



## Challenges and Achievements of India's Bharatmala Programme: A Phase-wise Comparative Study

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### Abstract:

Infrastructure and resource development are essential for India's long-term economic growth, competitiveness, and human development. Recently, the Government of India has implemented corridor-based highway projects to reduce regional disparities and improve logistics efficiency. The Bharatmala Pariyojana, launched in 2017, is one of the most ambitious national highway programs, designed to enhance freight movement, lower logistics costs, and foster a more integrated spatial economy.

This research paper investigates Bharatmala Phases I and II within the broader context of infrastructure and resource development in India. Using policy analysis, secondary data review, and spatial evaluation, the study highlights the progress achieved in Phase I, the strategic goals of Phase II, and the challenges related to land acquisition, environmental restrictions, rising costs, and financial gaps. The paper contends that Bharatmala has the potential to transform national connectivity, but its success relies on institutional capacity, sustainable resource management, and the implementation of advanced monitoring and financing systems. The findings underscore the importance of multi-level coordination, transparent land policies, digital project management, and environmental protections to maximize the socio-economic benefits of infrastructure growth in India.

### Introduction:

Rapidly developing and modernizing road infrastructure is critical to India's economic growth strategy: highways connect manufacturing hubs, cut transportation costs, and facilitate regional development. The Bharatmala Pariyojana, announced in 2017, intends to create approximately 34,800 km of national corridors, ring roads, economic corridors, port connectivity, and border roads through a multi-component program. The initiative has been delivered in stages over time; Phase I is the current delivery tranche, while Phase II planning and budgetary changes are underway to expand the network and correct errors learned from Phase I. This article examines programmatic design, successes thus far, and limits that must be addressed for Phase II.

Infrastructure is essential for economic and social growth. Roads, transportation networks, logistical systems, and resource corridors are the foundations of national productivity. In India, infrastructure has historically suffered from underinvestment, fragmented planning, sluggish implementation, and out-of-date designs. These constraints have contributed to high logistics costs of 14-18% of GDP, significantly higher than global norms. The uneven development of road networks has also resulted in geographical inequality, with interior, border, and tribal areas being underserved.

India has launched a number of initiatives to address these structural obstacles, the most extensive and integrated national highway development plan since the Golden Quadrilateral

and the National Highways Development Programme being the Bharatmala Pariyojana. In order to create a continuous network for freight movement, economic activity, defense logistics, and regional integration, Bharatmala uses a corridor-based and resource-oriented planning methodology instead of concentrating on individual road segments.

### Objectives:

1. To conduct a comparative analysis of Bharatmala Phase 1 and Phase 2.
2. To analyze the major challenges in the implementation of Bharatmala Phase 1 and Phase 2 and the resource constraints affecting the delivery.
3. To review the performance of the first and second phases of the Bharatmala project.

### Research Methodology:

This is a qualitative policy-analysis study that draws on secondary data sources such as official documents (Ministry of Road Transport and Highways project pages, annual reports, sanctioned fund releases, and Press Information Bureau notes), major national media reports, and synthesized policy analysis available through March 2025. Documents studied include the Ministry of Road Transport and Highways Bharatmala pages and e-book, National Highway Authority of India status information, and numerous Press Information Bureau releases reporting on completed road lengths and funding.

### The method combined:

- a) Descriptive synthesis of official figures,
- b) Thematic analysis of implementation bottlenecks reported in government updates and independent reporting, and
- c) solution-mapping based on best-practice recommendations in public procurement, environmental clearance reform, and project financing literature.

### Background & Programme Design (Phase I and Phase II overview):

#### a) Bharatmala:

#### Phase-I: - Scope and Components

Initially approved (2017) for approximately 34,800 km of corridors spanning numerous components, including economic corridors, national corridor efficiency enhancement, inter-corridor connectivity, coastline and port connectivity roads, border roads, and ring roads.

According to official reports, by late 2024 and early 2025, projects totaling 26,425 km had been awarded, with 18,700-19,800 km under construction. These are the key progress indicators for Phase I delivery.

#### Financing and Costs:

**Phase-I:** baseline: Earlier project aggregations stated package-level aggregate costs in the multiple-lakh-crore range; prior Press information bureau reporting for awarded works referred to values (for granted Phase-I works) on the order of several lakh crores. Project financial planning has been updated as costs and packages have matured.

Phase-II (planning direction)

**Phase II:** planning aims to increase coverage, finish remaining priority corridors, and incorporate new policy priorities (resilience, green transportation, and multimodal logistics integration). Government records and press notes (as well as ministry remarks) indicate that awarding and construction will proceed, with amended budgetary plans under consideration – Phase-II design specifics will be determined by budget approvals and Phase-I lessons learned.

### Comparative study of Bharatmala Phase-I vs Phase-II:

#### Purpose & Strategic Focus:

Phase I - The main goals are to connect 550 districts, increase freight share on national

roads, decongest national corridors, and create economic corridors, inter-corridors, and feeder routes to close important gaps in the network. It found numerous choke sites for decongestion and gave priority to capacity augmentation

Phase-II (primary focus): shift emphasis toward large greenfield expressways/long access-controlled corridors (high-speed expressways) and expansion of corridors not completed in Phase-I, effectively a “Bharatmala 2.0” that places a stronger priority on new expressways linking major metros and ports. (Examples included in Phase-II: Surat–Chennai, Pune–Bengaluru, Bengaluru–Vijayawada expressways).

#### **Scale: Length, Components, and Numbers:**

Phase-I: 34,800 km was initially planned (including the completion of the remaining National Highways Development project work as well as enhanced corridors, economic corridors, inter-corridors, feeder roads, and expressway features specified under Phase-I). Expressway portions, the National Corridors Efficiency Program, and 44 economic corridors were among the components.

Phase-II: Not a single fixed little package like Phase I, but rather a subsequent tranche of several thousand kilometres of additional greenfield expressways and priority corridors. Phase II focuses on long, access-controlled expressways (many greenfield), which are individually quite significant projects.

#### **Estimated Cost & Funding Approach:**

Phase I: Funding is provided by a combination of the Central Road and Infrastructure Fund (fuel cess), toll revenue, supplementary budgetary support, and internal/extra-budgetary resources. Total estimated approval figures in government papers exceed several lakh crore rupees.

Phase-II: Individual expressways in Phase II cost tens of thousands of crores. The funding strategy for Phase-II remains hybrid, with PPP where viable and central budgetary allocation however due to larger greenfield expressways, land acquisition and CAPEX per km are more than many Phase-I brownfield renovations. (Estimated costs can be found in project-level reports, such as Surat–Chennai at 45-50,000 crore and Pune–Bengaluru at 50,000 crore).

#### **Technical Character & Construction Complexity:**

Phase I: Brownfield renovations (widening, 4/6 laned), bypasses, ring roads, corridor decongestion, and a few expressway segments are included. Complexity is caused by traffic control on live corridors, utility transfers, and environmental approvals for renovations.

Phase-II: Greenfield content is higher, with long access-controlled expressways, tunnels, and massive bridges in hilly/remote terrain (for example, Raipur–Visakhapatnam corridor tunnels in Phase I; multiple greenfield expressways in Phase II). Greenfield expressways require greater land acquisition, higher speed design, more wayside amenities, and stronger access controls, which increases complexity, longer lead times, and larger environmental and social effect procedures.

#### **Timeline & Current Status:**

Phase-I: Since its inception in 2017, many packages have been granted, and significant sections have been finished. The National Highway Authority of India reports under-construction segments and expressway sections (as of recent annual reports). Government tracking has increased to measure the economic, safety, and environmental implications of completed projects.

Phase-II: preparatory and early execution stage for many major expressways foundation approvals for projects like Bengaluru–Vijayawada (laid 11 Mar 2024) and works for large expressways are in progress; expected completion years for some expressways are mid-to late-2020s, depending on packages.

### **Economic & Socio-Regional Impacts (Expected and Observed):**

Phase I: Targeted to increase freight traffic share on national highways, decongest logistical corridors, and improve connectivity to 550 districts, early results include shorter travel times on completed portions, improved port connectivity, and local job creation during construction. The Ministry has undertaken ongoing monitoring of the repercussions.

Phase-II: Phase II, which will build long-distance expressways connecting major economic centers and ports, is expected to reduce transit times, increase freight speeds, and stimulate corridor-oriented industrial and urban development, but the benefits will be contingent on timely completion and integration with multimodal logistics (rail, ports).

### **Environmental & Social Challenges:**

Phase I (upgrades): managing environmental clearances where alignment passes sensitive areas, traffic diversion impacts during works, and rehabilitation for limited land take.

Phase-II (greenfield): larger land acquisition needs, potential displacement, ecological impacts for long greenfield stretches, and higher scrutiny for tunnels, forest, river crossings. Both phases require robust resettlement, better environmental impact mitigation, and improved stakeholder engagement. Recent project news shows complex tunnel works and extensive mitigation designs.

### **Implementation Model & Procurement:**

Phase-I: mix of Engineering Procurement Construction and Hybrid Annuity Model, plus monetisation for mature assets. Emphasis on faster award of contracts and land clearances to accelerate delivery.

Phase-II: greater use of Hybrid Annuity Model for expressways with viability gap funding where needed; expected higher private-sector interest for long-distance expressways with good traffic projections. Project-level procurement and packaging strategies differ by corridor to manage land and financial risk.

### **Conclusion:**

Phase I of the Bharatmala Programme focused on rapid expansion of the national highway network by improving connectivity through economic corridors, border and coastal roads, port links, and green field expressways, with the objective of enhancing freight efficiency, reducing travel time, and strengthening national integration. Phase II builds on this foundation with a more region-specific and sustainability-oriented approach, emphasizing network optimization, last-mile connectivity, urban decongestion, logistics efficiency, technological integration, environmental considerations, and road safety. Overall, Phase I represents expansion and integration, while Phase II focuses on consolidation and optimization, together supporting long-term economic growth, balanced regional development, and global competitiveness.

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