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for CSE – 2021-22

GEOGRAPHY

Transport

by

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The term "**Infrastructure**" denote the essential elements forming the basis of a system or a structure.

- Transport is an important infrastructural service which facilitates agriculture and industry to grow to their fullest potential.
- Transport carries people and goods from one place to another. It helps both the production, distribution as well as consumption processes.
- A dense and efficient network of transport is essential to promote social cohesion, accelerate economic prosperity and ensure security and territorial integrity.
- Transport consists of three different modes- Land, Water and Air. They complement each other and in the process constitute a single integrated network.

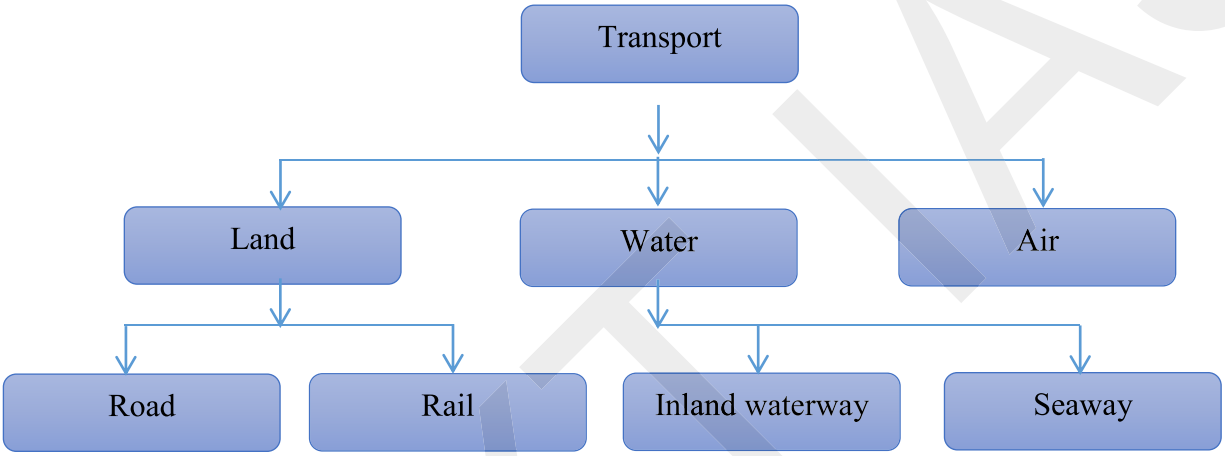

Figure 1: Modes of Transport

- Land transport is further classified into-
  - Road transport
  - Railway Transport
- **Road Transport**
  - The Ministry of Road Transport and Highways is the apex body for formulation and administration of the rules, regulations and laws relating to road transport and transport research.
  - It encompasses construction and maintenance of National Highways (NHs), administration of Motor Vehicles Act, 1988 and Central Motor Vehicles Rules 1989, National Highways Act, 1956 and National Highways Fee (Determination of Rates and Collection) Rules, 2008, formulation of broad policies in relation to road transport, environmental issues, automotive norms etc.
  - India has the second largest road network in the world, spanning a total of 62.16 Lakh Kilometers. This comprises National Highways, Expressways, State Highways, Major District Roads, Other District Roads and Village Roads.

National Highways	1,36,440 km
State Highways	1,76,818 km
Other roads	59,02,539 km
Total	**62,15,797 km**

Table 1: Road length segregation in India (**Source**: Annual Report, 2020-21, MoRTH)

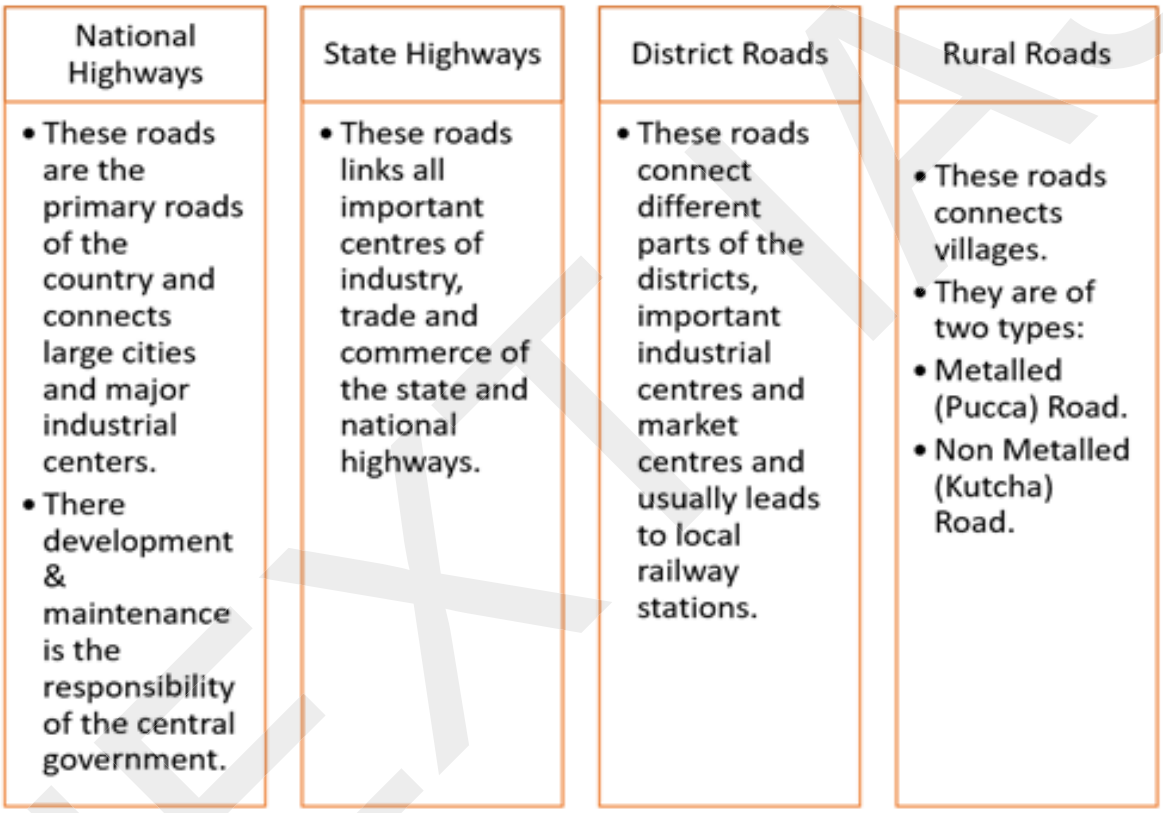

Figure 2: Classification of Roads in India

- All roads other than National Highways in the States fall within the jurisdiction of respective State Governments.
- **National Highways**
  - Roads those are required for strategic movement, those that reduce the travel time substantially, and those that open up backward areas and help economic growth, are also classified as National Highways.
  - They connect all major ports, state capitals, large industrial and tourist centers, and foreign highways.
  - These are constructed by Central Government and maintained by National Highways Authority of India (NHAI).

- NHAI is the apex body to improve the quality of National Highways. It comes under the Ministry of Road Transport and Highways (MoRTH).
- NH 44 is the longest national highway with the distance of 3,745 km. It spans from Srinagar in the North to Kanyakumari in the South.
- The National Highways have a total length of 1, 36,440 km. (Annual Report Data, 2020-21, MoRTH).
- NHs constitute very less of the total road length in the country but carry 40% of the total traffic.
- Government of India started **National Highway Development Programme (NHDP**) under NHAI.

  NHDP

  (i) It was launched in **1998** with the objective of developing roads of international standards which facilitate smooth flow of traffic.

  (ii) **It includes components like Golden Quadrilateral** is 5,846 km long 4/6 lane, high density traffic corridor that connects India's four big metro cities: Delhi, Mumbai, Chennai, Kolkata.

  (iii) With 4,076 km long road, **North South Corridor** aims at connecting Srinagar in Jammu and Kashmir with Kanyakumari in Tamil Nadu.

  (iv) With 3,640 km of road length, the **East West Corridor** has been planned to connect Silchar in Assam with the port town of Porbandar in Gujarat.

- **State Highways**
  - They are the arterial roads of a state that connect to National Highways, district headquarters and important cities and are also linked to district roads.
  - These are constructed by State Governments.
- **Major District Roads**
  - They connect areas of production, main markets and the State and National Highways crossing the state.
  - It is constructed and maintained by Zilla Parishad.
- **Village Roads**
  - These connect villages to each other or to the nearest District Roads.
  - These are the responsibility of Village Panchayats.
  - In the year 2000, government launched Pradhan Mantri Gram Sadak Yojna (PMGSY) to provide rural connectivity to unconnected habitations.
- **Expressways**
  - These are the best quality roads.
  - Generally they have six lanes and controlled access.
  - Lucknow Agra Expressway is longest expressway with 302 km.
  - Mumbai Pune Expressway was the first 6-lane expressway to be constructed.
- **Border Roads**
  - These are constructed and maintained by Border Road Organization (BRO) which comes under Ministry of Defense.

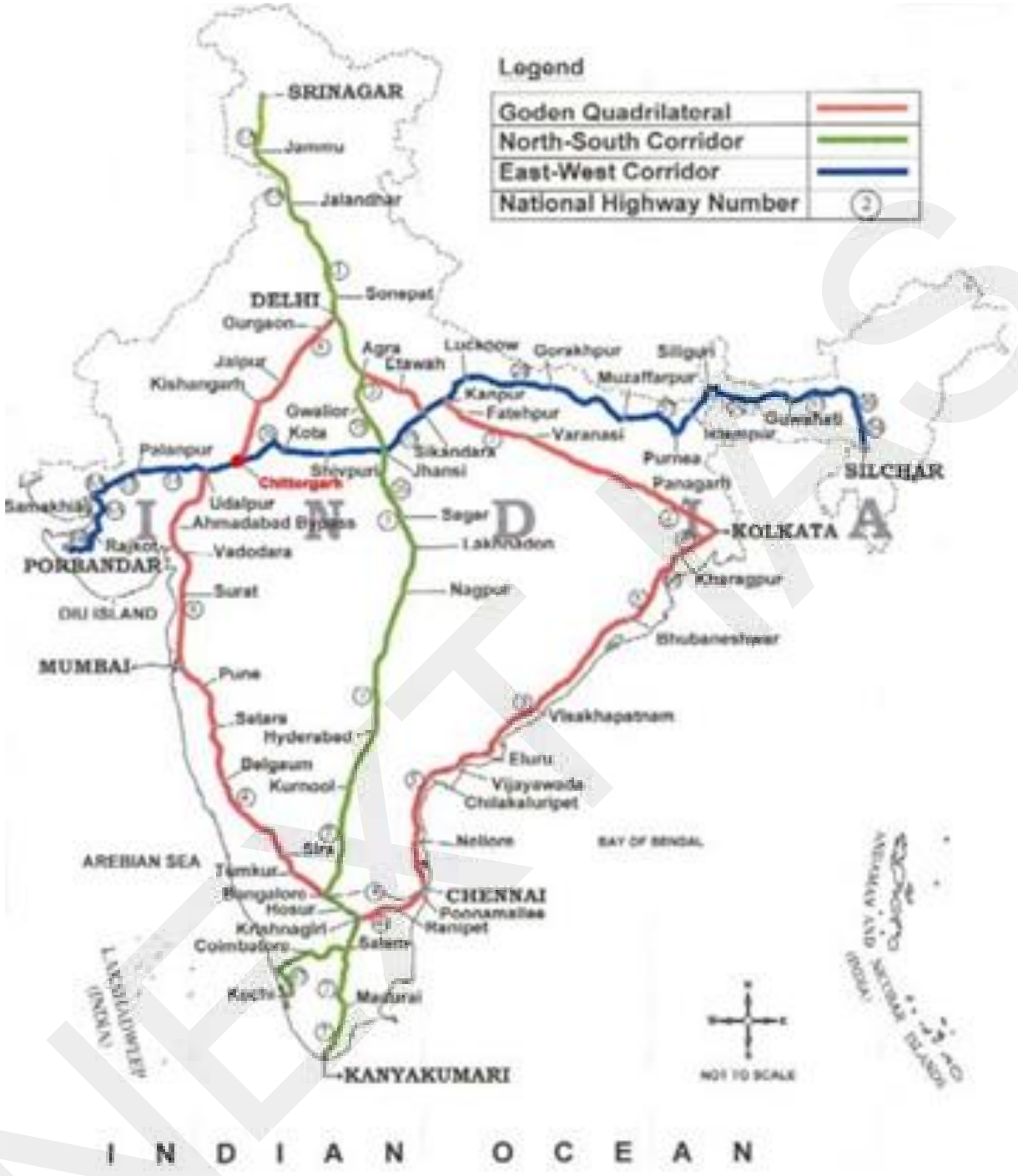

Figure 3: Golden Quadrilateral (GQ) and NS-EW Corridors

- **Associated Organizations**
  - **National Highways Authority of India (NHAI)**
    - It was set up through an act of Parliament, namely the National Highways Authority of India Act, 1988.
    - The NHAI is responsible for the development, maintenance and management of the National Highways entrusted to it.
    - It became operational in 1995.

- **National Highways & Infrastructure Development Corporation Ltd. (NHIDCL)**
  - It was set up to exclusively carry out the task of construction/up-grading/widening of National Highways in part of the country which share international boundaries with neighboring countries in order to promote regional connectivity on a sustainable basis.
- **Indian Academy of Highway Engineers (IAHE)**
  - IAHE is a registered society under the administrative control of the MoRTH. It is a collaborative body which was set up in the year 1983 with the objective of fulfilling the long felt need for training of Highway Engineers in the country.
- **Indian Road Congress (IRC)**
  - The Indian Roads Congress (IRC) is the Apex Body of Highway Engineers in the country. The IRC was set up in December, 1934 on the recommendations of the Indian Road Development Committee best known as Jaykar Committee set up by the Government of India with the objective of Road Development in India. It decides the minimum requirements for roads, keeping in mind geography, speed, volume of traffic and safety.

- **Bharatmala Pariyojana**
  - In 2017, an umbrella programme for the National Highways "Bharatmala Pariyojana Phase-I" was approved for construction/up-gradation of NHs of 34,800 km over a period of 5 years (2017-18 to 2021-22).
  - The programme focuses on optimizing efficiency of freight and passenger movement across the country by bridging critical infrastructure gaps through effective interventions like development of Economic Corridors, Inter Corridors and Feeder Routes, National Corridor Efficiency Improvement, Border and International Connectivity Roads, Coastal and Port Connectivity Roads and Green-field Expressways.
  - Multi-modal integration is also built into this program.
  - Special attention has been paid to fulfilling the connectivity needs of backward and tribal areas, areas of economic activity, places of religious and tourist interests, border areas, coastal areas and trade routes with neighboring countries.

Figure 4: Bharatmala Pariyojana and its objectives

- **E-tolling and FASTag**
  - N**ational Electronic Toll Collection (NETC) programme**, the flagship initiative of Ministry of Road Transport and Highways, has been implemented on pan-India basis in order to ensure seamless movement of traffic through fee plazas and increase transparency in collection of user fee using **FASTag** which is based on **Radio Frequency Identification (RFID**) Technology.
  - The National Payment Corporation of India (NPCI) is the Central Clearing House (CCH).
  - Towards the objective of achieving 100% collection through electronic payment, the Government has mandated to declare all lanes, except one lane in each direction as FASTag lane w.e.f. December 2019.
  - This one lane in each direction will accept all other modes of payment including FASTag.

Figure 5: FASTag and its fields

- **Grand Trunk (GT) Road**
  - Sher Shah Suri built the Shahi (Royal) road to strengthen and consolidate his empire from the Indus Valley to the Sonar Valley in Bengal.
  - It was called Uttarapatha and was the key feature of many empires in Ancient Indian history.
  - The road was later renamed as the Grand Trunk (GT) road during the British period, connecting Calcutta and Peshawar.
  - At present, GT Road extends from Amritsar to Kolkata. It is bifurcated into two segments-
    (a) National Highway (NH)-1 from Delhi to Amritsar.
    (b) NH-2 from Delhi to Kolkata.
  - Now the numbering has been changed by National Highway (Amendment) Act 2010.

Figure 6: Grand Trunk Road

- **International Roads**
  - These connect India with its neighboring countries.
  - Some of the current projects are-
    - **The India-Myanmar-Thailand (IMT) trilateral highway**

Figure 7: India-Myanmar-Thailand Trilateral Highway

(1) It will connect Moreh in Manipur to Mae Sot in Thailand.
(2) India is undertaking construction of two sections of the Trilateral Highway in Myanmar.
   - Construction of Kalewa-Yagyi road section
   - Construction of Tamu-Kyigone-Kalewa (TKK) road section
(3) The highway will facilitate easy movement of goods and people among the three countries.
(4) The National Highways Authority of India has been appointed as the technical executing agency and project management consultant
   - **Zaranj-Delaram Road**
(5) It is being built in Afghanistan by the Border Road Organization (BRO).
(6) It provides access to Indian goods from Chabahar port of Iran to Afghanistan and Central Asia.

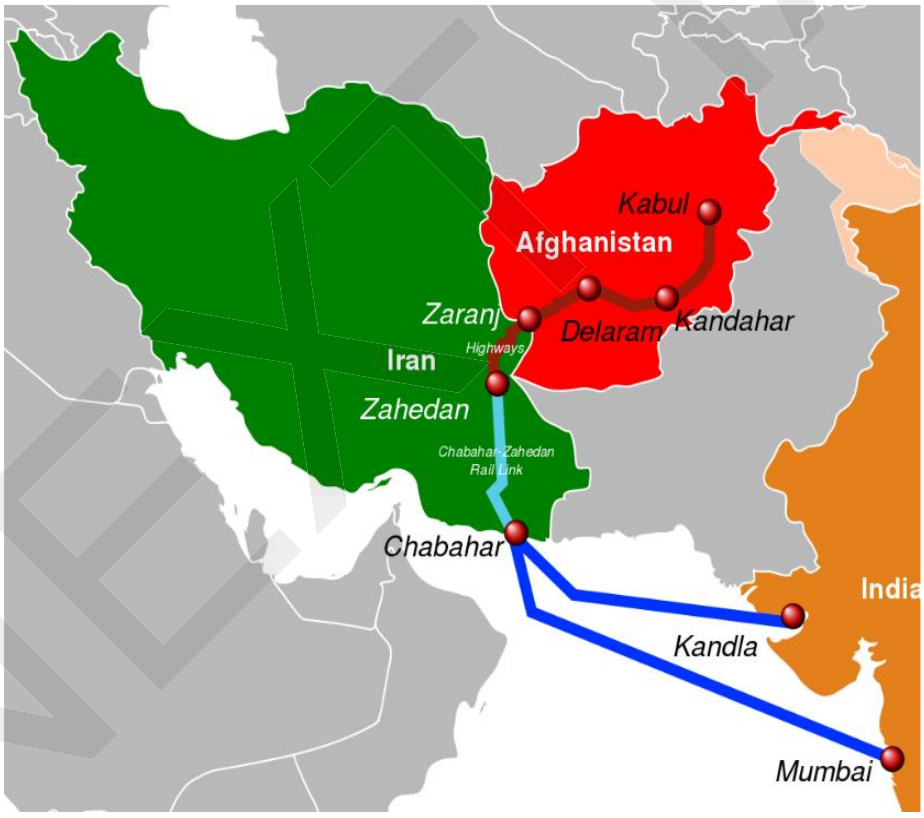

Figure 8: Zaranj-Delaram Road

- **International North-South Transport Corridor (INSTC)**

(7) INSTC is a multi-modal connectivity project to establish transport networks (ship, rail, and road route) for moving freight between India, Russia, Iran, Europe and Central Asia.

(8) INSTC project was initiated by Russia, India and Iran in September 2000 in St. Petersburg.
(9) The agreement was signed on 16th May 2002.
(10) INSTC would enhance accessibility to the land locked central Asian nations.
(11) It links Indian Ocean and Persian Gulf to the Caspian Sea via Iran, and then onwards to northern Europe via St. Petersburg in Russia.
(12) The route primarily involves moving freight from India, Iran, Azerbaijan and Russia.
(13) The objective of the corridor is to increase trade connectivity between major cities such as Mumbai, Moscow, Tehran, Baku, Bandar Abbas, and Astrakhan etc.
(14) India has recently proposed to include Chabahar port in INSTC.

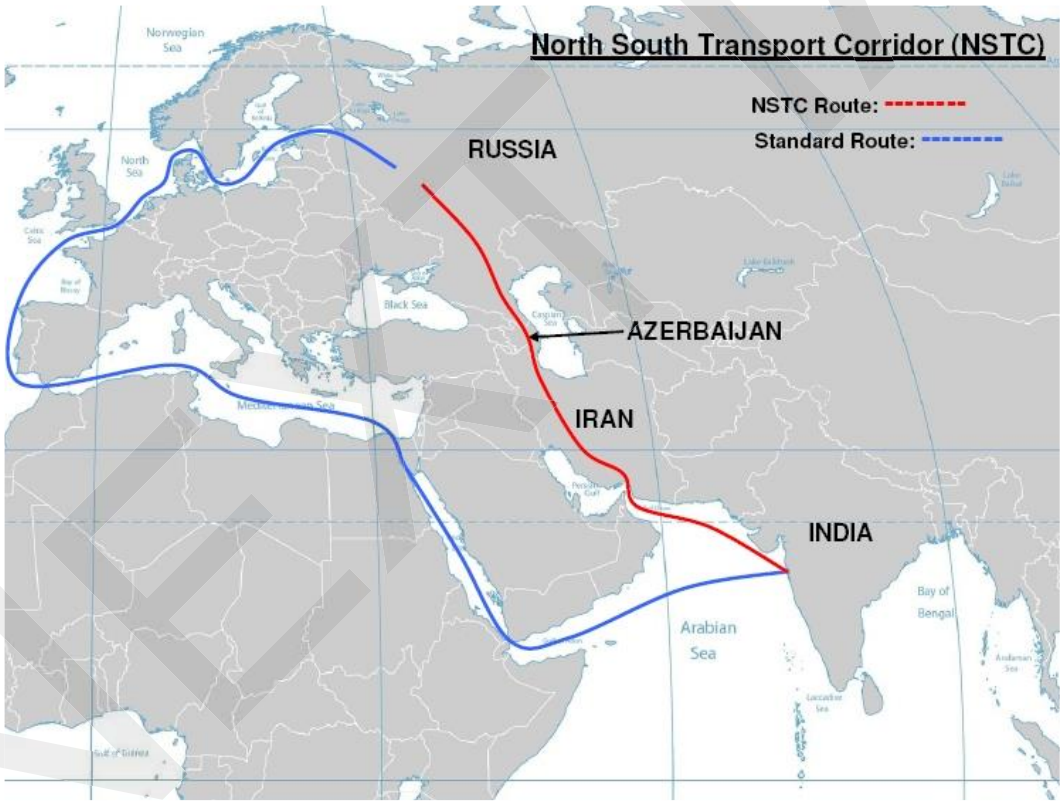

Figure 9: INSTC Route

- **Railway Transport in India**
  - Indian railway system is the largest in Asia and the fourth largest in the world. It is the biggest departmental public undertaking in the country.
  - Total railway network in the world
    - 1st – USA
    - 2nd- China

    - 3rd –Russia
    - 4th – India
  - The first train ran in India between Bombay and Thane, a stretch of 34 km on April 16, 1853.
  - The second train ran between Howrah and Hooghly in 1854.
  - The headquarters of Indian Railway is in New Delhi.
  - The first electric train in India was 'Deccan Queen'. It was introduced in 1929 between Bombay and Poona.
  - Indian Railways has the second biggest electrified system in the world after Russia.
  - The first Metro Rail was introduced in Kolkata (West Bengal) on October 24, 1984.
  - Indian railways have always kept the national supply chain running in almost all the daunting and unprecedented times like COVID.
- **National Rail Plan (NRP) 2030**
  - A National Rail Plan (NRP) 2030 has been developed with a view to develop infrastructure by 2030 to cater to the traffic requirements up to 2050.
  - Based on the NRP, a Vision 2024 document has been prepared to develop infrastructure by 2024 to enhance modal share of Railways in freight transportation to more than 40 per cent and to cater to the traffic requirements up to 2030.
  - Multi tracking of 14,000 Km route, electrification of entire Railway network, upgrading the speed potential of important routes to 130 KMPH and 160 KMPH (present speed potential 110 KMPH), completion of important coal connectivity and port connectivity projects have been planned as part of Vision 2024.
  - Indian Railway Finance Corporation (IRFC) is mobilizing resources with sufficient moratorium period and projects are being targeted to be completed well before expiry of moratorium period.
- **Speeding Electrification of Railways and Mission Greening**
  - Electrification has been accorded high priority as a part of the national goal to transform India into a green nation.
  - 66% of track length has been electrified by November 2020. Railways aim to complete electrification of its entire broad-gauge network by 2023.
  - Once completed, IR will achieve a unique feat among the major railways in the world to run trains fully with indigenously produced power without dependence on imported fossil fuel.
  - After 100% electrification, estimated saving on fuel/energy bill for IR would be about Rs.14500 Cr per annum.
  - Indian Railways started its pilot 1.5 MW solar energy plant with an aim to power its energy needs.
  - This is part of an ambitious programme is to generate 20 Giga Watt of solar power by 2030 using the separable railway land.

- Besides generating renewable energy the programme would also provide free-of-cost fencing along the railway track thereby protecting the railway property from encroachment.
- **The Indian Railways operate in three different gauges:**
  1. Broad Gauge Railway (Distance between rails is 1.67 m).
  2. Metre Gauge Railways (Distance between rails is 1.00 m).
  3. Narrow Gauge Railways India (Distance between rails is 0.762 or 0.610 m).

- **Dedicated Freight Corridors**
  - Dedicated Freight Corridor (DFC) project is a broad gauge freight corridor being constructed by the Indian Railways.
  - It aims to provide an efficient and reliable transportation system through construction of freight corridors traversing the entire country.
  - Dedicated Freight Corridor Corporation of India Limited (DFCCIL) is a special purpose vehicle of the railways which has been entrusted with the job to develop DFCs in the country.

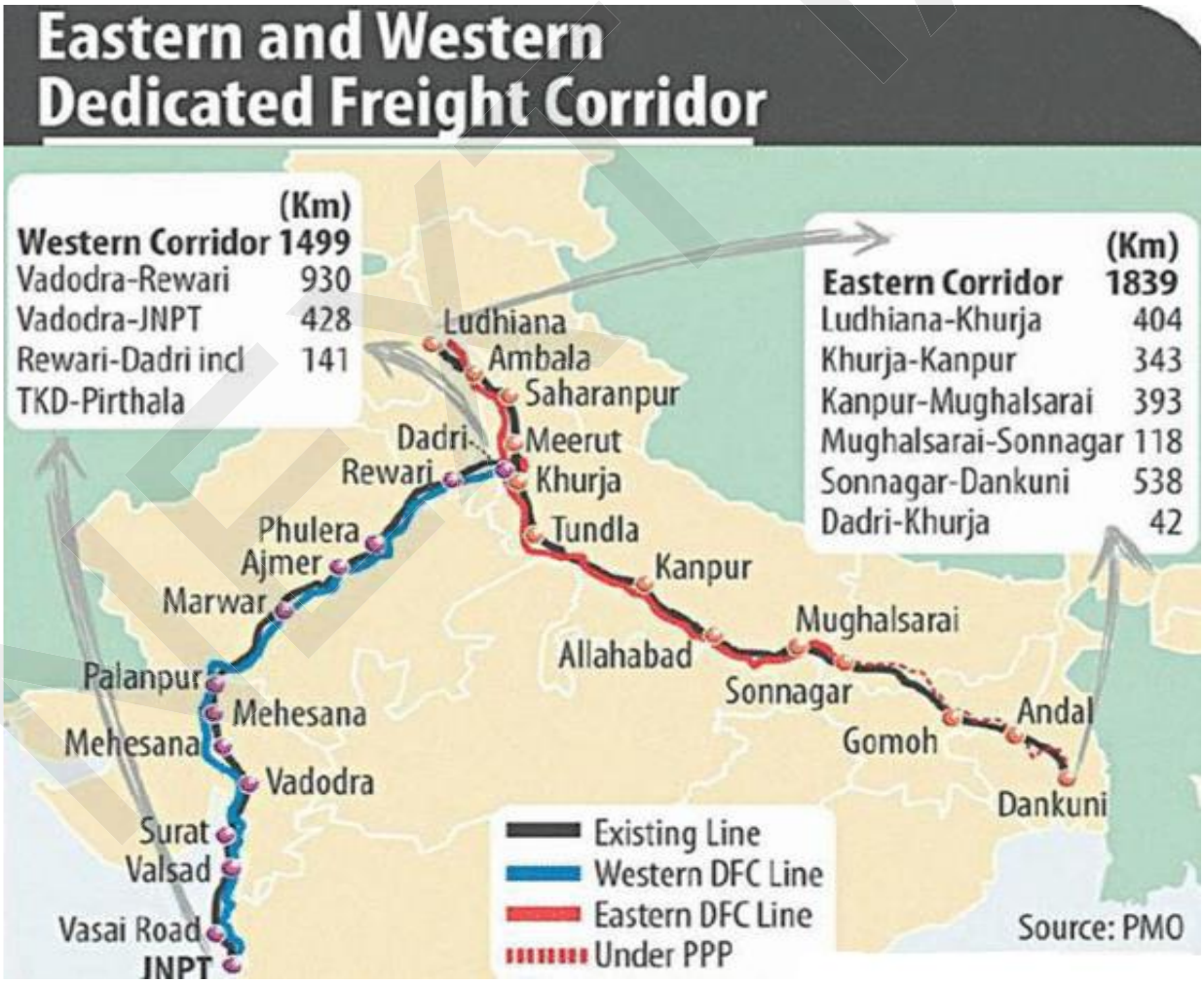

Figure 10: Eastern and Western Dedicated Freight Corridors

- **Western DFC**
  - It runs from Dadri (Uttar Pradesh) near Delhi to Jawahar Lal Nehru Port Trust (JNPT) in Mumbai.
  - It covers the States of Haryana, Uttar Pradesh, Delhi, Rajasthan, Gujarat, and Maharashtra.
  - It is funded by World Bank.
  - Along WDFC, Delhi Mumbai Industrial corridor (DMIC) is being developed.
  - Its length is 1506 Km.
- **Eastern DFC**
  - It spans from Ludhiana in Punjab to Dankuni in West Bengal.
  - It covers the States of Punjab, Haryana, Uttar Pradesh and Bihar, Jharkhand and West Bengal.
  - It is funded by Japan International Cooperation Agency (JICA).
  - Along EDFC, Amritsar-Kolkata Industrial corridor (AKIC) is being developed.
  - The distance of EDFC is more than WDFC.
  - Dadri (WDFC) and Khurja (EDFC) will link at Uttar Pradesh.
  - All the freight traffic that is currently on the rail routes between Delhi and Mumbai and Delhi and Kolkata would be moved to these corridors in parts to decongest the existing lines.
  - Its length is 1865 Km.
- **Other DFC –**

DFC	Length in Km.
East-West DFC (Kharagpur-Bhusawal)	2000
North-South DFC (Itarsi-Vijaywada)	975
Eastern Coast DFC (Kharagpur-Vijaywada)	1115

Table 2: Other DFCs and their respective lengths

- **RO-RO (Roll on /roll off) services**
  - RORO ships are cargo ships designed to carry wheeled cargo, such as cars, trucks, trailers that are driven on and off the ship on their own wheels or using a platform vehicle.
  - It will reduce pollution and will also save time.
- **Mumbai-Ahmedabad Bullet Train**
  - The Mumbai-Ahmedabad high-speed corridor will have a high speed train, with financial assistance from the Japanese Government.
  - The **Shinkansen** high speed technology will be used in this train.

- "National High-Speed Rail Corporation Limited", a Special Purpose Vehicle (SPV) has been formed for the implementation of this project.
- Indian railways will hold 50% of the equity in the SPV.
- The project cost is estimated at 1.10 Lakh Crore.
- Financial assistance has been provided by the Japanese government in the form of a loan upto 81% of the project cost to be repaid in 50 years with a 15 year moratorium at a nominal interest rate of 0.1%.
- The Mumbai to Ahmedabad High Speed Rail (MAHSR) project will cover a distance of 508 kms.

- **Waterways**
  - There are two types of waterways-
    - **Sea way**- International trade is mainly for Goods and is transported through sea.
    - **Inland waterway** - within the country through rivers, lake, canal, etc,
  - In India, Government estimates 14500 Km of inland waterway as potential navigable waterway.
  - Water way is more economical than any other transport system because-
    - Fuel consumption is very less.
    - Heavy goods can be transported easily.
    - It reduces road congestion and traffic in road ways.
    - Minimum land acquisition.
  - **Ministry of Shipping** is responsible for Inland waterway.
- **National Waterways**
  - Transportation plays an important role in the development of a country and it is of great significance for a developing country like India.
  - The country is bestowed with a plethora of diverse topography which enables different kinds of transportation.
  - National Waterways Act came into effect in 2016. It proposed 106 additional National Waterways and merges 5 existing Acts which have declared the 5 National Waterways. (total 111 waterways)
  - In 1986, the Government of India created Inland Waterways Authority of India (IWAI) for regulation and development of Inland Waterways for navigation and shipping.

National Waterways in India

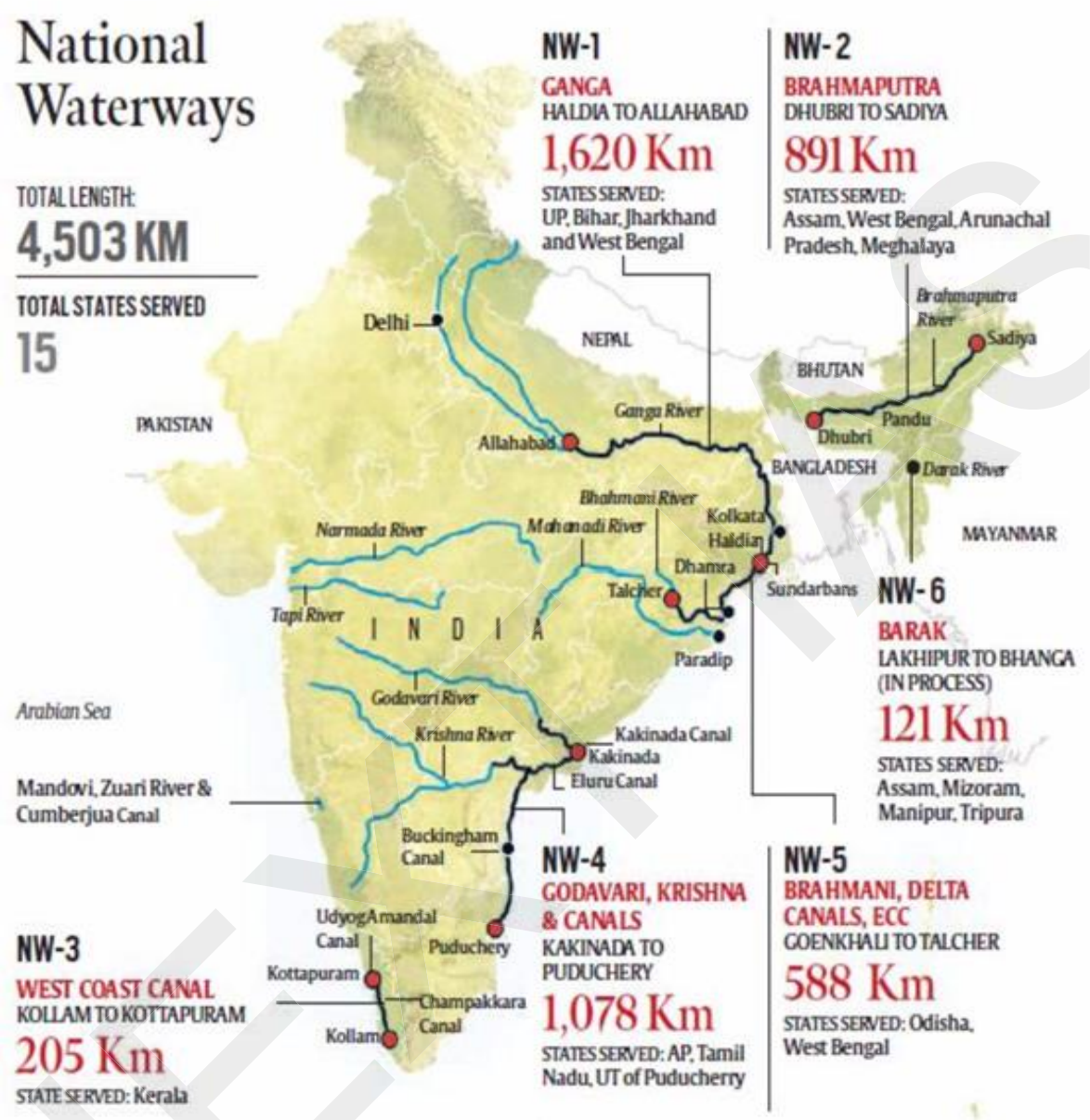

Figure 11: National Waterways in India

- **National Waterway 1**
  - It is on Ganga-Bhagirathi Hooghly River.
  - It starts from Prayagraj and ends in Haldia.
  - Its length is1620 Km.
  - States covered are Uttar Pradesh, Bihar, Jharkhand and West Bengal.
  - Multimodal terminal is being developed at Varanasi and sahibganj.

Figure 12: National Waterway 1

- **National Waterway 2**
  - It is on River Brahmaputra.
  - It starts from Sadiya (Assam) and ends in Dhubri (Assam).
  - Its length is 891 Km.
  - State which is covered is Assam.
- **National Waterway 3**
  - It is on the West Coast Canal, Champakara Canal and Udyogamandal Canal.
  - Its starts from Kottapuram and ends in Kollam.
  - Its length is 205 Km.
  - State which is covered is Kerala.

Figure 13: National Waterway 2

Figure 14: National Waterway 3

- **National Waterway 4**
  - Kakinada-Puducherry canal stretch (767km) along with Godavari River stretch (171km) between (Bhadrachalam and Rajhamundry) and Krishna River stretch (157km) between (Wazirabad and Vijaywada) is termed as NW-4.
  - Total length of NW-4 is 1095 km.
  - The Kakinad canal and Eluru canal and Commamur canal which are irrigation cum navigation canal also interlink the two major river systems of Godavari and Krishna.
- **National Waterway 5**
  - It covers the Talcher- Dhamra stretch of river Brahmani, Geonkhali- Charbatia stretch of East Coast Canal, Charbatia- Dhamra stretch of Matai River and Mangalgadi-Paradip stretch of Mahanadi delta rivers.
  - Total length is 588 km in which river portion is 371 km and canal portion is 217 km.

Figure 15: National Waterway 4

Figure 16: National Waterway 5

- **National Waterway 6**
  - It is proposed on the Barak River from Bhanga to Lakhipur (121 km) in the state of Assam.
  - River Barak originates from Patkari range of Manipur at an elevation of 2440 mts. The river flows through Manipur, Manipur-Mizoram and Manipur-Assam border and then along Assam and then finally enters into Bangladesh.

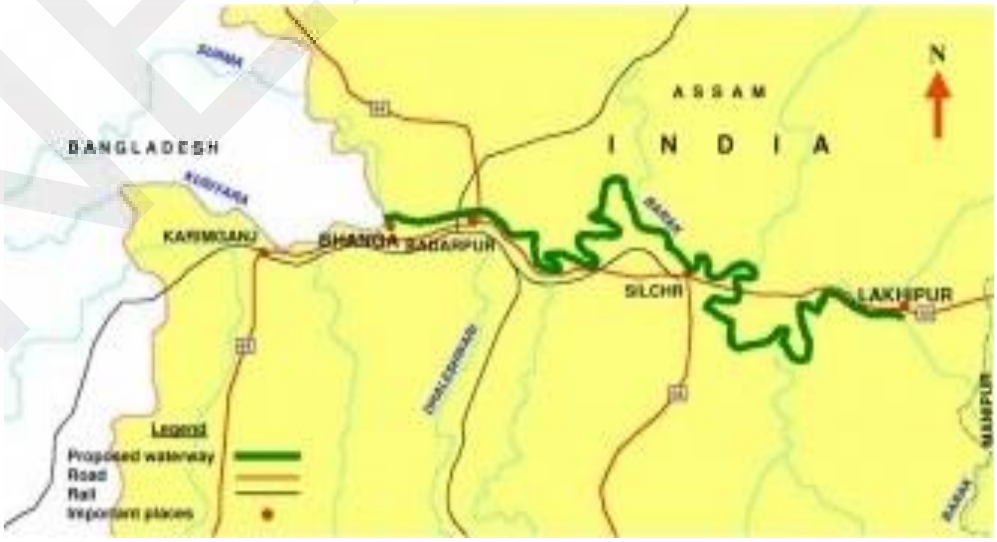

Figure 17: National Waterway 6

- **Inland Waterways Authority of India (IWAI)**
  - This body was created by the government of India in 1986 for regulating and developing inland waterways for shipping and navigation.
  - The body chiefly undertakes development and maintenance projects of IWT infrastructure on national waterways. It undertakes these projects through grants from the **Shipping Ministry**.
  - Its headquarters is in **Noida**. It also has regional offices in various other cities and towns across the country.
- **World view**
  - Busiest water way in the world- Rhine River Waterway It passes through Germany, France and Netherland.
  - Longest waterway- Yangtze River waterway. It connects Wuhan, shanghai etc.
- **Sagarmala Project**
  - Sagarmala project is a **port-led development programme** of **Ministry of Shipping**.
  - A Shipping ministry study has claimed that the project could lead to an annual saving of Rs 40,000 Crore by optimizing logistics.
  - Currently 95% of India's trade by value and 70 % by volume take place through maritime transport.
  - India is lacking the high quantity of international trade via coastal line due to the lack of infrastructure facilities and advanced coastal technologies.
  - The cost of shipping/evacuating goods through Indian maritime transport is quite high compared to that of China, South Korea, Japan and other developed countries. This makes Indian goods uncompetitive in the international market.
  - The vision of the Programme is to reduce logistics cost of EXIM and domestic trade with minimal infrastructure investment.

    Objectives of **the project**
    - Augmenting operational efficiency of ports (more terminals for loading and unloading cargo).
    - Optimizing logistics (rails, roads and inland waterways).
    - Identify capacity additions (more ports wherever viable).
    - Modernize India's Ports so that port-led development can be augmented.
    - Constructing new ports by securing private-sector participation through PPP models.
    - Improving the port connectivity via various rail corridors, freight friendly expressways and inland waterways.
- **Seaways**
  - It requires coastal location.
  - There are two types of ports-
    - Major port - 12
    - Minor port - around 185 (Most in Maharashtra)

- **Major Ports in India:**
  - India has 12 major ports —

Western coast -6

1. **KandlaPort** -- Gulf of Kutch (Gujarat) ---It is a tidal port of India. It is known for handling much of the crude oil imports of India.
2. **Mumbai Port**-- Maharashtra--It is one of the oldest modern natural ports of India.
3. **JNPT/Nhava sheva port**---Maharashtra – It is the largest container port of India. It was built to reduce the burden on Mumbai port. It is one of the high tech and busiest ports.
4. **Marmugao**--Goa -- It is a natural port famous for iron ore exports.
5. **New Mangalore** -- Karnataka—It is famous for iron ore exports.
6. **Kochi port** --Kerala—It is located on the Willingdon Island on the South West coast of India. It is located on the cross roads of the East-West Ocean Trade. It is a natural port. It is called as queen of Arabian Sea.

Figure 18: Major Sea Ports in India

A major port at **Vadhavan** near Dahanu in Maharashtra will be developed on the "Landlord Model". A Special Purpose Vehicle (SPV) will be formed with Jawaharlal Nehru Port Trust (JNPT) as the lead partner with equity participation equal to or more than 50% to implement the project.

East Coast- 6

Eastern coast has shallow water. Therefor requires dredging to remove silt.

1. **Chennai**—It is in Tamil Nadu. It is the oldest artificial port.
2. **Ennore** --Tamil Nadu. It is latest port. It is first major private port. To reduce pressure of chennai port.
3. **V. O. Chidambarnar or Tuticorin port**—This port has been now renamed as V. O. Chidambaranar Port. It is located in the Gulf of Mannar. Tuticorin is the only port in South India to provide a direct weekly container service to the United States.
4. **Visakhapatnam**—It is in Andhra Pradesh. It is an artificial port and deepest port of India.
5. **Paradip** –It is located at the confluence of river Mahanadi in Bay of Bengal in Odisha. It was the first major port on East Coast commissioned in Independent India.
6. **Kolkata (including Haldia**)-- It is situated on the river Hooghly. It is the only riverine major port of India. It is known for twin dock systems i.e. Kolkata Dock System (KDS) on the eastern bank and Haldia Dock Complex (HDC) on the western bank of river Hooghly. Kolkata Port Trust is renamed as Syama Prasad Mookerjee Port in 2020.

Mundra Port

Mundra Port is the largest private port of India located on the north shores of the Gulf of Kutch near Mundra, Kutch district, Gujarat. Formerly operated by Mundra Port and Special Economic Zone Limited (MPSEZ) owned by Adani Group, it was later expanded into Adani Ports & SEZ Limited (APSEZ) managing several ports. It is the largest container port in India.

- **Minor ports**
  - As per the Indian Constitution the **maritime transport comes under the concurrent list.**
  - The **Central Shipping Ministry controls and supervises the major ports**, whereas the **minor ports and intermediate are managed by the state government's maritime board.**
  - Some of the minor ports are- Kundapur (Udupi district Karnataka), Jafrabad (Gulf of Cambay Gujarat), Karaikal (Puducherry), Gopalpur (Odisha) etc.
- **World view**
  - **Shanghai** port is the busiest port in the world. At the second and third place are **Singapore** and **Shenzhen**.
  - China has developed ports in our neighborhood under its String of pearls.
    - Pakistan- Gwadar port

- Sri Lanka - Hambantota port, Colombo port
- Myanmar- kyaukpyu port (deep sea port), Yangon port

  - India is developing ports in
    - Myanmar- Sittwe port
    - Iran- Chabhar port
    - Oman- Duqm port

Figure 19: String of Pearls of China (Port Development in other nations)

- **Airways**
  - Regional **Connectivity Scheme (RCS)- Ude Desh ka Aam Nagrik (UDAN)**
  - **Ministry of Civil Aviation** has launched RCS-UDAN in 2016 to facilitate/stimulate regional air connectivity and making air travel affordable to the masses.
  - Promoting affordability of regional air connectivity is envisioned under RCS by supporting airline operators through various concessions by Central Government, State Governments and airport operators and financial support (Viability Gap Funding) to meet the gap between the cost of airline operations and expected revenues on regional routes.

- **DIGI Yatra**
  - **DIGI Yatra policy** has been launched by **Ministry of Civil Aviation** in 2018 which intends to provide seamless and hassle-free passenger experience at Indian Airports, without the need for verification of ticket and ID at multiple touch points.
  - DIGI Yatra aims to simplify the passenger processes at various check points in the airport right from the terminal entry gate, check-in/bag drop, security check and boarding gates.
- **Indian Air Cargo**
  - Growth of air cargo is critical for industries such as e-commerce, pharmaceuticals, electronics, agriculture, horticulture, floriculture, animal husbandry and marine exports, high-value goods, including gems and jewelry and fashion garments where shipments are highly time sensitive.

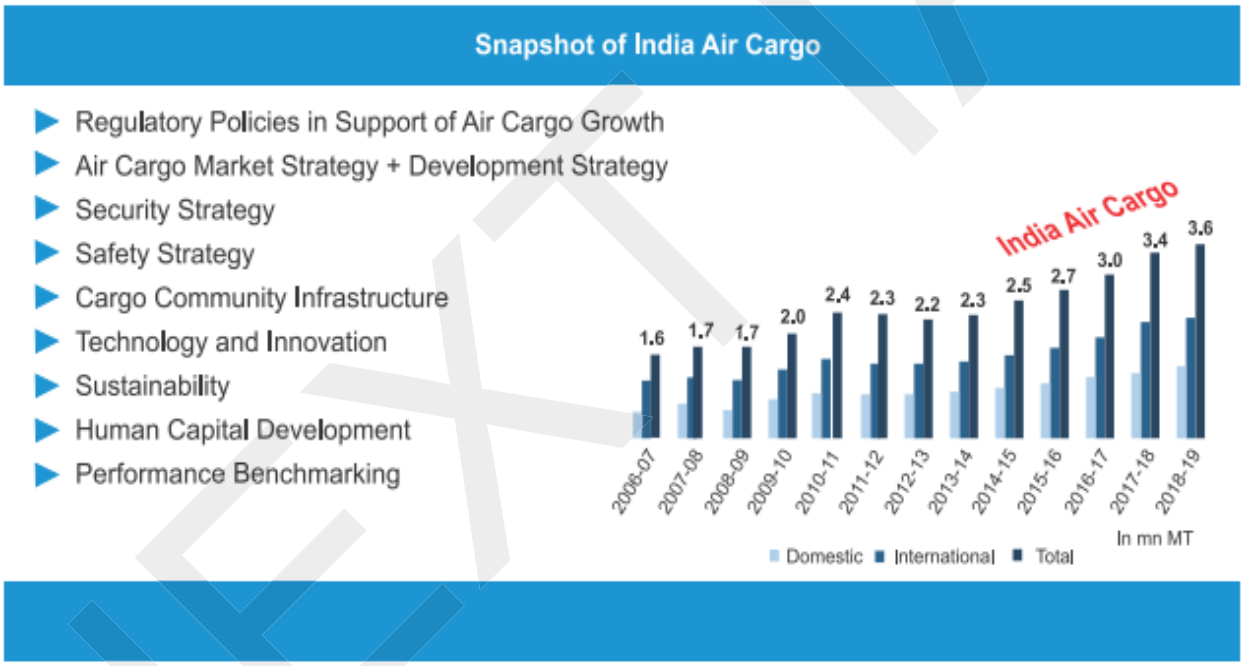

Figure 20: Indian Air Cargo statistics

- **Unmanned Aircraft System Rules (UAS Rules), 2021 or Drone Rules, 2021**
  - Drones offer immense opportunities for economic growth and employment generation.
  - These rules are applied to all the persons owing or possessing or engaged in exporting, importing, and manufacturing, trading, leasing, operating, transferring or maintaining a drone in India.
  - Drones come in a variety of sizes and are capable of carrying payloads of equally variable sized payloads. From life-saving medication to packages and more, drones provide an efficient method of delivery.

- **Classification of Drones**

Drones	Weight Range
Nano	Less than or equal to 250 gm
Micro	Greater than 250 gm and less than or equal to 2 kg
Small	Greater than 2 kg and less than or equal to 25 kg
Medium	Greater than 25 kg and less than or equal to 150 kg
Large	Greater than 150 kg

Table 3: Classification of Drones

- **Uses of Drones**
  - **Military**- Drones are used by Military and defence forces for bombing and search operations.
  - **Delivery**- Delivery drones are usually autonomous UAVs that are used to transport food, packages or goods. These flying vehicles are known as "last mile" delivery drones because they are used to make deliveries from stores or warehouses close by.
  - **Emergency rescue-** In the case of a capsized boat or drowning individual, officials can throw an Autonomous Underwater Vehicle (AUV) into the water to assist in the rescue. If there's an avalanche, drones are deployed to look for those caught in the snow.
  - **Agriculture-** Carrying out field surveys, seeding over fields, tracking livestock and estimating crop yield are all made easier through the use of UAVs.
  - **Wildlife and historical conservation-** Tracking wildlife populations is nearly impossible with humans on the ground. Having an eye-in-the-sky allows wildlife conservationists to track roaming groups of animals.
  - **Medicine-** Unmanned aerial vehicles are being used to deliver emergency medical supplies and cargo.

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