hazira-Vijaipur-Jagdishpur (HVJ) pipelines. Recently, a pipeline is also



- constructed from Salaya (Gujarat) to Mathura (Uttar Pradesh). It is 1256 km long pipeline which transport crude oil from Gujarat to Punjab (Jalandhar) via Mathura. Construction of a 660 km long pipeline from Numaligarh to Siliguri is also in progress.

Communication Networks

- A number of communication cum-transportation means have been used since human history, for e.g. messages were delivered by beating drum or hollow tree trunks, giving indication through smoke or fire or with the help of fast runners.
- Development in the field of science and technology brought many revolutionary inventions in means of communication like post office, telegraph, printing press, telephone, satellite, etc.
- Based on scale and quality, the mode of communication can be divided into following categories:

Personal Communication System

- The most advanced and best means among all personal communication system is internet which is widely used in urban cities.
- E-mail is the main source through which a user can directly connect with others and can also get access to the world of knowledge and information.
- Use of internet is increasing for e-commerce and carrying out money transactions.
- The internet is like a huge control warehouse of data, with detailed information on various items.
- It is a cheaper mode of communication which provides an efficient access to information at a comparatively low cost.
- Letters, telephone, fax are also used for personal communication.

Mass Communication System Radio

- Radio broadcasting was started in 1923 by Radio Club of Bombay. Within short time, it gained immense popularity and became a part of every household in India.



- After seeing its popularity, the government of India, in 1930 took the control of this mode of communication under Indian Broadcasting System.
- It was changed to All India Radio in 1936 and to Akashwani in 1957.
- It broadcasts various programmes related to information, education, entertainment and special news bulletins on special session of parliament and state legislature.

Television (TV)

- Television (TV) broadcasting has emerged as the most effective audio-visual medium for disseminating information and educating masses.
- First television broadcasting was started in National Capital in 1959. Till 1972, it was the only urban place where TV services were available.
- After 1972, several other centres became operational. In 1976, TV broadcasting services were separated by All India Radio and got a separate identity as Doordarshan (DD).
- Its revolutionary development began after the launch of INSAT-IA (National Television -D1) when Common National Programmes (CNP) were started for the entire network and its services were extended to the backward and remote rural areas.

Satellite Communication

- Satellite is an advanced mode of communication. They also regulate the use of other means of communication. From economic and strategic point of view, use of satellite is very vital for the country as these give continuous and synoptic view larger area.
- Various operations can be done through satellite images, e.g. weather forecast, monitoring of natural calamities, surveillance of border areas, etc. There are two satellite system in India on the basis of configuration and purposes:

Indian National Satellite System (INSAT)

This was established in 1983. It is a multi-purpose satellite system for telecommunication, meteorological observation and for various other data and programmes.

Indian Remote Sensing Satellite System (IRS)

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- The IRS satellite system started in India with the launch of IRS-IA in March 1988 from Vaikanour in Russia.
- India has also developed her indigenous launching vehicle PSLV (Polar Satellite Launch Vehicle).
- These remote sensing satellites collect data in several spectral band and transmit them to ground stations which is very useful in the management of natural resources and other various purposes.
- The National Remote Sensing Agency (NRSA) at Hyderabad is responsible for facilitating for acquisition of data and its processing.

Chapter 11 International Trade

Changing Patterns of the Composition of India's Exports

- During recent years, a change has been recorded in the composition of commodities in India's international trade. There is a decline in the share of agriculture and allied products whereas shares of petroleum and crude products and other commodities have increased. The share of petroleum products has increased mainly because of the rise in petroleum prices and increase in the petroleum refining capacity of India.
- A huge decline is registered in the export of traditional items like, coffee, spices, tea, pulses, etc due to the tough international competition. Though an increase has been registered in floricultural products, fresh fruits, marine products and sugar, etc. But manufacturing sector alone accounted for 68% of India's total value of export in 2010-11.
- The major competitors of India are China and other East Asian countries. Apart from this, the gems and jewellery are other commodities that have larger share in India's international trade.

Changing Patterns of the Composition of India's Import

- During 1950s and 1960s, India faced serious food shortage, thus the country had to import food grain, capital goods, machinery and equipments at large scale.



- The balance of payment was adverse as imports were more than export inspite of all the efforts of imports substitution. After 1970s, the success of green revolution discontinued the food grain import.
- But the energy crises of 1973 replaced the import of food grains by fertilizers and petroleum as the prices of petroleum had been raised.
- Besides, other imported goods were machine and equipment, special steel, edible oil and chemicals.
- According to economic Survey 2011-12, petroleum products have registered a rapid increase in import goods.
- It is a raw material for petrochemical industries and also used as fuel. The increase signifies the tempo of rising industrialisation and improvement in standard of living.
- Periodic price rise of petroleum in the international market may be another reason for this increase.
- Import of capital goods like non-electrical machinery, transport equipment, manufactures of metals and machine tools registered a steady increase. This increase could be because of increasing demand in the export oriented industrial and domestic sectors.
- Import of food and allied products registered a decrease because of a sudden decline in imports of edible oils.
- Pearls and semi-precious stones, gold and silver, metalliferous ores and metal scrap, non ferrous metals, electronic goods, etc are other important items of India's import.

Direction of Trade

- India is a trading partner with most of the countries and major trading blocks of the world.
- India has goal to double its share in international trade within the next 5 years. To achieve this objective, India has started to adopt suitable measures which includes import liberalisation, reduction in import duties, de-licensing and change from process to product patents.
- India has created an example in terms of percentage of Asia and ASEAN (Association of South-east Asian Nations) in total trade of world has increased.



- It was 33.3% in 2000-01 and it increased to 57.3% in the 2011-12. In contrast to this, the share of Europe and America decreased from 42.5% to 30.8%. This has helped India to survive during the global crisis in Europe and America.
- With the development of India's trade direction, India's trading share with different countries also changed. During 2003-04, USA was India's largest trading partner. Now UAE has displaced USA as it was India's largest trading partner during 2010-11.
- After UAE, China is the second largest trading partner with India continuing this position from 2008-09 to 2010-11. USA has slipped to third position.
- India's foreign trade is mainly carried through oceanic and air routes. Foreign trade via land route is only limited to the neighbouring countries such as Nepal, Bhutan, Bangladesh and Pakistan.

Sea ports as Gateways of International Trade

- India has a long history of international trade via sea ports as it has long coastline and is opened to sea from three sides. Water provides smooth surface and cheap transport without any hinderance.
- India has developed many ports on its coast. These ports are named with suffix 'pattan' meaning port. It is interesting to know that India has more sea ports on West coast than its East coast.
- After coming of the European traders and colonisation of the country by the British, the Indian ports have emerged as gateways of international trade.
- There are some parts which have very vast area of influence and some have limited area of influence.

Major and Minor ports

- At present, India has 12 major and 185 minor or intermediate ports. For major ports, central Government is responsible for deciding the policies and regulate their functions and for minor ports, State Government is responsible for the same functions stated above.



- A larger port of total traffic is handled by major ports, e.g. about 71% of the India's oceanic traffic was handled by the 12 major ports during 2008-09.
- The Britishers used these ports to export natural resources of India; particularly from their hinterland but this trend was discontinued after 1947.
- The India lost its two very important ports i.e. Karachi port to Pakistan and Chittagong port to Bangladesh (erstwhile East-Pakistan). But India recovered successfully from this loss by opening many new ports, for instance, Kandla in the West and the Diamond harbour near Kolkata on river Hugli in the East.
- Today, large volumes of domestic and international trade are handled by these Indian ports. Most of the ports are equipped with modern infrastructure.
- Previously, it was expected that government agencies are responsible for the development and modernisation of Indian ports. But it was considered that there is a need to increase the functions and bring these ports at par with the international ports. Thus, private entrepreneurs have been invited for the modernisation of ports in the country.
- The cargo handling capacity of Indian ports increased from 20 million tonnes in 1951 to more than 600 million tonnes at present.

Important Ports

Some of the Indian ports along with their hinterlands are as follows:

Kandla Port

- This port is situated at the head of Gulf of Kutch. The main objectives of this major port are to serve the needs of Western and North-Western ports of the country and also to reduce the pressure at Mumbai port.
- This port is mainly designed to receive large quantities of petroleum and petroleum products and fertilizers.
- To reduce the pressure at Kandla port, an offshore terminal named Vadinar has also been developed.
- Due to confusion in demarcation of the boundary, hinterland of one port may overlap with that of the other.

Mumbai Port



- This is a natural harbour and the biggest port of India.
- The location of this port is closer to the general routes from the countries of Middle East, Mediterranean Countries, North Africa, North America and Europe, where the major share of country's overseas trade is carried out.
- This port is extended over a large area with the length of 20 km and width of 6-10 km with 54 berths and has the country's largest oil terminal.
- The main hinterlands of this port are Madhya Pradesh, Maharashtra, Gujarat, Uttar Pradesh and some parts of Rajasthan.

Jawaharlal Nehru Port

- This satellite port is located at Nhava Sheva. It was developed to relieve the pressure at the Mumbai port.
- It is the largest container port in India.

Marmagao Port

- It is located at the entrance of the Zuari estuary which is a natural harbour in Goa. It gained significance after its remodelling in 1961 to handle iron-ore exports to Japan.
- Construction of Konkan railway extended its hinterland, e.g. Karnataka, Goa, Southern Maharashtra constitute its hinterland.

New Mangalore Port

- It is mainly used to export iron-ore and iron concentrates, and other commodities like fertilizers, petroleum products, edible oils, coffee, tea, wood pulp, yam, granite stone, molasses, etc.
- It is located in Karnataka which is its major hinterland.

Kochchi Port

- This port is popularly known as 'Queen of the Arabian sea'.
- It is a natural harbour and situated at the head of Vembanad Koyal.
- Kochchi port is located close to the Suez-Colombo route.
- It serves the needs of Kerala, Southern-Karnataka, and South-Western Tamil Nadu.

Kolkata Port



- It is located on the Hugli river 128 km inland from the Bay of Bengal. This port was developed by the British as it was once the capital of British India.
- The port has lost its significance considerably on account of the diversion of exports to the other ports such as Vishakhapatnam, Paradwip and satellite port, Haldia.
- It is also facing the problem of silt accumulation in the Hugli river, which hinders the link to the sea.
- Its hinterland covers Uttar Pradesh, Bihar, Jharkhand, West Bengal, Sikkim and the North-Eastern states.
- It also provides port facilities to our neighbouring land-locked countries such as Nepal and Bhutan.

Haldia Port

- It is located 105 km downstream from Kolkata.
- It has been constructed to reduce the congestion at Kolkata port.
- It handles bulk cargo like iron-ore, coal, petroleum, petroleum products and fertilizers, jute, jute products, cotton, and cotton yarn, etc.

Paradwip Port

- The port is located in the Mahanadi delta and it is about 100 km far from Cuttack.
- It has advantage of having the deepest harbour, thus it is best suited to handle very large vessels.
- It mainly handles large scale export of iron-ore.
- Odisha, Chhattisgarh and Jharkhand constitute its hinterland.

Vishakhapatnam Port

- It is a land locked harbour situated in Andhra Pradesh.
- It is connected to the sea by a channel which is cut through solid rock and sand.
- To handle various commodities like iron-ore, petroleum and general cargo an outer harbour has been developed.
- Andhra Pradesh is the main hinterland for this port.

Chennai Port

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- The artificial harbour of Chennai is one of the oldest ports on the eastern coast.
- It was built in 1859.
- Because of the shallow water near the coast, it is not suitable for large ships.
- Tamil Nadu and Puducherry constitute its hinterland.

Ennore Port

- This newly developed port is situated 25 km north of Chennai.
- It was developed to minimise the pressure at Chennai port.

Tuticorin Port

- It is another port which was developed to relieve the pressure of Chennai port.
- This port handles several commodities like coal, salt, food grains, edible oils, sugar, chemicals and petroleum products.

Airports

Air transport plays a significant role in the international trade of a nation.

The advantages are follows:

- Air transport is very useful for handling high value or perishable goods over long distance.
- It takes less time to transport cargo.

The disadvantages are as follows:

- Air transportation is very costly.
- It is not suitable for the transportation of heavy and bulky commodities.

Thus, having these disadvantages air transport is not/less preferred for international trade as compared to oceanic routes. At present, there are 12 international airports. They are; Ahmedabad, Amritsar, Bengalura, Chennai, Delhi, Goa, Guwahati, Hyderabad, Kochchi, Kolkata, Mumbai and Thiruvananthapuram. Apart from these, there are 112 domestic airports in India.



Chapter 12 - Geographical Perspective on Selected Issues and Problems

Environmental Pollution

Environmental pollution is the release of substances and energy from waste products of human activities. It is of various types. Thus, they are classified based on medium through which pollutants are transported and diffused. **The classification of pollution are as follows:**

- Water pollution
- Air pollution
- Noise pollution
- Land pollution

Water Pollution

- Quality of water is majorly degraded by several factors i.e. indiscriminate use of water by fast growing population and expansion of industries. No surface water is found in pure form in rivers, canals, lakes, etc as all the water sources contain small quantities of suspended particles, organic and inorganic substances. Water becomes polluted, when quantity of these substances increases in it. It becomes unsuitable for human uses and its self purifying capacity declines. There are two sources of water pollution:
- **Natural** Erosion, landslides, decay and decomposition of plants and animals, etc are natural sources that make water polluted.
- **Human** Industrial, agricultural and cultural activities of human beings make water polluted.
- Water pollution created from human beings are major problem in modern times. Industrial activities of pollution.

Sources of Pollution in the Ganga and the Yamuna Rivers



River and state	Polluted Stretches	Nature of Pollution	Main Polluters
Ganga (Uttar Pradesh, Bihar and West Bengal)	Downstream of Kanpur	Industrial pollution from towns like Kanpur.	Cities of Kanpur, Allahabad, Varanasi, Patna and Kolkata, release domestic wastes into the river.
	Downstream of Varanasi	Domestic wastes from urban centres.	
	Farrakka Barrage	Dumping of carcasses in river.	
Yamuna (Delhi and Uttar Pradesh)	Delhi to confluence with Chambal	Extraction of water by Haryana and Uttar Pradesh for irrigation.	Delhi dumping its domestic waste.
	Mathura and Agra	Agricultural runoff resulting in high levels of micro-pollutants in the Yamuna.	
		Domestic and industrial waste of Delhi flowing into the river.	

- Most of the industrial wastes, e.g. polluted waste water, poisonous gases, chemical residuals numerous heavy metals, dust, smoke, etc are disposed off in running water, lakes, reservoirs, rivers and other water bodies and thus, destroy the bio-system of these waters. Major culprits are leather, pulp and paper, textiles and chemicals industries.
- Today use of various types of chemicals like inorganic fertilizers, pesticides and herbicides are common in agriculture. These chemicals pollute surface water such as rivers, lakes, tanks as well as
- groundwater by infiltrating into the soil. These fertilizers increase the amount of nitrate content of surface waters. Besides this, cultural activities such as pilgrimage, religious fairs, tourism, etc also cause water pollution. In India, almost all surface water sources are contaminated and unfit for human consumption.
- Use of polluted water can harm human health and can cause various water borne diseases, e.g. diarrhoea, intestinal worms, hepatitis, etc. World Health Organisation (WHO) shows that about one fourth of the communicable diseases in India are water borne.

Air Pollution

- A larger proportion of contaminants like dust, fumes, gas, fog, odour, smoke or vapour in air for a long duration is known as air pollution may be harmful to flora and fauna and to property.
- There is an increase in emission of poisonous gases into the atmosphere because of increasing use of various fuels for energy in various sectors, thus resulting in the pollution of air. The main sources of air pollution are combustion of fossil fuels, mining and industries which release oxides of sulphur,



and nitrogen, hydrocarbons, carbon dioxide, carbon monoxide, lead and asbestos.

Effects of Air Pollution

The effects of air pollution are as follows:

- Air pollution is responsible for many diseases related to our respiratory, nervous and circulatory systems.
- Air pollution is responsible for creating smoky fog over cities which is known as urban smog. It has negative effects on human health.
- Air pollution is also responsible for acid rain. First rain after summer in urban areas always shows high acidic nature of rain water i.e. it shows lower pH level than the subsequent rain.

Noise Pollution

- Noise pollution refers to a noise that causes a condition which is unbearable and uncomfortable to human beings. This noise can be from various sources.
- It is a recent phenomenon which became a serious concern only after a variety of technological innovations. The level of steady noise is measured by sound level expressed in terms of decibels (dB).
- Factories, mechanised construction and demolition works, automobiles and aircrafts are major sources of noise that cause noise pollution.
- Apart from these, there are also some periodic sources of noise pollution such as sirens, loudspeakers in different festivals and programmes and other activities of different communities.
- Noise produced by traffic is a major source of noise pollution. It creates a huge inconvenience to the people.
- Intensity and nature of noise made by traffic is dependent on various factors such as type of vehicle (aircraft, train vehicle, etc)/ condition of road and condition of vehicle (in case of automobiles). In sea traffic, the noise; pollution is limited to the harbour because of loading and unloading activities of containers.
- Noise pollution from industries is also a serious problem but its intensity varies because of some factors such as type of



industry, types of machines and tools, etc. The intensity of noise pollution decreases as distance from source of pollution (Industrial areas, arteries of transportation, airport, etc) increases. Thus, noise pollution is location specific.

Effects of Noise Pollution

- Noise pollution is a major cause of anxiety, tension and some other mental problems and disorders among people in many metropolitan and big cities in India.

Urban Waste Disposal

- Overcrowding, congestion, increasing population, improper infrastructure and facilities to support this population, lack of sanitation, foul air, etc are some features of urban areas.
- Mismanagement of solid wastes and environmental pollution caused by them has now become a major problem. Solid wastes are a variety of old and used articles, for e.g. stained small pieces of metals, broken glass wares, plastic containers, polythene bags, ashes, floppies, CDs, etc dumped at different places.
- These discarded materials are also known as refuses, garbage and rubbish, etc and are disposed off from two sources i.e. household or domestic establishments and industrial or commercial establishments.
- Public lands or private contractor's sites are used to disposed off household or domestic wastes. Low lying public grounds (landfill areas) are used to disposed off industrial solid wastes by public (municipal) facilities. Industries, thermal power houses and building constructions and demolitions are contributing with more turn out of ashes and debris in solid wastes.
- Disposal of industrial wastes has increased because of the concentration of industrial units in and around urban centres. Urban waste is a bigger problem in small towns and cities than metropolitan cities in the country. About 90% of solid waste is collected and disposed off successfully in Mumbai, Kolkata, Chennai, Bangalore and other metropolitan cities.
- About 30-50% solid wastes in other towns and cities in country is not collected and disposed off properly. It is a major problem because it accumulates on streets, in open spaces



between houses and in wastelands and can cause various health problems.

Impacts of Improper Management of Solid wastes

Improper management of solid wastes has following impacts:

- Solid wastes are threat to human health and can cause various diseases. It creates foul smell, and it harbours flies and rodents that can cause typhoid, diphtheria, diarrhoea, malaria, cholera and other diseases.
- Solid waste can create inconvenience rapidly if they are not properly handled. Wind and rainwater can splitted it and cause a discomfort to people.
- Industrial solid waste can cause water pollution by dumping it into water bodies. Drains carrying untreated sewage also result into various health problems.
- Untreated waste release various poisonous biogases such as methane in air by slow fermentation process. These wastes are resources as energy can be generated from them! By compositing these wastes, problem of energy could be solved as well as its management in urban areas.

Rural-Urban Migration

- Movement of people from rural area to urban area are caused by various factors such as high demand for labour in urban areas, low job opportunities in rural areas and disparities in terms of development in rural and urban areas. Smaller and medium cities provide low opportunities which force people to bypass these small cities and directly come to the mega cities for their livelihood.
- Mostly daily wage workers like, welders; carpenter, etc move to another cities for work, periodically and provide remittances to their families for daily consumption, health care, schooling of children,
- etc. This has improved their early abject situation into a better one. Simultaneously, due to temporary and transferable job situation, these labourers and their families hear the pain of separation of their near and dear ones.
- Sometimes these workers also face difficulty in assimilation to the new culture and environment. Due to these menial jobs at



low wages in informal sector in urban areas, the spouses are left behind

- in rural areas to look after children and elderly people. Thus, the rural-urban migration stream is dominated by the males.

Trend of Urbanisation in the World Currently, about 54% of the world's 7 billion (2011) population lives in urban areas of world. This proportion of urban population will increase in future. It is estimated that between 2025 to 2030, this percentage would be grown with 1.44% per year. This high urban population will pressurise governments to optimise infrastructure facilities in urban areas for giving a standard quality of life.

It is estimated that by 2050, about two-thirds of the world's population will live in urban areas. It would create a high pressure on existing infrastructure and sanitation, health, crime problems and urban poverty. There are various factors responsible for growth of urban population:

- When high birth rate and low mortality rate increase.
- Net in-migration or movement of people from other areas.
- Reclassification of urban areas to encompass formerly rural settlements.

In India there is a estimation that about 60% India's urban population has increased after 1961. About 29% of this growth has been caused by rural-urban migration.

Problems of Slums

- Settlement geography differentiate the two concepts namely urban or urban centres and rural. They are also defined differently in different countries.
- These two are differentiated by their functions but sometimes interdependent on each other. These two concepts are also divided in terms of their separate cultural, economic and technological aspects.
- According to 2001 census, about 72% of India's population is rural (according to 2011, rural population is 68.84%). Most of these rural areas are still in poor conditions and perform primary activities.
- According to Mahatama Gandhi, villages are ideal republics. These work as supplement to the core urban centre forming its hinterland.



- Urban areas are more developed in terms of the socio-economic, politico-cultural, etc than other areas.
- Urban areas have farmhouse, high income of people and their localities, wide roads, street lights, water and sanitation facilities, lawns, well developed green belts, parks, playgrounds and other facilities, provisions for individual security and right of privacy.
- Apart from these attractions urban areas also have slums, jhuggi jhopari' clusters and colonies of shanty-structures.
- These are environmentally incompatible and degraded areas of the cities. These are occupied by the migrants who were forced to migrate from rural areas to urban areas for

employment and livelihood. But because of high rent and high costs of land, they could not afford proper housing and start to live in these areas.

Characteristics of Slums

Slums have following characteristics:

- Slums are least choice residential areas that have broken down house, bad hygienic conditions, poor ventilation and does not have basic facilities like drinking water, light and toilet facilities, etc.
- Slums are overcrowded with people and have many narrow street patterns prone to serious hazards from fire.
- Most of the slum dwellers works for low wages, high risk-prone and unorganised sectors of the urban economy. They face various health related problems such as malnutrition, illness and prone to various diseases.
- They are not able to send their children school to provide them education because of low level of income.
- Dwellers are vulnerable to drug abuse, alcoholism, crime, vandalism, escapism, apathy and social exclusion because of poverty.

Land Degradation

- Limited availability and deterioration of quality of land, both are responsible to exert pressure on agricultural land. Soil



erosion, water logging, salinisation and alkalisation of land lead to land degradation which declines productivity of land.

- In simple words, temporary or permanent decline in productive capacity of the land is known as land degradation. All degraded land may not be considered as wasteland.
- But if process of degradation is not checked, then a degraded land may be converted into wasteland. Natural and man-made processes, both degrade the quality of land.

Classification of Wastelands

- **National Remote Sensing Agency (NRSA)** It is an organisation responsible for classification of wastelands in India. It classifies wastelands by using remote sensing techniques on the basis of the processes that have created them.
- **Wasteland Caused by Natural Agents** Gullied/ ravinous land, desertic or coastal sand, barren rocky areas, steep sloping land, glacial areas, etc are types of wastelands caused by the natural agents. These are considered as wastelands caused by natural agents.
- **Wasteland Caused by Natural as well as Human Factors** Water logged and marshy areas, land affected by salinity and alkalinity and land with and without scrubs which are degraded by the natural as well as human factors are included in this category.
- **Wastelands Caused by Man-made Processes** Shifting cultivation area, degraded land under plantation crops, degraded forests, degraded pastures and mining and industrial wastelands are some types of wastelands that are degraded because of human action.

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