India’s Infrastructure Challenge

For Prelims: National Highways, Regional Connectivity Scheme (RCS) – UDAN, Galathea Bay Mega Port, India-Middle East-Europe Economic Corridor, Delhi-Meerut RRTS Corridor, Parvatmala Pariyojana, Blockchain, PM Gati Shakti, Municipal Bonds, InvITs, Green Bonds.

For Mains: Status of infrastructure in India and challenges associated with it, Steps needed to improve and strengthen infrastructure development.

Source: TH

Why in News?

The **collapse** of the **Mahisagar River Bridge** in **Vadodara** due to **structural failure**, killing **20 people**, highlights growing concerns over **infrastructure** **quality** amid **similar incidents** nationwide.

Similar Instances of India’s Poor Infrastructure

- **Gujarat:** The **2022 Morbi suspension bridge collapse** claimed **135 lives**.
- **Maharashtra:** The **Palava Bridge** on **Kalyan-Shil Road** was **closed within two hours** of opening due to **structural defects**, while the **Pune Pedestrian Bridge** over the **Indrayani River collapsed under tourist weight.**
- **Assam:** The **Harang Bridge collapsed** (**June 2025)** after **two overloaded trucks** crossed during **heavy rain**, cutting off **Barak Valley** from **Tripura**, **Mizoram**, and **Manipur**.
- **Madhya Pradesh:** The **Aishbagh rail overbridge** in **Bhopal**, featuring a **hazardous 90-degree turn**, triggered **public outrage**.
- **Bihar:** In **2024**, at least **12 bridges collapsed within 20 days**. In **2025**, the **collapse of Munger’s Bichli Pul** over the **Gandak River isolated 80,000 residents**.

What are the Reasons Behind India’s Poor Infrastructure?

- **Corruption & Substandard Materials: Contractor mafia and kickbacks** (reward for awarding the deal) allow **politically linked firms** to use **poor-quality materials** for **higher profits**.
    - **Ghost projects and fund misuse**, especially in **Bihar**, cause **weak structures**, like Purnea’s **illegal ghost bridge** built for a **land scam**.
- **Poor Maintenance & Overloading: Neglect of old bridges**, like those in **Morbi** and over the **Indrayani River**, led to collapse due to **lack of inspection and reinforcement**.
    - **Overloading**, as seen in **Assam’s Harang Bridge**, causes failures when **traffic rules are ignored** and **heavy vehicles go unchecked**.
- **Engineering Flaws**: **Poor planning**, seen in **Bhopal’s Aishbagh rail overbridge** and **Indore’s under-construction bridge**, results in **unsafe infrastructure**.

    - **Lack of expert oversight** and **technical review** leads to **structural flaws** in many projects.
- **Lack of Accountability: Poor accountability** follows disasters like **Morbi** and **Mahisagar**, with **officials and contractors rarely punished**.
    - **Lax safety regulations** and the **absence of strict bridge audits** let **unsafe structures** remain in use.
- **Climate & Environmental Factors:** In **Assam** and **Bihar**, **floods and river erosion** weaken bridge foundations, yet **preventive action is lacking**.
    - **Unplanned urbanization** in cities like **Mumbai** and **Pune** leads to **stressed infrastructure.**
- **Political Interference: Rushed inaugurations** of **incomplete projects** (like the **Palava Bridge**), bypassing **safety checks**.
    - **State-centre mismanagement**, including **bureaucratic delays** and **fund disputes**, stalls many infrastructure projects.

What is the Current State of Infrastructure Development in India?

- **Highways and Roads:** India holds the position of having the **world's second-largest road network** (after the **United States**), with **National Highways** extending to **1,46,145 km** as of **2024**.
- **Railways: India's first bullet train project**, designed for speeds of **280 km/h**, is expected to be **completed by 2026**.
    - The past decade has seen a **decline in consequential accidents**, despite notable incidents like the **Kanchenjunga Express crash**.
- **Civil Aviation:** India is the **world's third-largest domestic aviation market**, with the number of **operational airports** rising from **74 in 2014** to **157 in 2024**.
    - Under the **Regional Connectivity Scheme (RCS)–UDAN**, **millions of passengers** have benefited by **December 2024**.
- **Maritime Sector:** India aims to rank among the **top five shipbuilding nations by 2047**.
    - Major projects like the **Galathea Bay mega port** and the **India-Middle East-Europe Economic Corridor** are underway to enhance **trade connectivity**.
- **Urban Metro:** The **metro network** expanded from **248 km in 2014** to **945 km by 2024**, now operating in **21 cities** and serving **1 crore daily commuters**.
    - The **Namo Bharat train** on the **Delhi-Meerut RRTS corridor** strengthens **regional connectivity** and improves **urban transportation**.
- **Ropeways Development:** Under the **Parvatmala Pariyojana**, around **60 km of ropeway projects** were slated for award by **FY 2024-25**, including the **Varanasi Urban Ropeway** and the **Gaurikund-Kedarnath Ropeway.**

Government Initiatives for Infrastructure Development

- **PM Gati Shakti Scheme**
- **Bharatmala scheme**
- **National Infrastructure Pipeline (NIP)**
- **Sagarmala Project**
- **Ude Desh Ka Aam Nagrik (UDAN)**

How can India Improve and Strengthen Its Infrastructure Development?

- **Strict Quality Control:** All major infrastructure projects like **bridges, highways, and dams** should undergo **independent audits** by institutions like **IITs**, with **lifetime bans** for firms linked to poor construction.
    - Implement **real-time fund tracking using blockchain** to curb **embezzlement and ensure transparency**.

- **Adopt Advanced Engineering & Materials:** Use **high-quality materials** like **fiber-reinforced polymers** and **corrosion-resistant alloys**, inspired by **Japan's earthquake-proof bridges**, for **flood-prone areas** like **Assam and Bihar**.
    - Adopt **AI and IoT-based sensors** for **real-time monitoring** of bridges to detect **cracks, stress, and overloading**.
- **Shift Focus from Construction to Maintenance:** India must adopt a **proactive maintenance approach** using **Bridge Management Systems (BMS)**, ensuring a **fixed share of capital expenditure** is allocated for **Operations & Maintenance**.
    - States should implement **structured maintenance policies** like **Bihar's Bridge Maintenance Policy 2025**, featuring **IIT audits** and **sensor-based monitoring.**
- **Strengthen Infrastructure Planning:** Utilize the **GIS-based National Master Plan** under **PM Gati Shakti** for **integrated, data-driven infrastructure planning**, and deploy **AI tools** for **predictive planning**, **logistics optimization**, and **bottleneck detection**.
- **Deepen Infrastructure Financing:** Maintain **high public capital expenditure** while encouraging **PPP models**, and **monetise brownfield assets** to fund new infrastructure.
    - Promote **municipal bonds**, **InvITs**, **green bonds**, and **blended finance** to attract **long-term institutional investments**.

Conclusion

India's **infrastructure** faces a **paradox**: rapid **expansion** alongside **glaring failures**. While **highways**, **metros**, and **aviation** have advanced, recurring **bridge collapses** expose deep **systemic flaws** in **quality control**, **corruption**, and **maintenance**. **Urgent reforms** in **planning**, **execution**, and **transparency** are essential to ensure **inclusive** and **structurally sound** development.

Drishti Mains Question

Highlight the key reasons behind recurring infrastructure failures in India, with recent examples.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. With reference to 'National Investment and Infrastructure Fund', which of the following statements is/are correct? (2017)

1. It is an organ of NITI Aayog.
2. It has a corpus of `4,00,000 crore at present.

Select the correct answer using the code given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Ans: (d)

Mains

Q. "Investment in infrastructure is essential for more rapid and inclusive economic growth." Discuss in the light of India's experience. (2021)