TARGET PRELIMS 2024
BOOKLET-52; ECONOMY-12

PRELIMS MASTERS PROGRAM
ECONOMY-18
INFRASTRUCTURE-2

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2. INLAND WATERWAYS

- **Inland Waterways Potential in India**
  - Inland water transport holds great untapped potential as a means for the transportation of goods and passengers. India has a large endowment of rivers, canals, and other waterways. The total navigable length of waterways in India is around 14,850 kilometres.

- **Need for improving and Inland waterways and ports.**
  i. **Contribution in trade:** Only 3.5% of trade in India is done through the mode of Inland waterways, which is 47% in China, 40% in Europe, 44% in Japan and Korea and 35% in Bangladesh.
  ii. **Fuel Efficient -> Cost Effective**
  iii. **Less Polluting**
  iv. **Economic growth and jobs**
  v. **Reducing Pressure on Road ->** less congestion
  vi. **Fewer accidents** - when compared to any other mode of transport.
  vii. **Less Land Acquisition Problems and Less Deforestation:** As land capital required in case of water transport is minimal when compared to road and rail transport.

1) INLAND WATERWAYS AUTHORITY OF INDIA ACT, 1985

- Empowers the government to declare waterways with potential for development of shipping and navigation as National Waterways and develop such waterways for efficient shipping and navigation.

- For development and regulation of inland waterways in the country the Inland Waterways Authority of India (IWAI) was set up in October 1986
  - » IWAI is the nodal agency under the Ministry of Shipping to make National Waterways commercially navigable. It aims to increase the cargo transportation through IWT.
  - » Currently, it is developing the National Waterways for commercial navigation, including with assistance from the World Bank.

- It is **headquartered** in **Noida** and have regional offices at Patna (Bihar), Kolkata (WB), Guwhati (Assam) and Kochi (Kerala) and sub offices at other places throughout India.

2) NATIONAL WATERWAYS ACT, 2016

- **Commenced in 2016**
- **Provisions**
  - » The act merged five erstwhile acts which had declared 5 National Waterways. It also proposed 106 additional National Waterways.
  - » The act has thus **declared 111 rivers or river stretches**, creeks, estuaries as National (inland) Waterways (including the five older ones)
  - » Now, according to entry 24 of the Union list of the seventh schedule, the union government can regulate these waterways for development with regard to shipping, navigation and transport through mechanically propelled vessels.
- **Other details**

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- These 111 waterways pass through 24 states and two UTs with an approximate length of 20274 km^2. These will pass through nearly 139 river systems, creeks, estuaries and related canal systems of India.
- Assam (17) and WB (16) will have the highest number of waterways.

3) OTHER STEPS TO PROMOTE NATIONAL WATERWAYS IN INDIA

i. Sagarmala Project

ii. Declaration of 106 new waterways as National Waterways (total 111) through an act in 2016.

iii. Implementation of **Jal Marg Vikas Project (JMVP)** to **augment capacity of NW-1** with the technical and financial support of the **WB**.

4) IMPORTANT NATIONAL WATERWAYS

1. **National Waterway - 1:** (Allahabad to Haldia - 1620 KM): Ganga - Bhagirathi-Hoogly River system
   - **States Served:** UP, Bihar, Jharkhand and WB.
2. **National Waterway - 2:** (Dhubri - Sadiya - 891 km): River Brahmaputra
   - **States Served:** Arunachal Pradesh, Assam, West Bengal, Meghalaya.
3. **National Waterway - 3:** West Coast Canal (Kottapuram-Kollam) along with Udyogmandal and Champakara Canals (205 km)
   - **States Served**: Kerala
4. **National Waterway-4**:

Kakinada-Puducherry canals along with Godavari and Krishna rivers (1078 km)

- **States Served**: AP, TN, UT of Puducherry

5. **National Waterway - 5:** East Coast Canal integrated with Brahamani river and Mahanadi delta rivers (588 kms)

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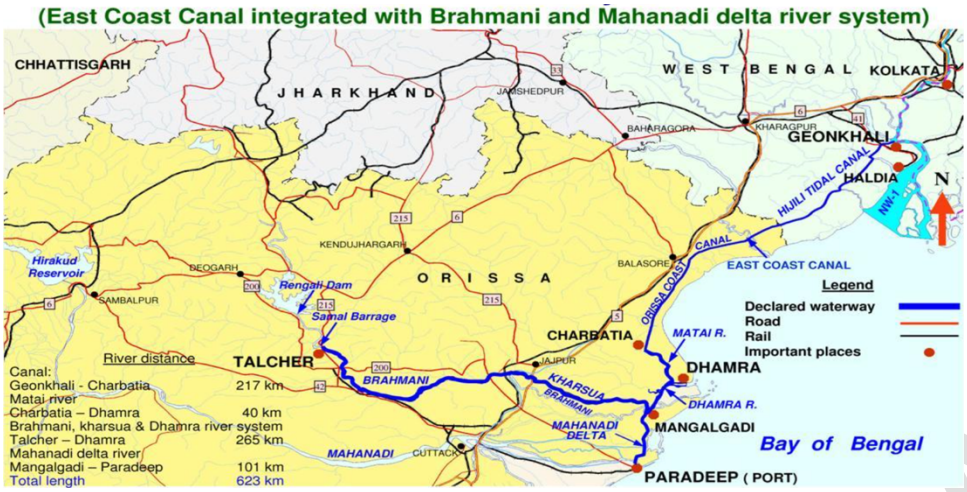
- 

6. **National Waterway - 16:** Between Lakhipur and Bhanga (121 km) of the **Barak River**.
   - **About Barak River**: It is the 2nd largest river in the NE region. It originates from South of Kohima in Nagaland near Nagaland-Manipur border. After traversing through Nagaland, Manipur, and Assam, it splits at Bhanga into two streams called Surma and Kushiyara. These two streams rejoin at Markuli in Bangladesh and thereafter the river is called **Meghna**. Barak-Meghna River System has a total length of 900 kms (origin to upstream Chandpur in Bangladesh). Out of this, 524 kms is in India, 31 km on Indo-Bangladesh border and the rest is in Bangladesh. Out of the portion in India, **only 121 kms stretch between Lakhipur and Bhanga** is navigable and has been declared as **NW-16** in the year 2016.
   - **State Served:** Assam, Mizoram, Tripura and Manipur

7. **NW-10 (river Amba, MHA), NW-68** (Mandovi river, Goa), NW-73 (river Narmada, Gujarat, and MHA), NW-83 (Rajpuri Creek, Maharashtra), **NW-85** (Revadanda Creek - Kundalika River system, MHA), **NW-91** (Shashtri River - Jaigad Creek system, MHA), **NW-97** (Sundarban waterways, West Bengal), **NW-100** (river Tapi, Gujarat and Maharashtra), and **NW-111** (Zuari River, Goa) also are operational in parts atleast.

5) KOCHI WATER METRO

- **Why in news?**
  - » Kochi Water Metro completes one year after being formally inaugurated in 2023 (April 2024)

- **Beginning**:
  - » In April 2023, PM Modi inaugurated the first phase of the Kochi Water Metro - a first of its kind **public boat service in India integrated with a metro rail network**.

- **Details**:
  - » The Kochi Water Metro is a project being implemented by **Kochi Metro Rail Corporation Limited** (KMRL) with assistance of a German funding agency, Kreditanstalt fur Wiederaufbau.
  - » It includes **boats** that are battery powered, air conditioned, and disabled friendly among other features. Thus, it operates like any traditional ferry, but with modern facilities, enhanced safety and security measures.
  - » **How is it linked to the metro rail?**
    - Envisaged as a feeder service of the Kochi metro rail, which has been operational since 2017.

    - These boats have been designed as coaches of Kochi Metro. Its boat terminals, passenger entry and exit gates, ticket counters and safety measures mirror the features of the metro rail service.
    - **All jetties** feature electronic display boards about boat services. Announcements are made in English, Hindi and Malayalam.
  - » **Routes and Terminals**: It will operate in backwaters of Kochi, connecting 10 nearby islands with mainland of Kochi, the commercial hub of Kerala.

- **Updates: 20 lakh commuters travelled in Kochi Water Metro in a year (April 2024)**
- **Updates: Kochi Water Metro considering hop on - hop off trips for tourists** (April 2024)
  - » Talks to be held with local bodies for launching the project; efforts on to usher in first-and last-mile connectivity from various ferry terminals.
- **Updates**: Even as the launch of the Kochi Metro is delayed by two years, **the electric ferry of the project has won the famed Gussies Electric Boat Award - 2022** in the **commercial ferry category**. (Nov 2022)
  - » Gussies Electric Boat Award were instituted in memory of **Gustave Trouve**, a French electrical engineer who had 75 patents.

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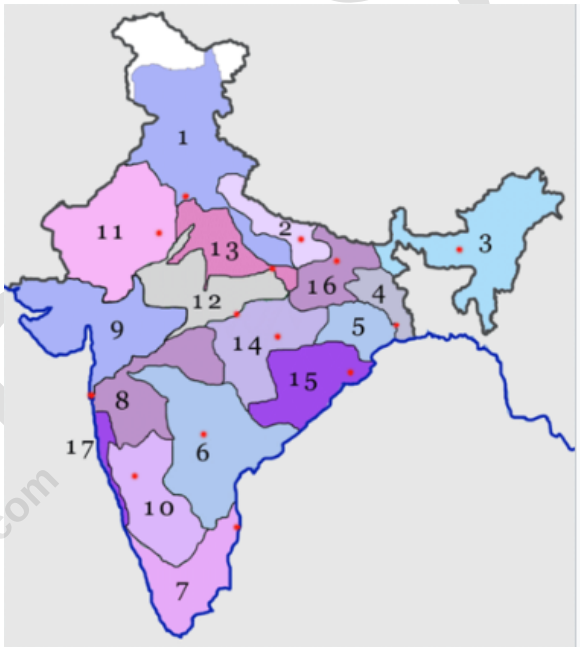
3. RAILWAYS

1) 17 ZONES OF INDIAN RAILWAYS (SOURCE: INDIA YEARBOOK)

Indian Railways is divided into **17 zone**s which are the basic operating Units of Railways. Each zone is further sub-divided into **divisions**, each having divisional headquarters. Each of the divisions is headed by a **Divisional Railway Manager** (DRM), who reports to the **General Manager (GM)** of the Zone.

The Zones and their headquarters are mentioned below:

Sl.No.	Zonal Railways	Headquarters
1.	**Central**	Mumbai
2.	**Eastern**	Sealdah (Kolkata)
3.	East Coast	Bhubaneshwar
4.	East Central	Hajipur
5.	**Northern**	Delhi
6.	North-Central	Allahabad
7.	North-Eastern	Gorakhpur
8.	Northeast Frontier	Maligaon (Guawahati)
9.	North Western	Jaipur
10.	**Southern**	Chennai
11.	South Central	Secundrabad
12.	South Eastern	Garden Reach (Kolkata)
13.	South East Central	Bilaspur
14.	South Western	Hubli
15.	**Western**	Churchgate, Mumbai
16.	West Central Railway	Jabalpur
17.	Metro Railway	Kolkata



Indian Railway Zones

- Other Sources also mentions another zone: **Konkan Railway** - **Navi Mumbai**

2) REVENUE PROBLEM OF INDIAN RAILWAYS

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- **Key Challenge**:
  - » **High Operating Ratio:** While the Indian Railway's capital expenditure has increased in the recent years, IR's **Operating Ratio**, which is the **ratio of ordinary working expenses to the gross traffic receipts,** has shown no improvement. A lower ratio implies better profitability and surplus for capital investment.
  - » **Trap of Rising Debt**: Lack of surplus, leads to the need of augmentation of funds from **Gross Budgetary Support (GBS)** and **Extra Budgetary Resources** (EBS). The EBS leads to the need of repayment of principal and interest.

- **But** it is **important to continue to invest in railways** as investment in railways boost manufacturing and services, tax revenue for government and allows for more job opportunities.

- **Where is the problem?**
  - » IR's **freight segment is profitable**, whereas the passenger segment is making huge losses.
    - For e.g. CAG report presented to Parliament in Aug 2023 states that there was a **loss of Rs 68,269 crores** in all the classes of passenger services during FY22, with all profit from freight traffic nullified in cross subsidizing passenger services.
  - » **Political Economy** makes it difficult to increase the passenger fares substantially. So, **increasing profits from freight traffic** by increasing freight volume is crucial.

- **Indian Railways Decreasing Share in Freight Traffic**:
  - » IR's modal share in India's freight traffic has steadily decreased from 80% at the time of independence to **27% currently**.
  - » **Why the decrease?**
    - **Competition from other modes**:
      - Improvement in roadways infrastructure, and successive price hikes in railways etc.
      - Pipelines and coastal shipping have also forayed into transportation of bulk items.
    - **Poor Performance in non-bulk freight transport**
      - For e.g. in parcel segment, the tariff is pretty high. After adding the first and last mile costs, the prices are higher than truck rates.
      - Other challenges are improper terminals, inconsistent weighbridges, unreliable transit times, complex booking and delivery mechanisms.
    - **Lack of Diversity**: 11 commodities in the IR's transport basket account for **90% of tonnage and revenue**, of which coal is around 45% and iron and cement 10% each.
    - **Slow average speeds** of freight trains of around 25 km/hour.
    - **Lack of participation of private players**: It should be noted that private container train operation policy, initiated in 2006 to boost the rail share of container movement, has not made any significant dent in improving the share.
  - » **Recent Steps taken**:
    - **Dedicated Freight Corridor** (DFCs)
    - **Gati Shakti Cargo Terminals**
    - **Focus on expanding freight basket** - by targeting more commodities (e.g. Kishan Rail)
    - Policy of "**Long term Tariff Contracts**" with major customers
    - Double Stack dwarf Container train under a wire - a new delivery model

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- **RO-RO Services** - to reduce road congestion and environmental improvement.

» **Note: Bulk Cargo vs General Cargo**

- General cargo includes goods typically transported in bags, boxes, crates, drums or barrels.
- **Bulk Cargo** consists of loose materials like grain, coal, or iron ore loaded directly into a ship's hold or train carriage, while general cargo ships in smaller units.

3) KEY INITIATIVES DISCUSSED IN RAILWAY SECTOR (ESI 2022-23)

Box XII.2: Major initiatives of the Indian Railways

✓ Mumbai-Ahmedabad High Speed Rail (MAHSR) Project: The MAHSR project, which was sanctioned by the government in 2015, with technical and financial cooperation from Government of Japan, is under execution and survey & design aspects of it have been finalised.

✓ Dedicated Freight Corridor (DFC) Project: One of the most ambitious and biggest ever infrastructure project in the railways, which comprises construction of two dedicated freight corridors, i.e., Eastern and Western DFCs along the golden quadrilateral, will offer higher transport output in the country with reduced transit time and cost.

✓ GatiShakti Multi-Modal Cargo Terminal (GCT): GCTs are being developed by private players on non-railway land as well as fully/ partially on railway land, based on demand from industry and potential of cargo traffic. 21 GCTs have been commissioned and more than 90 more locations have been provisionally identified for development of GCTs (as of 31 October 2022). This will boost investment from industry in the development of additional terminals for handling rail cargos.

✓ Induction of semi-high-speed Vande Bharat Trainsets: Semi High-Speed Self-Propelled Vande Bharat Trainsets were manufactured by Integral Coach Factory, Chennai, with indigenous efforts. These trains have ultra-modern features like quick acceleration, substantial reduction in travel time, having maximum speed of 160 kmph, on-board infotainment and Global Positioning System (GPS) based passenger information system, etc.

✓ Electrical/Electronic Interlocking System: envisages centralized operation of points and signals to enhance safety in train operations. These systems have been provided at 6,322 stations covering 99 per cent stations of Indian Railways (as of 30 September 2022).

✓ Development of Hyperloop technology: Hyperloop is an emerging transportation technology that can be faster and greener than airplanes and railways. In this system, vehicles run in the levitating state (with the help of Linear Induction Motors/Electromagnets) and in vacuum environment. The technology is still in the development phase. Indian Railways intends to develop a demonstrative project on Hyperloop Technology. Indian Railways has collaborated with IIT Madras for developing Hyperloop Technology by setting up Centre of Excellence for Hyperloop Technology at IIT Madras at the cost of ₹8.34 crore.

✓ Kisan Rail trains were introduced in FY21 to enable speedy movement of perishables from production or surplus regions to consumption or deficient regions. Up to 31 October 2022, Indian Railways have operated 2,359 Kisan Rail services, transporting approximately 7.91 lakh tonnes of perishables including fruits and vegetables.

4) NATIONAL RAIL PLAN VISION-2030

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- Indian railways have prepared a National Rail Plan (NRP) for India - 2030.
- The plans are to create **future ready** Railway system by 2030.
- The NRP is aimed to formulate strategies based on both **operational capacities and commercial policy initiatives** to increase **modal share of the Railways in freight to 45%** (at present it is around 27%) and to sustain it.
- **Other aspects:**
  - **Reduce transit time of freight** substantially by **increasing average speed of freight trains to 50Kmph**.
  - As part of the National Rail Plan, **Vision 2024 has been launched** for accelerated implementation of certain critical projects by 2024 such as: 100% electrification, multi-tracking of congested routes, upgradation of speed to 160 kmph on Delhi-Howrah and Delhi-Mumbai routes, upgradation of speed to 130kmph on all other Golden Quadrilateral-Golden Diagonal (GQ/GD) routes and elimination of all Level Crossings on all GQ/GD route.
  - Identify new Dedicated Freight Corridors and new High Speed Rail Corridors.
  - Assess rolling stock requirement for passenger traffic as well as wagon requirement for freight.
  - Assess Locomotive requirement to meet twin objectives of 100% electrification (Green Energy) and increasing freight modal share.
  - **Assess the total investment in capital** that would be required along with a periodical break up.
  - Sustained involvement of the Private Sector in areas like operations and ownership of rolling stock, development of freight and passenger terminals, development/operations of track infrastructure etc.

5) RESTRUCTURING OF RAILWAYS

- **Earlier Situation:**
  - The **Railway Board** is the Indian Railway's apex decision making body.
    - It was constituted in 1905 to assist Ministry of Railways in key administrative and executive work of Railways.
    - It consisted of a **chairman** and **seven members** from **different service departments** such as Finance, traffic, civil, mechanical, electrical and signal & telecom.
    - The department heads were generally secretary level officers and are a member of the Railway Board.
    - These **departments were vertically separated from top to bottom** and worked in Silos.

- **The Management and Administrative arm** of the organization was staffed by officers belonging to **8 Group A Services of IR** that include Indian Railway Traffic Service (IRTS), Indian Railway Account Services (IRAS), Indian Railway Personal Service (IRPS), Indian Railway Service of Engineers (IRSE), Indian Railway Service of Mechanical Engineers, Indian Railway Service of Signal Engineers, and Indian Railway Service of Electrical Engineers. (3 civil and 5 engineering services)
- **Key Problems**
  - **Over-departmentalization** has led to work taking place in Silos
    - According to **Bibek Debroy Committee**, this over departmentalization manifests itself it in the form of **unhealthy competition** and lack of team work and cohesion.

  - **Various committees over the years -** Prakash Tandon Committee (1994), Rakesh Mohan Committee (2001), Sam Pitroda Committee (2012) and Bibek Debroy Committee (2015) has suggested **unification of services,** but the railway ministry hadn't acted on it till 2019.

» **In 2019, Union Cabinet approved restructuring of Indian Railways** with the following components:
    - **Reorganization of the Railway Board**
        - Reduction in number of **members** of the board to **5** (a chairperson, who will act as CEO and **four members** responsible for infrastructure, operations & business development, rolling stock, and finance).
    - **Unification of existing 8 group A service** into single service**: The Indian Railway Management Service** (IRMS)
        - In Feb 2022, the Union government officially issued a gazette notification about the proposed merger of existing eight services of Indian Railways, which fall under the Central Civil Services.
    - **Post of General Managers** working at zonal level will be upgraded **to secretary** level.
        - **Indian Railway Medical Services (IRMS)** to be renamed to **Indian Railway Health Services** (IRHS)
» **Advantages:** Ending Departmentalism, create coherent vision for organization, promotes faster decision making, Recruit engineers/non-engineers as per need, bring decision making as per market realities, infuse fresh thinking etc.

6) DEDICATED FREIGHT CORRIDORS (DFC)

- **Why in news?**
    - India Railways has operationalized 90% of its DFCs, covering a distance of 2,800 kms. Utilizing the advantages of this freight focused infrastructure, India intends to build more DFCs connecting important cities. (April 2024)
- **About DFCs:**
    - **Dedicated Freight Corridors** (DFCs) are high speed and high-capacity railway corridors that are **exclusively meant for the transportation of freight or goods commodities**.
    - India's Ministry of Railways has undertaken the construction of **two DFCs namely:**
        i. **Eastern Dedicated Freight Corridor**:
            » 1,840 kms (between Ludhiana (Punjab) to Sonnagar (Near Kolkata, WB)). It will also include PPP section of the Sonnagar-Dankuni route.
            » It will run through Delhi.
            » States covered include Punjab, Haryana, Uttar Pradesh, Jharkhand, Bihar and West Bengal.
        ii. **Western Dedicated Freight Corridor** (between **Dadri (Uttar Pradesh**) and **Mumbai** (Jawaharlal Nehru Port Terminal (JNPT)).
            » **1,506 kms**
            » **States covered: UP, Haryana, RAJ, Gujarat, and MHA.**
    - The DFCs are being developed by **Dedicated Freight Corridor Corporation of India Ltd** (DFCCIL).
    - The Funding for DFC is through **World Bank (US$ 2.725 billion) for EDFC**, and **Japan International Cooperation Agency (JICA) loan (38,722) for WDFC** and rest from the Gross Budgetary Support (GBS).
- **Expected Impact**
    - Reduce travel time on the two routes for both passengers and goods.

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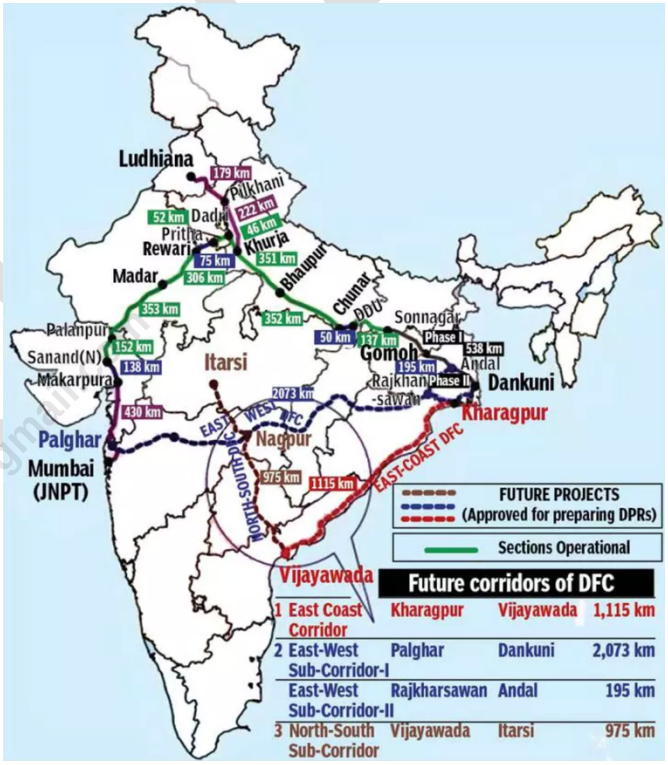
- DFCCIL will run freight trains at the **maximum speed** of 100 kmph as against the current maximum speed of 75 kmph on Indian Railway tracks whereas the **average speed** of freight trains will also be increased from existing speed of 26 kmph on Indian Railway lines to 70 kmph on DFC.

- Benefit industries; Reduce pollution

- **Progress**:
  - As of April 2024, India Railways have operationalized **100% of the eastern arm** and **85% of the western one**.
  - **Average speed** of the trains is around 50-60 kmph (and can be increased upto 100 km per hour)
  - **Estimated** cost of operationalizing the network currently stand at Rs 1,24,000 crores.

A) 3 MORE DEDICATED FREIGHT CORRIDORS, INCLUDING COMMODITY SPECIFIC ROUTES, ARE BEING CONSIDERED AS PART OF THE INDIAN RAILWAYS' PLAN (APRIL 2024)

- **The three corridors together** will cover a length of 4,300 kms with an estimated project cost of Rs **2 lakh crores**.
- **Progress**:
  - **All three network alignment reports** are being prepared by the Dedicated Freight Corridor Corporation of India Ltd (DFCCIL). While two of the DPRs have been submitted, a third will be ready by the end of this month.
    - **East Coast Track**: The proposed corridor is along the east coast running parallel to the existing coastal passenger rail line and covers approximately 1,200 kms starting at Kharagpur (WB) and terminating in Tenali (in Andhra Pradesh). The route passes through mineral bearing states of Bengal and Odisha, connecting the Vizag route. The target sector includes coal, fertilizers, and iron-ore movement apart from commodities like steel.



    - » **North South Corridor**: It covers **Itarsi** (in Madhya Pradesh) to **Tenali** (Andhra Pradesh) a distance of around 1,000-1200 kms. It will pass through Itarsi, Nagpur, Vijayawada and end at Tenali. It will pass through four states, MP, MHA, Telangana and Andhra Pradesh. Traffic would cover coal, cement, fertilizers, petroleum, lubricants etc. The long term plan would be to connect Dadri in UP with Itarshi. This will allow connecting the existing and operational DFCs with the upcoming ones.
    - » **The third corridor** - still under preparation- covers the East West Route connecting Andal (WB) with Palgarh (MHA). This route passes through five states which include **WB, Jharkhand, Odisha, Chhattisgarh, and Maharashtra**. The main line will cover close to 2,100 km and there will be spur lines with additional 300 kms.

7) GATI SHAKTI CARGO TERMINALS

- The Ministry of Railways has launched a new policy for developing **Gati Shakti Cargo Terminals (GCTs)**, which are **multimodal logistics facilities** that can **handle rail cargo along with other modes** such as road or water transform.
    - » It will provide **seamless integration** of rail transport with other modes of transport and enable customers to choose their preferred mode based on cost effectiveness and convenience.

- GCTs are being developed by **private players** with minimal intervention from the government.
- As of **Dec 2023**, 15 GCTs have been commissioned and around 96 more locations have been provisionally identified.
- It will provide **seamless integration** of rail transport with other modes of transport and enable customers to choose their preferred mode based on cost effectiveness and convenience.
- This will reduce congestion at railway stations and improve passenger amenities.

8) OTHER MAJOR RAILWAY INFRA NEWS

A) AMRIT BHARAT STATION SCHEME FOR INDIAN RAILWAYS

- Ministry of Railways have formulated a new policy for modernization of stations named "**Amrit Bharat Station"** scheme. It envisages development of stations on a continuous basis with a long-term vision. It is based on **Master Planning** for long term and implementation of the elements of Master Plan as per the needs and patronage of the station.

B) CABINET APPROVES SPECTRUM FOR RAILWAYS (FEB 2024)

- The Railways had sought 5 MHz of wireless spectrum for sending real-time data from trains, which would enhance passenger safety.
    - » TRAI had floated a consultation paper on whether the transporter should be able to get - largely free of cost.
- **But Union Cabinet in a surprise move** approved the proposal, even though TRAI's response was pending.

C) CHENAB BRIDGE

Indian railways is constructing the **iconic Arch Bridge on River Chenab** as part of the **Udhampur-Srinagar-Baramulla Railway Link (USBRL)** project to **connect the Kashmir valley to the rest of the nation**.
It is **located** between Bakkal and Kauri in the Reasi district of Jammu Division of J&K, India.

It will be the world's highest railway bridge that soars **359 meters above the bed** of the Chenab river in J&K.

- The bridge is 35 meter higher than the Eiffel Tower in Paris.

The 1.315 km long bridge is being constructed at a cost of Rs 1486 crore.

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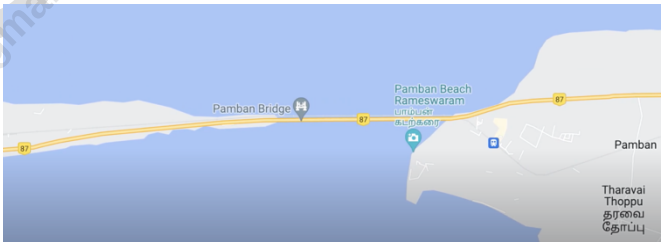
In April 2021, Indian **railways completed the arch closure of Chenab Bridge**. The Arch is the most difficult part of the bridge. It stands only with the support from the two embankments and without any intermediate pier. ▪ **No pier** could be used as the river is 359 meters below and no pier could possibly come at a height like that. ▪ Arch consists of steel boxes, which will be filled with concrete to improve stability. The bridge is expected to be **open for rail traffic in 2024**.	

- **Other key features of the Bridge**
  - » The Bridge is designed to withstand high wind speed upto 266 km/hour.
  - » The bridge is also designed for blast load in consultation with DRDO for the first time in India.
  - » It can also withstand earthquake forces of highest intensity Zone-5 in India.

- **Note:** While the Chenab bridge project is being touted as the World's highest rail bridge by India, it may lose the title to **neighbouring China**, which is constructing the **Daduhe railway bridge** in Ludig along the **Sichuan-Tibet** Railway at a height of 380 meters.

D) PAMBAN BRIDGE – INDIA'S FIRST VERTICAL LIFT RAILWAY BRIDGE

- **Why in news?**
  - » New Pamban Bridge may miss its Nov 2023 deadline (Sep 2023)
- **Details**
  - » **Background:** The existing Pamban Rail Bridge, which connects Rameswaram to mainland India is more than a 100 years old. It was built in 1914 and connects **Mandapam** to the **Rameshwaram Island**. Till 1988, it was the only link connecting the two locations when a new road bridge was built parallel to the sea link.



- **New Railway Bridge:**
  - » The state-of-the-art bridge will be country's first vertical lift railway sea bridge.
    - ▪ The bridge is **stretches for 2.05 km** and will have a **63 meter stretch which will lift up while remaining parallel to the deck to allow access to the ships**.
  - » It will help railways to operate trains at higher speed and will carry more weight and increase the volume of traffic.
  - » It is being executed by **Rail Vikas Nigam Limited** (RVNL) at a cost of Rs 535 crores.

- **Missing Deadlines** (Sep 2023)
  - » Its initial deadline was March 2023, which was then extended to July 2023 and then to Nov 2023. However, in Sep 2023, due to increased wind speed at the project site the work has been hampered.
  - » As of Dec 2022, 84% work has been completed.

- **Video:**
  - » See video in the link: https://www.thehindu.com/news/national/tamil-nadu/watch-pamban-bridge-indias-first-vertical-lift-railway-bridge/article65487414.ece to get better understanding.

9) REGIONAL RAPID TRANSIT SYSTEM (RRTS) PROJECT AND NAMO BHARAT RAPIDX TRAIN

- **Why in news?**
  - » PM Modi inaugurated the priority section of Delhi-Ghaziabad-Meerut RRTS Corridor at Sahibabad RapidX station in Ghaziabad, Uttar Pradesh (Oct 2023)

- **Background:**
  - » **Need:** Increasing traffic, congestion, pollution, accidents in Delhi NCR.
  - » In 2005, the **Planning Commission** formed a task force under the chairmanship of Secretary, Ministry of Urban Development to develop a **multi-modal regional transit system for the NCR**.
  - » **The Integrated Transport Plan for NCR** 2032 also includes RRTS connecting regional centres.
  - » **In July 2013**, a joint venture (JV) of GoI, and the States of Haryana, Rajasthan, Uttar Pradesh, and Delhi was formed - **National Capital Region Transport Corporation (NCRTC)**.

- **The Delhi-Meerut RRTS** is a partially operational **82.15 km** long semi-high speed rail and regional transit corridor that will connect NCR cities of Delhi, Ghaziabad, and Meerut.
  - » **It is the first of the four rapid rail corridors** planned under the first phase of the RapidX project managed by the NCRTC.
  - » It allows a max speed of 180 km/h and distance between Delhi and Meerut will be covered in less than 1 hour.
  - » The **foundation stone** for the project was laid by PM Modi in March 2019, and construction began in June 2019.
  - » **Current Scenario**:
    - As of March 2024, corridor from **Sahibabad** to **Modinagar Depot** was operational.
    - **Rest of the entire 81 km** long corridor will be opened by June 2025.
  - » **Who owns the Corridor?**
    - The owner of the corridor and its trains is the **NCRTC**, under who the construction is also underway.
    - **The operator** of the corridor is **DB RRTS Operations** India Pvt Ltd a subsidiary of **Deutsche Bahn (DB)**.
  - » Upon opening, the RRTS became the first regional transit system of India, also consisting the fastest rapid transit train in India.

- **Namo Bharat RapidX Train**:
  - » Trains of the RRTS will be known as 'Namo Bharat RapidX'
  - » These trains are indigenously manufactured with a designed speed potential of 180 kmph and operational speed potential of 160 kmph. They are fully air-conditioned, safe and comfortable.
  - » Every Namo Bharat RapidX Train will have six coaches, including a premium coach. One coach in every train is reserved for women.

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10) RAILWAY SAFETY

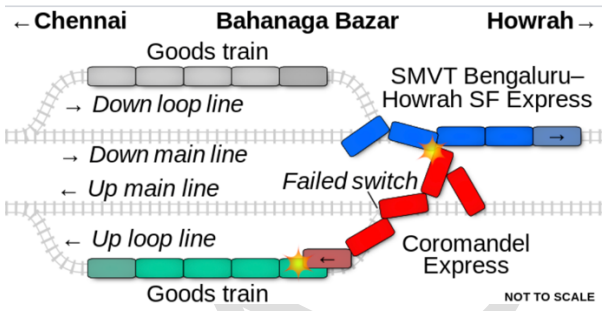
A) ODISHA ACCIDENT

On 2nd June 2023, three trains collided in Balasore district in Odisha state. The Coromandel Express entered the passing loop instead of the main line near Bahanaga Bazar Railway Station at full speed and collided with a goods train. Due to its high speed, its 21 coaches derailed and three of those collided with the oncoming **SMVT Bengaluru-Howrah Superfast Express** on the adjacent track.

A total of 296 people were killed, and more than 12,00 others were injured in the accident.

It was the **deadliest railway crash** since the Firozabad rail collision in 1995. It was also the **deadliest rail disaster worldwide** since the 2004 Sri Lanka Tsunami train wreck.

Main Reason: Signaling Failure



B) WHY COROMANDEL EXPRESS CRASHED: UNDERSTANDING THE BASICS OF RAILWAYS SIGNALING SYSTEM

- **Interference with the "Configuration" of the track** led to the Coromandel Express to smash into the stationary goods train.

- **Understanding the Interlocking in Railways:**
  - » **Interlocking** is a crucial safety mechanism that ensures train movements continue without any conflicts, thus preventing accidents. There are **three main components** of the inter-locking system: **point**, **track occupancy sensing devices**, and **signal**. The interlocking system coordinates the functions of these three components to control train movements.

- **What is the function of each of these three main components?**
  - » **Signals** (which are lights of green, red, and yellow color) are installed along the track to indicate the status of the track ahead.
  - » **Track Circuits and Electrical Circuits** (also known as the track-occupancy sensing devices) that detect the presence of trains.
    - There are various kinds of track-occupancy devices. Generally, sensors are installed on the tacks that detect the passage of wheels on the rails. These are called axle counters.
  - » **Points** allow trains to change tracks.
    - The Coromandel was supposed to go through Bahanagar Bazar on the 'Up' main line, but the point just before the station switched the express on the loop line that was already occupied by the stationary goods train.
    - How does the points work?

- The Points, also known as **Switch Rails**, are movable rails that are typically placed at the point of divergence of two tracks going to different directions. Once the direction of a train is determined, the **point gets locked to a particular position**, and cannot be budged until the train has passed. The driver, or loco pilot, has no say in this matter.

- **How is the whole system configured?**
  - » A **sound logic of what is 'safe' train operation is fed** into interlocking system, which is controlled remotely from the station.
    - Earlier, some of the components also worked manually.
  - » **Today**, out of the 7,000-odd stations in the Indian Railway network, only around 100 small stations still have manual levers to control these points. The **rest operate electronically**, even though the basic principles of the logic are taken from the old and time-tested standard procedure for safety.

- **How safe is the system?**
  - » If any of the three components (signals, points, and track occupancy sensors) doesn't correspond to the overall 'safe' logic fed into the computer, the system will work to stop the oncoming train. This means **if the point is not locked**, or not set to the desired direction, and/or if the sensing device detects that the track is not clear the **signal will automatically turn red** - indicating to the oncoming train that something is wrong and that it should stop. This is called a **"fail safe"** system - one that errs on the side of the safety.

- **This interlocking system** is used in railway networks worldwide.

- **How are these systems secured against interference?**
  - » **The relay room** - which is the place from where the entire interlocking/ signaling apparatus can be controlled or manipulated - is locked with **double locks**. **One key** is with the station master; the other is in the custody of the signaling staff. To open the relay room, even for maintenance, station master's permission is required. With improved technology, opening and closing of relay rooms were connected electronically to the **data loggers**. Every event is registered on a server, and an SMS is also triggered to officials concerned.
- **What happened in Balasore accident?**
  - » As it now appears, a signal maintainer or technician of the signaling department at the Bahanaga Bazar station **did open one of the location boxes at the station to "loop" the circuit and achieve a "clear path"** (or a green signal) for the Coromandel Express.
    - **Note:** Location boxes are the junctions of cables from various hardwares meeting circuits to work in the pre-set safety logic.
  - » This **Safety override** is usually unauthorized.

C) COMMISSIONER OF RAILWAY SAFETY (CRS)

- Investigation into the recent tragic train accident in Odisha, is being conducted by the Commissioner of Railway Safety for the south-eastern circle.
- **Rail Safety Commissioners** are part of the Commission of Railway Safety (CRS), a government body that **acts as the railway safety authority in the country**.

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- CRS deals with matters related to safety of rail travel and operations, among some other statutory functions - inspectorial, investigatory, and advisory - as laid down in the Railways Act, 1989.
- Investigating Railway Accidents is one of the key responsibilities of the CRS.
- It is headquartered in Lucknow.

- It is to be noted that **CRS doesn't report to Ministry of Railways**. It is under the administrative control of the **Ministry of Civil Aviation (MoCA)**.
  - **Why?**
    - » To keep CRS insulated from the country's railway establishment and **prevents conflict of interest**.
- It was in May 1941, that the Railway Inspectorate was separated from the Railway Board and put under the administrative control of the then Department of Post and Air. This inspectorate was redesignated as the CRS in 1961.

11) IMPORTANT STEPS IN RECENT DECADES TO ENSURE RAILWAY SAFETY

i. **Anil Kakodkar Committee: High Level Safety Review** Committee was formed by Ministry of Railways in 2011 and it submitted its report in Feb 2012. It recommended modernization of tracks; elimination of level crossings by building rail over and under bridges; strengthening Railway Bridges; 100% mechanized track maintenance etc.

ii. **Rashtriya Rail Sanraksha Kosh** (RRSK) was created with a corpus of Rs 1 lakh crore over a period of 5 years for giving a major boost to safety related works.

iii. **Induction of technology for safety improvements – Smart Coach**
- » Smart coach with diagnostic system monitor bearing vibrations provides advance information on health of bearing wheel & track. In addition, coach has been provided with wheel slip protection monitoring.

iv. **Complete switchover to LHB**: Indian Railways have decided to completely switch over to manufacture of LHB design main line coaches from 2018-19 onwards.
- » **Linke-Hofmann-Busch** (LHB) coach is a passenger coach of Indian Railways. It is developed by Linke-Hofmann-Busch of Germany and produced by rail coach manufacturing units at **Kapurthala, Chennai and Raibareli**. They have been used since 2000 on the broad gauge network of Indian railways.

v. **Other steps include**
- » **Elimination of level crossings**
- » Number of **stations with the installation of CCTV based camera surveillance** have increased.
- » **Indian Railway Institute of Disaster Management** have been opened up in Bangalore for training of officers and staff.
- » **Commandos for Railway Security** - Launch of first Railway Commando battalion '**CORAS'** on 14th Aug 2019 to tackle the menace of terrorism and Naxalism.
- » **Empowerment of RPF** to make seizure under Narcotics, Drugs and Psychotropic Substances (NDPS) Act
  - GoI through a notification in April 2019, empowered RPF to make seizures and arrest under NDPS act.
  - Subsequently, RPF have recovered large number of such recoveries.

vi. **Provision of Electronic Interlocking (EI):** To increase safety and flexibility EI is being adopted on large scale to derive benefits of digital technologies in train operation and enhance safety.

vii. **KAVACH Technology (Automatic Train Protection System)**

» **KAVACH** has been developed indigenously by RDSO in association with three Indian vendors and it has been adopted as our **National Automatic Train Protection (ATP)** System.

▫ It will aid Loco Pilot to avoid Signal Passing At Danger (SPAD) and over speeding but also help in train running during inclement weather such as dense fog.

» **Key features:**

▫ Controls speed of the train by automatic application of brakes in case Loco Pilot fails to apply the brakes

▫ Repeats line-side signal in cab which is very useful for higher speeds and foggy weather

▫ Works on principle of continuous update of Movement authority

▫ Auto Whistling at LC gates

▫ **Collision avoidance** by direct to loco communication

▫ **Supports** feature of SOS in case of any mishap to control train in vicinity.

» **Total Expenditure** incurred so far on development work of Kavach is Rs 16.88 crores.

» At present (March 2022) Kavach roll out is planned on New-Delhi Howrah and New Delhi - Mumbai Section which is targeted for completion by March 2024. Further rollout will be planned based on experience gained.

4. URBAN DEVELOPMENT

1) SMART CITIES MISSION (SCM)

- Government of India launched **Smart Cities Mission (SCM) on 25 June 2015**.
  - It **aims** to transform 100 cities by 2019-20.
    - » The mission has been given two extensions with the new deadlines being 30th June 2024.
  - The SCM has **two main aspects**:
    - » **Area Based Development** consisting of three components: Redevelopment (city renewal), retrofitting (city improvement), and green field projects (city extension)
    - » **Pan city Solutions based on ICT**.
  - It is based on the idea of developing the entire urban eco-system on the principles of complete and integrated planning.
  - The **main objective** of the Smart Cities Mission (SCM) is to promote cities that provide **core infrastructure, clean and sustainable environment** and give a decent quality of life to their citizens through application of 'Smart solutions'.
  - It also **aims** to drive economic growth and improve quality of life through comprehensive work on social, economic, physical, and institutional pillars of the city.
  - The plan is also to create a **replicable model** which will act like a light house to other aspiring cities.

- **What was the initial plan?**
  - **100 smart cities** were selected through 4 rounds of competition between Jan 2016 and June 2018.
  - **Funding**:
    - **Around 2 lakh crores** (coming from Center, States, ULBs and PPPs) was kept aside for the mission.

- **Implementation and Monitoring Mechanisms:**
    - The **implementation of the SCM** at the city level is done by **SPV** created for the purpose.
        - » The SPV brings in a business model of governance. It was adopted by bypassing the existing models of city governance in the country.
        - » This SPV is led by a bureaucrat or a representative of an MNC, and other major stakeholders. It was created under the Companies Act.
        - » The SPV plans, appraises, approves, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects.
        - » The SPV is headed by a full time CEO, and has nominees of Central Government, State governments and ULB on its Board.
    - At the **state level**, the mission implementation is coordinated by the **State Level High Powered Steering Committee (HPSC)** chaired by Chief Secretary of the State.
    - At the **national level**, implementation of SCM is monitored by an **Apex Committee headed by Secretary**, MoHUA.
        - The apex committee regularly reports on the progress of projects through the **Real Time Geographical Management Information System (GMIS)**.
    - **A Smart City Advisory Forum (SCAF)** has also been established at the city level to advise and enable collaboration among various stakeholders.
        - As of May 2023, the Smart Cities have convened more than 756 meetings of SCAF.
    - **Integrated Command and Control Centres (ICCC)** is operational in all 100 Smart Cities**.**
        - These ICCCs work as the **brain and nervous system for the city operations,** using technology for urban management.

- **Note:** The period of implementation of SCM has also been extended upto **June 2024** and all remaining projects are expected to be completed by this time.

- **Progress:**
    - » The mission has around **78,00 projects worth Rs 1.8 lakh crores**. As of July 2023, around 74% of the projects were completed.
    - » As of 1st May 2023, Rs 38,400 crores were released under the Smart Cities Mission, of which **around 90% (**Rs 35,261) crores have been utilized.
    - » **Only 22 cities out of 100 cities** have been able to finish all projects commissioned under the mission.

A) LABELLING STRATEGY OF SCM

- **The 100 Cities** part of SCM are marking their completed projects with **logos**, in a strategy aimed at displaying the accomplishment so far.
    - » In June 2023, a letter to the Smart City CEOs asked for the implementation of the "**labelling strategy"**.
        - To form a "link to build trust with the community".
        - This would act as a method for creating awareness and providing information to the stakeholders of the projects.

B) SMART CITIES AWARD, 2022 (ANNOUNCED IN AUG 2023)

- The MoH&UA has named **Indore** as the best city, and **Madhya Pradesh** the best state in the Smart Cities Mission in its **India Smart Cities Awards 2022**.
  - » **Surat and Agra** were named second and third best among the cities and **TN** second in states, with the third prize being shared by **Rajasthan and Uttar Pradesh**.
- **How were the winners chosen?**
  - » Based on their ranking in terms of progress of projects, project outcomes, and presentations submitted for the awards.

2) AMRUT (ATAL MISSION FOR REJUVENATION AND URBAN TRANSFORMATION) AND AMRUT 2.0

» Launched on 25th June 2015 to complement the Smart Cities Mission. It targeted **covering 500 cities** with a population of 1 lakh and more.

» It focused on **development of basic infrastructure** in the sectors of water supply; sewerage and septage management; storm water drainage; non-motorized transport; and development of green spaces and parks.
» Mission also mandated a set of 11 Reforms for all the Mission cities and Capacity building activities for the ULBs.

» **Ministry:** Ministry of Housing and Urban Affairs
» It is a **Centrally sponsored scheme** being funded through Central and State/ULB share.

A) AMRUT 2.0

- The Union Cabinet has approved the **AMRUT 2.0 for the period FY2021-22 to 2025-26,** as a step towards Aatma Nirbhar Bharat and with an aim of making the cities 'water secure' and 'self-sustainable' through **circular economy of water**.
  - » AMRUT Mission has been subsumed under AMRUT 2.0 and ongoing projects of AMRUT 1.0 will be funded till 31st March 2023.
- It targets to provide 2.68 crore tap connections and 2.64 crore sewer/septage connections to achieve the below outcomes:
  - » **Universal coverage of water supply** by providing household tap connections in all **4,378 statutory towns**.
  - » **100% coverage of household sewerage/septage management** in **500 AMRUT cities**.
- **Total indicative outlay** for AMRUT 2.0 is Rs 2,77,000 crore including central share of Rs 76,760 crore for five years from **FY 2021-22 to FY 2025-26**.
  - » Ministry of Housing and Urban Affairs has approved State Annual Action Plans (SAAPs) of all States/Uts amounting to Rs 77,640 crores of the entire mission period.

- **Monitoring Provisions:**
  - » The mission will be monitored on a robust technology portal and the projects will be geo-tagged.

- **Other features:**
  - » Endeavour to make mission paperless

» It promotes **Circular Economy** of water through development of **City Water Balance Plan** (CWBP) for each city focusing on recycle/reuse of treated sewage, rejuvenation of water bodies and water conservation.

- **Other Components of AMRUT 2.0:**
  - » **Pey Jal Survekshan**: To ascertain equitable distribution of water, reuse of wastewater, mapping of water bodies and promote healthy competition among the cities/towns.
  - » **Technology Sub Mission for Water** to leverage latest global technologies in the field of water.
  - » **Information, Education, and Communication (IEC)** campaign to spread awareness among masses about conservation of water.

- **The total outlay** for AMRUT 2.0 is **Rs 2,99,000 crore** including central share of Rs 76,760 crore for five years.
  - » This outlay includes Rs 22,000 crore (Rs 10,000 crores as central assistance) for projects of AMRUT till March 2023.
  - » The **fund** for the projects is shared by Centre, State and ULBs. **Central funds** is released to the states in three tranches based on the allocation to the states as per the State Water Action Plan.
  - » Mission will also **mobilize market finance** for mandating implementation of 10% worth of projects in cities with population above 10 lakhs through **Public Private Participations**.

- Entrepreneurs/start-ups will be encouraged in water ecosystems.
- The mission has a **reform agenda** focused towards financial health and water security of ULBs.
  - » Meeting 20% of water demand through recycled water, reducing non-revenue water to less than 20% and rejuvenation of water bodies are major water related reforms.
  - » Reforms on property tax, user charges, and enhancing credit worthiness of ULBs are other important reforms. ULBs will be rewarded with incentive on accomplishing the reforms.

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