



Rerouting Indian Railways' Future

*This editorial is based on "[Roadblocks to Indian Railways' 'Mission 3,000 MT'](#)" which was published in *Economics and Political Weekly* on 14/09/2024. The article highlights the significant decline in Indian Railways' freight transport share and its impact on India's net-zero ambitions. It emphasizes the need for strategic reforms and capacity enhancements to achieve the National Rail Plan's freight targets by 2030-31.*

For Prelims: [Indian Railways](#), [National Rail Plan](#), [Dedicated Freight Corridors](#), [Nationally Determined Contribution](#), [Bharat Gaurav trains](#), [Comptroller and Auditor General of India](#), [Kavach](#), [Balasore triple train crash](#).

For Mains: Significance of Railways for India, Major Issues Related to Indian Railways.

[Indian Railways](#), operating the **world's fourth-largest rail network**, has been facing significant challenges in maintaining its dominance in the country's transportation sector. Despite an increase in route kilometers and track length since 1950, **its share in freight transport has declined dramatically from 85% in 1951 to less than 30% in 2022**. This decline poses a serious challenge to India's net-zero ambitions and efforts to decarbonize the transport sector. The [National Rail Plan](#) aims to reverse this trend by targeting a **45% rail share in freight transport by 2030-31**, with an ambitious goal of 3,600 million tonnes of freight loading.

However, the railway's performance indicators reveal concerning trends. The growth rates of passenger and freight movement have slowed, particularly during the **Twelfth Five-Year Plan period (2012-13 to 2016-17)**, indicating a decoupling of GDP and traffic performance. To achieve its ambitious targets, Indian Railways needs to transform its business strategies, diversify revenue sources, and address capacity constraints and service quality issues.

What is the Significance of Railways for India?

- **Economic Backbone:** Indian Railways plays a pivotal role in India's economic development, acting as a crucial link in the supply chain.
 - It transported **1,512 million tonnes of freight in 2022-23**, contributing significantly to industrial and agricultural growth.
 - The establishment of [Dedicated Freight Corridors](#), or DFCs, is expected to lower logistics costs through the use of higher axle load trains
- **Driver in Achieving India's Climate Goals:** As India strives to meet its [Nationally Determined Contribution \(NDC\)](#) target of reducing emission intensity of GDP by **45% from 2005 levels by 2030**, railways emerge as a key player in sustainable transportation.
 - Rail transport is significantly more energy-efficient than road transport, with rail freight **generating less than one-fifth of the greenhouse gas emissions of road**

transport per ton kilometer

- The shift from road to rail for freight transport could significantly contribute to India's climate goals.
- **Affordable Mobility:** Indian Railways serves as a great social equalizer by providing affordable transportation to millions of Indians.
 - The railways' revenue earnings were up by **73% in the passenger segment during April-January 2023.**
 - The railways' tiered pricing system ensures accessibility across economic strata.
- **Bolstering National Security and Integration:** Railways play a crucial role in national security and integration.
 - They are vital for **rapid mobilization of troops and equipment to border areas.** The strategic importance is evident in projects like the **Bilaspur-Manali-Leh rail line**, which will provide all-weather connectivity to the Ladakh region.
 - Additionally, railways foster national integration by facilitating cultural exchange and tourism.
 - The recently launched **Bharat Gaurav trains, showcasing India's cultural heritage**, are an example of how railways contribute to national identity and tourism.
- **Urban Lifeline:** Railway-based urban transport systems are reshaping India's cities. Over the last 10 years, **700 km of new metro lines have been made operational**, bringing the total operational length to 945 km, and extending metro services to **21 cities across the country**,
 - These systems are crucial for sustainable urban development, reducing traffic congestion and air pollution.
 - For instance, Delhi Metro, **carrying about 6.5 million passengers daily, has helped reduce CO2 emissions annually.**
 - The integration of metro systems with other modes of transport is creating efficient urban mobility ecosystems.
- **Bridging the Urban-Rural Divide:** Railways act as a catalyst for balanced regional development. Projects like the **Northeast Frontier Railway's expansion** have opened up remote areas for economic activities.
 - The **111 km Jiribam-Imphal railway line**, once completed, will be a game-changer for Manipur's connectivity and economy.
 - Such projects not only improve connectivity but also bring ancillary development in **education, healthcare, and local industries**, helping bridge the urban-rural divide.

What are the Major Issues Related to Indian Railways?

- **Declining Modal Share in Freight Transport:** Indian Railways has experienced a significant decline in its share of freight transport, from **85% in 1951 to less than 30% in 2022.**
 - This shift poses challenges to India's environmental goals and transport sector efficiency.
 - The National Rail Plan aims to increase rail's freight share to **45% by 2030-31**, but current projections fall short.
 - For instance, even with an optimistic **7% CAGR**, annual freight loading is projected to reach **only 2,598 MT by 2030-31**, far below the **3,600 MT target.**
 - This decline reflects broader issues of competitiveness and adaptability in the face of changing economic structures and transportation needs.
- **Financial Performance and Operating Ratio:** The railway's financial health has been deteriorating, as evidenced by its **increasing operating ratio (OR).**
 - The OR has risen from a low of **78.7% in 2006-07** to **breaching the 100% threshold in 2021-22.**
 - This means **Indian Railways is spending more than it earns**, raising serious concerns about its financial sustainability.
 - The **Comptroller and Auditor General of India** has also flagged that the reported OR may not reflect the true financial performance.
 - For instance, in 2019-20, if actual pension expenditures were considered, the OR would have been **114.35%** instead of the reported **98.36%**, indicating a more severe financial strain than officially acknowledged.
- **Over-reliance on Coal for Revenue:** Indian Railways heavily depends on coal transport for its freight revenue, **with coal contributing 47% of freight earnings in 2021-22.**

- This over-reliance poses a significant risk as India moves towards renewable energy sources.
- The Ministry of Power's recent directive (January 2023) to use **"Rail-Ship-Rail" mode for coal transport** to certain states may further reduce revenue from coal transport.
 - The lack of diversification in freight revenue sources makes Indian Railways vulnerable to shifts in energy policy and market demands, potentially impacting its long-term financial stability.
- **Capacity Constraints and Infrastructure Limitations:** Despite increasing its running track length from 51,315 km in 1950-51 to **102,831 km in 2021-22**, Indian Railways faces significant capacity constraints.
 - This limits its ability to meet growing transportation demands and compete with other modes.
 - The **pace of network expansion has not kept up with overall freight demand** growth in the economy.
 - This has contributed to the **declining share of railways in freight movement**, particularly for bulk commodities.
 - For example, despite price inelasticity, the **share of railways in cement transport declined from 2005-06 to 2019-20**, indicating that factors beyond pricing, such as capacity and service quality, are influencing shipper choices.
- **Technological Adaptation Lag:** Indian Railways faces challenges in adopting new technologies and modernizing its operations to meet evolving market demands.
 - The **container service, along with other goods**, contributes **only 12% to freight loading** and has remained stagnant.
 - This indicates **a lag in adapting to changing freight patterns**, especially in high-value sectors like automobiles.
 - **Kavach**, an automated train protection safety system aimed at preventing collisions on the same track, remains **largely unimplemented**.
 - It's been 4 years since the Indian Railways began deploying the device, yet by early August, 2024 **Kavach** had been installed **only on 1,456 km of the South Central Railway**, accounting for just **3% of the national rail network**.
- **Safety Concerns and Derailments:** Indian Railways continues to grapple with safety issues, particularly derailments.
 - There has been an average of **44 consequential train accidents every year** in the five-year period ending 2022-23.
 - The **Balasore triple train crash in June 2023**, and **Sabarmati Express Derailment in August 2024** highlighted persistent safety vulnerabilities.
 - Factors contributing to derailments include **outdated track infrastructure, human error, and signal failures**.
 - The **railways' target of "zero accidents" remains elusive**, necessitating continued focus on track renewals, modern signaling systems, and enhanced safety protocols.
- **Slow Progress in High-Speed Rail Projects:** India's ambitious high-speed rail projects, particularly the **Mumbai-Ahmedabad bullet train corridor**, have faced significant delays and cost escalations.
 - Originally planned to be operational by 2023, the project's completion date has been **pushed to 2028** due to land acquisition issues.
 - The slow progress in high-speed rail implementation **puts India behind global competitors** and delays the modernization of rail transport, affecting long-term competitiveness and economic growth.
- **Human Resource Management and Skill Gaps:** Indian Railways, one of the world's largest employers, faces challenges in human resource management and skill development.
 - There's a **growing skill gap** as the railway modernizes its operations. For instance, the introduction of **semi-high-speed trains like Vande Bharat** requires specialized skills in maintenance and operations.
 - Union Railway Minister stated in Rajya Sabha that more than **2.50 lakh posts** remain vacant in the Indian Railways as of **July, 2023**.
 - Addressing these vacancies while ensuring the workforce is equipped with relevant skills for modern railway operations is a significant challenge.

Key Committees Related to Reforms in Indian Railways

- **Vinod Rai Committee (2015):**
 - Establish an independent Railway Safety Authority with statutory powers.
 - Create a Railway Accident Investigation Board for impartial inquiries.
 - Form a separate Railway Infrastructure Company to manage assets.
 - Introduce a performance-linked incentive scheme for railway employees.
- **Rakesh Mohan Committee (2010):**
 - Revamp the accounting system to follow Indian GAAP.
 - Expand into FMCG, IT, containerized cargo, and automobile sectors.
 - Prioritize long-distance transport, speed upgrades, and high-speed rail corridors.
 - Enhance connectivity to industry clusters and major ports.
 - Develop logistics parks at key hubs.

What Measures can be Adopted to Revitalize Indian Railways?

- **Implement Advanced Traffic Management Systems:** Indian Railways should accelerate the deployment of advanced traffic management systems like **Kavach across its network**.
 - This automated train protection system can **significantly improve safety and operational efficiency**.
 - For example, expanding Kavach beyond the current 1,456 km to cover at least 20% of the network within the next two years could **drastically reduce collision risks**.
 - This implementation should be **prioritized on high-traffic corridors and accident-prone sections**.
 - The system could be integrated with **AI-powered predictive maintenance** tools to proactively identify potential track or signal failures, further enhancing safety and reducing downtime.
- **Diversify Freight Portfolio and Enhance Logistics Services:** To reduce dependence on coal transport and adapt to changing market demands, **Indian Railways should aggressively diversify its freight portfolio**.
 - This could involve developing specialized services for **high-value, time-sensitive goods like pharmaceuticals, electronics, and perishables**.
 - For instance, creating a network of **temperature-controlled containers** and dedicated express freight corridors could attract new customers from these sectors.
 - Additionally, **partnering with e-commerce giants to create specialized rail-based logistics solutions** could tap into the growing online retail market.
- **Accelerate High-Speed Rail and Semi-High-Speed Projects:** While addressing the delays in the Mumbai-Ahmedabad bullet train project, Indian Railways should **simultaneously focus on expanding its network of semi-high-speed trains like Vande Bharat**.
 - This expansion should be complemented by upgrading existing tracks and signaling systems to support higher speeds.
 - For example, modernizing the **Golden Quadrilateral network** to consistently support speeds of **160-200 km/h** could significantly reduce travel times on key routes, making rail more competitive with air travel for intercity journeys.
- **Develop Sustainable and Energy-Efficient Operations:** Indian Railways should accelerate its transition to renewable energy and energy-efficient technologies.
 - This could involve **increasing the electrification of tracks from the current levels to 100%**, coupled with a significant expansion of solar and wind power generation along railway lines.
 - For example, **installing solar panels on station rooftops and unused railway land** could generate a substantial portion of the railways' energy needs.
- **Modernize Freight Terminals and Develop Multimodal Logistics Parks:** Indian Railways should focus on **modernizing existing freight terminals** and **developing new multimodal logistics parks** to improve efficiency and attract more freight traffic.
 - This could involve automating loading and unloading processes, implementing advanced inventory management systems, and creating seamless intermodal connections.

- These parks should be equipped with **advanced container handling equipment, real-time tracking systems**, and integrated customs clearance facilities to offer end-to-end logistics solutions.
- **Enhance Station Redevelopment and Commercial Utilization:** Accelerate the station redevelopment program to transform major railway stations into world-class transit hubs and commercial centers.
 - This initiative should go beyond cosmetic improvements to include smart city features, mixed-use developments, and enhanced passenger amenities.
 - For example, the redevelopment of **Rani Kamlapati Railway Station in Bhopal**, with its **modern design, airport-like facilities**, and focus on sustainability, serves as a model.

Conclusion

Revitalizing Indian Railways is crucial for its role in India's economy and sustainability. By tackling challenges like declining freight share and financial sustainability through modernization and innovative strategies, the railways can enhance efficiency and competitiveness. Initiatives such as **diversifying services and redeveloping stations** will significantly contribute to national integration and sustainable development, **positioning Indian Railways as a key driver of India's future growth**.

Drishti Mains Question

Examine the role of Indian Railways in fostering sustainable development and economic growth in India. Discuss the challenges faced by the sector and suggest measures to overcome them.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. With reference to bio-toilets used by the Indian Railways, consider the following statements: (2015)

1. The decomposition of human waste in the bio toilets is initiated by a fungal inoculum.
2. Ammonia and water vapour are the only end products in this decomposition which are released into the atmosphere.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (d)