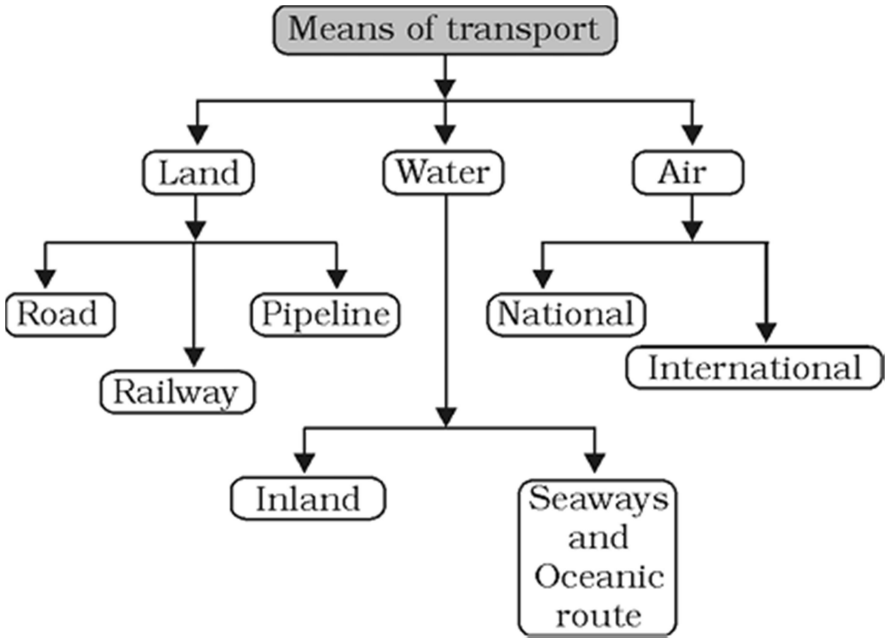
Transport in India

Transport System in India

- The transport system in India includes **Rail transport, Road transport, Air transport, water transport, and portal connectivity.** India has one of the largest road networks in the world, the **largest railway system in Asia, and the second-largest in the world.**
- The use of transport and communication depends upon our need to move things from place of their availability to the place of their use. Human-beings use various methods to move goods, commodities, ideas from one place to another.

The **following diagram shows the major means of transportation.**



Road Transport in India

- The pathways and unmetalled roads have been used for transportation in India since ancient times. With the economic and technological development, metalled roads and railways were developed to move large volumes of goods and people from one place to another. Roads happen to be the most popular mode of transportation.
- India has one of the largest road networks in the world with a total length of 5,897,671 kilometers (3,664,643 mi) as of 31 March 2017. About 85 percent of passengers and 70 percent of freight traffic are carried by roads every year. Road transport is relatively suitable for shorter distance travel.

For the purpose of construction and maintenance, roads are classified as

1. National Highways (NH),
2. State Highways (SH),
3. Major District Roads, and
4. Rural Roads.

National highways

- The main roads which are constructed and maintained by the Central Government are known as the National Highways.
- These roads are meant for inter-state transport and movement of defence men and material in strategic areas.
- These also connect the state capitals, major cities, important ports, railway junctions, etc.
- India has 142,126 km (88,313 mi) of National Highways as of April 2019. The National Highways constitute only 2 percent of the total road length but carry 40 percent of the road traffic.

Golden quadrilateral:

Golden Quadrilateral comprises construction of 5,846 km long 4/6 lane, high-density traffic corridor, to connect India's four big metro cities of Delhi-Mumbai-Chennai-Kolkata. With the construction of the Golden Quadrilateral, the time-distance and cost of movement among the megacities of India will be considerably minimized.

North-South and East-West Corridor:

North-South corridor aims at connecting Srinagar in Jammu and Kashmir with Kanyakumari in Tamil Nadu (including Kochchi-Salem Spur) with a 4,076 km long road. The East-West Corridor has been planned to connect Silchar in Assam with the port town of Porbandar in Gujarat with 3,640 km of road length.

State highways

- These are **constructed and maintained by state governments (PWDs)**. They join the state capitals with district headquarters and other important towns.
- **These roads are connected to the National Highways.**
- These constitute **4 percent of the total road length in the country.**

District roads

- These roads are the **connecting link between District Headquarters and the other important nodes in the district.**
- They account for **14 percent of the total road length of the country**.

Rural roads

- These roads are **vital for providing links in the rural areas.**
- About **80 percent of the total road length in India is categorized as rural roads.**
- There is **regional variation in the density of rural roads because these are influenced by the nature of the terrain.**

Other Roads – Border roads and international highways

- Other roads include Border Roads and International Highways.
- The Border Road Organisation (BRO) was established in May 1960 for accelerating economic development and strengthening defence preparedness through rapid and coordinated improvement of strategically important roads along the northern and north-eastern boundary of the country.

- It is a premier multifaceted construction agency. It has constructed roads in high altitude mountainous terrain joining Chandigarh with Manali (Himachal Pradesh) and Leh (Ladakh). This road runs at an average altitude of 4,270 metres above the mean sea level.
- Apart from the construction and maintenance of roads in strategically sensitive areas, the BRO also undertakes snow clearance in high altitude areas. The international highways are meant to promote a harmonious relationship with the neighbouring countries by providing effective links with India.
- The distribution of roads is not uniform in the country. The density of roads (length of roads per 100 square km of area) varies from only 12.14 km in Jammu and Kashmir to 517.77 km in Kerala with a national average of 142.68 km in 2011.
- The density of roads is high in most of the northern states and major southern states. It is low in the Himalayan region, north-eastern region, Madhya Pradesh and Rajasthan.

Areas factors influence in roadways

Terrain:

Nature of terrain and the level of economic development are the main determinants of the density of roads. Construction of roads is easy and cheaper in the plain areas while it is difficult and costly in hilly and plateau areas

Climate:

Quality of roads is relatively better in plains as compared to roads in high altitude areas, rainy and forested regions.

Economic development:

Areas with a high level of economic development will have more road density as compared to areas with a low level of economic development. E.g. Maharashtra has more road density than Himanchal Pradesh

Industries:

Areas with more industrial concentration will have more road density as compared to areas with low industrial concentration. E.g. Jamshedpur is having more road density than Patratu in Jharkhand.

Cities and towns:

Cities and towns will have more road density than rural areas.

Importance of Roads

Port connectivity

- Roadways serve for the special links for feeder roads to important railway routes and ports. This is essential for the development of domestic and international trade.
- Road connectivity for about 50 minor ports and road connectivity for 24 Airports serves the purpose of connecting basic infrastructure.

Rural areas

- All villages will be connected with all-weather roads by the end of the 12th five-year plan. They serve an important purpose in the growth of the rural economy.

Tribal areas

- Roads in Left-Wing Extremism (LWE) affected districts will be continued and works taken up earlier in the Eleventh Plan will be completed during the 12th five-year plan.
- Special Package for development of roads of around 1000 km length in the Scheduled Areas (under Fifth Schedule) has been taken up under Tribal Sub- Plan.

JK and North East

- Road Development in the North-East has been boosted by the initiation of the Trans-Arunachal Pradesh Highway Project. The capacities of NHAI and BRO would be further development for this purpose.
- State road projects in the state of J&K are being developed from strategic considerations.
- Reforms in Motor Vehicles Act have been taken up to simplify inter-state movement with simplified procedures. There has been the creation of truck terminals to ease traffic congestion.

Railways

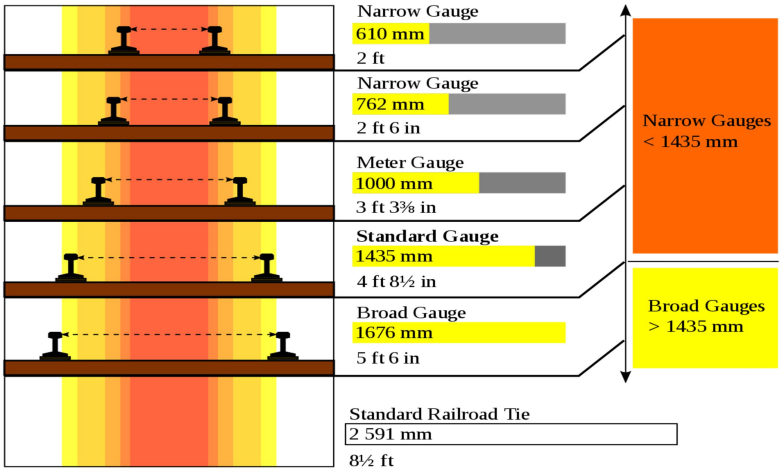
- Rail transport is the most commonly used mode of long-distance transportation in India. Rail operations throughout the country are run by the state-owned company, Indian Railways.
- The rail network traverses the length and width of the country, covering a total length of 63,140 km (39,200 miles).

- It is one of the largest and busiest rail networks in the world, transporting over 5 billion passengers and over 350 million tonnes of freight annually.
- Their operation covers twenty-eight states and three Union territories and also links the neighbouring countries of Nepal, Bangladesh and Pakistan.
- Railways were first introduced to India in 1853, and by 1947, the year of India's independence; they had grown to forty-two rail systems.
- In 1951 the systems were nationalised as one unit, to become one of the largest networks in the world.
- The total length of track used by Indian Railways is about 108,706 km (67,547 miles).
- Track sections are rated for speeds ranging from 75 to 160 km/h (47 to 99 mph).

Indian railways Gauges

The gauge of the railway track is **a clear minimum vertical distance between the inner sides of two tracks** is called a railway gauge. That is, the distance between the two tracks on any railway route is known as a railway gauge. Approximately sixty percent of the world's railway uses a standard gauge of 1,435 mm.

1. The Broad gauge
2. The Metre gauge
3. The Narrow gauge



- the Broad gauge (wider than the standard gauge – 4 ft 8½ in (1,435 mm));
- The metre gauge; and the Narrow gauge (narrower than the standard gauge).
- Broad gauge – 1,676 mm (5.5 ft) – is the most widely used gauge in India with 86,526 km (53,765 miles) of track.
- In some regions with less traffic, the metre gauge – 1,000 mm (3.28 ft) – is common, although the Unigauge project is in progress to convert all tracks to broad gauge.
- Narrow Gauge is present on a few routes, lying in hilly terrains and in some erstwhile private railways (on cost considerations), which are usually difficult to convert to broad gauge.
- Narrow gauge covers a total of 3,651 km (2,269 miles).
- The Nilgiri Mountain Railway and the Darjeeling Himalayan Railway are two famous hill lines that use narrow gauge.
- This gauge is also used by zoos in India, whose tracks are sometimes maintained by the railways.

About Railways

- The Indian Railways network is one of the longest in the world.
- It facilitates the movement of both freight and passengers and contributes to the growth of the economy.
- The Indian Railway was introduced in 1853, when a line was constructed from Bombay to Thane covering a distance of 34 km.
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- Indian Railways is the largest government undertaking in the country.
- The length of the Indian Railways network was 67,956 km (Railway yearbook 2019-20).
- Indian Railways is the proud owner of four UNESCO accorded World Heritage Sites namely Darjeeling Himalayan Railway (1999), Nilgiri MountainRailway (2005), KalkaShimlaRailway (2008)and Chhatrapai Shivaji Terminus, Mumbai (2004).

In India, the railway system has been divided into 16 zones.

S.No.	Railway Zone	Headquarters
1	Central	Mumbai CST
2	Eastern	Kolkata
3	East Central	Hajipur
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	South Western	Hubli
15	Western	Mumbai (Church Gate)
16	West Central	Jabalpur

Water Transport

- It is the cheapest means as compared to other means of transport because it involves no expenditure on construction other than maintenance.
- It is very useful for transporting heavy and bulky goods. A ship can carry lakhs of tonnes of goods at a time.
- It is a better mode of transportation for petroleum and its products as it involves cross-continental transfers.
- India lacks in petroleum deposit and most of it is imported from Middle East countries.
- It is fuel efficient and environment friendly means of transportation.

1. Inland Waterways:

India has inland navigable waterways measuring 14,500 km which include canals, rivers, backwaters and narrow bays etc. But only 3,700 km of river length is suitable for mechanized boats in river Ganga and Brahmaputra in the north and Godavari, Krishna and Kaveri in the south.

A good network of inland waterways is able to reduce the traffic on the highways. It also helps transportation of goods.

Inland Waterways Authority of India was constituted in 1986 and looks after the development, maintenance and management of inland water ways in the country. The following three waterways have already been declared as National Waterways,

NW 1 – River Ganga from Allahabad, Uttar Pradesh to Haldia, West Bengal (1620 km)
NW 2 – River Brahmaputra from Sadiya to Dhubri in Assam (891 km)
NW 3 – Kollam to Kotapuram stretch of canal in Kerala (205 km)

2. Oceanic Waterways

If you look at the map of India, you will find that India is surrounded on three sides by the Arabian Sea, the Bay of Bengal and the Indian Ocean with a coastline of 7516 km India had only 49 ships in 1946 with a capacity of 1,27,083 tonnes.

After independence, the Government has taken various measures resulting in procurement of 616 ships in 2004 with a gross tonnage of 700,000 tonnes of carrying capacity.

The two categories of Indian Sea Waterways are:

(a) Coastal shipping:

Transporting passengers and cargo between the ports located along the coast of the country is done by coastal waterways. Ships of about 100 navigation companies are engaged in coastal waterways handling about 7 lakh tonnes of cargo through 12 main ports and 189 small and medium class ports.

(b) International shipping:

Most of the shipping capacity of India is used in international trade. Through the ports of the east coast to Myanmar, Malaysia, Indonesia, Australia, China, and Japan and from the west coast ports to the U.S.A., Europe and Asia are used for export and import.

Air Transport

Air transport in India was **started in 1911**. It is managed by Air India. IndiGo, Air India, Spicejet, and GoAir are the major transit corporations. India's is the world's third-largest domestic and overall civil aviation sector.

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, 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'.

Air Transportation

- Air transport is considering that world is becoming a global village. It is the fastest means of transport and one can reach the destination in a few hours covering the distance of hundreds of kilometres.
- It is free from surface hindrances such as inaccessible mountains, dense forests, marshy lands or flooded areas.
- It is most important due to its utility in national defence.
- It also connects countries of different continents making earth a global village.

- It is suitable for transporting fruits, vegetables or high value goods like costly drugs and sophisticated machines in desired time frame.
- It is very useful at the time of natural or any other calamities for saving people or supplying goods of their basic requirements immediately.
- Rapid speed is the most peculiar feature of Air Transport. The aircrafts can fly at a speed of 500 km/h without any difficulty. Some planes can fly at a supersonic speed. No other means of transport can move at such speed
- Indian holds 9th position in the world in civil aviation market.
- Aviation plays an important role in international travel and transport.
- The significance of airways multiplies during war time situation and disaster management, natural calamities.
- The cargo (freight) services are based mainly on aviation sector.
- Airway is the index of modernity of a region.
- Air ways are free gift of nature and no capital is spent in their construction or maintenance
- Aviation sector provides employment to 7 million people directly and indirectly.

Factors for development of air transport in India

- The weather conditions in India are also quite congenial to air transport. Poor visibility due to clouds, fog and mist hinders air transport but India is lucky to have clear weather for most part of the year except for a short duration in rainy season.
- The central location of India which has Europe West Asia on the western side and South East Asia and East Asia on the Eastern side.
- India has extensive plains which provide suitable landing sites in India.

- The need of airways is high due to the larger size of India.

Challenges of aviation sector

- The rates and fare charged by airlines are substantially higher than that of Railways/Roadways. It is a class transport rather than mass transport.
- There is the problem of last-mile connectivity with airways. It can only be provided by Railways/Roadways.
- Air transport is not fit for carrying heavyweight cargo, which can only be transported by Railways/Roadways/Shipping.
- Bad weather caused by storms, rains, fog restricts the flight of an aircraft.
- Most accidents are fatal, where chances of survival are less.
- Airports cannot be made everywhere, the geography of a place plays important role in the construction of the airport.
- India specific challenges:
- India imports carrier aircrafts had has not the domestic base.
- The taxes related to Air Turbine Fuel are very high in India.
- The maintenance, Repair, and Overhaul (MRO) industry is not well developed in India.
- Less people prefer air transport than other means of transport.
- Aviation sector is highly capital intensive. Expansion of Airports is also very difficult.
- Competition: The arrivals of LCCs (Low-cost carriers) lead to wearing down the market share of the premium airlines. To moderate the decline in market share, the premium airlines were forced to reduce their fares and this, in the long run, lead to a pricing war amongst the airlines with potentially affecting the financial viability of the carriers.

- Financial Health: Though India is among the fastest-growing aviation markets in the world, its airlines have been gripped in losses. The Centre for Asia Pacific Aviation predicts expects India's consolidated airline industry to post a loss of $1.65 billion to
- Indira Gandhi International Airport is the busiest airport in India. It has the longest runway of 4km

Air transport services in India can be classified into the following categories:

1. Domestic and International Services

Domestic and International services are provided by government and private provider. **Pawanhans Helicopter Ltd.** (government undertaking) – This Company provides air transport to the Oil and Natural gas Corporation, Indian Oil and in the North-Eastern part of the country.

International Airports in India - Important Facts

- There are 34 operational International Airports in India.
- Indira Gandhi International Airport is the largest International airport constructed in 5495 acres. It is also the busiest airport in India followed by the Chhatrapati Shivaji International Airport.
- Cochin International Airport, Kerala is the first international airport in India developed under PPP- Public Private Partnership Model.
- Calicut International Airport, Kerala is recently added to the list of International Airports in India.
- Juhu Aerodrome, Mumbai is the First and oldest Airport in India founded in 1928
- Airport of Trichy is the smallest airport in India.

- Kushok Bakula Rimpochee, Ladhak is the 23rd highest commercial airport in the world at 3256 meters.