Department of Commerce
Ministry of Commerce & Industry
Government of India

INDIA LOGISTICS

Logistics Wing, Ministry of Commerce

Draft National Logistics Policy and Integrated National Logistics Action Plan

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Preface

The logistics sector is a key priority area for the Government of India where it aims to create drive logistics efficiency, reduce cost of doing business, generate additional jobs, enhance farmer income and improve the trade competitiveness of the country. The government has been implementing a multi-pronged strategy that not only targets improvements in infrastructure and connectivity, but also in re-engineering business processes and policies. In order to drive an integrated development of logistics in the country and to provide adequate representation to the sector and to propel the future growth of the country, a Logistics Wing has been created in the Ministry of Commerce and Industry consequent to an amendment to the second schedule of the Government of India (Allocation of Business) Rules, 1961, on 7th July 2017, allocating the task of "Integrated development of Logistics sector" to the Department of Commerce and Industry.

To provide for a broader vision of logistics of the future, the Logistics Wing has prepared a draft “National Logistics Policy” which outlines the vision, objectives and thrust areas in logistics for the country. The National Logistics Policy also consists of a governance mechanism involving stakeholders at multiple levels of decision making, along with a Logistics fund to drive the various initiatives.

In order to achieve the objectives laid out in the policy, the Logistics Wing has created the first phase of a comprehensive “Integrated National Logistics Action Plan” to optimize key elements of the logistics value chain. The action plan has been developed following an intensive data centric approach, along with inputs from over 200+ industry stakeholders and 60+ interventions identified to be executed in a phase wise manner. The Division will now focus on implementation of these interventions in coordination all relevant government stakeholders and also towards developing the next phase of the action plan

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Summary of the National Logistics Policy

Logistics is a critical driver of economic development in the country and has a multiplier effect on boosting trade, improving competitiveness and creating jobs. Because of the critical role of logistics in the next phase of development of the country, the Logistics Wing has created a National Logistics Policy outlining its broad vision for the sector and defining the key objectives targeted to be achieved in logistics in the country in the coming years.

The policy consists of 18 thrust areas for the logistics sector in line with the defined objectives and vision which are targeted to be implemented in the next five years. These include (i) Reducing the cost of logistics in the country through improvement of modal mix by implementing critical projects, development of multi-modal parks, executing commodity wide interventions and improving first and last mile connectivity (ii) Creating a data and analytics tool to monitor logistics movement and a Logistics e-marketplace to enable transparent trading of logistics services between providers and users (iii) Developing an integrated national logistics action plan and also creating state level action plans (iv) Streamlining EXIM processes, reducing dwell time for interstate cargo to improve the flow of goods (v) Strengthening the warehousing sector in India and promoting standardization in logistics (vi) Improving farmer income through reduction in agri wastages through efficient agri logistics (vii) Promoting employment and skilling in logistics (viii) Strengthening the MSME sector through logistics and promoting e-commerce through efficient movement of goods (ix) Promoting startups in logistics through a startup acceleration fund and promoting green and sustainable activities in logistics

In order to drive progress across the defined objectives and thrust areas and to ensure effective coordination across all relevant stakeholders, four councils are proposed to be constituted in the policy. These councils will have representation from all stakeholders at varying levels to drive decision making and create impact in logistics. In addition, a non-lapsable logistics fund is proposed to drive progress against key thrust areas of logistics such as providing VGF for MMLPs, connectivity projects, skilling programs, startup acceleration funds, and setting up the logistics tool and e-marketplace.

Integrated National Logistics Action Plan

Executive Summary

The key objectives as covered in the National Logistics Policy have been translated into actionable initiatives in the phase I of the Integrated National Logistics Action Plan through a comprehensive commodity corridor analysis, process mapping and value chain analyses. The set of interventions in phase I have already been pre aligned with more than 250+ industry as well as government stakeholders who were involved in the development of the plan. The Logistics Wing in the Ministry of Commerce will reach out to relevant line ministries, government departments, PSUs and state governments for implementation of the action plan

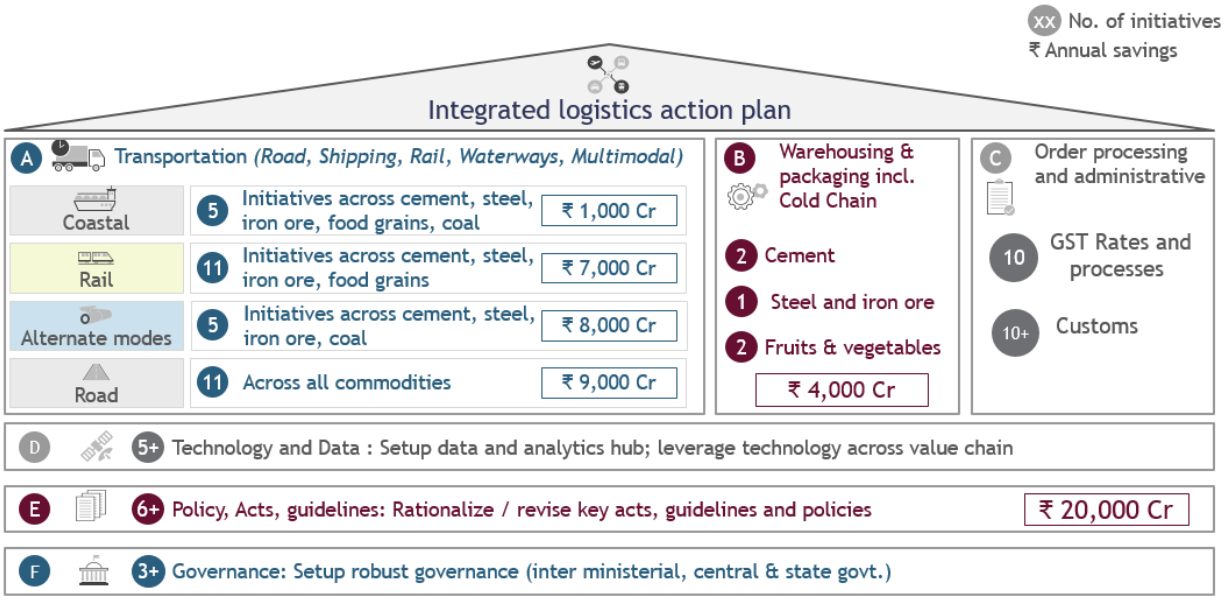
In the phase I of the action plan, using a data intensive approach, 60+ interventions have been identified with the potential to optimize the logistics costs of the country by over INR 50,000 Cr annually covering the key elements as detailed below:

1. Commodity corridor analysis of top 8 commodities covering ~55-60% of the total freight movement including establishing the modal mix, calculating the unit transportation costs, plotting the major origin-destination pairs, identifying key interventions to improve the logistics efficiency has been completed. These include interventions across the logistics value chain. Few examples include interventions to optimize movement of iron ore through development of slurry pipelines with the potential to reduce logistics costs by 6000 Cr +, development of integrated terminals for cement handling and steel handling next to rail sidings to generate annual savings up-to 1600 Cr, set up of aggregation hubs, auto-grading units and low cost distribution cold storage for fruits and vegetables to increase farmer income by 30-40% among many others. The identified interventions have been translated into an action agenda to be driven by the relevant central ministries/ state governments
2. Actionable steps for streamlining different logistics processes such as dwell time for inter-state cargo movement by road, customs process, EXIM related dwell times, logistics

related GST issues, warehouse licenses and approval processes etc. have been defined and aligned with relevant stakeholders

3. A comprehensive logistics planning tool has been designed as a single source of all logistics information and planning across all central ministries in the country. A proof of concept for the same has been developed to showcase various use cases which could aid the planning of infrastructure and also its regular monitoring.
4. The plan also details out policy, act and guideline modifications to address inefficiencies, minimize costs and to promote more efficient use of existing and upcoming infrastructure with focus on the National Logistics Policy, MMLP policy and a model warehousing policy
5. There was an increased focus on identification of actionable interventions to enhance the logistics skilling landscape, in particular for the truck driver segment which will be largest growth driver for logistics employment in the country in the coming years
6. Inter-ministerial committee meetings under the Chairmanship of the head of the Logistics Division are held at a regular frequency to align the action agenda for each ministry and track the progress against the same. Additionally, a comprehensive governance framework has been proposed, including set up of a National Council for Logistics, chaired by the Prime Minister to review the progress of the Integrated National Logistics Action Plan
7. There is also a focus on regular communication of Action Plan to the relevant industry stakeholders as well as to the media to get feedback on their practicality and effectiveness and also create a conducive & collaborative atmosphere for their implementation

A summary of the various interventions is described in the image below:



The various initiatives have been divided into three core areas of logistics, namely Transportation, Warehousing and Order Processing while initiatives in Technology, Policy and Governance cut across these three core areas of logistics. The below table illustrates the various initiatives by commodity/processes and the stakeholders who will be implementing the same. The stakeholder wise interventions are covered in Annexure A.

Sl. No.	Initiative	Owner
Cement		
1	Develop 22 cement integrated warehouse terminals for bulk and bagged cement to realize the estimated annual cost optimization potential of INR 1700-1800 Cr • In consultation with cement manufacturers, identify land parcels where available for setting up the integrated terminals for cement • Invite private participation to develop the terminals • Clarify the MoU with CRWC allowing it to construct cement silos	Ministry of Railways (MoR)

2	Increase cement coastal shipment share from ~1% to 5% by focusing on 11 identified coastal routes to realize the estimated annual cost optimization potential of INR 250-300 Cr. (Routes covered in the detailed section) • Prioritize development of coastal berths for identified east coast ports of Haldia, Paradip, Vizag, and Chennai • Develop connectivity to east coast ports to ease congestion; Focus on rail connectivity to identified ports – Haldia, Paradip, Vizag, Chennai • Develop plans to run scheduled vessels to enable aggregation	Ministry of Shipping in partnership with Cement Players
3	Increase cement inland waterways share to 6% (18MTPA) by focusing on identified national waterways – NW-4, NW-55 & NW-21 to realize the estimated annual cost optimization potential deliver estimated impact of INR 250-300 Cr • Expedite development of terminals at prioritized locations. Seek feedback from manufacturers for prioritizing terminal locations, extent of mechanization, and facilities required at terminals • Develop a stakeholder communication plan to communicate the ongoing/planned developments to industry players to enable them to make their logistics plan accordingly.	IWAI
4	Upgrade rake handling capacity and facilities for cement handling at identified 21 public railway sidings to deliver an estimated impact of INR 300-350 Cr	Ministry of Railways
5	Decrease congestion and improve rake availability on prioritized rail routes where volume of cement movement is high, especially for corridors where potential to move to coastal shipping, National Waterways or DFC is low (Routes covered in the detailed chapter)	Ministry of Railways
Steel		

6	Facilitate development of iron ore slurry pipeline to increase its share for iron ore movement from 3-4% to 15%(60MTPA) to deliver an estimated annual cost optimization potential of INR 6000 Cr • Ministry of Railways to develop policy and approval process for granting RoW for slurry pipelines and other associated industrial utility services • DoC, MoRTH, Ministry of Railways, Ministry of Environment and respective state governments to facilitate single window clearance for RoW • Ministry of Steel to evaluate option of developing common user facility pipelines • Department of Commerce to be nodal agency for facilitating single window clearances	Ministry of Railways, Ministry of Steel, State Government, DoC
7	Explore development of modified BFNSM wagons to allow steel coils to be loaded perpendicular to track direction to deliver estimated annual cost optimization potential of INR 300 Cr • Ministry of Railways to work in coordination with RDSO, wagon manufacturers and steel manufacturers • Focus on expediting approvals for development of modified BFNSM wagons to allow steel coils to be loaded perpendicular to track direction	Ministry of Railways
8	Increase coastal movement for steel from current ~1% to 6% (13MTPA) by focusing on 8 identified coastal routes to realize estimated annual cost optimization potential of INR 300 Cr • Develop plans for running scheduled vessels along west and east coast ports to enable aggregation • Improve rail connectivity to identified ports – Haldia, Paradip, Vizag, Chennai • Expedite completion of select projects identified under Sagarmala and Bharatmala • Develop a policy to promote creation of smaller jetties with captive cargo supported through VGF if required and through an accelerated approval process	Ministry of Shipping

9	Develop integrated logistics park for steel at 23 potential locations to realize estimated annual cost optimization potential of INR 800 Cr • Ministry of Railways in consultation with steel players to identify land parcels (where available) for setting up the integrated steel terminals • Invite private participation for development of terminals • Locations to be combined with integrated cement / other commodities warehouses for common locations	Ministry of Railways, Logistics Wing
10	Increase national waterways share for steel from <1% to 7% (15MTPA) by focusing on NW-96, NW-5, NW-1, NW-110 and iron ore share from <1% to 12% (40MTPA) by focusing on NW-64, NW-5, NW-96, NW-1 to realize estimated annual cost optimization potential of INR 1800 Cr • IWAI to develop policy to promote development of jetties through PPP/ other modes • IWAI to expedite development of terminals at locations prioritized by steel players through stakeholder feedback discussions • IWAI to develop a stakeholder communication plan to communicate the ongoing/planned developments to industry players	IWAI
Fruits and Vegetables		
11	Apple: Reduce packaging costs by using collapsible plastic crates instead of carton boxes for transporting apple. This has the potential to reduce the cost of logistics for apples by 12 % (annual optimization of INR 30-40Cr) and increase farmer margin by 7 % • Conduct trial run with a packaging solutions company including farmers, traders & retailers in ecosystem for promoting RPCs • Document learnings and develop an institutional plan for country wide roll out	Himachal Pradesh and Jammu & Kashmir Agri-Marketing Boards

12	Apple: Develop aggregation hubs to consolidate, auto-grade and certify produce to reduce the cost of logistics for apples by 15% (annual optimization of ~INR 400 Cr) and increase farmer margin by 20% • To be set up near the farms, in J&K and Himachal with auto-grading lines in large apple growing regions • Explore the feasibility of increasing vehicle fleet size mix at aggregation hubs due to enhanced road access • Potential for e-trading at the aggregation hubs can be explored	State Government of H.P. & J&K
13	Apple: Install Controlled Atmosphere Storages (CA) as common user facilities for farmers, and facilitate working capital financing for the farmers to enable farmers to sell produce in the lean season to improve farmer margin by 50% and reduce annual imports by 800 cr. • State governments of HP & J&K to identifying locations and invite private investors to develop CA stores as common user facilities • State governments, Ministry of Agriculture and Logistics Division to work with financial institutions to develop a plan for facilitating financing to farmers to encourage adoption of CA facilities through Negotiable Warehouse Receipts(NWRs) • Explore facilitating tapering subsidies for farmers to encourage adoption of CA facilities	State Government and Agricultural Marketing Board (HP & J&K)
14	Tomato and other perishables: Setup low-cost washing and drying lines at local mandis to improve sanitation and increase shelf life in transit or storage to improve farmer income by 14% - • Respective state governments to identify locations in local mandis and work with APMCs to set up washing & drying lines • Initiate pilots at select Mandis to demonstrate a proof of concept	State Government, local APMCs & FPOs

	• APMCs to invite companies to setup and run the lines and charge farmers on a pay per use model	
15	Tomato and other perishables: Setup low-cost cold room facilities as common user facilities for farmers as well as traders at local mandis for short term, transit and distribution storage to improve farmer income by 20% and reduce wastages by 10% • Respective state governments and state agricultural marketing boards to pilot select micro cold storages as a proof of concept • On-board startups and relevant partners, and offer space at local mandis to provide the facilities in a pay per use scheme	Agri-marketing boards - Maharashtra & Karnataka
16	All relevant fruits and vegetables: Explore adoption of insulated-ventilated containers attached to passenger trains for transporting tomatoes and other fresh produce from large producing regions to consumption centers	MoR, Trader Associations
17	Banana: Install mechanical cableways in dense banana plantations to reduce farm to packhouse/collection center transportation cost to improve farmer margins by 15% • To start with, initiate a pilot in one large plantation in Jalgaon region to test efficacy of the mechanization in partnerships with the farmer producer organizations • Based on success of the pilot institutionalize the specifications and locations for country wide rollout in banana plantations	APEDA, MSAMB for Pilot
18	Banana: Improve first mile road infrastructure to reduce damages in transporting banana bunces from farm to packhouse/mandi to save 260 crore logistics cost every year • State governments to seek feedback from farmer producer organization to prioritize projects to improve quality and width of roads, while also enabling larger trucks to collect produce from near the farm	Maharashtra and Tamil Nadu State Governments

	• Re-evaluate load capacities of bridges in dense banana plantation areas for supporting entry of larger vehicles near the farm	
Food grains		
19	Facilitate bulk movement of food grains with the focus to reduce wastages by upto 40% and reduce logistics costs of food grains with the potential to realize annual cost optimization of INR 2000- 2200 Cr • FCI to expedite setting up of 10MT of wheat silo next to rail sidings at identified locations • FCI to define a plan for migrating from traditional storage to silo based storage for all food grain storage in the country • FCI to fast track the procurement of bulk BCBFG wagons in line with silo capacity • FCI to lead pilot for set up of bulk silos for Rice and further plan for setting up country wide network silos • Ministry of Railways in consultation with FCI and CWRC identify land parcels for setting up wheat silos	Food Corporation of India, CRWC, MoR
20	Increase coastal shipment of food grains share from current ~0.15 MnT to ~7 MnT by focusing on 11 identified coastal routes to realize estimate cost optimization potential of INR 300-400 Cr • FCI to tender out identified routes for coastal shipment to enable price discovery and comparison with current conventional rail freight costs • Explore potential for bulk movement of food grains by the coastal route	Food Corporation of India, Shipping Corporation of India, Ministry of Shipping
21	Reduce all inter-state / long haul movement of paddy by 50% and ensure only milled rice is moved, by developing milling capacity in Tamil Nadu	Tamil Nadu Civil Supplies Corporation
Coal		

22	Increase use of conveyors for first mile transportation of coal from mine to rail sidings at existing mines, for rail sidings with loading greater than 4 MTPA to realize estimated cost optimization potential of INR 1200-1400 Cr annually • ~200 MTPA capacity across 27 mines identified • Ministry of Coal/ Coal India to explore feasibility and plan for the development of conveyors for first mile movement of coal (from mine to siding) at existing mines	Ministry of Coal
23	Increase coastal movement of coal to 220 MTPA from current ~30 MTPA to achieve cost optimization potential of INR 8000-8500 Cr annually • Ease railway congestion from Ib Valley and Talcher to Paradip and Dhamra by constructing new line • Mechanisation for capacity improvement at Paradip • Institutional framework for managing end to end logistics from mine to power plant by a third-party aggregator	Ministry of Railways, Ministry of Shipping
24	Increase share of inland waterway movement of coal to ~25 MTPA by focusing on identified NWs –1, 5, 4, 100, 110, 64, 73 to realize annual cost savings of INR 550-700 Cr • In short term, IWAI to expedite development of NW1 to start movement of coal. • IWAI to seek feedback from coal producers and power producers for prioritizing terminal locations, extent of mechanization, and facilities required at terminals • IWAI to develop a stakeholder communication plan to communicate the ongoing/planned developments to industry players to enable them to make their logistics plan accordingly • IWAI to prioritize development of NW-5 which is a critical element in coastal shipment of coal	IWAI
25	Ministry of Coal and Ministry of Power in discussion with the various power plants to explore potential for using washing coal for power plants which are >500 km away from pithead, use lower grade of coal, and where boiler is suitable to use	Ministry of Coal

	beneficiated coal to realize annual cost savings of INR 3000-3200 Cr • Based on potential identified, develop an action plan for setting up washing capacity. • Explore appropriate contracting and ownership transfer model for washed coal	
Containers		
26	Increase penetration of dwarf containers for domestic shipments • Logistics Wing to coordinate with CTOs for identification of domestic routes for dwarf container movement • Ministry of Railways to expedite approval of the identified railway routes	Ministry of railways
27	Explore feasibility for domestic containers to enter custom bonded area and leverage technological solutions (such as RFID) for segregation between EXIM and domestic goods	Department of Customs
28	Ministry of External Affairs to coordinate with the Ministry of Railways, Department of Customs to modify the Rail Service Agreement to allow all licensed CTOs to run EXIM trains to terminals in Nepal, Bangladesh etc	Ministry of External affairs
29	Department of Customs to explore possibility of allowing small value additions (eg packaging, labelling, marking, branding, quality testing etc) to be undertaken in ICDs	Department of customs
30	Department of Customs and Ministry of Railways to coordinate to facilitate linkage of the weight of container mentioned in ICEGATE to all licensed CTO systems and FOIS	Department of customs
31	Explore feasibility of allowing domestic container movement of commodities such as iron ore pellets, soap stone, gypsum, limestone, dolomite, quartzite, manganese ore, beryl, quick lime (burnt lime)	Ministry of Railways
32	Explore feasibility of developing a web based platform to facilitate interchange of containers and vessel slots between leasing companies, shipping lines, logistic companies etc (check feasibility of leveraging the Logistics e-marketplace portal)	Logistics Wing

Chemicals		
33	Revisit rules of DG transportation to consider allowing ISO containers for domestic transportation of chemicals via rail, coastal and inland waterway	PESO
34	Consider allowing pre-booking of RoRo Wagons, increase frequency of RoRo trains	Ministry of Railways
35	Consider revising CMVR rules in line with UN Model Recommendations for DG transportation with extensive consultation with the industry	MoRTH
36	Explore designing certification and authorization trainings for handling DGs during warehousing and transport on the lines of courses as provided by IATA	MoRTH
Parcels		
37	Introduce SWIFT module in Express Cargo Clearance System (Courier EDI) for e-clearance	Department of customs
38	Remove restrictions on perishable / commodities goods from Regulation 2 (2) (d) of Courier Imports and Exports (Clearance) Regulations, 1998	Department of customs
39	Permit ramp to ramp transfer from domestic to international aircrafts and vice versa	Department of customs
40	Modify policy to facilitate time-bound auctions, disposal and destruction of caged shipments to decongest the express facilities	Department of customs
41	Modify suspension of license rules of authorized couriers without preliminary investigation under the Regulation 14 of Courier Imports and Exports (Clearance) Regulations, 1998	Department of customs
42	Increase staffing of custom officers at Mumbai, Delhi, Bangalore and Chennai courier terminals	Department of customs
43	Explore extension of validity period of e-way bills for distances less than 100km	GST Council
44	Modify holding of shipment rules to allow truck release and issue notice for holding only the problematic parcels/consignment at the checkpoint or at service center	GST Council

45	Explore possibility of liability limit for carriers based on the commercial obligation in the entire transaction	GST Council
46	In case of courier service or mail services provided by Indian transporters to Indian registered customers exporting goods from India, the IGST tax charged should be available to the registered Indian exporter as input tax credit, even in case where the place of supply under Section 12(8) of the IGST Act is reported as 97-Other territories	GST Council / Customs
47	Explore relaxation of city entry restrictions for electric commercial vehicles to facilitate first/last mile connectivity	MoRTH and State Governments
48	Introduce well-defined time lines and objective check-list criteria for evaluating the express terminal proposals • Rationalize multiple permissions required from Customs even if the facility is within existing Customs bonded area • Allow operators to start operations using own security as airport access control at airside is already manned by CIS	BCAS/ Customs/ State Government
49	Allow foreign cargo airlines to self-handle security functions and obtain Regulated Agent Certification to facilitate ease of doing business (presently, International express cargo airlines registered in India are not permitted to carryout x-ray screening and security functions for their own cargo aircrafts)	BCAS
Interstate Movement		
50	Explore possibility of enabling E-way bill only if a vehicle has all valid documents including valid fitness certificate (including high security number plate, RFID (FAStag), Pollution Under Control certificate), Vehicle Registration certificate, relevant National/ State Permit and has no pending challans greater than 1 month	GST Council and MoRTH
51	Explore feasibility of providing access to data captured in various toll systems (such as automated vehicle classifier, weigh in motion, number plate recognition system, RFID) to RTO systems	MoRTH and State Governments

52	MoRTH to coordinate with State Governments to: • Facilitate 100% adoption of Vahan and E challan systems • Mandate standardized high security registration plate, FASTag and Pollution Under Control certificate for issuance of Vehicle Fitness Certificate • Mandate standardized high security registration plate, FASTag for issuance of National Permit • Mandate issuance of Fitness Certificate, National Permit only through Vahan	State Governments and MoRTH
GST		
53	Notify single GST rate for Multimodal transportation and value added services for Logistics industry (for non-EXIM trade)	GSTN
54	Allow input tax credit for warehousing & related services for service recipient outside State	GSTN
55	Continue exemption to international air / sea freight to ensure level playing field for Indian businesses	MoC
56	Provide zero-rating of services for transhipment of goods at ports	GSTN
57	Grant IGST exemption for import of vessels by Indian flag carriers	GSTN
58	Allow seamless input tax credit for GST paid on bunkers and spare parts for coastal shipment	GSTN
Skilling		
59	Curriculum prescribed by ASDC for commercial drivers in National Quality Packs to be made mandatory for trainings	State Governments and MoRTH
60	Facilitate single window for setting up driver training institutes comprising MoRTH, state governments and Logistics Division to streamline approvals required for setting up the institute	MoRTH, State Government and Logistics Division

61	Explore the idea of mobile truck driving schools for remote locations (LMV to HMV training)	MoRTH and Logistics Division
62	Explore making truck driver training mandatory through ASDC / LSC approved IDTRs / DTIs	State Governments and MoRTH
63	Enable transparency in driver licensing process across states by making it completely online and transferring driving test authority from RTOs to driver training institutes approved by ASDC or other third party -Recommend policy modifications eg. checking for literacy during driving test instead of educational qualification	State Governments and MoRTH

The rationale, issues and impact of these interventions are covered in details in following chapters.

The Integrated National Logistics Action Plan will now enter phase II, where the focus will be on implementation of the identified interventions in coordination with all relevant stakeholders. Also additional areas may need to be further deep-dive such as various process initiatives in sea ports, land ports and air ports, and interventions for promoting of green and sustainable logistics, interventions for streamlining movement of over-dimensional cargo will be covered in the next phase of the plan.

Introduction and Challenges

An effective and efficient logistics ecosystem can be a key contributor to robust economic growth in the country, with the potential to facilitate domestic and foreign trade, promote global competitiveness, enhance incomes, drive the 'Make in India' initiative and reduce economic disparities across geographies. The sector is one of the most important accelerators of trade in the country. Specifically, an efficient supply chain network has the potential to increase farmers' income manifold, which can lead to a domino effect on the overall economy. A reliable, efficient and cost-effective logistics infrastructure for commercial goods is hence critical to India's continued inclusive and rapid economic growth.

An efficient and reliable logistics network coupled with a transparent and consistent cross border trade facilitation process is a key driver of export competitiveness in the country. It acts as an enabler for expanding the foreign markets for indigenous goods. An efficient logistics ecosystem will also encourage investments in the country, especially FDI and will in turn positively impact international trade

Despite the recognition of logistics being a critical driver of economic development, logistics cost in India, estimated at 13-14% of GDP, is very high (USA 9-10%, Europe 10%, Japan 11%) compared with more efficient global environments, and the sector continues to be highly unorganized. India also has a skewed modal transportation mix, with 60% of freight moving on roads, which is significantly larger than in key developed economies. Also, different parts of the logistics value chain currently are being managed by many ministries including Road Transport and Highways, Shipping, Railways, Civil Aviation, Commerce and Industry, Finance and Home Affairs. In addition, a large number of government agencies provide relevant trade clearances and impact the value chain.

Government of India has also recognized the importance of the sector to propel the future growth of the country and a Logistics Wing has been created consequent to an amendment to the second schedule of the Government of India (Allocation of Business) Rules, 1961, on 7th July 2017, allocating the task of "Integrated development of Logistics sector" to the Department of Commerce and Industry. Some of the activities like cold chains, multi-modal logistics parks etc. in the logistics sector have also been included in the Harmonized Master List of Infrastructure sub-sectors' and has been granted infrastructure status in November 2017 which will enable the sector to avail infrastructure lending at easier terms with enhanced limits, access to larger volume of funds as External Commercial Borrowings (ECB) and access to longer tenure funds from insurance companies

Thus there is a need to take an integrated view of logistics in India which will address the key challenges such as:

- High cost of logistics, which is impacting competitiveness of Made in India goods in the domestic & global markets
- Unfavorable modal mix (Roadways >60%) leading to high reliance on roadways and suboptimal development and usage of other modes.
- Inadequate and low-quality modal and terminal transport infrastructure & limited availability of multi modal interchange points
- Lack of first and last mile connectivity especially in the hinterland from the ports
- Lower fleet mix on roadways which further increases the costs of transport
- Under-developed material handling infrastructure leading to more than 90% of the handling done manually which increases costs and time to transport
- Fragmented warehousing with no data on location, size and utilization of warehouses
- Inefficient and ill-designed storage facilities for cargo and containers with no well-defined protocols on operation and maintenance

- Multiple regulatory/policy making bodies overseeing the field of logistics leading to both delays in execution of logistics infrastructure projects and also lack of integrated infrastructure planning
- Procedural complexities arising out of cumbersome and duplicate processes leads to higher dwell time and inefficient use of logistics infrastructure
- Lack of skilled manpower in truck drivers, seafarers, warehousing managers and quality inspection supervisors
- Lack of a nodal agency for logistics to coordinate with various government stakeholders
- High wastages in agri-logistics reducing the reach of agri products and absence of cold chain critical for market linkages

The various goals of the Integrated National Logistics Action plan, which are targeted to be achieved over the next five years are as follows:

- Driving logistics cost as a % of GDP down from estimated current levels of 13-14% to 10% in line with best-in-class global standards[1] and incentivize the sector to become more efficient by promoting integrated development of logistics
- Optimizing the current modal mix (road-60%, rail-31%, water-9%) in line with international benchmarks and promote development of multi modal infrastructure. At present, there is a gap in the availability of MMLP infrastructure for enabling seamless multimodal freight transfer, providing world class storage and handling as well as delivering value added freight services. Even where ICDs' and CFSs' have been created, there is potential to improve their utilization and performance

[1] USA: 10% , Germany : 9%

- Improving first mile and last mile connectivity to expand market access of farmers, MSMEs and small businesses
- Enhancing efficiency across the logistics value chain through increased digitization and technology adoption
- Ensuring standardization in logistics (warehousing, packaging, 3PL players, freight forwarders)
- Increasing employment in the logistics sector by generating additional jobs and focusing on enhancing skills in the sector and encouraging gender diversity
- Reducing losses due to agri-wastage through effective agri-logistics involving access to cold chain, packaging and other post-harvest management techniques and thereby enhance agriculture price realization and farmer income

Approach and Methodology

To develop the National Logistics Action Plan, five key work streams were identified involving the following:

1. **Commodity Corridor Analysis:** Top 8 commodities, covering 60% of the movement were identified and for their detailed value chain analysis, top O-D pairs were mapped. Various benchmarks such as modal mix, unit transportation costs and logistics costs as a percentage of sales price were determined. Key interventions to improve logistics efficiency and efficacy were recommended, which were then translated into an action agenda for the National Logistics Action Plan.

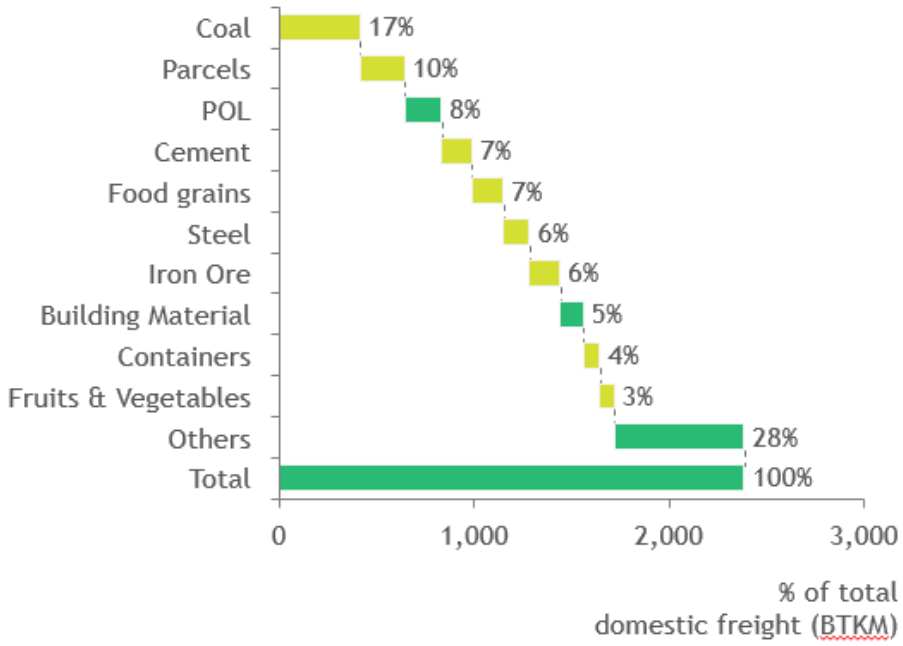


Figure 1: Top Commodities selected for the Analysis

2. **Processes:** Process interventions in each of the above commodities, related to smoother flow of goods and lowering logistics costs were identified. An analysis on

interstate road transportation of goods was carried out to identify various reasons causing toll and non-toll stoppages. GST, which has been a gamechanger for the logistics industry was analysed to identify gaps in its applicability to multi-modal transportation and stakeholder inputs from major channels were incorporated in the action plan to simplify it and enhance compliance

3. **Policies:** Various policies relating to the development of the logistics sector through efficient use of infrastructure, optimized movement of goods, and other guidelines effecting lower cost of logistics were created with focus on the National Logistics Policy, MMLP Policy & the Model Warehousing Policy
4. **Skilling:** The logistics skilling landscape of India was studied to identify gaps and also to understand levers for increasing employment in the logistics industry. Skilling in the truck drivers segment, who make up of a significant portion of the logistics workforce was analyzed and interventions to enhance the employment in the sector were identified.
5. **Logistics Geo-Analytics Tool:** A National Logistics Geo-Analytics tool was conceptualized to monitor and optimize the current movement of various commodities, pan India and act as a tool for various government stakeholders to plan for infrastructure and also monitor performance of current logistics infrastructure in the country.

A holistic approach was followed where all the key aspects of logistics including transportation on various modes, warehousing, handling and order processing were studied to create the action plan. An intensive data centric approach was adopted along with inputs from over 200+ industry stakeholders. Also, at each stage, relevant government departments as well as PSUs were consulted to seek their inputs and align them on the final recommendations. These include MoRTH, Ministry of Shipping, Ministry of Civil Aviation, Railways, IWAI, Ministry of Steel, Agriculture Ministry, Customs, FCI, Coal India Ltd., GSTN, CWC among others.

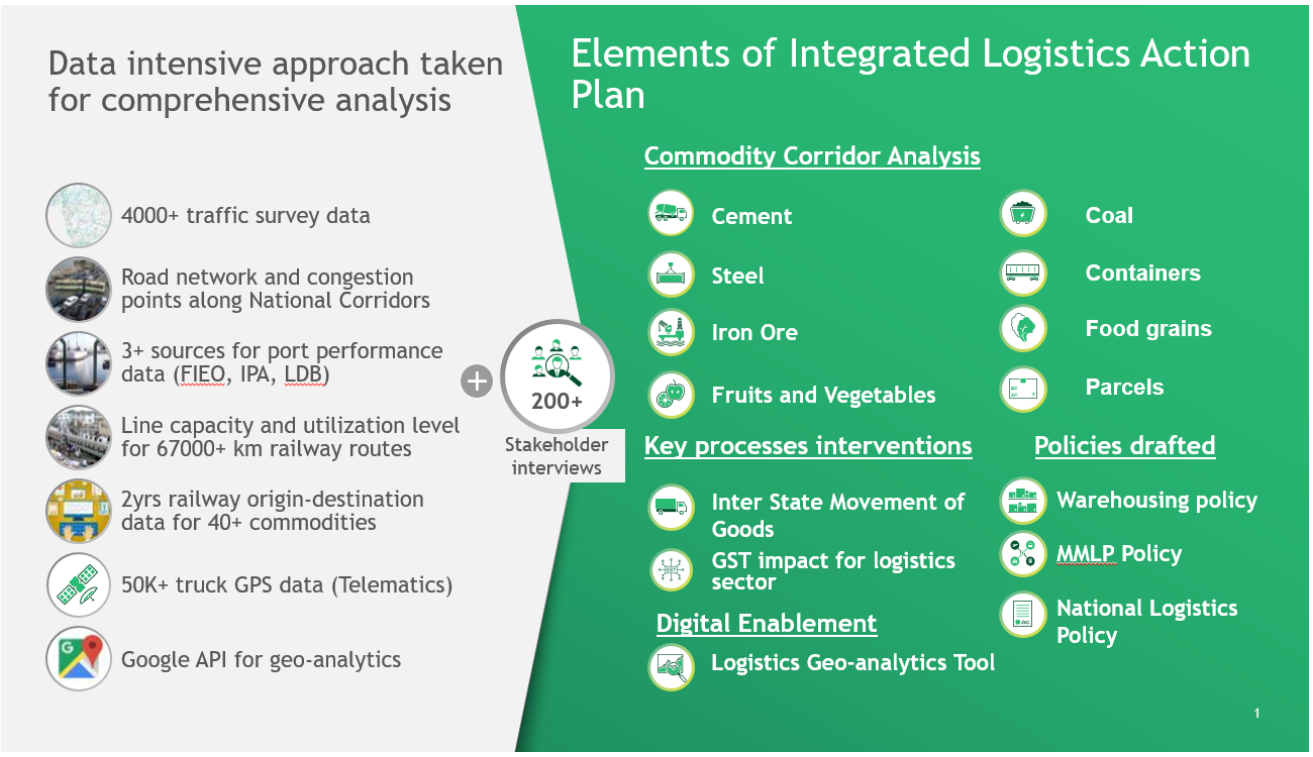
Figure 2: Various Government Stakeholders consulted

A detailed list of the stakeholders consulted has been included as a part of Appendix B

A data intensive approach was undertaken to analyse and develop initiatives:

- 4500+ traffic survey data
- Road network and congestion points along National Corridors
- 3+ sources for port performance data (Federation of Indian Export Organizations, Indian Port Association, Logistics Data Bank)
- Line capacity and utilization level for 67000+ km railway routes
- 2yrs railway origin-destination data for 40+ commodities
- 50K+ truck GPS data (Telematics)
- Google API for geo-analytics
- Previous Government studies – Sagarmala, Bharatmala etc
- Price and Arrivals data on fruits and vegetables from NHB and DMI

A summary of the approach has been explained in the figure below


Data intensive approach taken for comprehensive analysis
4000+ traffic survey data
Road network and congestion points along National Corridors
3+ sources for port performance data (FIEO, IPA, LDB)
Line capacity and utilization level for 67000+ km railway routes
2yrs railway origin-destination data for 40+ commodities
50K+ truck GPS data (Telematics)
Google API for geo-analytics
200+
Stakeholder interviews
Elements of Integrated Logistics Action Plan
Commodity Corridor Analysis
Cement
Steel
Iron Ore
Fruits and Vegetables
Coal
Containers
Food grains
Parcels
Key processes interventions
Inter State Movement of Goods
GST impact for logistics sector
Policies drafted
Warehousing policy
MMLP Policy
National Logistics Policy
Digital Enablement
Logistics Geo-analytics Tool
1

Chapter 1: Commodity Corridor Analysis - Cement

Contents

1 Context

In line with the mandate given to the Logistics Wing to integrate and optimize the several elements of the logistics value chain, this chapter covers the action plan to optimize the logistics cost of cement in India.

India is the **second largest producer** of cement in the world after China[1] with ~280 MT cement production. Cement freight contributes to **~7% of the total freight[2]** movement in the country and it is the fourth largest commodity movement in India. Indian cement industry expected to continue to **grow at 7% CAGR** over next 5 years[3].

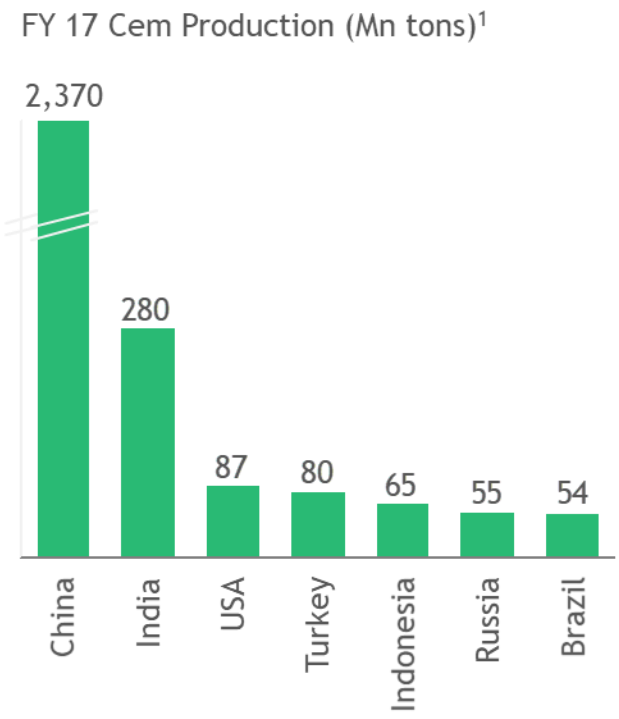


Figure 1: Cement production in India

Logistics cost includes the cost of freight, packaging, handling, loading, unloading, inventory, and storage. The logistics cost for Indian firms ~at 22-25% of revenue is higher than that of global leading firms at ~10-16% of revenue. The difference can partly be

[1] Source : Global cement report 2017
[2] As per Planning commission Total Transport System Study on Traffic Flows and Modal Costs (Highways, Railways, Airways and Coastal Shipping)
[3] CMA, State GDP of India, BCG demand model, analyst reports

attributed to the higher cement prices in the developed economies and partly to inefficiencies in cement transportation in India

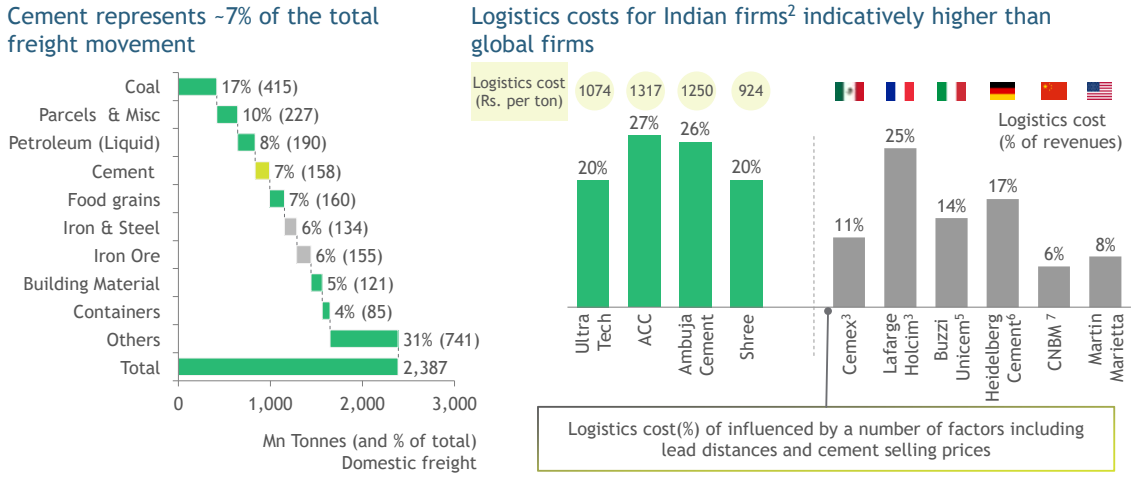


Figure 2: Cement Logistics cost in India

Given that the Indian cement demand is estimated to reach ~450-500 MT by FY 2025[4], it is imperative to achieve higher cost efficiencies in logistic performance of the industry. This would result in reduction in the cost of logistics in India and make the Indian cement industry more competitive in India and for exports.

This report details out the initiatives identified to reduce the logistics cost of the cement industry.

2 Approach Methodology

The cement industry constituting ~7% of the total freight in India was analysed by major traffic flow corridors. The key supply clusters and the district level demand of cement was identified. The analysis includes establishing the key supply and demand centers, determining modal mix, calculating the unit transportation costs across different modes, plotting the major origin-destination pairs for road, rail and juxtaposing them with congestion and 4500+ traffic data points. The demand of each state was further broken into district wise demand.

This was supplemented by detailed discussions with relevant stakeholders -- cement manufacturers, cement dealer associations, 3PL players, transporters, truck aggregators,

[4] CMA, State GDP of India, BCG demand model, analyst reports

Ministry of Road Transport & Highways, Ministry of Railways, Central Railside Warehousing Corporation, Shipping Companies, and port associations. Existing reports and representations made by Cement Manufacturing Association were also referred to while drafting the interventions.

The initiatives focus on reducing freight cost, reducing storage & handling costs, improving modal mix, and laying out a roadmap for future infrastructure creation across modes to minimize overall logistics cost of the country. Subsequently, discussions on the identified set of initiatives have been done with respective ministries such as Ministry of Railways, Ministry of Road Transport & Highways for alignment and implementation.

3 Landscape

3.1 Supply and demand dynamics

The Indian cement industry can be disaggregated into regional clusters of supply and demand. There are ~ 12 key supply clusters located all over India. The supply clusters are primarily around limestone deposits. The total manufacturing capacity of cement is ~420-450 MTPA. It is expected to grow at 3.5-4.5% CAGR over next 5 years.

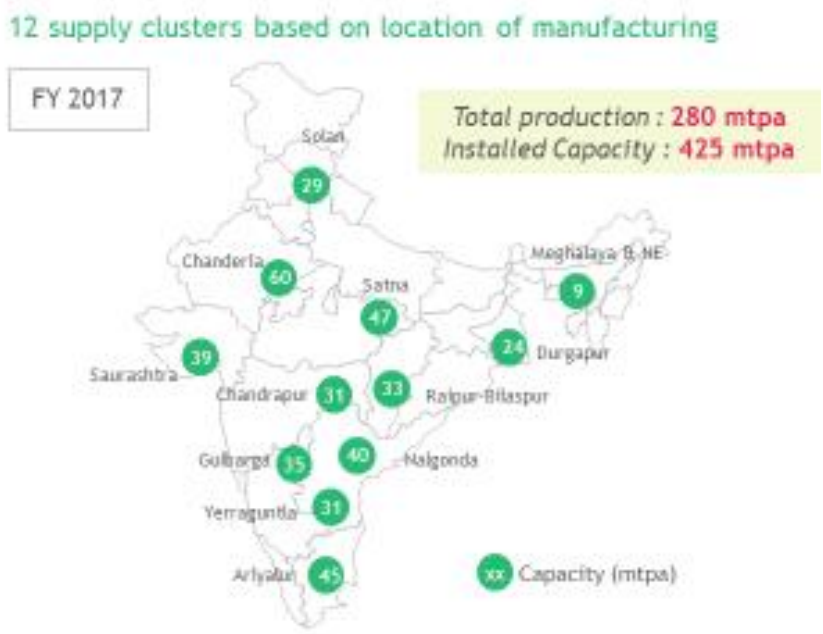


Figure 3: India Cement production

As discussed earlier, cement demand is poised to grow at ~7% to reach 450-500 MTPA by FY 2025. It is distributed throughout the country. The nationwide demand was divided into demand of individual states.

Figure 4: State wise cement demand

The demand of all states was further divided into district-wise demand. As an illustration, the district-wise demand of Rajasthan state has been shown below.

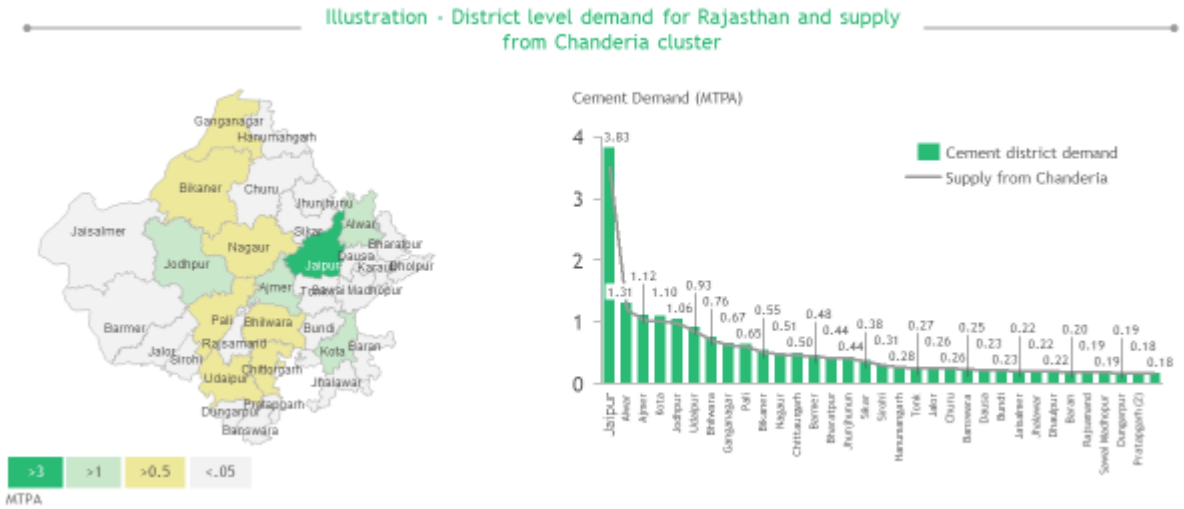


Figure 5: District level demand

3.2 Cement Movement

Cement is a localized business with average lead lesser than 600 km. Top 10 corridors of cement movement make up ~56% of the total cement movement.

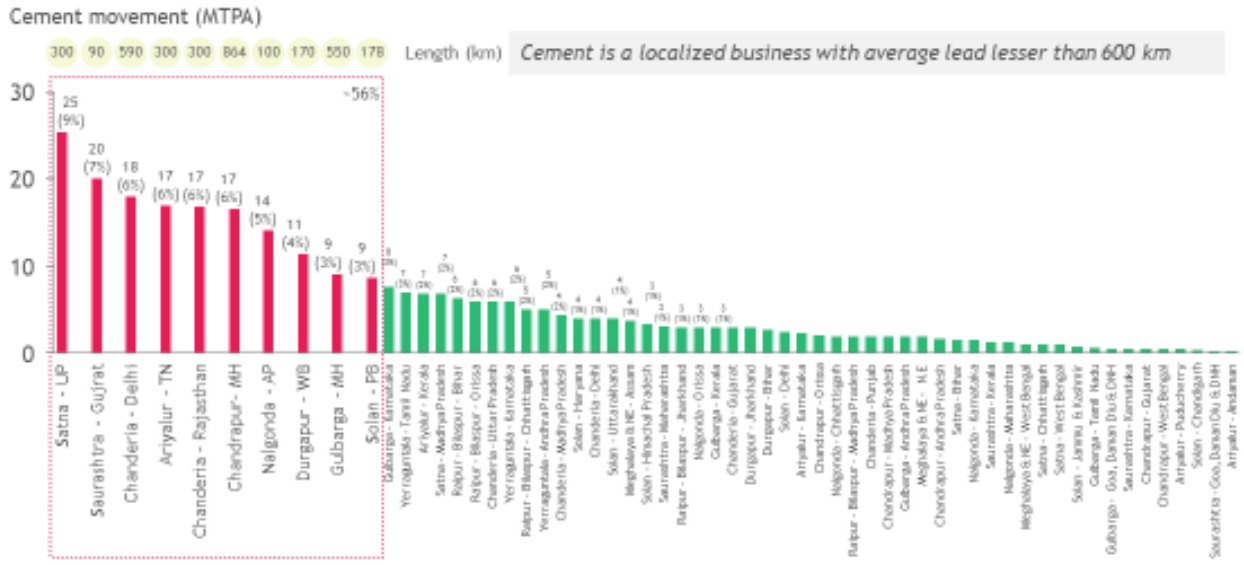


Figure 6: Top cement movement corridors

3.3 Bulk and bagged cement

There are two forms of transporting cement in India: 50 kg bags and bulk form. Bulk cement is required by institutional customers whereas bagged cement by retail customers. Even though 35-40% of cement demand in India is from institutional customers, only 20-25% of cement in India is transported as bulk cement and the remaining in bagged form. This is in contrast to >80% of cement transported as bulk in developed markets.

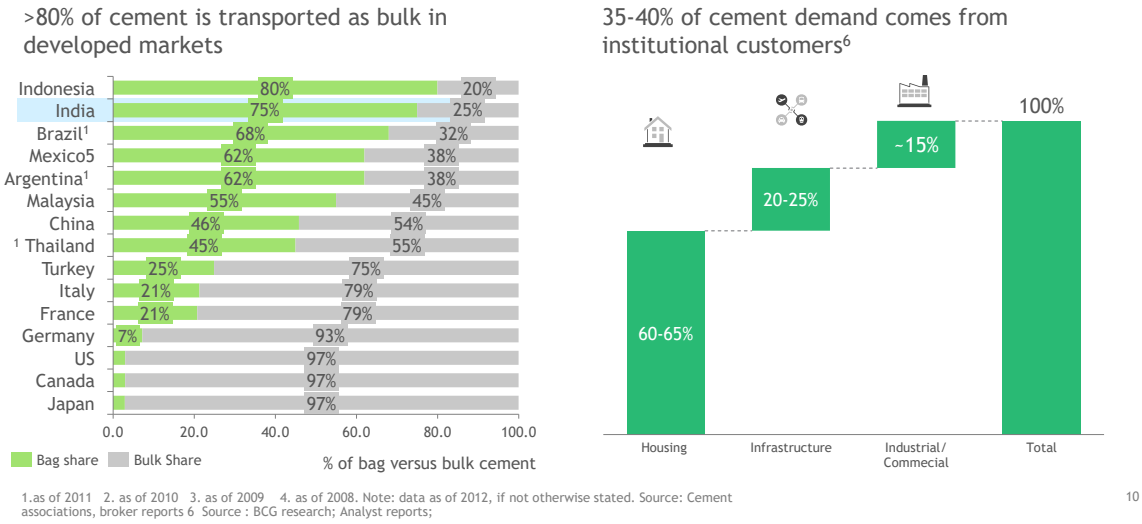


Figure 7: Bulk and Bagged Cement share comparison

3.4 Modal mix

The modal share of cement in India is skewed towards road transportation. ~70-72% of cement in India is transported by road, ~26-28% by rail and ~2% by coastal transportation. This is in contrast to global cement movement where rail is the dominant mode of transportation. ~50% of cement in United States and ~90% of cement in Russia is

transported through rail. The rail share of cement in India has decreased from ~41-43% in 2008-09 to ~26-28% in 2016-17[5].

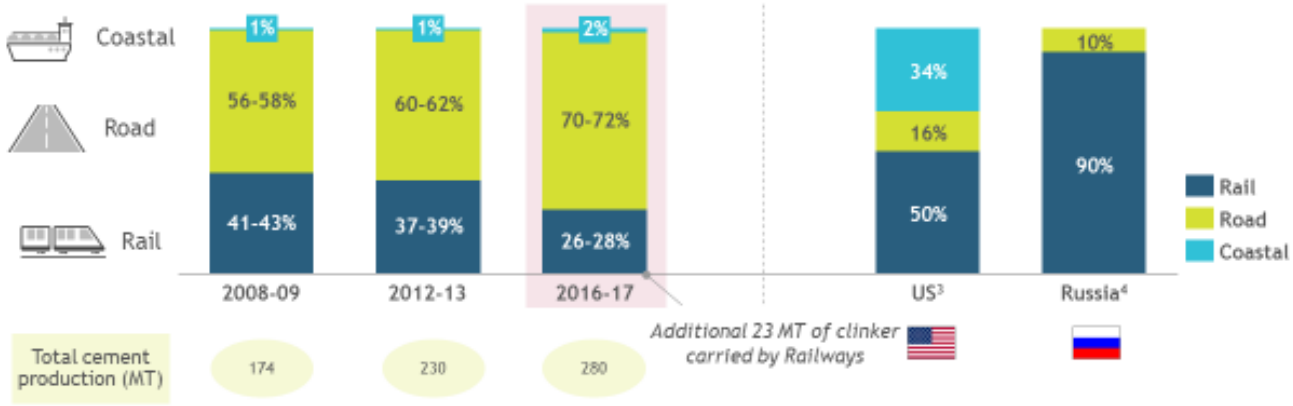


Figure 8: Modal share of cement in India

3.5 Modal economics:

As seen from the figure below, the logistics cost per ton per km varies significantly across the different modes of transportation as a function of the lead distances. Logistics cost mentioned below include handling costs, first mile/last mile costs, inventory costs, storage, wharfage, demurrage, and freight costs. In case of bagged cement, transportation by road is the cheapest form of transport till ~300 km beyond which rail becomes the cheapest till ~1400 km. In case of bulk cement, transportation by road is the cheapest form till ~200 km beyond which rail becomes the cheapest form of transportation till ~1400 km.

[5] Railway data basis railway reported annual reports and FOIS data; Railway reports Clinker and Cement together. Cement share has been estimated from the overall share. 2 Road and coastal movement data basis expert discussions, Indian ports association report and multiple industry reports

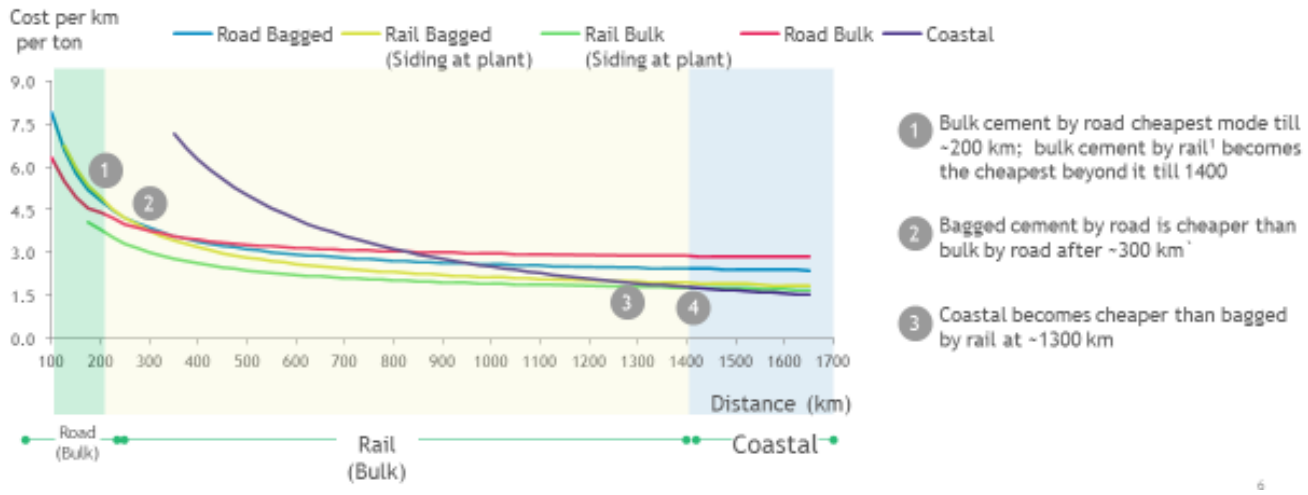


Figure 9: Logistics cost per ton per km for different transportation modes

Detailed cost break-up of the above costs has been provided in the appendix.

4 Key challenges

This section of the report details out the issues faced by cement players and other stakeholders across the various modes of transportation leading to sub-optimal logistics cost.

a) **Lack of bulk handling and storage infra:** There is a lack of bulk cement storage silos at top demand centers of cement. Even at large construction sites, there is limited handling and storage infrastructure for bulk cement

b) **Lack of storage facilities at rail terminals:** There is a shortage of cement storage facilities at railway sidings and terminals (for both bagged and bulk cement). Dedicated cement rail warehouses (at CRWC sidings) have a capacity of only 0.33 MT[6]. The lack of capacity at existing sidings lead to either delay in unloading rakes which leads to higher demurrage costs or it cement companies store cement in warehouses away from terminal incurring additional handling and freight expense.

[6] Central Railside Warehousing corporation reported warehouses on its website, December 2018

c) **Low mechanization at rail heads :** Cement handling is manual at rail stations. This leads to higher costs and time. Presence of unions further add to the costs eg Mathadi unions in Maharashtra charge upto 2-3x of handling costs at other stations. Frequent delays in unloading lead to higher demurrage charges

d) **Lack of coastal shipping infrastructure :** Lack of handling and storage space at ports leads to mismatch between port handling and in-land infrastructure capacities. Insufficient number of dedicated coastal berths results in longer lead times for transportation. Loading/ discharge is manual and controlled by unions in many ports.

e) **Low Rake Availability :** Railway rake availability is a major challenge particularly during peak season. This forces cement manufacturers to use trucks for longer distances and makes rail unreliable

f) **Unpredictable delivery times by rail :** Delivery time by railways cannot be predicted as corridors are congested and freight trains are given low preference. 492 out of total 1219 Sections of Indian Railways i.e. 40% of Sections are running at 100% or above line capacity[7]. Unavailability and unpredictability of rakes make rail freight unattractive and adds Rs~200-400/ton of nominal cost. This is not the actual cost paid by the industry but the opportunity cost of lost sales due to unpredictability of rail when compared to road movement.

g) **Frequent stoppages at checkpoints via road :** Frequent stoppages of the truck on the road add to delays.

h) **Lack of mechanism to use open rakes :** As discussed above cement specialized wagons (BCN &BCNHL for bagged; BTAP & BCCW for bulk) have low availability but the general open wagons have higher availability , the general wagons (BOXN, BOXNHL) cannot be used without incurring significant damages due to absence of technology

[7] Lifeline of the nation – White paper by Indian Railways, February 2015

5 Recommendations and action agenda

Cement is indispensable for nation building and is inextricably linked with country's growth. Given the increasing demand of cement in the country, there is a need to overcome the aforementioned challenges in a structural manner to ensure sufficient infrastructure capacity and its efficient use.

5.1 Summary and End state

Several initiatives to overcome the above mentioned challenges were identified and evaluated. The interventions leading to annual savings of INR ~3500 - 3600 Cr have been listed below.

a) Explore feasibility of setting up integrated cement terminals at 22 identified locations
b) Upgrade rake handling capacity at existing identified railway sidings
c) Increase cement coastal shipment share from ~1% to 5% by focusing on 11 identified coastal routes
d) Increase cement inland waterways share from <1% to 6% (18MTPA) by focusing on NW-4, NW-100, NW-1, NW-64, NW-110
e) Facilitate increased rail share by decreasing congestion and improving rake availability on identified cement corridors

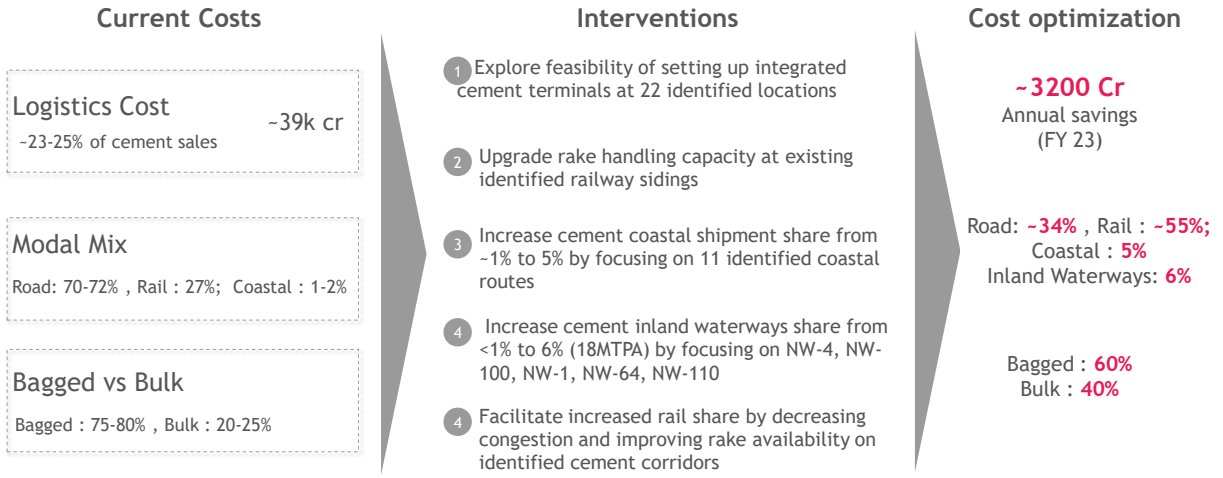
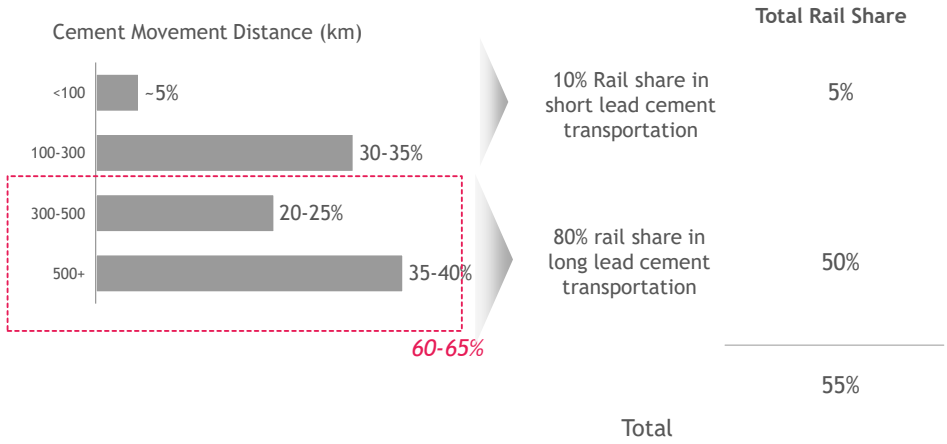


Figure 10: Cement Summary Recommendations

The rail share target is of 55% as shown in the figure below



As per Total Transport System System Study on Traffic Flows and Modal Costs (Highways, Railways, Airways and Coastal Shipping)

A list of routes where share of railways is low has been provided in the appendix.

5.2 Integrated cement terminals at 22 identified locations

As highlighted above, Indian cement industry has a skewed modal mix and an over-reliance on bagged cement when compared to cement industry in the developed world. One major reason for such an industry structure has been the lack of bulk cement handling and storage facilities and high overall costs in rail transportation of cement. Both of these can be addressed by using integrated cement terminals at railway station which have bulk cement handling & storage facilities. Similar terminals are also present in other countries. Details of the terminals present in United States have been given below. An integrated cement terminal in India is proposed to contain the following –

1. The terminal will have rail unloading facilities so that cement can be transported into the terminal using railway rakes
2. Bulk and bagged cement storage facilities
3. Automated bulk and bagged cement handling
4. Bulk cement loading facilities to trucks

Additionally, the following facilities may also be present at select terminals based on local requirement

1. Bagging facilities to convert bulk cement to bagged form
2. Blending facilities

5.2.1 Global benchmarking

United States cement industry is organized into a network of 362 terminals. These terminals provide both bulk and bagged cement storage handling facilities along with value added services. Nearly half of the deliveries of cement are via such terminals. These terminals are either rail terminals or ship terminals or both. A schematic of a typical terminal has been shown below.

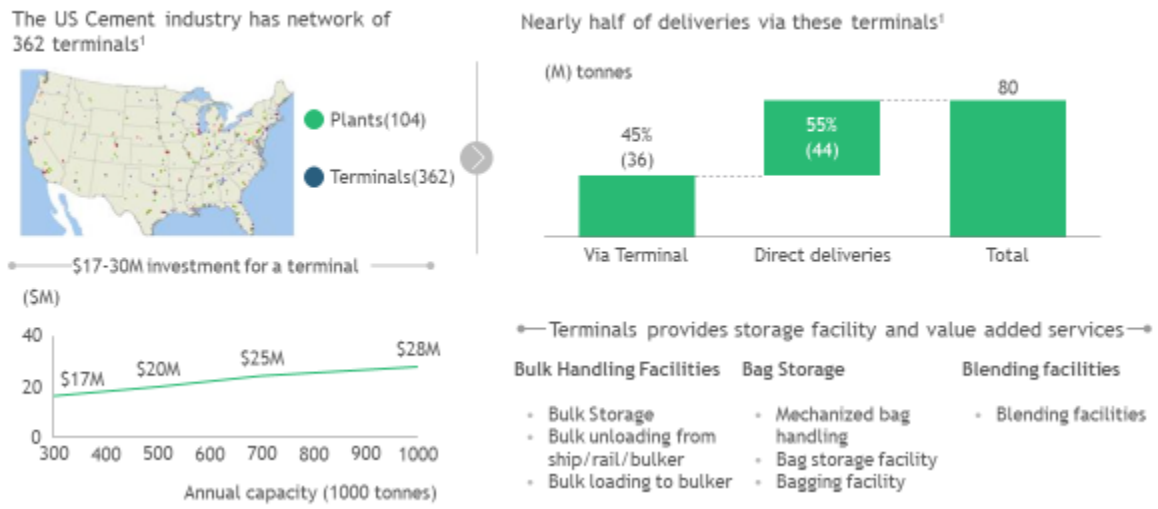


Figure 11: Terminals in the US cement industry

These terminals provide the following facilities.

Bulk Handling Facilities

- Bulk Storage
- Bulk unloading from carrier–ship/rail/bulker
- Bulk loading to bulker

Bag Storage

- Mechanized bag handling

- Bag storage facility
- Bagging facility

Blending facilities

- Blending facilities to prepared blended cement
- Bagging and bulk transport for blended cement

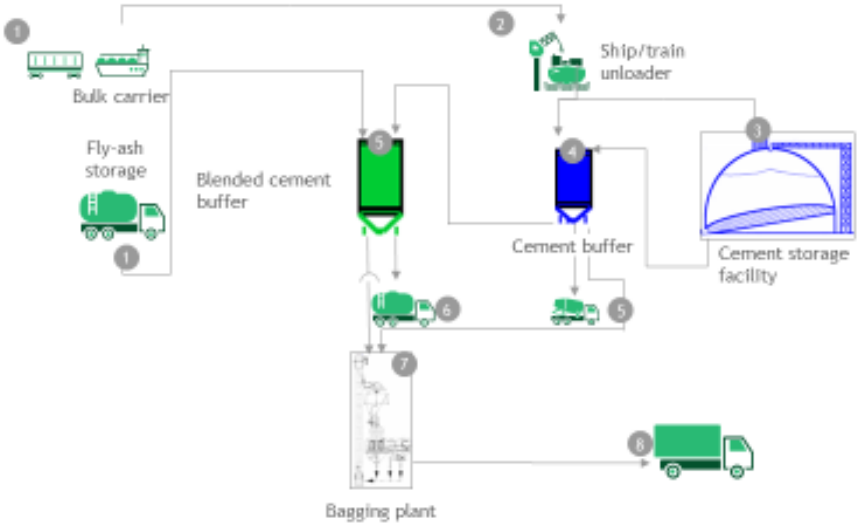


Figure 12: Representation of a typical cement terminal in US

5.2.2 Requirement for terminals in India

a) Secondary freight cost: In the current scenario, due to lack of storage at rail terminals, cement needs to be stored at secondary warehouses. This leads to additional secondary freight transportation cost. ~30% of cement transported by rail is stored in secondary warehouses.

b) Limited bulk handling facilities at rail terminals : Facility to handle bulk cement is low at rail terminals resulting in 1% of cement in bulk by rail

c) Low mechanization at rail terminals : As covered in Section 4 : Key Challenges, handling of cement is manual at public sidings

d) Limited scale benefit : Individual cement players maintain their own small secondary warehouses and are unable to take scale benefits

5.2.3 Cement terminals in India

A three step approach was used to identify location of cement terminals in India.

a) Largest demand centers with highest growth potential of cement were identified
b) The demand in each was broken into retail demand and institutional demand.
    a. High institutional demand : Institutional customers require bulk cement and hence such centers to focus on setting up bulk terminals
    b. High retail demand: Retail requires bagged cement and hence such centers to focus on bag handling facilities in wave 1 and such centers to develop bulk facilities in wave 2.
c) The list was discussed and finalized with cement manufacturers association, its member firms, and with other cement manufacturing players

22 locations were identified for cement terminals. These are as follows -

S. No	State	Location	Type
1	Maharashtra	Mumbai/Thane*	Wave 1
2	Delhi	Delhi*	Wave 1
3	Rajasthan	Jaipur*	Wave 1
4	Delhi - NCR	Near Gurgaon or Ghaziabad*	Wave 1
5	Uttar Pradesh	Lucknow	Wave 1
6	West Bengal	Asansol or Bardhaman	Wave 1
7	Gujarat	Ahmedabad*	Wave 1

8	Gujarat	Surat	Wave 2
9	Gujarat	Vadodara	Wave 2
10	Karnataka	Bangalore*	Wave 1
11	Tamil Nadu	Tuticorin	Wave 2
12	Uttar Pradesh	Agra	Wave 1
13	Uttar Pradesh	Varanasi	Wave 2
14	Uttarakhand	Roorkee or Sidcul	Wave 2
15	Maharashtra	Akola	Wave 2
16	Jharkhand	Jasidih	Wave 2
17	Bihar	Danapur or Fatuah or Sarai	Wave 2
18	Bihar	Raxaul or near Raxaul	Wave 2
19	Jammu & Kashmir	Kathua or Jammu	Wave 2
20	Punjab	Bhatinda	Wave 2
21	Punjab & HP	Chandigarh	Wave 2
22	Odisha	Bhubhneshwar or Dhenkanal or Jagannathpur or Cuttack	Wave 2

Table 1 List of locations identified for integrated cement terminals

The * marked locations are common for cement and steel terminal.

5.2.4 Cost optimization potential

There is a total cost optimization potential of Rs ~1700-1800 Cr per annum. There are four levers for it. These are

	Savings lever	Unit Savings (Rs/ton)	Impact (MTPA)	Total Savings (Rs Cr)	Remarks
1	Savings due to Secondary Freight	400-450 per ton	12-15 MTPA	~500-600	As cement will not be required to be transported to a secondary warehouse, the cost of transportation shall be saved
2	Savings due to better handling	Rs 80-120/ton	50 MTPA	~400-500	As bulk cement requires automation, labour cost can be reduced Also automation in bag handling further reduces handling costs
3	Savings due to increase in share of bulk cement	Rs 190-200/ton	30-35 MTPA	~600-700	Cost savings due to using bulk instead of bagged (To avoid double counting, handling and downstream cost savings are not a part of this)
4	Savings due to increase in modal mix of rail	Rs 70-80/ton	25-30 MTPA	~150-250	Cost savings due to increase in share of rail
	Total			~1700-1800	

Table 2 Cost optimization potential for integrated cement terminals

5.2.5 Cost of terminals

The cost of setting up a cement terminal depends on a number of factors. They have been explained below

Cost Head	Cost (INR)
Civil Works incl. infrastructure (20000T RCC Silo)	~60 cr
Plant and Machinery Incl Contractor cost	~25 cr
Technical Knowhow / Supervision Fee	~0.7-1 Cr
Miscellaneous Fixed Asset	~1-1.5 Cr
Pre-Operative Expenses	4-5 cr
DG set (750 KVA) for emergency	~.7 Cr
Miscellenaous expenses and Contingency	~2-5 Cr
Land (10 acres)	Vary by location 8-12 Cr
Total	~100 - 110 Cr

5.2.6 Action agenda

To achieve the above objective, an inter-ministerial coordinated effort is required. The following action agenda has been drafted post the inter-ministerial consultations on 1st of November, 2018 coordinated by the Logistics Wing.

1) In consultation with cement manufacturers, Ministry of Railways (MoR) to identify land parcels (where available) for setting up the integrated terminals for cement at the identified locations
2) MoR to draft a contracting model for development of terminals
3) The development of terminals to take place in a phased manner. MoR to invite private participation and bid out a pilot terminal

4) The development of wave-1 terminals to follow after incorporating feedback from pilot terminal.

5.3 Increase share of coastal transportation

As identified earlier, coastal transportation is the most efficient mode of transportation of cement for distances greater than ~1400 km. India is richly endowed with natural maritime advantages, with a 7,500-km coastline covering 13 states and union territories, a strategic location on key international trade routes and 14,500 km of navigable and potentially navigable waterways. More than 1 bn tonnes of cargo was handled across over 200 ports in FY 2015. Coastal and inland waterway transportation is energy efficient, eco-friendly and reduces logistics costs for domestic freight. However, the Indian coastline and river network has historically remained under-leveraged.

Despite the vast coastline with large production and demand centers close to the coast, only ~2% of cement is transported through coastal mode. Industrial development has not fully utilised the structural advantages of efficient supply chains leveraging proximity to coast.

5.3.1 Challenges to coastal shipment

A detailed discussion with the industry stakeholders highlighted the following challenges to coastal shipment:

a) Insufficient port connectivity: Most of the major ports are constrained with insufficient rake availability and evacuation problems Railway routes to/from ports is congested. This makes first and last mile transportation unpredictable.
b) Lack of cement handling facilities at ports : Lack of capacity and dedicated cement berths at ports
c) Multiple stakeholder interaction: Several transport segments such as first mile, main haul by sea and last mile lead to the manufacturer dealing with multiple stakeholders for shipment and handling. A key step here would be to encourage end-to-end coastal shipment solutions provided by third part players

5.3.2 Potential routes identified

The movement through coastal route consists of seven elements. These are

1) Loading at Factory
2) First mile movement from plant to load port
3) Storage and handling charges at load port
4) Ocean freight
5) Handling charges at discharge port
6) Last Mile Freight from port to the demand centre
7) Damages, Pilferage and Inventory costs

The seven costs together determine viability of coastal movement for a corridor. In India, the production centers of cement are located mostly close to limestone deposit clusters. Of these clusters, the clusters in state of Gujarat, Tamil Nadu, and Andhra Pradesh are close to the coast.

The consumption clusters are spread across the country depending on urbanization and industrialization.

In this report, potential routes for coastal shipment for cement have been identified through an analysis of the key origin destination inter-state rail and road movements across the country. The figure below provides a summary of the potential routes for coastal movement of cement in MT

#	From	To	In Current Year terms[1]	FY25	Savings[2]	Preferred Nature
1	Gujarat	Maharashtra	3.5 -4	6 - 6.5	~200	Bulk
2	Gujarat	Gujarat	1.5-2	3.5 – 4		Bulk
3	Andhra Pradesh	Odisha	2-2.5	3 – 3.5	~250	Clinker/Bulk
4	Tamil Nadu	Odisha	1-1.5	2 – 2.5	640	Clinker/Bulk
5	Andhra Pradesh	West Bengal	1-1.5	2 – 2.5	350	Clinker/Bulk
6	Andhra Pradesh	Kerala	0.8-1.2	1 – 1.5	~100	Clinker/Bulk
7	Maharashtra	Karnataka	0-0.5	0.5 – 1		Bulk

8	Maharashtra	Kerala	0-0.5	0.5 – 1		Bulk
9	Gujarat	Karnataka	~0.5	~1	~800	Bulk
10	Telangana (Machilipatnam)	Odisha	~0.3	~0.5	150	Clinker/Bulk
11	Telangana(Machilipatnam)	West Bengal	~0.2	~0.2	~500	Clinker/Bulk
12	Tamil Nadu	West Bengal	0-0.5	0-0.5	~700	Clinker/Bulk
13	Other O-D pairs		0-.2	0-0.2		
	Total		**12-14**	**21-23**		

Table 3 List of coastal routes identified for cement

5.3.3 Cost optimization potential

The average savings per ton of cement transported using coastal shipment on specific routes is around INR 250-300. Given that the current coastal movement is only ~3 MTPA, there exists potential annual savings of ~INR 250-300 cr by increasing modal share of coastal transportation to ~13 MTPA from existing 10 MTPA

Area	Units	Value
Current Share of coastal	MT	~3
Proposed share of coastal (FY23)	MT	~13
Increase in share of coastal	MT	~10 MT
Average Savings per ton	Rs	250-300
Total Savings	Rs. Cr	250-300

Table 4 Cost optimization potential for coastal movement of cement

5.3.4 Action agenda

To achieve the above objective, a coordinated effort between the ministries and industry stakeholders is required. Following action steps would are required:

a) Ministry of Shipping (MoS) to coordinate with Logistics Wing, and cement players to validate and prioritize coastal shipment routes for cement, steel and iron ore
b) MoS to prioritize development of coastal berths for east coast ports of Haldia, Paradip, Vizag, and Chennai
c) MoR to develop connectivity to east coast ports to ease congestion – Haldia, Paradip, Vizag, Chennai

5.4 Increase share of inland waterways

Inland waterways in India are underdeveloped as a mode of transportation, despite their inherent advantages of fuel efficiency, environment friendliness, hinterland connectivity to less developed rural regions, and its capacity to shift large volumes of cargo from congested roads.

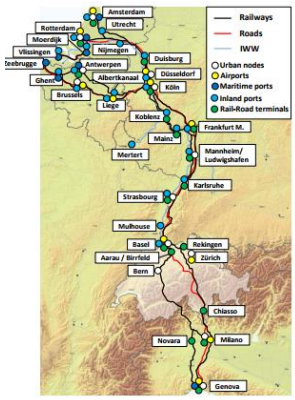
Similar to coastal transportation, inland waterways is a cost effective alternative over long distances. 111 waterways in India have been identified as 'National Waterways'. Despite this the share of inland waterway transportation of cement is less than ~1%. Globally, inland waterways have been utilized for congestion and cost reduction. Examples of global utilization of inland waterways has been given below.

5.4.1 Benefits and global benchmarking

Globally, countries such as US, China, Germany, and Japan have heavily relied on river waterways for transportation in the cement industry. Another major example is the Rhine Alpine corridor in the Blue Banana region of Europe. The Blue Banana, also known as the European Megalopolis or the Manchester–Milan Axis is a corridor of urbanization spreading over Western and Central Europe, with a population of around 111 million. One

of the key corridors in Blue Banana is the Rhine Alpine corridor. This multimodal corridor incorporates the Rhine River as the key inland waterway in Europe, as well as important tunneling projects in Switzerland, including the world's longest and deepest rail tunnel, the Gotthard Base Tunnel.

Outline of Rhine



Corridor Characteristics

- One of the 9 corridors of core network defined by TEN-T1
- Runs from Rotterdam to Genoa along river Rhine through Industrial heart of Europe
- Over 1 Billion Tonnes of freight transported across corridor
- Covers 19% of EU's GDP
- Catchment area covers 13% of EU's population
- 217 projects identified worth 60 Bn Euro starting from 2014- 38 worth 6 Bn Euro in IWW2

High compliance of IWW with TEN-T criteria to ensure project success

- 100% Complaint to CEMT Class IV
- 82% fulfill criteria of Min draft of 2.5 metres
- 97% fulfill criteria of min height under bridges of 5.25 m
- RIS3 deployment for enhancing safety, efficiency and environmental friendliness
- Availability of alternative and cleaner fuel

Figure 13: Rhine Alpine corridor developed by Trans-European Transport Network for multi-modality

The corridor conveys over 1bn tonne of cargo annually. It has a catchment area covering 70 mn people (13% of EU's population) contributing to 19% of EU's GDP. The corridor passes through 13 key cities, provides access for cargo via 11 airports, 8 seaports, 22 inland ports and 20 Rail-Road logistic parks. There are 217 projects identified worth 60 bn Euro starting from 2014 of which 38 worth 6 Bn Euro in IWW. The corridor provides multimodal access terminals with over 40% being tri-modal access. In the entire corridor of ~1200 km, there are close to 100 terminals for bi/tri-modal interchanges. This translates to a terminal every 10-12 KM. As shown in figure 26, this brings almost 100% Rhine Alpine Corridor within the catchment of both rail and river transportation. Not surprisingly, the share of waterway transport is close to 54% for the cargo moving through this corridor. Figures below show a snapshot of the Rhine Alpine corridor.

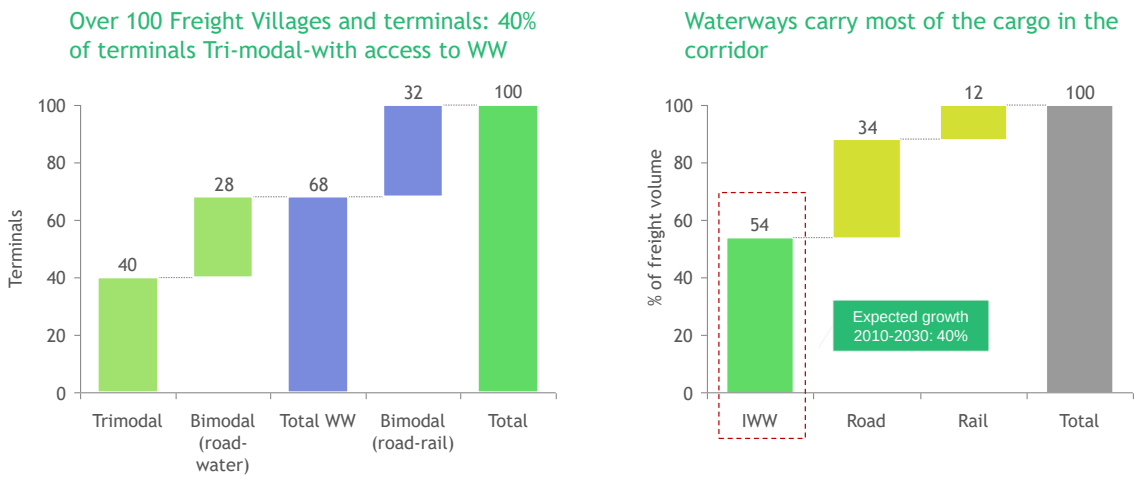


Figure 14: Waterways carries ~55% of the cargo in the Rhine-Alpine corridor project

National waterways provide with favourable cost economics given long distances and favourable first mile and last mile distances. The average freight costs per tonne per km for riverine movement is approx. INR 1-1.2 which is significantly lower than road (INR 2-3) and rail (INR 1.4-1.6) for long distances. This makes it an attractive alternative for cargo movement.

5.4.2 Potential routes identified

India has 111 identified national waterways of which 5 are developed/under construction and the remaining 106 were notified in 2016 and are under various stages of DPR preparation/evaluation. Based on discussions with the Inland Water Authority of India (IWAI), it has shortlisted 36 national waterways, which exhibit technical feasibility of being developed for vessels to move. This report lists down identified potential routes/ national waterways from these technically feasible waterways for cement movement. From the list of technically feasible NWs, the NWs which are less than 50 km away from cement plants and major demand centers were identified. From this, the NWs on which the cost of movement of cement is lesser than current mode of movement were further shortlisted.

As an illustration, the cement plants and key markets on NW-04 have been shown below.

Figure 15: Cement plants and demand centers on NW-04

As a result 5 NWs have been identified with potential for cement movement. These are as follows-

S No	NW Number	Name	Movement stretch
1	4	Krishna River	Mukhtyala – Vijayawada – Kakinada
2	100	Tapi River	Jalgaon – Surat- Port
3	1	Ganga	Various loading points in WB to Patna, Varanasi
4	64	Mahanadi River	Paradip – Cuttack(Coastal) Sambalpur - Cuttack
5	110 (Not in Phase 1 & 2 but technically viable)	Yamuna River	Panipat to Allahbad

Table 5 List of National Waterways identified for cement movement

5.4.3 Challenges of Inland Waterway movement

Inland waterway shipment, though a potential alternative to road and rail transportation, also faces certain limitations. A detailed discussion with the industry stakeholders highlight the following main such challenges:

a) Low availability of high capacity, low draft barges: This challenge can be circumvented by incentivizing high capacity, low draft barges. Cost economics improve by ~40% with increase in capacity of vessel from 1000DWT to 3000DWT. Globally, low draft, high capacity push barges/ tugs have been launched in several countries such as Paraguay, Australia, US etc.

b) Poor connectivity infrastructure to terminals: Proximity and easy accessibility to waterways essential to capture hinterland traffic. For example, construction of quay walls as low-cost alternatives to building terminals can help improve accessibility to waterway. Flemish government supports and encourages construction of quays along inland waterways. Private companies pay 20% of the construction cost and the government pays the remainder.

c) Insufficient terminal infrastructure: Terminal Infrastructure development on identified waterways with storage facility at terminal, handling infrastructure and connectivity with rail/road will ensure capturing hinterland traffic.

d) Low availability of Ro-Ro facilities in urban areas: Wherever waterway advantage exists, Ro-Ro facility may be encouraged to de-congest the cities (e.g. Kolkata, Mumbai etc.)

e) First and last mile costs: which account for almost 30% of the total freight act as a hindrance to shift to waterway shipment. A possible solution is to develop a policy to promote creation of smaller jetties with captive cargo supported through VGF and accelerated approval process.

f) Multiple stakeholder interaction: Several transport segments such as first mile, main haul by sea and last mile lead to the manufacturer dealing with multiple stakeholders for shipment and handling. A key step here would be to encourage end-to-end waterway shipment solutions provided by third part players.

g) Unavailability of return load: on national waterway would lead to higher costs for deploying dedicated vessels.

5.4.4 Cost optimization potential

The average savings per ton of cement transported using inland waterway shipment is ~INR 150-200. There exists potential to increase inland waterway movement to ~16-18 MTPA with annual savings potential of ~INR 250-300 cr.

Area	Units	Value
Current Share of inland waterways	MT	~0
Proposed share of coastal (FY23)	MT	~16-18
Increase in share of coastal	MT	~16-18
Average Savings per ton	Rs	150-200
Total Savings	Rs. Cr	250-300

Table 6 Cost optimization potential for inland waterway movement

5.4.5 Action agenda

To achieve the above objective, an inter-ministerial coordinated effort is required. The following action agenda has been drafted post the inter-ministerial consultations coordinated by the Logistics Wing :

a) IWAI to get feedback from cement manufacturers for prioritizing terminal locations, extent of mechanization, and facilities required at IWAI terminals.
b) IWAI to develop a stakeholder communication plan to communicate the ongoing/planned developments to industry players to enable them to make their logistics plan accordingly
c) IWAI to develop policy to promote availability of barges and prepare an incentive structure to encourage use of high capacity, low draft barges

5.5 Upgrade rake handling capacity at existing sidings

Increasing rail share of cement requires action across the value chain of cement movement by rail. In the first initiative we discussed construction of new integrated cement rail terminals with bulk handling facilities at selected locations. In our consultations with cement manufacturers, another initiative which was highlighted was the need for immediate upgradation of existing cement unloading terminals. The issues highlighted and the recommendations have been summarized below.

5.5.1 Need

The following issues were highlighted during stakeholder consultations with cement manufacturers.

1. Inadequate platform space for unloading rakes : This leads to higher demurrage costs as cement manufacturers are unable to unload the rake
2. Lack of storage space at platform : This leads to higher demurrage or wharfage costs. It also leads to increased secondary freight and secondary handling costs.
3. Absence of covered sheds : The problem of lack of space becomes exacerbates in poor weather conditions
4. Inadequate lighting at platforms to inhibit 24 hour siding operations.

5.5.2 Prioritized siding locations

A large number of sidings along with issues on each were highlighted during the interactions. 21 sidings of these have been prioritized for immediate action basis volume of cement movement and growth potential. These are –

S. No	Station	Zone
1	Dehrionsone (DOS)	East Central Railway
2	Alamnagar (AMG)	Northern Railway
3	Amousi (AMS)	Northern Railway
4	Ara	East Central Railway

5	Laheria Sarai (LSI)	East Central
6	Kalighat (NACC)	Eastern Railway
7	Varanasi (BSB)	Northern Railway
8	Khori	North Western Railway
9	Ghaziabad	Northern Railway
10	Cossipore	Eastern Railway
11	Fatuah	East Central Railway
12	Jasidh	Eastern Railway
13	Iradatganj	North Central Railway
14	Jalgaon	Northern Railway
15	Yamuna Bridge	North Central Railway
16	Kanakpura	North Western Railway
17	Ahmedabad	Western railway
18	Vadodara	Western railway
19	Surat	Western Railway
20	Bhatinda	Northern Railway
21	Raxaul	East Central Railway

Table 7 List of cement terminals identified for upgradation

5.5.3 Action agenda

Ministry of Railways (MoR) may conduct consultations with cement manufacturers to identify the specific issues at each siding. Subsequently, MoR may explore plans for upgradation of the identified sidings.

5.6 Facilitate increased rail share by decreasing congestion and improving rake availability on identified cement corridors

Increasing rail share of cement requires action across the value chain of cement movement by rail. Apart from lack of cement handling facilities at cement terminal, lack or rake availability and high rail congestion were the issues highlighted for cement

movement by rail. Delivery time by railways cannot be predicted as corridors are congested and freight trains are given low preference. 492 out of total 1219 Sections of Indian Railways i.e. 40% of Sections are running at 100% or above line capacity[8]. Unavailability and unpredictability of rakes make rail freight unattractive and adds Rs~200-400/ton of nominal cost. This is not the actual cost paid by the industry but the opportunity cost of lost sales due to unpredictability of rail when compared to road movement.

Cement terminal development has been discussed in initiative #1 and #4. Issues in cement transportation due to high rail congestion have been summarized in this section.

5.6.1 Need

The following issues were highlighted during stakeholder consultations with cement manufacturers.

1. Low rake availability : Low rake availability leads to operational variability and increases unpredictability of rail transportation
2. High variability in freight time : High congestion on the route further adds to the variability in freight travel time

5.6.2 Prioritized routes for de-congestion

As stated earlier in the report, cement transportation by rail becomes competitive to road transportation at distances greater than 300 km (when the loading plant has a siding at the plant). As a result, origin-destination pairs where cement movement is greater than 300 km should have a higher than average cement rail share and the routes which have low rail share are sub-optimal. To identify and prioritize routes for de-congestion, sub-optimal routes with high rail congestion were identified. The process has been illustrated in the image below.

[88] Lifeline of the nation – White paper by Indian Railways, February 2015

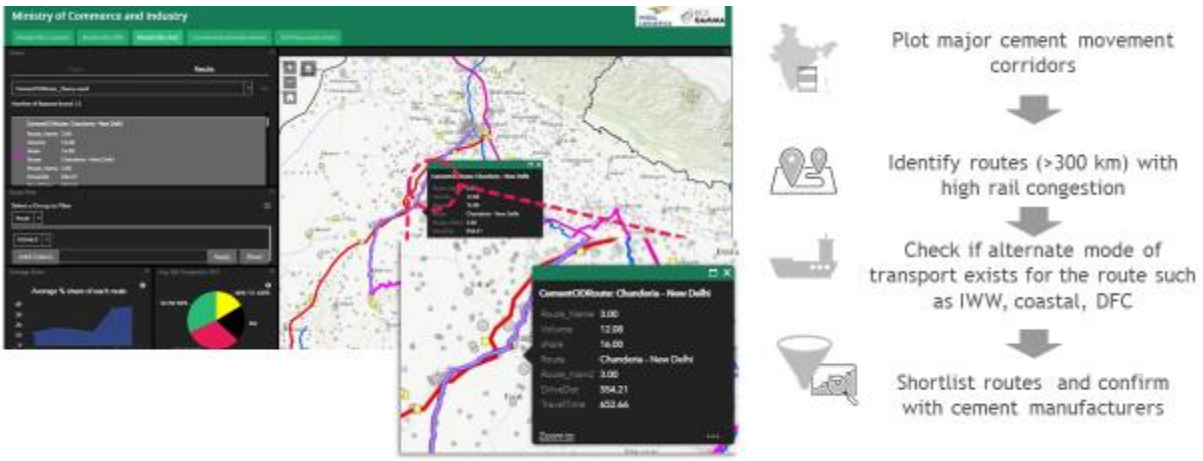


Figure 16: Identifying sub-optimal rail routes for de-congestion

The identified routes are as follows

1. Chanderia - Delhi
2. Chanderia - Jaipur
3. Yerraguntala – Chennai
4. Yerraguntala – Bangalore

Additional 12 routes were proposed by cement manufacturers. These are -

1 Kanpur Central- Kanpur Anwarganj – Lucknow

2 Allahabad - Allahabad City – Varanasi

3 Bilaspur division to Bihar/Howrah (ECR)

4 Kanpur via Ohan, Zone – NCR

5 Mandamarri (SCR) to Bhadli(CR)

6 Cossimbazar, Krishanagar via Naihati

7 Santhia to Malda

8 Wadi - Dund (Central Railway)

9 Guntakal - Bangalore Via DMM (SC-SWR)

10 Phulera - Jaipur via Ringus (NWR)

11 Alwar to Rewari (NWR)

12 Raigarh - Jhaarsugda (BSP-JSG) (SEC)

5.6.3 Action agenda

Ministry of Railways (MoR) should conduct consultations with cement manufacturers to finalise the routes for de-congestion. Subsequently, MoR should explore plans for de-congestion of the routes

6 Conclusion

The Integrated National Logistics Action Plan lays out a preliminary set of five key initiatives for cement with potential annual savings of ~INR 3200-3500 Cr basis discussions with ministries and key industry stakeholders. The cement industry was analysed by major traffic flow corridors. The analysis included establishing the optimal modal mix, calculating the unit transportation costs across different modes, plotting the major origin-destination pairs for railways and for road etc. In summary, the initiatives have been converted into action agendas for consideration of different ministries and are listed as a part of the action agenda under various interventions.

7 Appendix 1 : Modal Economics for cement movement

The modal economics breakup for movement of cement has been given below

All costs in Rs/Ton	Road		Rail		Coastal
Cost head	Road Bagged	Road Bulk	Rail Bagged[1]	Rail Bulk[1]	Bagged
Last Mile[3]	370 (for 60% of delivery through WH and direct delivery costs for remaining 40%)	480	380 (for direct order & material picked from rail head)	650	
Additional handling and freight[4]	-	-	160 (For material without direct orders)	-	-
Wharfage & Demurrage[5]	-	-	55	20	20
Secondary Warehouse – Rent[6]	30-50	20 (Silos)	30-50	20	30-50
Inventory (Capital Costs)[7]	5-10	5-10	10-15	10-15	25-35
Bagging Cost (Savings)[8]	-	-200	0	-200	-

Total					
• 100 km[1]	820	693	898	700[2]	1800-2000
• 200 km • (Durgapur - Kolkata)	1048	993	1045	870	1800-2000
• 500 km • (Gulbarga - Mumbai)	1610	1713	1495	1300	1800-2000
• 1000 km • (Saurashtra - Mumbai)	2600	2913	2215	2020	2000-2200
• 1500 km • (Saurashtra - Mangalore)	3590	4213	2925	2730	2000-2200
Last Mile[3]	370 (for 60% of delivery through WH and direct delivery costs for remaining 40%)	480	380 (for direct order & material picked from rail head)	650	
Additional handling and freight[4]	-	-	160 (For material without direct orders)	-	-
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Secondary Warehouse – Rent[6]	30-50	20 (Silos)	30-50	20	30-50
Inventory (Capital Costs)[7]	5-10	5-10	10-15	10-15	25-35
Bagging Cost (Savings)[8]	-	-200	0	-200	-
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• 1500 km (Saurashtra - Mangalore)	3590	4213	2925	2730	2000-2200

Table 8 Break-up of unit cost of transportation by various modes

8 Appendix 2 : Other initiatives evaluated

Other initiatives evaluated to reduce cement logistics cost are as follows .

8.1 Develop rail sidings to increase rail share

Cement transportation by railways becomes economical at lead distances greater than 300 km only when the loading plant has a railway siding at the plant. Transporting from a public siding adds handling costs and first mile freight costs to the cost of rail transportation.

Major cement plants were evaluated to check the presence of railway siding. 77 such plants did not have a siding. 32 plants from the list of 77 plants have their market more than 300 km away and hence require railway siding. The plants should invest to develop sidings.

8.2 Reduce handling costs through -palletization

Palletization can reduce the cost of cement handling through increased mechanization. The following issues related to palletization were highlighted during stakeholder consultations with cement manufacturers.

- Low uptake expected in the current industry setting as pallets cannot be unloaded at dealer.
- Unloading at few large company owned godowns can be done but eventually pallets need to be broken for dealer delivery.
- Reverse logistics of pallets add to cost

Hence this initiative can only be taken as a trial now and needs to be reconsidered when industry develops further

8.3 Reduce handling costs through use of Jumbo bags

Jumbo bags are large cement bags (1-1.5 T) which can be used to reduce cement handling costs . The following issues related to jumbo bags were highlighted during stakeholder consultations with cement manufacturers.

- Low uptake expected in the current industry setting as customer resistance for jumbo bags
- It needs to be used 3-4 times for cost effectiveness. Reverse logistics add to cost

Hence this initiative can only be taken as a trial now and needs to be reconsidered when industry develops further

9 Appendix 3 : List of sub-optimal cement routes

The table below provides a snapshot of top 100 routes which are greater than 400 km long and yet have low rail share. A complete list of routes can be obtained through logistics division.

#	OD Pair	Road Share %	#	OD Pair	Road Share %
1	REWA - ARARIA	>80%	2	MANDSAUR - NEW DELHI	>80%
3	AJMER - NEW DELHI	>40%	4	NALGONDA - CHENNAI	>80%
5	SATNA - ARARIA	>80%	6	KOTA - NEW DELHI	>20%
7	AJMER - GURGAON	>80%	8	JUNAGADH - SURAT	>80%
9	CHITTAURGARH - NEW DELHI	>40%	10	NALGONDA - VISHAKHAPATNAM	>80%
11	SIROHI - MUZAFFARNAGAR	>40%	12	VIJAYAWADA - CHENNAI	>80%
13	NALGONDA - SRIKAKULAM	>80%	14	AJMER - LUDHIANA	>20%
15	SIROHI - GURGAON	>80%	16	HYDERABAD - VISHAKHAPATNAM	>80%
17	AMERELI - SURAT	>80%	18	SIROHI - REWARI	>40%
19	NALGONDA - VIZIANAGARAM	>80%	20	GUNTUR - CHENNAI	>80%
21	SIROHI - ROHTAK	>80%	22	MANDSAUR - MUZAFFARNAGAR	>80%
23	SIROHI - FARIDABAD	>40%	24	CHITTAURGARH - HISAR	>60%
25	MANDSAUR - GHAZIABAD	>80%	26	HYDERABAD - CHENNAI	>80%
27	KOTA - GURGAON	>80%	28	NALGONDA - MADRAS PORT	>80%
29	AJMER - AGRA	>20%	30	CHITTAURGARH - GURGAON	>80%
31	NIMACH - GURGAON	>80%	32	SIROHI - KARNAL	>60%
33	SIROHI - JALANDHAR	>80%	34	CHANDRAPUR - BULDHANA	>20%
35	AJMER - ROHTAK	>80%	36	REWA - NEW DELHI	>80%
37	ANANTAPUR - CHENNAI	>80%	38	SATNA - MAUNATH BHANJAN	>20%
39	SIROHI - ALWAR	>20%	40	MANDSAUR - GURGAON	>80%
41	VIJAYAWADA - SRIKAKULAM	>80%	42	REWA - INDORE	>80%
43	UDAIPUR - SURAT	>80%	44	VISHAKHAPATNAM - HYDERABAD	>80%
45	SIROHI - HISAR	>40%	46	MANDSAUR - JHUNJHUNUN	>80%
47	NAGPUR - HYDERABAD	>80%	48	SATNA - SAHARANPUR	>20%
49	AJMER - GHAZIABAD	>80%	50	JANJGIR - NAGPUR	>80%
51	MANDSAUR - RAMPUR	>80%	52	RAIPUR - PUNE	>80%
53	CHENNAI - TUTICORIN	>80%	54	CHITTAURGARH - AGRA	>20%
55	VIJAYAWADA - CHITTOOR	>20%	56	CHANDRAPUR STEEL PLANT - JHUNJHUNUN	>80%
57	GANDHINAGAR - NEW DELHI	>80%	58	HYDERABAD - NAGPUR	>80%
59	KOTA - SONIPAT	>60%	60	BHUJ - VADODARA	>20%
61	CHITTAURGARH - PANIPAT	>60%	62	AHMADABAD - MUMBAI PORT	>80%

#	OD Pair	Road Share %	#	OD Pair	Road Share %
63	SIROHI - LUDHIANA	>40%	64	BANDRA - KOLHAPUR	>80%
65	NALGONDA - VISHAKHAPATNAM PORT	>80%	66	JAIPUR - FIROZPUR	>80%
67	AJMER - FARIDABAD	>80%	68	JUNAGADH - BANDRA	>40%
69	HYDERABAD - PUNE	>80%	70	MANDSAUR - FIROZPUR	>80%
71	AJMER - MEERUT	>20%	72	REWA - GWALIOR	>80%
73	CHANDRAPUR - SANGLI	>80%	74	RAJKOT - SURAT	>80%
75	SATNA - BAREILLY	>80%	76	CHITTAURGARH - AHMADABAD	>80%
77	CHANDRAPUR - BID	>80%	78	VADODARA - MUMBAI PORT	>80%
79	PALI - NEW DELHI	>80%	80	GURDASPUR - SRINAGAR	>80%
81	NALGONDA - ADILABAD	>80%	82	AJMER - GANGANAGAR	>80%
83	CHITTOOR - VIJAYAWADA	>80%	84	PERAMBALUR - MALAPPURAM	>20%
85	SIROHI - SONIPAT	>20%	86	CUDDALORE - TUTICORIN	>80%
87	GUNTUR - CHITTOOR	>40%	88	VIJAYAWADA - VIZIANAGARAM	>80%
89	RAIGARH - BANDRA	>80%	90	AHMADABAD - BANDRA	>80%
91	CHENNAI - ERNAKULAM	>80%	92	REWA - GORAKHPUR	>80%
93	HYDERABAD - VISHAKHAPATNAM PORT	>80%	94	CHENNAI - THIRUVANANTHAPURAM	>80%
95	BHUJ - AHMADABAD	>80%	96	CHITTAURGARH - FIROZPUR	>80%
97	BANDRA - NEW DELHI	>80%	98	JAMNAGAR - SURAT	>80%
99	MANDSAUR - MEERUT	>80%	100	HYDERABAD - BANGALORE	>80%

Chapter 2: Commodity Corridor Analysis – Steel & Iron Ore

Contents

1 Context

In line with the mandate given to the Logistics Wing to integrate and optimize the several elements of the logistics value chain, this chapter deals with initiatives identified to optimize the logistics cost of steel and iron ore in India.

India is the third largest producer of steel in the world, manufacturing ~98 MMT in FY17 and having a total capacity of 125 MMT. It is also the fourth largest producer of iron ore, mining ~185MMT in FY17. Steel and iron ore freight together contribute to ~12% of the total freight movement in the country.

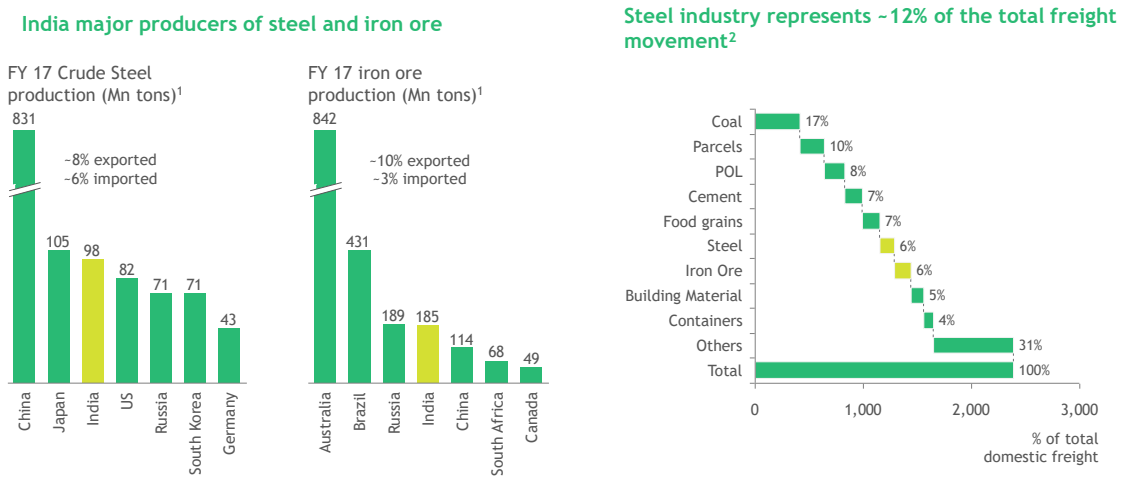


Figure 1: Indian steel and iron ore production

India's logistics cost for the steel industry (including inbound and outbound logistics) represents ~ 16-18% of total revenue of Steel players, significantly higher than best in-class benchmarks which are at ~10-12% globally. The in-bound and out-bound logistics are highly dependent on the lead distance of the iron-ore mine sources and the consumption markets of the final product respectively. Given that the Indian steel and iron ore demand is estimated to double by 2025 to 300MMT and 490MMT respectively, it is imperative to achieve higher cost efficiencies in logistic performance of the industry. This would make the steel manufacturers more competitive in India and for exports.

This report details out the initiatives identified to reduce the logistics cost of the steel industry.

2 Approach Methodology

The steel industry constituting ~12% of the total freight in India was analysed by major traffic flow corridors. The analysis includes establishing the modal mix, calculating the unit transportation costs across different modes, plotting the major origin-destination pairs for road, rail and juxtaposing them with congestion and 4500+ traffic data points. This was supplemented by detailed discussions with relevant stakeholders (steel manufacturers, iron ore mining companies, associations such as the Kalinga Nagar Industries Association, Government departments such as Ministry of Steel, Ministry of Shipping, Ministry of Railways) across the supply chain of the commodity to understand the issues and identify possible interventions. Previous Government reports such as Sagarmala, National Steel Policy 2017, and Infrastructure Study Report for 300MT Steel by 2025 by MECON etc were referred to while drafting the interventions. The initiatives focus on reducing freight cost, improving modal mix by facilitating inter modality, improving first-mile last mile connectivity and laying out a roadmap for future infrastructure creation across modes to minimize overall logistics cost of the country. Subsequently, initial discussions on the identified set of initiatives have been done with respective ministries such as Ministry of Railways, Ministry of Steel etc for alignment and implementation.

3 Landscape: Steel

3.1 Supply and demand dynamics

The Indian steel industry is divided into primary and secondary sectors. The former comprises of a few large integrated steel producers manufacturing billets, slabs, hot rolled coils etc, while the latter comprises of small units producing value added goods such as cold rolled coils, galvanized coils, beams and sponge iron etc. The Indian steel industry is more consolidated than the global steel industry with the top 6 steel manufacturers

accounting for ~60% of the steel production while globally the top 5 players account for only ~15% of the global steel production.

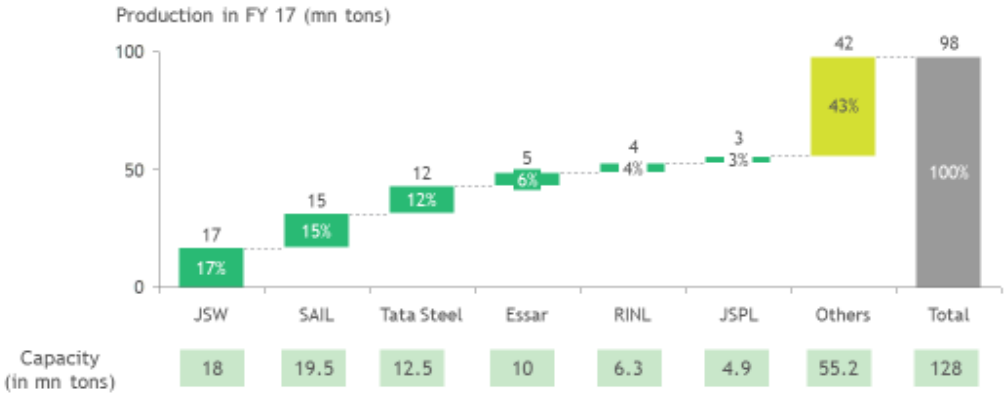


Figure 2: India Steel production profile

The Indian steel industry is disaggregated into regional clusters of supply and demand. Most of the steel plants are close to iron ore mines. Such a distributed profile requires significant inter-state long haul movement from East and West India to North India where the auto and capital goods production clusters, major cities and infrastructure project sites are located. The steel production in South India mainly caters to the manufacturing and consumption clusters of South India and West India.

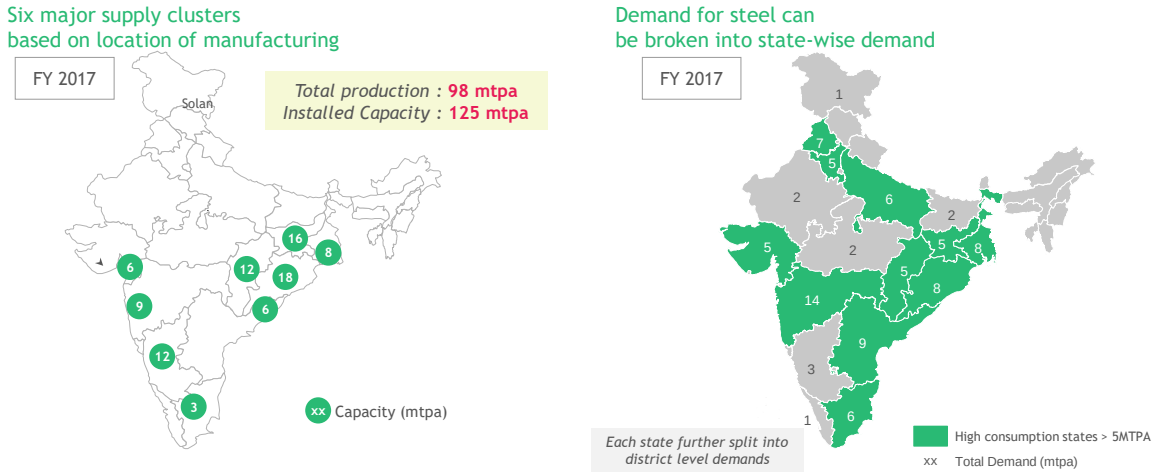


Figure 3: Statewise production and consumption patterm of steel

3.2 Modal mix

The modal share of the outbound steel products in India is skewed towards road and rail with negligible contribution of coastal shipment or national waterways. In India, ~50-55% of steel is transported by road compared to ~20-30% globally. The share of coastal and inland waterway movement globally is much higher around ~20%. In context of the Indian steel industry, the large players on an average move 60-80% of their steel through the rail mode through their own/contracted stockyards at key consumption centers. The smaller players, on the other hand, rely mainly on road, constituting ~80%-90% of their steel movement focusing largely on regional markets. The average lead distances is ~500km for the road mode of transport and is ~900km for the railway mode. In Japan, the modal mix of rail and waterways increases to 97% from current 77% for distances greater than 500km.

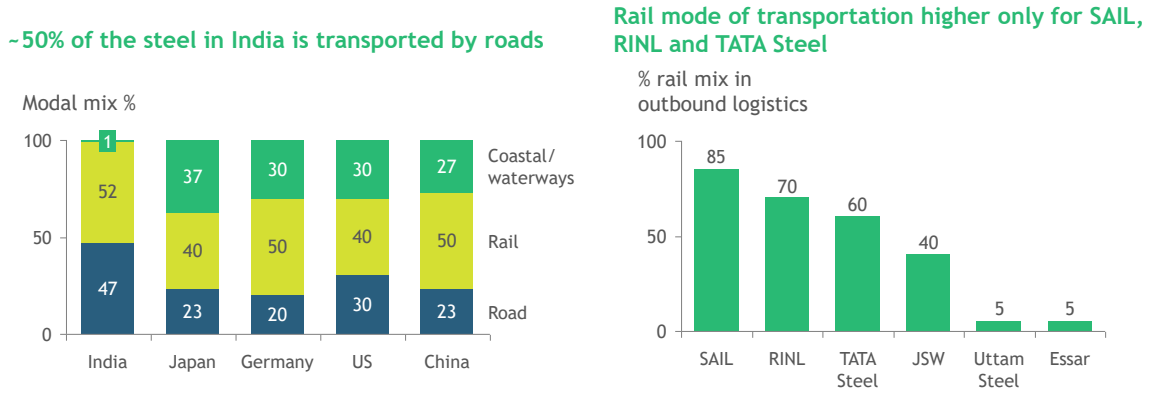


Figure 4: Road share of steel transportation in India higher than other countries

3.3 Modal economics:

As seen from the figure below, the cost per ton per km varies significantly across the different modes of transportation as a function of the lead distances. Transportation of steel by road is the cheapest mode upto ~400-500km beyond which rail is cheaper. Coastal shipment becomes more economical than rail for lead distances greater than 1200-1300km.

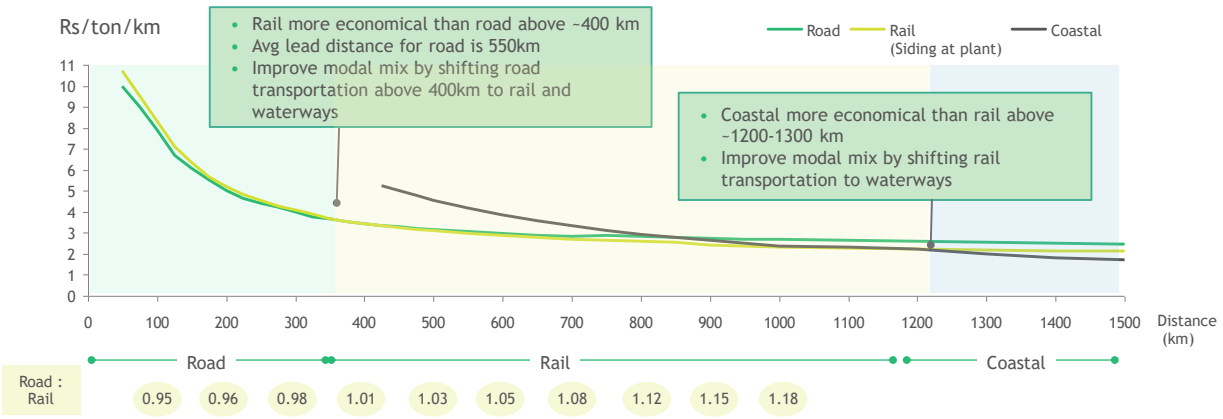


Figure 5: Logistics cost per ton per km for different transportation modes

Given that rail mode of transportation is economical for distances greater than 400-500km, there exists potential of shifting around 20mn tons of steel from the road mode to the rail mode and coastal shipment. This will help improve to a more cost efficient modal mix and closer to the global benchmarks.

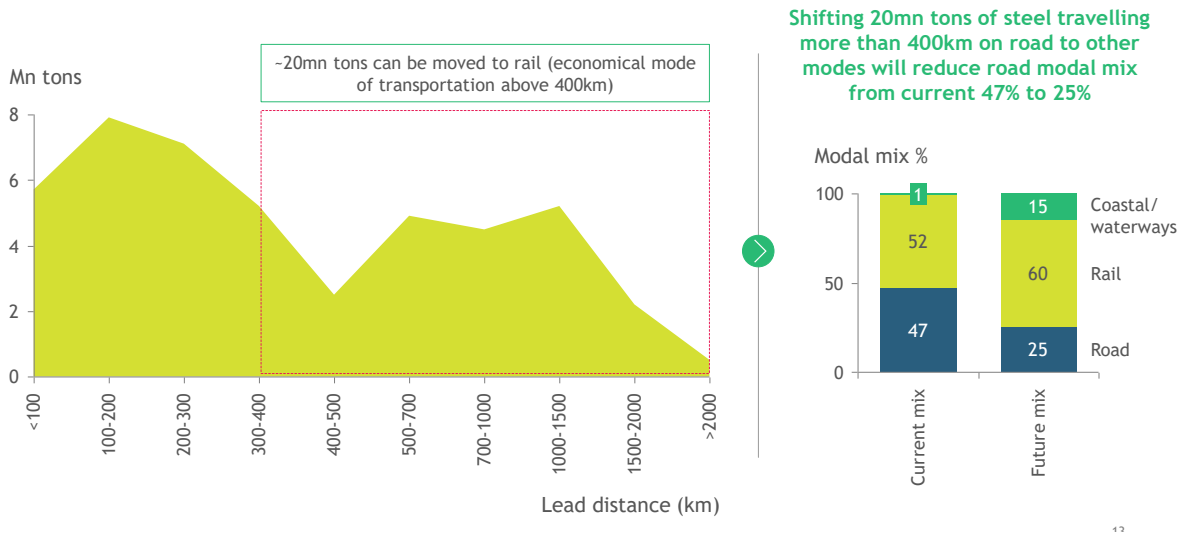


Figure 6: Significant amount of steel travelling more than 400km by road

The above transportation costs include last mile, handling, main haul freight, warehouse rent and inventory costs. An illustration of the cost breakup is provided in the figures below. It is observed that, other than the main haul freight, last mile and handling costs significantly contribute to the overall logistics costs.

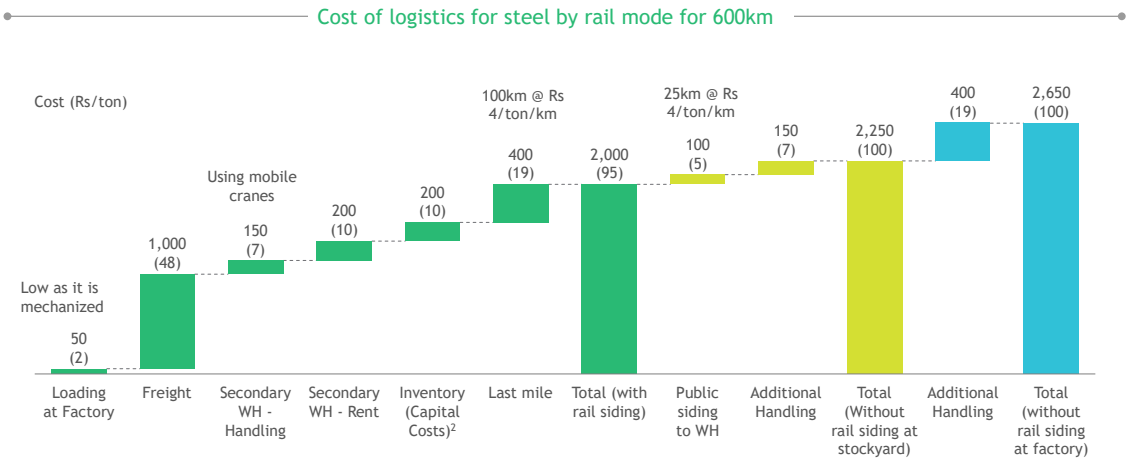


Figure 7: Logistic cost breakup for rail transportation

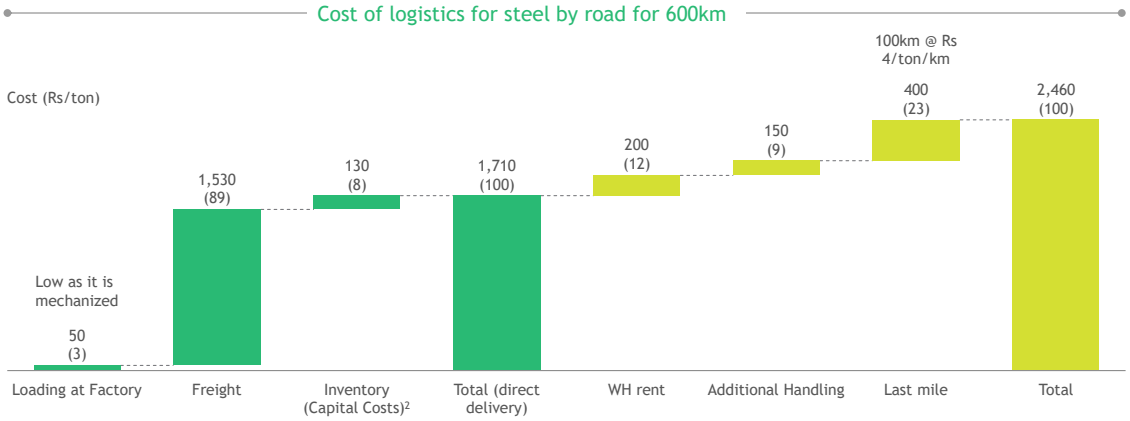


Figure 8: Logistic cost breakup for road transportation

4 Landscape: Iron ore

4.1 Supply and demand dynamics

Iron ore is the most important raw material for production of steel and contributes to over 40% of the total raw material requirement. In India iron ore occurs mainly in two different forms i.e. hematite & magnetite. Almost the entire present day production of iron ore comes from hematite reserves. Magnetite reserves of the country are not mined currently as these occur in eco-fragile areas of Western Ghats. The iron ore industry is slightly concentrated with top six companies account for ~50% of the iron ore production in India. The reserves are concentrated and the top four states account for ~90% of the iron ore

production. The major distribution of iron ores of the country are confined to five distinct zones namely:

Zone A	Singhbhum in Jharkhand and Cuttack in Orissa
Zone B	Dantewara & Durg in Chhattisgarh and Chandrapur & Gadchiroli in Maharashtra
Zone C	Bellary-Hospet belt in Karnataka
Zone D	Goa, Ratnagiri in Maharashtra and North Karnataka
Zone E	Metamorphosed BIF along the west coast in Karnataka and Kerala

Given the concentrated profile of iron ores and the high logistic costs involved in its transportation, most of the steel plants have been located in an around these regions.

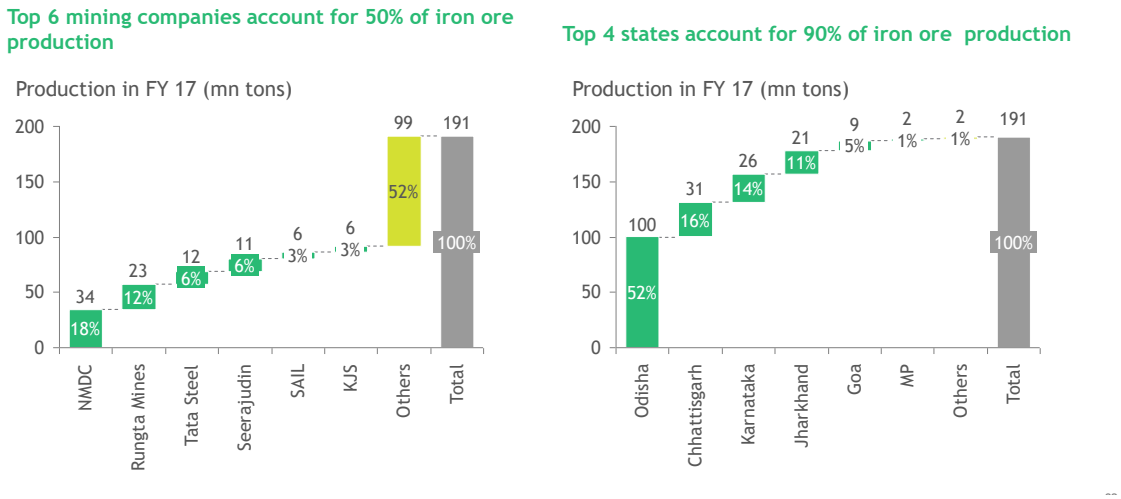


Figure 9: Statewise and company-wise iron ore production

4.2 Modal mix

The modal share of the inbound iron ore to steel plants in India is skewed towards rail with lower contribution of roads and negligible contribution of coastal shipment or national waterways. ~20% of steel is transported by road compared to ~10% globally. The share of coastal and inland waterway movement globally is much higher around ~25-30%. In context of the Indian steel industry, the large players on an average move ~90% of their iron ore through the rail mode. The smaller players, on the other hand, still rely

significantly on road, constituting ~30-40% of their iron ore movement. The average lead distances is ~400km for the road mode of transport and is ~600km for the railway mode. Slurry pipeline is another mode of transportation leveraged globally. Presently in India, there are only three functional iron ore slurry pipelines.

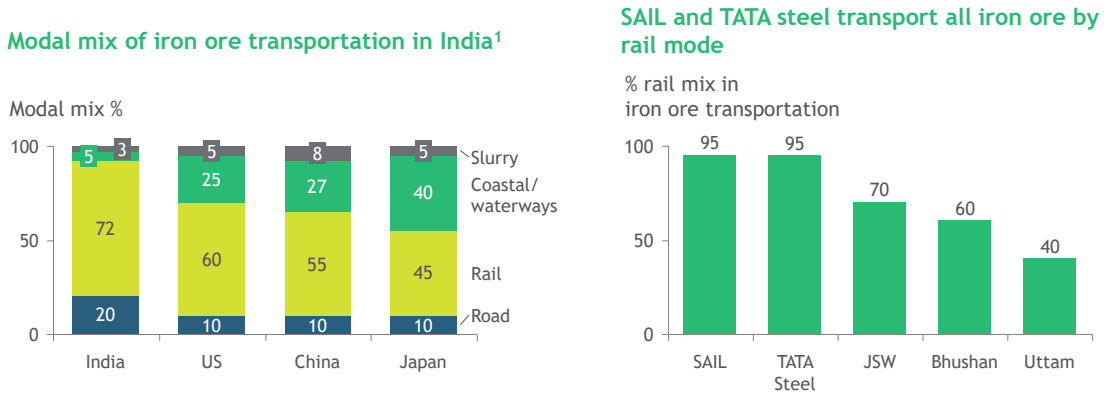


Figure 10: ~70% of the iron ore in India is transported by railways

4.3 Modal economics

As seen from the figure below, the cost per ton per km varies significantly across the different modes of transportation as a function of the lead distances. Transportation of iron ore by road is the cheapest mode upto ~300km beyond which rail is cheaper. Coastal shipment becomes more economical than rail for lead distances greater than 1200-1300km, depending on the first mile, last distances.

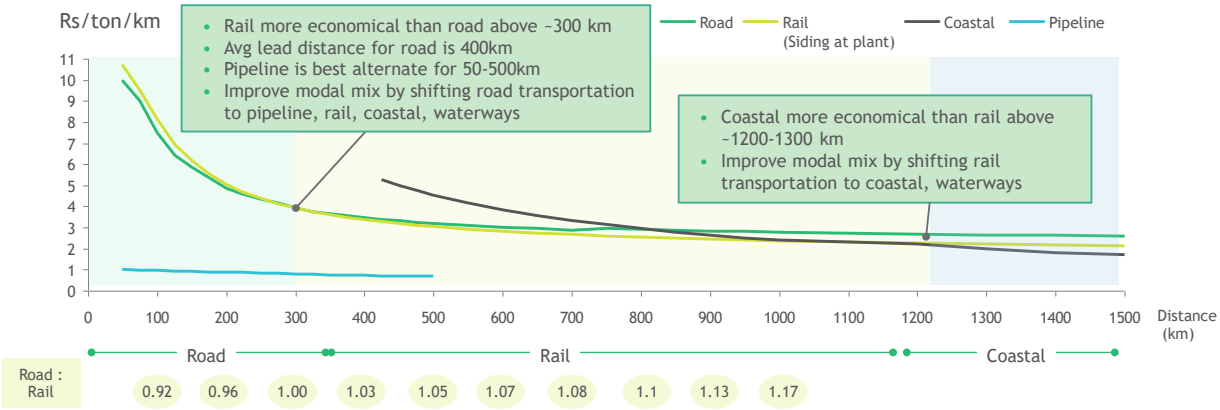


Figure 11: Logistics cost per ton per km for different transportation modes

Given that rail mode of transportation is economical for distances greater than 300km, there exists significant potential of shifting iron ore transportation from the road mode to the slurry, rail mode and coastal shipment. This will help improve to a more cost efficient modal mix.

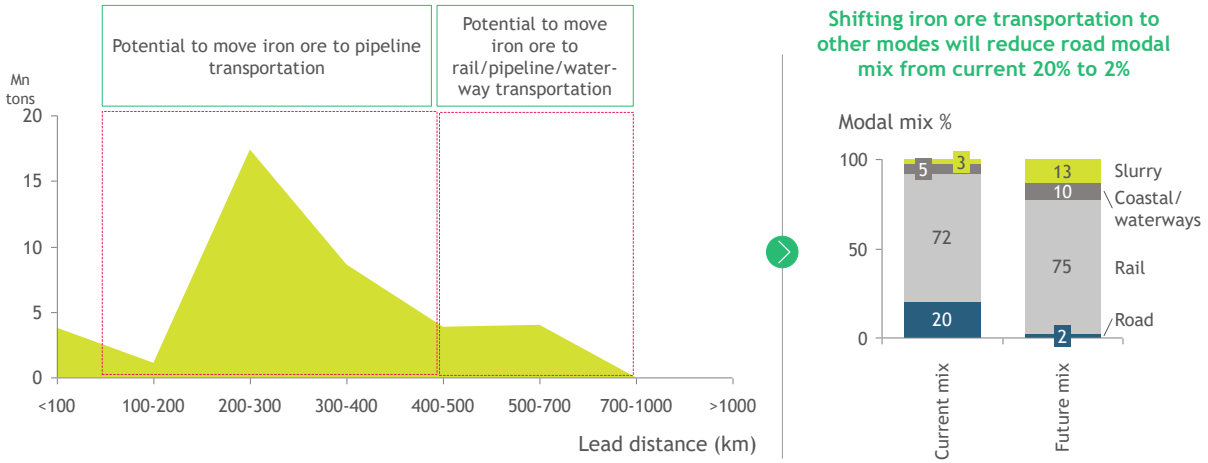


Figure 12: Significant amount of iron ore can be shifted to other modes of transportation – slurry, coastal, rail

Conclusion: The high dependence on road and rail mode is resulting in higher logistics costs for domestic steel players as compared to global players. This has necessated the exploration of alternate modes of transportation such as coastal shipment, national waterways, slurry pipelines, the shift from road to rail and the elimination of the transportation inefficiencies in existing preferred modes of rail and road.

5 Key challenges for steel and iron Ore logistics

This section of the report details out the issues faced by steel players and other stakeholders across the various modes of transportation leading to sub-optimal logistics cost.

a) **Insufficient rake availability:** Insufficient rakes alloted to steel players despite consistent high demand for the rakes. The situation gets worsened in peak

seasons forcing steel manufacturers to use trucks for longer distances. Eg Kolkata-Mumbai; Jamshedpur-Jalandhar are top origin-destination routes for road transportation despite being >1000km in distance. A large steel player gets 5 rakes per day 4000T/rake while demand can go upto 12 rakes/day for Dhamra port.

b) **Lack of connectivity to ports/mines:** Inadequate road/rail infrastructure to ports leads to longer lead times and first mile costs. Most of the ports on the east coast have limited railway connectivity and have high congestion on the entry roads. Lack of rail connectivity to mines leads to short haul movements by road increasing costs by Rs200/ton. Additionally, road conditions between mines and main roads very poor with unpaved and narrow roads

c) **Lack of coastal shipment infrastructure:** and storage space at ports leads to mismatch between port handling and in-land infrastructure capacities. Insufficient number of dedicated coastal berths results in longer lead times for transportation. Loading/ discharge is manual and controlled by unions in many ports. Feeding from the yard to the vessel is often constrained by manual handling (25000 tons/day) as opposed to mechanized handling (75000 tons/day).

d) **Lack of national waterways infrastructure:** Of the 111 national waterways declared, only around 35 waterways are identified as technically feasible. Presently, NW-1, NW-3 are commercially functional waterways, the remaining technical feasible waterways are at different stages of development. Insufficient number of terminal locations/jetties along the waterway lead to higher first mile costs

e) **High first mile, last mile and handling costs:** Handling and last mile account for ~25% of the total logistics cost. Most of the steel stockyards do not have railway sidings leading to higher mid mile costs. First mile road transportation under union influence leads to higher road freight charges (Eg in Orissa it is as high as Rs6-8/ton/km)

f) **Limited availability of custom rakes:** Current BRN flat open wagons can accommodate ~2500tons of steel compared to custom rakes ~4000tons. Furthermore, the special BFNSM wagons require non-electrified lines for

loading/unloading resulting in longer evacuation times and limited public siding access.

g) **Unpredictable delivery times by rail:** Delivery time by railways cannot be predicted due to high congestion on steel corridors and lower preference given to freight trains than passenger trains. Eg Hospet – Marmagao port line is a single line leading to capacity bottleneck

h) **Environmental issues:** Haul road transportation and iron ore unloading are major dust generating activities. On the same lines, Shah Commission report, 2013 has suggested minimal or no use of road for iron ore transportation.

6 Recommendations and action agenda

With the increase in steel and iron ore demand and production, the requirement of adequate infrastructure, an optimum mix of rail, road, coastal and national waterways, efficient and seamless inter-state movement become more pertinent. There is a need to overcome the aforementioned challenges in a structural manner to ensure sufficient infrastructure capacity and its efficient use. Discussions with several stakeholders across the supply chain identified a list of possible initiatives to reduce logistic cost and improve logistics efficiency for the Indian steel industry.

6.1 Summary

The interventions leading to annual savings of INR 7000-8000 Cr are listed out below. The target modal mix for both steel and iron ore has also been specified below.

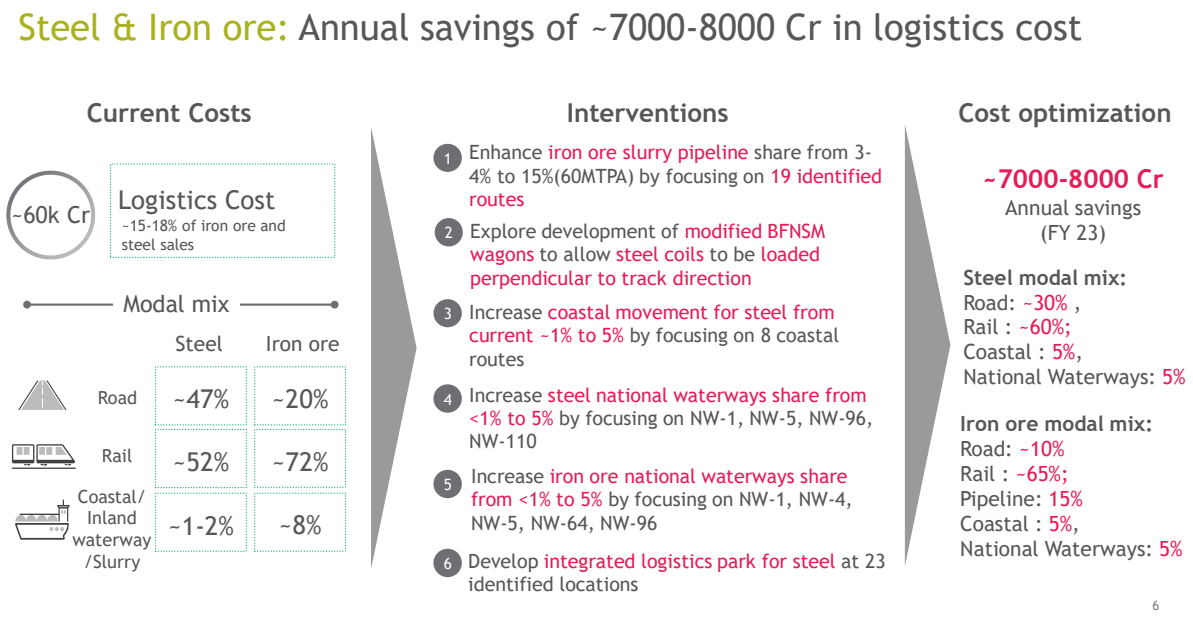


Figure 13: Summary of interventions

a) Encourage pipeline transfer of iron ore
b) Increase share of coastal transportation
c) Increase share of inland waterways
d) Develop logistics park at major steel handling locations
e) Increase stock of load efficient wagon types

20 mn tonnes tons of steel travelling above 400 km can be moved to rail (economical mode of transportation above 400km)

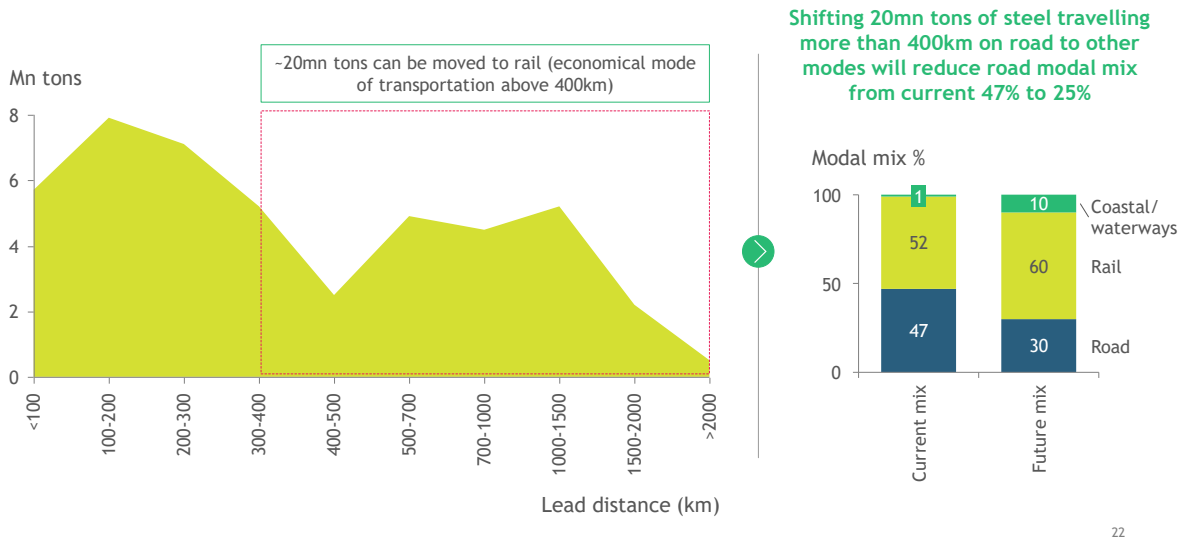


Figure 14: Rail transportation potential for steel

A list of sub-optimal rail routes which are greater than 400 km long but the share of rail is low has been provided in the appendix.

35 mn tonnes tons of iron ore can be shifted to other modes of transportation as shown in the figure below.

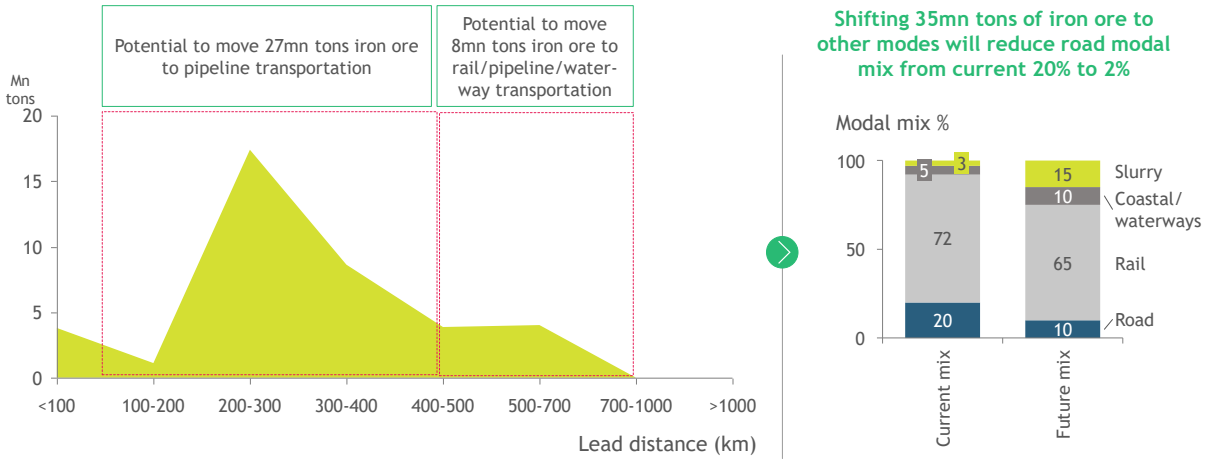


Figure 15: Rail transportation potential for iron ore

6.2 Encourage slurry pipeline transfer of iron ore

6.2.1 Need

As mentioned in the Infrastructure Study Report for 300MT steel by 2025, the iron ore requirement would be of the order of 490 MTPA. Presently, the main mode of transportation of iron ore is railways, which account for ~70% of the movement. The proposed projected growth of steel industry would impart tremendous pressure on railways with respect to inward and outward traffic, loading and evacuation of raw materials and finished products. With companies driving driving for lower logistics cost, iron ore slurry pipelines are a cost effective alternative. Additionally, in India the location of major identified iron ore resources are in environmentally fragile zone and located far away from the steel plants & port. Many potential sources such as Rowghat in Chattisgarh, Chiria in Jharkand, Gandhmardan-Daitari-Malangtoli region of Odisha, Bababudhan of Karnataka and Ongole region of Andhra Pradesh are not adequately supported by railway infrastructure[1]. With plans to have large volume blast furnace the use of pellets shall also increase which requires grinding of ores/fines to fine size thus making slurry transportation a more feasible option. Road transportation of iron ore is frought with high pollution related risks. The Shah Commission report 2013 highlights the haul road transportation and iron ore loading/unloading as major dust generating activities. Slurry pipelines are a viable alternative solution to reduce logistics cost, meet future transport demands & reduce environmental impact.

6.2.2 Cost economics, benefits and global benchmarking

As seen from the figure below, mineral transportation in India is skewed towards expensive modes like road and rail. Iron ore slurry pipeline is a highly cost effective transportation mode.

[1] Infrastructure Study Report for 300MT steel by 2025

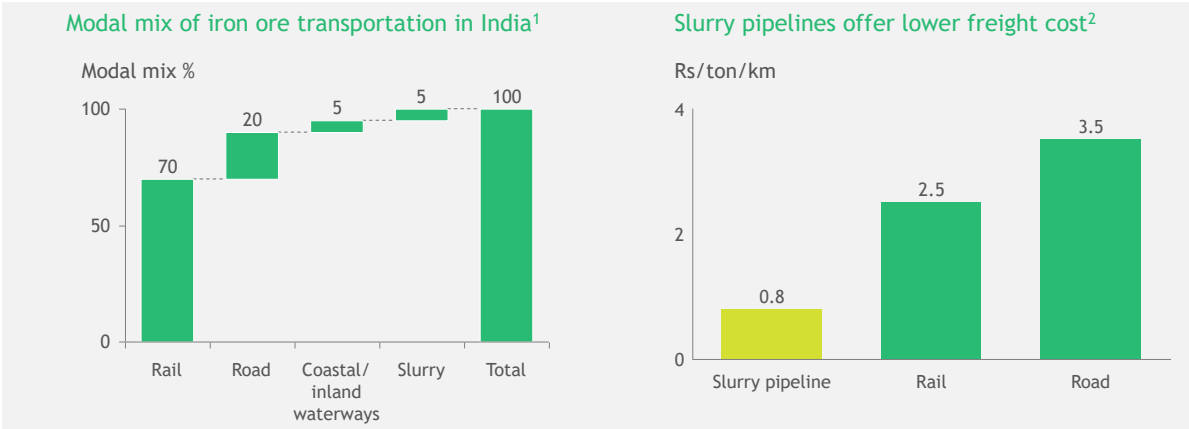


Figure 16: Current modal mix of iron ore and logistics cost per km per ton for different modes

The cost of construction and operations of the pipeline exhibit feasibility with a payback period of approx. 5yrs or lesser. The table below summarizes the cost economics:

Capital expenditure	4-6 Rs/ton/km
Operational expenditure	0.6-1 Rs/ton/km
Capacity of pipeline	2-20 MTPA
Length of pipeline	50-500 km
Construction period	2-3 years
Pay back period	3-7yrs

Similar economics is also reiterated in Cost Effective Solution for Steel Industry, a report prepared by former CMD of MECON India. The report mentions that the investment cost for setting up a slurry pipeline is INR 4.5-5 a tonne for a km (for minimum distance of 100 km and capacity of 10 MTPA) with an operational cost of the slurry pipeline is around INR 0.6/t/km.

Apart from the cost effectiveness, iron ore slurry pipeline offer many other advantages over the existing modes of transportation. Bulk and distant transportation of iron ore concentrate in slurry form is environment friendly. The environmental degradation due to vehicular movement in congested road network of mining areas is eliminated. The CO2 emissions are ~80% lower compared to surface transport. Slurry pipelines will result in up-gradation and utilization of the currently unused low grade iron ore available at

different mine sites across the country. This would enhance the resource base and support mineral conservation. Space requirement of pipeline transport is minimal. It also does not require return of empties to starting point and hence is ideal for uni - directional traffic such as for iron ore. The figure below gives a snapshot of the benefits of the slurry pipeline transportation. This mode however also has a few limintations mainly relating to its utility for solids/mineral transportation only compared to road and railways, which are multipurpose in nature and the availability constraint of large volumes of water as carrier fluid and water recycleablity.

Figure 17Benefits of slurry pipeline transportation

Globally, slurry pipelines are being used for iron ore and other mineral transportation. The table below lists out the examples of iron ore pipelines:

Region	Km	Capacity
Samarco : from Germano to Point Ubu Pellet Plant in Brazil	396	15 MTPA

Region	Km	Capacity
Da Hong Shan pipeline in China for Kunming Iron & Steel Corp	171	3.5 MTPA
Anglo Ferrous Minas-Rio in Brazil	522	23 MTPA
Savage River, Tasmania, Australia	85	10 MTPA
Minas Gerais to Iiheus Port, Brazil	420	25 MTPA
Wellstead to Albany port, Australia	100	10 MTPA
Chongin, North Korea	98	4.5 MTPA
Zanada Project : Mines to Pointe Noire Port, Cango,	370	12 MTPA
Mount Gibson Ranges to Geraldton, Asia Iron Holding , Australia	278	10 MTPA
Balla Balla Mines to Port Hedland , Aurox Resources, Australia	110	10 MTPA

The table below lists out the examples of other mineral ore pipelines:

Mineral	Region	Km	Capacity
Coal	Black Mesa, USA	439	4.8 MTPA
	Belevo-Novosibink, CIS	256	3 MTPA
Copper Concentrate	Irian Jaya, Indonesia	112	0.3 MTPA
	KBI, Turkey	61	1 MTPA
	Bougen Ville, Papua New Guinea	27	1 MTPA
Limestone	Kensworth Beds, UK	92	2.0 MTPA

	Calveras, USA	28	1.5 MTPA
Phosphate Slurry	Velep, Brazil	120	2.0 MTPA

6.2.3 Potential slurry pipeline routes

Given the benefits of slurry pipelines, companies such as Essar Steel and Brahmani River Pellets Ltd (BRPL) have already constructed pipelines in the iron ore belts in Orissa, Chattisgarh and Andhra Pradesh. Presently there are 3 operational pipelines and 4 other proposal projects by JSW, NMDC, JSPL and Bhushan as mentioned in the tables below.

Existing completed projects	**Owner**	**Length (km)**	**Capacity**
Kirandul - Vizag	Essar Steel	267	8 MTPA
Barbil - Jajpur	BRPL	218	4 MTPA
Dabuna - Paradip	Essar Steel	253	8 MTPA

On-going projects	**Owner**	**Length (km)**	**Capacity**
Joda to Paradeep	JSW	260	15 MTPA
Kirandul to Vishakhapatnam	NMDC	456	15 MTPA
Kumundi to Meramandali	Bhushan Steel	125	8 MTPA
Barbil to Angul	JSPL	200	10 MTPA

The iron ore slurry pipelines can be constructred on many possible routes in the steel manufacturing supply chain – beneficiation plant to pelletization plant (Essar: Dabuna to Paradeep), beneficiation plant to steel plant (Bhushan steel: Kumundi–Meramandali), port to pelletization plant located in steel plant complex (JSW - Karnataka coastal areas to palletization plant in vijayanagar) etc. The report outlines in the table below the potential routes for

slurry pipelines basis the discussions with stakeholders and previous Ministry of Steel reports.

Possible pipeline routes	**Distance (Km)**	**Approx %age rail coverage**	**Sections with railway line nearby**	**Nearest NH/SH**	**Remarks**
Joda-Paradeep	280		Joda-Paradeep	92% NH; NH-520, NH-20, NH-53, NH-5A	JSW has already filed proposal on this route
Barbil-Jamshedpur	150	50%	Barbil-Chaibasa	SH 6	Infrastructure study report by MECON for JPC, Ministry of Steel
Barbil-Bokaro	270	80%	Barbil-Gola	NH 320	
Barbil-Durgapur	320	20%	Barbil-Chaibasa	NH 116B, NH 314, NH 14	
Barbil-Burnpur	290	90%	Barbil-Chaibasa-Balarampur-Purulia-Burnpur		

Possible pipeline routes	Distance (Km)	Approx %age rail coverage	Sections with railway line nearby	Nearest NH/SH	Remarks
Rowghat/Dalli-Bhilai1	200	90%	Rowghat-Kusum Kasa-Parsoda-Bhilai		Infrastructure study report by MECON for JPC, Ministry of Steel
Gua-Chiria-Rourkela-Jharsuguda-Raigarh1	330	70%	Manoharpur-Rourkela-Jharsuguda-Belpahar-Raigarh	Salai Gangda-Gua Road, NH 4	Infrastructure study report by MECON for JPC, Ministry of Steel
Gandhamardan/Keonjhar-Paradeep port1	250	90%	Keonjhar-Bamanipal-Nua Sunguda-Paradeep		
Gandhamardan-Meramandali, Bhushan Steel1	250	60%	Bargarh-Sambalpur-Redhakhol-Boinda-Angul-Meramandali	SH 3, NH 53	Infrastructure study report by MECON for JPC, Ministry of Steel
Bellary-Tornagallu	60	90%	Bellary-Tornagallu		Infrastructure study report by MECON for JPC, Ministry of Steel
Hospet-Tornagallu	70	90%	Hospte-Tornagallu		Infrastructure study report by MECON for JPC, Ministry of Steel

Possible pipeline routes	Distance (Km)	Approx %age rail coverage	Sections with railway line nearby	Nearest NH/SH	Remarks
Bababudan-Tornagallu	310	50%	Bababudan-Chitradurga	NH 50, SH 40	Infrastructure study report by MECON for JPC, Ministry of Steel
Chikmangalur-Tornagallu	300	50%	Chikmangalur-Chitradurga	NH 50, SH 40	Infrastructure study report by MECON for JPC, Ministry of Steel
Ongole-RINL plant, Vizag	490	90%	Ongole-Bapatla-Vijaywada-Vizag		Infrastructure study report by MECON for JPC, Ministry of Steel
Joda-Raigarh	330	70%	Manoharpur-Raigarh	SH 10B, SH 4	
Kirandul/Bacheli-RINL plant, Vizag	370	10%	Tallapalem-Vizag	SH 5, SH 47, Others	NMDC is developing a project proposal from Bacheli to Nagarnar
Noamundi-Kalinganagar	300	10%	Noamundi-Belaipada	NH 20	
Koirala, Sundergarh-Jharsuguda	50			SH 10	

6.2.4 Limitations

The construction of pipelines is, however, also frought with issues such as delay in land acquisition for right of user width (Eg Dabuna - Paradip land acquisition near Paradip port

took almost 2yrs for compensation negotiation), time delay to multiple clearances, social unrest by locals, and availability and recyclability of water used etc. An illustration of the list of approvals and the average clearance time is provided in the table below.

S. No	Approval/Clearances	Authority	Average time line
1	Land acquisition	Concerned land owner – NHAI/Railways/Central/State Gov, private owners	2 years
2	Environmental Clearance	Ministry of Environment, Forest and Climate Change	8months – 1 year
3	Forest Diversion (in case of cross country and/or passing through protected areas)	Ministry of Environment, Forest and Climate Change	1 – 1.5 years
4	Consent to Establish (CTE) & Consent to Operate (CTO)	State board	8months – 1 year
5	Approval of National Board For Wild Life	Ministry of Environment, Forest and Climate Change	6 – 8 months
6	Coastal Regulation Zone Act, 2011	Coastal Zone Management Authorities of the State/CZMA authorities	6 – 8 months

6.2.5 Action agenda

The National Steel Policy 2017 lays emphasis on targeting transportation of iron ore pellets using slurry pipelines given its cost effectiveness. The average savings per ton of iron ore transported using slurry pipelines is around INR 800-1000. Thus, there exists potential annual savings of ~INR 6,000 cr by increasing modal share of slurry pipeline transportation to 15% from current 5% (assuming shift of further ~60-70 MTPA from

rail/road to slurry pipeline). The total expected iron ore movement in 2025 is around 490 MTPA.

To achieve the above objective, an inter-ministerial coordinated effort is required to reduce the constraints in pipeline construction and encourage investments in slurry pipelines. The following action agenda has been drafted post the inter-ministerial consultations on 1st of November, 2018 coordinated by the Logistics Wing.

Ministry of Railways	• Develop policy and approval process for granting RoW for slurry pipelines along the railway tracks (Canada and US already have policies for pipeline construction along railway lines) • Facilitate single window clearance for RoW permission
Ministry of Steel	• Prioritize pipeline projects from the list of identified pipeline routes by Logistics Wing, DoC and/or identify any new potential routes • Evaluate option of developing common user facility pipelines • Establish a SOP in coordination with relevant departments for giving time based approvals
Ministry of Commerce and Industry	• Nodal agency for facilitating single window clearances for future mineral slurry pipeline/conveyor projects • *Infrastructure status awarded to slurry pipelines on 13th August, 2018 (already completed)*
Ministry of Road Transport and Highways	• Facilitate single window clearance for RoW permission • *Policy for RoW utilization already released in Nov 2016 by MoRTH (already completed)*

6.3 Increase share of coastal transportation

6.3.1 Need

As mentioned in the Infrastructure Study Report for 300MT steel by 2025, the iron ore requirement would be of the order of 490 MTPA with the steel production targeted at 300MT. Presently, the main mode of transportation of iron ore and steel are railways and road which together account for ~90-95% of the movement. The proposed projected growth of steel industry would impart tremendous pressure on railways and road with respect to inward and outward traffic, loading and evacuation of raw materials and finished products. With companies targeting lower logistics cost, coastal shipment is a cost effective alternative over long distances.

6.3.2 Benefits and global benchmarking

Globally, countries such as US, China and Japan have heavily relied on coastal and river waterways for transportation in the steel industry. For example in China, almost 30% of the transportation is catered to by the coastal shipment mode. Most of the steel capacity in China is located on the coasts giving it logistics cost saving, flexibility in sourcing raw material, and better linkages with global markets. Another example of an international coastal steel cluster is in Pohang in South Korea. As per the Sagarmala report by Ministry of Shipping, developing these coastal capacities in India could save on an average INR 800 to INR 1,000 per tonne on logistics cost. In case of steel, the savings are driven by no inland logistics costs involved for coking coal, reduction in steel transportation through coastal shipping, and use of new technology (slurry pipelines) for transporting iron ore from mine to coast. An illustration of the favourable cost economics of coastal shipment from the RINL plant to the auto cluster in Pune is given below.

Cost element	Rate (INR/ton/km)	Distance (km)	Total cost (INR/ton)
Road freight from plant to port	6	10	60
Handling charges at Vizag and Mumbai ports			500

Ocean freight charges			1000
Rail freight from Mumbai to Pune	2.3	150	350
Total			~1900

The total coastal shipment cost from RINL plant to Pune is around INR 1900/ton against railway shipment cost of INR 2200/ton resulting in ~INR 200-250/ton of savings. Additionally, the transportation costs reduce by almost 20% for using larger vessel sizes such as 7000DWT as compared to 2000-3000DWT vessel sizes owing largely to more economical ocean freight charges. Currently, companies such as Essar, JSW are already using the coastal shipment route for movement of iron ore and steel on certain specific routes, however they are still using smaller sized vessels.

6.3.3 Potential routes identified

In India, the production clusters of steel are located mostly in and around the iron-ore mines in Eastern India and the North Karnataka–South Goa region with only ~10-20% of coastal capacity. However, the consumption clusters are spread across the country depending on urbanization and industrialization. National Capital Regon (NCR), Uttar Pradesh, Maharashtra and Tamil Nadu account for the highest receivers of steel, mostly produced by plants in the Eastern hinterland and North Karnataka. With several of these steel consumption clusters within accessible reach to the ports, coastal shipment comes across as a viable transportation alternative. In this report, potential routes for coastal shipment for the steel industry have been identified through an analysis of the key origin destination inter-state rail and road movements across the country. The figure below provides a summary of the potential routes for coastal movement of ~9-10 MTPA of steel by 2025.

#	**From**	In Current Year terms[1]	FY25	Savings (INR/MT)[2]
1	Odisha -Tamil Nadu	0.3 - 0.5	0.6 - 0 .7	~430
2	Jharkhand- Maharashtra	0.9 - 1.1	1.7 - 2	300-350
3	Odisha-Maharashtra	0.6 - 0.8	1.2 - 1.5	

4	Odisha-Rajasthan	-	-	
5	Karnataka-Gujarat	0 - 0.1	~0.1	
6	MH- Gujarat	0.1 - 0.2	~0.3	
7	Jharkhand-Tamil Nadu	0.5 - 0.7	1 - 1.2	600-650
8	Odisha-Gujarat	0.4 - 0.5	0.6 - 0.8	~1000
9	Others	~1.8	~3.5	~430
	Total	**5-6**	**9-10**	

Figure 18: ~9-10 MTPA steel coastal shipping opportunity by 2025

6.3.4 Limitations

Coastal shipment, though a potential alternative to road and rail transportation for the steel industry, also faces certain limitations. A detailed discussion with the industry stakeholders highlight six main such challenges:

a) Viability of small shipment sizes: creates a hindrance factor for optimal usage of coastal shipment because of high costs. Many steel players have largely a small ticket order profile. A possible solution to circumvent this is to facilitate agglomeration of cargo at load ports through time-tabled/scheduled running of ship vessels between important port destinations. These steel agglomeration centres can be rail based steel warehouse facilities at the ports for cargo agglomeration through sorting based on product type and players and having value added services such as packaging and labelling.

b) Availability of smaller vessels: Most of the EXIM vessels available are mostly Supramax and larger category size vessels resulting in most individual players with small shipment sizes sub-optimally utilizing these vessels. A possible solution to circumvent this is to incentivize smaller coastal vessels.

c) Insufficient port connectivity: Currently, most of the ports are constrained with insufficient rake availability and evacuation problems. For example, Vizag General Cargo Berth on an average gets 4 to 5 rakes against demand for 10 rakes. Many ports such as Chennai port face huge traffic jams at the port gates resulting in longer lead times. Expediting the completion of select projects under Sagarmala

and Port connectivity projects under Bharatmala would encourage higher steel coastal traffic.

d) First and last mile costs: which account for almost 30% of the total freight act as a hindrance to shift to coastal shipment. A possible solution is to develop a policy to promote creation of smaller jetties with captive cargo supported through VGF and accelerated approval process.

e) Multiple stakeholder interaction: Several transport segments such as first mile, main haul by sea and last mile lead to the steel manufacturer dealing with multiple stakeholders for shipment and handling. A key step here would be to encourage end-to-end coastal shipment solutions provided by third part players. For example, RINL is looking to tender out critical shipment routes with end to end contract clauses.

f) Unavailability of return load: on coastal routes lead to higher costs for deploying dedicated vessels. Currently, JSW operates 4-6 small vessel dedicated barges for its steel shipment from Mumbai/Dolvi to Gujarat, Kerala and Tamil Nadu. This results in a total round trip of around 12 days with the vessel coming back empty.

6.3.5 Action agenda

The National Steel Policy 2017 lays emphasis on targeting transportation of iron ore through coastal shipment mode. The average savings per ton of iron ore transported using coastal shipment on specific routes is around INR 200-250. Thus, there exists potential annual savings of ~INR 300 cr by increasing modal share of coastal transportation to ~5-6% from current 1% (assuming shift of further ~10-13 MTPA from rail/road to coastal shipment). To achieve the above objective, a coordinated effort between the ministries and industry stakeholders is required. Following action steps would require consideration:

a) Ministry of Shipping (MoS) to coordinate with Logistics Wing, DoC, to validate and prioritize coastal shipment routes for cement, steel and iron ore

b) MoS to explore feasibility of running scheduled vessels for movement of steel on identified shipping circuits by enabling aggregation. MoS may conduct meetings

with Logistics Wing, DoC, Ministry of Steel, shipping lines, and steel manufacturers for the same

c) MoS may develop a policy to promote creation of smaller jetties with captive cargo supported an accelerated approval process and VGF if required

6.4 Increase share of inland waterways

6.4.1 Need

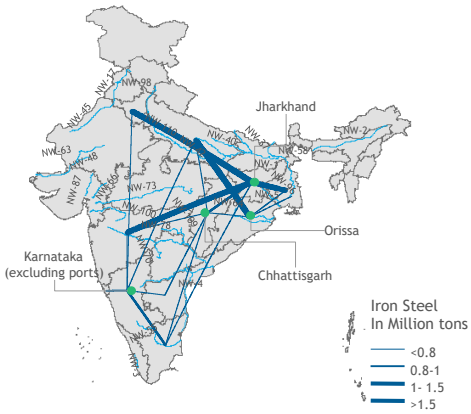
With companies driving for lower logistics cost, national waterways shipment is a cost effective alternative over long distances. In some regions of India, it can also be an alternative mode for the first mile movement owing to issues in rake and truck availability.

6.4.2 Potential routes identified

India has 111 identified national waterways of which 5 are developed/under construction and the remaining 106 were notified in 2016 under various stages of DPR preparation/evaluation. Based on discussions with the Inland Water Authority of India (IWAI), it has shortlisted around 36 national waterways, which exhibit technical feasibility of being developed for vessels to move. This report lists down identified potential routes/ national waterways from these technically feasible waterways for steel and iron ore movement given that the first and last mile is not greater than 50km on an average. It is observed that approximately 60 MTPA steel plant capacity (~50% of current capacity) and approximately 30% of total steel demand is located within 100km of a national waterway. For example, inland states like Bihar and Uttar Pradesh can be serviced through waterways from plants situated in the West Bengal region. In addition to this, steel from the plants in West Bengal can also be shipped using inland waterways and sent to Kolkata/Haldia. Also, plants like Tata Kalinganagar can effectively utilise NW-5 (on the Brahimini river) to transport their finished products and raw materials hence solving the problem of backhaul. NW-4 is another important river for servicing the iron ore

and steel requirement of the Orissa and Andhra Pradesh region. A snapshot of the routes is provided in the figures below.

Steel movement mapped on inland waterway network



Potential to move ~10 MMT via waterways

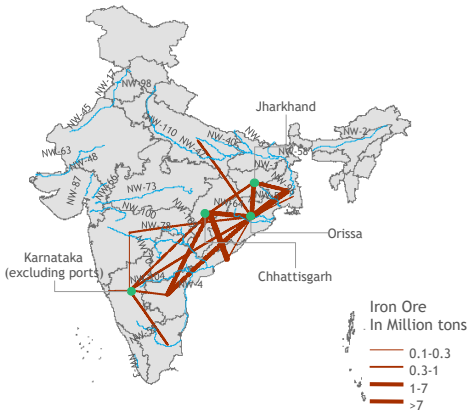
Potential route examples

Origin	Destination	Route	Value (in MMT)
Jharkhand	West Bengal	NW-96 NW-5	1.8
Orissa	Uttar Pradesh	NW-5 NW-1	1.5
Jharkhand	Haryana	NW-1 NW-110	1.4
Jharkhand	Maharashtra	NW-96 Coastal NW-4	1.4

Emerging potential waterways—NW-4, NW-1, NW-96, NW-110 and NW-5

Figure 19: Key corridors identified for steel movement

Iron ore movement mapped on inland waterway network



Potential to move ~10-20 MMT via waterways

Potential route examples

Origin	Destination	Route	Value (in MMT)
Chhattisgarh	Andhra	NW-64 Coastal	9.29
Orissa	Jharkhand	NW-5 Coastal NW-96	7.60
Orissa	Jharkhand	NW-64 Coastal NW-96	5.99
Orissa	West Bengal	NW-5 NW-1	5.27
Orissa	West Bengal	NW-64 Coastal NW-1	4.15

Emerging potential waterways—NW-5, NW-1, NW-96, NW-64

Figure 20: Key corridors identified for iron ore movement

Commodity	NW No.	National Waterway name	Stretch name
Steel & iron ore	NW 1	Ganga Bhagirathi - Hoogly	Allahabad – Kolkata

Commodity	NW No.	National Waterway name	Stretch name
Steel & iron ore	NW 4	Kakinada - Puducherry Canal system integrated with Godavari and Krishna	Vijayawada – Chennai
Steel & iron ore	NW 5	East Coast Canal integrated with Brahamani and delta rivers of Mahanadi	Kendrapara - Kolkata
Steel & iron ore	NW 64	Mahanadi River	Sambalpur – Cuttack
Steel & iron ore	NW 96	Subarnarekha River, Jharkhand - Orrisa	Jamshedpur – Baleshwar
Steel & iron ore	NW 110	Yamuna River	Allahabad - Delhi

6.4.3 Limitations

National waterway shipment, though a potential alternative to road and rail transportation for the steel industry, also faces certain limitations. A detailed discussion with the industry stakeholders highlight the following main such challenges:

a) Low availability of high capacity, low draft barges: This challenge can be circumvented by incentivizing high capacity, low draft barges. Cost economics improve by ~40% with increase in capacity of vessel from 1000DWT to 3000DWT. Globally, low draft, high capacity push barges/ tugs have been launched in several countries such as Paraguay, Australia, US etc.

b) Poor connectivity infrastructure to terminals: Proximity and easy accessibility to waterways essential to capture hinterland traffic. For example, construction of quay walls as low-cost alternatives to building terminals can help improve accessibility to waterway. Flemish government supports and encourages construction of quays

along inland waterways. Private companies pay 20% of the construction cost and the government pays the remainder.

c) Insufficient terminal infrastructure: Terminal Infrastructure development on identified waterways with storage facility at terminal, steel and iron ore handling infrastructure and connectivity with rail/road will ensure capturing hinterland traffic.
d) Low availability of Ro-Ro facilities in urban areas: Wherever waterway advantage exists, Ro-Ro facility may be encouraged to de-congest the cities (e.g. Kolkata, Mumbai etc.)
e) First and last mile costs: which account for almost 30% of the total freight act as a hindrance to shift to waterway shipment. A possible solution is to develop a policy to promote creation of smaller jetties with captive cargo supported through VGF and accelerated approval process.
f) Multiple stakeholder interaction: Several transport segments such as first mile, main haul by sea and last mile lead to the steel manufacturer dealing with multiple stakeholders for shipment and handling. A key step here would be to encourage end-to-end waterway shipment solutions provided by third part players.
g) Unavailability of return load: on national waterway would lead to higher costs for deploying dedicated vessels.

6.4.4 Action agenda

The National Steel Policy 2017 lays emphasis on targeting transportation of iron ore through national waterways mode. The average savings per ton of iron ore transported using national waterway shipment on specific routes is around INR 200-250. Thus, there exists potential annual savings of ~INR 300-400 cr by increasing modal share of national waterway transportation to ~7% (10MTPA) from <1% for steel and to ~12% (10-15MTPA) from <1% for iron ore. A workshop with representation from key stakeholders including the Ministry of Steel, PSUs, private steel producers, Ministry of Shipping, Shipping Corporation of India, Port authorities, Indian Railways on further detailed studies on feasibility, alignment and coordination would be critical for successful execution for these initiatives. To achieve the above objective, a coordinated effort between the ministries and industry stakeholders is required. Following action steps would require consideration:

a) IWAI to explore developing a policy to promote development of jetties through PPP/ other modes
b) IWAI to explore developing a policy to promote availability of barges and prepare an incentive structure to encourage use of high capacity, low draft barges
c) IWAI, in coordination with Logistics Wing, DoC, to lead discussions with steel manufacturers to identify optimal terminal locations, extent of mechanization and terminal infrastructure required on the identified feasible national waterways

6.5 Develop logistics park at major steel handling locations

6.5.1 Need and benefits

The Indian steel industry disaggregated into regional clusters of supply and demand. The consumption clusters especially are spread across the country depending on urbanization and industrialization. This mandates the requirement of setting up steel stockyards across the country to ensure service delivery levels. The stocking requirements generally differ from one steel player to another depending on the product mix and customer type services. Major steel players have almost 50-70% of flat portfolio which are mainly long term continuous production with stocking near the customers. The long and semi product type are generally made to order with large product order being delivered at the project side otherwise going through the stock and sale mode[2]. Below is the snapshot of the network of stockyards across the country by the major steel producers to serve demand clusters.

[2] ADB report

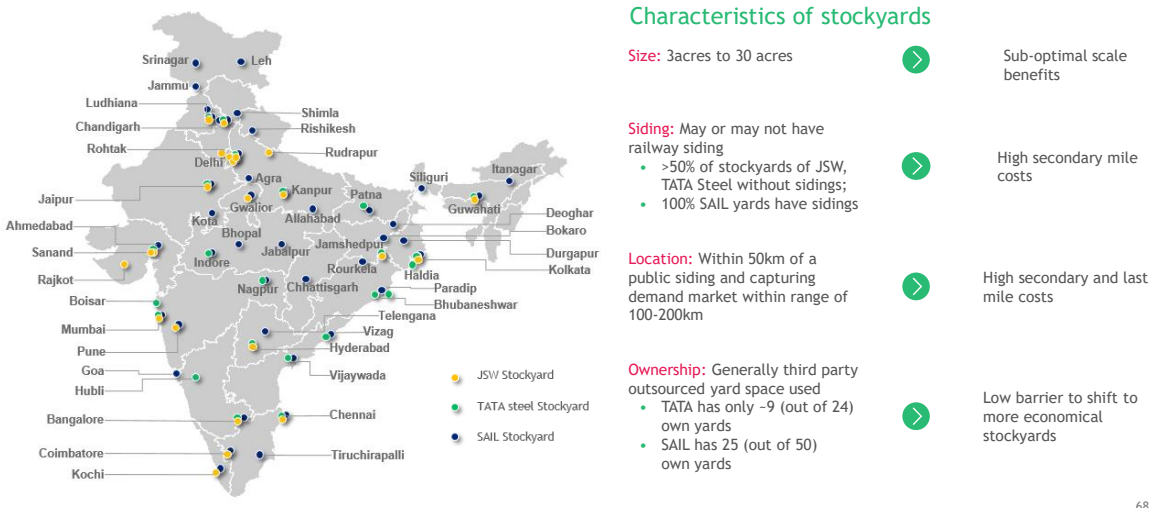


Figure 21: Steel stockyard network

The existing logistics chain of steel where the stockyard does not have a railway siding or the steel cargo is handled at a public goods sheds involves the following additional costs:

a) Multiple handling to the tune of ~INR150/ton
b) Secondary freight charges for moving from nearest railway siding to stockyard/dearler ~INR300/ton extra
c) Small warehouses do not lead to economies of scale or better handling technology adoption such as the use of EOT cranes etc leading to additional costs of ~INR100/ton.

Hence, rail linked stockyard facility near key consumption centers can minimize challenges of handling at goods shed, secondary freight charges and city based movement resulting in savings of INR 500-600/ton and overall annualized saving potential of INR 600-800 Cr.

6.5.2 Potential locations

This study highlights the potential locations for developing steel logistics park. The criteria for selecting locations for the integrated terminals were threefold:

a) Shortlisting top 40 demand centers which account for ~50-60% of total steel demand
b) Selecting the high demand growth centers which have institutional demand and large upcoming infrastructure projects
c) Selecting the stockyards which are sub-optimally serviced by the nearest railway siding leading to multiple handling and secondary freight costs
d) Selection of additional locations which are port based to reduce last mile costs and facilitate coastal shipment

Given the shortlisting criteria, 23 locations identified for developing steel logistics parks are mapped below.

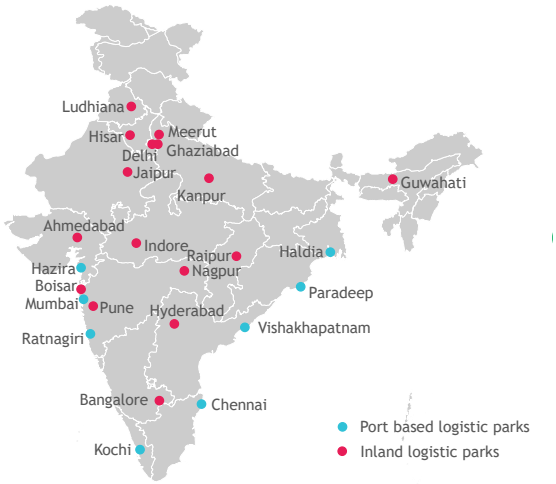


Figure 22: Shortlisted steel logistic parks locations

6.5.3 Cost of terminals

The cost of setting up a steel terminal depends on a number of factors. They have been explained below

Cost Head	Cost (INR)
Railway Siding	~5 cr/per km

Land (for 10 acres)	~8-12 Cr
Civil Cost • 10 acres total land • 4 acres covered warehouse	~35 cr
Total	~45- 55 Cr

6.5.4 Action agenda

The following action agenda has been drafted post the inter-ministerial consultations on 1st of November, 2018 coordinated by the Logistics Wing.

Ministry of Railways

a) Explore feasibility of setting up common user integrated logistics park for steel in PPP mode at 23 identified locations and check for the availability of land
b) Invite private participation for developing the terminals and bid out

Ministry of Steel

a) In coordination with industry stakeholders, to conduct surveys for feasibility studies to zero down on the exact location for warehouses in the identified cities

6.6 Increase stock of load efficient wagon types

6.6.1 Need and benefits

Presently, railways constitute ~55% of the movement of steel in India. Most of the steel products are essentially moved in BRN wagons which have a lower pay load to tare ratio. This results in the overall capacity to ~2300-2500 tons. These rakes have also higher unitization costs and take longer to secure the material on top of the flat bed. The Railways had then developed a BFNS M wagon with reduced wagon length and hence enabling more number of wagons and therefore a higher loading capacity ~4000T. The steel coils however had to be loaded with their axis along the direction of the railway track. Many public sidings with electrified tracks cannot be accessed with these wagons

because use of mobile cranes to load/unload coils interferes with the electric cables. For example, Pune siding is inaccessible, hence currently being serviced from Loni siding which adds to last mile costs. The requirement to create additional tracks for loading/unloading results in requirement of more land and infrastructure and therefore higher capex costs.

Globally, in countries of Europe, US the specialized wagons for steel transportation allow for coils to be loaded perpendicular to the direction of railway track and hence giving the benefit of easier loading/unloading with help of forklifts. This results in lower lead times as well as lower requirement of physical spaces. Presently, Steel manufacturers like JSW, in coordination with Research Design and Standards Organisation (RDSO) and Jindal Rail (wagon manufacturer), is in the process of developing a wagon design which allows for the aforementioned type of loading.

The following tables illustrates the comparison between the different wagon types.

Parameter	BRN wagons	BFSN M wagons	Modified BFSNM wagons
Axle load (tons)	20	20	20
Pay load (tons)	57	68	68
Number of wagons	40	58	58
Total capacity (tons)	2300	3944	~4100
Length of wagon (m)	13	10	10
Coil loading	Horizontal I parallel to tracks	Horizontal I parallel to tracks	Horizontal I perpendicular to tracks

- Faster evacuation using forklifts instead of overhead mobile cranes
- Increased access to many public sidings with electrified tracks; CAPEX cost savings
- Coordinate between RDSO and steel players to finalize deisgn and implement

Figure 23: Comparison of different wagon types

6.6.2 Action agenda

Ministry of Railways should explore, in coordination with RDSO, wagon manufacturers and steel manufacturers, development of modified BFNSM wagons to allow steel coils to be loaded perpendicular to track direction. Subsequent to this, the stock of such specialized wagons need to be gradually increased through proper incentivization and

inclusion in the existing Liberal Wagon Investment Scheme (LWIS) and Special Freight Train Operator (SFTO) schemes being run by Ministry of Railways.

7 Conclusion

The Integrated National Logistics Action Plan lays out a preliminary set of five key initiatives with potential annual savings of ~INR 7000-8000 Cr basis discussions with ministries and key industry stakeholders. The total steel and iron ore freight in India was analysed by major traffic flow corridors. The analysis included establishing the optimal modal mix, calculating the unit transportation costs across different modes, plotting the major origin-destination pairs for railways and for road etc. In summary, the initiatives have been converted into action agendas for consideration of different ministries and are listed as a part of the action agenda under various interventions. To enable the country to gear towards the target of 300MT steel production by 2025, the initiatives emerging from the aforementioned elements of the Action Plan require coordinated inter-ministerial and industry effort.

8 Appendix 1 : List of sub-optimal steel movement routes

The table below provides a snapshot of top 100 routes which are greater than 400 km long and yet have low rail share. A complete list of routes can be obtained through logistics division.

#	OD Pair	Road Share %	#	OD Pair	Road Share %
1	VISHAKHAPATNAM - HYDERABAD	>60%	2	SUNDARGARH - VISHAKHAPATNAM	>80%
3	RAIPUR - BANDRA	>80%	4	JAMSHEDPUR - KANPUR	>80%
5	NAGPUR - BANDRA	>80%	6	KOLKATA - BANDRA	>80%
7	MUMBAI PORT - AHMADABAD	>80%	8	RAIPUR - VISHAKHAPATNAM	>80%
9	BANDRA - AHMADABAD	>80%	10	RAIPUR - VISHAKHAPATNAM PORT	>80%
11	BANDRA - NEW DELHI	>80%	12	JAMSHEDPUR - NEW DELHI	>80%
13	NAGPUR - HYDERABAD	>80%	14	CHENNAI - HYDERABAD	>80%
15	JAMSHEDPUR - FARIDABAD	>80%	16	JAMSHEDPUR - LUDHIANA	>80%
17	KENDUJHARGARH - GAYA	>80%	18	HYDERABAD - CHENNAI	>80%
19	CHAIBASA - CHENNAI	>80%	20	ERODE - CHENNAI	>80%
21	JAMNAGAR - JAIPUR	>80%	22	VISHAKHAPATNAM PORT - HYDERABAD	>80%
23	RAIPUR - PUNE	>80%	24	BANDRA - HYDERABAD	>80%
25	BANDRA - NAGPUR	>80%	26	BANDRA - KOLKATA	>80%
27	JAMSHEDPUR - JAIPUR	>80%	28	PADRAUNA - JAGATSINGHPUR	>80%
29	BOKARO - NEW DELHI	>80%	30	VISHAKHAPATNAM - BANDRA	>80%
31	BANDRA - BANGALORE	>80%	32	MUMBAI PORT - VADODARA	>80%
33	CHAIBASA - BANGALORE	>80%	34	HYDERABAD - NAGPUR	>80%
35	AHMADABAD - BANDRA	>80%	36	PADRAUNA - PANIKOILLI	>80%
37	SUNDARGARH - CHENNAI	>80%	38	JAMNAGAR - UDAIPUR	>80%
39	INDORE - NEW DELHI	>80%	40	JAMSHEDPUR - JALANDHAR	>80%
41	NEW DELHI - JAMMU	>80%	42	VIZIANAGARAM - HYDERABAD	>80%
43	JAMSHEDPUR - AHMADABAD	>80%	44	RANCHI - KOLKATA	>80%
45	KENDUJHARGARH - JAIPUR	>80%	46	CHENNAI - THIRUVANANTHAPURAM	>80%
47	JHARSUGUDA - NAGPUR	>80%	48	CALCUTTA PORT - JAGATSINGHPUR	>80%
49	SURAT - NEW DELHI	>80%	50	NAGPUR - PUNE	>80%
51	SUNDARGARH - SAMASTIPUR	>80%	52	AHMADABAD - NEW DELHI	>80%
53	SUNDARGARH - BANGALORE	>80%	54	CALCUTTA PORT - NAGPUR	>80%
55	SURAT - JAIPUR	>80%	56	AHMADABAD - MUMBAI PORT	>80%
57	HYDERABAD - VISHAKHAPATNAM	>80%	58	BHUBANESHWAR - BANDRA	>80%

#	OD Pair	Road Share %	#	OD Pair	Road Share %
59	RANCHI - VARANASI	>80%	60	HYDERABAD - BANGALORE	>80%
61	NORTH GOA - AHMADABAD	>80%	62	NEW DELHI - SRINAGAR	>80%
63	ALIBAG - GANDHINAGAR	>80%	64	DURGAPUR - HYDERABAD	>40%
65	HYDERABAD - BANDRA	>80%	66	INDORE - AHMADABAD	>80%
67	VISHAKHAPATNAM PORT - RAIPUR	>80%	68	SUNDARGARH - NAGPUR	>80%
69	KAKINADA - HYDERABAD	>80%	70	GORAKHPUR - INDORE	>80%
71	KOLKATA - NEW DELHI	>80%	72	INDORE - BANDRA	>80%
73	BANGALORE - BANDRA	>80%	74	NAGPUR - GANDHINAGAR	>80%
75	CHENNAI - VIJAYAWADA	>80%	76	SURAT - RAJKOT	>80%
77	RANCHI - BANDRA	>80%	78	BANDRA - KOLHAPUR	>80%
79	PADRAUNA - PARADWIP	>80%	80	BANDRA - JAMNAGAR	>80%
81	RAIPUR - NASHIK	>80%	82	BANDRA - CALCUTTA PORT	>80%
83	BANDRA - INDORE	>80%	84	SUNDARGARH - HYDERABAD	>80%
85	BANGALORE - HYDERABAD	>80%	86	BANDRA - VADODARA	>80%
87	JAMSHEDPUR - GUWAHATI	>80%	88	SURAT - INDORE	>80%
89	PUNE - NEW DELHI	>80%	90	ROURKELA STEEL PLANT - HALDIA	>80%
91	NAGPUR - AHMADABAD	>80%	92	CUTTACK - VISHAKHAPATNAM PORT	>80%
93	BANDRA - RAJKOT	>80%	94	CUTTACK - VISHAKHAPATNAM	>80%
95	BANDRA - VISHAKHAPATNAM	>80%	96	VALSAD - NEW DELHI	>80%
97	GANDHINAGAR - FIROZPUR	>80%	98	VIJAYAWADA - CHENNAI	>80%
99	KENDUJHARGARH - VIJAYAWADA	>80%	100	GANDHINAGAR - JHUNJHUNUN	>80%

Chapter 3: Commodity Corridor Analysis – Fruits and Vegetables

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1 Context

In line with the mandate given to the Logistics Wing to integrate and optimize the several elements of the logistics value chain, this chapter deals with initiatives identified to optimize the logistics cost of fruits and vegetables in India.

India is the second largest producer of fruits and vegetables in the world, producing ~93 MMT and ~178 MMT respectively in FY17-18 and having a total planted area of 16.5 mn ha. Fruits and vegetables together contribute to more than ~3% of the total freight movement in the country.

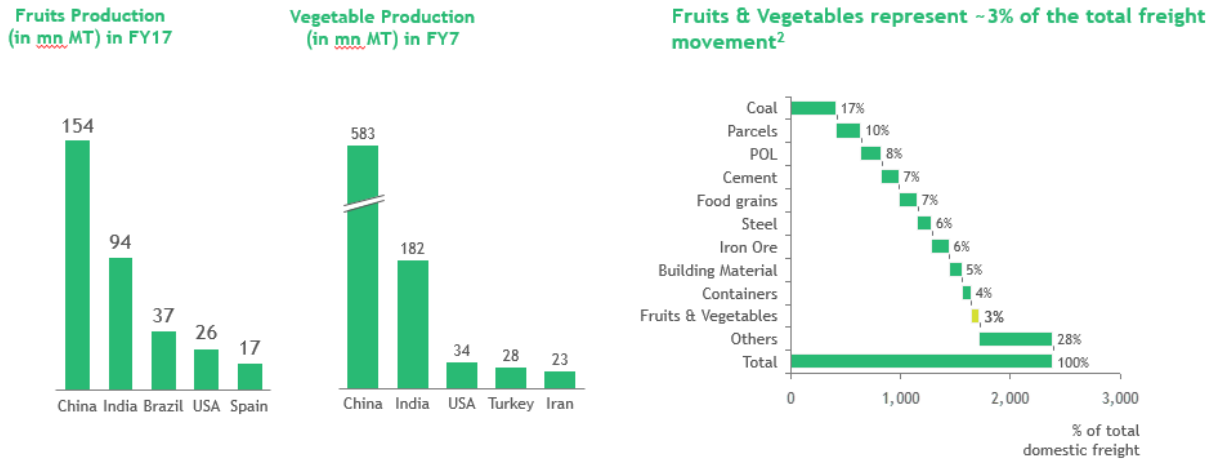
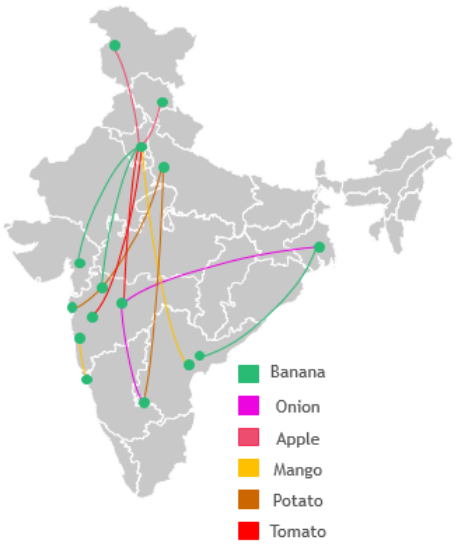


Figure 1: Indian fruit and vegetable production and logistics

India's logistics cost for the long distance movement of fresh produce, consists of ~ 25-50% of final retail price, which is significantly higher than best in-class benchmarks globally.

Although more than 70% of F&V is consumed locally (within 100km), there is a huge movement of fresh produce across the country in categories such as apples, bananas, potato and tomato. Given India's changing dietary patterns with inclusion of more fruits and vegetables and rapid urbanization, the logistics of fresh produce is bound to increase and be a significant portion of the retail price.



#	Fruit	Selected Corridor	Distance in km
1	Banana	Jalgaon–Delhi	1200
2	Banana	Vizianagram–Kolkata	850
3	Banana	Vadodara Belt–Delhi	1000
3	Onion	Lasalgaon–Kolkata	1800
4	Onion	Lasalgaon–Bangalore	1050
5	Apple	Baramulla Region–Delhi	900
6	Apple	Shimla, Kullu Belt–Delhi	400
7	Mango	Vijaywada–Delhi	1859
8	Mango	Ratnagiri- Goa	300
9	Potato	Agra–Mumbai	1200
10	Potato	Agra–Bangalore	2000
11	Tomato	Ahmednagar-Delhi	1350
12	Tomato	Lasalgaon–Delhi	1200

Figure 2 Key ODs for major fruits and vegetables

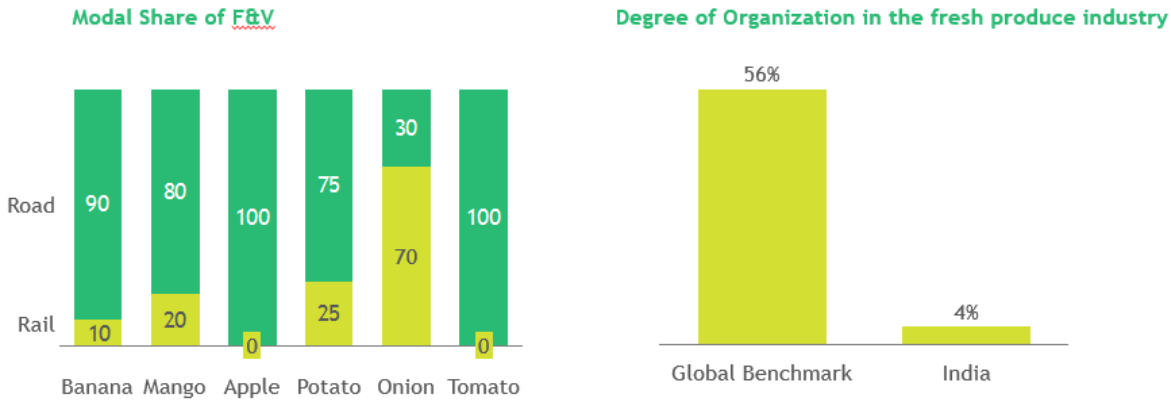


Figure 3 Modal share & Degree of Organization

In India, most of the long distance movement of fresh produce in the country is on roadways (except onion) and the organized players only have a 4% market share compared to global benchmark of a basket of developed countries of 56%

This report details out the initiatives identified to reduce the logistics cost in fresh produce.

2 Approach Methodology

The fresh produce industry constituting ~3% of the total freight in India was analysed by major corridors. The analysis was conducted by onground analysis at each cluster of the

fruit/vegetable where the team ideated and identified issues with each player of the value chain, namely farmers, traders, wholesalers and retailers. Also, different farmer organizations, transport unions, cold storage operators and packaging players were onboarded for identifying gaps in the current value chain. At each stage of the value chain, from harvesting in farms to retailing in urban markets, costs, wastages and transit time were determined. The analysis also included establishing the farmer incomes and there was explicit focus on increasing farm income through logistics efficiency.

The costs, wastages and times in the value chain were compared against global peers in each fruit/vegetable to identify suitable interventions at each stage of the value chain which could reduce overall cost of logistics and improve farm incomes. It was ensured that the suggested interventions donot distort the prevailing market structure and worked within the frameworks of fresh produce trading and retailing as is the case in the country currently.

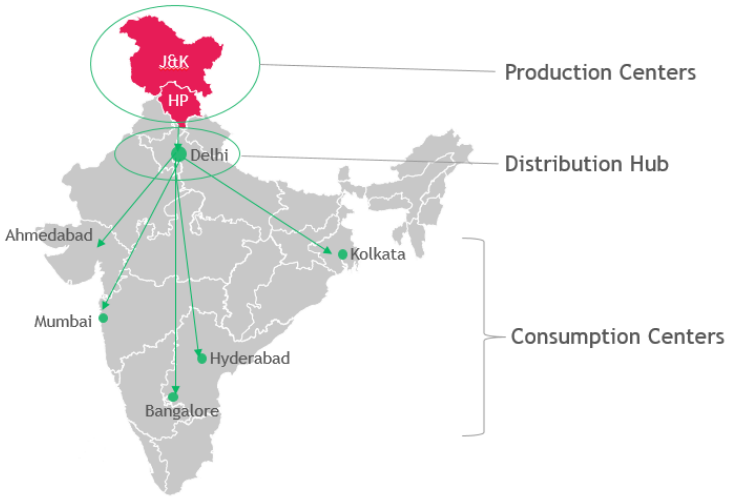
3 Apple

3.1 Landscape and value chain

India produced 2.3 MMT of apples in FY17-18 where the supply was primarily from 3 states, namely J&K (~65%), Himachal Pradesh (~30%) and Uttarakhand (~5%). Also, top 8 districts in these three states account for more than 90% of the apple production by volume. Due to the concentrated supply base in the extreme north of India, apples are transported over large distances to various urban centres with Delhi acting as the hub for the rest of the country. All of the transportation is carried out by open trucks in the peak season while in the lean season, cold stored apples are supplied to the market through reefer vehicles.

Once the domestic supply of apples run out due to lack of storage, heavy demand and poor quality produce, there is a huge influx of imported apples (> 3 lakh tonnes) from US, NZ and other leading apple growing nations at premium prices to the retail markets. Only

a handful of Indian players who have invested in CA facilities and have efficient product collection systems can take advantage of the off season price and compete with the imports which gives them upto 2x the price of the peak season price.



Top apple producing districts in India

District	'000 tonnes
BARAMULLA	523.992
SHIMLA	407.751
ANANTNAG	189.3914
SHOPIAN	183.412
KUPWARA	130.368
KULLU	104.589
PULWAMA	90.182
KULGAM	72.518

Top 8 districts account for ~90% apple production

Figure 4: India apple production and distribution

Apples are harvested from mid October to the end of December in different parts of J&K and HP where they are packed in cardboard/wooden boxes to be shipped to various parts of the country through a network of intermediaries at each stage of the value chain. For a typical value chain to Delhi wholesale market, 8-9 major steps are undertaken. Due to fragmented markets and large number of steps in the value chain, high costs and losses are incurred.

Value Chain	Key Processes	Challenges	Day
Harvesting	• Harvesting done by employed labour • There is a loss of 4-5% on fruits while harvesting due to dropping etc and these fruits are not packed for selling and are locally consumed		0
Transport to Pack Tent	• After harvesting 40kg of fruit, the harvester transports the fruit from the orchard to a nearby temporary packing tent • A harvester can harvest and transport 18(20kg) boxes a day.		0
Grading & Packing	• Grading is done by the packer who first grades the apples into various categories based on size in plastic crates • Then, these apples are packed into wooden/CFB boxes for onward transportation	• Over packing up to 20% extra is done in boxes to reduce transport costs. Leads to 2-3% loss • No mechanized grading techniques used which leads to more labour requirement and also grading is not proper • Packaging is done in one time CFB and wooden boxes which are expensive	0.5
Loading to Truck	• As trucks pick up from near the orchards, there is no significant first mile cost and the boxes are loaded directly into the truck	• Trucks load at various points on the way and therefore take almost a day to completely load • This adds an additional day in travel time for the trucks	1

9

Figure 5: Value chain of Apples (1/2)

Long Haul Transport	• Transport takes place in 9T or 12T (payload) trucks • Travel time for truck is approximately 32-36 hours	• 5-6% damage occurs in long haul transit of apples • Reefer trucks not used as they are twice the cost • Trucks take more time as there are 7-8 tolls and checkpoints on the way • Trucks are almost invariably overloaded • City restrictions limits truck movement to mandi	2-3
Long Term Storage	• Apples are to be tested for their properties to be stored in CA storage for longer term(6-8m) • Cold Storage may be employed for shorter duration(2-3m)	• No access to cold storage and CA facilities as infrastructure is lacking • Lack of awareness and risk taking ability of farmer for storing in CA or cold storage due to price risk	NA
Auction/Sale	• Apples at auction/sale are bid by traders and even wholesalers and larger retailers. • The farmer receives the proceeds of the sales from commission agent less costs and margins	• Price risk is borne by grower • Growers feel the process of auction at azadpur mandi is not transparent	3
Last Mile	• Repackaging of the apples into smaller cartons for distribution to retailers and sub-wholesalers • Last mile carried out in small 5T or lower vehicles due to low volume of transport	• High last mile costs per kg	4
Selling & Distribution	• Apples are quickly sold off on carts and established shops but in the open • Huge margins are added to hedge against possible losses	• High wastages(>7%) occur in this step of the value chain • No temperature controlled cabinets or temporary storage is used, amplifying losses	5-6

10

Figure 6: Value Chain of Apples (2/2)

3.2 Cost components of the value chain

Price and Costs in the Peak Season	INR/20 kg box	As a % of Auction Price
Auction Price of Grade A Indian apples	1200-1400	100%
Margins of Intermediaries	240-280	20%
Trader Margin(10%)	120-140	10%
Commission Agent Margin(8%)	96-112	8%
Other fees & Commissions(2%)	24-28	2%
Total Logistics costs	250-270	22%
Wastages During Transport(~5%)	50-58	5%
Open Truck Transport Costs	80-90	7%
Loading/Unloading costs	7-8	1%
Packaging Material and labor	105-120	9%
Packing losses(~2%)	10-11	2%
Transport to Tent	9-10	1%
Production & Harvesting Costs	410-510	34%

Figure 7: Detailed Breakdown of Costs in the Apple Value Chain to Delhi

As seen in the table above, at a wholesale price of 1200-1400 rupees per 20kg (which is generally overpacked to 23kg) box of apples, logistics cost equivalent to 20-25% of the wholesale price is incurred. Three major components of the cost include open-truck transportation charges, packaging materials and labor charges and wastages in the value chain. A detailed split of the logistics cost is explained in the chart below:

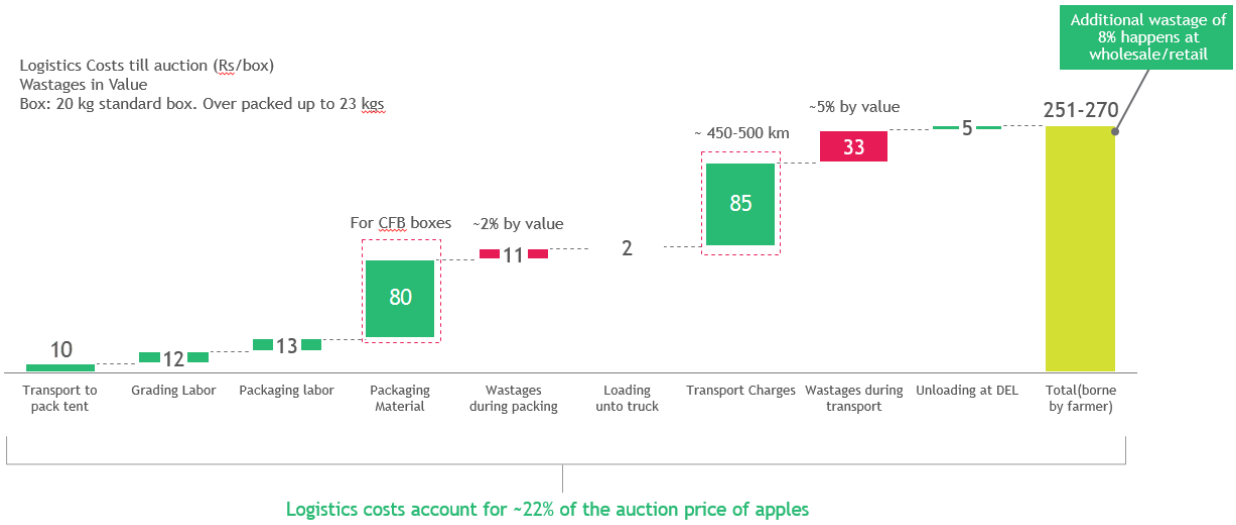


Figure 8: Detailed breakdown of logistics cost

3.3 Key Challenges

This section of the report lists the key challenges faced by stakeholders in the fresh apples industry and also lists factors which can be targeted to improve the suboptimal logistics.

a) **Overpacking of fruits:** Due to fixed transportation & packaging charges per box, there is a huge incentive for farmers and traders to overpack the apples in the box to reduce the per apple transportation and packaging charges. This leads to additional damage to the fruit to the tune of 3% and increases the cost of wastages for the end consumer.

b) **High lead time of transport:** Trucks aggregate produce from a large number of farms and build a full load throughout the day to leave for distant markets such as Delhi. Therefore, a full extra day of a truck's time is spent in aggregating and loading from different farms which increases the cost of transportation and also diminishes quality of fruit leading to wastage

c) **Manual sorting and grading:** Manual sorting and grading of produce without use of technology and protocols leads to retesting and checks at all points of the value chain increasing times and costs. Also, farmers are not able to get a good price due to low bargaining power of uncertified and ungraded produce

d) **Higher wastages in the value chain:** The transportation of apples using manual handling, open-truck transportation and the current marketing systems leads to upto 10% value wastage across the supply chain which is a direct impact on the bottomline of the farmer

e) **Smaller fleet mix:** As the trucks used for apple transportation have to collect apples from the first mile itself, they mostly consist of 9-12T capacity trucks as they have to navigate sharp turns in the hilly regions of HP & J&K. This increases the cost of long haul transportation to distant markets such as Delhi.

f) **Lack of usage of CA facilities:** There is a lack of CA storage availability at the supply pools and thus the supply glut during the peak season cannot be stored for consumption in the lean season when there is shortage of local apples and hence it is imported from other countries

g) **Intra-city restrictions hampering movement:** As Azadpur mandi is in Delhi, movement of trucks carrying apples is only allowed from 11 PM to 6 AM which leads to large number of trucks waiting for days at the border to get access to the mandi. This increases cost of transportation, inventory holding costs and also increases the transit time.

3.4 Recommendations

There is a need to overcome the aforementioned challenges in a structural manner to ensure sufficient infrastructure capacity and its efficient use. Discussions with several stakeholders across the supply chain identified a list of possible initiatives to reduce logistic cost and improve logistics efficiency for the transportation of apples. The interventions are listed out as below:

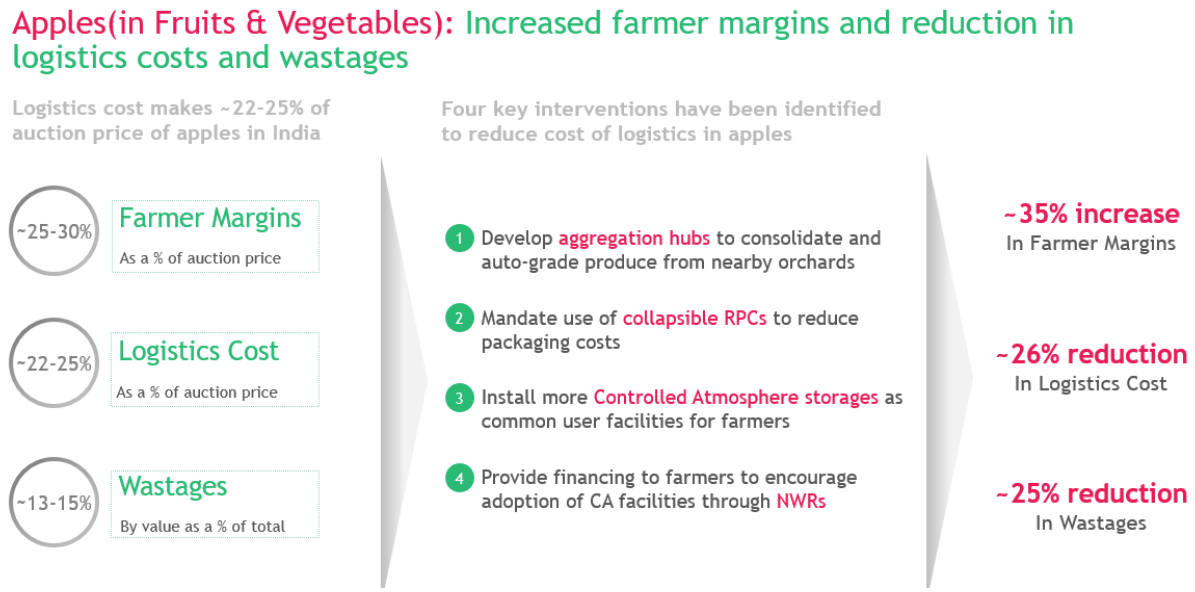


Figure 9: Summarized Interventions for Apples

3.4.1 Promoting Collapsible Plastic Crates as an alternate packaging material

3.4.1.1 Need Assessment

Currently, the Indian apples are produced primarily for domestic market with major movement of apples across key corridors from Delhi to India's metros. Currently the packaging material and labor spent on a 20 kg box is in the range of INR 100-110 which is upto 10% of the wholesale price of the apples being sold. Thus, it was proposed to use multi-use packaging, in line with global standards for transportation of apples and make it more cost effective for the farmer.

Multi-use packaging such as plastic crates for transport of fruits and vegetables is quite prevalent in other food value chains such as for tomato but they suffer from high backhaul costs due to significant empties movement over large distances. Hence, it is suggested that collapsible plastic crates be used, which can be folded on emptying to occupy a fraction of the space and allow for huge backhaul movement of the containers.

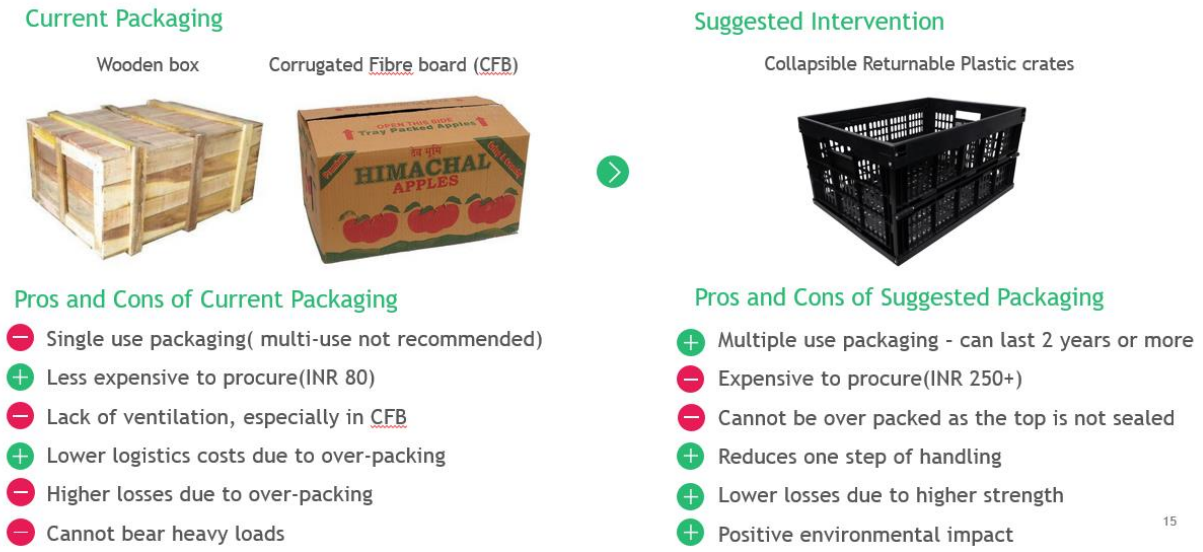


Figure 10: Comparison of Collapsible RPCs with CFBs

3.4.1.2 Cost competitveness of the model

Using collapsible plastic crates vis-à-vis cardboard boxes is cost competitive, even if overpacking into cardboard boxes is taken into account. This is illustrated in the figure below:

Costs incurred in the current packaging mechanism

Cost Head	INR/box
Carton Price	48
Trays	30
Miscellaneous(Tape, etc)	3
Total	81
Savings from Over-packing	40
Net cost to grower	41

Costs incurred post switching to collapsible RPCs

Cost Head	INR/box
Crate cost	250
No of uses	50 times
Cost per use	5
Packaging Foam cost	10
Backhaul cost	6
Net cost to grower	21
Savings from wastage reduction	12.5

Figure 11: Cost comparison of Collapsible Crates vs CFB boxes

The use of such crates will allow the farmer to save atleast INR 20 per cycle which will boost his margins by more than 7%. Also, net savings due to wastage reduction which will be realized throughout the value chain will amount to atleast savings of INR 32-33 per cycle and this will directly reduce the logistics cost by 11-12%. Over a significant period of time, this cost saving should trickle uniformly to all players in the value chain, further increasing the income of the farmer.

3.4.1.3 Business models for effective implementation

Due to significant overhead of managing the flow of crates in the apple transportation ecosystem, the solution has to include a robust business model for effective implementation. Globally, there are 4 predominant themes of collapsible plastic crate implementation. They are:

Grower/shipper owned

This model works best when the buyer uses the crates for operations within the control of the RPC owner, such as for harvest, pre-cooling or temporary storage. Example: Adani Agrifresh

Pros and Cons
- (+) Lower running costs
- (−) Not scalable
- (−) Only feasible with organized players

Plastic crate manufacturer/APMC owned

Most small farmers use crates once a year, hence being able to rent or lease them from a crate manufacturer/supplier/any other player will help them reduce purchasing costs. A deposit which is minimum of the market value of the crates will be collected till the crates are returned.
Example Bungobox, CHEP provide RPCs for lease with self-managed backhaul

Pros and Cons
- (−) Backhaul mechanism needed
- (+) Higher running costs
- (+) Convenient & User-friendly

Figure 12: Business models for RPC implementation (1/2)

Selling of crates with produce

In this system, the user buys the RPC from the market and then sells the produce along with the crates. As a lot of money is blocked in crates, the crate movement will be faster and they will be returned faster to the market

Pros and Cons
- (+) Higher crate utilization
- (−) Higher upfront costs
- (+) No tracking mechanism needed

Trader/Retailer owned crates

Trader/Retailer owns the crates and ships them to farmers to collect the produce in them. This reduces upfront cost for the grower and enables transition to crates. Ex: Some traders at Azadpur Mandi use this business model

Pros and Cons
- (+) Higher crate utilization
- (+) No upfront costs
- (−) May not be scalable

Figure 13: Business models for RPC implementation (2/2)

Of these 4, the highlighted ones, namely Plastic crate manufacturer/APMC owned and the Selling model are pegged to work the most effectively in the Indian fruits and vegetables marketing ecosystem. In direct to consumer value chains, grower or retailer owned inventory are the most effective business models for the crates.

3.4.2 Creating aggregation hubs with auto-grading & certification of produce

3.4.2.1 Need Assessment

Currently, most of the apples are in Himachal and J&K are collected individually from the farmers through local agents of transport unions. These agents identify the loads available at each farm gate and plot a route for a small truck of 9T or 12T capacity to load these and then ship it to urban markets situated far away. This process takes a full day and leads to high losses due to higher transportation time. Also, the produce is manually graded by the farmers at the farm itself and thus lacks the consistency and certification necessary to command a higher margin. Therefore, it is proposed that aggregation hubs with auto-grading and certification of produce will provide higher margins for farmer and also reduce logistics costs across the value chain.

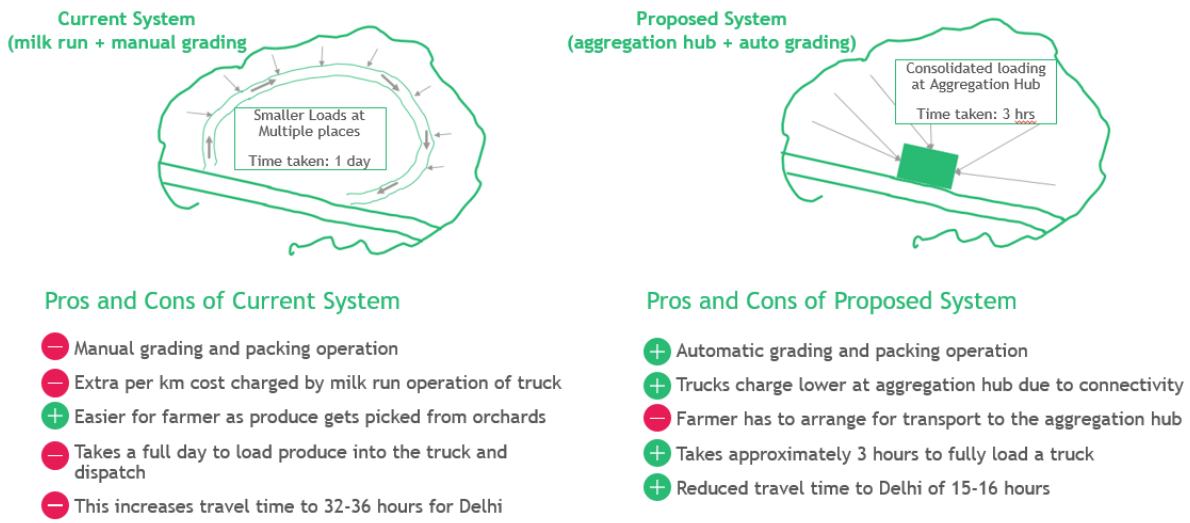


Figure 14: Benefits of Setting up Aggregation Hubs in Himachal and J&K

3.4.2.2 Cost competitiveness of the model

Setting up of Aggregation Hubs with grading/sorting and certification will need to be attractive to the farmer to incentivise him to use it for grading and consolidation of his produce. As opposed to earlier, the farmer will now have to transport the boxes to a center instead of it being picked up at the farmgate. Thus, this additional expense of his needs to be offset with savings from processing his produce at the center. The figure below

details out the costs and savings for the farmer, alongwith the net incentive to bring it to a hub for grading and packaging.

Current System (milk run + manual grading) Cost Head	INR/box	Proposed System (aggregation hub + auto grading) Cost Head	INR/box
Grading cost	12-14	Grading cost	5
First Mile	0-0	First Mile	3-5
Transport cost	80-90	Transport cost	78-85
Loading Cost	2-4	Loading Cost	2-4
Total Grading, Loading & Transport cost	95-110	Total Grading, Loading & Transport cost	90-100
		Savings to farmer in the proposed system	6-9
		Additional Margin due to Auto-graded produce(5% of selling price-1200)	60

Gains of upto INR 69 per box which is ~20% of the total margins of the growers

Due to autograding and certification of produce it is expected that the farmer will fetch a higher price (5%) for a box of apples and this will increase his incentive to be certified. Also, due to automated grading, the labor cost incurred earlier will be lower.

Additionally, aggregation hubs will reduce total logistics costs due to time savings of faster loading, larger fleet mix and reduction in wastages. The following table illustrates the savings incurred in installing aggregation hubs.

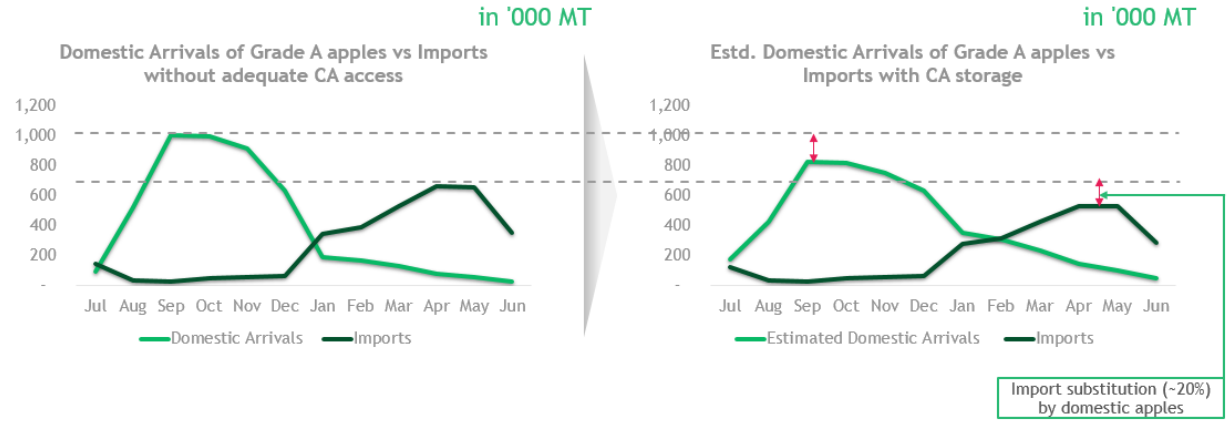
Driver	Details	Savings (inr/box)	Savings(in INR crores)
Auto Graded Produce	• Grading and packing done at mechanized aggregation hub	9	72
Reduction in Wastages due to reduction in travel time	• Reduction in travel time saves approximately 2% of the wastages	12-13	100
Better Utilization of trucks: Reducing 1 day of travel time	• Fixed costs of running a truck are apportioned over a larger number of trips • Margins are assumed to be constant	13-14	110
Shifting to Higher Tonnage trucks(20-25T)	• Higher tonnage vehicles have lesser running cost (3.46/ton-km for 10T payload vs 2.04/ton-km for 21T payload)	12*	96
		46	378

The savings which annually correspond to INR 378 crores, will help save ~15% of the logistics cost incurred in apples.

3.4.3 Develop CA storage infrastructure for farmers to reduce dependence on imports

3.4.3.1 Need Assessment

India imports ~3 lakh tonnes of premium apples from US, China etc which fill in the gap for the shortfall of domestic supply three months post the production period. Over a period of time, through efficient production, logistics and branding, these crops have developed a strong market in India with a favourable consumer preference. Thus, it is very important for Indian apple growers to develop infrastructure to sell throughout the year to take advantage of high price points and a strong market.



20% import substitution can be achieved with adequate installation of CA storages which will give a big boost to farmer incomes by providing them atleast 50% extra margins and reduce imports worth INR 400 crores every year.

3.4.3.2 Cost economics of the model

At a cost of INR 240-300 per box of apples/season, the CA store operator can obtain an IRR exceeding 15% over a period of 15 years. Also, this price of CA storage, when incorporated in the costs of the farmer alongwith the additional margins he will derive by selling in the lean season, leads to a 50% boost to farmer margins on a per box basis. Even if farmers store only 20% of their produce in CA, they will boost their overall incomes by 10%.

Price and Costs in the Peak Season	INR/20 kg box
Auction Price of Grade A Indian apples	1200-1400
Margins of Intermediaries	240-280
Trader Margin(10%)	120-140
Commission Agent Margin(8%)	96-112
Other fees & Commissions(2%)	24-28
Total Logistics costs	250-270
Wastages During Transport(~5%)	50-58
Losses in Cold Storage	0-0
Cold storage costs	0-0
Open Truck Transport Costs	80-90
Loading/Unloading costs	7-8
Packaging Material and labor	105-120
Packing losses(~2%)	10-11
Transport to Tent	9-10
Production & Harvesting Costs	410-510
Net Farmer Margin	285-300

Price and Costs in the Lean Season	INR/20 kg box
Auction Price of Grade A Indian apples	1900-2100
Margins of Intermediaries	370-420
Trader Margin(10%)	184-208
Commission Agent Margin(8%)	148-167
Other fees & Commissions(2%)	37-42
Total Logistics costs	600-720
Wastages During Transport(~5%)	31-35
Losses in Cold Storage	67-74
CA storage costs	240-300
Reefer Transport Costs	120-150
Loading/Unloading costs	7-8
Packaging Material and labor	105-120
Packing losses(~2%)	10-11
Transport to Tent	9-10
Financing cost	12-15
Production & Harvesting Costs	410-510
Net Farmer Margin	420-450

Figure 15: Increased farmer margins due to CA storage

Head	Value
Total Investment(1200MT store)	9.60 crores
Government Subsidy(Capex)	5.32 crores
Revenue Price Point	INR 15/kg
Net IRR for operator	15.96%

Figure 16: CA Operator investment summary

Detail financial projections for the CA store operator are attached in the appendix.

3.4.3.3 Alternate subsidy disbursement for CA storages – DBT

To incentivise CA operators to provide storage facilities to farmers and also ensure that the subsidy provided by the government also encourages throughput, it is suggested to explore direct benefit transfer for disbursement of subsidies. The outgo for the government in case of DBT will also be over a period of years, unlike in capex where it is based on construction milestones. The outgos for the government are thus compared below:

For a 1200 MT CA storage	Option 1 Capex-Linked Backend Subsidy	Option 2.1 DBT—Flat Tier	Option 2.2 DBT—Tapered Monthly	Option 2.3 DBT—Tapered Yearly	Option 2.4 DBT—Tapered Monthly & Yearly
Upfront Investment by Dev. Including loan	430-450 lakhs	940-980 lakhs	940-980 lakhs	940-980 lakhs	940-980 lakhs
Subsidy (%)	55% on capex	34% on price	34% on price	60 to 34% on price	60 to 34% on price
Year one base revenue/kg and targeted IRR	INR 15/kg @ 15-16%	INR 23/kg @ 15-16%	INR 23/kg @ 15-16%	INR 23/kg @ 15-16%	INR 23/kg @ 15-16%
NPV of Government Outflow at Y0	500-550 lakhs	400-450 lakhs	400-450 lakhs	520-570 lakhs	520-570 lakhs

80% to 20% to boost utilization

Figure 17: Comparison of Govt. Outgo in DBT vs Capex

As the DBT is paid on usage of CA facilities, it has to be ensured that systems are built in place to reduce cases of fraud. For this to happen, the packages are to be tagged with tamper proof UID and checked at each entry/exit point for verification. The following workflow below illustrates the same:

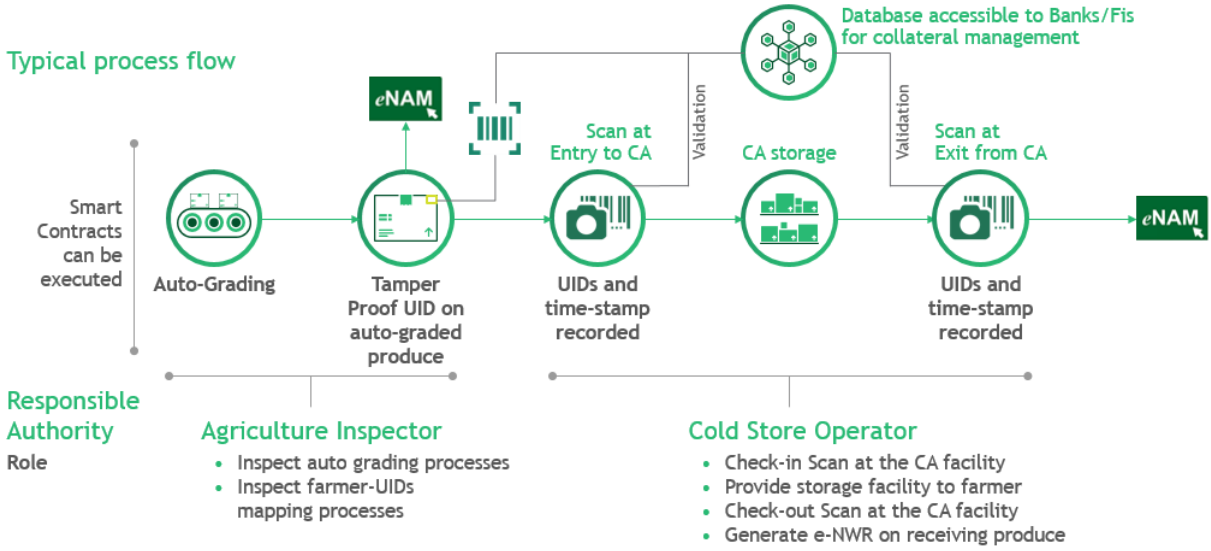


Figure 18: Systemic checks to prevent DBT misuse

This process flow, coupled with credit extension only to groups of farmers on valid e-Negotiable Warehouse Receipts will increase the viability of DBT and reduce leakages.

4 Tomato

4.1 Landscape and value chain

Tomatoes in India consist of primariliy 2 varieties, the local variety which has lower yield and shelf life and the hybrid variety which has much higher yields, has a thicker skin, which lends it a high shelf life. The hybrid variety is the one which is transported over large distances while the local variety is consumed within 200 kms given its lower shelf life. The ideal climatic conditions for growing hybrid tomatoes is warm weather and this weather is present year round in two belts, one comprising near Pune and other near Bengaluru. India produced a total 22 mnT of tomatoes in FY 17 without any significant exports during the period.

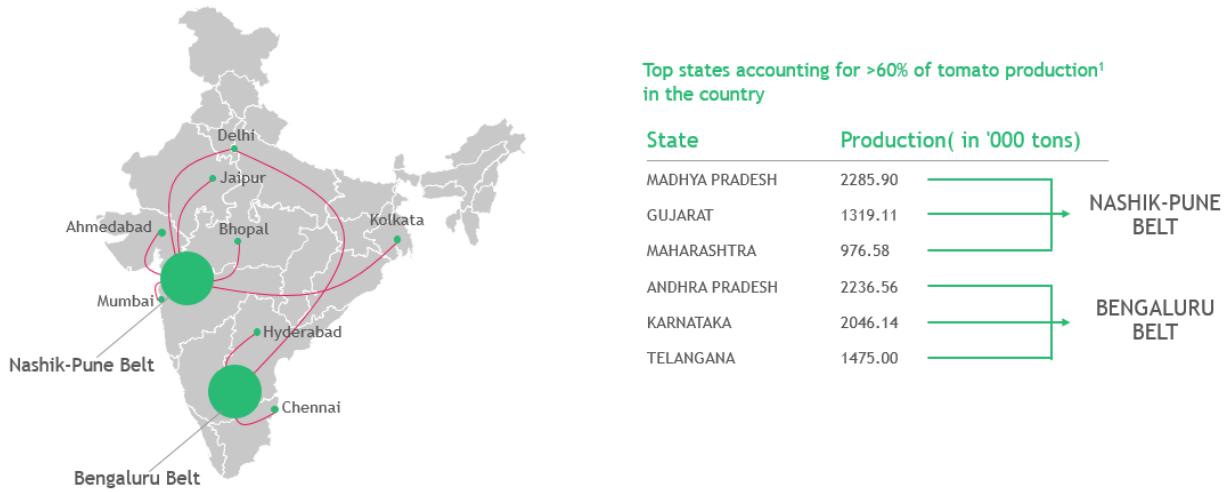


Figure 19: Tomato production areas and demand centers

Hybrid tomatoes grown can be grown round the year but the ideal harvesting season is in the winters when a huge supply of tomato crushes the market prices. As tomatoes cannot be stored for long periods of time, the glut situation in the market thus prevails for upto a month. Also, tomatoes are shipped for large distances in trucks which leads to >15% damage in transit. The following table illustrates the entire value chain for tomato:

Value Chain	Key Processes	Challenges
Harvesting	• Harvesting done by employed labour • 3-4% tomatoes are discarded at this stage	
Loading in Buckets/Crates	• The harvested tomatoes are collected in plastic crates which can hold upto 20kg of tomatoes.	
Transport to Packtent	• A temporary packtent, setup by the small grower(or group of growers) is used to unload the tomatoes and pack them in crates	• Packtents donot have pre-cooling and washing/sanitization facilities • Manual grading & sorting is not done
Transport to Mandi	• Transport to the mandi is carried out in small lorries capable of carrying upto 100 crates(~2-3T)	• Prohibitively high transport cost(~ INR 20-30 per crate) means the farmer can only afford it once
Auction at Mandi	• Tomatoes are sold in the mandi and the farmer is paid by the trader • The trader/commission agent takes responsibility of shipping the tomatoes to distant markets	• As mandis donot have cold rooms to temporarily store produce, sale cannot be postponed till market conditions are favorable

Figure 20: Steps in the Tomato Value Chain (1/2)

Value Chain	Key Processes	Challenges
Re-packaging by the trader	• Tomatoes are transferred from farmer's crates and repacked into 25kg crates	• Extra step of handling leads to 3-4% losses • Overpacking of 25 kg tomatoes in 20 kg crate leads to higher losses during transport
Loading unto Truck	• Manual labour is employed to load the crates into the trucks	
Long Haul Road Transport	• Long haul transport in 16-20T trucks for longer distances. Takes upto 3 days to transport from Maharashtra to Delhi	• Decay losses in tomatoes during transportation(>10%) • Transportation time is high(2 days +)
Unloading & Last Mile	• Crates are cross docked to last mile vehicles or temporarily stored at the mandi • Last mile carried out in small 5T or lower vehicles due to low volume of transport	• High last mile transport costs/kg
Selling & Distribution	• Tomatoes are quickly sold off and the crates are returned to the traders • Huge margins are added to hedge against possible losses	• High wastages(>10%) occur in this step of the value chain

Figure 21: Steps in the Tomato Value Chain (2/2)

In the value chain of tomato, the farmer brings his produce to the mandi in plastic crates where, post the auction, the trader unloads his tomatoes and repackages ~25% more tomatoes in the same crate as earlier for long haul transportation. The produce is then marketed to different parts of the country in 16-20T trucks. The final retail price of the tomato is atleast 4 times the price fetched by the farmer.

4.2 Cost components of the value chain

Price and Costs in the Peak Season	INR/25 kg box	As a % of Auction Price
Auction Price of Hybrid Tomato	400-450	100%
Margins of Intermediaries	80-90	20%
Trader Margin(10%)	40-45	10%
Commission Agent Margin(8%)	32-36	8%
Other fees & Commissions(2%)	8-9	2%
Total Logistics costs	220-240	55%
Wastages in the Value chain(~15%)	52-60	15%
Long Haul Transport Costs	95-105	26%
Loading/Unloading costs	7-8	2%
Packaging Material and labor	20-23	6%
Re-Packing losses(~2%)	8-9	2%
Transport to Mandi	30-40	10%
Production & Harvesting Costs	60-70	13%
Net Farmer Margins	50-80	12%

Figure 22: Costs incurred in the tomato value chain

As seen in the table above, for a wholesale price of 400-450 rupees per 25kg crate in Delhi mandi, logistics cost incurred is equivalent to 50-55% of the wholesale price. Three major components of the cost include open-truck transportation charges, wastages in the value chain and first mile transportation charges. A detailed split of the logistics cost is explained in the chart below:

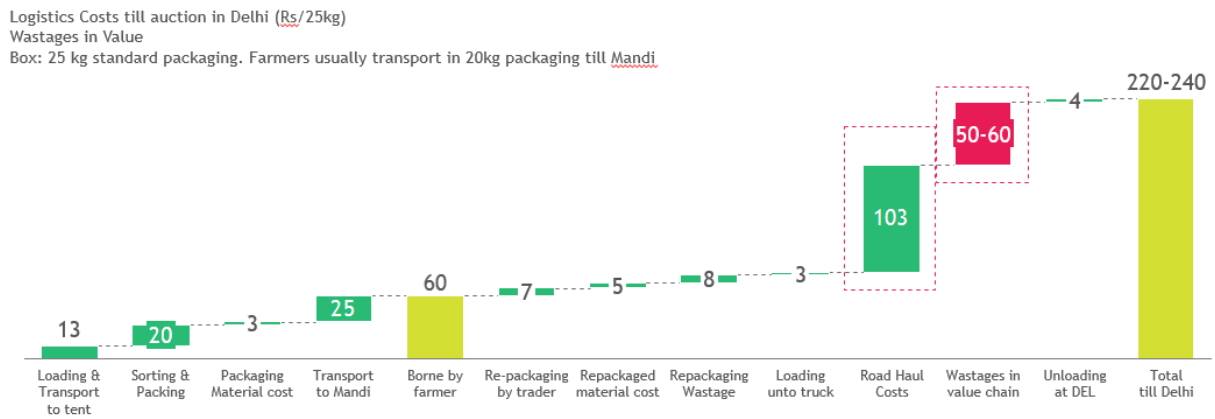


Figure 23: Detailed split of logistics cost in tomato

4.3 Key Challenges

This section of the report lists out the key challenges faced by stakeholders in the fresh tomatoes industry and also lists out factors which can be targeted to improve the suboptimal logistics cost.

a) **Higher in-transit wastages due to microbial damage:** As tomatoes have thinner skins, higher water content and susceptible to physical damage, they incur huge losses in transit which affects the price and also the marketable quanitity. Some of these wastages can be reduced if the tomatoes are washed and cleaned in a sanitizing solutions so that the surface of the produce is free from microbes for atleast the next 72 hours.

b) **Lower shelf life in marketing:** As explained above, tomato is a highly perishable product and thus has a very short span for trading. This reduces its marketability and thus the price quoted by traders are lower

c) **Huge price fluctuations:** There are high price fluctuations for tomatoes (and also for similar highly perishable products) in the mandis as there is a lag between supply and demand, causing oversupply and undersupply at times. This creates an environment of uncertainty with farmers selling at whatever price quoted by the trader.

d) **Overpacking of fruits:** Overpacking tomatoes in crates to reduce transportation and packaging charges costs, damages the tomatoes immensely due to heat and microbial damage.

e) **High transit time to metros:** As tomatoes have lower shelf life, a transit time of 3+ days (an average, to distant metros) reduces the marketable life to a great extent, which increases food losses. Thus, it is important that tomatoes be transported faster and should be sold well within their marketable lives.

f) **Intra-city restrictions hampering movement:** As Azadpur mandi is in Delhi, movement of trucks carrying tomatoes is only allowed from 11 PM to 6 AM which leads to large number of trucks waiting for days at the border to get access to the mandi. This increases cost of transportation, inventory holding costs and also increases the transit time.

4.4 Recommendations

Below is a snapshot of the detailed recommendations in tomatoes:

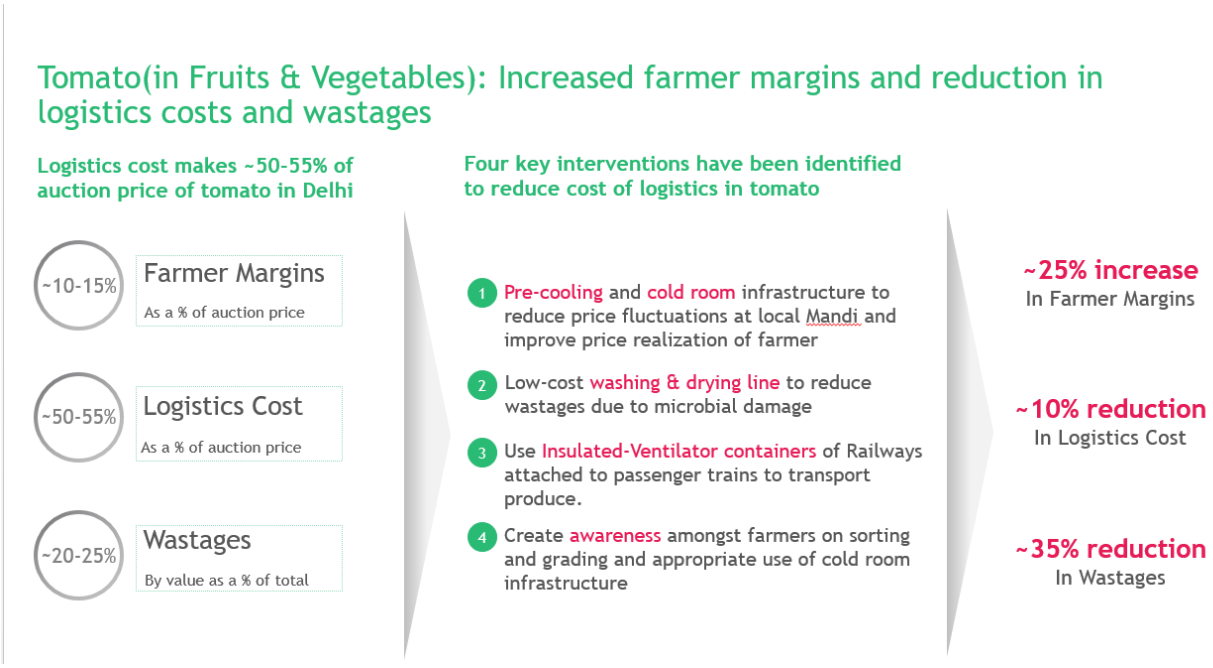


Figure 24: Summarized interventions for tomatoes

4.4.1 Installing transit cold storages and pre-coolers at mandis

In India's APMCs, the price fluctuations in perishable commodities is much higher than global benchmarks due to lower marketable shelf life and high variability between demand and supply. As farmers don't have the option to bring back their produce the next day for sale, they sell it at any price in the market which causes distress amongst farmers as sometimes they are not able to recover even the cost of production.

Figure 25: Illustrative price functuation in Tomato (Narayangaon)

Thus it is important to reduce these fluctuations by means of transit storages which can provide farmers the option to temporarily store produce and sell it later when prices are higher.

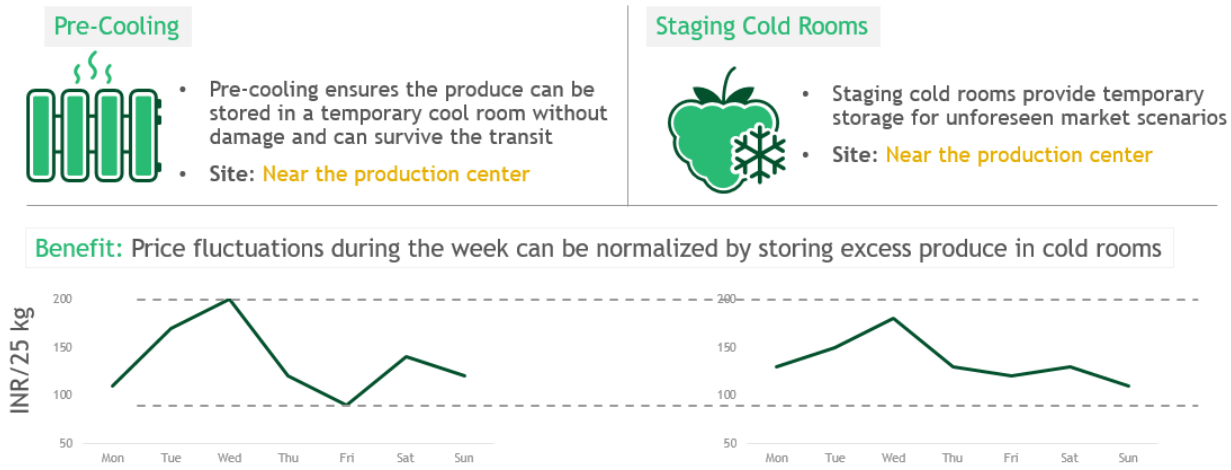


Figure 26: Temporary cold storages at Mandis to reduce price fluctuations

Currently there are two solutions in the market for installing transit rooms, namely, solar powered cold rooms or low-cost cold rooms which run on single phase electricity. As many products will be stored together, the cold rooms will maintain a generic temperature where transit storage (upto a week) is feasible. The maximum capacity of such cold storages can be upto 20T.

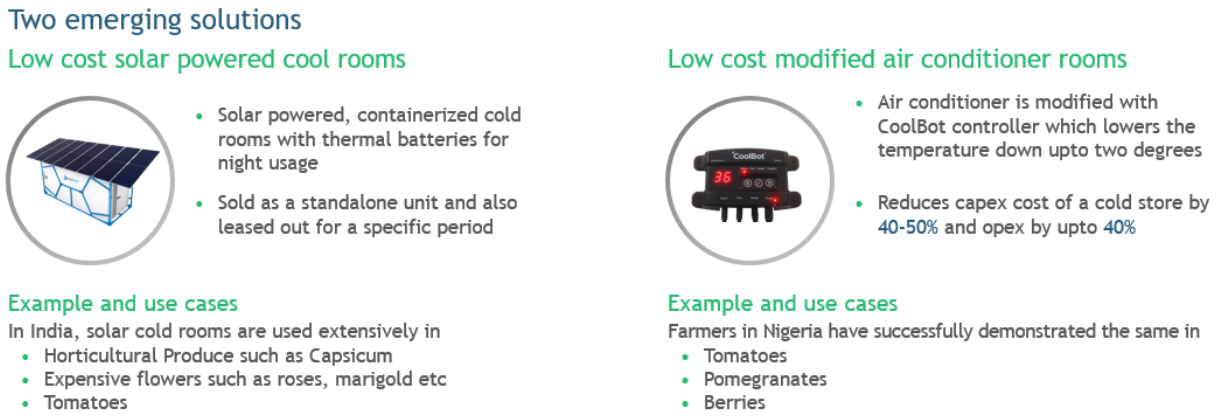


Figure 27: Two emerging solutions for small cold rooms at mandis

Low cost solar powered cool rooms

Cost Head (5 MT)	Amount
Upfront Cost	~INR 10 lakhs
Annual Operating Expense	<INR 5000
Net Opex(excl. labor) at full utilization	< 10p/kg/day

Low cost modified air conditioner rooms

Cost Head (10 MT)	Amount
Upfront Cost	~INR 4-5 lakhs
Annual Operating Expense	<INR 80K-1L
Net Opex(excl. labor) at full utilization	~ 5p/kg/day

For short term transit storage at mandis

Cost Head	INR/25kg
Short Term Storage Cost(2-3 days) incl. of opex, labor and rent	20-30
Additional Price Realization	30-50
Net increased farmer income	10-15

Potential to increase farmer income by 15-20% and reduce wastages by 10%

Figure 28: Increase in farmer income due to mandi cold store

As detailed out in figure 26, there is a potential to increase farmer income by atleast 15-20% while saving 10% on the logistics cost, largely by preventing wastages. For most farmers, the margins will be much higher as they will most likely sell the produce in the early hours the next day which will reduce the cost of storage as well for them.

4.4.2 Setting up of low cost washing & drying line

4.4.2.1 Need Assessment

Although washing and drying (with ppm chlorine) is an integral step in most fruit and vegetable supply-chains worldwide, the same is not followed in India due to cost constraints. This has significant effect on long haul tomato transportation as tightly packed tomatoes generate a lot of heat which becomes ideal conditions for microbial rotting. Thus to prevent that, all long haul transportation tomatoes must be adequately washed and dried to limit such contamination. This can save 3-4% of the transported crop. The net cost saving and benefit to the farmer is illustrated in the figure below:

Area	INR/25kg box
Cost of washing & drying	2-3
Margins of provider	1-1.5
Net Cost	3-4.5
Decay wastage avoided	10-12
Savings	7-8

Business model for farmer

Setup by: FPOs

Cost Borne by: Individual Farmers

Price Realization: To farmers

Business model for trader

Setup by: APMCs

Cost Borne by: Any user-Individual farmers, FPOs and traders

Price Realization: Contributes to margins of the user

Figure 29: Benefits of washing and drying infrastructure

There is a saving of 7-8 INR per box of tomato, which roughly translates to 12-14% additional income for the farmer. As it is an indirect saving, generated through prevention of wastages during transit, the same may take some time to be passed on at the discretion of the trader/middlemen. Infrastructure in washing and drying lines can be setup in two modes:

a) Farmer Producer Organisation (FPO) owned: FPO owned lines will be available to farmers in the FPO and will enable them to sell top quality produce to the market. This will also ensure any additional price realization obtained from washing and drying will be directly benefiting the farmers.
b) APMC/Trader owned: APMC or trader owned lines will be utilized after the produce has been procured from the farmer. As the traders will be carrying out the cleaning and drying themselves, any additional price realization will accrue to them instead of the farmers.

Hence, the first model is suggested for improving farmer price realization.

4.4.2.2 Cost competitiveness of the model

Figure below details out the cost of operating such a line.

Estimated Capex Requirements for a 20T/day washing & drying line	
Washing Line	INR 6 lakhs
Air Drying	INR 4 lakhs

Figure 30: Capex Requirements for a Washing & Drying Line

Running at full capacity, the washing and drying line will have the following opex costs:

Operating Costs at full capacity	INR/day
Electricity	200-250
Manpower	300-400
Utilities	100-200
Depreciation	~300
Rental to APMC/Packhouse	~100
Interest cost(30% financing)	60-70
Total cost for 20 tonnes	1100-1200

Figure 31: Total costs for operating a washing & drying line

This brings down the total cost to INR 2-3 per 25kg crate of tomatoes.

4.4.3 Transporting FnV in Insulated-Ventilated containers on Passenger trains

4.4.3.1 Need Assessment & Cost Economics

Currently, the travel time to Delhi from supply pools in Maharashtra is 3+ days which leads to a lot of wastages in the value chain. Also, significant wastages also occur due to uneven roads and vibrations from the truck body. Thus it is natural for FnV to be transported via railways. Indian Railways had procured 98 Insulated-Ventilated containers for transporting fresh produce faster and cheaper on rail for large origin and destination pairs. Although, in experimentation with Banana, the pilot project failed as the quantities required to fill up a rake were difficult to obtain and rake filled with bananas on arriving in terminal markets distorted the pricing. Thus, it is suggested that passenger trains having less than 24 coaches which are running on the route should carry 1-2 containers for transporting fresh produce from one part of the country to another.

Benefits of transporting by insulated-ventilated containers:

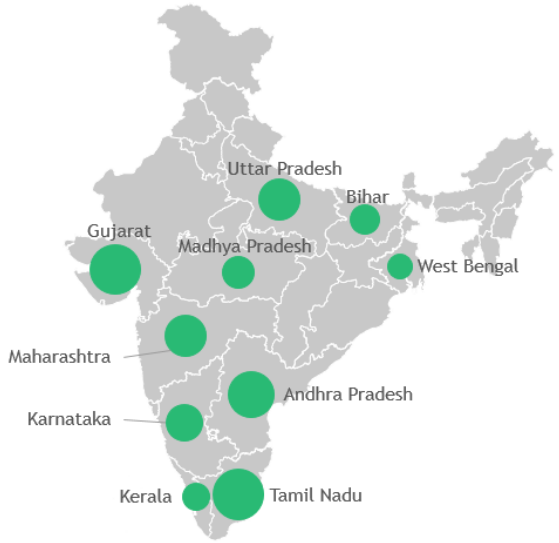
- Rail is cheaper than road for transit over large distances(~INR 2-3/kg by rail compared to ~INR 4-5/kg by road)
- Transit time on rail is 30-40% lower than by road for 1000+ km routes (when transporting through passenger trains)
- Transit damage on road is much higher than transporting in I-V containers (for tomatoes, transit damage on road is >10%)

5 Banana

5.1 Landscape and value chain

Banana production in India touched 30 mnT in FY 17 with the top five producers being Tamil Nadu, Gujarat, Andhra Pradesh, Uttar Pradesh and Maharashtra. Although India is the largest producer of the fruit in the world, it exports less than 1% of its produce owing

to high domestic demand and lack of integration with world markets. Certain banana producing regions in the country, such as Jalgaon/Savda in Maharashtra have the highest productivity in the world and also grow the same cultivar as desired in global markets. But due to gaps in agri-logistics, these regions have not yet fully achieved their potential in export markets.



Top states accounting for >90% of banana production in the country

State	Production(in '000 tons)
TAMIL NADU	4331.65
GUJARAT	4185.52
ANDHRA PRADESH	3570.62
UTTAR PRADESH	3061.21
MAHARASHTRA	3025.15
KARNATAKA	2370.95
MADHYA PRADESH	1758.05
BIHAR	1535.30
KERALA	1292.41
WEST BENGAL	1172.34

Bananas are transported in two modes, in bunches and in packaged forms. The packaged bananas have more expensive logistics to retain the quality of the banana to the end consumer but sells for atleast 50% higher price than bunches. Majority of the bananas marketed in India (85 %+) are in bunches form and incur large wastages during transportation and handling.

Below is the value chain of banana for both bunches and packaged. The highlighted step of Washing and Packaging is optional if the bananas are shipped in bunches.

Value Chain	Key Processes	Challenges
Harvesting	• Harvesting done by employed labour • Bananas are harvested in bunches	
Manual transport in Bunches	• Bananas are manually carried from the field to the road head	• A significant cost in the value chain is the first mile cost of bringing bananas from the farm to the road head. Costs upto INR 35/ bunch
Auction at Mandi/Farm	• Traders usually collect the produce from the farm/mandi in trucks and carry it to the packhouse for washing & packing	
First mile transport	• First mile transport is in trailers if the road condition is poor and in trucks if it is motorable	• High losses occur in this stage of the value chain(upto 5-6%) due to susceptibility of the fruit to jerks and bouncy roads
Washing & Packaging	• Washing and packing is manual and it is packed in carton boxes with polyethylene sheets	• Substantial price realization due to washing & packaging which flows to the trader and not to the farmer • No precooling infra present

Figure 32: Steps in the value chain of bananas (1/2)

Value Chain	Key Processes	Challenges
Loading unto Truck	• Manual labour is employed to load the crates/bunches into the trucks	
Long Haul Road Transport	• Long haul transport in 13-16T trucks for longer distances. Takes upto 3 days to transport from Maharashtra to Delhi	• Transportation time is high(2 days +) • Transportation is in lower tonnage trucks due to size of ripening chamber
Unloading	• Crates/bunches are unloaded manually at the ripening chamber	
Ripening & Last Mile	• Ripening is carried out in ethylene ripening chambers for 1-2 days • Sometimes banned carbide might be used	• Size of ripening chamber restricts the fleet mix of the truck • High last mile costs/kg
Selling & Distribution	• Bananas are quickly sold off as they have very low shelf life post ripening	• High losses occur at this step of the value chain

Figure 33: Steps in the value chain of bananas (2/2)

5.2 Cost components of the value chain

Price and Costs for Packed	INR/25 kg box	As a % of Price
Auction Price of Banana	450-500	100%
Margins of Intermediaries	50-60	12%
Trader Margin(10%)	40-45	10%
Other fees & Commissions(2%)	9-10	2%
Total Logistics costs	240-260	60%
Wastages During Transport(~2%)	9-10	2%
Ripening cost	25	6%
Open Truck Transport Costs	100-105	22%
Loading/Unloading costs	7-8	2%
Packaging Material and labor	90-95	20%
First Mile transport to packhouse	22-23	5%
Manual Transport	20-25	3%
Production & Harvesting Costs	75-80	17%
Net Farmer Margins	50-70	12%

Price and Costs for Bunches	INR/25 kg box	As a % of Price
Auction Price of Banana	350-400	100%
Margins of Intermediaries	40-50	12%
Trader Margin(10%)	35-40	10%
Other fees & Commissions(2%)	7-8	2%
Total Logistics costs	180-200	53%
Wastages During Transport(~10%)	35-40	10%
Ripening cost	5	1%
Open Truck Transport Costs	100-105	29%
Loading/Unloading costs	7-8	2%
Packaging Material and labor	0	0%
First Mile transport to packhouse	22-23	6%
Manual Transport	20-25	4%
Production & Harvesting Costs	75-80	21%
Net Farmer Margins	45-65	14%

Figure 34: Cost components of the value chain of Banana

The various cost components in the value chain for bananas counts long haul transportation costs, packaging costs (for packed bananas) and manual transportation from farm to roadhead as major cost components. Overall logistics costs represent a significantly high component (55-60%) of the total wholesale price of the product, primarily, due to low value and large transport distances.

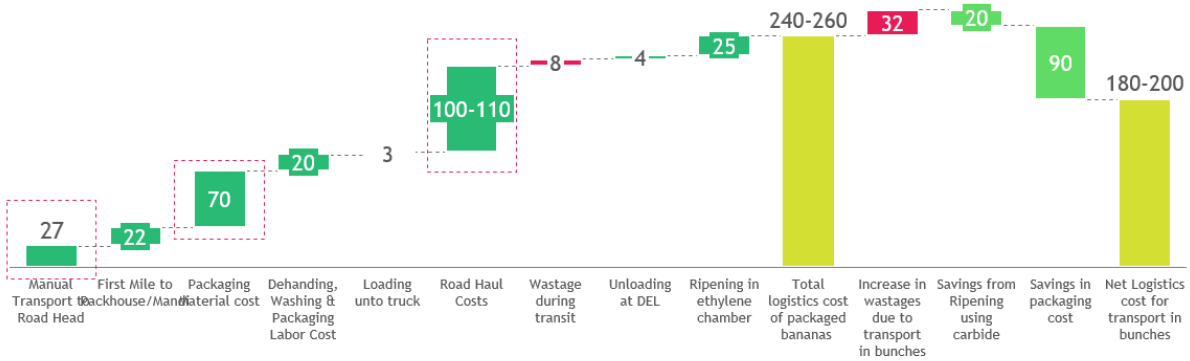


Figure 35: Detailed breakdown of logistics cost for banana

5.3 Key Challenges

This section of the report lists the key challenges faced by stakeholders in the fresh tomatoes industry and also lists factors which can be targeted to improve the suboptimal logistics.

a) **Higher cost of first mile transport:** As banana plantations are spread over large plots of land and bunches are very heavy to carry, the first mile transportation costs of banana are very high and farmers incur significant labor charges to collect the produce from the plantations to the road head.

b) **Poor export quality of bananas:** Bananas exported from India to other parts of the globe do not survive the sea voyage and therefore do not fetch the correct price or quantity leading to loss to the farmers. Globally, there are multiple countries with similar demography, conditions, and banana variety which export large quantities of banana such as Ecuador, Phillipines.

c) **Poor road conditions damaging bananas during transport:** Poor road conditions in the hinterland of banana farms prevents larger trucks with good suspensions to reach near the farmgate and collect the produce. Therefore bananas are transported in smaller vehicles such as tractors which do not have sufficient suspension and this leads to significant damage in the first mile itself.

d) **Lower shelf life of fruit:** Due to improper harvest planning, shelf life of bananas harvested in India are much lower than in other countries.

e) **Smaller vehicles used in long haul transportation:** Due to smaller vehicle sizes used in long haul transportation, the costs of transport are exceedingly high. Although it partly relates to poor road conditions in supply clusters, it is also limited by the size of ripening chambers owned by traders across the country.

5.4 Recommendations

Below is snapshot of detailed recommendations for bananas:

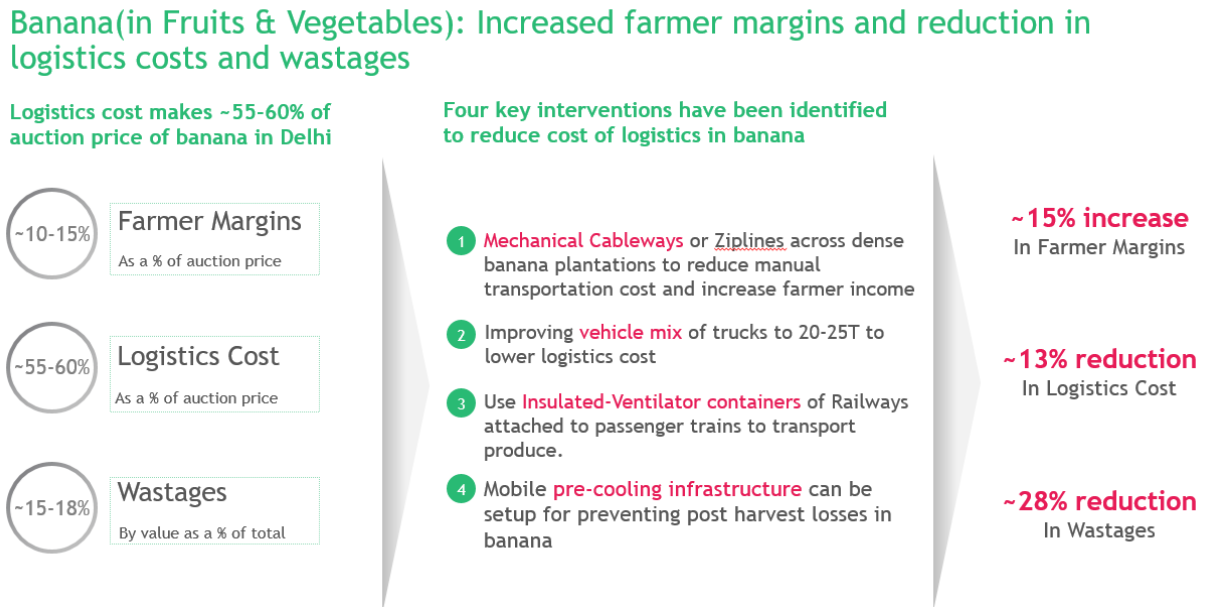


Figure 36: Summarized interventions in banana

5.4.1 Installing cableways for banana transportation

5.4.1.1 Need Assessment

In the banana value chain, manual transportation of banana is one of the largest cost heads due to large plantations and heavy unit size of the load (bunch) and thus eats into a significant portion of the margin of the farmer. At upto INR 35/bunch, it is too high and there are cheaper modes of transportation such as mechanical cableways which can be installed for cheaper and faster transportation of bananas.

Figure 37: Comparison of Manual Transport and Cableways

Also, the carried bananas will have less damages as they donot bear the weight of the bunch and this will significantly save time and costs for the farmer.

5.4.1.2 Cost competitiveness of the model

The costs and investments required for a 20 acre continuous plantation have been summarized below:

Cost Head	Unit	Current System	Proposed System
Average manual labor/bunch	INR/bunch	35	14
Total no of bunches	No.	22,400	22,400
Total cost of manual transport	INR/year	7,84,000	3,13,000
Cost of renting a line(annual)	INR/year	0	3,00,000
Total cost of transport	INR/year	7.84,000	6,13,600

As summarized here, there is a total saving of INR ~1.5-2 lakhs by installing a cableway system. As a cableway of 500m length costs about INR 10 lakhs, so at a conservative estimate of 3 lakh yearly rent, it will still be cheaper to install and run it than carry out manual transportation. But for locations other than Jalgaon, where plantation density is low, manual transportation will still be the more viable option. If it is implemented in major

banana growing regions of Maharashtra, it could lead to annual savings of ~120 crores from that region alone.

5.4.2 Improving first mile infrastructure in banana growing regions

5.4.2.1 Need Assessment and Benefits

Upto 10% of the bananas are damaged in transit due to poor quality roads and this cost is directly borne by the farmer. Thus to prevent this, it is suggested that the first mile infrastructure of these regions be upgraded for smooth road connectivity and for allowing the movement of larger trucks near the farm.

The recommendation is splt into 3 categories:

- Increasing road width for larger trucks to access the farms and prevent double handling at a packhouse
- Increase weight rating of bridges to allow heavier trucks to safely carry produce to the markets
- Improve quality of roads to reduce damage during first mile transport

In the Jalgaon region, construction of wider and smoother roads can save 220 crores worth of banana every year and also reduce logistics cost by 40 crore through deployment of larger trucks.

5.4.3 Improving export potential through long distance transport protocol

India's banana exports are less than 1% of total banana exports even when we have the highest production because our underdeveloped agri-logistics infrastructure is not geared to serve distant profitable markets like the EU and USA. Banana is a sensitive fruit and gets cosmetically damaged very easily (black spots, cuts). Thus, for Indian bananas to develop a market abroad, there is a need to create a long distance (sea) protocol for

bananas being shipped from the country so that they retain a good marketable life in these countries.

Figure 38: Levels of Long Distance Protocol

There are two major deficiencies in the current long distance protocol and these belong to the areas of:

a) Fruit Care Operations: Fruit care operations are pre-harvesting interventions where different activities such as removing touching fruits, pruning touching leaves etc are carried out to result in high quality fruits being harvested.
b) Harvest planning: In bananas, the flowering is staggered over 4 weeks for the entire crop. Thus, staggered harvesting is essential to only harvest the crops which are at the right level of maturity. Due to low land holding, farmers in India harvest it in one go, resulting in fruits which have a lower shelf life.

6 Action Agenda

To implement the key recommendations in Fruits and Vegetables there is a need for a coordinated effort with state agricultural and marketing boards, FPOs, central ministries and APMCs to achieve the results. To achieve them, the following action agenda is proposed:

6.1 Apple

Intervention	Owner

Collapsible Plastic Crates • Evaluate feasibility of using collapsible returnable plastic crates for apple movement in the country • Evaluate subsidy programmes for purchase of plastic crates and incentivize traders/farmers to switch • Conduct trials using these crates to test the efficacy	State Agricultural Marketing Boards(HP, J&K) Local APMCs
Aggregation Hubs • Identify locations where fruit aggregation hubs can be setup for faster collection and loading of fruit • Release RFP for constructing aggregation hubs for apples with autograding facilities	State Agricultural Marketing Boards (HP & J&K) FPOs, APMCs
Installation of CA stores • Invite private players to setup CA facilities for farmers with support from government • Explore Direct Benefit Transfer of subsidy to farmers to enable them to use these services and be a beneficiary • Expedite time taken to process a loan on a e-NWR issued for apples stored in CA and also facilitate the creation of e-NWR	M/o Agriculture State Agricultural Marketing Boards(HP & J&K)

6.2 Tomato

Intervention	Owner
Cold chain Infrastructure • Evaluate feasibility of small cold rooms for storing fresh produce and identify mandis/marketplaces • Discussions with APMCs and Agricultural Marketing Board to install and operate small cold rooms for temporary storage of fruits and vegetables being sold there	State Agricultural Marketing Boards(Maharashtra, Karnataka) Local APMCs

• Awareness campaign for cold rooms at Mandi/marketplaces for reducing wastages and improving income • Facilitating approvals for land, electricity and utility for the cold rooms to operate	
Washing & Drying Infrastructure • Explore installation of a washing and drying line for tomatoes in a Mandi and its long term effects on the value chain • Experimental run of a washing and drying line in a Mandi in tomato growing areas to assess costs and create awareness amongst farmers	State Agricultural Marketing Boards FPOs, APMCs
Reduction in Transport Costs • Mapping of major fresh produce movement across the country which can be shifted to railways • Initiate talks with Railways on feasibility of using I-V containers attached to passenger trains for carrying fresh produce	M/o Railways Trader Associations

6.3 Banana

Intervention	Owner
Mechanical Cableways for Bananas • Encourage FPOs to setup banana ziplines as shared infrastructure for transporting bananas in plantations in Jalgaon & Savda. The projects return IRRs of between 15-20% • Awareness campaign for using them for farmers, traders and exporters to improve adoption • Facilitate FPOs in purchasing and obtaining subsidies for installing banana zip lines	State Agricultural Marketing Boards(Maharashtra, Andhra Pradesh, Gujarat) FPOs in Banana
Improve First Mile Infrastructure	State PWDs

• Quality and width of roads are to be enhanced to meet specifications of large 25T truck movement to the banana plantations • Bridges are to be upgraded to support heavy vehicles to enhance truck movement from the banana plantations	
Long distance transport protocol • The M/o Commerce(APEDA) in collaboration with National Research Center for Bananas must develop the long distance transport protocols to enable banana shipments with transit time upto 45 days • These protocols should be enforced on all banana shipments to maintain quality and brand of Indian bananas	M/o Commerce (APEDA) NRC for Banana

7 Conclusion

The Integrated National Logistics Action Plan for fruits and vegetables laid out the set of key initiatives which can boost the livelihood of 12 crore farmers to help them increase their income to more sustainable levels and help reduce rural distress. The initiatives laid out cover the entire spectrum of Agri-logistics from harvesting to the final consumer and has covered the major corridors of movement of produce. In summary, the initiatives have been converted into action agendas for consideration of different ministries and are listed as a part of the action agenda under various interventions. To enable the country to gear towards the target of doubling farmer income by 2022, the initiatives emerging from the aforementioned elements of the Action Plan require coordination between center and state and efforts from all stakeholders.

Chapter 4: Commodity Corridor Analysis - Foodgrains

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1 Context

In line with the mandate given to the Logistics Wing, a comprehensive National Integrated Logistics Action Plan is being formulated to integrate and optimize the several elements of the logistics value chain. The Ministry of Commerce is evaluating initiatives to reduce logistics cost commodity by commodity. This report evaluates initiatives to reduce the logistics cost of food grains in India.

Food grains represent 7% of total freight movement[1] in the country, making it the fifth largest commodity by freight movement by BTKM. India is the second largest producer of food grains globally with a production of 275 MnT for FY 2016-17.India's logistics cost for food grains represents ~ 20% of total wholesale price, which is much higher than best in-class markets such as Australia, where logistics costs for food grains represents ~14% of wholesale price. Furthermore, >5% of post-harvest food grain production is wasted before it reaches the end consumer. India's higher logistics cost for food grains and significant wastage can be attributed to a lack of modern bulk storage, handling and transportation infrastructure of food grain as well as a skewed modal mix. [2]

Improving transportation, storage and handling infrastructure as well as India's modal mix for food grains will be instrumental in reducing India's logistics cost. This report addresses all of the above issues and suggests four initiatives to procure, store, handle and move food grains at optimum cost.

2 Approach and methodology

A comprehensive approach was taken that studied the end to end value chain of food grains in India. On the ground analysis at rice mills, mandis as well as central & state warehouses was conducted to determine pain points along the logistics value chain of food grains. Experts & stakeholders such as FCI, Ministry of Shipping, Central Warehouse Corporation, State Warehousing Corporation, rice millers, commission agents, farmer producer organizations, warehouse managers, food grain consultants,

[1] RITES
[2] Department of Agriculture and Water Services Australia, FAO, Expert Interviews, BCG Analysis

private agri logistics players, rice distributors and freight operators were interviewed to understand and determine key logistics inefficiencies for food grains.

3 Landscape of food grains

India is the second largest producer of food grains globally with a production of 275 MnT for FY 2016-17. Rice and wheat comprised ~ 3/4ths of the overall production of food grains for FY 2016-17.The Food Corporation of India (FCI) is the Central Government's nodal agency for the procurement, distribution and storage of food grains. The FCI along with other state agencies procures 35-45% of total food grain production in India under centralized and decentralized procurement systems. This report focuses on the government value chain of rice and wheat in India.

Table 1 Food grain production in India 2016-17

Commodity	**Production in 2016-17** (MnTPA)[3]
Rice	110
Wheat	99
Pulses	23
Coarse Cereals	43
Food grains	275

3.1 Landscape of rice

India is the second largest producer of rice globally, producing 110 MnT of rice in FY 2016-17. Thirteen million tons of rice is exported primarily to the Middle East, UK and USA while 97 MnT of rice is consumed domestically. The Indian rice industry can be disaggregated into surplus and deficit states.[4]

[3] Department of Agriculture Cooperation & Farmer's Welfare
[4] FAO, APEDA

3.1.1 Surplus and deficit States for rice

Surplus states are states that the FCI moves rice out of and produce more rice than they consume. Surplus stocks in these states are moved to meet the requirements of deficit states under the NFSA/TPDS and other schemes as well as to create buffer stocks for a state. The major surplus states for rice are listed in table 2 and the deficit states for rice in India are listed in Table 3.

Table 2 Surplus states for rice in India in 2016-17

Surplus state	**Surplus Stock of rice** (MnT)[5]
Punjab	+9.9
Haryana	+3.2
Andhra Pradesh	+2.0
Chhattisgarh	+1.9
Odisha	+1.7

Table 3 Deficit states for rice in 2016/17

Deficit state	**Deficit stock of rice** (MnT)[6]
Tamil Nadu	(3.3)
Assam	(2.5)
Maharashtra	(2.2)
Karnataka	(2.2)
Bihar	(1.7)
Kerala	(0.1)
West Bengal	(0.1)

The difference in production and consumption of food grains across the country requires rice to be transported from surplus to deficit regions. Movement of rice occurs both intra

[5] Food Corporation of India

state; primarily undertaken by state agencies and the FCI to meet the state's rice requirement; and interstate primarily undertaken by the FCI to meet the country's rice requirement. The average lead distance for the interstate movement of rice is ~1300km[7]. Figure 1 illustrates the major surplus and deficit states for rice in the country.

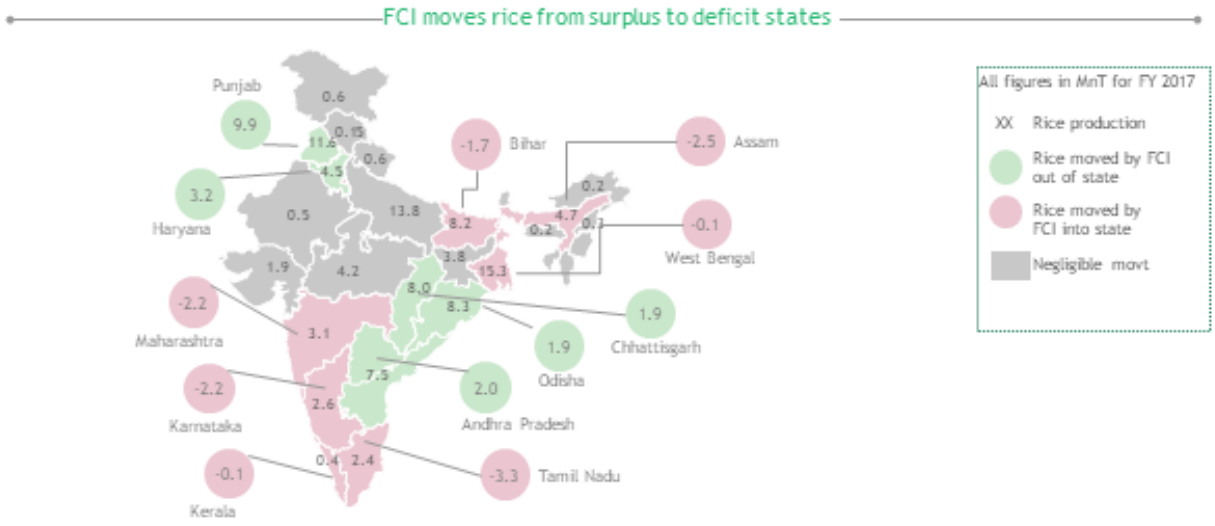


Figure 1 Representation of surplus and deficit states of rice 2016/17

3.1.2 Modal mix

Intrastate movement of rice is undertaken by rail and road. Road represents 90% of the FCI's intrastate movement of rice. Interstate movement of rice is undertaken by rail, road, inland waterways and coastal shipping. Approximately 90-95% of rice moved by the FCI is moved by rail to different parts of the country. Interstate road movement is mainly undertaken in parts of the country not connected by rail. The FCI has undertaken a few recent initiatives to move rice through riverine and coastal movement yet share of coastal and riverine remains insignificant. This study focuses on FCI's interstate movement of rice.

3.1.3 Origin destination pairs

The interstate movement of rice can be broken down into originating railway divisions and destination railway divisions. Approximately seventy percent of total rice freight

[7] Food Corporation of India

movement originates from six railway divisions; Ambala (20%), Firozpur (17%), Sambalpur (11%), Vijayawada (9%), Delhi (9%) and Raipur (6%). An OD pair analysis for the given railway divisions was conducted to understand the key commodity corridors for rice movement within the country. As listed in table 15 of the appendix, top 20 corridors from originating railway divisions constitute **~70%** of total rice interstate movement.[8] These corridors should be prioritized in implementing any key logistics interventions.

3.1.4 Rice value chain

The value chain of rice comprises series of seven stages as illustrated in figure 2.

Harvesting & procurement: Paddy is first harvested by a farmer either using a combine harvester or manual labor. It is loaded into a tractor trolley in bulk and transported to a local mandi 1-10 km away where it is bagged into gunny bags, weighed and graded. Farmers have the option of selling at the Minimum Support Price to the government through a commission agent or at a higher price to private corporations. The 2018-19 MSP for grade A rice is INR 1770/quintal and for common grade rice is INR 1750/quintal.

Milling: Paddy is then loaded onto an open ended truck manually and then transported to a government approved rice mill where it is unloaded, debagged, milled into rice and then bagged into gunny bags. The milling process removes an additional layer of husk on the paddy, removes other foreign particles and impurities and dries paddy to the optimum 12% moisture to make it rice. Rice is then bagged and loaded in gunny bags onto an open ended truck and transported to a nearby FCI owned or hired warehouse for long term storage.

Storage at origin & long haul transportation: Rice is stored for 3-6 months in the warehouse to fulfil the year round consumption of rice. Insect & rodent infestation, lack of moisture control and multiple stages of manual handling in conventional godowns increases wastage of rice in storage to 4-5% of total production. Gunny bags of rice are then transported in open ended trucks to a rail depot where they are stored for 0-2 days. Once a rake is completely filled, rice is then moved from a surplus to a deficit state by the FCI. The movement of rice from surplus to deficit states is determined by a linear

[8] FOIS

programming model developed by the FCI. Initial analysis revealed that 5-10% of long haul movement can be reduced by sourcing rice locally and improving storage infrastructure. A further analysis can be undertaken to improve the current linear programming optimization model.

Storage at destination & retail: Rice gunny bags are then unloaded from the rake and transported to a local godown in an open ended truck by a freight operators. Around 1-2% of rice is lost in pilferage either at the rail depot or on its way from the depot to a warehouse. Rice is stored for 1 month at the destination warehouse before it is transported to a small district warehouse where it is stored for 2-4 weeks before it is dispatched to a fair price shop. Rice is sold at INR 3294/quintal to above poverty line (APL) and below poverty line (BPL) citizens at fair price shops.

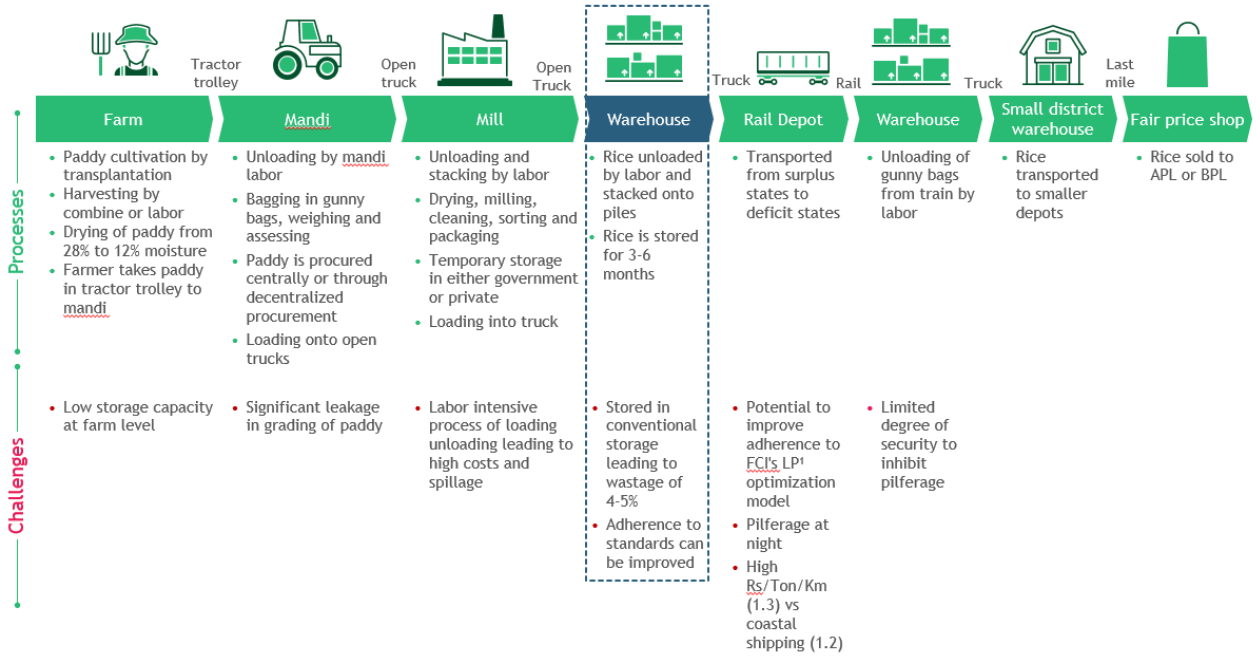


Figure 2 Value chain of rice

3.1.5 Cost breakdown of rice[9]

Logistics costs contribute ~20% of the economic price of rice. Wastage in storage, long haul rail transportation and secondary truck freight movement account for ~80% of logistics costs (~18% of the economic price of rice).

Table 4 Cost breakdown for rice

Price & costs in peak season	INR/quintal	As % of Economic Price
Economic price of Grade A rice at FPS	3,294	100%
Milling costs	550-570	17%
Margin intermediaries	260-270	8%
Total logistics costs	650-700	20%
Loading/unloading	15-20	0.5-1%
Storage	40-50	1-2%
Wastage in storage	140-150	4-5%
Long haul rail	190-200	5-6%
Truck freight costs	220-230	6-7%
Pilferage	30-35	1-2%
Packaging cost	15-20	1-2%
Minimum Support Price	1770	54%

3.2 Landscape of wheat

India is the second largest producer of wheat globally, producing 99 MnT of wheat in FY 2016-17. Almost all of India's wheat is consumed domestically with 0.3 MnT being exported and approximately five million tons of wheat is imported primarily from Ukraine and Australia. [10] The Indian wheat industry can be disaggregated into surplus and deficit states.

[9] FCI, Expert Interviews, BCG Analysis
[10] FAO, APEDA

3.2.1 Surplus and deficit states for wheat

The major surplus states for wheat are Punjab (12.0 MnT), Haryana (6.0 MnT) and Madhya Pradesh (0.6 MnT). Surplus stocks in these states are moved to meet the requirements of deficit states under the NFSA/TPDS and other schemes as well as to create buffer stocks. Rajasthan and Uttar Pradesh are among the top producing wheat states in the country but consume most of their produce within the state making them net neutral states. The major deficit states for wheat in India are given below:

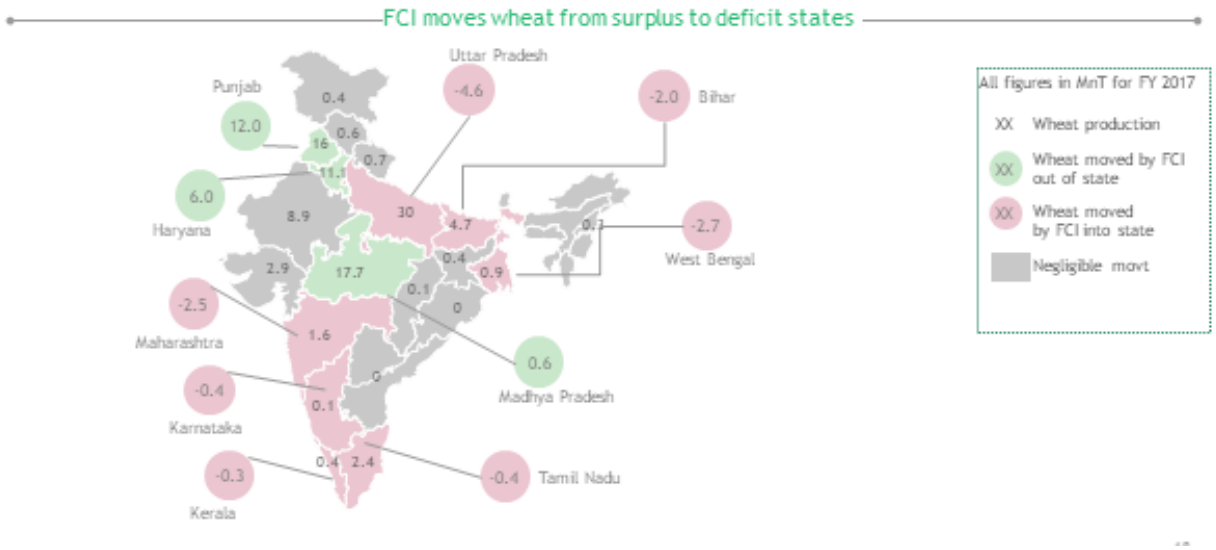


Figure 3 Representation of producing, surplus and deficit states for wheat in India 2016-17

Table 5 Deficit states for wheat in India 2016-17

Deficit state	**Deficit stock of rice** (MnT)[11]
Uttar Pradesh	(4.6)
West Bengal	(2.7)
Maharashtra	(2.5)
Bihar	(2.0)

Movement of wheat occurs intra state; primarily undertaken by FCI and state agencies to meet the state's wheat requirement; and interstate primarily undertaken by the FCI to meet deficit state's wheat requirement. Twenty five percent of wheat is moved interstate while 75% of wheat is moved within a state. The average lead distance for the interstate movement of wheat is ~1300km[12]

3.2.2 Modal mix

Interstate movement of wheat is undertaken by rail and road. Approximately 90-95% of wheat is moved by rail to different parts of the country. Interstate road movement is mainly undertaken in parts of the country not connected by rail. Intrastate movement of rice is undertaken by rail and road. Road represents **90%** of the intrastate movement of rice. The FCI should explore riverine or coastal movement of wheat between states. [13]

3.2.3 Origin destination Pairs

The interstate movement of wheat can be broken down into originating railway divisions and key destination railway divisions. Approximately eighty five percent of total wheat freight movement originates from five railway divisions; Firozpur (31%), Ambala (23%), Delhi (19%), Bikaner (7%), and Bhopal (4%). An OD pair analysis, listed in table 16 of the appendix, for the given railway divisions was conducted to understand the key commodity corridors for wheat movement within the country. These corridors should be prioritized for any key logistics interventions.

3.2.4 Wheat value chain

The wheat value chain, as shown in figure 4, is similar to the rice value chain where wheat is harvested, procured at a mandi, stored in FCI hired or owned godowns, transported long haul by rail, unloaded by labor and then sold at fair price shops. Unlike rice, wheat does not need to be milled but is milled post purchase at a fair price shop. Similar to rice, wastage in storage due insect & rodent infestation, lack of temperature control and

[12] FOIS, RITES
[13] FCI

multiple stages of manual handling in conventional godowns leads to wastages of wheat in storage to 4-5% of total production.

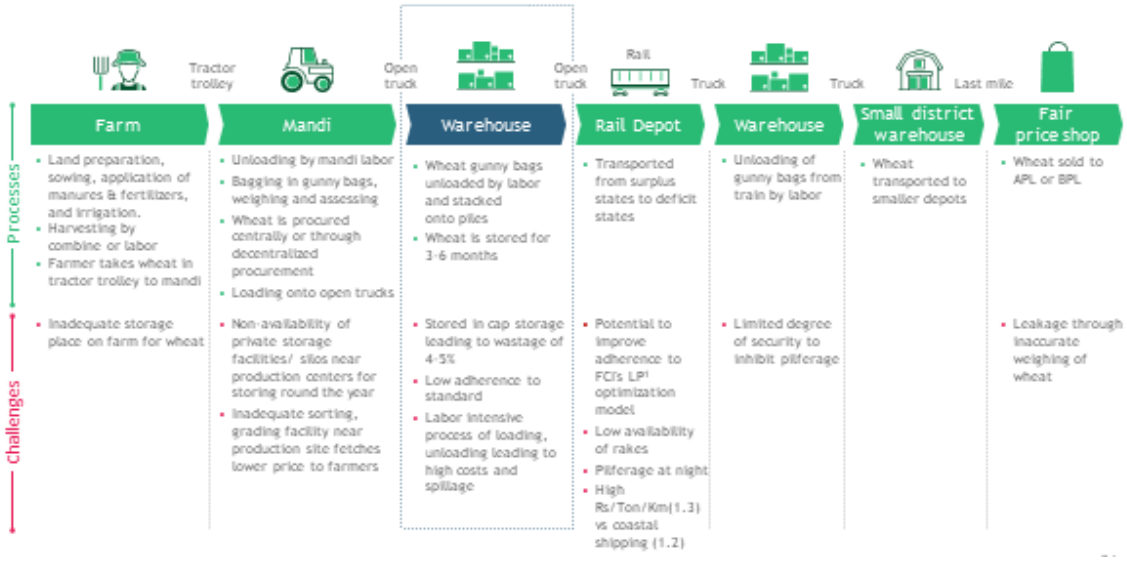


Figure 4 Value chain of wheat in India

3.2.5 Cost breakdown of wheat

Logistics costs contribute ~25% of the economic price of wheat. Wastage in storage, long haul rail transportation and secondary truck freight movement account for ~80% of logistics costs (~20% of the economic price of wheat). Key interventions should prioritize reducing wastage in storage, long haul rail and secondary truck freight costs to reduce the logistics costs of wheat. Table 6 lists out the cost break down of the wheat value chain.

Table 6 Cost breakdown of wheat

Price & costs in peak season	INR/quintal	As % of Economic Price
Economic price of wheat at FPS	2,396	100%
Margin of intermediaries	90-100	4%
Government margin	(40-45)	(2%)
Total logistics costs	575-625	25%
Loading/unloading	10-15	0.5-1%
Storage	40-45	2-3%
Wastage in storage	100-110	4-5%

Long haul rail	190-200	7-8%
Truck freight costs	190-200	7-8%
Pilferage	30-35	1-2%
Packaging cost	15-20	1-2%
Minimum Support Price	1735	54%

4 Challenges

The current grain value chain in India has resulted in logistics costs comprising 20-25% of the economic price of grain compared to 14% in developed markets. India's high food grain logistics cost can be attributed to four issues with the current value chain.

a. **High cost of secondary freight movement:** Secondary freight movement to/from a warehouse to a rail depot accounts for 5-6% of the economic price of grain.
b. **Wastage in long term storage** - Storage of food grains in CAP and poor storage practices lead to 4-5% of wastage of post-harvest food grains. Wastage in storage can be attributed to a lack of moisture and temperature control, insect and rodent infestation and multiple stages of manual handling.
c. **Skewed and unfavorable modal mix** – Rail comprises 85% of all interstate transportation of grain costing an average of Rs. 250/quintal for distances greater than 1000 km. Cheaper modes of transport such as coastal and riverine can be explored where average logistics costs are Rs. 225/quintal for distances greater than 1000 km.
d. **Movement of paddy**: Paddy contributes to 5% of the total rice interstate movement. Paddy being 20% heavier increases logistics costs by 20%. Setting up milling capacity can reduce the movement of paddy.

With the aim to improve India's food grain logistics and solve for four issues (High cost of secondary freight movement, wastage in storage, skewed and unfavourable modal mix and movement of paddy), this report lays out four initiatives which are expected to reduce logistics costs by 2,300-2,500 crores (7% of total interstate logistics costs).

5 Initiatives

1) **High cost of secondary movement and wastage in long term storage**: Develop bulk handling, storage and transportation capacity of food grain to reduce logistics by 30-40% by reducing wastage, secondary freight and manual handling costs
    a. Construction of 10 MnT of bulk silo storage capacity to reduce wastage and handling costs from 6-7% to 1-2%. Silos deploy state of the art technology to control temperature and moisture, prevent infestation from insects and use mechanized handling to reduce wastages in manual handling.
    b. Procurement of 100 BCBFG rakes to reduce secondary freight costs from 7-8% to 0-1%. Silos with attached railway siding and top loading, bottom discharge BCBFG wagons eliminate handling and secondary freight movement to/from a warehouse to a rail depot
    c. Develop a network of hub and spoke silos at the mandi and railway depot level in Punjab and Haryana. A network of smaller silos at the mandi level will reduce the distance required to travel by the farmer to the silo and thereby incentivize him to store grain in a silo.
2) **Skewed and unfavorable long haul modal mix:** Increase share of coastal shipping to 7-8 MnT along identified key 11 routes to reduce long haul freight costs by 10-15%.
3) **Skewed and unfavorable long haul modal mix:** Explore potential of riverine movement of grain along 5 identified routes to reduce long haul freight costs.
4) **Movement of paddy:** Develop rice milling capacity in Tamil Nadu to reduce movement of paddy.

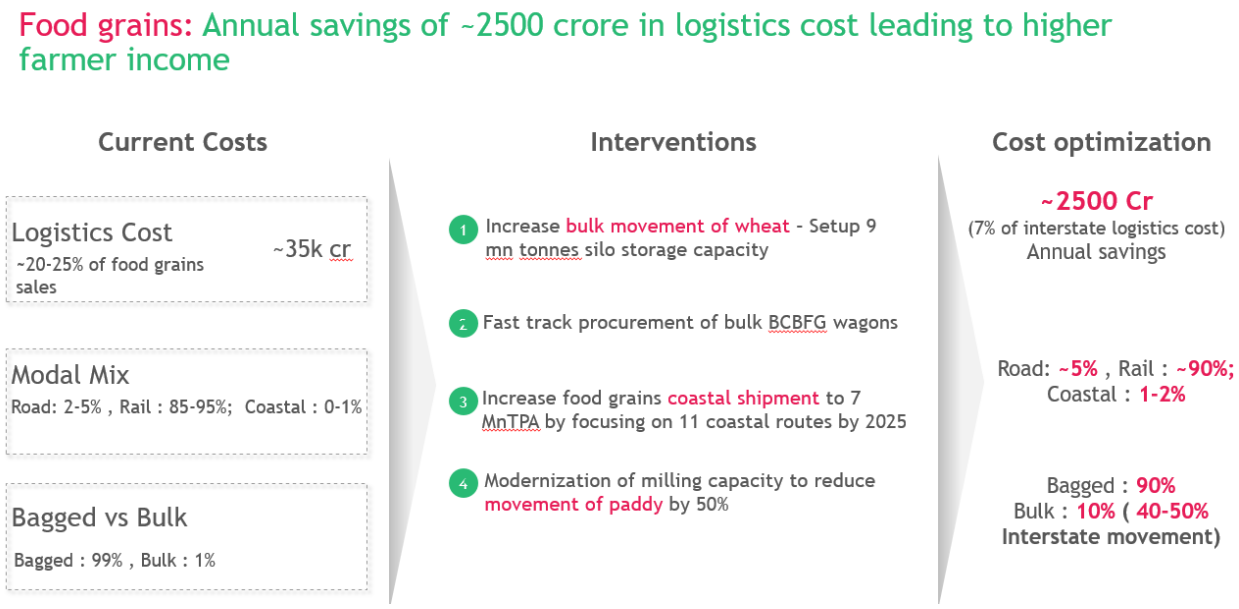


Figure 5: Summarized interventions for foodgrains:

5.1 Develop bulk handling, storage and transportation capacity

Food grains in India are stored in three storage forms; conventional godowns (~80-85%), cover and plinth storage (~20-25%) and bulk silos (<1%). Share of bulk silo storage in India is significantly lower than developed markets where it is ~70%.Storage in bulk silos brings a number of advantages. Silos deploy state of the art technology to reduce wastage of food grains from 4-5% to 0-1% by controlling moisture level, using screw augers to reduce manual handling and using bucket conveyors that eliminate the need to bag and unbag food grains. Silos are constructed adjacent to railway sidings that help reduce transportation and handling from a warehouse to a rail depot from 6-7% to 0-1%.

Developing bulk handling, storage and transportation capacity for food grains requires

I. Construction of bulk silo capacity to store and handle food grains
II. Procurement of bulk BCBFG wagons to transport and handle food grains

5.1.1 Construction of bulk silo capacity to store and handle food grains

5.1.1.1 Cost savings and reduction of wastages in the bulk value chain

Procurement & storage

Bulk silos shrink the conventional value chain of wheat. In the bulk value chain, a farmer will bring wheat in bulk in a tractor trolley to the silo. The silo is a government declared mandi where the farmer's produce is weighed by a weigh bridge, unloaded by 30 tonne and 60 tonne weighbridges into sweep augers, tested and then graded before the farmer receives payment for his harvest. The government buys wheat of fair and average quality and tests the wheat quality in testing laboratories using special equipment designed to detect live infestation, presence of foreign particles and moisture content. The farmer is allowed visibility throughout the testing process. Average service time from sampling to exit for a farmer is less than 1 hour. Wheat is then moved into 12,500 MT capacity steel silos equipped with temperature monitoring and fumigation systems.

Dispatch & receipt

Wheat is then top loaded into BCBFG (high speed, high capacity, top loading, and bottom discharge) wagons. This maintains the quality of wheat as well as reduces pilferage from 1% to 0% as the top of the BCBFG wagons are hydraulically sealed. Once a BCBFG rake has reached a receiving silo, grain is unloaded from the bottom of a rake and then inspected for quality. Post which grain is bagged using a bagging machine and then transported to a small district warehouse. [14]

[14] Source: IVEY

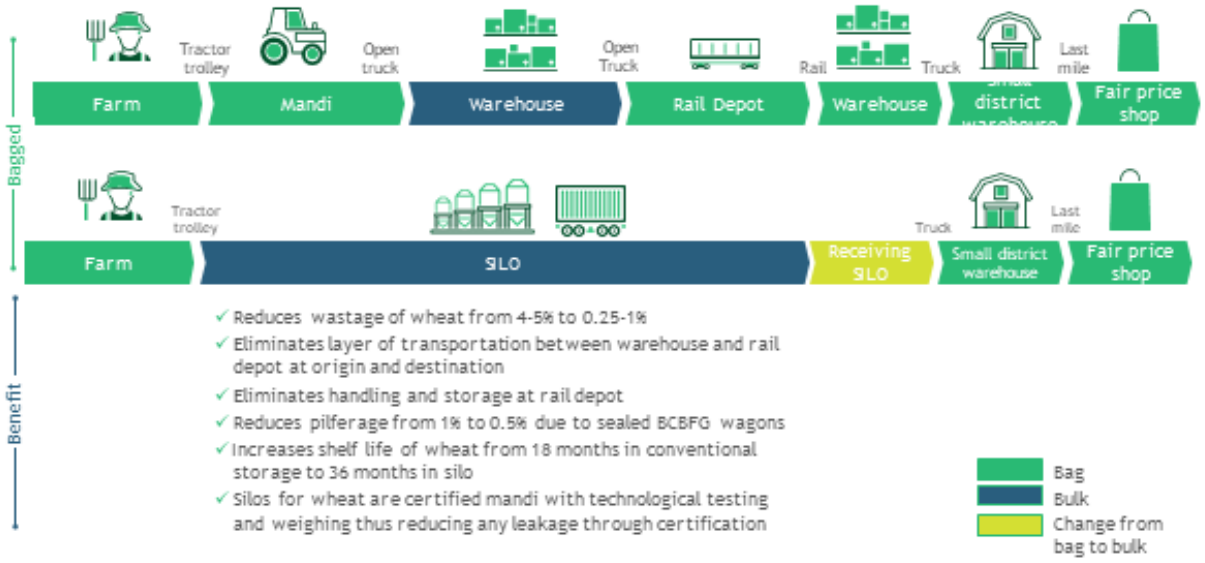


Figure 6 Representation of bulk value chain for wheat

By shrinking the value chain and reducing secondary freight movement as well as deploying state of the art technology to reduce wastage, bulk silos will reduce logistics costs of wheat by 30-40%. Wheat silos reduce logistics costs by 30-40% by reducing wastage from 4-5% to 0-1%, eliminating an additional stage of transportation and thereby reducing transportation costs from 6-7% to 0-1% and reducing handling costs from ~2% to ~ 1%.

Table 7 Cost savings from wheat silos

Price and costs in peak season (INR/quintal)	**Bagged without railway siding**	**Silo with railway siding**
Economic price of wheat	2,396	2,396
Government Saving	(40-45)	213
Margin of intermediaries	90-100	90-100
Total logistics cost	575-625	330-380
Loading/unloading	10-15	5-10
Storage	40-45	75-90
Wastage in storage	100-110	5-10
Long haul rail	190-200	190-200

Truck freight costs	190-200	20-30
Pilferage	30-35	15-20
Packaging cost	15-20	15-20
Minimum Support Price	1735	1735

5.1.1.2 Global Example

India lags other developed markets in its share of silo storage capacity. Silo storage comprises 1% of total storage capacity in India compared to 70% in Australia, 70% in USA and 20% in China. The construction of silo storage capacity can reduce India's food grain logistics costs to bring it on par with Australia and USA.

The US grain value chain comprises a network of grain elevators (silo storage systems) owned by private agriculture players that procure grain from the farmer and sell it to food processors. The grain elevator enables bulk handling, improves storage quality and provides access to a railway siding.

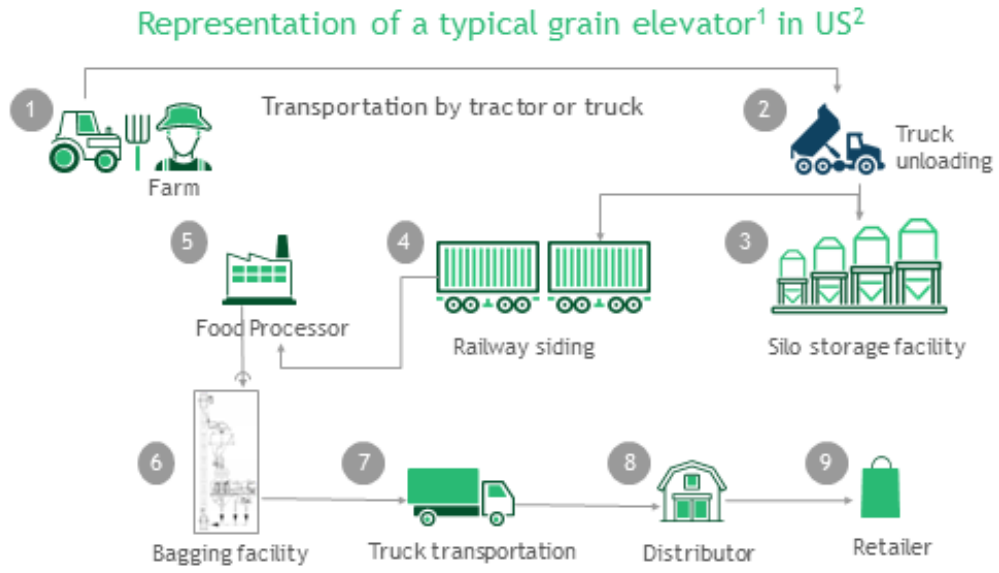


Figure 7 Representation of grain elevator supply chain

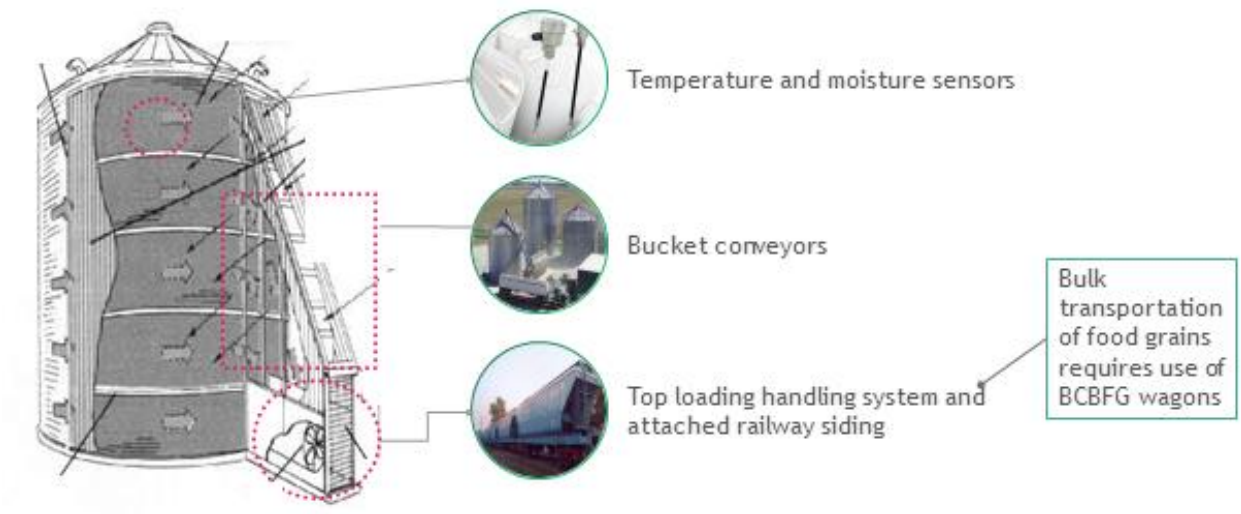


Figure 8 Representation of wheat silo

Types of silos: Due to the difference in the nature of the grain, rice and wheat have to be stored in different silos. Rice being more fragile is stored in conical bottom smaller silos of 3,000 – 4,000 MT capacity and require an internal cooling unit to maintain 12% moisture level. Wheat being more durable is stored in flat bottom silos of 12,500 MT capacity and does not require an internal cooling unit. For these reasons, wheat silos are cheaper than rice silos costing Rs. 40 crores vs Rs. 50 crores. More than eighty five percent of the silo capacity globally comprises wheat silos. Although rice silos have proven to be successful in certain markets such as China, the Food Corporation of India has decided to construct 85% of wheat silo capacity and construct 15% rice silo capacity based on results from a pilot project of two rice silos in Bihar. [15]

Table 8 Comparison of rice and wheat silos

	Rice	**Wheat**
Capacity	3,000 – 4,000 MT	12,5000 MT
Shape	Conical bottom	Flat bottom
Cost	50 crores	40 crores
% of silo capacity globally	80-85%	15-20%

[15] FCI, Expert Interviews

Presence of cooling unit	Yes	No

The Government of India along with the Food Corporation of India has decided that silos (both procuring and consuming silos) and BCBFG wagons will all be individual investment schemes under the PPP model. Procuring and consuming silos will be set up under one of two investment schemes.

1) Design Build Finance Operate Transfer (DBFOT)- : Silos to be set up on land belonging to FCI/State Agencies. Under this, Niti Aayog (Planning Commission) and Ministry had proposed setting up of silos under PPP mode with VGF funding from DEA. Silos were to be set up on existing depots of FCI/State Agencies for a concession period of 30 years. All the silos planned will have railway sidings. Post 30 years, the asset will be transferred to the FCI.
2) Design Build Finance Operate Own (DBFOO): At other locations where there is a Storage Gap and land is not available with FCI or State Agencies, Silos have been planned to be constructed on private land without any land transfer. These Silos are planned with railway sidings and 30 years concessionaire period. These silos are planned without VGF and silo operators bid on the rate they will charge the FCI.

Under both models, the FCI will guarantee 98-100% capacity utilization for the silos. Under the DBFOT model, the FCI will guarantee an average price which will escalate indexed on inflation. The equity IRR a private player can expected to attain under the DBFOT model for a wheat silo is 12-15%. Table 11 lists out the costs and the return a private party can expected to attain for the 30 year concession period.

Table 9 Financial return from wheat silo

Capacity 50,000 MT	
Cost	**Rs. crore**
Land	3-4

Capacity 50,000 MT	
Cost	**Rs. crore**
Construction cost	28-30
Railway siding	4-5
Preoperative costs	3-4
Capital expenditure	38-43
Debt	70%
Payback period	9.5 years
Discount rate	10.0%
Project IRR (30 years)	9.50%
Equity IRR	12-15%

Rice silos: At present, technology for storage of rice in silos has not been completely tested. As shown in figure 8, the rice supply chain involves an additional stage of milling when compared to the wheat supply chain. Milling is usually done by small local millers who would not have the bulk receiving, handling and dispatching capacity there by requiring rice to be unloaded, stacked, unbagged, bagged and then stacked again thereby increasing the packaging costs from 2% to 3%. The FCI is however conducting pilot projects of 2 rice silos of 50,000 MT capacity in Bihar based on which the construction of rice silo capacity should be considered.

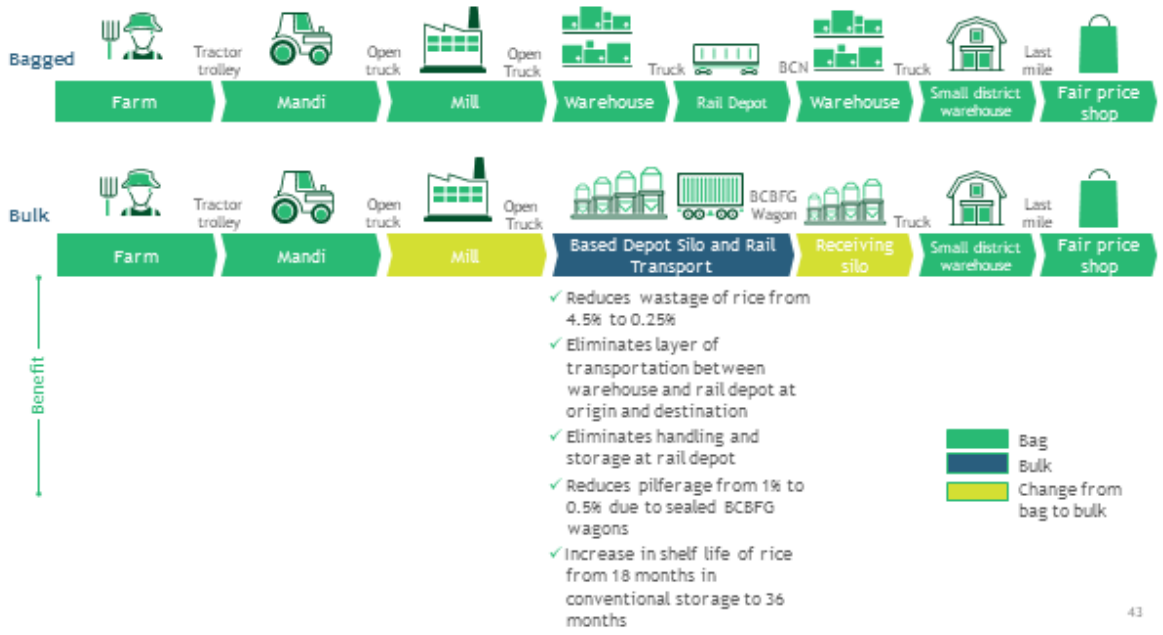


Figure 9 Representation of bulk rice value chain

Due to smaller capacity silos (3000 MT), the requirement of a cooling unit and additional handling, rice silos yield a lower ROI of 7-9%. Thus given the additional stage of handling and lower ROI, it is recommended that the construction of wheat silo capacity is prioritized. Table 8 in the appendix displays the economic savings and financial return from a rice silo

5.1.1.3 Planned capacity of silos

The Shanta Kumar High Level Committee recommends to construct 10 MnT of silo capacity under a PPP model in India– 9.8 MnT of wheat silo capacity and 0.2 MnT of rice silo capacity by 2022. As shown in table 12, currently 0.625 MnT of silo capacity has already been constructed primarily by Adani Agrilogistics. 0.45 MnT of additional silo capacity is under construction and an additional 3.2 MnT of silo capacity has already been tendered. Over 50% of silo capacity has already been tendered or in action of tendering.

Table 10 HLC planned silo capacity

Progress	Capacity (MnT)

Total interstate movement of wheat	25
Total planned capacity for silos by HLC	10
Silos constructed	0.625
Silos under construction	0.45
Tender awarded	3.15
Under tender action/to be retendered	0.85
Location approved by HLC	3.2
Total planned capacity	8.25
Total Unplanned capacity	1.75

5.1.1.4 Priority locations

BCG has conducted an analysis investigating the top 20 originating wheat railway stations. Stations with less than 100,000 MT of originating wheat freight movement were filtered out as they would not ensure 100% capacity utilization of silos. The locations for setting up silo storage capacity is listed in table 13 in the appendix and is contingent on the availability of land and the presence of storage deficit in that areas. Silos would require 7-10 acres of land with minimum dimensions of 100m x 400m for the construction of a silo and 1.5 km in length for the development of railway siding. Furthermore, land should be private land.

Bulk transportation, handling and storage of food grains can be implemented in two models.

a) Current model of 50,000 MT procuring and consuming silos in major surplus and deficit states
b) A hub and spoke network of spoke silos (12,500 – 25,000 MT) at the mandi level and hub silos (1,00,000 – 2,00,000 MT) at rail depots

Hub & spoke model: The hub and spoke model will reduce an additional stage of transportation from the warehouse to the rail depot when compared to the traditional supply chain. A hub and spoke model should be implemented in states with high concentration of mandis such as Punjab and Haryana. Furthermore, in locations where farmers have to travel long distances to a silo, the farmer can travel to the local mandi, sell and then store the grain in a spoke silo which will then be transported by a truck in bulk to a hub silo.

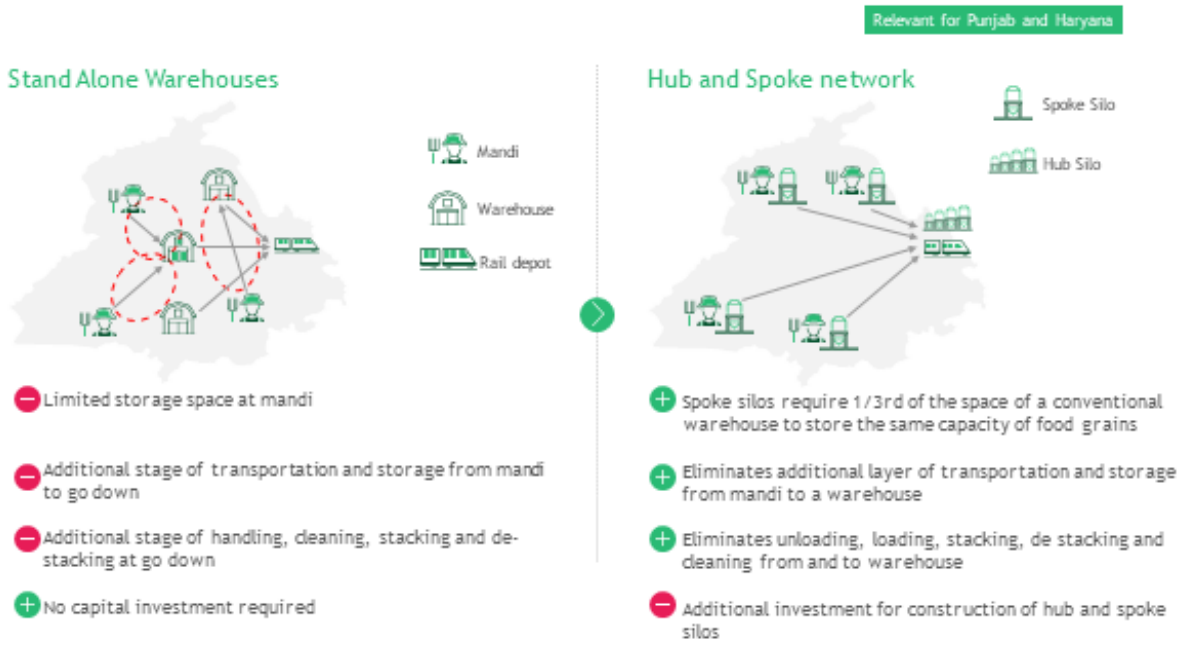


Figure 10 Representation of hub & spoke model in Punjab & Haryana

Issues with development of bulk silos: The development of silo capacity whether in a model of large procuring and consuming silos or in the hub and spoke model faces certain issues.

I. Difficulty in acquiring land for third party private player
   a. Small land holding in key deficit states
   b. Delays in documentation of land acquisition
   c. Not upto date land records

II. Time delay due to multiple clearances
   a. Forest, environment, private land, railway, water clearances

b. E.g. in Narela, FCI faced difficulty in receiving clearances from Ministry of Environment, Forest and Climate Change

The construction of bulk silos will require the procurement of BCBFG wagons for bulk transportation of grain to realize cost savings of 30-40% for wheat and 20-30% for rice.

5.1.2 Procurement of BCBFG wagons for the bulk transportation of food grains

Bulk movement of food grains will require top loading and bottom discharge BCBFG wagons. Currently, greater than 90% of wheat freight movement is conducted through BCN or BCNHL wagons. BCBFG wagons represent >1% of overall wheat freight movement in the country. BCBFG wagons cost 20 crores per rake and provide 50% faster turnaround time in loading/unloading.[16]

	Train Composition	Permissible carrying Capacity (tones)	Tare Weight (t)	Payload	Cost per wagon	Speed (km/hr)	Rake loading time	Unloading features
BCBFG 	48-50 wagons	63	26.44	60.84	40-45 lakhs	65	3-4 hours	Top loading gravity bottom discharge
BCN 	40-42	58	27.23	54.08	20-25 lakhs	75	7-8 hours	Manual labor

Figure 11 Comparison of BCBFG to BCN wagons

Currently, India has 6-8 BCBFG rakes all owned by Adani Agrilogistics. FCI would require 1 new BCBFG rake for every 0.1 MnT of planned silo capacity. The FCI is currently preparing to tender investment in BCBFG rakes to 3PLS, wagon manufacturers and large agri logistics players. Despite the seasonal production of wheat, utilization of BCBFG will

[16] FOIS, High Level Committee Report, Expert Interviews, BCG Analysis

not be a concern as interstate movement of wheat occurs year round as shown in figure 11.

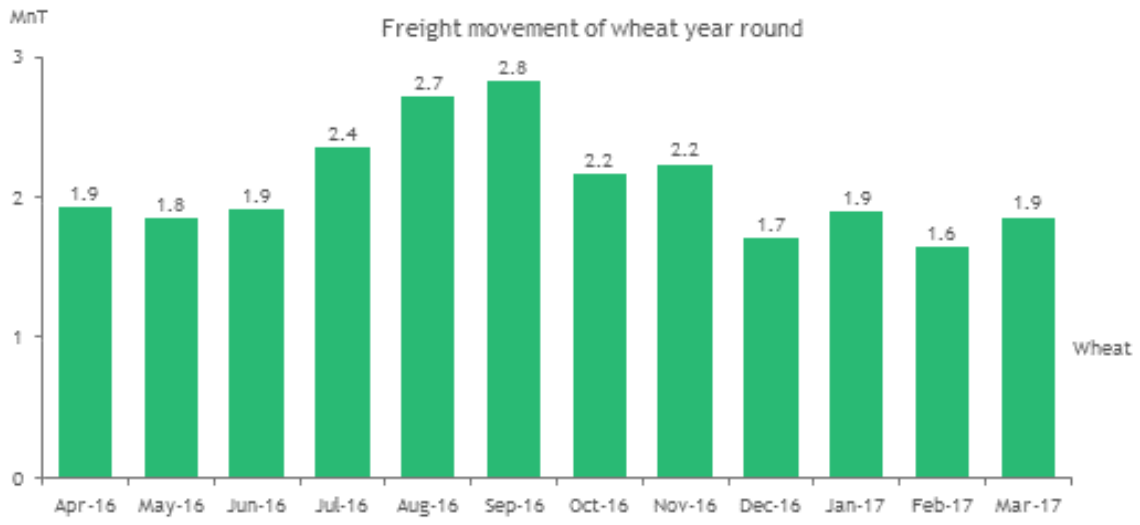


Figure 12 Freight movement of wheat year round

5.1.3 Action agenda

Development of 10 MnT of silo capacity at the identified locations is expected to reduce food grains interstate logistics costs by **~2,100 – 2,200** crores annually (~7%).

Table 11 Total interstate cost savings from implementation of wheat silos

Area	Units	Values
Current share of bulk capacity	MnT	1.2
Proposed share of bulk	MnT	10
Increase in share of bulk	MnT	8.8
Average savings per quintal	Rs.	240-250
Total potential annual savings	Rs. Cr	2,100-2,200

The following list of action items should be prioritized to reduce interstate logistics costs of food grains in India.

1. **Wheat Silos**
    a. FCI to expedite setting up of 9 MnT of wheat silo capacity at identified locations
    b. Accelerate construction of silos under tender
    c. Fast track approvals for silos under tender process
    d. Identify locations for remaining unplanned capacity
    e. Explore hub and spoke model in Punjab and Haryana
2. **Rice Silos**
    a. Evaluate feasibility of rice silos based on pilot in Bihar
    b. Conduct surveys for feasibility studies to zero down on the exact location for future rice silos
3. **Wagons**
    a. FCI to fast track the procurement of bulk BCBFG wagons in line with estimated build up of silo capacity
    b. Prepare RFP for BCBFG wagons

5.2 Increase share of coastal shipping

5.2.1 Coastal shipping potential

India's 7500 km coastline spans 13 maritime states and union territories. Ninety-five percent of India's trade by value and 70% by volume takes place through maritime transport.

Global example: Maritime nations such as China, Japan and USA have effectively used their coastline for domestic coastal shipping of major commodities. Transportation through coastal shipping or inland water currently contributes less than 6% of India's modal mix. Water contributes 24% to China's freight modal mix as China uses its inland waterways to transport raw material and finished goods. Australia transports 17% of its goods through coastal shipping.

Despite India's 7500+ km long coastline, India's share of food grains coastal transportation is low for long haul interstate transportation. Five deficit and one surplus states for food grains in India are located on the coast. Coastal shipping has the potential to reduce logistics costs by 10-15%.

Identified routes: Based on the OD analysis, the Ministry of Shipping has identified the potential to ship 3 MnT of food grains through coastal shipping along 10 routes by 2025 as shown in figure 12. 1.3 MnT of the identified potential is to be transported from the landlocked states of Punjab and Haryana. Grain will be transported from Punjab/Haryana to Kandla Port in Gujarat and shipped to Tuticorin, Mangalore or Cochin Port in the South. [17]

#	From	In Current Year terms[1]	FY25	Savings[2]
1	Punjab – Karnataka	0.5	0.6	
2	Andhra Pradesh – Kerala	0.4	0.5	
3	Odisha- West Bengal	0.3	0.4	
4	Andhra Pradesh- Tamil Nadu	0.2	0.3	
5	Haryana- Karnataka	0.2	0.2	
6	Punjab – Tamil Nadu	0.2	0.2	~100-200
7	Haryana – Tamil Nadu	0.2	0.2	
8	Andhra Pradesh – Karnataka	0.1	0.1	
9	Punjab – Kerala	0.1	0.1	
10	Other O-Ds	0.1	0.1	
	Total	2	3	

Figure 13 Representation of 10 identified routes for coastal shipping of food grains

[17] Ministry of Shipping

Coastal shipping value chain: The movement of food grains through coastal shipping will require containerized movement of grain. A trailer operated by a freight operator will transport grain from an FCI depot in a surplus state to a nearby ICD. Loading and unloading onto the trailer will be done manually in gunny bags. The gunny bags will then be unloaded at the ICD and the grain will be stuffed in containers. Stuffing has to occur at the ICD due to availability of container handling equipment and to ensure full utilization of containers. Containerized rakes will then move from the ICD to a port where containers will then be unloaded and loaded onto a ship. Post arrival at the destination, containers of grain will be unloaded from ship through mechanized handling and loaded onto a rake for transportation to an ICD. At the destination ICD, the gunny bags are unloaded and then transported by truck to a warehouse. The FCI will contract a third party logistics provider to operate the entire supply chain and transport grain from an FCI origin warehouse to a FCI destination warehouse.[18]

Cost savings: Coastal shipping of food grains reduces food grain logistics costs by 10-15% primarily due to the lower long haul freight charge. The FCI currently undertakes coastal shipping of food grains from Kakinada Port, Andhra Pradesh to Cochin Port, Kerala. However coastal route represents less than 10% of the coastal shipping opportunity. Coastal shipping movement should be conducted from the Punjab/Haryana to the grain deficit states in the south to realize savings of INR 300-400 crores. Figure 13 represents the possible route and cost savings for movement of food grain from Punjab to Kerala.

[18] FCI

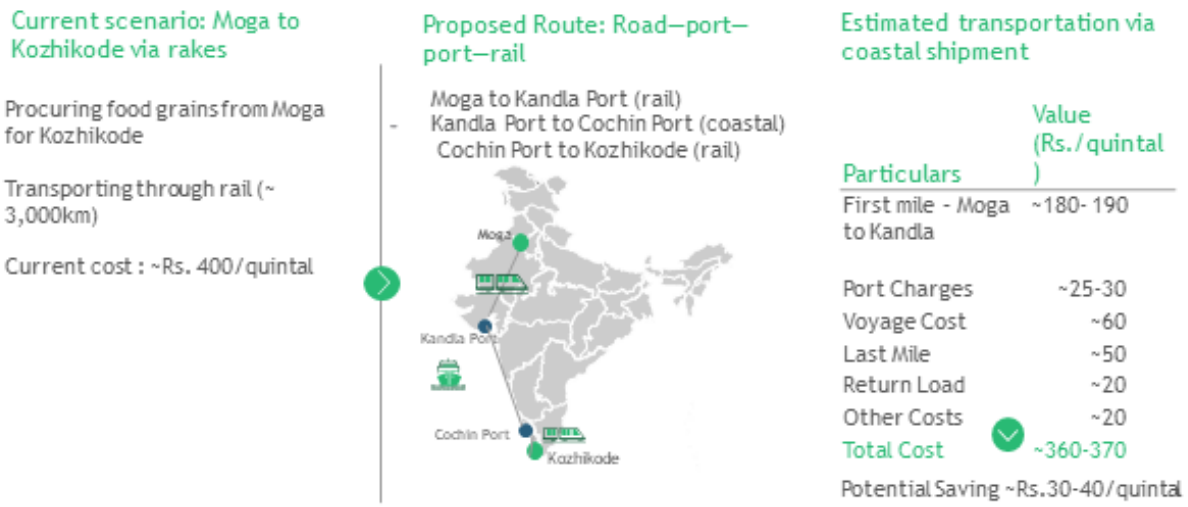
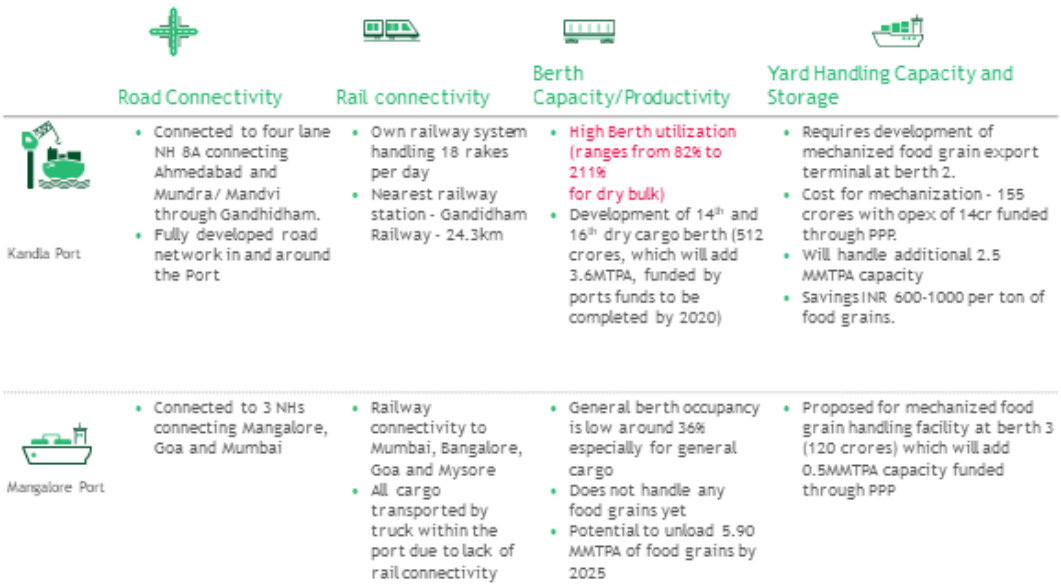


Figure 14 Representation of coastal movement from Punjab to Kerala

Capacity Expansion: Kandla port will be the main origin port from which 5.2 MnTPA of food grains is expected to be shipped to a southern state. To achieve coastal shipping movement of food grain, additional berth capacity will be required at Kandla Port expected to cost Rs 512 crores funded by ports funds. [19]



	Road Connectivity	Rail connectivity	Berth Capacity/Productivity	Yard Handling Capacity and Storage
Kandla Port	• Connected to four lane NH 8A connecting Ahmedabad and Mundra/ Mandvi through Gandhidham. • Fully developed road network in and around the Port	• Own railway system handling 18 rakes per day • Nearest railway station - Gandidham Railway - 24.3km	• High Berth utilization (ranges from 82% to 211% for dry bulk) • Development of 14th and 16th dry cargo berth (512 crores, which will add 3.6MTPA, funded by ports funds to be completed by 2020)	• Requires development of mechanized food grain export terminal at berth 2. • Cost for mechanization - 155 crores with opex of 14cr funded through PPP. • Will handle additional 2.5 MMTPA capacity • Savings INR 600-1000 per ton of food grains.
Mangalore Port	• Connected to 3 NHs connecting Mangalore, Goa and Mumbai	• Railway connectivity to Mumbai, Bangalore, Goa and Mysore • All cargo transported by truck within the port due to lack of rail connectivity	• General berth occupancy is low around 36% especially for general cargo • Does not handle any food grains yet • Potential to unload 5.90 MMTPA of food grains by 2025	• Proposed for mechanized food grain handling facility at berth 3 (120 crores) which will add 0.5MMTPA capacity funded through PPP

Figure 15 Evaluation of Mangalore and Kandla port capabilities

[19] Ministry of Shipping

5.2.2 Action agenda

The movement of 7 MnTPA of food grains through coastal shipping along the 11 identified routes is expected to reduce food grain interstate logistics costs by 5-10%. FCI should prioritize the list of following actions steps to achieve savings of Rs. 200-300 crores as listed in table 12.

Table 12 Economic cost savings from coastal shipping of food grains by 2025

Area	Units	Value
Current share of coastal shipping	MnT	0.14
Proposed share of coastal shipping	MnT	7-8
Increase in share of coastal shipping	MnT	7-8
Average savings	INR/quintal	30-40
Total annual savings	Rs. Cr	200-300

Action steps:

a. FCI to tender out identified routes for coastal shipment to enable price discovery and determine economic feasibility of identified routes

b. Evaluate infrastructure requirement and port connectivity issues

   i. Deep dive for select focus ports

c. Joint action plan with Ministry of Shipping to be prepared for development of identified coastal corridors

d. Explore possibility of bulk transportation of food grains in containers for coastal shipping

5.3 Explore potential of riverine movement

5.3.1 Inland waterways potential

Similar to coastal routes, inland waterways are cost effective for long distances. India has 111 identified national waterways of which 5 are developed/under construction and the remaining 106 were notified in 2016 under various stages of DPR preparation/evaluation. Despite, India's share of freight transportation through inland waterways remains negligible and lags developed markets.

Global Comparison: India moves 0.4% of all freight through inland waterways compared to 11% in Germany, 17% in Australia and 24% in China. Average freight costs per tonne per km for riverine movement (1.19) are significantly lower than road (2.28) and rail (1.41) for long distances.

Current movement: The Food Corporation of India along with IWAI has undertaken two riverine movements of food grain as listed below

a) FCI moved 10,000 MT of raw rice (as a pilot project) through multimodal riverine movement from Andhra Pradesh to Tripura (NE) via Ashuganj Port in Bangladesh during 2014-15.
b) FCI moved 9691 MT and 2267 MT Raw Rice during 2015-16 and 2016-17 respectively through multimodal riverine movement from West Bengal to Tripura (NE) via Ashuganj Port in Bangladesh. This movement occurred as Indian Railways had changed the composition of the railway track from MG to BG thereby preventing long haul rail movement to Tripura.

The following list of national waterways in table 16 have the potential for movement of food grains. NW-1, NW-3 and NW-4 are ready for movement of food grain while NW-16 and NW-110 would need to be developed further for movement of food grains. NW-4 and NW-110 have the potential to move 0.9MnTPA of food grains. The potential movement of food grains along NW-1, NW-3 and NW-16 needs to be explored.

Table 13 List of potential national waterways for movement of food grains

Waterway	States it flows through	Stretch	Potential (MnTPA)[20]
NW-1	UP to West Bengal (through Jharkhand and Bihar)	Gazipur to Kalughat	TBD
NW-3	Kerala	TBD	TBD
NW-4	Andhra Pradesh to Tamil Nadu	Kakinada(AP) to Puducherry	0.6
NW-16	Delhi to Assam through Bihar	Badalpur(delhi) to Silchar(Bihar) and Karinganj (Assam)	TBD
NW-110	Haryana to UP (Yamuna river)	Panipat, Kurukshetra to Naini (UP)	0.3

5.3.2 Action agenda[21]

The FCI along with IWAI can implement the following steps to promote the use of inland waterways for movement of food grains.

NW-1

a. IWAI to construct terminals at Gazipur (UP) and Kalughat (WB) for loading/unloading of food grains
b. FCI to consider transportation of food grain procurement in UP to deficit states of Tripura and Assam
c. IWAI to construct a multi modal cargo aggregation hub with mechanized handling at Varanasi and Sahebganj to handle movement of food grains

NW-3

[20] BCG Analysis
[21] FCI

d. IWAI and FCI to conduct joint site visit and examine expected utilization of IWAI terminals for transportation of rice within Kerala

NW-4

e. FCI to inform IWAI of list of identified locations for potential terminals and handling requirements.

NW-16

f. FCI to explore potential origin and destination warehouses close to NW-16 for movement of food grains

NW-110

g. IWAI to fast track development of river for movement of food grains

5.4 Develop rice milling capacity

The interstate movement of rice in India comprises 96% movement of rice and 4% movement of paddy.[22] Paddy comprises of rice with an additional layer of husk over it. Paddy is brought by the farmer to the mandi, sold and then milled into rice, which is then moved between states. Paddy being 20% heavier than rice, increases logistics costs by 20%.

Almost 60% of paddy originates from Tiruchchirappalli and Chennai central, both in the state of Tamil Nadu. Tamil Nadu procures paddy through the Tamil Nadu Civil Supplies Corporation. Based on initial analysis, it was found that a shortage of capacity to mill paddy into rice exists in Tamil Nadu. The Tamil Nadu Civil Supplies Corporation procured 1.5 MnT of paddy in 2016-17 with an annual milling capacity of 0.5 MnT. Developing 1MnT of rice milling capacity can reduce long haul movement of paddy. [23]

Table 14 Division wise movement of paddy

Railway Division	Originating paddy (MnT)
Tiruchchirappalli	0.53

[22] FOIS
[23] Tamil Nadu Civil Supplies Corporation

Mughal Sarai	0.21
Chennai Central	0.06
Dhanbag	0.06
Other	0.21
Total	1.07

6 Appendix

Table 15 OD Pairs for rice in 2016-17

	OD Pair	Freight movement (MnTPA)
1	Ambala Cant Jn - Bihar	1.06
2	Firozpur Cant - Karnataka	0.96
3	Firozpur Cant - Assam	0.96
4	Delhi - Tamil Nadu	0.7
5	Ambala Cant Jn - Karnataka	0.65
6	Ambala Cant Jn - Tamil Nadu	0.64
7	Firozpur Cant - Tamil Nadu	0.58
8	Ambala Cant Jn - Maharashtra	0.57
9	Sambalpur - Maharashtra	0.47
10	Vijayawada Jn - Assam	0.47
11	Ambala Cant Jn - Goa	0.44
12	Vijayawada Jn - Karnataka	0.43
13	Sambalpur - Assam	0.42
14	Vijayawada Jn - Andhra Pradesh	0.41
15	Delhi - Maharashtra	0.41
16	Firozpur Cant - Uttar Pradesh	0.39
17	Ambala Cant Jn - Uttar Pradesh	0.38
18	Ambala Cant Jn - Assam	0.35

	OD Pair	Freight movement (MnTPA)
19	Delhi - Karnataka	0.35
20	Sambalpur - Gujarat	0.28

Table 16 OD pairs for wheat in 2016-17

	OD Pair	Freight movement (mntpa)
1	Firozpur Cant – West Bengal	1.7
2	Firozpur Cant – Uttar Pradesh	1.7
3	Ambala Cant Jn - Uttar Pradesh	1.24
4	Delhi - Uttar Pradesh	1.06
5	Delhi - West Bengal	0.97
6	Ambala Cant Jn - West Bengal	0.97
7	Ambala Cant Jn - Gujarat	0.95
8	Firozpur Cant - Gujarat	0.83
9	Bikaner Jn - Uttar Pradesh	0.68
10	Ambala Cant Jn - Bihar	0.66
11	Firozpur Cant - Maharashtra	0.65
12	Firozpur Cant - Bihar	0.62
13	Delhi - Maharashtra	0.53
14	Ambala Cant Jn - Maharashtra	0.51
15	Firozpur Cant - Rajasthan	0.43
16	Bikaner Jn - Rajasthan	0.39
17	Ambala Cant JN - Rajasthan	0.38
18	Delhi - Rajasthan	0.35
19	Firozpur Cant - Tamil Nadu	0.33
20	Firozpur Cant - Himachal Pradesh	0.32

Table 17 List of prioritized location for setting up procuring silos

	Location	Originating movement (MnT)	State	Status	Capacity
1	Patiala	510,000-520,000	Punjab	Tender	50,000
2	Chheharta	500,000-510,000	Punjab	Tender	50,000
3	Muktsar	480,000-490,000	Punjab	Tender in process	50,000
4	Jakhal	450,000-460,000	Haryana	Tender in process	50,000
5	Ajitwal	450,000-460,000	Punjab	Tender	50,000
6	Patti	390,000-400,000	Punjab	No tender	-
7	Rohtak	380,000-390,000	Haryana	Tender	50,000
8	Kaithal	370,000-380,000	Haryana	Operational	1,00,000
9	Sirsa	370,000-380,000	Haryana	Tender	50,000
10	Moga	360,000-370,000	Punjab	Operational	1,00,000
11	Abohar	350,000-360,000	Punjab	Tender in process	50,000
12	Barnala	340,000-350,000	Punjab	Tender	50,000
13	Tohana	330,000-340,000	Haryana	No tender	-
14	Tarn Taran	3300,000-340,000	Punjab	No tender	-
15	Pipariya	320,000-330,000	Madhya Pradesh	No tender	-
16	Mansa	320,000-330,000	Punjab	Tender in process	1,00,000

	Location	Originating movement (MnT)	State	Status	Capacity
17	Fazilka	320,000-330,000	Punjab	Tender in process	50,000
18	Budhlada	320,000-330,000	Punjab	Tender in process	1,00,000
19	Firozpur	320,000-325,000	Punjab	Tender in process	1,00,000
20	Taraori	320,000-325,000	Haryana	Tender in process	75,000

Table 18 Economic cost savings from implementation of rice silo

Price and costs in peak season (INR/quintal)	Bagged without railway siding	Silo with railway siding
Economic price of rice	3294	3294
Milling costs	550-570	550-570
Margin of intermediaries	260-270	210-230
Total logistics cost	650-700	460-510
Loading/unloading	15-20	6-8
Storage	40-50	110-130
Wastage in storage	140-150	8-10
Long haul rail	190-200	220-230
Truck freight costs	220-230	50-60
Pilferage	30-35	14-18
Packaging cost	15-20	46-50
Minimum Support Price	1735	1735

Chapter 5: Commodity Corridor Analysis - Coal

Contents

1 Context

In line with the mandate given to the Logistics Wing to integrate and optimize the several elements of the logistics value chain, this chapter tracks the action plan to optimize the logistics cost of **coal** in India.

India is the **second largest producer** of coal in the world after China with ~660 MT[1] coal production in FY17. India also imports ~190 MT[1] of coal which take the total movement of coal in India to ~850 MT imports.

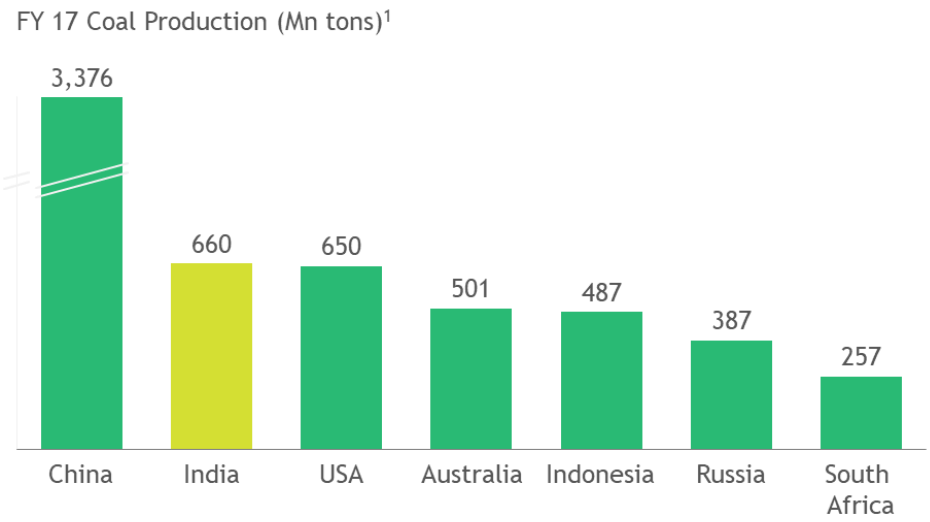


Figure 1: Coal production in India

Coal freight contributes to **~17% of the total freight[2]** movement in the country and it is the single largest freight movement in India. Given that the Indian coal production is estimated to reach ~900-1000 MTPA by FY2020[3], it is imperative to achieve higher cost efficiencies in logistic performance of the industry. This would result in reduction in the cost of logistics in India and make Indian coal and subsequently downstream products more competitive in India and for exports.

[1] Coal Directory 2016-17
[2] As per Planning Commission Total Transport System Study on Traffic Flows and Modal Costs (Highways, Railways, Airways and Coastal Shipping)
[3] As per CIL Vision document, Rakesh Mohan study on Logistics

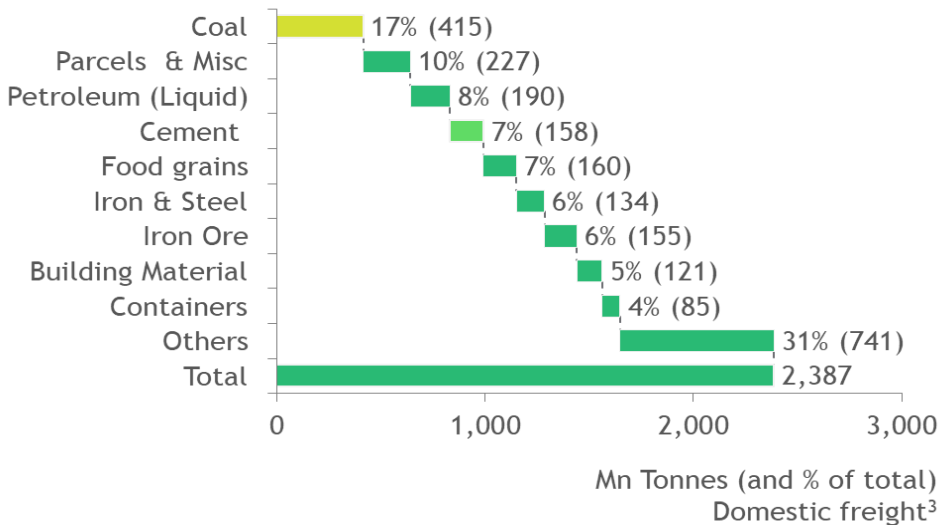


Figure 2: Coal production in India

Logistics cost includes the cost of freight, packaging, handling, loading, unloading, inventory, and storage. Logistics cost of coal vary with the distance transported. Logistics contribute average 35-40%[4] of the landed price of coal in India.

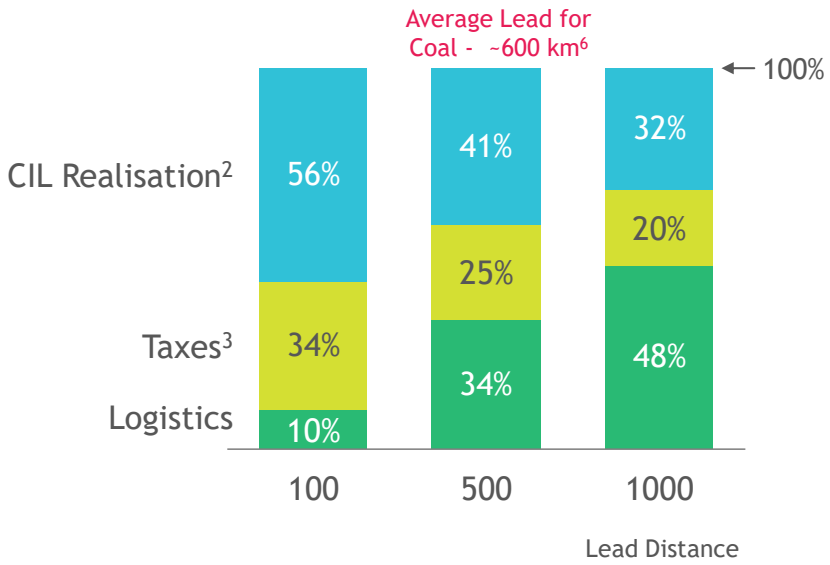


Figure 3: Logistics cost of coal with distance in India

This report details out the initiatives identified to reduce the logistics cost of the coal.

[4] As per CIL; FOIS rail freight

2 Landscape

In India coal is broadly classified into two types – Coking and Non-Coking. The former constitute only a small part of the total coal resources of the country. These two are further subdivided on the basis of certain physical and chemical parameter (such as ash content) as per the requirement of the industry.

Coking Coal: Coking coal, when heated in the absence of air, form coherent beads, free from volatiles, with strong and porous mass, called coke. Coking coal has coking properties and is mainly used in steel making and metallurgical industries.

Non-Coking Coal: Non-Coking Coal does not have coking properties and is mainly used for power generation. It is also used for cement, fertilizer, glass, ceramic, paper, chemical and brick manufacturing, and for other heating purposes.

2.1 Coal Production

Coal reserves in India are concentrated in select states. Four states contribute >75% of coal production. Odisha was the highest coal producing state in FY17 with 139.4 MT of coal production followed by Chhattisgarh (138.5 MT), Jharkhand, and Madhya Pradesh[5]. Almost all

Coking coal was produced in the state of Jharkhand which accounted for 96.7% of the total

Coking coal production.

[5] Coal Directory 2016-17

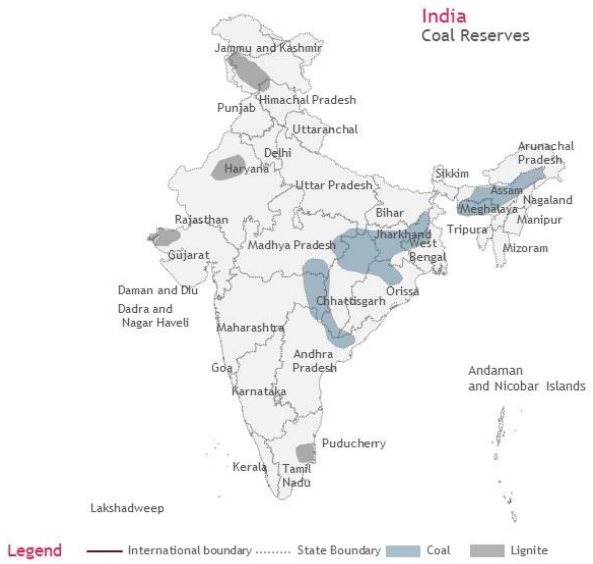


Figure 4: State-wise coal production in India

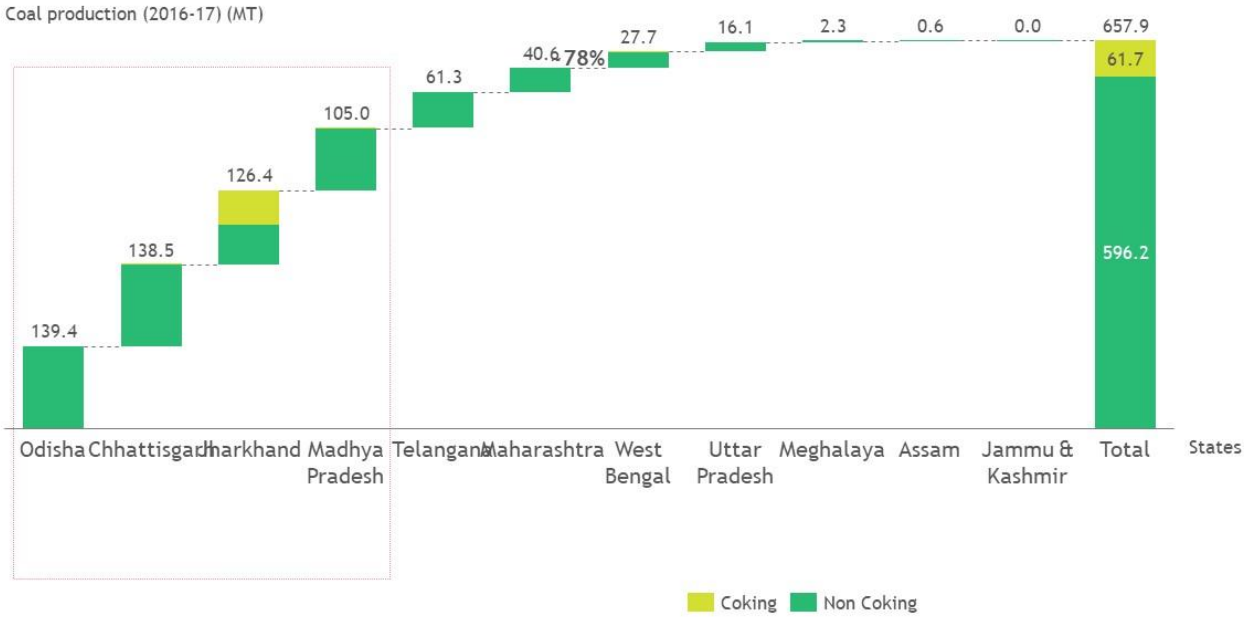


Figure 5: State-wise coal production in India

2.2 Coal Consumption

More than 80% of coal in India is consumed by power sector. This is followed by steel sector which consumes ~7% of coal. Cement and sponge iron consume another 1% of coal each. The remaining coal is consumed in a variety of other industries including fertilizers, pulp & paper, chemicals, and bricks[1].

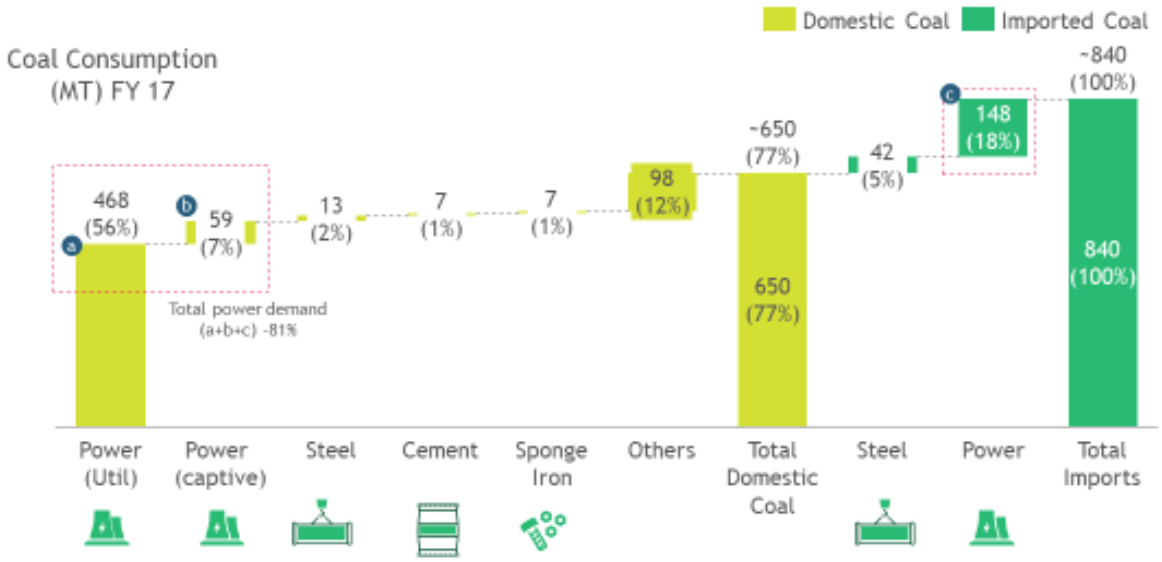


Figure 6: Coal consumption by industry sector

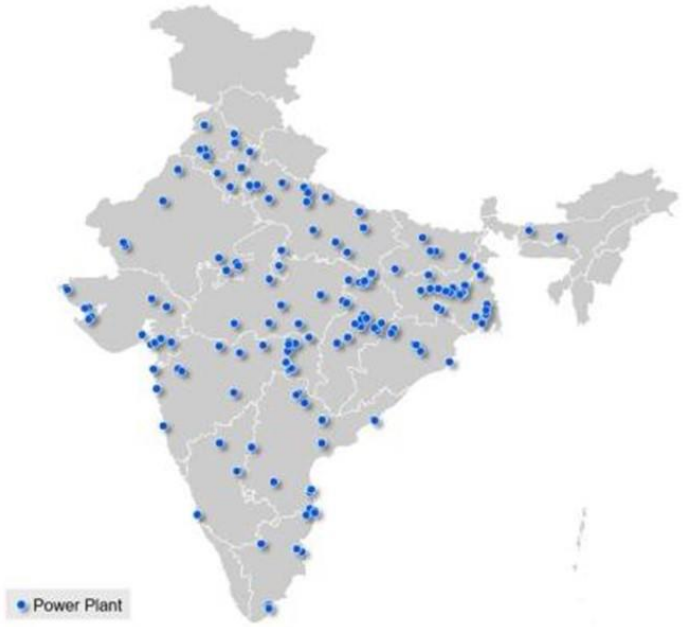


Figure 7: Locationof power plants in India - Showing power plants are spread through out the country with larger concentration in Northern plains

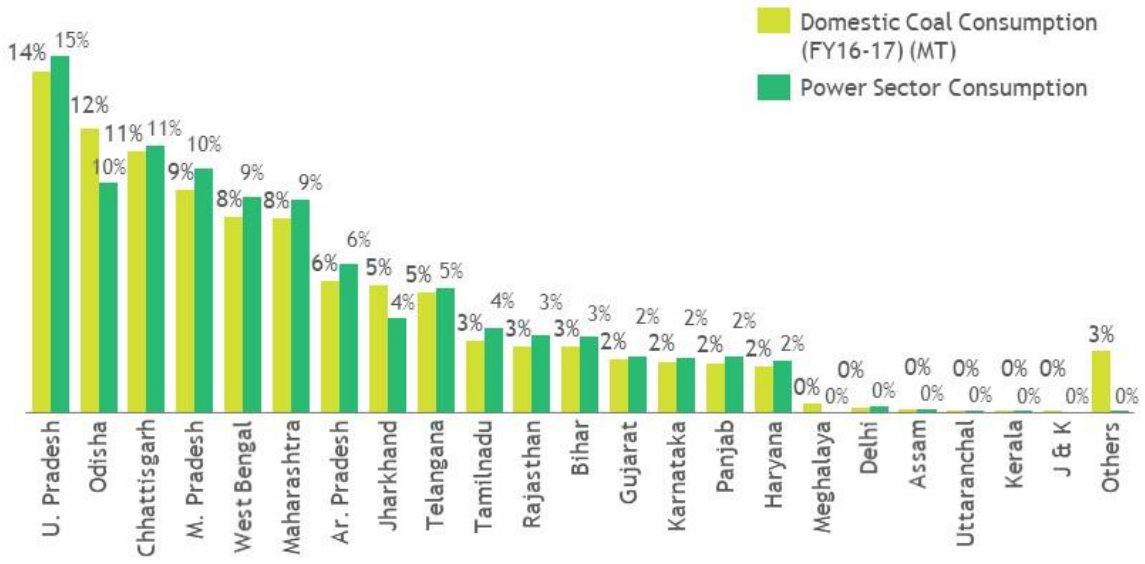


Figure 8: Coal consumption by state

Whereas coal production is concentrated in the eastern part of the country as discussed earlier, coal consumption is distributed throughout the country with thermal power plants present at varied locations. Uttar Pradesh, Odisha, Chhattisgarh, and Madhya Pradesh are the leading consumers of coal. As a result coal needs to be transported over large distances from its mining areas to consumption areas. The average lead of coal in India is ~500-600 km. Top 30 origin-destination pairs (O-D pairs) of coal contribute to ~60% of coal movement in India as shown in the figure below.

Top OD Pairs of coal contribute ~60% of domestic coal usage

	Source State	Source City	Destination State	Consumption (FY 17-18)
1	Chattisgarh	Bilaspur	Chattisgarh	60.55
2	Madhya Pradesh	Singrauli	Uttar Pradesh	45.47
3	Odisha	Jharsuguda	Odisha	32.44
4	Odisha	Jharsuguda	Tamil Nadu	24.29
5	Maharashtra & Madhya Pradesh	Nagpur & Betul	Maharasthra	24.26
6	Chattisgarh	Bilaspur	Maharasthra	20.39
7	Odisha	Jharsuguda	Andhra Pradesh	18.46
8	Odisha	Jharsuguda	Maharasthra	16.77
9	Jharkhand	Dhanbad	West Bengal	14.84
10	Jharkhand	Ranchi	Uttar Pradesh	14.05
11	Chattisgarh	Bilaspur	Madhya Pradesh	13.19
12	West Bengal	Durgapur	Bihar	12.93
13	Chattisgarh	Bilaspur	Gujarat	11.67
14	Odisha	Jharsuguda	West Bengal	11.45
15	Jharkhand	Ranchi	Jharkhand	9.59
16	Odisha	Sambalpur	Gujarat	6.64
17	Jharkhand	Ranchi	Haryana	6.40
18	Chattisgarh	Bilaspur	Rajasthan	5.66
19	Chattisgarh	Sarguja	Rajasthan	5.57
20	Odisha	Sambalpur	Punjab	5.56
21	Odisha	Sambalpur	Chattisgarh	5.21
22	Odisha	Angul	Telangana	4.79
23	Odisha	Jharsuguda	Karnataka	4.71
24	Chattisgarh	Bilaspur	Punjab	4.64
25	Jharkhand	Dhanbad	Uttar Pradesh	4.57
26	West Bengal	Durgapur	Andhra Pradesh	4.35
27	West Bengal	Durgapur	Uttar Pradesh	4.18
28	Chattisgarh	Bilaspur	Telangana	4.04
29	Madhya Pradesh	Singrauli	Rajasthan	3.80
30	Tamil Nadu	Neyveli	Uttar Pradesh	3.75
31	Maharashtra & Madhya Pradesh	Nagpur & Betul	Karnataka	3.56
32	Chattisgarh	Raigarh	Chattisgarh	3.49
33	Maharashtra & Madhya Pradesh	Nagpur & Betul	Madhya Pradesh	3.17

Figure 9: Top O-D pairs of coal movement

2.3 Modal Mix

Railways is the dominant mode of coal transportation. ~64% of coal was transported through railways in FY18. Coal is brought by road from mines to the rail sidings. Feeder rail routes then carry the coal from the rail sidings to the trunk routes. The trunk routes carry it over long distances, usually between distant states. Close to the destination, feeder routes move the materials from the trunk route to the rail siding at the power or steel plant or other customers. ~3% of coal was transported through coastal routes and about ~3-5% using road network. This figure for road transportation does not include the first mile transportation of coal as discussed above and refers to only long haul coal transportation. Inland waterways is an emerging mode of coal transportation and <0.5% of coal in FY18 was transported using the inland waterway network.

~27-30% of thermal power plants are either pithead plants or are port projects. Pit head plants mostly receive coal from the nearby mine through a variety of short lead movement methods such as road, conveyors, ropes, and Merry-Go-Round (MGR). Port projects receive coal mostly through nearby port which includes both domestic and imported coal.

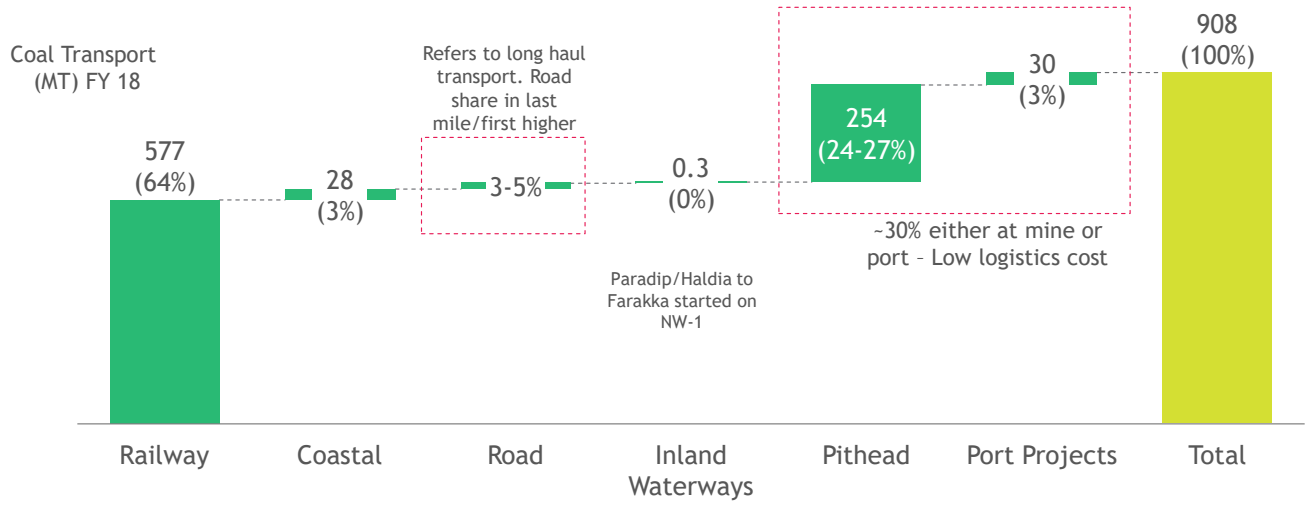


Figure 10: Modal mix of coal movement in India

2.4 Global Benchmarks

As discussed earlier, India is world's second largest coal producer. Other large producers of coal are China, US, and Australia. Among these, Australia has the lowest cost of coal logistics and it is significantly lower than other countries as shown in figure 6.

The low logistics costs in Australia are driven by mix of two factors - shorter lead distances and optimal modal mix. Australia exports ~75-80% of coal production and the remaining 20-25% is used primarily for power generation. As a result the Australian coal movement can be split into two- movement for domestic consumption and the movement for exports. Majority of Australia's coal mines are located in the south –southwest region of Australia within a distance of 200-250 km from the coast. Coal movement for export takes place from such mines to the nearest port. Thus average lead distances for coal movement for export is 210 km. Also 90% of this movement is via rail ensuring optimal modal mix.
In case coal movement for domestic consumption, the average lead distances is only 10-20km. This is because majority of power plants are at pit-head. 80% of coal movement for domestic consumption is via conveyors ensuring optimal modal mix as shown in the figure below.

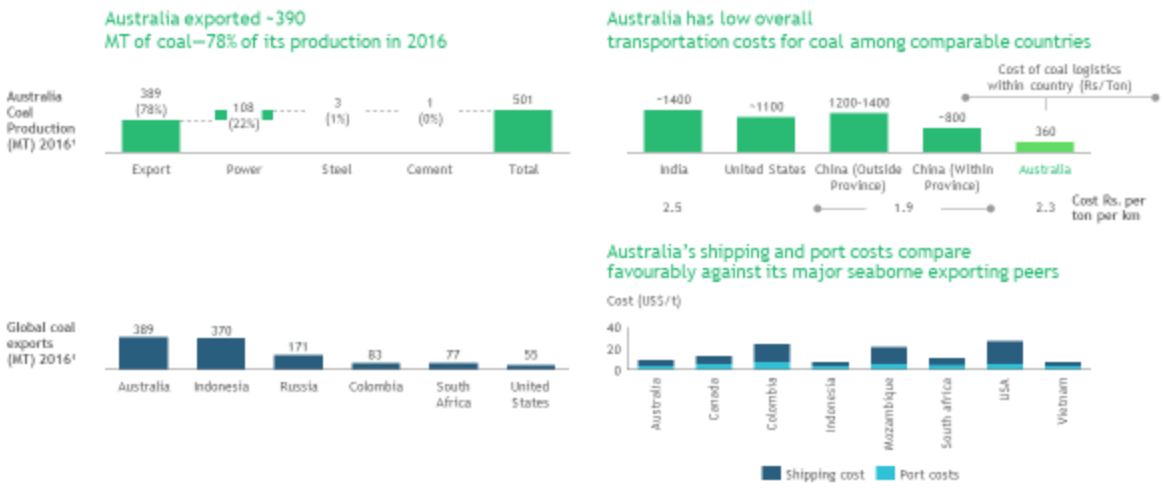


Figure 11: Coal Logistics global benchmarks

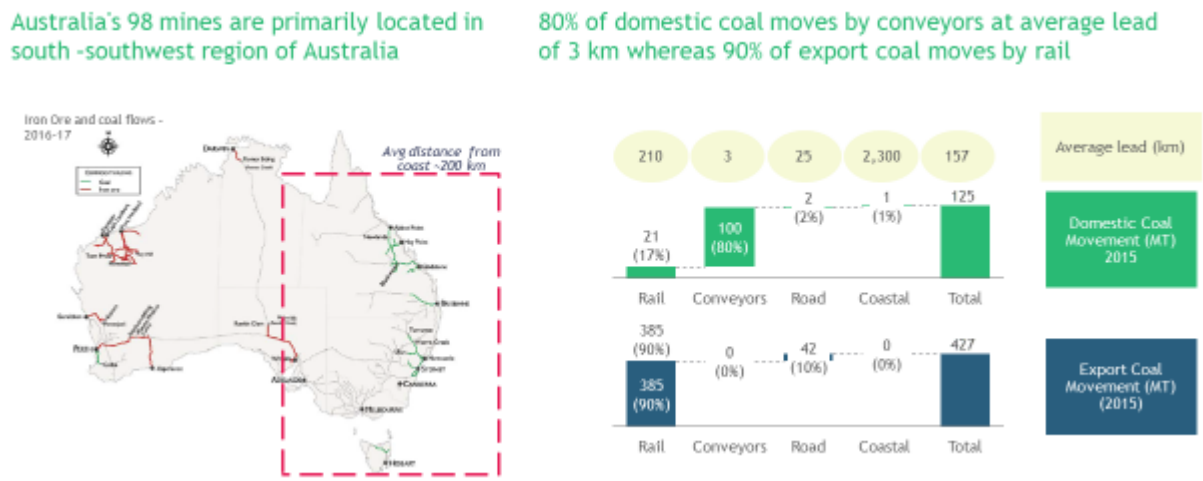


Figure 12: Coal movement in Australia

3 Key challenges

This section of the report details out the issues faced by coal players and other stakeholders across the various modes of transportation leading to sub-optimal logistics cost.

a) **First mile connectivity**

Coal is generally transported from mines to the nearest rail siding by road. The evacuation of material is hampered by the following factors: (1) lack of adequate and appropriate material handling infrastructure at the mine and at the rail siding;

(2) inadequate road capacity from the mine head to the railway siding; (3) Poor condition of roads (4) Roads passing through congested areas

b) Last Mile connectivity

Transport of unsized coal sometimes results in delays in unloading, especially of bottom discharge wagons, because large pieces get stuck. Sizing of coal before dispatch would avoid this problem and ensure faster unloading of rakes. It would also increase the carrying capacity of wagons through better compaction. Sometimes there are delays in unloading because the material handling system at the receiving power plant cannot handle all types of wagons. Either a power plant should be designed to handle a particular type of wagon and only that type of wagon should be sent to that power plant, or all power plants should be capable of handling all types of wagons–bottom discharge, tippler, etc.

c) High rail congestion

Almost all the major rail routes (>80%) over which coal is transported are operating above 10% capacity.

d) **Lack of port capacity:**

As per Rakesh Mohan committee report, capacity utilization for coal handling at ports averages 85 per cent with at least four operating at 100 per cent or more. International norms recommend a capacity utilization below 70 per cent to avoid delays.

e) **Low Rake Availability :**

Rake availability along with rail congestion leads to further delay in coal deliveries. The problem is exacerbated during peak season

4 Recommendations and action agenda

Almost all economic activity requires electricity and steel is an important input for many industries. In order to sustain a GDP growth rate of 8-10 per cent over the next two decades, it is estimated that the transport requirements for coal industry are expected to grow from about 900 Mt now to 3,700 Mt in 2031-32. These very large increases in the transport requirements for bulk commodities will be a great challenge.

There is a need to overcome the aforementioned challenges in a structural manner to ensure sufficient infrastructure capacity and its efficient use. Nine initiatives were identified and evaluated across four impact levers for reducing coal logistics cost. These initiatives have been summarized in the figure below.

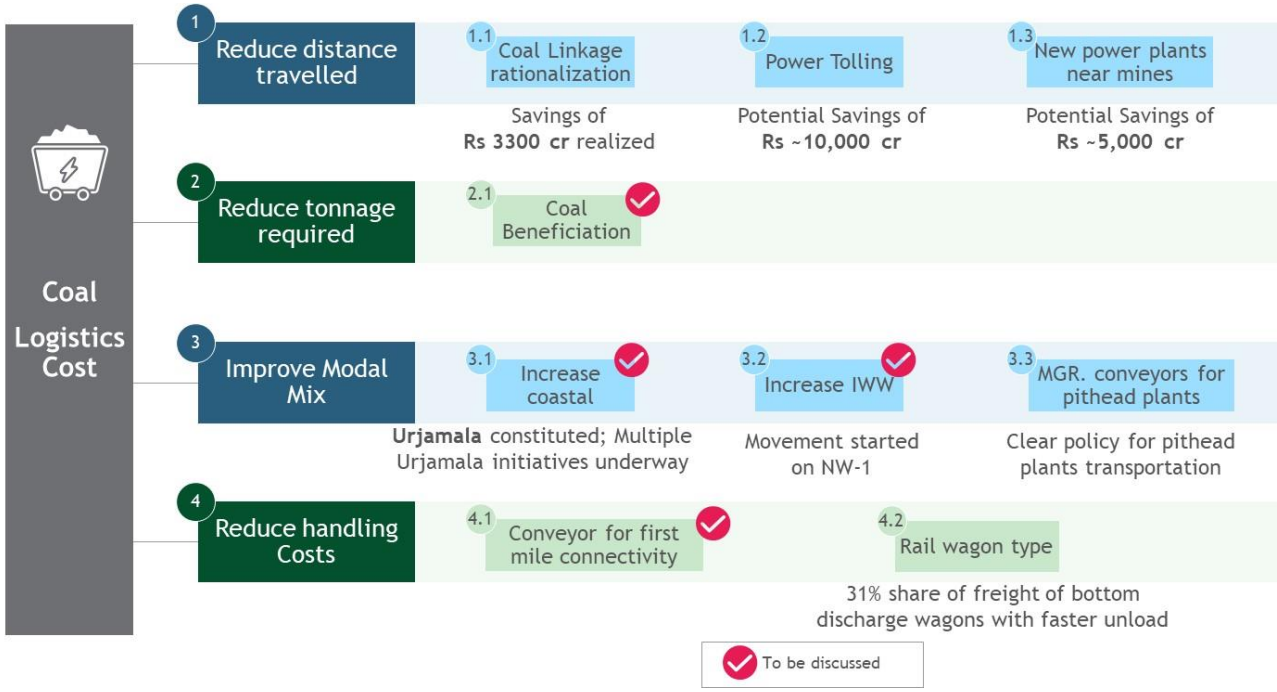


Figure 13: Levers for reducing logistics cost of coal

Five of these initiatives are already in advanced stages of implementation and significant savings have already been realized. Four of these need to be further explored and to reduce logistics cost of coal.

4.1 Increase use of conveyors for first mile transportation of coal from mine to rail sidings at existing mines

First mile transportation of coal from mine to the rail siding is a critical part of the coal supply chain. Due to the poor quality of road transportation in the mining area, the loading at rail sidings shows an annual pattern: it peaks during winter and declines during summer and monsoon. The mine company is unable to utilize the rail capacity optimally, and the unused capacity is lost. Railways estimates that the drop in loading results in a loss of about 50 rakes per day for a substantial part of the year.

Further, because the coal from the mines in the traditional coal fields has to be moved through heavily populated villages, and is vulnerable to blockage and other disturbances due to socio-political events, the following suggestions have been made about transportation from mine-heads to rail-heads in the Rakesh Mohan Committee report[6].

- Wherever possible, long-distance conveyor belt systems should be used.
- Siding rationalisation plans should be developed.
- Coal mining companies should consider developing a hub-based system for transporting coal from existing mines wherever feasible

Globally conveyors are used for coal transportation to pit-head plants. 80% of Australia's domestic coal movement was through conveyors in 2015

Piped conveyors are cheaper than road transportation and offer the following advantages over open conveyors

- Reduces coal pilferage and quality loss
- Mitigates the environmental impact of dust. This become critical when passing through residential areas

	Road	**Piped Conveyor**	**Open Conveyor**
Operating Cost (Rs per ton per km)	Rs 4-7[7]	Rs 2-3	Rs 2-3
Capex Cost	Road construction cost	~15-18 Cr per km for 1000 TPH line	~12-14 Cr per km for 1000 TPH line

Table 1 Cost comparision between conveyors and road movement of coal

Based on above costs, conveyors become viable at a minimum loading of 4 MTPA. Therefore, sidings where loading is greater than 4 MTPA have been identified below.

Conveyors are not new to the Indian coal mining industry. Conveyors with total capacity of ~36 MTPA are installed at 6 public mining companies. The details of these conveyors have bene provided below. It is essential to further establish conveyors at existing mines, wherever feasible.

[6] India transport report by National Transport Development Policy Committee
[7] For distances less than 30 km

Agency	Company	Belt	Rope
Public	NCL	3.0	
Public	WCL	0.3	2.0
Public	SECL	7.3	
Public	MCL	1.4	
Public	IISCO	0.2	0.1
Public	SCCL		0.3
Private	TISCO	6.3	
Private	SPL	17.1	
Total		**35.6**	**2.4**

Table 2 Current coal conveyor and rope installations

Conveyors can potentially be set up leading to these railway sidings contingent on other factors being favourable. Some of the other factors which need to be studied in detail and which would require support from CIL/Coal Ministry are

- Distance between the mine and the rail siding
- Current condition of road and road development plans
- Terrain and slope near the mine
- Future capacity of the mine

Company	Siding	Quantity of Coal Loading[8] (FY16-17)
MCL	South Balanda-Jagannath Colliery Sdg	18.5
	Belpahar Open Cast Mines No.6	10.4
	Lingaraj Mgr Of M/S MCL At Talcher	10.3
	Bharatpur Private Sdg Of MCL	9.5
	Belpahar Open Cast Mines I And Ii	8.4
	Anaanta Colliery Sdg	7.6

[8] FOIS movement of commodities

	Kanika Siding Of MCL	5.7
	M/S Lajkura Open Cast Mines I And II, Brajarajnagar	5.2
	Lajkura Open Cast Mines -Ii, Brajrajnagar	5.1
	Locm - Iii Sdg, Belpahar	4.3
MCL Total		85.1
SECL	Gevra Project (Junadih) Colliery I-Iv	18.7
	New Kusmunda Colliery Siding, Korba	11.0
	Dipika Siding Of SECL Srv Gad	6.3
	Old Kusmunda Colly Sdg	5.7
SECL Total		41.7
SCCL	Rudram Pur (No1. 5 Incline)Colliery Sdg. Bhadra Chellam Road	8.1
	Central Screening Plant, Manuguru	6.8
	Godavari Khani No 6 Colliery, Ramgundam	5.7
	Low Temp. Corbonisation Plant Colliery, Manchiryal	5.1
	Godavari Khani No 1 Colliery, Ramgundam	5.0
SCCL Total		30.6
CCL	Bachra Sdg At Ray	8.5
	Churi Sdg At Ray	7.3
	Khalari Sstt. Sdg. No, 1, Khalari	5.0
CCL Total		20.9
NCL	Dudhi Chua Siding Shakti Nagar	11.5
	Spur Siding	7.6
NCL Total		19.2
ECL	Pure Sitalpur Colly Siding	7.2
	Lalmatia Loading Complex(Rajmahal Area)	4.4
ECL Total		11.6
WCL	Ghugus	8.5

Total	**217**

Table 3 List of identified rail sidings for setting up conveyors

Areas other than those mentioned above which are suitable for setting up conveyors also need to be explored.

4.1.1 Action Agenda

Ministry of Coal, along with CIL and its subsidiaries, to explore and evaluate the potential of setting up conveyor for first mile movement of coal (from mine to siding) at existing mines. Explore the potential and draft a phased development plan covering all possible mines.

4.1.2 Cost Optimization Potential

Volume Potential (Subject to further study)	~200-220 MTPA
Savings per ton per km	Rs 3-4 per ton per km
Surface transport distance	5-30 km
Total potential savings	1200-1400 Cr per annum

4.2 Increase share of coastal transportation

India is richly endowed with natural maritime advantages, with a 7,500-km coastline covering 13 states and union territories, a strategic location on key international trade routes and 14,500 km of navigable and potentially navigable waterways. More than 1 bn tonnes of cargo was handled across over 200 ports in FY 2015. Coastal and inland waterway transportation is energy efficient, eco-friendly and reduces logistics costs for domestic freight. However, the Indian coastline and river network has historically remained under-leveraged.

Coastal shipping offers average savings of Rs 800/ton over rail transport. Despite the vast coastline, coastal shipping carries only about three per cent of the coal freight.

Industrial development has not fully utilised the structural advantages of efficient supply chains leveraging proximity to coast.

An inter-ministerial taskforce was setup under 'Urjamala' to evaluate coastal shipping potential of coal. 220 MTPA of coastal potential was identified under the initiative as shown in the figure below.

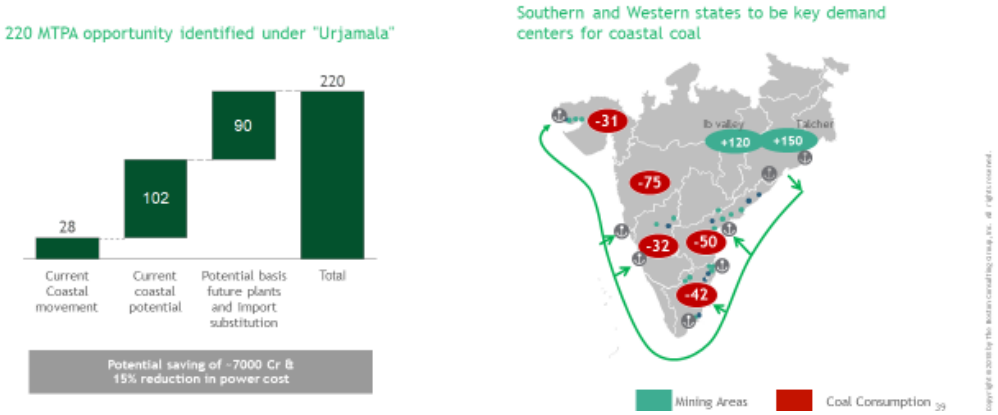


Figure 14: Coastal sipping potential identified under 'Urjamala'

4.2.1 Challenges

The coal movement from mine to destination plant can be split into seven step as shown in figure below.

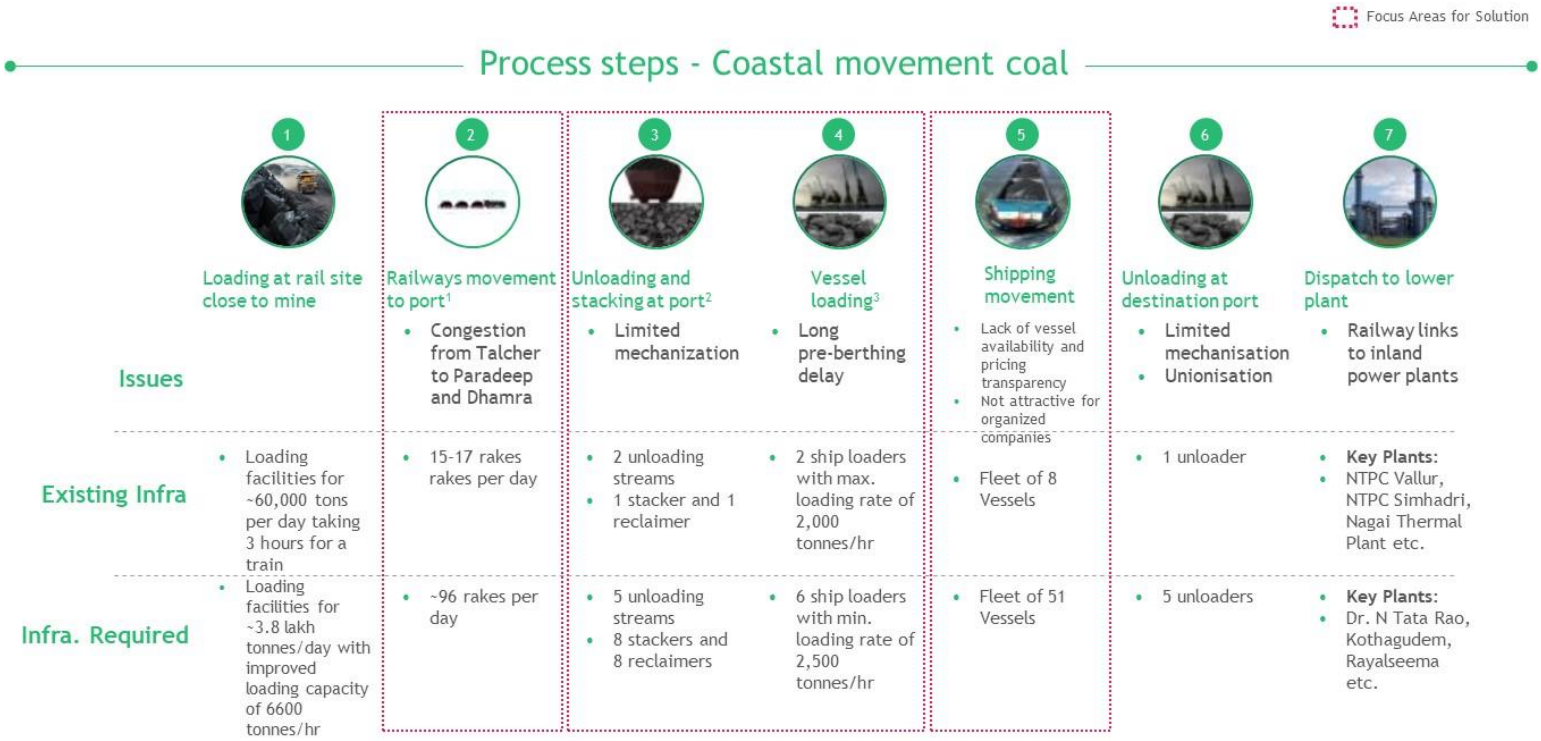


Figure 15: Coal coastal movement process steps and challenges

Four of these have been identified as areas of challenges for coastal movement of coal as shown in the figure above. These are -

1. Rail movement to port
2. Unloading and stacking at port
3. Vessel loading
4. Ship Movement

4.2.2 Action Agenda

Three key steps have been identified under the initiative to improve coastal shipping. These are–

- Ease railway congestion from Ib Valley and Talcher to Paradip and Dhamra by constructing new line
- Mechanisation for capacity improvement at Paradip
- Institutional framework for managing end to end logistics from mine to power plant by a third-party aggregator

Work on the above initiatives has already started with capacity projects underway at Paradip port and various projects initiated by Railways to reduce congestion on the Talcher Paradip line.

4.2.3 Cost Optimization potential

Coastal movement is particularly suited for move large quantities of bulk commodities and offer significant cost advantages for such movement. Potential savings basis potential movement identified under 'Urjamala' is as follows –

Area	Units	Value
Current share of coastal	MT	28
Proposed share of coastal	MT	220

Increase	MT	192
Average distance of coastal	Km	~1400
Average cost of coastal incl handling and cost to/from port	Rs/Ton	~2100
Average cost by rail	Rs/Ton	~2500
Savings per ton	Rs/Ton	~800
Total Savings	Rs. Cr	8000-8500 Cr

4.3 Increase share of inland waterways

Inland waterways in India are underdeveloped as a mode of transportation, despite their inherent advantages of fuel efficiency, environment friendliness, hinterland connectivity to less developed rural regions, and its capacity to shift large volumes of cargo from congested roads.

Similar to coastal transportation, inland waterways is a cost effective alternative over long distances. 111 waterways in India have been identified as 'National Waterways'. Despite this the share of inland waterway transportation of coal is less than ~1%. Globally, inland waterways have been utilized for congestion and cost reduction. Examples of global utilization of inland waterways has been given below.

Currently coal movement has started on National Waterway -1 (the Ganga-Bhagirathi-Hooghly River System) from Sandheads in Bay of Bengal to Farakka Thermal Power Plant of NTPC Ltd. in District Murshidabad, West Bengal.

4.3.1 Potential routes identified

India has 111 identified national waterways of which 5 are developed/under construction and the remaining 106 were notified in 2016 under various stages of DPR preparation/evaluation. Based on discussions with the Inland Water Authority of India (IWAI), it has shortlisted 36 national waterways, which exhibit technical feasibility of being

developed for vessels to move. This report lists down identified potential routes/ national waterways from these technically feasible waterways for coal movement. From the list of technically feasible NWs, the NWs which are feasible for coal movement were identified. From this, three NWs were shortlisted on which the cost of movement of coal from mine to plant is lesser than current mode of movement. These are

National Waterway	Number of power plants	Average of Distance from the NW	Capacity (MW)
NW-4 – Krishna Godavari river system	22	9.0	19377
NW-1 - Ganga-Bhagirathi-Hooghly river	10	3.4	9305
NW-100 – Tapi River	5	5.0	2520

Table 4 List of identified national waterways for coal movement

4.3.2 Challenges of Inland Waterway movement

Inland waterway shipment, though a potential alternative to road and rail transportation, also faces certain limitations. A detailed discussion with the industry stakeholders highlight the following main such challenges:

a) Low availability of high capacity, low draft barges: This challenge can be circumvented by incentivizing high capacity, low draft barges. Cost economics improve by ~40% with increase in capacity of vessel from 1000DWT to 3000DWT. Globally, low draft, high capacity push barges/ tugs have been launched in several countries such as Paraguay, Australia, US etc.
b) Poor connectivity infrastructure to terminals: Proximity and easy accessibility to waterways is essential to capture hinterland traffic. For example, construction of

quay walls as low-cost alternatives to building terminals can help improve accessibility to waterway.

c) Insufficient terminal infrastructure: Terminal Infrastructure development on identified waterways with storage facility at terminal, handling infrastructure and connectivity with rail/road will ensure capturing hinterland traffic.

4.3.3 Action agenda

To achieve the above objective, an inter-ministerial coordinated effort is required. The following action steps are required -

a) IWAI to get feedback from coal mining agencies for prioritizing terminal locations, extent of mechanization, and facilities required at IWAI terminals.
b) IWAI to develop policy to promote availability of barges and prepare an incentive structure to encourage use of high capacity, low draft barges

4.3.4 Cost Optimization potential

Potential savings if inland waterway movement identified above is achieved is as follows –

Area	Units	Value
Current share of waterway	MT	~.3
Proposed share of coastal	MT	~25
Increase	MT	~24-25
Savings per ton	Rs/Ton	~250-300
Total Savings	Rs. Cr	~550-700 Cr

4.4 Coal Beneficiation

Coal washing or beneficiation is a process (with or without use of water) of mechanical separation of impurities (ash) from coal, making it suitable for particular use. As a result of removal of ash content, the cost of logistics of coal transport decrease. Other benefits of coal washing are

Benefit	Effects
Reduction in transport costs	15% reduction in logistics for 1,000 km lead when reducing from 41 to 34%
Reduction in CO_2, emissions due to reduced fuel consumption in transport	1000 km distance and ash reduction from 41% to 34% results in 15'% reduction in CO_2, emissions
Improvement in thermal efficiency	3% improvement for every 5% reduction in feed coal ash
Reduced land requirement for ash land disposal	Using coal with 34% ash instead of coal with 41% ash reduces requirement by about 30%

Table 5 Benefits of using washed coal

Washing removes unwanted ash but at the same time also produces rejects which has coal content and hence results in loss of calorific value. Both the factors need to be looked at together when deciding if washing is economical. Thus a blanket decision whether washing is beneficial or not cannot be taken. The benefits depends on a number of factors which have been explored below.

As the percentage of ash content in raw coal increases, percentage of ash removal also increases thus decreasing the final weight of coal and increasing its gross calorific value per ton. Also as the percentage of ash content in the raw coal increases, the percentage loss of pure coal increases, thereby, increasing the cost of washing.
The effect of ash content in raw coal has been shown using graphs below.

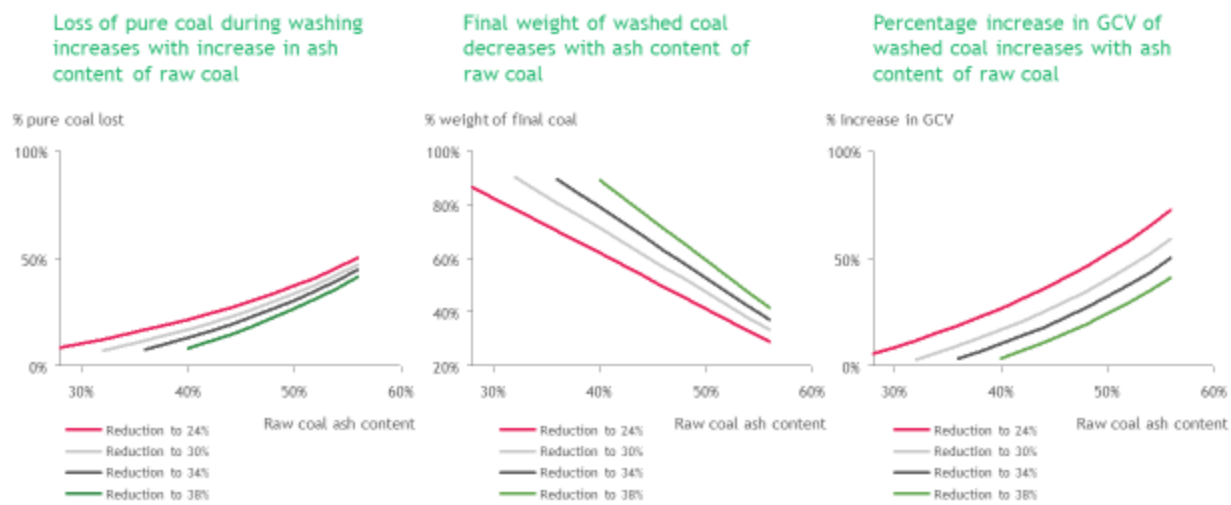


Figure 16: Effect of ash content in raw coal on washing output

Overall, the savings can be calculated using the formula below[9] –

Savings due to washing = Savings due to logistics cost reduction + Savings due to power plant efficiency increase - Cost in washing - Cost due to loss of coal in washing + Gain from sale of washery rejects

Each element of the formula further varies as follows

S. No	Element	Calculation methodology
1	Logistics Cost Saving	Savings in rail freight as per FOIS fares Savings in handling costs at loading and unloading stations
2	Savings due to power plant efficiency increase	Efficiency gain (3%)
3	Cost of washing	Washing cost per ton
4	Cost due to loss of coal in washing	Cost of raw coal lost in washing Excess cost of Sizing, Surface transport and handling incurred on lost coal

[9] Coal directory; Internal analysis

		Excess cost of GST, Cess, and Royalty paid on lost coal Excess cost of transport to washery incurred on lost coal
5	Gain from sale of washery rejects	Gain from direct sale of washery rejects

Table 6 Elements of cost for calculating the savings from coal washing

The savings obtained primarily vary based on three factors. These are raw coal ash content, final ash content (or percentage of ash reduction), and the distance between mine and power plant

The variation of savings with distance, raw coal ash content, and final coal ash content have been plotted below

Figure 17: Variation in cost of washed coal with varying raw coal ash content, final ash content, and distance

Based on above curves, it is economical to transport washed coal to power plants where the following conditions are met

1. Distance between power plant and mine > 500 km
2. Ash content between 40% and 55% (Grades between G10 and G13)
3. Power plant boiler gains efficiency by using lower ash coal

Using condition 1 & 2 above, 150-200 MTPA of opportunity for coal washing can be identified. The final potential depends further on condition 3. Ministry of power in

coordination with Ministry of coal needs to identify the exact potential basis power plant boiler design as specified in condition #3.

Currently washed coal production in India only at ~45 MTPA.

The following parameters among others need to be ensured for washery project to become viable

- Firm source of coal supply
- Commitment on supply of evenly spread and defined quantity of coal over a reasonably long period say 15 to 20 years
- Land for setting up of washery
- Sharing of infrastructural facilities such as power, water, siding etc with the mine

4.4.1 Action Agenda

- Ministry of Coal and Ministry of Power in discussion with the various power plants to explore potential for using washing coal for power plants which are >500 km away from pithead, use lower grade of coal, and where boiler is suitable to use beneficiated coal
- Based on potential identified, develop an action plan for setting up washing capacity. For setting up washery set up the following parameters need to be kept in mind
    - Firm source of coal supply
    - Commitment on supply of evenly spread and defined quantity of coal over a reasonably long period say 15 to 20 years
    - Land for setting up of washery
    - Sharing of infrastructural facilities such as power, water, siding etc with the mine
- Explore appropriate contracting and ownership transfer model for washed coal

4.4.2 Cost Optimization potential

Potential savings if coal beneficiation potential is achieved are as follows –

Area	Units	Value
Current Washing of Non-Coking coal	MT	~20
Proposed washing of non-coking coal	MT	~180-200
Increase	MT	~160-180
Average ash content for Indian coal	%	42%
Cost savings at 550 km and 42% to 34%	INR Cr	~5%
Reduction in costs	INR/Ton	170-190
Total Savings	Rs. Cr	3000-3200 Cr

5 Conclusion

The Integrated National Logistics Action Plan lays out a preliminary set of four key initiatives for coal basis discussions with ministries and key industry stakeholders. The coal industry was analysed by major traffic flow corridors, major demand and supply centers. The analysis included establishing the optimal modal mix, calculating the unit transportation costs across different modes, plotting the major origin-destination pairs for railways and for road etc. In summary, the initiatives have been converted into action agendas for consideration of different ministries and are listed as a part of the action agenda under various interventions.

Chapter 6: Commodity Corridor Analysis - Containers

Contents

1 Context

In line with the mandate given to the Logistics Wing to integrate and optimize the several elements of the logistics value chain, this chapter deals with initiatives identified to optimize the logistics cost of container movement in India.

In FY 17, the total throughput of Indian container terminals was estimated around 15.4 million TEUs with a five year CAGR at ~10%. This is driven mainly by increase in imports and exports by 16% and 7% respectively and due significantly higher than estimated global containerized demand growth of 3-4%[1]. The container movement accounts for ~4% of the total freight movement in the country and is an integral part of the import and export business.

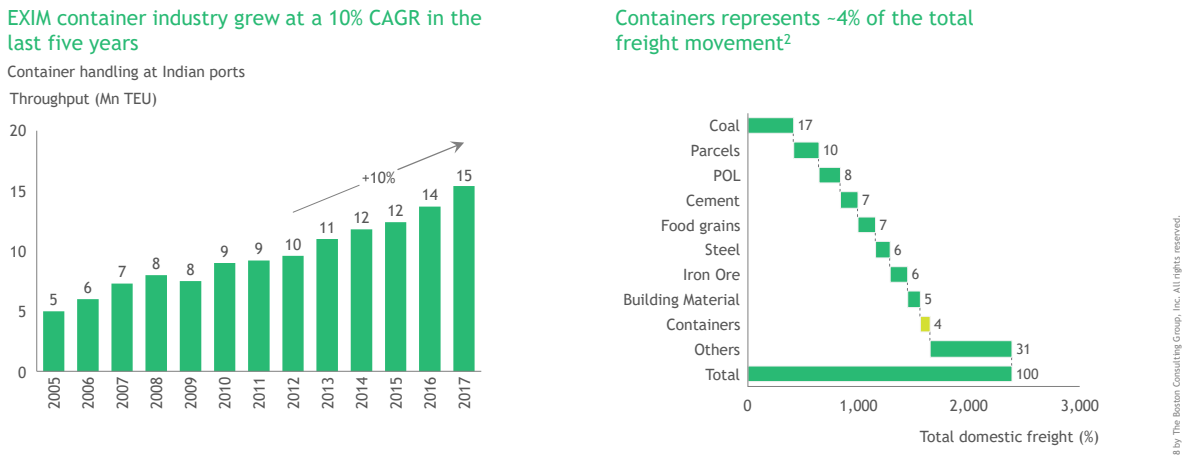


Figure 1: Indian container industry

1.1 Characteristics of container transportation in India

India's container transportation is characterized with 3 key inherent features resulting in the total cost of EXIM container movement in India to be significantly higher compared to other countries:

[1] Indian Container Market Report, 2018

a) High average lead distances: Many of the large manufacturing clusters in India are based in the hinterland of the country. Export or imports arising from these locations hence have to travel over the long hinterland distances to be connected to the port. On an average, the lead distances in India are around 600-700km as compared to China where distances are around 300-400km. Therefore, it is pertinent to reduce cost of hinterland transportation to overcome inherent disadvantage of long lead distances for export competitiveness.

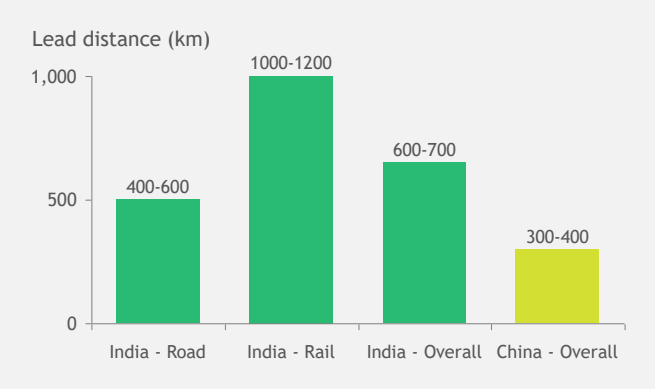


Figure 2: Lead distances in India and China

b) High rail and road freight cost: As seen from the figure below, unfavorable pricing of railway freight charges on account of subsidization of passenger fare make it more expensive to China and other global countries. Similarly, road freight charges are almost 20-25% higher than the charges in USA and Germany. Revision of pricing policy can improve rail viability for containerized cargo (especially for lighter loads), however, this is likely to take time to come into effect.

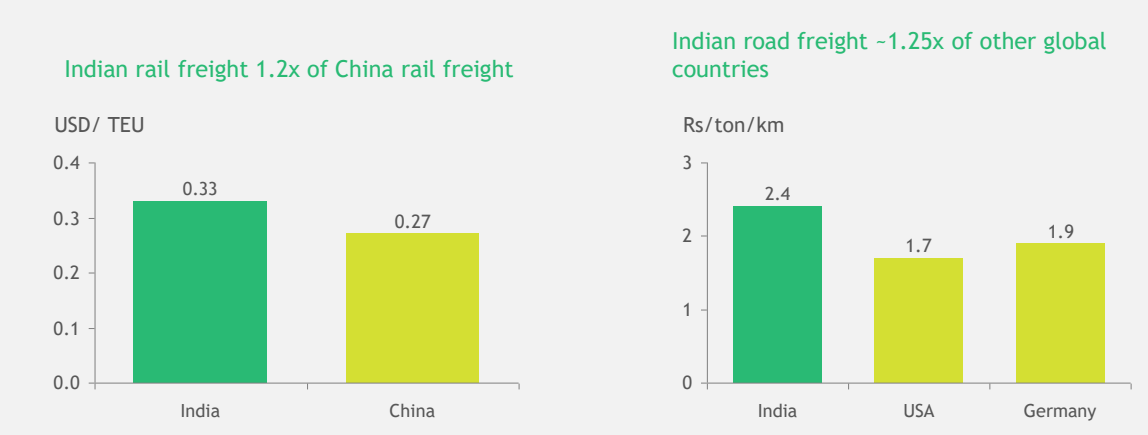


Figure 3: Rail and road freight comparison

c) Inherent imbalance between exports and imports: As seen from the figure below, type of goods being exported and imported into India lead to inherent imbalance in trade. Currently, imports constitute ~55-60% of the total container movement of which heavy cargo such as paper, metal products, machinery form a significant proportion. Exports on the other hand are largely lighter cargo such as food and agriculture products, textiles and garments, chemicals and other consumer goods. Light commodities are transported in 40ft containers and heavy commodities in 20ft containers. This different container type requirement and the trade imbalance results in significant container repositioning cost. Eg Ludhiana exports yarn, textiles in 40ft containers and imports waste paper and scrap in 20ft containers.

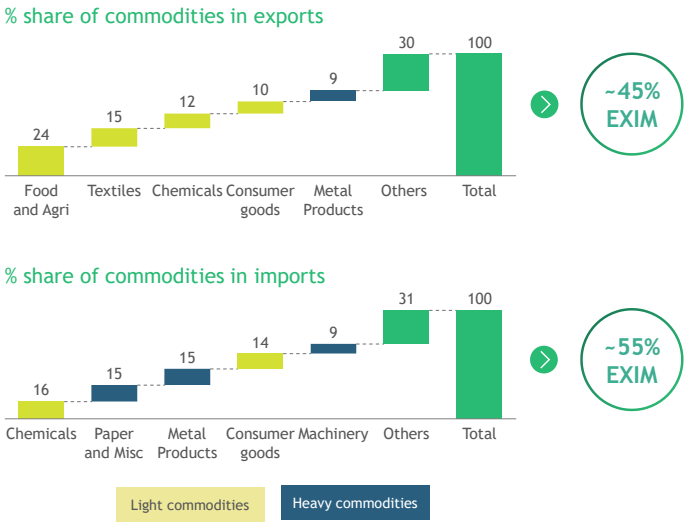


Figure 4: Type of goods exported and imported lead to inherent imbalance in trade

1.2 High lead times transportation

Apart from the longer lead distances, inefficiencies in the road and rail transportation also result in longer lead times for cargo movement. For example, Indian containers take 1.5x more time as compared to Chinese containers. The figure below illustrates, for the same distance, the lead time break up and comparison of the different segments of the transportation journey of a container in India and China. It is observed that high variability in transit time (8 to 17 days) make it difficult for exporters to plan container logistics and to commit to tight deadlines to their customers. The high transit time thus results in higher levels of inventory along the supply chain. Complicated and time consuming procedures for customs and interstate border formalities, main haul transportation time and congestion at ports are some of the key issues which result in this variability and longer lead times.

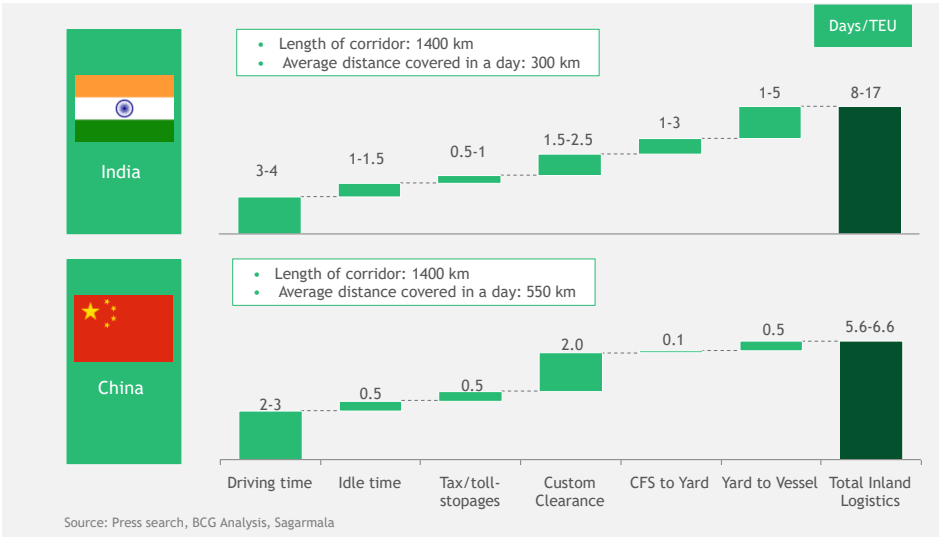


Figure 5: Lead time comparisons

Given that the container demand is estimated to grow in future, it is imperative to achieve higher cost efficiencies in logistic performance within the characteristics of the Indian container industry. This would make the Indian exports goods more competitive in the global scenario as well as lower the overall costs of imports. This report details out the initiatives identified to reduce the logistics cost of the container industry.

2 Approach methodology

The container industry constituting ~12% of the total freight in India was analysed by major traffic flow corridors. The analysis includes establishing the modal mix, calculating the unit transportation costs across different modes, plotting the major origin-destination pairs for road, rail and juxtaposing them with congestion and 4500+ traffic data points. This was supplemented by detailed discussions with relevant stakeholders (container train operators such as CONCOR, Shipping line companies such as Maersk, associations such as Association of Container Train Operators, ACTO, exporters, importers and Government departments such as Indian Port Association, Ministry of Shipping, Ministry of Railways etc) across the supply chain of the commodity to understand the issues and identify possible interventions. Previous Government reports such as Sagarmala, BRIEF reports by Federation of Indian Export Organisations, and other industry reports such as Indian Container Market Overview by Drewry and Gateway research etc were referred to while drafting the interventions. The initiatives focus on reducing freight cost, improving modal mix by facilitating inter modality, improving first-mile last mile connectivity and laying out a roadmap for future infrastructure creation across modes to minimize overall logistics cost of the country. Subsequently, initial discussions on the identified set of initiatives have been done with respective ministries such as Ministry of Railways, and association such as ACTO etc for alignment and implementation.

3 Landscape: Indian Container Transportation

3.1 EXIM vs domestic container movement

The Indian container movement is largely driven by the EXIM trade. Export and imports together account for ~80-85% of the total container movement. Major export commodities include food and agriculture products, ready-made garments and textiles, chemicals, steel products, reefer food products, yarn etc. Major import commodities include electronic and electrical goods, machinery, chemicals, machinery, paper and machinery, polymer products etc. Use of containers for domestic movement is still at its early stage

of adoption. Currently heavy commodities such as marbles, tiles etc are moved using containers on select routes.

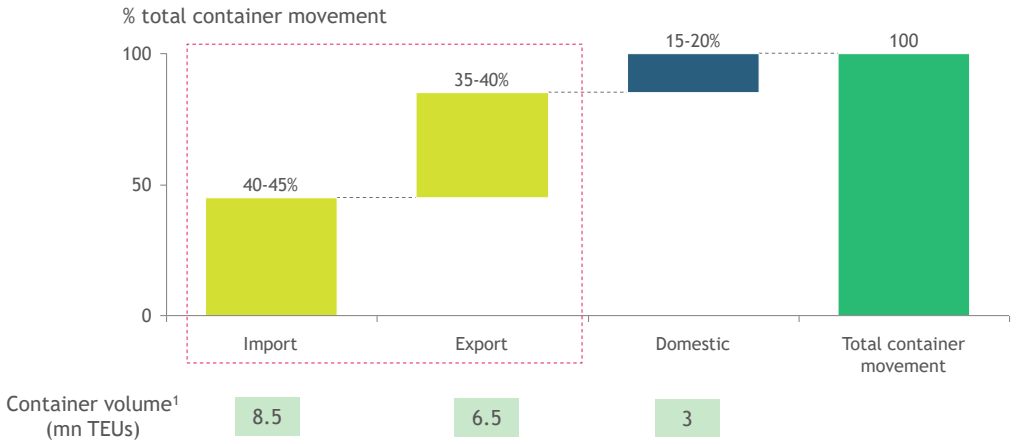


Figure 6: Export and import container trade

3.2 Key corridors

The container handling in India can be largely focused to 3 or 4 major industrial clusters which are – North West India (comprising of the National Capital Region, Punjab, Haryana and Rajasthan), Central and West India (Maharashtra, Gujarat, Madhya Pradesh), South India (Tamil Nadu, Andhra Pradesh and Telangana) and a small demand getting generated in East India. According to the Sagarmala report, the North-West Corridor accounts for ~65% of overall import traffic (15 of the top 20 import routes) and ~70% of export traffic (17 of the top 20 export routes).

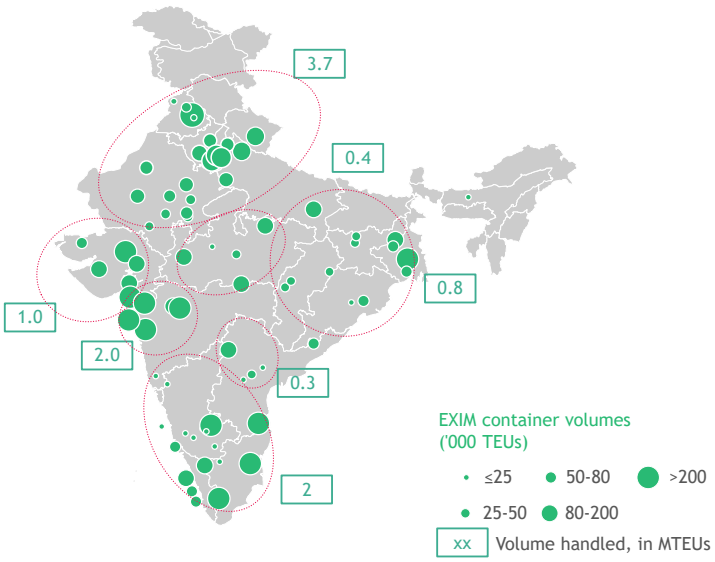


Figure 7: Container handling volumes across India

The EXIM container handling at ports is highly consolidated. Key ports such as JNPT, Mundra, Chennai, Pipavav, Kolkata, Vizag and Tuticorin account for ~80% of the EXIM container movement. Also, as observed from the figure below, ports on the west coast dominate the container infrastructure and throughput in India. More than 70% of the country's containers are handled at the west coast ports. It was also learnt during stakeholder conversations that there are instances of containers, meant naturally for the east coast, to go through west coast ports due to better ocean freight rates, inadequacy of container handling capacity at east coast ports and lack of strong inland connectivity to those ports. Though this dominance is said to continue, handling at east coast ports has accelerated in recent years due to the coming up of new private ports. This coincides with the rise in dependency on Eastern countries given India's increased sourcing of goods from China and other Asian countries. While India's dependency on the East as the export destination remains more or less constant, but as the import source, the importance of the East has increased drastically. 49% of India's import was from the east in 2017, which was just 30% in 2000[2].

[2] Indian Container Market Report, 2018

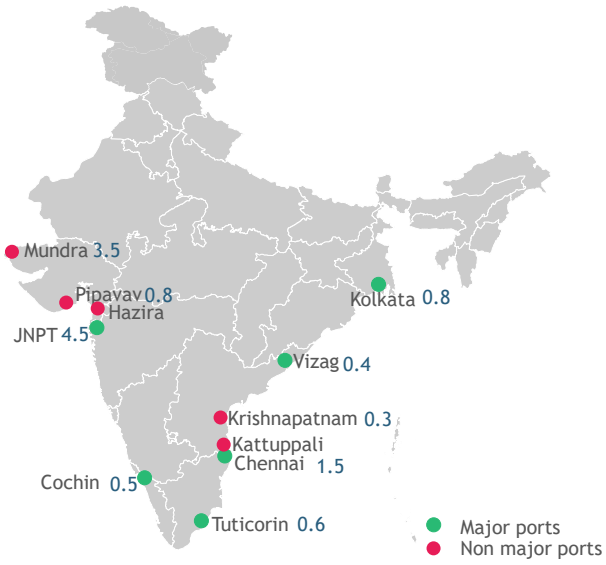


Figure 8: Key ports and volume of TEUs handled

3.3 Modal mix

The modal share of container transportation in India is highly skewed towards road with little contribution from railways and negligible contribution of coastal shipment or national waterways. In India, ~70-75% of containers is transported by road compared to ~30-50% globally. The share of coastal and inland waterway movement globally is much higher around ~10-30%. The average lead distances is ~400-600km for the road mode of transport and is ~1000-1200km for the railway mode. Rail transportation continues to contribute significantly lower than roads for hinterland evacuation for ports, with 6 out of 8 major container handling ports having rail coefficient <25%. The higher rail modal mix for Pipavav and Mundra are on account of double stack container trains which make rail transport much cheaper.

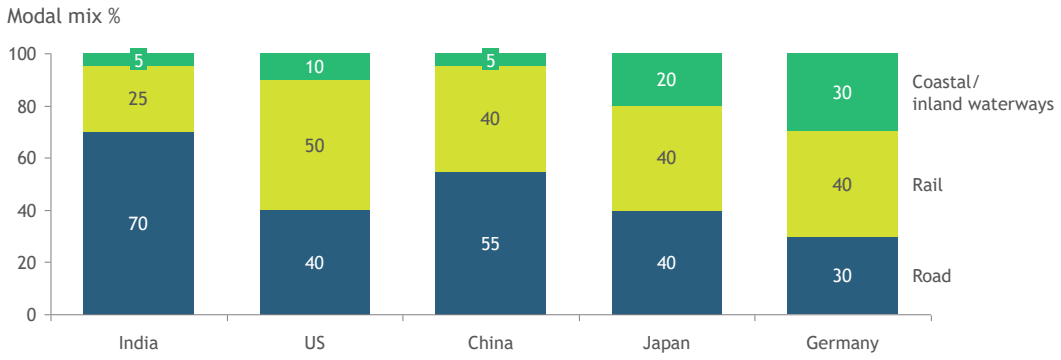


Figure 9: Modal mix for containers

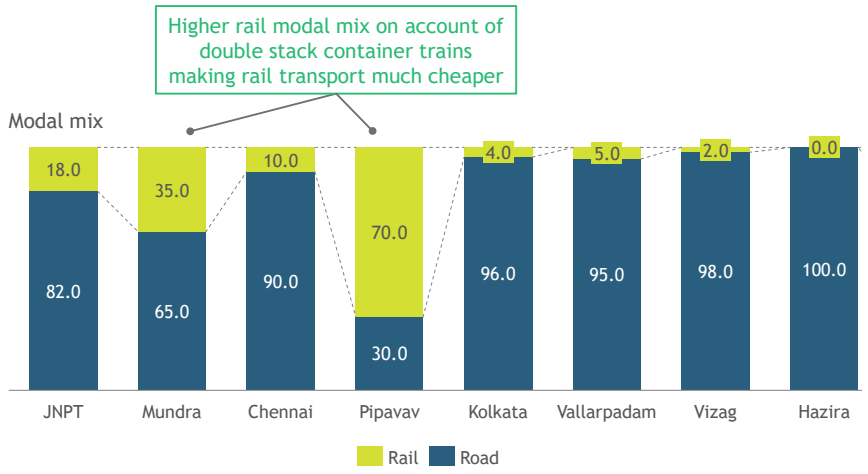


Figure 10: Modal mix for evacuation from ports

3.4 Modal economics

As seen from the figure below, the cost per ton per km varies significantly for rail and road modes of transportation as a function of the lead distances. Transportation of container by road is the cheapest mode upto ~900-1000km beyond which rail is cheaper. The same cross over is observed to be ~500-600km in USA. Coastal shipment becomes more economical than rail for lead distances greater than 1200-1300km.

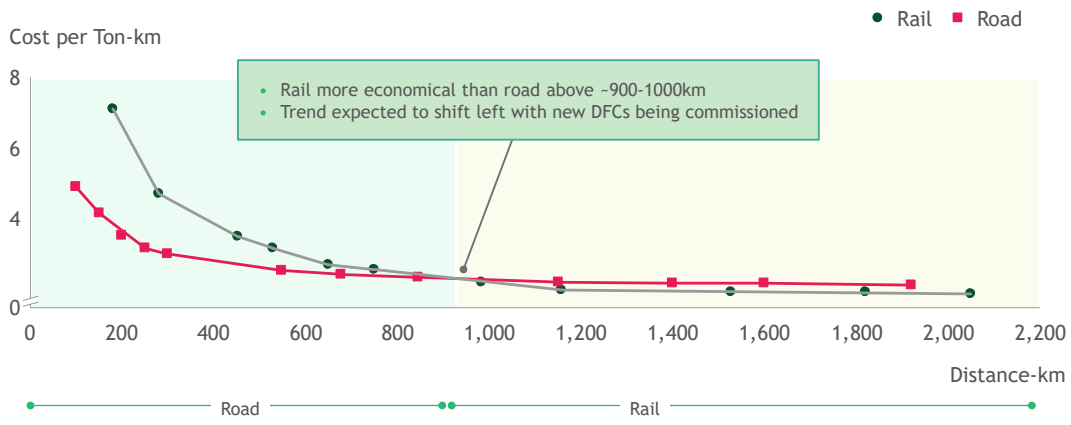


Figure 11: Logistics cost per ton per km for different transportation modes

It is observed that the value that can be unlocked by reducing rail cost cross over distance is substantial. Currently rail multi-modality option is feasible for only 5 of top 20 OD pairs in the country. The same can be improved to 12 if the cross-over distance is reduced to 500-600 kms. This can further result in an additional potential of 440mn tons of cargo that can move on rail and resulting in around 40% modal shift. This will help improve to a more cost efficient modal mix and closer to the global benchmarks.

Origin	Destination	Distance	Origin	Destination	Distance
Delhi	Mumbai	1423	Mumbai	Kolkata	2056
Delhi	Bangalore	2167	Delhi	Kolkata	1490
Jagatsinghpur	Sundargarh	385	Vishakhapatnam	Hyderabad	621
Krishna	Hyderabad	285	Pune	Mumbai	180
Pali	Delhi	575	Bellary	Mangalore	431
Angul	Jagatsinghpur	159	Rewa	Araria	791
Bangalore	Mumbai	980	Nagpur	Mumbai	811
Ahmedabad	Mumbai	523	Guntur	Hyderabad	285
Coimbatore	Ernakulam	180	Satna	Allahabad	204
Chennai	Bangalore	347	Bangalore	Hyderabad	568

Figure 12: Key OD Pairs in India and applicability of modal shift

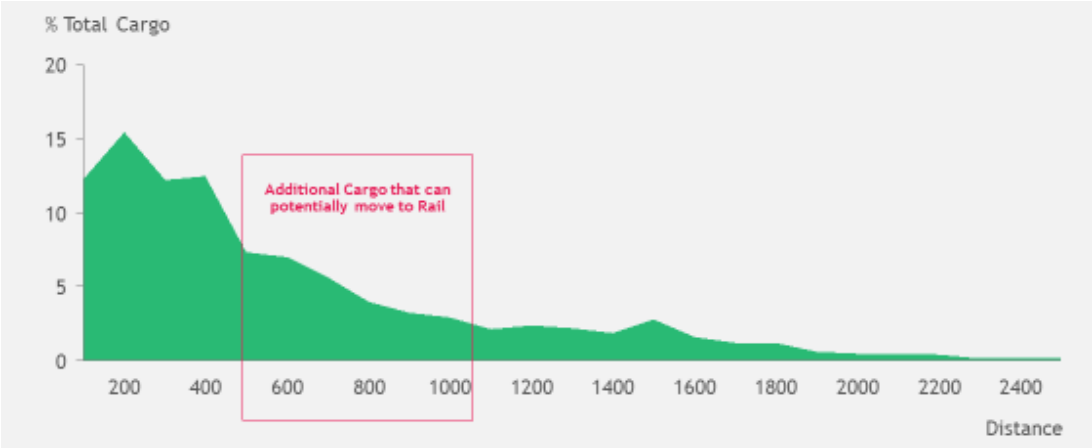


Figure 13: Potential cargo that can move to Rail if cross-over happens at 500-600km

The above transportation costs include first mile, handling, main haul freight, and inventory costs. An illustration of the cost breakup is provided in the figures below. For the railway mode it is observed that, other than the main haul freight, first mile and inventory costs significantly contribute to the overall logistics costs.

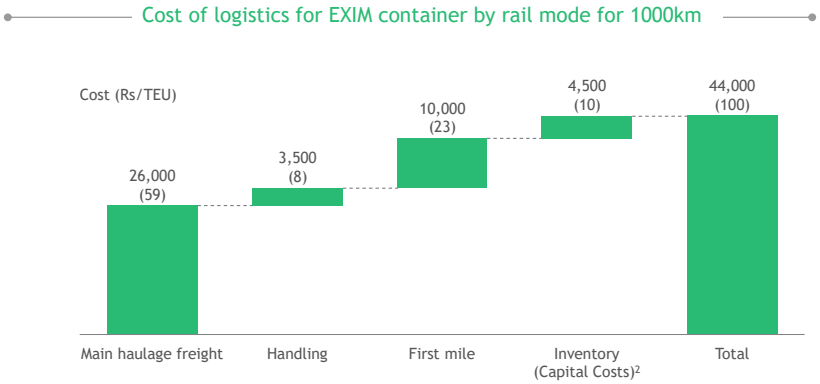


Figure 14: Logistic cost breakup for rail transportation

Assumptions: Train distance/ day – 500km; cargo value – Rs 20L; WACC – 17.5%; lead time – 2 days at port; 1 day at ICD; 3 days of travel; empty container handling charges ~1000-1500 Rs/TEU, mechanized direct destuffing at ICD ~1000 Rs/TEU

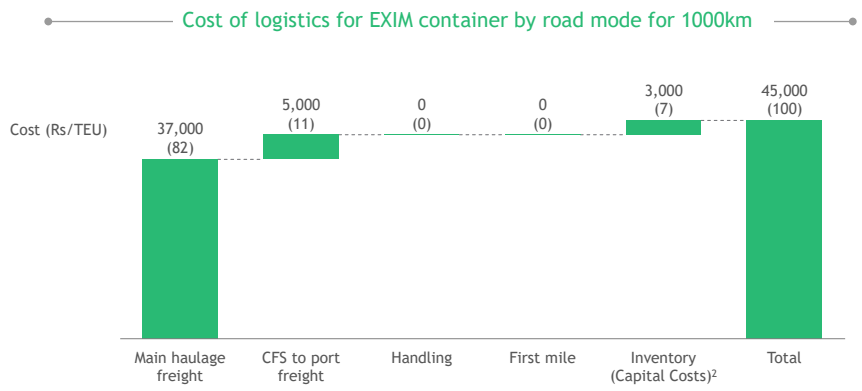


Figure 15: Logistic cost breakup for road transportation

Assumptions: Truck distance/ day – 300km; cargo value – Rs 20L; WACC – 17.5%; lead time – 1.5 days at port gate; travel time – 3.5 days

Apart from freight, there are other factors which are taken into consideration by the importer/exporter for deciding between rail and road mode. A brief of the same is given below.

Factor	Remarks	Impact
Freight rate	• Comparison done against on-going road prices (driven mainly by diesel prices) • Prefer road for longer distances (>1000km) if rate quoted by road transporter is lower due to confirmed return load (route specific)	●
Time sensitive cargo	• Preferred to be sent by road due to lower time variability • Frequency of service of trains at ICD significant factor	●
Type of commodity	• Heavy commodities like scrap, waste paper by train; light commodities like textile, yarn by road • Traded import goods such as pulses, soya bean etc by road as large consignment is destuffed at CFS near port and sent to various destinations	◐
Choice of customs office	• Choice of CFS/ICD depending on least risk/hassle/familiarity of customs clearance	◐
Amount of cargo	• Large consignments (>1 rake load) preferred by rail generally	○
First mile/last mile distances	• Large first mile distances to ICD may deter rail transportation	○

● High impact factor ○ Low impact factor

Figure 16: Factors for deciding between rail and road mode of transportation

4 Key challenges for container transportation

This section of the report details out the issues faced by importers, exporters, container train operators, and other stakeholders across the various modes of transportation leading to sub-optimal logistics cost. The challenges have been categorized into 'to and

from the port' and 'at the port' for better clarity. The following figure gives a snapshot on the same.

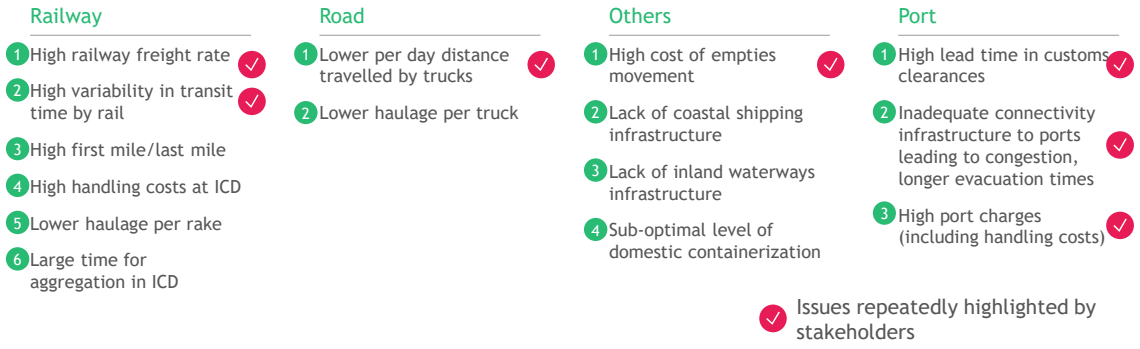


Figure 17: Key issues prioritized through industry stakeholder discussions to reduce overall logistics cost

4.1 Key challenges: To and from the port

a) **High rail freight costs for containers:** As aforementioned, there exists unfavorable pricing of railway freight charges on account of subsidization of passenger fare which make it more expensive to China and other global countries. Since 2006, there have been 10 upward revisions in the rail haulage charges with one of the highest ever increase between December 2014 and March 2015 of around 27-41% (for different categories). These high rail freight charges make it even more detrimental for transporting light weight commodities (<10T) through rail. It is therefore required to rationalize rates for containers especially for larger distances to reflect actual cost. Also, exploring removal of minimum distance freight charge (currently at 50km) to cost per actual distance travelled will facilitate higher containerization volumes moving through rail and thus also ease congestion at ports (eg JNPT to rail linked CFS).

b) **High variability in transit time by rail:** Delivery time by railways cannot be predicted due to high congestion on major corridors and lower preference given to freight trains than passenger trains. This issue would get resolved to a great extent by the commissioning of Western and Eastern DFCs and the proposed Delhi-Mumbai Industrial Corridor (DMIC). However, it is pertinent that the DMIC also include the development of requisite feeder rail/road connectivity to

hinterland/markets/ICDs and select ports along the west coast to ensure effective use of the DFCs.

c) **Large time for aggregation in ICDs:** is another constraint for lower modal mix of railways. Given that significant number of importers/exporters have less than rake cargo volume, it results in different demand levels for rakes at various ICDs. For example, high traffic ICDs have demand of around 14 rakes/day in comparison to ICDs in Agra, Bhopal etc which have less than 1 rake/day demand. Therefore, large aggregation times deter importers/ exporters to use railway mode of transportation. Beginning time-table based schedule running of rakes would greatly impart clarity and help in aggromeration of cargo.

d) **Lower per day distance travelled by trucks:** Indian trucks travel a distance of ~300km per day as compared to global benchmarks of ~500km. Frequent stoppages at state checkpoints and tolls increases the lead time and cost of delivery. On an average, ~1hr of driving time is lost at tolls.

e) **High cost of empties movement:** arise because of the imbalance of trade and different types of commodities transported in different corridors. Empties cost account for approximately 10% of the operating cost for shipping lines. Also, ~25% of containers handled at ICDs and CFS in India are empties. Some interventions to reduce the cost of empties are allowing co-travel of domestic and EXIM containers in the same rake, developing an all port-ICD integrated empties exchange and exploring the use of collapsible containers.

f) **Inadequate connectivity infrastructure to ports:** Inadequate road/rail infrastructure to ports leads to longer lead times. Most of the ports on the east coast have limited railway connectivity. The large container ports also have high congestion on the entry roads. For example, high congestion due to city traffic in Chennai and Kolkata has diverted container traffic to Ennore and Dhamra respectively resulting longer lead distances. There also exists high congestion from near by CFSs to port in JNPT, Chennai, Kolkata etc. Specific projects for increasing rail and road connectivity, covered under the Bharatmala program, would help improve connectivity.

g) **Lack of national waterways infrastructure:** Of the 111 national waterways declared, only around 35 waterways are identified as technically feasible. Presently, NW-1, NW-3 are commercially functional waterways, the remaining technical feasible waterways are at different stages of development. Insufficient number of terminal locations/jetties along the waterway lead to higher first mile costs

4.2 Key challenges: At the port

a) **High lead time in customs clearance:** are a result of complex, manual and paper driven custom processes at the port. As per Ease of Doing Business report, dwell time for exports in India is 40% higher than that of Port of Singapore. According to the BRIEF reports, import dwell time at JNPT, Chennai and Mundra range between 40-70hrs and the export dwell time ranges between 60-100hrs. The customs clearance time for imports itself is around 35-50hrs. The Risk Management system is used for only around 40-50% of the consignments with a target given to release 80% of the containers at JNPT and ICD / TKD under RMS facilitation without any physical inspection. The Government has already begun initiatives to reduce lead times at ports with the institutionalization of the DPD/DPE systems, implementing PCS 1x at ports etc. It is further required that RFID systems, use of RMS, improving efficiency and effectiveness of ICEGATE system etc are improved to ensure lower lead times and ease of doing business.

b) **High port charges (including handling costs):** Presently, it is observed that the Indian port charges are almost 1.5-1.8 times higher than near by ports such as the Colombo port. This also results in ports such as Vallarpadam etc to become less competitive to Colombo as transshipment hub ports. High port charges also result deter shipping lines from berthing at the Indian ports and hence reducing business volume throughput. The importers and exporters thus cannot leverage on the volume discounts which economies of scale bring in. Currently the rate structure is set by the Tariff Authority for Major Ports (TAMP). Many of the major container ports have sub-optimal container handling throughput. For example, quay cranes

in JNPT do ~20 moves/hr which is significantly lower than that of Mundra which do ~35 moves/hr.

5 Recommendations and action agenda

With the increase in containerization demand, the requirement of adequate infrastructure, an optimum mix of rail, road, coastal and national waterways, efficient and seamless inter-state movement become more pertinent. There is a need to overcome the aforementioned challenges in a structural manner to ensure sufficient infrastructure capacity and its efficient use. Discussions with several stakeholders across the supply chain identified a list of possible initiatives to improve logistics efficiency for container movement in India. The interventions are listed out below.

a) Increase penetration of dwarf containers for domestic shipment
b) Improving custom processes at ports
c) Increase share of coastal transportation
d) Increase share of inland waterways
e) Modification of ICD/CFS guidelines
f) Rationalization of the rail freight charges
g) Explore use of collapsible containers
h) Explore feasibility for domestic containers to enter custom bonded area and leverage technological solutions (such as RFID) for segregation between EXIM and domestic goods
i) In coordination with Department of Customs, explore possibility of allowing small value additions (eg packaging, labelling, marking, branding, quality testing etc) to be undertaken in ICDs
j) Explore feasibility of developing a web based platform to facilitate interchange of containers and vessel slots
k) Explore feasibility of allowing domestic container movement of commodities such as iron ore pellets, soap stone, gypsum, limestone, dolomite, quartzite, manganese ore, beryl, quick lime (burnt lime)

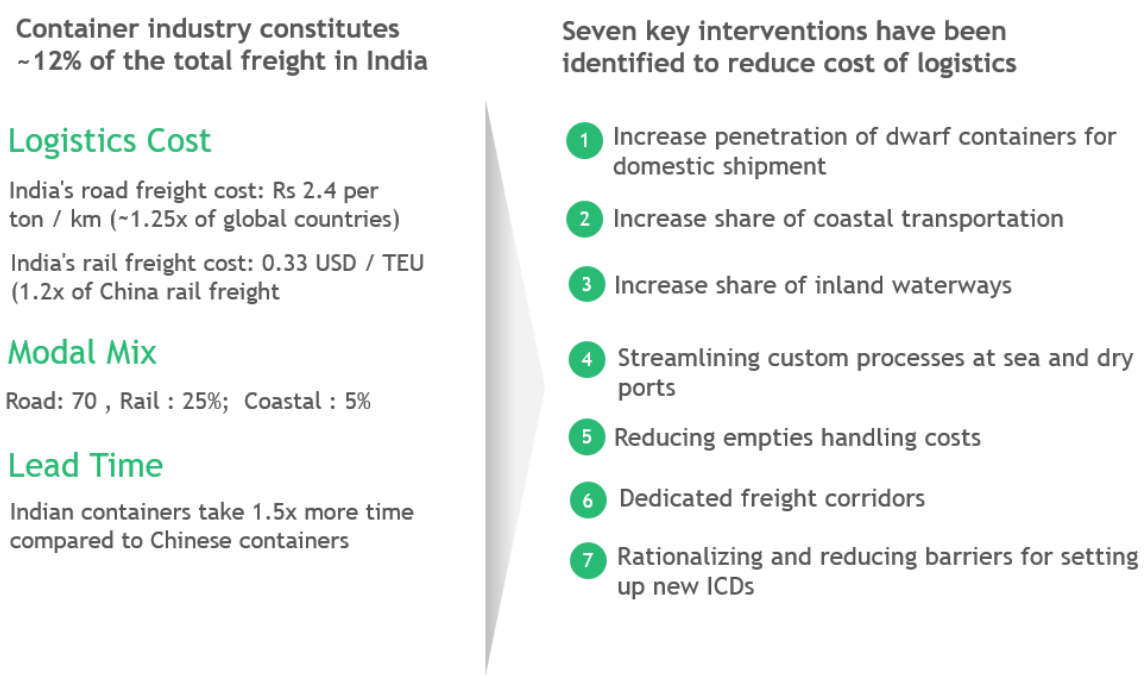


Figure 18: Summary interventions for Containers

5.1 Increase penetration of dwarf containers for domestic shipment

5.1.1 Need and benefits

As aforementioned, there exists unfavorable pricing of railway freight charges on account of subsidization of passenger fare which make it more expensive to China and other global countries. These high rail freight charges make it even more detrimental for transporting light weight commodities (<15T) through rail. Presently, cargo loads <15T/TEU such as parcels, agri products, FMCG, consumer durables, wood etc predominantly move by road. To overcome this challenge, new type of ISO certified containers - dwarf containers - have been designed and developed. These dwarf containers are lower in height by 662-mm (26 inches) and wider by 162-mm (6.3 inches) than standard ISO containers. The volume has been maximised by adopting FRP (fibreglass reinforced plastic) flooring—only 9-mm thick, as against ISO's 28-mm thick hardboard flooring. These containers provide 67% increase in volume when double-stacked and can carry a weight of 71 tonnes, against 40 tonnes by an ISO container. Such a configuration utilizes the 4-feet additional height available up to the 25kV OHE

catenary wires which the normal ISO containers are unable to utilize, enabling almost 30% savings in freight charges. The cross-over distance from road transportation to rail transportation for dwarf container scenario lowers by around 200-300km for light weight cargo as compared to the current crossover at 1000km. Given the benefits of dwarf containers, commercial trial runs have already begun with dwarf containers. The first consignment of polypropylene granules in 82 double-stacked containers was moved from Reliance Industries' own siding in Kanalus near Rajkot in Gujarat to Rewari in Haryana. A list of potential routes for dwarf containers identified through independent analysis has been provided in the Appendix

5.1.2 Action agenda

To achieve the above objective, two identified steps are required to be undertaken:

a) Approval of railway routes for running dwarf containers by Ministry of Railways: Currently, only 2 routes have been approved – Jamnagar to Gurgaon and Jamnagar to Ludhiana (apart from the pilot route aforementioned). Ministry of Railways approves the route on a case on case basis given a CTO's application. However, the approvals tend to have a long lead time. It is required to look at possible alternatives for pre-approving routes in bulk to ensure less business time is lost in beginning dwarf container operations. A coordinated effort between Ministry of Railways, ACTO and CONCOR will facilitate this action point.
b) Availability of dwarf container rolling stock: Currently, only 2 sets of around 180 dwarf containers (manufactured in China) exist in the country. Going forward, as the demand for running dwarf containers increase, it is required that the lead time for obtaining rolling stock is reduced. An alternative for the same needs to be explored.

5.2 Increase share of coastal transportation

5.2.1 Need

Presently, the main mode of transportation of containers is road which accounts for ~70% of the movement. The proposed projected growth of the container industry would impart pressure on railways and road with respect to inward and outward traffic, loading and evacuation of containers. With companies targeting lower logistics cost, coastal shipment is a cost effective alternative over long distances.

5.2.2 Benefits and global benchmarking

Globally, countries such as US, China and Japan have heavily relied on coastal and river waterways for container transportation. For example in European Union and US, almost 30% and ~10-15% of the transportation is catered to by the coastal shipment mode. As per an industry report, developing coastal transportation potential in India could save on an average INR 600-700 per tonne on logistics cost. An illustration of the favourable cost economics of coastal shipment from Delhi to Chennai is given below.

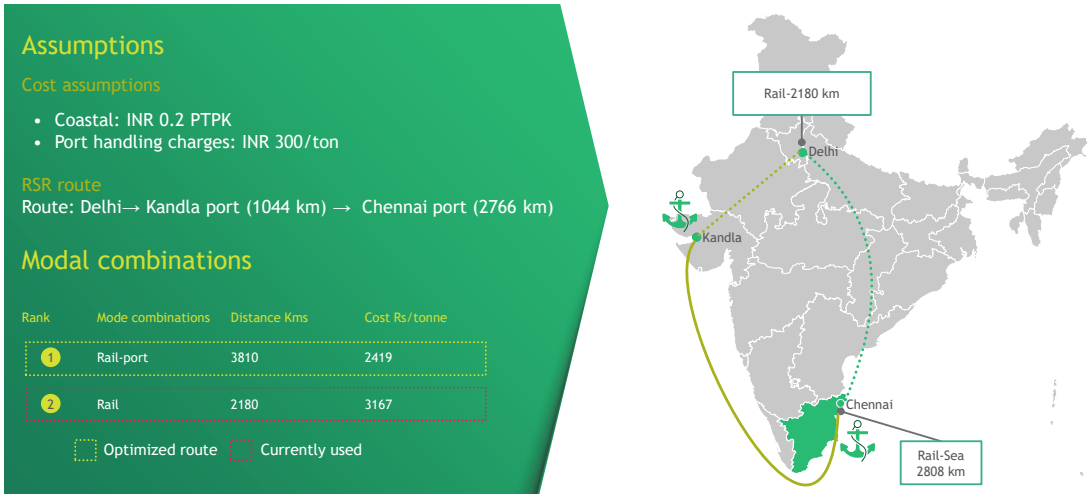


Figure 19: Coastal shipping cheaper than railways for longer lead distances

The total coastal shipment cost from Delhi to Chennai is around INR 2400/ton against railway shipment cost of INR 3100/ton resulting in ~INR 600/ton of savings. Additionally, the transportation costs reduce by almost 20% for using larger vessel sizes such as

7000DWT as compared to 2000-3000DWT vessel sizes owing largely to more economical ocean freight charges.

5.2.3 Potential routes identified

At present, coastal shipping of containerised cargo is restricted to the transportation of marbles, tiles, machinery/transport equipment, textiles (cotton, silk, etc.), metal and products, marine products, iron and steel, plastic and products from a few states such as Rajasthan, Punjab, NCR and Gujarat. Ports like Chennai, Kolkata, New Mangalore, JNPT and Visakhapatnam have commenced dedicated coastal container feeder service to connect some of the major ports and terminals. These routes have the potential to increase the share of coastal container shipping in total domestic cargo movement. In this report, potential routes for coastal shipment for the domestic container industry have been identified through an analysis of the key origin destination inter-state rail and road movements across the country. The figure below provides a summary of the potential routes for coastal movement of ~0.2 mn TEUs of containers.

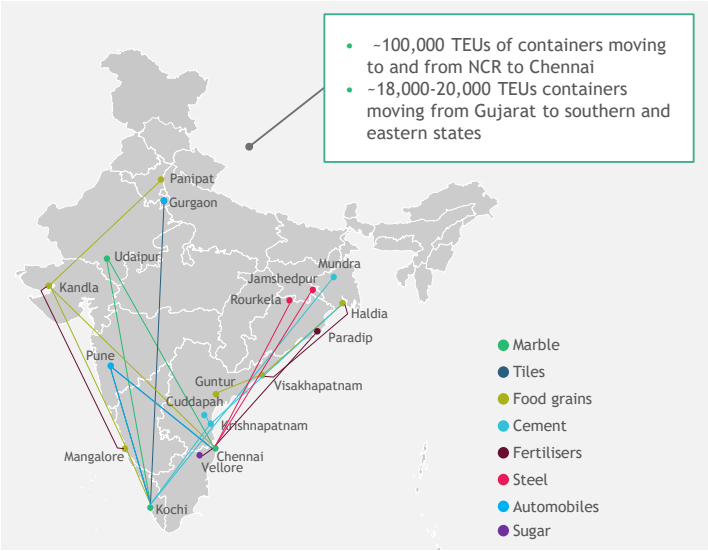


Figure 20: ~0.2 mn TEUs coastal shipping opportunity

5.2.4 Limitations

Coastal shipment, though a potential alternative to road and rail transportation, also faces certain limitations. A detailed discussion with the industry stakeholders highlight six main such challenges:

a) Insufficient port connectivity: Currently, most of the ports are constrained with insufficient rake availability and road evacuation problems. Many ports such as Chennai port face huge traffic jams at the port gates resulting in longer lead times. Expediting the completion of select projects under Sagarmala and Port connectivity projects under Bharatmala would encourage higher container coastal traffic.
b) First and last mile costs: which account for almost 30% of the total freight act as a hindrance to shift to coastal shipment. A possible solution is to develop a policy to promote creation of smaller jetties with captive cargo supported through VGF and accelerated approval process.
c) Multiple stakeholder interaction: Several transport segments such as first mile, main haul by sea and last mile lead to dealing with multiple stakeholders for shipment and handling. A key step here would be to encourage end-to-end coastal shipment solutions provided by third part players. For example, CONCOR itself is exploring the possibility of providing a complete package for coastal plus rail transportation.
d) Unavailability of return load: on coastal routes lead to higher costs for deploying dedicated vessels. One-way traffic and empty load returns are major concern areas for shipping operators. According to industry estimates, even if return cargo is available, it does match the parcel size.

5.2.5 Action agenda

Many initiatives have already been undertaken by the Government to boost coastal shipment.

a) Under the Sagarmala programme, 16 projects for dedicated coastal berth development have been sanctioned as part of the coastal berth scheme. Besides, plans have been revealed to develop 14 coastal economic zones.
b) Cabotage relaxation for containers in India to ensure sufficient feeder availability and lower cost of empty movement
c) Major ports have been directed to provide priority berthing to coastal ships to reduce the waiting time of ships

d) Under the Bharatmala programme, Government has proposed the development of 2,000 km of coastal roads to improve the connectivity between ports and hinterland

e) Institutionalizing a scheme for providing financial assistance of up to 75% of the cost, subject to a maximum of Rs 300 million, for construction of exclusive berths at ports is in operation.

f) Opening of a coastal route by signing of the SOP between India and Bangladesh signed the standard operating procedure (SOP)- movement of cargo through river sea vessels (RSVs) or equivalent class vessels to reduce cost

Also, currently, there are 6 major Indian shipping carriers plying the Indian coastal lines.

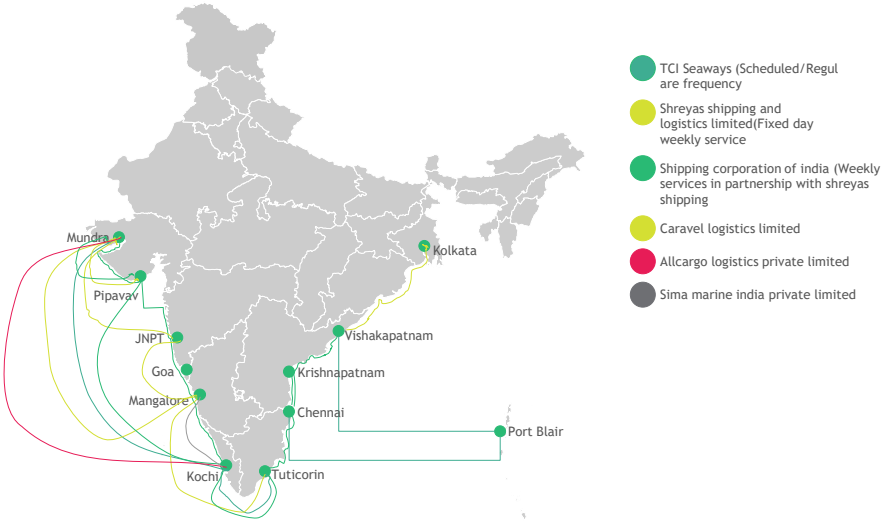


Figure 21: Currently, six major Indian shipping carriers plying the Indian coastal lines

Given that the average savings per ton of iron ore transported using coastal shipment on specific routes is around INR 600-700, a coordinated effort between the ministries and industry stakeholders is required. Following action steps would require consideration:

a) Ministry of Shipping (MoS) to coordinate with Logistics Wing, DoC, and ACTO to validate and prioritize coastal shipment routes for domestic container movement

b) MoS to explore feasibility of running scheduled vessels for movement of containers on identified shipping circuits by enabling aggregation. MoS may conduct

meetings with Logistics Wing, DoC, Ministry of Shipping, shipping lines, and manufacturers for the same

c) MoS may develop a policy to promote creation of smaller jetties with captive cargo supported an accelerated approval process and VGF if required
d) Expedite execution of projects under Bharatmala and Sagarmala programme

5.3 Increase share of inland waterways

5.3.1 Need

With companies driving for lower logistics cost, national waterways shipment is a cost effective alternative over long distances. In some regions of India, it can also be an alternative mode for the first mile movement owing to issues in rake and truck availability.

5.3.2 Potential routes identified

India has 111 identified national waterways of which 5 are developed/under construction and the remaining 106 were notified in 2016 under various stages of DPR preparation/evaluation. Based on discussions with the Inland Water Authority of India (IWAI), it has shortlisted around 36 national waterways, which exhibit technical feasibility of being developed for vessels to move. The identified potential routes/ national waterways from these technically feasible waterways for container movement given that the first and last mile is not greater than 50km on an average is given below:

a) National waterway 1: As per the study conducted by the Hamburg Port Consulting (HPC), the development of NW-1, under the Jal Marg Vikas Project, has huge potential for transportation of containerised cargo (table given below)[3]. NW-1 potentially serves the major cities of Haldia, Howrah, Kolkata, Bhagalpur, Patna, Ghazipur, Varanasi and Allahabad, their industrial hinterlands and several

[3] Medium augmentation case (Jal Marg Vikas project with 3m draft up to Farakka, 2.5m until Patna and 2m up to Varanasi)
Source: Environmental and Social Impact Assessment Report May 2016, Jal Marg Vikas Project, Inland Waterways Authority of India

industries located along the Ganga Basin. Given that the rail and road corridors in this region are already saturated, hence NW-1 presents as an environment friendly, fuel efficient and cost-effective alternative mode of transportation. Further, the planned terminal at Kalughat will facilitate container transportation and handling Nepal and North India bound containers. Additionally, the possibility of moving containers from inland container depots directly through waterways up to Kolkata/Haldia and thereafter to Singapore would arise. This would reduce the distance by approximately 1,500 km than compared to movement through the Jawaharlal Nehru Port Trust.

Stretch of NW-1	**Type of cargo**	**Forecast 2020**	**Forecast 2025**
Stretch-1 (Haldia-Varanasi)	General cargo	18,72,123	27,83,131
Stretch-2 (Patna-Varanasi)	General cargo	17,43,011	25,91,191
Stretch-3 (Haldia-Patna)	General cargo	2,17,457	2,95,933
Total		**3,832,591**	**5,670,255**

b) National waterway 3: NW-3 is strategically located to serve Vallarpadam container terminal. NW-3 comprises of the West Coast between Kottapuram and Kollam (168 km), Udyogmandal Canal between Cochin port and Eloor (23 km) and Champakkara Canal between Cochin Port and Ambalamugal (14 km). An MoU has been signed between IWAI and Cochin Port Trust for development of roll-on/roll-off (ro-ro) /lift-on/lift-off (Lo-Lo) IWT terminals at Bolghatty and Willingdon Islands on NW-3 for providing connectivity to Vallarpadam port. Containers from landlocked sources and transiting through NH-49 (Madurai-Kochi) and NH-47 (South Kerala) move to Willingdon Island and transit across to the Vallarpadam ro-

ro barges. This avoids a road transit of 35 km through the congested Kochi city roads. Since the commencement of operations of these terminals, around 250 containers are being transported daily between them. The figure below gives the potential routes and commodities for container movement on NW-3.

Thrikunapuzha, Kayamkulam and Kollam terminals

- Areas served: Southern Kerala
- Industries in the area: Coir, cashew, clay, wood, handloom, seafood, etc.
- Potential: Currently, seafood is being moved in reefer trucks from Kollam to Kochi Port; fertilisers are being transported to Kochi and Udyogmandal; coconut and palm oil are currently being imported from Tamil Nadu and Mangalore (palm oil).
  - These commodities can be transported through waterways

Vaikkom terminal

- Areas served: The terminal serves the eastern part of the Vembanad lake
- Industries in the area: Coir, rubber-based products
- Potential: Rubber-based products are exported from the Kottayam ICD. At present, containers are sealed and transported to ICTT, Vallarpadam by trucks
  - This can be transported through feeder canals connecting NWs

Aluva terminal

- Industries in the area: FACT, chemicals, foodgrains, etc
- Road connectivity: NH-212, NH-17, NH-47, NH-47A, NH-220
- Potential: It is located on the Udyogamandal Canal, where regular movement of cargo such as zinc, rock sulphur, and minerals takes place

Maradu terminal

- Industries in the area: Fertilisers and chemicals, electrical, and allied engineering products, bamboo, coir, fishing, refineries, etc.
- Road connectivity: Closest to NH-47. It also has access to NH-220, NH-17, NH-212, etc.
- Rail connectivity: Close to Ernakulam railway station
- Potential for RO-RO ferry: RO-RO facilities can be developed between Maradu and Kottapuram for movement of POL trucks

Thanneermukkom and Alappuzha terminals

- Industries in the area: Coir products, drugs and pharmaceuticals, grey iron and SG iron castings, fisheries, coconut oil, marine food, etc.
- Potential: Large volumes of export cargo such as coir and marine products are transported in containers from Alappuzha.
  - At present, majority of the container cargo is transported by road involving huge expenditure

Kottapuram terminal

- Areas served: Thrissur, Calicut, Malappuram and Palakkad
- Industries in the area: Cement, steel, spinning mills, metal forging, ceramic products, coir industries, tiles, wheat flour, etc.
- Road connectivity: NH-212, NH-17, NH-47, NH-47A, NH-220
- Potential: Coir industries are situated near the terminal.
  - Coir products can be transported through containers from the terminal

Figure 22: Container movement on NW-3—Potential routes/commodities

c) Kaladan Multi-Modal Transit Transport Project: is being developed with the objective of enhancing the connectivity between mainland India and Myanmar through IWT, road and shipping routes. They key features of the project include - Construction of an integrated port IWT terminal at Sittwe, development of a 158-km navigational channel along River Kaladan from Sittwe to Paletwa, construction of an IWT-Highway transhipment terminal at Paletwa and construction of 6 IWT barges (300 tonne capacity) for transportation of cargo between Sittwe and Paletwa. Presently, bids have been invited by IWAI for provision of a container terminal along with container handling facilities at the Port of Sittwe and IWT terminal at Paletwa in Myanmar.

Figure 23: Kaladan Multi-Modal Transit Transport Project

d) Indo-Bangla protocol: In April 2017, an MoU was signed between India and Bangladesh for development of the Ashuganj-Zakiganj stretch of Kushiyara River and the Sirajganj-Daikhawa stretch of Jamuna River through joint dredging by the two countries. This is expected to considerably reduce the logistics cost of cargo movement to north eastern India and congestion through the Siliguri chicken's neck corridor. A pilot for direct cargo vessel movement was successfully completed in February 2017 when the first container vessel ship (with 65 containers on board) from Kolkata arrived at Dhaka's Panagon river port.

The figure below highlights the current infrastructure facilities on the major national waterways.

Place/Location	Depth (m)	Size of vessels that can be accommodated (DWT)	No. of berths	Cargo handling equipment and their capacity	Type and extent of storage facility available	Remarks
NW-1						
290-km long Barh-Ghazipur stretch	1.6-2	600	Fixed RCC (low and high) jetties of 50 m and 70 m berth, respectively	One container crane	Open storage and transit shed of size 45 x 15 m and sufficient storage space	• Low and high level permanent jetties are operational since 2008 and 2012 respectively and are capable for handling of containers and general cargo • Bunkering facility is also available • Differential global positioning system (DGPS) is operational
NW-2						
255-km long Bangladesh border-Pandu stretch	2.5	600	One low level RCC jetty and one high level RCC jetty	One container crane of 75 T capacity and two tyre-mounted crane of 20 T capacity	• Two transit sheds of 75 x 21 m each • Open storage facility also available	• BG siding has been completed • Approach road is available

Figure 24: Infrastructure facilities for container handling on national waterways (as of March 31, 2016)

Place/Location	Depth (m)	Size of vessels that can be accommodated (DWT)	No. of berths	Cargo handling equipment and their capacity	Type and extent of storage facility available	Remarks
NW-3						
NW-3: CPT area (Willingdon Island)	2.2	12 TEUs	One berth for container vessels	5 T crane through agency	5000 sq. m open storage	• These terminals have been constructed for container movement to ICTT, Vallarpadam. Operations on these terminals commenced from February 23, 2011
NW-3: CPT area (Willingdon Island)	2.2	12 TEUs	One berth for container vessels	5 T crane through agency	5000 sq. m open storage	

Infrastructure facilities available on state waterways (as of March 31, 2016)

Place/Location	Depth (m)	Size of vessels that can be accommodated (DWT)	No. of berths	Cargo handling equipment and their capacity	Type and extent of storage facility available	Remarks
Bihar: Munghyr-Raighat stretch	2	59'5" x 15'6" x 5'6"	One	One container crane	Godown	-

Figure 25: Infrastructure facilities for container handling on national waterways (as of March 31, 2016)

5.3.3 Limitations

National waterway shipment, though a potential alternative to road and rail transportation, also faces certain limitations. A detailed discussion with the industry stakeholders highlight the following main such challenges:

a) Low availability of high capacity, low draft barges: This challenge can be circumvented by incentivizing high capacity, low draft barges. Cost economics improve by ~40% with increase in capacity of vessel from 1000DWT to 3000DWT. Globally, low draft, high capacity push barges/ tugs have been launched in several countries such as Paraguay, Australia, US etc.

b) Poor connectivity infrastructure to terminals: Proximity and easy accessibility to waterways essential to capture hinterland traffic. For example, construction of quay walls as low-cost alternatives to building terminals can help improve accessibility to waterway. Flemish government supports and encourages construction of quays along inland waterways. Private companies pay 20% of the construction cost and the government pays the remainder.

c) Insufficient terminal infrastructure: Terminal Infrastructure development on identified waterways with storage facility at terminal, container handling infrastructure and connectivity with rail/road will ensure capturing hinterland traffic.

d) Low availability of Ro-Ro facilities in urban areas: Wherever waterway advantage exists, Ro-Ro facility may be encouraged to de-congest the cities (e.g. Kolkata, Mumbai etc.)

e) First and last mile costs: which account for almost 30% of the total freight act as a hindrance to shift to waterway shipment. A possible solution is to develop a policy to promote creation of smaller jetties with captive cargo supported through VGF and accelerated approval process.
f) Multiple stakeholder interaction: Several transport segments such as first mile, main haul by sea and last mile leads to the manufacturer dealing with multiple stakeholders for shipment and handling. A key step here would be to encourage end-to-end waterway shipment solutions provided by third part players.
g) Unavailability of return load: on national waterway would lead to higher costs for deploying dedicated vessels.

5.3.4 Action agenda

A workshop with representation from key stakeholders including IWAI, CONCOR, ACTO, industry players, Ministry of Shipping, Port authorities, Indian Railways on further detailed studies on feasibility, alignment and coordination would be critical for successful execution for these initiatives. A coordinated effort between the ministries and industry stakeholders is required. Following action steps would require consideration:

a) IWAI to explore developing a policy to promote development of jetties through PPP/ other modes
b) IWAI to explore developing a policy to promote availability of barges and prepare an incentive structure to encourage use of high capacity, low draft barges
c) IWAI, in coordination with Logistics Wing, DoC, to lead discussions with industry players to identify optimal terminal locations, extent of mechanization and terminal infrastructure required on the identified feasible national waterways
d) Seamless execution and running of Indo-Bangladesh Protocol on Inland Water Transit and Trade and the Kaladan Multi-Modal Transit Transport Project

5.4 Streamlining custom processes at sea and dry ports

5.4.1 Need

As aforementioned under the key challenges observed at the port (including both sea and dry ports), the time taken for custom processes is one of the major factors resulting in higher lead times for EXIM container movement. For example, Indian containers could take around 50 per cent longer than Chinese containers for a similar inland distance. The duration is highly variable due to the lack of automation in customs processes, lower speed of trucks and trains and congestion and inefficiency at ports, especially major ports. This unreliability of transport schedules forces shippers to incorporate buffers into timelines, increasing variability of idle time at the yard. As per Ease of Doing Business report, dwell time for exports in India is 40% higher than that of Port of Singapore. According to the BRIEF reports, import dwell time at JNPT, Chennai and Mundra range between 40-70hrs and the export dwell time ranges between 60-100hrs. The customs clearance time for imports itself is around 35-50hrs. The Risk Management system is used for only around 40-50% of the consignments with a target given to release 80% of the containers at JNPT and ICD / TKD under RMS facilitation without any physical inspection.

5.4.2 Action agenda

Given the benefits of enhancing ease of doing business and lower costs by reducing lead time by streamlining custom procedures, the same can be made more efficient by facilitating online submission of documents and forms, simplifying the process to become an accredited importer/exporter, a specialised clearance system for accredited importers/exporters, obtaining more scanning equipment and different treatment of coastal and EXIM cargo etc. Based on multiple interactions with port authorities, importers, exporters, shipping lines, transporters, freight forwarders, customs handling agents, container freight station officials and customs officials, following interventions have been identified and also discussed during the inter-ministerial meetings. A

coordinated effort between the ministries and industry stakeholders is required for successful implementation of the initiatives.

S No	Proposed interventions
1	Integrate remaining PGAs on SWIFT
2	Re-visit SOP for DPE containers and e- sealing facility in order to reduce the large number of containers being re-routed to CFSs
3	Ensure paperless clearance at the terminal for DPD containers (eg PNR document etc) - install an electronic system of information exchange among stakeholders to facilitate the clearance process
4	Revise custom's regulation of maintaining recording of OOCs and DOs for 5yrs and provide issuing OOC to custodians using an EDI message
5	Standardize eligibility criteria for Direct Delivery and mandate adherence across all ports
6	Explore feasibility of allowing tagged domestic containers into custom bonded area to increase backhaul and reduce empty movement by leveraging technology such as RFID etc
7	Ensure paperless clearance for exports (eg Transference copy/endorsed shipping bill has to be submitted in hard copy) - install an electronic system of information exchange among stakeholders to facilitate the clearance process
8	Make central registration of Authorised Dealer Code in the Customs EDI system for Pan- India operational in 3 months
9	Integrate identified 10 messages of Import & 7 messages of Export being exchanged between the Customs & the Custodians in Customs EDI System (ICES) within a period of 4 months
10	Develop alternate way for dispensing away with manual permission from Customs IFO
11	Increase staffing of custom officers at high traffic ICDs and CFSs

S No	Proposed interventions
12	New drive through scanners to be installed at high traffic ports
13	Increase the number of AEOs to 3500 and make the process of registration simple and transparent. All top importers to be included in the AEO list. Include all importers of HS code 8708 (auto parts) and exporters of HS code 85 (electrical machinery and equipment) in JNPT and Mundra ports as AEOs
14	Release 80% of the containers at JNPT and ICD TKD under RMS facilitation without any physical inspection

5.5 Reducing empties handling costs

5.5.1 Need

The cost of repositioning empty containers at the place of demand, is one of the most important issues in the shipping industry. Due to the imbalance in trade activities, the supply and demand patterns of empty containers at different ports and demand centers are also quite different. According to “International Asset System”, more than 50% of the total container life span is spent in an empty or waiting or being repositioned to demand center condition. Repositioning may reduce container waiting times and increase their utilization, but it incurs additional transportation and handling costs and occupies precious vessel spaces, especially when they were repositioned to a port where demands fall or too many empties have already arrived. As shown in the figure below, approximately 5-10% of total cost base typically spent on repositioning efforts. In India, ~25% of containers handled at ICDs and CFS in India are empties. According to the CONCOR annual reports, empties cost accounts for ~2.5-3% of the annual revenue. Thus avoiding empty container moves increases efficiencies and helps companies reduce logistics cost.

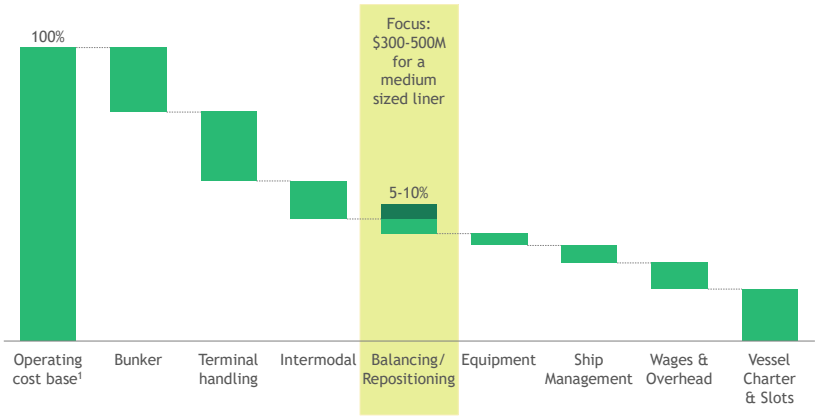


Figure 26: Repositioning costs a significant part of overall Opex

Several initiatives can be undertaken to reduce the cost of empty container movement. Some of them have been listed below:

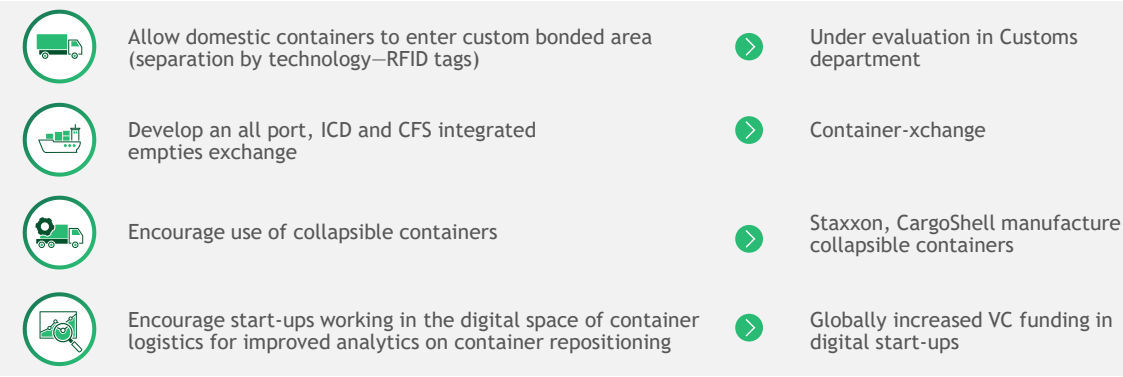


Figure 27: Potential initiatives to reduce empty container movement

The Department of Customs, India, is already evaluating the possibility of institutionalizing/ allowing domestic containers to enter custom bonded area by leveraging technology such as the RFID tags. Below, we discuss in some detail the two initiatives – container exchange platform and collapsible containers.

5.5.2 Container exchange platform

Globally, there are several online platforms which have been opened with the aim of tackling the issue of repositioning idle containers via the digitizing process. For example, 'xChange' is an independent company offering a neutral online platform for one-way container moves with more than 200 members and more than 250,000 containers in 2,500 locations. The platform is generating about 230,000 weekly transactions. According

to an industry report, a third of the empty container movements arising from the limitations of individual companies' operations can be avoided. Developing an all port, ICD and CFS integrated empties exchange or integrating the concept in the National Logistic Portal would be as step in the right direction. Below is an example of such a container exchange platform acting as information broker and workflow support for all container market participants.

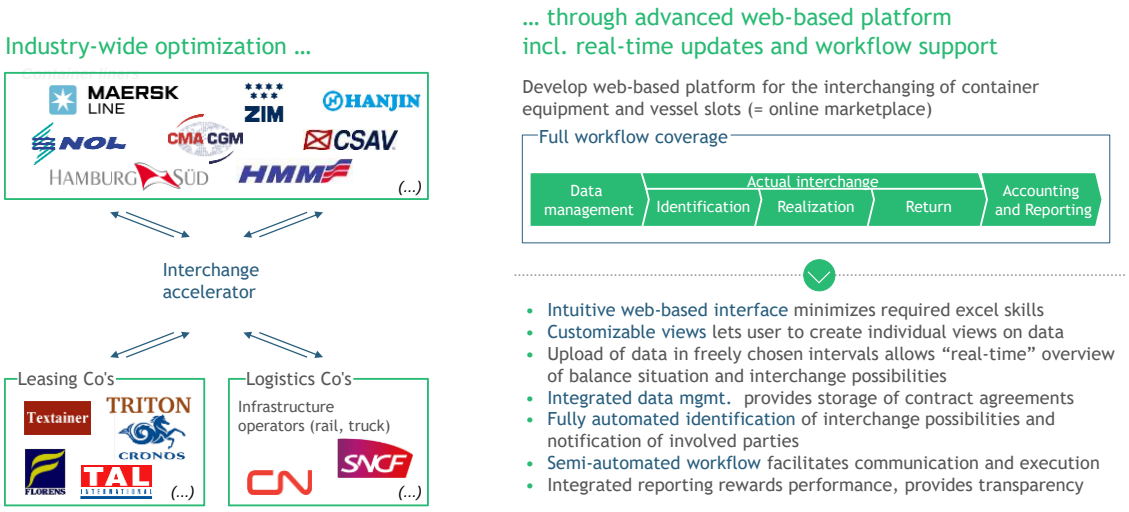


Figure 28: Illustration of an exchange platform

5.5.3 Collapsible containers

Collapsible containers is a relatively new and an innovative concept for reducing the cost of empty container movement. Presently, the initiative is at a research and trial stage. These containers can be folded when empty, thus reducing the volume they occupy and hence leading to savings of transportation cost, holding or storage cost as well as environmental and economical benefits of reduced fuel consumption. Companies such as Holland Container Innovations, Staxxon, Cargoshell, and Florida-based Compact Cargo Solutions are coming up with their own versions of collapsible containers and are being tested for ISO certification.

Volume saved, lower fuel consumption are major drivers

- 75% lower volume occupied when empty and collapsed
- Fuel savings as 25% lesser weight (composite material) and reduced number of empty container trips
- Better packing as roll-up front doors instead of swinging out doors
- ISO certified collapsible containers present in market

High upfront cost, structural stability are the major concerns

- 3x higher upfront purchase cost
- Questionable structural stability as still in testing phase
- Longer folding time requiring additional man power

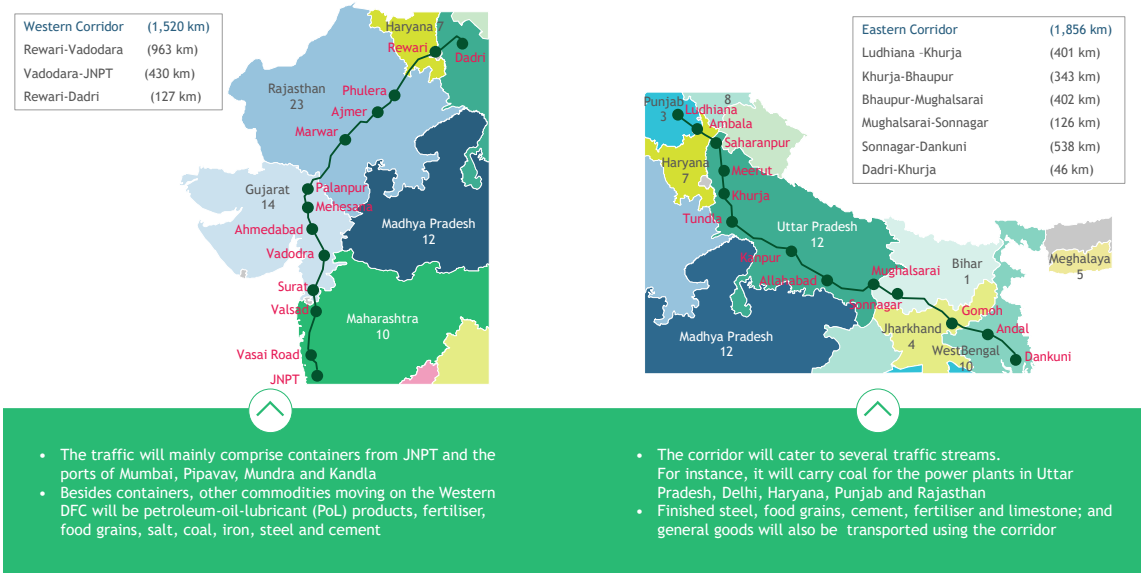
Staxxon, Cargoshell are companies developing collapsible containers

Figure 29: Overview on collapsible containers

5.6 Dedicated freight corridors

5.6.1 Need and benefits

Presently, one of the major issues being faced in transportation of containers using the railways mode is high variability of delivery time. The lead time cannot be predicted due to high congestion on major corridors and lower preference given to freight trains than passenger trains. Commissioning of Western and Eastern DFCs would significantly lower the above issue. The Dedicated Freight Corridor (DFC) project was conceived in 2004-05. With an investment of over Rs 800 billion, DFC is one of the biggest ongoing infrastructure projects in the country. Six high capacity corridors along the Golden Quadrilateral and its diagonals have been proposed. Under Phase I, two corridors – the Western and Eastern DFCs have been approved and completion is estimated by 2020 for the Western DFC. A Special Purpose Vehicle (SPV), the Dedicated Freight Corridor Corporation of India Limited (DFCCIL), was formed for project implementation with Ministry of Railways having 100% equity stake.



- The traffic will mainly comprise containers from JNPT and the ports of Mumbai, Pipavav, Mundra and Kandla
- Besides containers, other commodities moving on the Western DFC will be petroleum-oil-lubricant (PoL) products, fertiliser, food grains, salt, coal, iron, steel and cement

- The corridor will cater to several traffic streams. For instance, it will carry coal for the power plants in Uttar Pradesh, Delhi, Haryana, Punjab and Rajasthan
- Finished steel, food grains, cement, fertiliser and limestone; and general goods will also be transported using the corridor

Figure 30: Western and Eastern DFCs

The table below details out the characteristics of the DFC routes.

Key Dimensions	**Indian Railways**	**DFC Routes**
Height	4.3 m	7.1 m (Western) 5.1 m (Eastern)
Width	3,200 mm	3,660 mm
Train length	700 m	1,500 m
Train load	5,000 tonnes	13,000 tonnes
Axle load	22.9-25 tonnes	25 tonnes Bridges and formation designed for 32.5 tonnes
Maximum speed	75 kmph	100 kmph
Average speed	25 kmph	70 kmph
Grade	Up to 1 in 100	1 in 200
Station spacing (approx.)	7-10 km	40 km

The DFCs would essentially help in a faster, higher and longer container train service. Following are the benefits of DFCs:

- Reduce rail freight price by 20-25%
- Improve the share of freight traffic for rail to 50% (bulk and lighter commodities)
- Reduce in-transit time variability through scheduled time-table trains
- ~70% of freight is expected to shift to DFC, freeing up capacity on Indian Railways
- DFC would aid in decongestion of highways, as one freight train would be able to carry load equivalent to 1,300 trucks

The cost per ton per km lowers significantly for DFC. The cross over distance of around 900-1000km lowers to around 700km and 300km under different scenarios of DFC utilization.

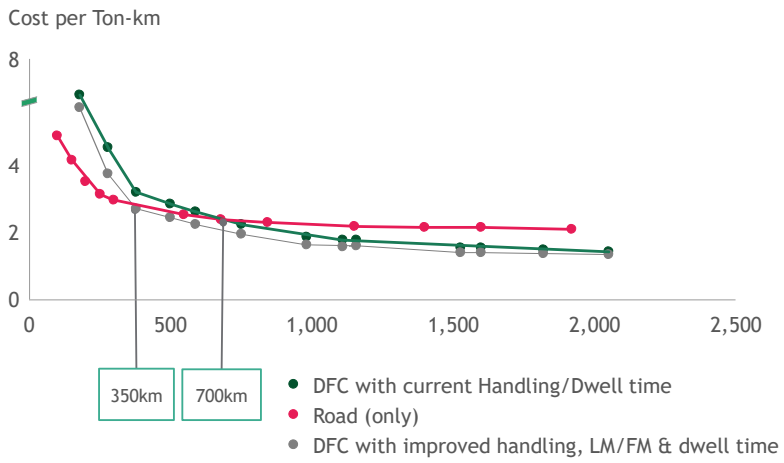


Figure 31: Cost curves for DFCs

5.6.2 Action agenda

Given the significant benefits of the DFCs, there is further potential to improve cost-effectiveness of DFC by optimally designing and locating interchanges. It is pertinent that the DFCCIL give focus to the development of requisite feeder rail/road connectivity to hinterland/markets/ICDs and select ports along the west coast to ensure effective use of the DFCs. A workshop with representation from key stakeholders including DFCCIL, CONCOR, ACTO, industry players, Ministry of Shipping, Port authorities, Indian Railways on further detailed studies on feasibility, alignment and coordination of would be critical for the success of the initiative.

5.7 Rationalizing and reducing barriers for setting up new ICDs

Inland Container Depots (ICDs) and Container Freight Stations (CFSs) are dry ports which handle all customs formalities related to import and export of goods. They serve as a multimodal logistic node for interchange between rail and road modes of transportation. In India, ICDs and CFSs are concentrated in Western and Southern states with a significant large number in the NCR and Punjab region.

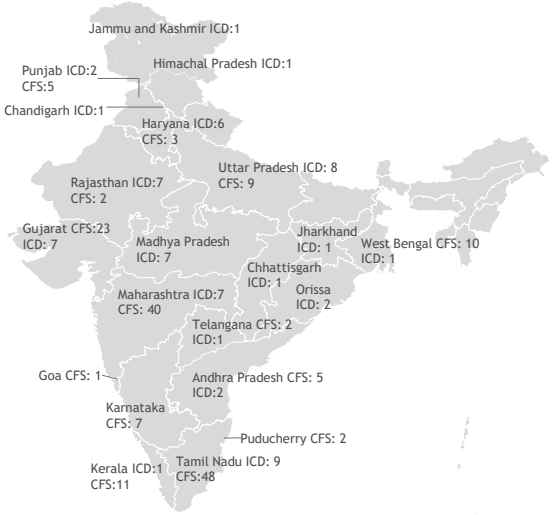


Figure 32: ICD and CFS distribution in the country

Identification of correct location of the ICD ensures lower first/last mile costs and adequate traffic to ensure optimum waiting time for cargo aggregation. It is therefore required that the Government, while monitoring the feasibility of the ICD requirement, also reduce barriers to set up new ICDs to facilitate overall logistics efficiency in transportation of EXIM/ domestic containers. Presently, low utilization levels, high cargo waiting time and procedural delays discourage opening of new ICDs. Approximately, 40% of the ICDs/CFSs audited were operating at utilization levels < 50%. For example, in Pune, 4 ICDs operating within 50km radius have a combined utilization level of 20%. Despite the high density, LoI for setting up new ICD in Bhamboli, Chakan, Pune granted to APM Terminals in November 2016. Low traffic leading to large cargo waiting times is another issue plaguing ICDs. For example, high traffic ICDs have 14 rakes/day viz a viz ICD Agra/Bhopal which get less than 1 rake/day. Lastly, high procedural delays in granting ICD license by the Inter Ministerial Committee further act as a cost driver for the handling

and freight tariffs charged by the ICD operator. For efficient use of ICD and CFS utilization, following are some of the key focus points:

a) Market forces to determine location of new ICDs
b) Reduce barriers of setting up new ICDs by reducing procedural delays at IMC end
c) Relook at current stall order for allowing new ICDs post completion of first phase of DFCs
d) Mandate installation of container scanners in all new ICDs
e) Encourage new ICDs/ CFS to be located outside city boundaries to ensure flexibility of work timings (unrestricted movement of trailers in day time)
f) Make provisions to allow ICDs to facilitate DPD/DPE
g) Direct Inland Delivery
h) Allow ICDs after studying railway congestion levels at the trunk connecting route (alternatively, allow milk runs)

5.8 Other miscellaneous initiatives

Industry stakeholder discussions with ACTO resulted in the following initiatives which need to be further detailed out through discussions between Ministry of Railways, Logistics Wing, Department of Customs, ACTO and CONCOR.

a) In coordination with Ministry of Railways, Department of Customs and Ministry of External Affairs, modify the Rail Service Agreement to allow all licensed CTOs to run EXIM trains to terminals in Nepal, Bangladesh etc
b) In coordination with Department of Customs, explore possibility of allowing small value additions (eg packaging, labelling, marking, branding, quality testing etc) to be undertaken in ICDs
c) In coordination with Department of Customs and Ministry of Railways, facilitate linkage of the weight of container mentioned in ICEGATE to all licensed CTO systems and FOIS
d) Ministry of Railways to explore feasibility of allowing domestic container movement of commodities such as iron ore pellets, soap stone, gypsum, limestone, dolomite, quartzite, manganese ore, beryl, quick lime (burnt lime)
e) Provide infrastructure status to rolling stock (eg container trains)

f) Ministry of Railways to explore feasibility of following modifications in good shed policy:
   a) Modify categorization of sheds on basis of capacity utilization rather than absolute rakes/month throughput
   b) Issue an exception list of good sheds and notify the rest as CRTs to avoid the tedious process of notifying CRTs for each and every shed
   c) Extend duration of permission of loading/unloading from Category 1 and 2 good sheds to perpetuity from current 6 months and 1 year respectively
   d) Extend permission of lift off-lift on of containers on mineral sidings for domestic and EXIM cargo (Custom clearance at CFS or factory or under DPD/DPE mode) with free time similar to that for crane consignments
   e) Allot commercial plots adjacent to good sheds on railway land to private players for a fixed tenure to facilitate temporary storage, custom activities etc and hence reducing last mile costs and facilitating exports

6 Conclusion

The Integrated National Logistics Action Plan lays out a preliminary set of 8 key initiatives with basis discussions with ministries and key industry stakeholders. The total container movement in India was analysed by major traffic flow corridors. The analysis included establishing the optimal modal mix, calculating the unit transportation costs across different modes, plotting the major origin-destination pairs for railways and for road etc. In summary, the initiatives have been converted into action agendas for consideration of different ministries and are listed as a part of the action agenda under various interventions. To enable the country to gear towards competitive exports and reduce cost of imports, the initiatives emerging from the aforementioned elements of the Action Plan require coordinated inter-ministerial and industry effort.

7 Appendix 1 : Potential routes for dwarf containers

Please find below the potential routes for dwarf container identified through an independent analysis and stakeholder discussions. The routes will need to be confirmed with container train operators.

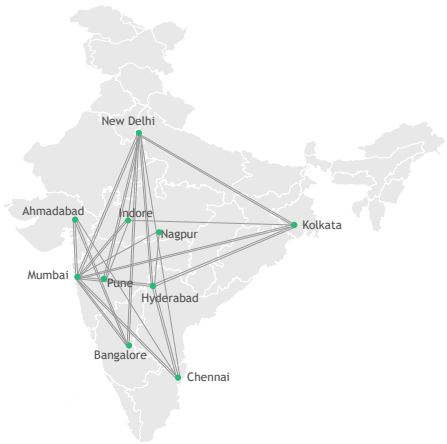


Figure 33: 35 routes across 10 consumption based centers prioritized - Dwarf Scenario

Chapter 7: Commodity Corridor Analysis – Parcels & E-Commerce

Contents

1 Context

In line with the mandate given to the Logistics Wing to integrate and optimize the several elements of the logistics value chain, this chapter deals with initiatives identified to optimize the logistics cost of parcels movement in India.

Parcels movement in India include three major service segments :

1. **Express / Courier** – The express / courier segment of the industry provides air, surface and express courier delivery services of parcels, documents and packages to a wide variety of consumers. Indian express industry comprising players like DHL, FedEx, BlueDart, Gati etc. is one of the fastest growing express industries globally. In India it grew at a CAGR of ~15% in the last 5 yrs and and is estimated to grow at a CAGR of ~17% by 2022 driven by demand from MSME, e-retail and manufacturing.

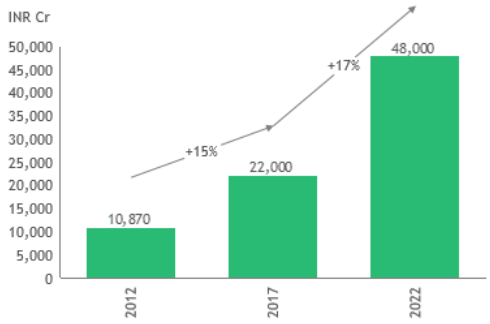


Figure 1: Express Industry Growth in India

2. **E-Commerce / E-Retail** – The E-Commerce market is another big segment which is driving the growth of the parcels industry. Indian E-Commerce market comprising players like Amazon, Flipkart, Delhivery etc. is expected to witness sales growth of ~4X by 2025 driven by smartphone penetration & growing online shoppers from Tier 2 cities & below. Online shoppers are expected to grow ~3X by 2025 driven by ~2X increase in both smartphone and internet users. Indian E-commerce penetration (2.9%) lags far behind China (17%) and US (16%), but is expected to rise to 10-12% by 2025 providing for huge potential for growth.

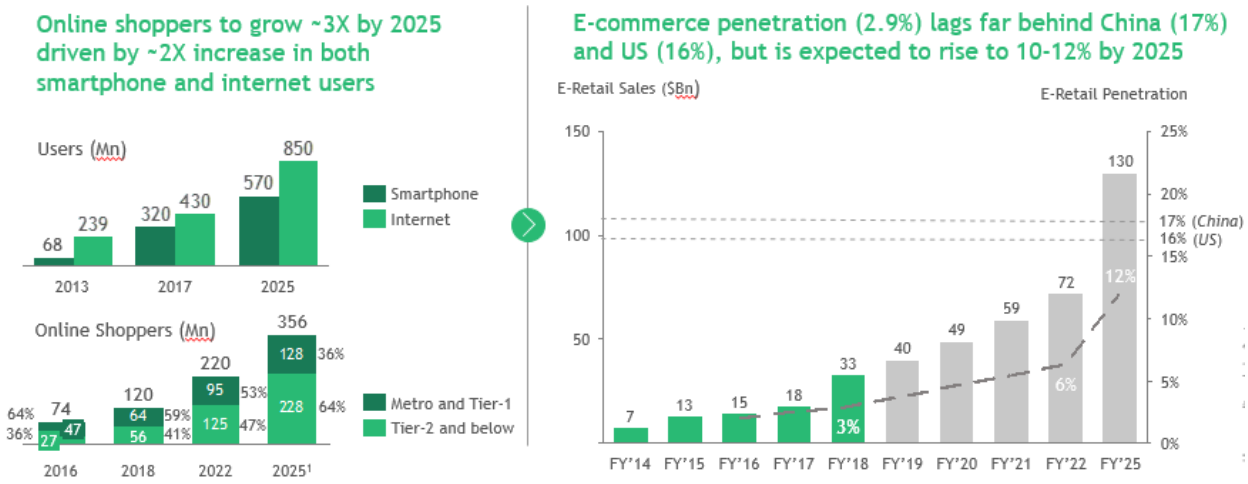


Figure 2: Growth of E Commerce industry in India

3. **India Post** - The government-operated postal system in India under the Department of Posts is the most widely distributed postal system in the world. The parcel business segment of India Post has seen an unprecedented profit growth in the past two years driven by the rise of e-commerce and its reach into the remotest corners of India. India Post aims to increase market share in parcel business segment to 10% in the next two years from its current share of 3-4% .[1]

This report details out the landscape, challenges faced and initiatives identified to reduce the logistics cost of the of the parcels industry as a whole.

2 Approach Methodology

The parcels industry was analysed segment wise basis detailed discussions with relevant stakeholders including parcel delivery providers, parcel delivery users, express industry players, ecommerce players and associations such as the Express Industry Council of India across the supply chain to understand the issues and identify possible interventions. Existing reports on Express Industry (by Express Industry Council of India and Deloitte) and on E Commerce Retail Logistics (by CII Institute of Logitsics and KPMG) were

[1] Statement by Minister of Communications (Manoj Sinha) on World Post Day (Oct 2018)

extensively referred to for the industry landscape. The initiatives identified focus on streamlining custom related, GST related and service reated issues for first and last mile and main haul.

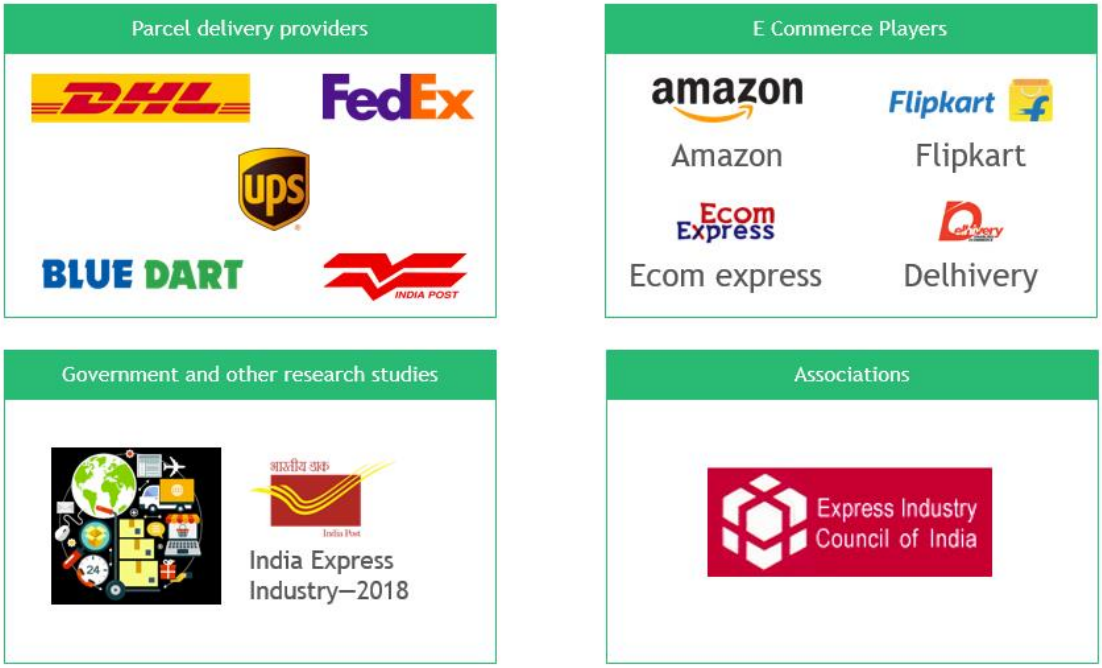


Figure 3: Stakeholder discussions across parcels value chain

3 Landscape

3.1 Express / Courier

3.1.1 Industry Structure

Depending on the origin and destination of delivery, the industry can be segmented as domestic and international express.

- **Domestic express** which refers to express delivery within the Indian borders, has grown at a CAGR of 22% since FY12 driven by the rise of e-retail in India. It is estimated to contribute close to INR 17,000 cr (77%) to the total express industry.
- **International shipments** constituting inbound and outbound shipments comprise remaining 23% to the total express industry.

Air is the main mode of transport for international shipments while road transport forms the major mode (~ 70% by value) for domestic shipments. There is negligible rail movement due to concerns on safety, pilferage, damage, reliability. The share of surface express in the total domestic express industry has increased from 63% in FY12 to 71% in FY17. Air express has witnessed a slower growth compared to surface express and the share has reduced over the past five years.

This trend of shifting from air to road is driven by better on-road efficiencies, expensive air freights, limited air cargo capacity, uncertainty of timely air uplift. With GST implementation, higher efficiencies are expected in the surface transport and the share of surface is expected to further improve in the future.

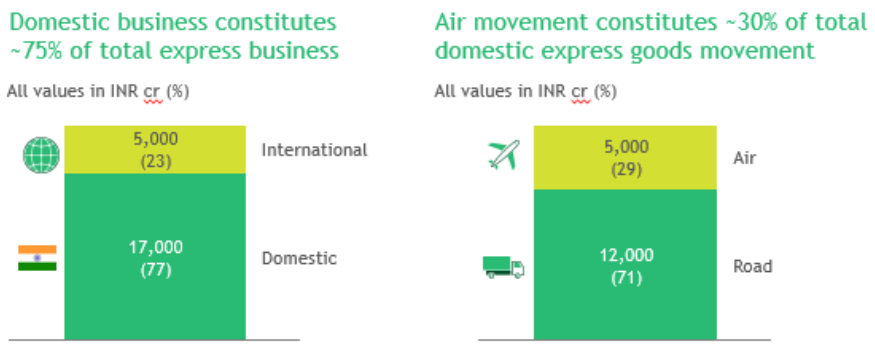


Figure 4: Express industry structure

3.1.2 Supply Landscape

The Indian express industry has more than 1000 active players having operations across India and internationally comprising of large scale players (75 to 80 percent) and the medium and small players (25 to 20 percent)

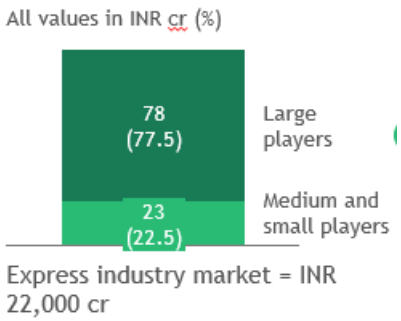


Figure 5: Express industry supply landscape

Major players include :

a) **Traditional Express players**: These include the following categories of players:

- Leading domestic players having nation-wide operations
- Indian entities of the leading global express providers (operating mostly in the international express segment but also contributing significantly to domestic express)
- Speed Post - the express section of department of Post of the Government of India

These players are focused on the traditional segments of the Indian express industry such as B2B express and document shipment. However, with the evolving trends they have started to set up business units to cater to the e-commerce B2C demand. They are preferred by the large scale, well-established companies due to their large scale and well established operations

b) **New emerging players**: These include the following categories of players:

- Captive arms of the leading e-retail players
- Service providers specializing in e-commerce.

These are technology-based companies which have been established to cater to the newer demand segments such as e-commerce. These are preferred by the customers for their infrastructure focused to their kind of business, reach, scale, agility and precision of delivery backed by technology and automation integration capabilities.

c) **Medium and small players:** The medium and small players include the express players focusing on certain niches – such as deliveries in select geographies, or across select lanes, or catering to consumers of specific industry.

3.1.3 Demand Landscape

Domestic express, comprising of shipments transported and delivered within the country, is the key constituent (77% by value) of the Indian express industry. West - South and North - South are the key lanes for domestic express.

Based on the destination of delivery, the shipments are categorized as B2B (business to business) shipments – delivered to another business entity or B2C (business to consumer) which refers to shipments for home delivery or C2C (consumer to consumer) which includes the parcels shipped by individuals across the country for business or personal use. B2B shipments contribute close to 60 per cent by value while B2C shipments constitutes almost all of the remaining 40 per cent. C2C market share is less than 2-3% constrained by low demand and high marketing investment.

i. In the B2B segment auto components, textile, electronics account for more than 50% of movements.

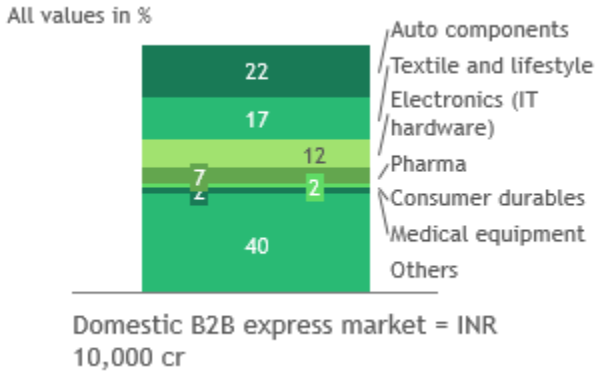


Figure 6: B2B segment demand landscape

ii. Within the B2C shipments, e-commerce is the main consumer, contributing more than 70 per cent to the B2C revenues, followed by BFSI and other document deliveries belonging to education, telecom or government and public service sector. This segment is expected to witness the fastest growth due to the growth of e-commerce.

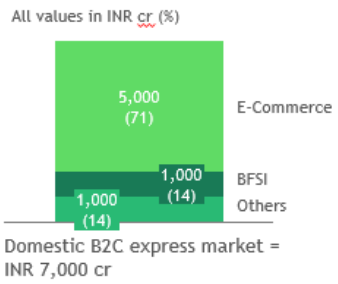
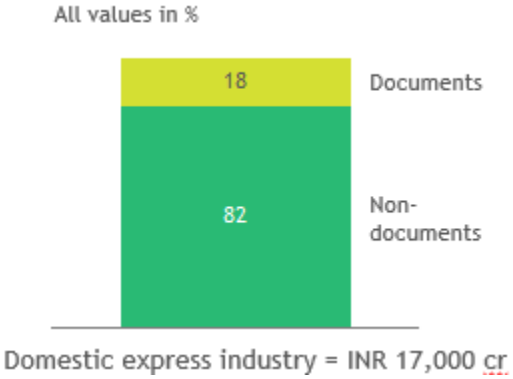


Figure 7 B2C segment demand landscape

iii. The market for C2C shipments is very small, less than 3% of the total domestic market.. The C2C segment provides high margins, however the growth is constrained by low demand and high marketing investment

Profile of shipments for the Indian express industry

The domestic express services are used for delivering documents such as credit cards, debit cards, cheques, government documents such as PAN cards and passport as well as non-document packages consisting of machine spare parts, electronic items, garments, imitation jewelry, return goods and others.



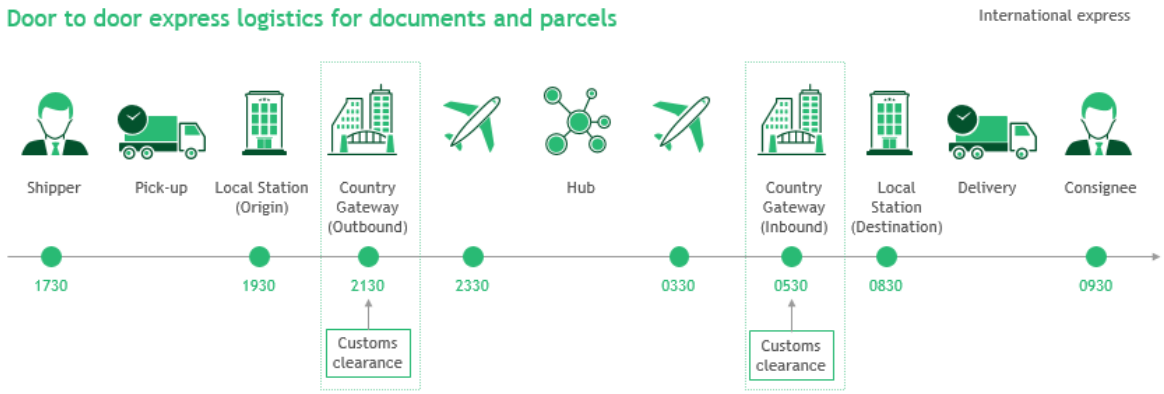
The share of documents in terms of volume has reduced driven by increasing internet penetration, measures taken by BFSI and telecom sector to cut down logistic costs and digitally provide sensitive information (passcode). Documents are expected to contribute not more than 20 per cent in value terms to the overall shipments.

With increasing digitization, the industry is moving away from a document v/s non-document classification to a weight-based classification. Close to half of the total packages moved weigh less than 2 kg, 30 percent weigh between 2 to 5 kg and the

remaining 20 per cent weigh more than 5 kgs, necessitating four wheeler solutions for transport.

3.1.4 Value Chain

The value chain for express industry comprises various stakeholders spread across first mile, main haul and last mile. Given the numbe of stakeholders involved across borders, it is imperative to have world class practices and state-of-the-art technologies integrated within the whole value chain to provide requisite speed and efficiency.



3.2 E Retail

The online retail market in India has grown significantly from its nascent state in the mid-2000s driven by internet and mobile phone penetration.

3.2.1 Supply Landscape

a) **Captive logistics units of e-retailers**: The leading large scale e-retailers such as Amazon, Flipkart have established their captive logistics units for the fulfilment needs. At least 60%-70% of their total volumes are processed by their captive units.24 Such captive units are expected to constitute close to 50% of the total e-commerce express segment.25

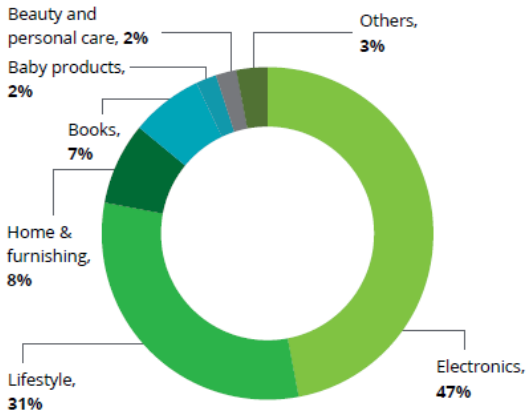
b) **E-commerce focussed startups / delivery players:** Having identified the opportunity created by e-commerce logistics, many new start-ups such as Delhivery,

Ecom Express, and Xpressbees have emerged to cater to the fulfilment demands of the sector. These contribute 25-30% to the total e-commerce delivery segment.

c) **Traditional express players**: Almost all of the traditional express players have set up separate business units to cater to the e-commerce express market. Together, these are estimated to contribute 20-25% to the total e-commerce express segment.

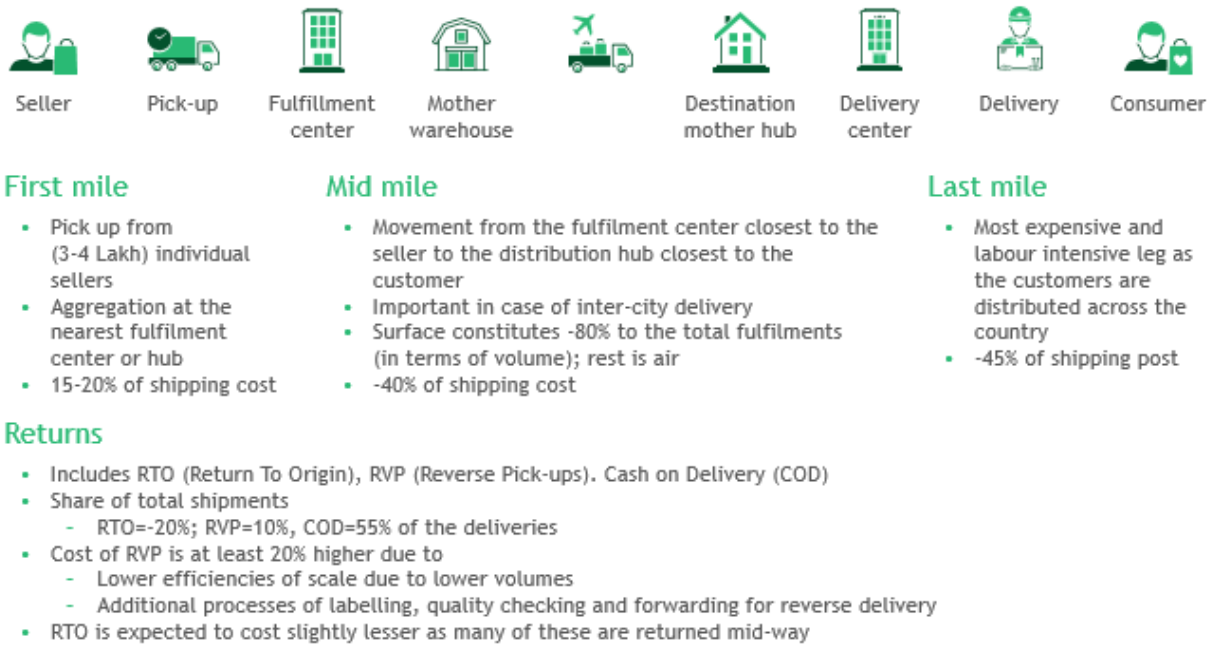
3.2.2 Demand Landscape

The top two players – Amazon and Flipkart contribute as much as 80 – 85% to the industry revenues. Electronics and lifestyle are the key constituents of e-retail in India and together they contribute close to 80% to the e-retail revenues.



3.2.3 Value Chain

The delivery network for e-retail is similar to the hub and spoke model traditionally followed by the express industry. The key stages inthe delivery of a B2C e-retail shipment are as follows:



Last mile and main haul are the most expensive legs of an e-commerce shipment. Disaggregated demand and supply and reverse logistics increase e-commerce supply chain complexity, compounded by reverse logistics. Major challenges faced by the e-tail value chain are as follows:

1. Inability to predict demand, last mile delivery challenges
   - Active expansion to tier 2 and tier 3 cities and remote pin codes
   - Demand is less concentrated and the infrastructure for transport and delivery is insufficient
2. Fragmented supply market; 3-4 lakh e-retail sellers
   - Leading players increasing the number of sellers on-boarded (~3-4 lakh sellersacross India)
   - Highly fragmented with a long tail of smaller sellers
3. High rate of returns, Cash on delivery
   - 20% return to origin
   - 10% reverse pick ups
   - ~60% COD—additional complexity of operations due to management of cash
   - Companies are looking to reduce logistics costs, to manage unit economics

Companies are looking to reduce logistics costs, to manage unit economics

- Focus on localization and outsourcing fulfilment: E-retailers are setting up regional FC's to cater faster to the increasing demand from Tier-2 & below cities. Inventory control achieved through forecasting and optimization models
- Modal shift to surface transport: To reduce line haul, e-retailers have setup large dedicated fulfilment centers near major demand bases (Metros/Tier-1) and also shifted to cheaper surface transport from air (2-3x costlier). Air accounts for less than 20% of shipments from 80% in 2012)

3.3 India Post

The Department of Posts, with its network of 1,54,965 Post Offices, is the largest postal network in the world. ~90% of the post offices are in rural areas as compared to the 10% in uran locations, giving India Post the widest rural depth. This network covers more than 25,000 pin codes, while even large private courier companies like DTDC reach only about 10,000. Business operations are divided into 5 Major segments:

- Postal and Mail operations
- Premium Services
- Rural businesses
- International business
- Financial services

Premium services include speed post, express parcel, business parcel, retail post, e-post, e-payment, e-post office, logistics post, business post. Increasing e-Commerce market in India has given a boost to the parcel segment where Business 2 Customer (B2C) parcels are on the rise. At the same time, there is a requirement to cater to the needs of the Customer 2 Customer (C2C) category parcels also. Considering the market requirements, customer demands and operational feasibility, Department of Posts rationalised parcel services and Express Parcel / Business Parcel services were

introduced by the Department in December, 2013 alongwith cash-on delivery facility as a value addition. The Department of Posts has been focussing on e-commerce sector to increase its revenue receipts. The Department facilitates has collected and remitted more than Rs 2,700 crore under cash-on-delivery till 2018 since its introduction in December 2013.

The ongoing e-commerce business segment resulted in increase of 13 per cent revenue of India Post in the 2017-18.

4 Key challenges

This section of the report details out the issues faced by the parcels industry across the value chain. The issues have been categorised into 2 categories basis their nature of delivery/ transportation into first-last mile issues and main haul issues :

First and Last Mile

a) City and airport access restrictions on commercial vehicles plying during peak hours leading to sub-optimal service levels
b) Infrastructure related
    i. Poor road connectivity Limiting the ease and access to last mile deliveries
    ii. Dedicated spaces for cargo delivering companies at stations and airports to carry out activities such as segregation etc
    iii. Commercially unviable rates (equivalent to charges levied for full service of cargo at airports) fixed by airport or cargo terminal operators for use of Airfreight Stations (AFS) for transfer of cargo
c) Regulation related
    i. Restrictive nature of Central Motor Vehicles Rules,1989 for carrying dangerous goods in accepted quantities (no differentiation for carrying small vs large quantity)
    ii. Non standardized rules on use of motorcylcles as commercial vehicles

Main Haul

a) GST Related

i. Holding of shipment: Entire truck held up in cases of issue with only singular/some part of the shipment consignment leading to service delays

ii. Penalty burden: Carriers carry the burden of penalty against the entire consignment value in case of errors (including clerical errors) in the e-way bill

iii. Implementation of IGST with regard to the place of supply provisions results in input credits not set-off leading to higher transaction costs to Indian exporters

iv. Implementation of GST has disallowed input credit on excise duty of 14% on ATF (ATF comprises ~40% of a cargo airline's direct operating cost)

b) Customs related

i. Manual clearance procedure from allied agencies such as Additional Drug Controller (ADC), Food Safety and Standards Authority (FSSAI) etc leading to delay of 48-72hrs

ii. Perishable goods like blood samples, clinical trial material follow cargo clearance rules resulting in longer lead times (48-96hrs)

iii. Mandatory movement of entire consignment from the flight to the airport terminal (not allowing ramp to ramp transfer) for parcel out of charge clearance leads to longer lead times and additional cost

iv. Huge inventory (>60 days) of uncleared / unclaimed shipments is stacked in the courier terminals, blocking space

v. Suspension of license of authorized couriers without preliminary investigation or show cause notice

vi. Shortage of Customs officers at express terminals (Mumbai, Delhi – 30% shortage, Bangalore – 80% shortage), resulting in ~20% shipments getting custom cleared after a delay of 24 to 48 hours

c) Air Cargo related

i. Limitations in self handling of security functions: International express cargo airlines registered in India are not permitted to carryout x-ray screening and security functions for their own cargo aircrafts

ii. Inordinate delays ranging from 18-24 months for commissioning cargo and express terminals

d) Low service level and safety of railway mode

e) Restricted seamless movement by road—Tolls, Checkpoints

f) Long gestation period and approval processes to set up warehouses

5 Recommendations and action agenda

Discussions with several stakeholders across the supply chain identified a list of possible initiatives to reduce logistic cost and improve logistics efficiency for the parcels industry as a whole:

Depart-ment	Issues	Possible Recommendation
Customs	Manual clearance procedure from allied agencies such as Additional Drug Controller (ADC), Food Safety and Standards Authority (FSSAI) etc leading to delay of 48-72hrs	Introduce SWIFT module in Express Cargo Clearance System (Courier EDI) for e-clearance
Customs	Perishable goods like blood samples, clinical trial material follow cargo clearance rules resulting in longer lead times (48-96hrs)	Remove restrictions on perishable / commodities goods from Regulation 2 (2) (d) of Courier Imports and Exports (Clearance) Regulations, 1998
Customs	Mandatory movement of entire consignment from the flight to the airport terminal (not allowing ramp to ramp transfer) for parcel out of charge clearance leads to longer lead times and additional cost	Permit ramp to ramp transfer from domestic to international aircrafts and vice versa

Depart-ment	Issues	Possible Recommendation
Customs	Huge inventory (>60 days) of uncleared / unclaimed shipments is stacked in the courier terminals, blocking space	Modify policy to facilitate time-bound auctions, disposal and destruction of caged shipments to decongest the express facilities
Customs	Suspension of license of authorized couriers without preliminary investigation or show cause notice	Modify suspension of license rules of authorized couriers without preliminary investigation under the Regulation 14 of Courier Imports and Exports (Clearance) Regulations, 1998
Customs	Shortage of Customs officers at express terminals (Mumbai, Delhi – 30% shortage, Bangalore – 80% shortage), resulting in ~20% shipments getting custom cleared after a delay of 24 to 48 hours	Increase staffing of custom officers at Mumbai, Delhi, Bangalore and Chennai courier terminals
GST council	Insufficient validity period (currently at 24hrs) of e-way bills for distance less than 100km (transit time for pick-up from customer premise to nearest operating unit sometimes takes longer given network design for consolidating multiple loads)	Explore extension of validity period of e-way bills for distances less than 100km
GST council	Holding of shipment: Entire truck held up in cases of issue with only singular/some part of the shipment consignment leading to service delays	Modify holding of shipment rules to allow truck release and issue notice for holding only the problematic parcels/consignment at the checkpoint or at service center
GST council	Penalty burden: Carriers carry the burden of penalty against the entire consignment value in case of errors (including clerical errors) in the e-way bill	Explore possibility of liability limit based on the commercial obligation in the entire transaction

Depart-ment	Issues	Possible Recommendation
GST council/ Customs	Implementation of IGST with regard to the place of supply provisions results in input credits not set-off leading to higher transaction costs to Indian exporters	In case of courier service or mail services provided by Indian transporters to Indian registered customers exporting goods from India, the IGST tax charged should be available to the registered Indian exporter as input tax credit, even in case where the place of supply under Section 12(8) of the IGST Act is reported as 97-Other territories
MoRTH/ State Traffic Police	City and airport access restrictions on commercial vehicles plying during peak hours leading to sub-optimal service levels	Explore relaxation of city entry restrictions for electric commercial vehicles to facilitate first/last mile connectivity
BCAS/ Customs/ CISF	Inordinate delays ranging from 18-24 months for commissioning cargo and express terminals	Introduce well-defined time lines and objective check-list criteria for evaluating the proposals Rationalize multiple permissions required from Customs even if the facility is within existing Customs Bonded Area Allow operators to start operations using own security as airport access control at airside is already manned by CISF
BCAS	Limitations in self handling of security functions: International express cargo airlines registered in India are not permitted to carryout x-ray screening and security functions for their own cargo aircrafts	Allow foreign cargo airlines to self-handle security functions and obtain Regulated Agent Certification to facilitate ease of doing business

Some other reccomendations identified to target main mile and last mile challenges:

Main Mile

- Explore rail as a cheaper mode for long haul movement. Parcel van pilots can can be explored on premium trains where adherence to time table is higher.

Last Mile

- Explore allowance of electric commercial vehicles during non-truck hours
- Leveraging uber/ ola and other commercial passenger vehicles for transportation
- Explore allowing usage of motocycles for commercial vehicle transportation
- Facilitate leveraging capability of india post pin code reach by the e-commerce companies

6 Conclusion

The Integrated National Logistics Action Plan lays out a preliminary set of key initiatives basis discussions with key industry stakeholders. The analysis included identifying major problem areas in the first, last and mid mile related to services and infrastructure, GST, customs, air cargo etc basis dicussions with stakeholders. The initiatives identified have been converted into action agendas for consideration of different ministries. The Indian express industry is indispensable to the operations of the leading industries and hence it is imperitive to drive the identified interventions on a mission mode basis .

Chapter 8: Interstate Movement

Contents

1 Context

Road freight is one of the most important modes of cargo movement in India and constitutes approximately 60% of the total cargo movement. As a part of the Integrated Logistics Action Plan, one of the key processes studied in detail is the interstate movement of cargo, particularly non-toll stoppages by RTOs. It is estimated that ~20% of the total trip time of a truck is accounted due to non-toll stoppages by RTOs and police and there is significant potential to optimise and reduce costs related to non-toll stoppages.

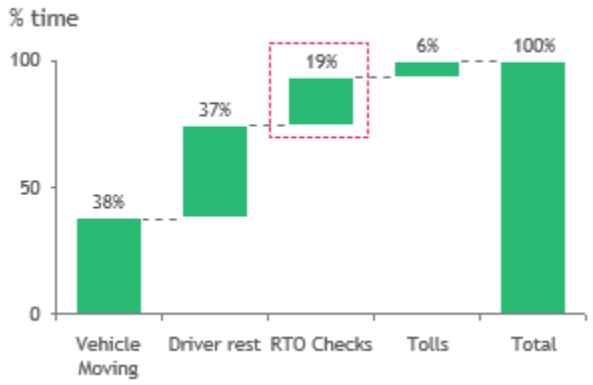


Figure 1: Time accounted to non toll truck stoppages[1]

This report details out the initiatives identified to reduce the non toll stoppages and streamline interstate movement of cargo in India.

2 Approach Methodology

All the reasons for which trucks can be stopped by RTOs have been studied in detail. Global and Indian benchmarks have been analyzed and stakeholder feedback has been gathered from truck drivers, transporters, state transport authorities and industry associations to arrive at key recommendations for seamless movement of interstate

[1] Source: Primary interviews with drivers & fleet owners

cargo. (Illustrative list of stakeholders consulted attached in Appendix 1 and Global Benchmarks studied detailed in Appendix 2)

3 Reasons for truck stoppages

There are more than 90 reasons for which trucks can be stopped by RTOs and Police authorities basis Motor Vehicles Act / Rules (Central / State), Carriage of Goods Act and other Vehicle related regulations (details in Appendix 2). Reasons for stoppage comprise: document related violations which include not carrying required documents like driving license, RC book, insurance papers, pollution under control certificate; cargo related violations including - carrying overweight / oversized cargo, loading on tailboard; vehicle related violations which include carrying 2 fuel tanks; driver and driving related violations which include over speeding, driving in no entry zone, no entry time.

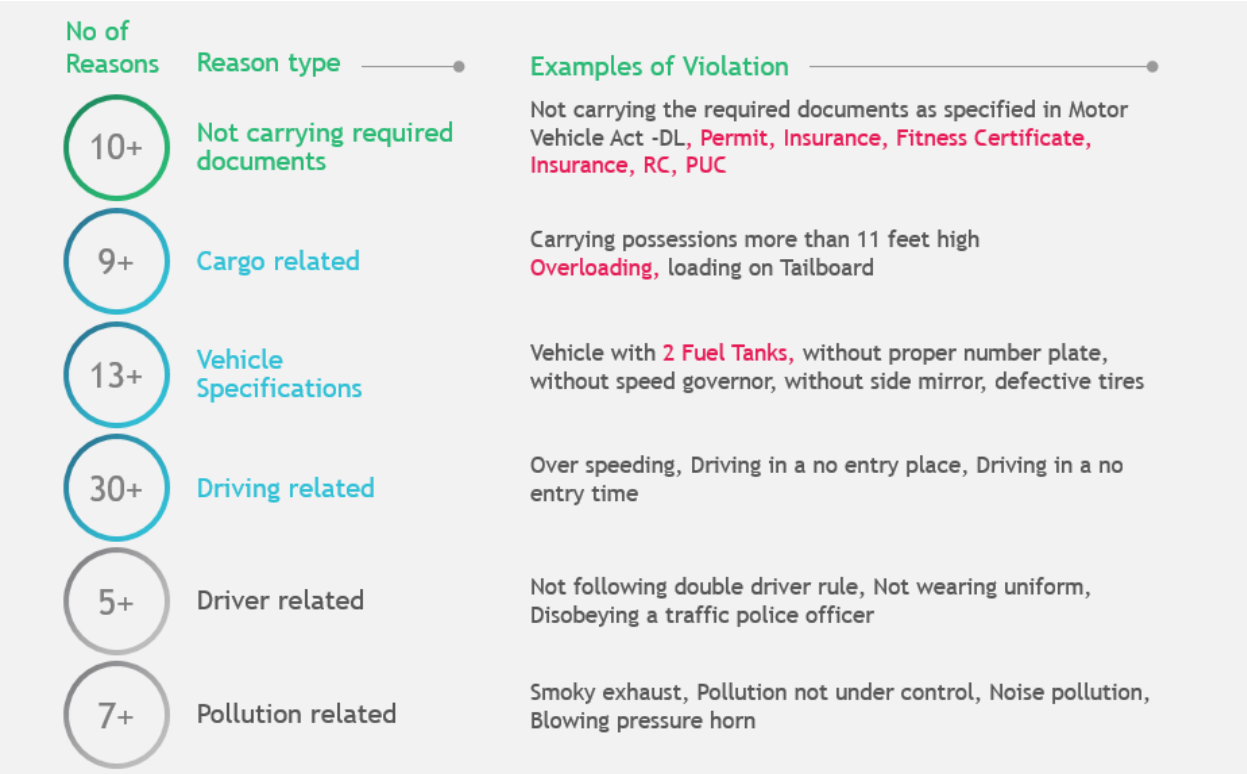


Figure 2: 90+ reasons for which trucks can be stopped by RTOs

Basis detailed discussions with truck drivers, transporters and RTOs, it has been identified that the **top 10 reasons for truck stoppages** pertain to documentation checks and overloading, comprising ~ 70%- 80% of the total stoppages:

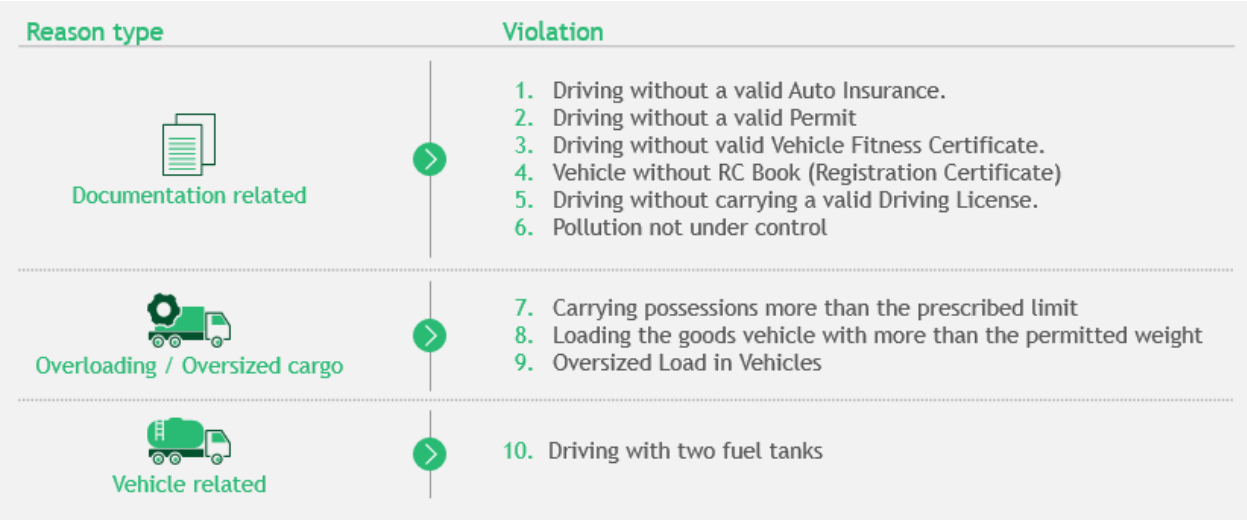
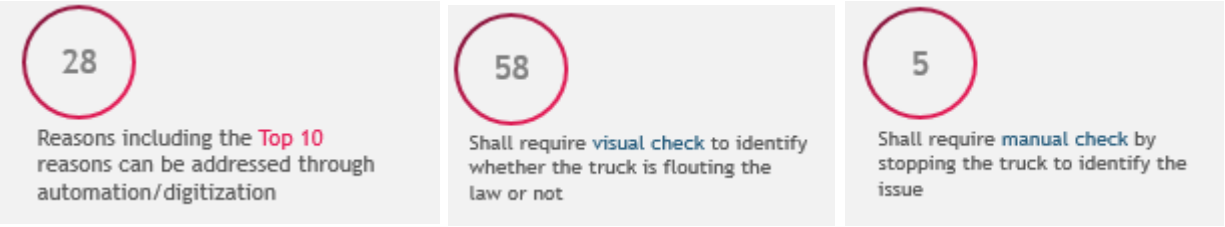


Figure 3: Top 10 reasons for truck stoppages by RTOs in India

4 Analysis

Of all the reasons analysed for truck stoppages, 28 reasons including the top 10 reasons can be addressed through automation and digitization of check points; 58 reasons require visual checks to identify whether the truck is flouting the law or not.

Only 5 reasons require manual check by stopping the truck to identify the issue - Driving under influence of alcohol and/ or drugs; driving when emotionally, mentally and/ or physically unfit, carrying illegal substances along with / hidden among goods; permitting your vehicle to be driven by an individual who does not hold a valid Driving License; driving by a minor (aged below 18)



28 Reasons that can be addressed through automation/digitization

Area	Truck stoppage reasons
Sensor/ Automation	1. Carrying possessions more than 11 feet high 2. Loading the goods vehicle with more than the permitted weight 3. Oversized Load in Vehicles 4. Driving with two fuel tanks 5. Tyres with some kind of defection 6. Driver refusing to weigh his vehicle 7. Driving without proper or valid number plate or illuminating the number plate at the back 8. Use of Offensive Number Plate for vehicle used in driving 9. Displaying 'Applied For' in place of Number Plate 10. Driving above the permitted Speed Limits by the Traffic Police 11. Abetment for Going over the Speed Limit 12. Hazardous or hasty (over the speed limit) driving 13. Driving through a place in 'NO ENTRY' Time
Documentation Related	14. Not carrying the required documents as specified in Motor Vehicle Act while driving 15. Driving without a Valid Auto Insurance 16. Driving without a Valid Permit 17. Driving without Valid Vehicle Fitness Certificate 18. Vehicle without RC Book (Registration Certificate) 19. Driving without carrying a Valid Driving License 20. Pollution Not Under Control
Documentation - Fitness certificate Check + Visual check	21. Smoky Exhaust (against specifications) 22. Painting of goods Carriages : Should be in highway yellow color front and back;white in case of hazardous goods 23. Usage of Colored/ Tinted light on the vehicle 24. Using multi-toned and/ or shrill horn 25. Vehicles that are fitted with tint/ dark glasses or sun films 26. Driving without a fixed Silencer 27. Driving without a Horn 28. Silencer and/ or muffler making a huge noise

58 Reasons shall require visual check to identify whether the truck is flouting the law or not (1/2)

Area	Truck stoppage reasons	
Visual Check	29. Carrying animals in goods vehicles in contravention of rules. 30. Transporting people hazardously or carrying people in goods carrier vehicles. 31. Carrying goods in an unsafe manner 32. Loading on Tail Board. 33. Carrying Goods in Passenger Vehicles 34. Rough/ Reckless/ Negligent Driving 35. Not driving in the proper lane. 36. Playing music while Driving. 37. Driving without fastening the seat belts. 38. Taking "U" turn during forbidden hours. 39. Failing to slow down at intersection/ junction. 40. Purposely disobeying Lawful Directions. 41. Using Mobile Phone while Driving. 42. Transporting goods in a treacherous or hazardous way. 43. Improper usage of horn when you drive. 44. Blowing Pressure Horn. 45. Use of horn in Silence Zone. 46. Disobeying a Traffic Police Officer in uniform. 47. Driving through a place in 'NO ENTRY' Time 48. Driving in the center and not keeping to left side of the road.	49. Not carrying on left of traffic island. 50. Driving on Footpath. 51. Stopping at pedestrian from crossing or crossing a Stop Line (Zebra Cross). 52. Driving against One Way. 53. Reversing without due caution and care. 54. Not taking adequate care while taking a "Turn". 55. Leaving a vehicle in untenanted engine. 56. In case of an accident involving a minor. 57. Violating the Yellow Line. 58. Violating the Stop Line. 59. Violating the Mandatory Signs. 60. Improper use of headlights and/ or tail light for your vehicle used in driving. 61. Using a High Beam when it is not needed. 62. Driving against Police Signal. 63. Not complying with the manual Traffic Signal. 64. Not complying with the Traffic signal / Sign Board. 65. Failing to give the appropriate Signal. 66. Signal Jumping. 67. Without Wiper 68. Without Side Mirror.

Area	Truck stoppage reasons
Visual Check	69. Overtaking hazardously. 70. Failing to deliberate way to sanction Overtaking. 71. Overtaking from the Wrong Side. 72. Leaving vehicle in a dangerous position. 73. Parking in the same direction of the flow of traffic. 74. Parking away from walkway towards road. 75. Parking against flow of traffic. 76. Parking causing Obstruction to other vehicles and people. 77. Parking in not any specified way. 78. Parking at any Corner/ Edge. 79. Parking within 15 meters on either side of a Bus Stop, causing inconvenience to those waiting for bus as well as bus drivers. 80. Parking on a Bridge. 81. Parking at any Traffic Island. 82. Parking in 'No Parking' Zone. 83. Parking on any Pedestrian Crossing. 84. Parking the vehicle on Walkways. 85. Parking in front of any gate. 86. Any kind of obstruction caused due to the way you have parked your vehicle.

5 Reasons shall require manual check by stopping the truck to identify the issue

Area	Truck stoppage reasons
Manual Check	87. Driving under influence of Alcohol and/ or Drugs. 88. Driving when emotionally, mentally and/ or physically unfit. 89. Carrying illegal substances along with / hidden among goods 90. Permitting your vehicle to be driven by an individual who does not hold a valid Driving License 91. Driving by a minor (aged below 18)

5 Recommendations

In order to automate violation detection of 28 reasons including the top 10 reasons, sensors based detection using RFID reader, medium speed weigh in motion, automated number plate system, automatic vehicle classifier, CCTV cameras is recommended, basis global benchmarks. It is also recommended that the usage of existing infrastructure being built on toll plazas under Electronic Toll Collection Programme should be explored rather than building additional infrastructure at new check posts for executing the following steps:

i. RFID Reader, Automated License Plate System to automatically capture vehicle number

ii. Medium Speed Weigh in Motion (MSWIM) to capture gross vehicle weight, height of passing vehicle, number of axles, axle spacing, number of wheels
iii. Automatic Vehicle Classifier (AVC) System to capture the vehicle type
iv. Access / retrieval of gross vehicle weight, vehicle type and vehicle dimensions from Vahan database basis vehicle number
v. Validate auto insurance, permit, vehicle fitness certificate, RC Book (registration certificate), pollution under control and tax payment through Vahan
vi. Corroborate weight and dimension data retrieved from MSWIM, AVC and Vahan to identify vehicles which are overloaded / carrying oversized load / carrying possessions more than the prescribed height
vii. If the vehicle is identified to be overloaded / carrying oversized load / carrying possessions more than the prescribed height or there is document related violation; challan to be generated automatically in E Challan system
viii. Incident capture camera to capture a digital image of the vehicle and CCTV cameras to capture footage

#	Infrastructure	Status
1	FASTags	Mandated by Supreme Court, states need to facilitate 100% adoption
2	Standardized number plates	
3	RFID Readers	Currently being implemented at toll locations by MoRTH under Electronic Toll Collection Programme. Explore feasibility of using the existing infrastructure at toll locations.
4	Automatic licence plate readers	
5	Automatic vehicle classifiers	
6	Medium speed weigh in motion	
7	CCTV cameras	

Figure 4: Status of the infrastructure that has been recommended to automate violation detection

It is also recommended that that E way bill should only be generated if the vehicle has the following in place:

i. Vehicle fitness (valid registration certificate, valid permits, tax payments)
ii. RFID (Fastag) enabled
iii. Valid PUC
iv. No pending challan beyond 1 month

This can be achieved by API based linking of Vahan and E Way bill

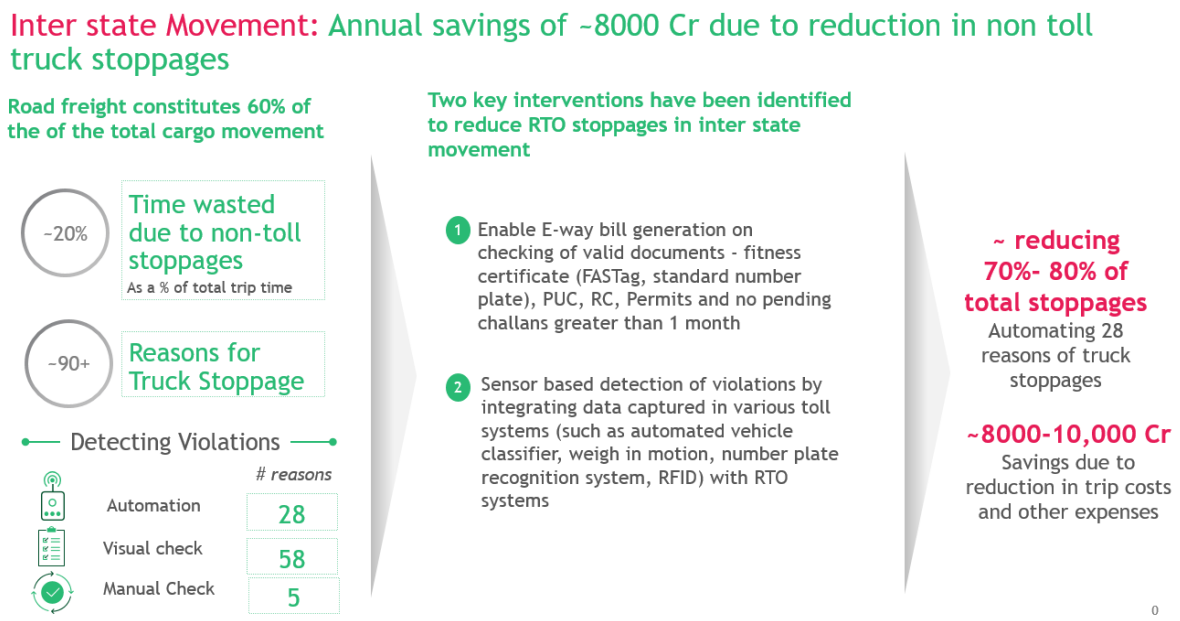


Figure 5 : Summarized interventions for Inter State Movement

To facilitate the key recommendation, the following **enablers** need to fall in place:

#	Enabler	Description
1	Fitness certificate issuance	Issuance of Fitness certificate only post mandatory checks for: • Standardized high security registration plates (HSRP) • NHAI approved FASTags
2	National permit issuance	Issuance of National permit only post mandatory checks for: • Standardized high security registration plates (HSRP) • NHAI approved FASTags
3	Vahan adoption	Mandate 100% Vahan adoption by all RTOs
4	Vahan capability expansion	• Issuance of Fitness certificate and National Permit only through Vahan • Integration of E challan systems of all states with Vahan • Expansion of Vahan fields to capture compliance related issues like pollution in control and FASTag related information
4	E - challan adoption	Mandate 100% E-Challan adoption by all RTOs
5	E - way bill	API based linkage of E way bill with VAHAN

6 Potential Savings

~20% of the trip time is currently attributed to non –toll stoppages by RTOs, leading to higher costs per tonne per kilometre. It is estimated that if the key recommendations are executed at all toll plazas on national highways, it will unlock ~INR 8000-10,000 Cr annual savings in logistics cost arising due to reduction in trip costs and other expenses[2]

7 Action agenda

Basis the analysis and stakeholder discussions, a preliminary action agenda has been identified for interstate movement, for consideration of respective Central Ministries and State authorities:

Ministry of Road Transport and Highways (MoRTH)

i. MoRTH may promote 100% adoption of Vahan, Sarathi and E challan systems by the states
ii. MoRTH may evaluate mandating issuance of Fitness Certificate, National Permit only through Vahan
iii. MoRTH may evaluate mandating standardized high security registration plate, FASTag and Pollution Under Control certificate for issuance of Vehicle Fitness Certificate
iv. MoRTH may encourage individual states (e.g. UP, MH) to adopt only NHAI standardized FASTag. MoRTH may be requested to check the RFID tags mandated by the Uttar Pradesh state government.

[2] For calcultions following assumptions have been made:
Assumed Highway BTKM (billion tonne per km) of 2043 for 2018-2019 (Road BTKM as per OECD data (2015-2016) - 2210.85; Highway Freight traffic of 70%; Annual Growth in BTKM – 9.7%)
Assumed costs of 25T truck with 15T Payload
Assumed that there is 1 hour of non toll stoppage for every 12 hour of drive

v. MoRTH may evaluate mandating standardized high security registration plate and FASTag for issuance of National Permit

GST Council

i. In coordination with MoRTH, GST Council may explore feasibility to generate e-way bill only if a vehicle has all valid documents including valid fitness certificate (including high security number plate), FAStag, PUC, RC, relevant National/ State Permit and has no pending challans greater than 1 month

State Governments

i. In coordination with MoRTH, State Governments may explore feasibility of integrating data captured in various toll systems (such as automated vehicle classifier, weigh in motion, number plate recognition system, RFID) with RTO systems
ii. State Governments may encourage 100% adoption of only NHAI standardized FASTag
iii. State Governments may promote 100% adoption of Vahan, Sarathi and E challan systems by the states
iv. State Governments may promote 100% adoption of standardized high security registration plates

Ministry of Electronics and Information Technology (MEITY)

i. MEITY to facilitate realtime data updation to Vahan
ii. In coordination with MoRTH, MEITY to expand scope of Vahan to capture compliance related issues like pollution in control and FASTag related details

8 Conclusion

The Integrated National Logistics Action Plan lays out a preliminary set of key reccomendations for streamlining inter state movement with potential annual savings of ~INR 8000-10,000 Cr. The analysis included identifying major reasons of truck stoppages

and addressing them through automation and digitization of check points; integration of Vahan and E Way bill. The initiatives have been converted into action agendas for consideration of different ministries and state governments.

9 Appendix

Appendix 1: Illustrative list of stakeholder consultations

Truck Drivers
- Delhi-Pune route
- Delhi-Bangalore route
- Delhi-Ankleshwar route

Logistics and Automation Startups
- Blackbuck
- Rivigo
- Vishwakarma
- Vehant Systems

Other stakeholders
- Secretary, All India Motor Transportation Congress
- Safeducate (Truck driver skilling)

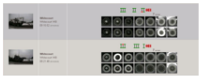
Transporters
- Safexpress
- DHL
- Safety Carriers Transport
- Sangha Transporters
- Walia Transporters
- OTPC
- Okara Roadways
- Karni Transporters
- East India Transport

RTOs and Authorities
- RTO - Ajmer, Rajasthan
- Jt Commisioner - Transport , Rajasthan
- NIC Director in charge of VAHAN and SARATHI
- Deputy Commissioner, Enforcement - Maharashtra State Transport Office

Field Visits
- Achhad Checkpost and Central Data Center (Maharashtra)

Appendix 2 : Global benchmarks studied

Global Benchmarks (1/3)

	technology	Description	Country	Type	
1	Weigh in Motion (WIM)	• Detect overloaded in commercial vehicles • Once, WIM identifies vehicle that are likely to be overloaded, such vehicles are diverted to a lane for checking by a static weighing device		Sensor - Weight	
2	Automated Under Vehicle Area Scanners (AUVAS)	• Current AUVAS systems are being used to check for explosives, firearms, drugs and other contraband cargo • Software can be designed to check for double fuel tanks and other illegal modifications in the truck		Sensor - Gear	
3	Axle Load Indicators	• Current systems are used to depict weight of the cargo loaded on the truck • The same technology can be linked to ignition and then truck can't be operated with cargo crossing load capacity		Sensor (In vehicle) - Weight	
4	Thermal Imaging System	• Identifies for thermal signatures associated with unsafe and defective equipment such as inoperative brakes, failed bearings and under-inflated or damaged tires		Sensor - Gear	

	technology	Description	Country	Type	
5	Tire Anaomaly and Classification System (TACS)	• Identify unsafe vehicles due to missing or underinflated tires • Consists of In Road Sensors, Roadside Electronics and Software and Graphical User Interface (GUI)		Sensor - Tyres	
6	Automated Number Plate Recognition	• Optical Character Recognition (OCR) to analyse and identify number plates • Fast recognition of vehicles to impose fines on vehicles violating traffic, toll collection		Sensor	
7	Risk Management System	• Roadside inspections risk rating system based on the number and severity of deviations found on vehicles operated by individual undertakings • Transporter's profiling to be based on roadworthiness tests, roadside inspections and insurance history		IT System	
8	CARNET	• Green Channel to be provided for cargo to move in sealed containers and closed body trucks across EU borders		Green Channel System	

	technology	Description	Country	Type	
9	HAZMAT System	• HAZMAT System used to track trucks carrying hazardous materials • Is used to ensure trucks follow pre defined route • Can immobilize trucks in case of emergency		IT System	

10	Comprehensive Management Software	• Comprehensive Management Software used for incidence processing and enforcement of traffic rules and regulations
		  • Violation Documentation - Using Sensors
		  • Incidence Processing - Using IT Systems
		  • Incidence Data Verification - Using Vehicle Owner Database, Driver Registry
		  • Collection Solution - Online Ticketing and Fine collection
				Sensors + IT Sytem	

11	Automatic Debit of Challan	• Driver and Vehicle Licensing Agency (DLVI) deducts fines directly from the Direct Debit Account of the holder • Late payment leads to fine (80 Pound) / vehicle could be clamped or crushed, or details being passed to a debt collection agency		IT Sytem	

Appendix 3: 90 reasons for truck stoppages by RTOs / Police Authorities

Area	Truck stoppage reasons
Sensor/Automation	1. Carrying possessions more than 11 feet high 2. Loading the goods vehicle with more than the permitted weight 3. Oversized Load in Vehicles 4. Driving with two fuel tanks 5. Tyres with some kind of defection 6. Driver refusing to weigh his vehicle

	7. Driving without proper or valid number plate or illuminating the number plate at the back 8. Use of Offensive Number Plate for vehicle used in driving 9. Displaying 'Applied For' in place of Number Plate 10. Driving above the permitted Speed Limits by the Traffic Police 11. Abetment for Going over the Speed Limit 12. Hazardous or hasty (over the speed limit) driving 13. Driving through a place in 'NO ENTRY' Time
Documentation Related	14. Not carrying the required documents as specified in Motor Vehicle Act while driving 15. Driving without a Valid Auto Insurance 16. Driving without a Valid Permit 17. Driving without Valid Vehicle Fitness Certificate 18. Vehicle without RC Book (Registration Certificate) 19. Driving without carrying a Valid Driving License 20. Pollution Not Under Control
Documentation – Fitness certificate Check + Visual check	21. Smoky Exhaust (against specifications) 22. Painting of goods Carriages : Should be in highway yellow color front and back; white in case of hazardous goods 23. Usage of Colored/ Tinted light on the vehicle 24. Using multi-toned and/ or shrill horn 25. Vehicles that are fitted with tint/ dark glasses or sun films 26. Driving without a fixed Silencer 27. Driving without a Horn 28. Silencer and/ or muffler making a huge noise
Visual Check	

	29. Carrying animals in goods vehicles in contravention of rules. 30. Transporting people hazardously or carrying people in goods carrier vehicles. 31. Carrying goods in an unsafe manner 32. Loading on Tail Board. 33. Carrying Goods in Passenger Vehicles 34. Rough/ Reckless/ Negligent Driving 35. Not driving in the proper lane. 36. Playing music while Driving. 37. Driving without fastening the seat belts. 38. Taking “U” turn during forbidden hours. 39. Failing to slow down at intersection/ junction. 40. Purposely disobeying Lawful Directions. 41. Using Mobile Phone while Driving. 42. Transporting goods in a treacherous or hazardous way. 43. Improper usage of horn when you drive. 44. Blowing Pressure Horn. 45. Use of horn in Silence Zone. 46. Disobeying a Traffic Police Officer in uniform. 47. Driving through a place in 'NO ENTRY' Time 48. Driving in the center and not keeping to left side of the road. 49. Not carrying on left of traffic island. 50. Driving on Footpath. 51. Stopping at pedestrian from crossing or crossing a Stop Line (Zebra Cross). 52. Driving against One Way. 53. Reversing without due caution and care. 54. Not taking adequate care while taking a “Turn”.

	55. Leaving a vehicle in untenanted engine. 56. In case of an accident involving a minor. 57. Violating the Yellow Line. 58. Violating the Stop Line. 59. Violating the Mandatory Signs. 60. Improper use of headlights and/ or tail light for your vehicle used in driving. 61. Using a High Beam when it is not needed. 62. Driving against Police Signal. 63. Not complying with the manual Traffic Signal. 64. Not complying with the Traffic signal / Sign Board. 65. Failing to give the appropriate Signal. 66. Signal Jumping. 67. Without Wiper 68. Without Side Mirror. 69. Overtaking hazardously. 70. Failing to deliberate way to sanction Overtaking. 71. Overtaking from the Wrong Side. 72. Leaving vehicle in a dangerous position. 73. Parking in the same direction of the flow of traffic. 74. Parking away from walkway towards road. 75. Parking against flow of traffic. 76. Parking causing Obstruction to other vehicles and people. 77. Parking in not any specified way. 78. Parking at any Corner/ Edge. 79. Parking within 15 meters on either side of a Bus Stop, causing inconvenience to those waiting for bus as well as bus drivers. 80. Parking on a Bridge. 81. Parking at any Traffic Island.

	82. Parking in 'No Parking' Zone. 83. Parking on any Pedestrian Crossing. 84. Parking the vehicle on Walkways. 85. Parking in front of any gate. 86. Any kind of obstruction caused due to the way you have parked your vehicle.
Manual Check	87. Driving under influence of Alcohol and/ or Drugs. 88. Driving when emotionally, mentally and/ or physically unfit. 89. Carrying illegal substances along with / hidden among goods 90. Permitting your vehicle to be driven by an individual who does not hold a Valid Driving License 91. Driving by a minor (aged below 18)

Chapter 9: GST

Table of Contents

1 Landscape & Context

Logistics is the backbone for economic growth in the country with potential to facilitate trade, enhance farmer income, drive the 'Make in India' initiative and reduce economic disparities across geographies. A reliable, efficient and cost-effective logistics infrastructure is hence critical to India's continued inclusive economic growth.

The government implemented the Goods and Services Tax (GST) from July 1st, 2017 onwards. GST promises to integrate India's multi-layered indirect tax system into a single unified one, simplifying the complexities of the existing tax structure and improve ease of doing business. The change in the indirect tax system has the potential to reduce transportation cycle times, enhance efficiency and effectiveness of the value chain and lead to consolidation of warehouses which could help the logistics industry reach its potential in terms of service and growth, reduced logistics costs and turnaround times. As per a recent report, the warehousing sector is expected to grow by 112% as GST is pushing companies to re-structure their portfolio and bring in larger and supply chain-efficient warehouses rather than focusing on tax saving through smaller facilities.

The implementation of GST has had a positive impact on the logistics industry in several ways including:

- 22 states abolished border check posts within 3 days of implementation of GST to allow for free movement of goods across states and move towards one nation-one tax-one market

- Differentiation between inter-state movement and intra-state movement of goods has been abolished thereby eliminating the need to open warehouses in each state and allowing larger, integrated warehouses to be developed to reduce administrative costs
- A digital input tax credit scheme designed under the GST has enabled various value chain constituents such as transporters, warehouse keepers etc. to reduce their capital and operating expenditure.

However, there are some issues with regard to GST rates and other administrative/operational aspects which need to be addressed to facilitate seamless movement of goods and services and reduction in logistics cost. In this note, issues related to differential GST rates and other GST administrative/operational issues have been highlighted.

2 Approach and Methodology

In order to develop a comprehensive list of key issues being faced by the logistics industry, the current GST rates on transportation and logistics services were baselined (Details in Annexure - I). Based on the baselining exercise, transportation and logistics services were grouped into buckets based on which services are typically bundled together. Each bundle of service was analyzed to identify any issues related to rate mismatch. In addition, discussions have been undertaken with stakeholders across the logistics value chain, such as:

- Leading transportation associations, industry players and journals
- Warehousing companies
- Freight forwarders
- Courier industry players and associations
- Customs House Agents
- Large end-users of Logistics industry including automotive companies and associations, e-commerce players

A detailed list of players, associations that we have interacted with to develop this draft has been included in Annexure- II.

Issues pertaining to GST rates and administrative and operational challenges that can be resolved by the Government and not a teething issue related to GST has been identified for a deep dive. Also, inputs from indirect tax experts specializing in the logistics industry in India has been sought to vet the issues raised by industry stakeholders.

3 Key Recommendations

3.1 Notify single GST rate for Multimodal transportation and value added services in Logistics industry

For transportation of goods, multimodal transportation (Road, Railways and Coastal Shipping) is an important means for movement of goods. Multimodal movement of goods typically includes a combination of more than one mode of transportation for the end-to-end delivery of products. Some examples are as under:

- Road and Railways - First and Last mile by Road, primary movement by Railways.
- Road and Shipping - First and Last mile by Road, primary movement by Coastal Shipping.
- Road, Shipping and Railways - First mile by Rail (if there is a Railway siding available in the factory), primary movement by Coastal Shipping and the Last mile by Road.

Further, the Logistics service provider undertakes various activities such as bundling, kitting, re-packaging, cleaning etc. while providing end to end services to the customers.

Currently, there is *lack of clarity on the GST rate on multimodal transportation* and different interpretations have been adopted by tax experts and consultants. Also, *it is not clearly defined if multimodal transportation is considered as a composite supply or a mixed supply*.

The GST rates prescribed for various components of multimodal and value added services differ. GST rates applicable on various activities in the multimodal movement and value added services are as follows:

- First mile (by trucks) – GST @5% under Reverse Charge Mechanism (RCM) or 12% under Forward Charge Mechanism (FCM);
- Port charges for storage of goods at origin Port (Wharfage) – GST @18%;
- Port handling of goods at origin port – GST@18%;
- CHA charges at origin and destination ports – GST@ 18%;
- Ocean freight (domestic coastal movement) – 5 % under FCM;
- Destination port wharfage – GST@18%;
- Destination port handling – GST@18%;
- Last mile transportation by trucks/trailers – GST @5% under RCM or @12% under FCM
- Kitting , re-packaging, bundling, cleaning etc. – GST @ 18%

The GST law has defined “composite supply” to mean a supply made by a taxable person to a recipient consisting of two or more taxable supplies of goods or services or both, or any combination thereof, which are naturally bundled and supplied in conjunction with each other, one of which is a principal supply. The GST rate as applicable to the principal supply is to be applied to the composite supply cases irrespective of the GST rate as applicable on the individual supplies. For example, where goods are packed and transported with insurance, the goods, packing materials, transport and insurance is a composite supply and goods is a principal supply, the GST rate as applicable to the goods is to be applied on the entire consideration for composite supply.

On the other hand, “mixed supply” has been defined to mean two or more individual supplies of goods or services, or any combination thereof, made in conjunction with each other by a taxable person for a single price where such supply does not constitute a composite supply. The highest GST rate amongst the individual supplies is to be applied on the entire consideration of mixed supplies. For example, supply of a package consisting of canned foods, sweets, chocolates, cakes, dry fruits, aerated drinks and fruit juices when supplied for a single price is a mixed supply. Each of these items can be supplied separately and is not dependent on any other. It shall not be a mixed supply if these items are supplied separately.

The GST rate on multimodal transportation of goods not been clearly defined in the GST Rate Tariff for services (Service Activity Code 9965) and hence businesses tend to classify it under the residuary rate (18%). Similar is the case with Value Added Services which are taxed at the residuary rate (18%).

Proposed solution and potential impact: It is suggested that multimodal transportation and value added services be clarified as composite supply. This will resolve the ambiguity on the GST rate to be applied for multimodal transportation of goods and value added services. Also, certainty in respect of GST liability for the service providers will lead to mitigation of likely disputes arising out of different interpretations taken by companies and tax experts.

Implications for stakeholders and next steps: Multimodal transport operators will likely benefit from the clarity on GST. There is no expected revenue loss to the Government from this initiative. As a next step, clarification needs to be issued by the GST Council / CBIC.

3.2 Allow input tax credit for warehousing and related services for service recipient outside the State

As per the current rules for place of supply concerning renting of warehouses, *if the customer/service recipient is not registered in the state where the warehouse is located, then the input tax credit cannot be claimed by the customer/service recipient in the state where the warehouse is located.*

In Business to Business (B2B) transactions, as per the current place of supply rules under the GST regime, place of supply of warehousing services is the physical location of the warehouse. If the customer/ service recipient is not registered in the State where the warehouse is located, then they do not get input tax credit on the GST charged by the warehouse. Given the consolidation of the supply chain post the GST implementation, in many States, the customer/ service recipients use the warehousing location as a temporary storage location from where there is no taxable supply undertaken. Hence, they are not able to off-set the CGST and SGST charged by the warehouse service provider. In the distribution network, renting of warehouse is a major operational cost and

GST paid on the renting expense, not being available for claiming input tax credit results in increase in logistics cost.

Proposed solution and potential impact: It is suggested that as a special dispensation, the recipient of the warehousing and related services may be allowed to avail input tax credit based on the integrated GST (IGST) charged by the Service Provider so that no credit is lost. If this initiative is implemented, it is expected to lead to a reduction in logistics cost (especially warehousing costs) as logistics players will be able to avail full input tax credit

Implications for stakeholders and next steps: Transportation/logistics players will benefit as they will avail full input tax credit and the benefits would be passed on to consumers leading to a reduction in logistics cost. There would be some revenue loss to the states as they will have to pass on the entire input tax credit to the logistics players. As a next step, an amendment in input tax credit provisions by the GST Council / CBIC is proposed.

3.3 Continuing exemption to international air / sea freight to ensure level playing field for Indian freight businesses beyond 30 September 2018

International freight, where the delivery destination is outside the exporting country, is not subjected to any levy of consumption tax in most of the advanced countries. *Despite having the delivery destination outside India, freight payable on export consignments initiated from India were subjected to GST*, leaving the Indian freight business less competitive; resulting in the shift of the international freight business outside India. For example, is case of transport of goods in a vessel, for every Rs 100 of freight charged, Rs 5 is payable as GST.

The Government of India provided the much-needed relief in January 2018 whereby an exemption has since been provided though with a sunset clause restricting it up to September 30, 2018.

Proposed solution and potential impact: It is suggested that the sunset clause in the current exemption be removed and the exemption be granted permanently. This initiative

will create a level playing field for Indian Shipping Companies who are competing with foreign shipping companies for international freight.

Implications for stakeholders and next steps: This initiative will benefit the Indian Shipping Industry by reducing their GST tax liability and also creating a level playing field with foreign shipping companies. However, it would lead to a revenue loss for the Government as GST revenues from Indian Shipping companies for international freight would be eliminated. As a next step, an amendment to the exemption notification by the GST Council / CBIC is proposed.

3.4 Zero-rating of services provided for transshipment of goods at ports to ensure India can compete with other transshipment hubs

In India, *GST is applicable on most of the transport-related services which are essential for transshipment of goods* such as loading, unloading, handling services, warehousing fees, excess weight charges, refrigeration and packing fees, etc. Due to the current place of supply rules, these services are currently being subject to GST even for transshipment of goods. So for every Rs 100 paid for such services, Rs 18 is charged as GST which increases the cost of operations. While in most of the cases, though a refund mechanism has been prescribed, considerable amount is locked up in working capital as refunds usually get delayed which lead to escalations in working capital requirements and logistics cost.

Generally, international transportation of goods including transport related services are zero-rated ab initio. This is done to ensure that the export of goods remain competitive and also the country becomes a hub for transshipment activities. Singapore and UAE are successful examples where the supply of international transportation services for Goods are zero-rated.

Proposed solution and potential impact: It is suggested that, as done internationally, international transportation of goods including transport related services should be zero-rated ab initio. This will ensure transshipment services are in-line with global standards

from a tax perspective and make Indian ports more competitive as transshipment hubs. This initiative will further enhance India's ability to emerge as a transshipment hub.

Implications for stakeholders and next steps: This initiative will lead to improvement in working capital requirements for transportation and logistics players providing services at ports for transshipment. No revenue loss to the Government as these credits would have been availed by the logistics players overtime. As a next step, amendment to the GST Law by the GST Council / CBIC is proposed.

3.5 Grant IGST exemption for import of vessels by Indian flag carriers

The Indian Shipping companies are on a growth trajectory and hence import vessels into India. *While there was an exemption from Counter vailing Duty in the erstwhile Excise regime, no such exemption has been granted in the GST regime.* This has resulted into substantial hardship for the Indian shipping industry as they have to pay IGST @ 5% on import of vessels into India. Since most of the Indian vessels carry international freight, there is hardly any GST payable on their output services resulting into blockage and accumulation input tax credits which is impacting the viability of the Indian shipping business and is also proving to be a deterrent for new players to have Indian flagged vessels in their fleet.

Proposed solution and potential impact: It is suggested that an ab initio exemption from IGST be provided to the Indian shipping industry while importing the vessels into India which will provide substantial relief to them as also will act as an incentive for new investments. This initiative will lead to improvement in working capital requirements for Indian shipping companies and further promote coastal shipping transportation mode.

Implications for stakeholders and next steps: This initiative will benefit the Indian shipping industry by improving their working capital requirements. It would lead to a revenue loss for the Government as GST revenues from Indian Shipping companies for international freight would be eliminated. As a next step, amendment to the GST Law by the GST Council / CBIC is proposed.

3.6 Allow seamless input tax credit for GST paid on Bunkers and spare parts for coastal movement of vessels

Given the Government of India priorities to push transportation through ports and inland waterways, the Indian Shipping companies have increased their operations along the coastal waterways. The shipping companies procure bunker and various spares and consumables for the vessels. *Since these are supplied at various ports, CGST and State GST is levied on the same. The Indian Shipping companies are unable to claim input tax credit fully as there is hardly any output tax liability accruing in the State of purchase*. This results in increase in costs for operating the vessels.

Proposed solution and potential impact: It is suggested that the Indian Shipping companies be allowed to claim full input tax credit of the GST paid on purchases of bunker and other consumables / spares irrespective of their source of purchase. This can be achieved if the suppliers are allowed to charge IGST to the Indian Shipping Companies using their head office as the billing address which will result in lowering of operational costs. This initiative will lead to a reduction in logistics costs as full input tax credits will be available and the benefits can be passed on to end users.

Implications for stakeholders and next steps: This initiative will benefit the Indian shipping industry by improving their margins due to additional credits claimed. However, there would be a revenue loss to the Government as the logistics players would claim input tax credit which currently is not available to them. As a next step, amendment in input tax credit provisions by the GST Council / CBIC is proposed.

3.7 Simplify the e-way Bill mechanism

E-Way Bill mechanism is a powerful tool to curb tax evasion. It has also helped in reducing the paper burden on transporters. However, it is imperative that the mechanism is simple to follow and easy to operate. While the Government has recently introduced simplified procedures for transporters having pan India operations, further simplification is required to make it more seamless.

The GST Authorities are empowered to detain / confiscate the contents of the entire vehicle even if one of the packages is not supported by a valid e-way bill. Since the transporter / courier agency aggregates all the deliveries together and delivers them at the destination location, those consignments with GST compliant documentation also get held up for delivery as they are tagged along with the non-complaint

Proposed solution and potential impact: It is suggested that the procedures for detention and confiscation of goods upon non-production of e-way bill is rationalised so that only those consignments which are not supported by an e-way bill are detained / confiscated, and other goods which fulfill the requirements are allowed to be transported in the same carrier. This will enhance ease of operations for logistics companies.

Implications for stakeholders and next steps: This initiative will have a positive impact on logistics players as it will ease operations. No potential impact on the Government. As a next step, Instructions / Directives to be issued by the GST Council / CBIC on simplification of e-Way bill mechanism is proposed.

4 Conclusion and next steps

In the above section, a consolidated view of the key GST related issues faced by the logistics sector has been analyzed with recommendation developed for each key issue. As a next step, this note can be tabled by the Logistics Division, Department of Commerce to The Ministry of Finance/ GST Council. Further analysis of the issues identified and their impact on state revenues from GST can be undertaken by the Ministry of Finance/ GST Council.

Annexure I

Classification of transportation and logistics services and the applicable GST rate

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	General Trade				
9961	Services in wholesale trade. Explanation-This service does not include sale or purchase of goods but includes: – Services of commission agents, commodity brokers, and auctioneers and all other traders who negotiate whole sale commercial transactions between buyers and sellers, for a fee or commission – Services of electronic whole sale agents and brokers, – Services of whole sale auctioning houses	9	9	18	-
	Services in retail trade. Explanation- This service does not include sale or purchase of goods	9	9	18	-
	Transportation				
9965 (Goods Transport Services)	(i) Transport of goods by rail (other than services specified at item no. (iv))	2.5	2.5	5	Provided that credit of input tax charged in respect of goods in supplying the service is not utilised for paying central tax or integrated tax on the supply of the service
	(ii) Transport of goods in a vessel	2.5	2.5	5	Provided that credit of input tax charged on goods (other than on ships, vessels including bulk carriers and tankers) used in supplying the service has not been taken

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
					[Please refer to Explanation no. (iv)]
	(iii) Services of goods transport agency (GTA) in relation to transportation of goods (including used household goods for personal use). Explanation.- "goods transport agency" means any person who provides service in relation to transport of goods by road and issues consignment note, by whatever name called	2.5	2.5	5	Provided that credit of input tax charged on goods and services usedin supplying the service has not been taken [Please refer to Explanation no. (iv)]
	(iii) Services of goods transport agency (GTA) in relation to transportation of goods (including used household goods for personal use). Explanation.- "goods transport agency" means any person who provides service in relation to transport of goods by road and issues consignment note, by whatever name called.	6	6	12	Provided that the goods transport agency opting to pay central tax @ 6% under this entry shall, thenceforth, be liable to pay central tax @ 6% on all the services of GTA supplied by it
	(iv) Transport of goods in containers by rail by any person other than Indian Railways	6	6	12	-
	(v) Transportation of natural gas, petroleum crude, motor spirit (commonly known as petrol), high speed diesel or aviation turbine fuel through pipeline	2.5	2.5	5	Provided that credit of input tax charged on goods and services used in supplying the service has not been taken [Please refer to Explanation no. (iv)]
	(v) Transportation of natural gas, petroleum crude, motor spirit (commonly known as petrol), high speed diesel or aviation turbine fuel through pipeline	6	6	12	-

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	(vi) Goods transport services other than (i), (ii), (iii), (iv) and (v) above	9	9	18	-
	Exemption / Concessions in Transport Services				
	Services by way of transportation of goods- (a) by road except the services of— (i) a goods transportation agency; (ii) a courier agency; (b) by inland waterways	Nil	Nil	Nil	-
	Services by way of transportation of goods by an aircraft from a place outside India upto the customs station of clearance in India	Nil	Nil	Nil	-
	Services by way of transportation of goods by an aircraft from customs station of clearance in India to a place outside India	Nil	Nil	Nil	Nothing contained in this serial number shall apply after the 30thday of September, 2018
	Services by way of transportation of goods by a vessel from customs station of clearance in India to a place outside India	Nil	Nil	Nil	Nothing contained in this serial number shall apply after the 30thday of September, 2018
	Services by way of transportation by rail or a vessel from one place in India to another of the following goods – (a) relief materials meant for victims of natural or man-made disasters, calamities, accidents or mishap; (b) defence or military equipments; (c) newspaper or magazines registered with the Registrar of Newspapers; (d) railway equipments or materials; (e) agricultural produce;	Nil	Nil	Nil	-

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	(f) milk, salt and food grain including flours, pulses and rice; and (g) organic manure				
	Services provided by a goods transport agency, by way of transport in a goods carriage of - (a) agricultural produce; (b) goods, where consideration charged for the transportation of goods on a consignment transported in a single carriage does not exceed one thousand five hundred rupees; (c) goods, where consideration charged for transportation of all such goods for a single consignee does not exceed rupees seven hundred and fifty; (d) milk, salt and food grain including flour, pulses and rice; (e) organic manure; (f) newspaper or magazines registered with the Registrar of Newspapers; (g) relief materials meant for victims of natural or man-made disasters, calamities, accidents or mishap; or (h) defence or military equipments	Nil	Nil	Nil	-

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	Services provided by a goods transport agency to an unregistered person, including an unregistered casual taxable person, other than the following recipients, namely: - (a) any factory registered under or governed by the Factories Act, 1948 (63 of 1948); or (b) any Society registered under the Societies Registration Act, 1860 (21 of 1860) or under any other law for the time being in force in any part of India; or (c) any Co-operative Society established by or under any law for the time being in force; or (d) any body corporate established, by or under any law for the time being in force; or (e) any partnership firm whether registered or not under any law including association of persons; (f) any casual taxable person registered under the Central Goods and Services Tax Act or the Integrated Goods and Services Tax Act or the State Goods and Services Tax Act or the Union Territory Goods and Services Tax Act	Nil	Nil	Nil	-
9967 (Supporting services in transport)	(i) Services of goods transport agency (GTA) in relation to transportation of goods (including used household goods for personal use). Explanation.- “goods transport agency” means any person who provides service in relation to transport of goods by road and issues consignment note, by whatever name called.	2.5	2.5	5	Provided that credit of input tax charged on goods and services usedin supplying the service has not been taken [Please refer to Explanation no. (iv)]

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	(i) Services of goods transport agency (GTA) in relation to transportation of goods (including used household goods for personal use). Explanation.- "goods transport agency" means any person who provides service in relation to transport of goods by road and issues consignment note, by whatever name called	6	6	12	Provided that the goods transport agency opting to pay central tax @ 6% under this entry shall, thenceforth, be liable to pay central tax @ 6% on all the services of GTA supplied by it
	(ii) Supporting services in transport other than (i) above	9	9	18	-
	(ii) Time charter of vessels for transport of goods	2.5	2.5	5	Provided that credit of input tax charged on goods (other than on ships, vessels including bulk carriers and tankers) has not been taken [Please refer to Explanation no. (iv)]
	(iii) Rental services of transport vehicles with or without operators, other than (i) and (ii) above	9	9	18	-
	Exemption / Concessions in Supporting Transport Services				
	Services by way of giving on hire – (a) to a state transport undertaking, a motor vehicle meant to carry more than twelve passengers; or (b) to a goods transport agency, a means of transportation of goods. (c) motor vehicle for transport of students, faculty and staff, to a person providing services of transportation of students, faculty and staff to an educational institution providing services by way of pre-school education and	Nil	Nil	Nil	-

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	education upto higher secondary school or equivalent				
9971 (Financial and related services)	(v) Leasing of aircrafts by an operator for operating scheduled air transport service orscheduled air cargo service by way of transaction covered by clause (f) paragraph 5 of Schedule II of the Central Goods and Services Act, 2017. Explanation.- (a) “operator” means a person, organisation or enterprise engaged in or offering to engage in aircraft operations; (b) “scheduled air transport service” means an air transport service undertaken between the same two or more places operated according to a published time table or with flights so regular or frequent that they constitute a recognisable systematic series, each flight being open to use by members of the public; (c) "scheduled air cargo service" means air transportation of cargo or mail on a scheduled basis according to a published time table or with flights so regular or frequent that they constitute a recognisably systematic series, not open to use by passengers.	2.5	2.5	5	Provided that credit of input tax charged on goods usedin supplying the service has not been taken [Please refer to Explanation no. (iv)]
9973 (Leasing or Renatl services, with or w/o	(vii) Time charter of vessels for transport of goods	2.5	2.5	5	Provided that credit of input tax charged on goods (other than on ships, vessels including bulk carriers and tankers) has not been taken [Please

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
operator)					refer to Explanation no. (iv)]
	(viii) Leasing or rental services, with or without operator, other than (i), (ii), (iii), (iv), (v), (vi) and (vii) above	Same rate of central tax as applicable on supply of like goods involving transfer of title in goods	Same rate of UT tax as applicable on supply of like goods involving transfer of title in goods	Same rate of integrated tax as applicable on supply of like goods involving transfer of title in goods	-
Exemptions / Concessions in Warehousing Services					
	Services by way of loading, unloading, packing, storage or warehousing of rice	Nil	Nil	Nil	-
	Services by way of fumigation in a warehouse of agricultural produce	Nil	Nil	Nil	-

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	(i) Support services to agriculture, forestry, fishing, animal husbandry. Explanation. – "Support services to agriculture, forestry, fishing, animal husbandry" mean - (i) Services relating to cultivation of plants and rearing of all life forms of animals, except the rearing of horses, for food, fibre, fuel, raw material or other similar products or agricultural produce by way of— (a) agricultural operations directly related to production of any agricultural produce including cultivation, harvesting, threshing, plant protection or testing; (b) supply of farm labour; (c) processes carried out at an agricultural farm including tending, pruning, cutting, harvesting, drying, cleaning, trimming, sun drying, fumigating, curing, sorting, grading, cooling or bulk packaging and such like operations which do not alter the essential characteristics of agricultural produce but make it only marketable for the primary market; (d) renting or leasing of agro machinery or vacant land with or without a structure incidental to its use; (e) loading, unloading, packing, storage or warehousing of agricultural produce; (f) agricultural extension services; (g) services by any Agricultural Produce Marketing Committee or Board or services provided by a commission agent for sale or	Nil	Nil	Nil	-

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	purchase of agricultural produce. (h) services by way of fumigation in a warehouse of agricultural produce. (ii) Services by way of pre-conditioning, pre-cooling, ripening, waxing, retail packing, labelling of fruits and vegetables which do not change or alter the essential characteristics of the said fruits or vegetables. (iii) Carrying out an intermediate production process as job work in relation to cultivation of plants and rearing of all life forms of animals, except the rearing of horses, for food, fibre, fuel, raw material or other similar products or agricultural produce.				
	Services by way of pre-conditioning, pre-cooling, ripening, waxing, retail packing, labelling of fruits and vegetables which do not change or alter the essential characteristics of the said fruits or vegetables	Nil	Nil	Nil	-
	Services provided by the National Centre for Cold Chain Development under the Ministry of Agriculture, Cooperation and Farmer's Welfare by way of cold chain knowledge dissemination	Nil	Nil	Nil	-
Postal/ Courier					
9968	Postal and courier services	9	9	18	-
Exemptions / Concessions in Postal/ Courier services					

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	Services by the Central Government, State Government, Union territory or local authority excluding the following services— (a) services by the Department of Posts by way of speed post, express parcel post, life insurance, and agency (b) services in relation to an aircraft or a vessel, inside or outside the precincts of a port or an airport; (c) transport of goods or passengers; or (d) any service, other than services covered under entries (a) to (c)above, provided to business entities	Nil	Nil	Nil	-
	Services provided by the Central Government, State Government, Union territory or local authority to a business entity with an aggregate turnover of up to twenty lakh rupees (ten lakh rupees in case of a special category state) in the preceding financial year. Explanation.- For the purposes of this entry, it is hereby clarified that the provisions of this entry shall not be applicable to- (a) services,- (i) by the Department of Posts by way of speed post, express parcel post, life insurance, and agency services provided to a person other than the Central Government, State Government, Union territory; (ii) in relation to an aircraft or a vessel, inside or outside the precincts of a port or an airport; (iii) of transport of goods or	Nil	Nil	Nil	-

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	passengers; and (b) services by way of renting of immovable property				
	Services provided by the Central Government, State Government, Union territory or local authority to another Central Government, State Government, Union territory or local authority: Provided that nothing contained in this entry shall apply to services- (i) by the Department of Posts by way of speed post, express parcel post, life insurance, and agency services provided to a person other than the Central Government, State Government, Union territory; (ii) in relation to an aircraft or a vessel, inside or outside the precincts of a port or an airport; (iii) of transport of goods or passengers	Nil	Nil	Nil	-
	Services provided by Central Government, State Government, Union territory or a local authority where the considerationfor such services does not exceed five thousand rupees: Provided that nothing contained in this entry shall apply to- (i) services by the Department of Posts by way of speed post, express parcel post, life	Nil	Nil	Nil	-

Service Activity Code	Service	CGST (%)	SGST (%)	IGST (%)	Condition
	insurance, and agency services provided to a person other than the Central Government, State Government, Union territory; (ii) services in relation to an aircraft or a vessel, inside or outside the precincts of a port or an airport; (iii) transport of goods or passengers: Provided further that in case where continuous supply of service, as defined in sub-section (33) of section 2 of the Central Goods and Services Tax Act, 2017, is provided by the Central Government, State Government, Union territory or a local authority, the exemption shall apply only where the consideration chargedfor such service does not exceed five thousand rupees in a financial year				

Annexure II

List of transportation and logistics players and associations consulted to prepare the draft note

S. No	Logistics Value Chain	Name of player/ association
1.	Core Transportation	Indian National Shipowners Association
2.	Core Transportation	Gateway Rail Freight Limited
3.	Core Transportation	DP World

4.	Transportation Journal	Transtopics
5.	Warehousing	Allcargo Logistics
6.	Warehousing	Varuna Logistics
7.	Warehousing	Central Warehousing Corporation
8.	Freight Forwarder/3PL	LF Logistics
9.	Freight Forwarder/3PL	Container Corporation of India
10.	Freight Forwarder/3PL	Adani Logistics
11.	Freight Forwarder/3PL	TVS Logistics
12.	Freight Forwarder/3PL	Arshiya Limited
13.	Courier/Express	Express Industry Council of India
14.	Courier/Express	DHL
15.	Courier/Express	FedEx
16.	Courier/Express	Blue Dart
17.	Courier/Express	GATI
18.	Custom House Agent	Bablani Clearing Forwarding & Logistics Pvt Ltd
19.	End Users	Society of Indian Automobile Manufacturers (SIAM)
20.	End Users	Tata Motors
21.	End Users	Firstcry.com (e-commerce)

Chapter 10: Policies: National Logistics Policy, MMLP Policy and Model Warehousing Policy

Contents

1 Context

A key element of the National Logistics Action Plan is to identify modifications that maybe required in the existing acts and rules, with the objective to optimize the movement of goods in the country and promote ease of doing business. Where relevant, as part of each of individual deep dives, key changes to existing policy, rules, regulations and guidelines have been covered in the respective sections.

Beyond that, 3 key policies also have been drafted as a part of the National Logistics Plan.This chapter covers a brief overview of the 3 policies :

- National Logistics Policy
- Multi Modal Logistics Park Policy
- Model Warehousing Policy

Given these policies are at varying stages of approval and launch the exact specific details have not been included as a part of this document. The details for the policies can be requested from thr logistics division

2 National Logistics Policy

2.1 Context and background

- Despite the recognition of logistics being a critical driver of economic development, logistics cost in India, estimated at 13-14% of GDP, is very high (USA 9-10%, Europe 10%, Japan 11%) compared with more efficient global environments, and the sector continues to be highly unorganized. India also has a skewed modal transportation mix, with 60% of freight moving on roads, which is significantly larger than in key developed economies
- Different parts of the logistics value chain currently are being managed by many ministries including Road Transport and Highways, Shipping, Railways, Civil Aviation, Commerce and Industry, Finance and Home Affairs. In addition, a large number of government agencies including Central Drug Standard Control Organization, Food Safety and Standards Authority of India, Plant and Animal

Quarantine Certification Service provide relevant trade clearances and impact the value chain

- Globally, leading countries that have achieved efficiency in logistics, like Germany, South Korea, Japan and Malaysia among others, follow a completely integrated approach towards logistics, and the government provides a coordinated oversight to the entire logistics value chain. In some countries, a Special Committee Chaired by the Prime Minister reviews progress of the National Integrated Logistics Action Plan. In line with the above, there is significant potential for India to integrate and optimize the various elements of its logistics value chain, to ensure seamless, multi modal growth of an efficient logistics sector
- Some of the activities like cold chains, multi-modal logistics parks, etc. in the logistics sector have also been included in the Harmonized Master List of Infrastructure sub-sectors' and has been granted infrastructure status in November 2017, which will enable the sector to avail infrastructure lending at easier terms with enhanced limits, access to larger volume of funds as External Commercial Borrowings (ECB) and access to longer tenure funds from insurance companies
- The National Logistics Policy, 2018 focuses on enabling integrated development of the logistics sector in the country. It aims to inform, clarify, strengthen and prioritize the key objectives, focus areas and the governance framework for logistics in India. It also clarifies the role of the various stakeholders including central ministries, state governments and other key regulatory bodies, and will promote holistic decision-making for the development of the logistics sector in India, to drive economic growth and trade competitiveness of the country

2.2 Vision

To drive economic growth and trade competitiveness of the country through a truly integrated, seamless, efficient, reliable and cost effective logistics network, leveraging best in the class technology, processes and skilled manpower

2.3 Key Thrust Areas

Given the pivotal role of the logistics sector in the development of the economy and the need to incorporate learnings from global best practices, the policy outlines an ambitious set of objectives. The following are some of the key thrust areas for logistics in India, to be achieved by the year 2022.

- Drive logistics cost as a % of GDP down from the estimated current levels of 13-14% to best-in-class global standards and incentivize the sector to become more efficient by promoting integrated development of logistics by:
    - Identification and Implementation of critical projects to drive an optimal modal mix through operational research and enable first mile and last mile connectivity
    - Driving development of Multi Modal Logistics Parks (MMLPs)
    - Driving interventions to reduce logistics cost and promoting logistics efficiency for movement of key commodities
- Creating a single window Logistics e-marketplace for transparency, compliance certification from government agencies and enabling logistics service providers to seamlessly engage with users
- Creating a data and analytics center to drive transparency and continuous monitoring of key logistics metrics
- Creating a Center of Trade facilitation and Logistics excellence (CTFL)
- Creating an Integrated National Logistics Action Plan and aligning with respective state development plans
- Enhancing transport and rolling stock infrastructure
- Streamlining EXIM processes to promote trade competitiveness
- Strengthening the warehousing sector in India and improving quality of specialized storage to reduce losses due to agri-wastage
- Reducing dwell time for interstate cargo movement by road
- Promoting standardization in the logistics sector
- Ensuring seamless movement of goods at Land Customs Stations (LCS) and Integrated Check Points (ICP)

- Generating employment and enhancing skilling in the logistics sector
- Strengthening the MSME sector through efficient logistics
- Promoting e-commerce through seamless flow of goods
- Promoting Green & Sustainable Logistics
- Setting-up a Startup acceleration fund

2.4 Governance mechanism

- **A** 'Framework Act on Integrated Logistics' will be enacted to define the role and responsibilities of all stakeholders in the multimodal logistics space. This will institutionalize the defined roles of stakeholders as per the National Logistics Policy, 2018 and enable the government to effectively drive the national logistics agenda, while ensuring long term continuity. The Act will provide a broad overarching national framework of general principles concerning the formulation and execution of, and support for, the policies and plans for logistics in India and overseas. This will facilitate greater efficiency in logistics, strengthening competitiveness of the logistics industry, and the greater advancement and internationalization of logistics.
- In order to drive progress across the key objectives and the defined thrust areas of the National Logistics Policy, 2018, and to ensure effective coordination across all relevant stakeholders – private and public, four councils / committees are proposed to be constituted as listed below. The exact composition and roles of each committee is elaborated in the National Logistics Policy, 2018.
    - National Council for Logistics, chaired by the Prime Minister of India, to provide overall direction and guidance for the integrated development of logistics and to review the progress made across the Integrated National Logistics Action Plan every six months
    - An Apex Inter-Ministerial Committee, under the chairmanship of the Minister of Commerce & Industry, to review the progress on the Integrated National Logistics Action Plan on a quarterly basis and resolve inter-ministerial issues

- A National Logistics Forum chaired by the Commerce Secretary with representation from government, academia as well as key industry/business stakeholders, to hear the voice of the industry on key challenges faced and to facilitate industry buy-in and feedback for key interventions defined in the Integrated National Logistics Action Plan
- An empowered task force under the head of the Logistics Wing, Department of Commerce with representation at the Joint Secretary (or equivalent) level from relevant departments. The task force will meet monthly to review progress against the Integrated National Logistics Action Plan at each intervention level, and also enable inter-ministerial coordination / information exchange required

2.5 Current status

A stakeholder consultation was conducted with the relevant stakeholders to formulate the policy. Inputs from various ministries were also included in the policy. The draft policy has been opened to public consultation and a final stakeholder consultation is scheduled for 19th and 20th Feb 2019

3 MMLP Policy

3.1 Context and background

- India has a skewed modal mix, with 60% of freight moving on roads, which is by far the highest among large countries. Freight movement by road is typically 25 – 30% more expensive than railways for long haul routes, thereby increasing the overall freight transportation cost in India. In comparison, in USA only 37% of freight is transported through road, while 48% of all freight is transported by rail; water also has a significant share of cargo at 14%. In China, only 22% of the freight is transported through road, while 47% is transported through rail and 31% of the

freight is through coastal and inland waterway. In contrast, both coastal shipping and inland waterways remain largely untapped in India.

- Indian warehousing market is highly fragmented and unorganized. A large portion of the warehouses are less than 10,000 sq.ft.in size thereby hindering mechanization and economies of scale. Unorganized players account for nearly 90% of the market. Underdeveloped material handling infrastructure with limited mechanization results in higher handling costs. For example, most steel stockyards in India deploy mobile cranes in contrast with global players where electric operated (EOT) cranes are deployed. Handling cost per ton for EOT cranes is one third that of mobile crane. Similarly cement handling at most warehouses is done using manual labor instead of mechanized conveyer belts.
- Currently, India has multi modal interchange points in the form of over 300 Inland Container Depots (ICD) and Container Freight Stations (CFS) catering primarily to EXIM cargo. As per the feedback received from several industry stakeholders, there is scope to improve the current infrastructure from cost as well as efficiency standpoint. For example, the container handling costs at ICDs in India is almost double that of the container handling costs in best-in-class freight villages like Interporto Bologna in Europe. Existing multi modal interchange points primarily serve EXIM container traffic and offer limited value added services. There is scope to increase the degree of mechanization and automation at these interchange points, extend them to handle domestic cargo and also offer value added services
- Globally, all large countries like US, Germany, Italy, Japan and China among other, have created a network of large Multi Modal Logistics Parks to ensure a seamless transfer of goods across modes. These logistics parks provide best in class handling infrastructure, as well as a large range of logistics services including warehousing, packaging, cargo aggregation and distribution etc.
- The Multi-Modal Logistics Park Policy, 2018 is aimed at bringing about a significant reduction in Logistics and warehousing cost by shifting to cost effective modes of transport like rail, coastal or waterway for the long haul, reducing handling costs through increased mechanization & reduced handling, and reducing secondary freight costs due to co-location of warehouses

3.2 MMLP Design Guidelines

In order to drive progress across the key objectives of the Multi-Modal Logistics Park Policy, 2018, a design guideline is proposed owing to the business need of each MMLP, which, at times, may differ given the variation in cargo traffic composition, location and volume projections etc. Key guidelines for designing of an MMLP are proposed to comprise of Modes of transport, Minimum area, Cargo type, Core services and Value Added Services, Equipment, Use of new and efficient technology, Sustainable operations, Development of Common User Terminal, Zoning regulations and FSI relaxation

3.3 Governing Authority

As development of MMLPs will require extensive coordination across various central ministries (e.g. Road, Rail, Shipping, Civil Aviation, Customs etc.) as well as respective State governments, the Policy proposes creation of Multi-Modal Logistics Park Agency (MMLPA) to identify, approve and monitor MMLP Projects.

3.4 Current Status

Policy has been drafted basis stakeholder consultations with the relevant. Inputs from various ministries and state governments have also been included in the policy.

4 Model Warehousing Policy

4.1 Context and background

- Indian warehousing market is highly fragmented and unorganized. Yet, with the advent of GST, the need to have several small warehouses is reducing and larger consolidated warehouses are being established at strategic locations. There is an increase in demand from sectors like e-commerce, third-party logistics providers, consumer durables, FMCG and manufacturing for larger sized and better quality

warehouses which is transforming the sector. But unorganized players still account for nearly 90% of the market and a large portion of the warehouses are small in size thereby hindering mechanization and scale economies.

- One of the biggest challenges in setting up quality warehouses in India is the number of approvals and licenses needed to construct and operate a warehouse. There are still more than 25 approvals and licenses needed at the pre – construction, construction and operation stage from various central, state and local authorities. These approvals vary from state to state and region to region
- Warehousing players have been struggling to navigate through the land acquisition procedures in India slowing down the post GST consolidation momentum. Land ceiling clearances, change of land use for agricultural land usage are some of the processes which can be eased out for fast track clearances.
- Current warehousing industry is largely characterized by lack of standardization, low levels of automation and underdeveloped material handling infrastructure with limited mechanization resulting in higher handling costs

4.2 Objectives

This policy shall act as a Model Policy for states to adopt. It would encourage states to streamline approvals, facilitate land acquisition and incentivize warehousing standards, skill development, green warehousing. The aim is to balance the need for driving standardization and efficiency in the warehousing sector with the desire to provide sufficient flexibility to the developers to carry out warehousing development and operations as per market needs

4.3 Streamlining licenses and approvals

Basis discussions with stakeholders, enabling a clearly defined 10 step approval / license process through single window clearances and well defined SLAs is of critical importance. The policy is being conceptualised to address this need.

4.4 Land and zoning

The policy is also creating mechanisms to facilitate land availability and acquisition by earmarking feasible land for warehousing

4.5 Warehouse design standards

Minimum warehouse design standards for clear height, floor load, equipment, docking, fire fighting, layout etc are being considered for driving standardization and efficiency in the warehousing.

4.6 Current status

Basis initial discussions with relevant warehousing stakeholders, policy is under development.

Chapter 11: Logistics Planning and Performance Monitoring tool

Contents

1 Context

The logistics sector is the backbone of economic growth in the country and is one of the most important accelerator of trade. Despite being a critical driver of economic development, logistics cost in India, at 13-14% of GDP, is high and the sector continues to be highly unorganized. The objective of the creation of the logistics division is to reduce this cost to under 10% of the GDP.

Currently, there is a lack of an integrated view on logistics in India. Different parts of the logistics value chain are being managed by at least seven different ministries including Commerce and Industries, Shipping, Civil Aviation, Railways, Road Transport and Highways, Finance, and Home Affairs. Consequently development in the field logistics takes place in a siloed manner. Also, there is no single place/ portal in the country which tracks and reports metrics across the logistics value chain. Thus, there is significant scope in consolidating, standardizing and driving consistency in data reporting and analytics in the logistics sector.

Additionally, global best practices dictate driving a consolidated approach for logistics which includes creating logistics portals and observatories which can monitor key logistics metrics, analyse data, provide single window access for information on logistics infrastructure, and suggest interventions to improve logistics in the country. Such portals also provide add-on tools to the end consumer like interactive maps, trade data and analytics reports. Details on logistics portals of few countries have been provided below.

The integrated Logistics Planning and Performance Monitoring Tool (LPPT) is to be a comprehensive planning tool to enable Logistics Division to identify logistics inefficiencies, analyse them, and prepare recommendations for improving logistics performance. It will also serve as the single source of truth for all logistics related information. A large number of initiatives have been identified as part of the National Logistics Action Plan. LPPT will also track the status of these initiatives. This report provides details on LPPT, its objectives, design, challenges, and the implementation plan.

2 Challenges

Four of the key challenges to development of a national logistics portal are as follows

1. Data Availability

   Logistics data availability for the whole of India is the primary challenge in building such a platform. The tool requires data of road network, rail network, coastal routes, waterways, commodity movements, and the costs involved. Geo-analytics data such as that of road network, rail network is in its infancy and is being developed. The data of commodity movement through road or data of warehouse locations is not captured in any digital format. The large geographic area and varying costs further add to the challenge significantly.

2. Data Quality

   The available data is marred by data quality challenges. More precisely, the availability of well-labelled, feature-rich, and accurate datasets is another hurdle. Available datasets are often outdated, duplicated, incomplete, inadequately referenced and lack common terms used to describe the data. Top level metadata such as data collection methodology and a description of the variables are also either missing or incomplete. These shortcomings make it difficult to compare and analyse datasets properly

3. Large number of stakeholders

   Logistics data in India is captured by a large number of stakeholders. These include a number of central ministries, state governments, private agencies, partner government agencies, and other public sector undertakings. The data format and storage methodology vary widely from organization to organization. This significantly adds to the challenge to the aim of consolidating this data. For the purpose of building the LPPT, the division will have to gather data from more

than 50 stakeholders each with its own mandate, and a unique data format & storage.

4. Rapidly evolving technology landscape
   The envisaged LPPT will utilize the best available technological solutions to gather, analyse and present data. The sector has seen a fast pace of technological change and it continues to increase. The division is expected to determine, adopt, and adapt to technological changes to keep the tool relevant

These challenges have been addressed while designing LPPT and have been detailed in the report below.

3 Objectives of Logistics Planning and Performance Monitoring Tool

The objectives of Integrated Logistics Performance Planning and Monitoring tool, henceforth referred to as 'the logistics tool', is to be a planning and monitoring tool to achieve the following objectives –

1. Support infrastructure planning by determining the nature, size, location of infrastructure required to enhance logistics efficiency and its relevant business case
2. Logistics process optimization by determining areas and nature of inefficiencies in the logistics sector
3. Logistics performance measurement, monitoring, and reporting including monitoring performance of states, various government bodies and ministries, and comparison with global benchmarks
4. Tracking interventions identified as part of Integrated National Logistics Action Plan

The Logistics Tool will be utilized by

- Officers of the Logistics division , Ministry of Commerce

- Officers of various Ministries, state governments, and government agencies
- General public, private individuals and private agencies

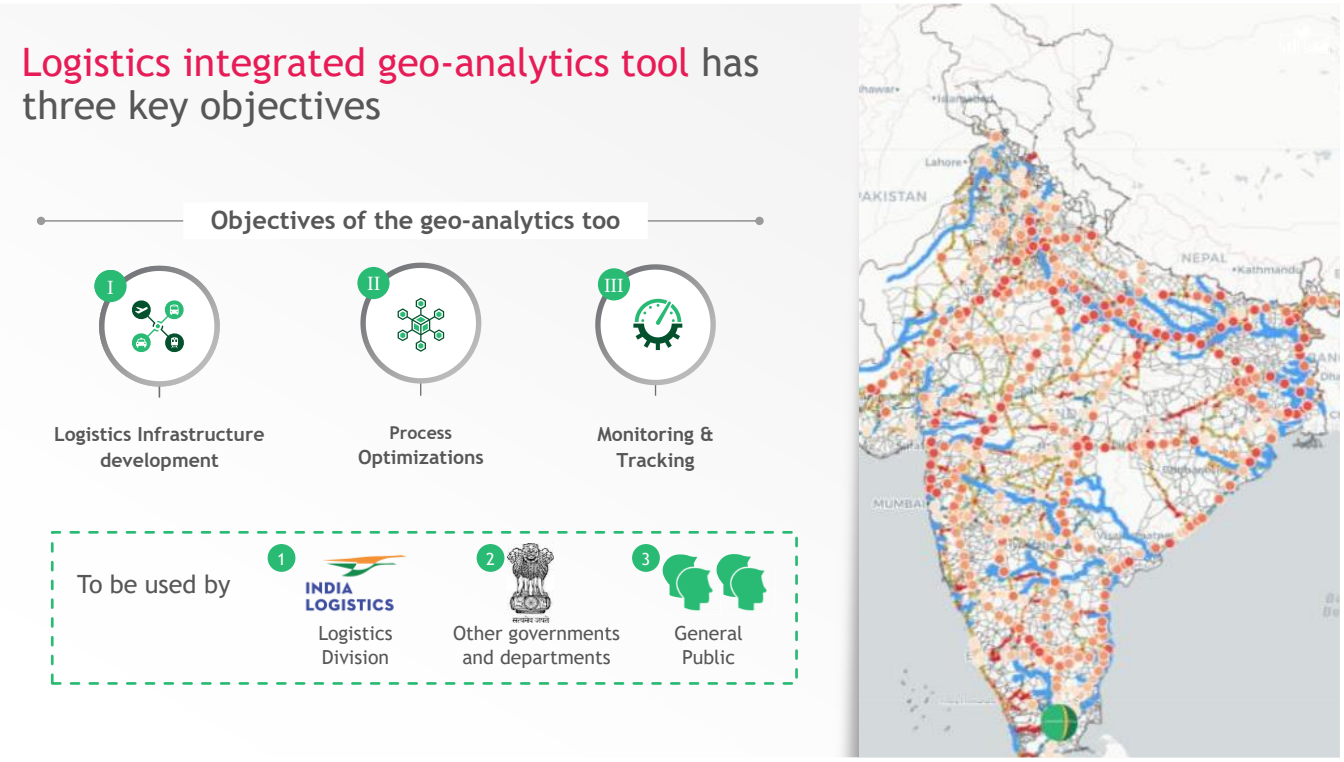


Figure 1: Objectives of LPPT

4 Global Benchmarks

The logistics portals of various countries were evaluated to understand the global best practices for logistics performance tracking and reporting. The nuances of the logistics portals for Canada, Spain, Panama and Colombia have been summarized below. Overall, the benchmarked countries seek to improve the competitiveness of their logistics value chains via various interventions which are monitored on a periodic basis. The table below summarizes the key indicators from other countries.

	Colombia	Spain	Panama	Canada
Ambit	National: All freight modes	National: All freight modes	National: All freight modes	National: freight on strategic trade corridors
Managing Entities	National Planning Department, Colombia	Ministry of Public Works, Spain	Georgia Tech Panama Logistics Research Centre	Transportation Canada
Indicator categories	Transit time on various supply networks Service levels of various logistics services Modal mix share of various modes of transport Costs involved in various segments of the supply chain Distribution of logistics players	Modal mix share of various modes of transportation Costs involved in different stages of the supply chain	Global indicators are tracked across various facets of the LPI score like global competitiveness index, doing business index etc.	Fluidity indicator of Canada measures end to end transit time across key corridors Evidence based system for analysis of supply chain and freight movement to improve competitiveness of Canada

	Colombia	Spain	Panama	Canada
Other components	Logistics infrastructure Geographic viewer Big data and analytics	Logistics infrastructure Reports and conference proceedings News, events and resources	Tools for air and ocean liner connectivity Interactive maps Trade data Inventory of logistics assets and services	

Table 1 Global Benchmarks for logistics portals

The detailed description of each of the above logistics portal is present in the appendix.

5 Proof of concept

Given the enormity of the challenge, the division decided to prepare a proof of concept (PoC) of the tool. The aim of the proof of concept is

- Identify, comprehend, and anticipate challenges to development of the tool
- Exactly indentify the data sources required
- Prepare and align on a draft output to reduce re-work
- Obtain requisite approvals

There were 2 main elements of the proof of concept. These are – Data Layers and Use cases. Five use cases were developed for the PoC and data was divided into four layers.

5.1 Data Layers

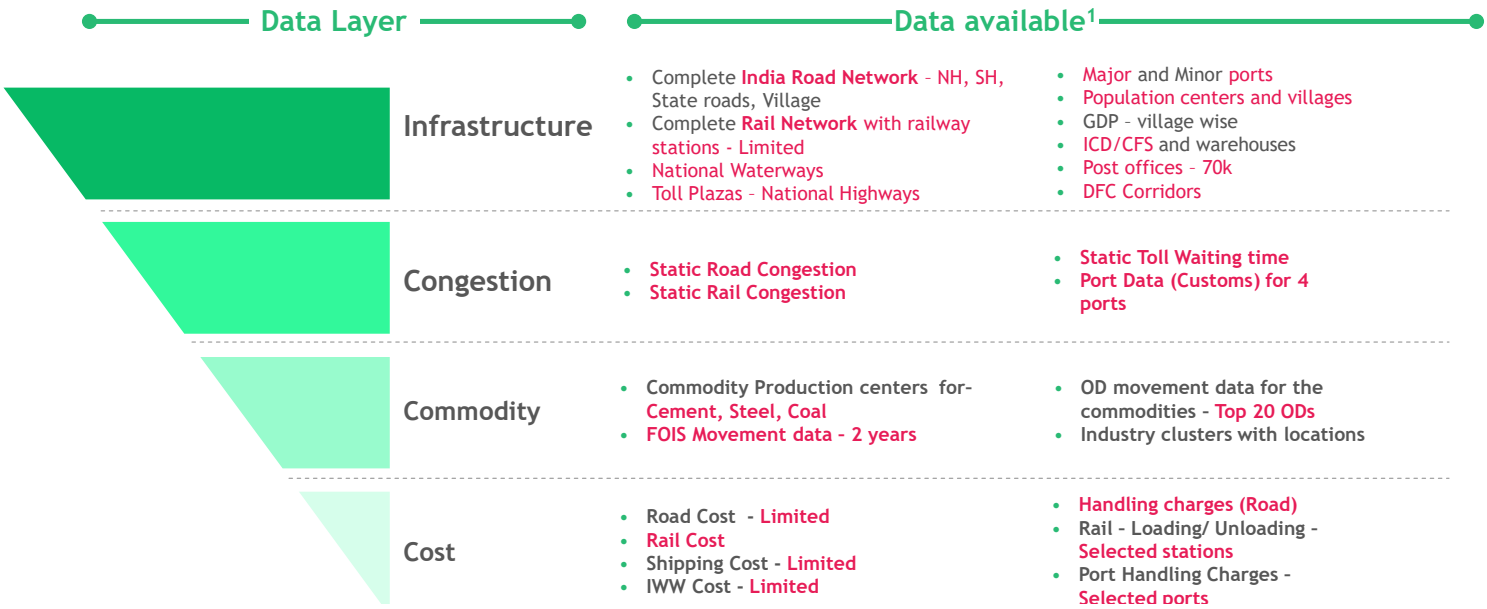


Figure 2: Data layers added to PoC of LPPT

Four layers of data has been added to the PoC. Each layer of data further contains datasets related to logistics. The datasets added have been provided in the figure above.

A data layer is a logical grouping of a varied independent datasets. Each dataset further defines a key component of the overall logistics tool. Even though the datasets of one data layer are independent, datasets from each layer are linked to datasets in other layers and all the layers together are used to define a logistics component. As an example, the infrastructure data layer consists of rail network, road network, and other elements which are independent and make up transport infrastructure of the country. The road network present in infrastructure layer, road congestion present in congestion layer, freight costs present in costs layer, and road commodity movement present in commodity layer together define the road movement of the country. The layers are only logical grouping of datasets and data structure can be different.

The data layers and sample datasets have been given below. Details of exact requirements and the source of data has been discussed in business requirements section. The data layers are as follows -

1. Infrastructure layer

- Contains geo-data and information on the infrastructure elements relevant to logistics
- Example - Complete India Road Network, Complete Rail Network with railway stations, National Waterways with terminals, Toll Plazas Major and Minor ports, Population centers and villages, GDP – village wise, ICD/CFS and warehouses, Post offices, DFC Corridors

2. Congestion Layer

- This layer is linked to infrastructure layer and provides information of average congestion on the infrastructure identified earlier
- Example - road congestion, rail utilization or congestion, port dwell time

3. Commodity Layer

- This layer contains information on the major origin and destination of the principal commodities of India
- This also contains the information of movement of the selected commodities between the identified origin and destinations
- The commodities include Coal, Cement, Steel, Iron ore, Food grains, parcels, fertilizers, etc. The exact list of commodities along with data sources has been provided in the business requirements section

4. Cost Layer

- This layer is linked to major modes of commodity movement in the country, namely – road, rail, shipping, inland waterways, air, and pipeline.
- This contains the average cost information for movement of each commodity by mode including the costs of handling, trans-shipment, re-packaging, long haul etc.
- The costs vary by commodity and also by region

5. Unclassified data layer

- This layer consists of other data which cannot be classified in any of above layers but is required for implementing LPPT

The data layers contained geo-data could be plotted on a map easily. As shown in the figure below

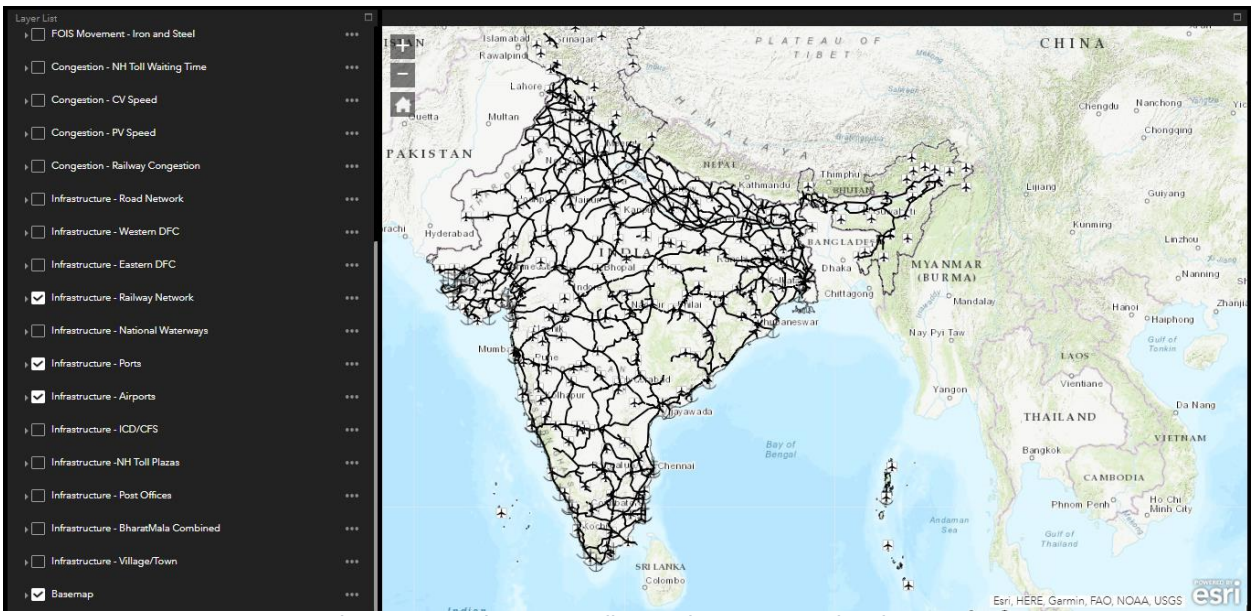


Figure 3: Data layers – Railway, Airports, ports data layer

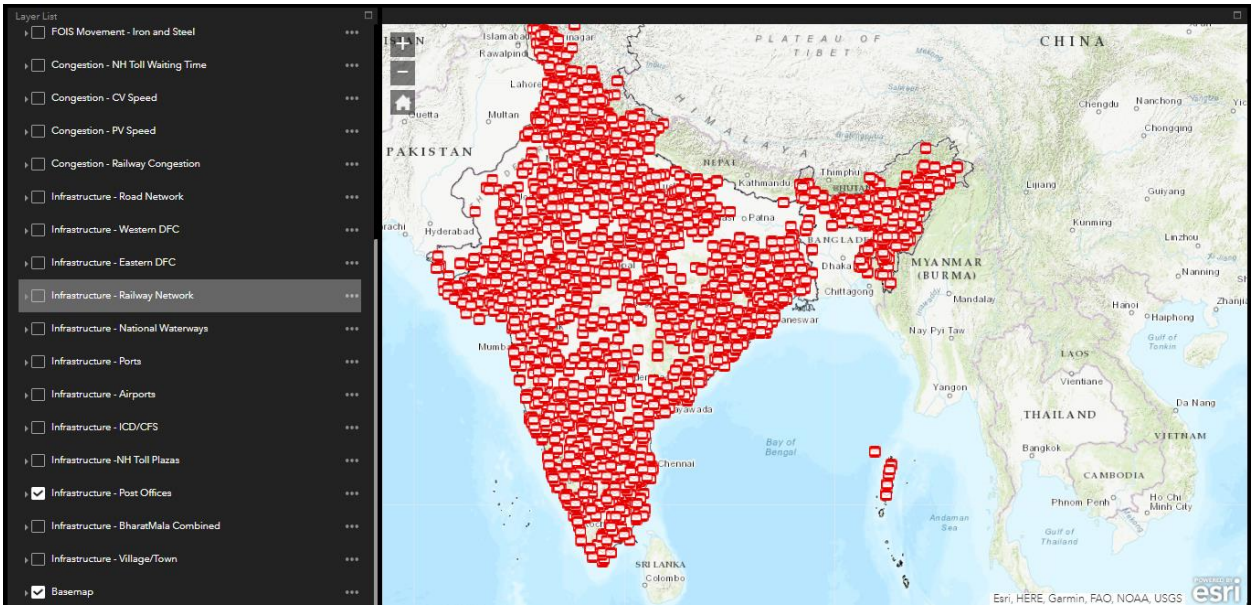


Figure 4: Data layers – Post offices

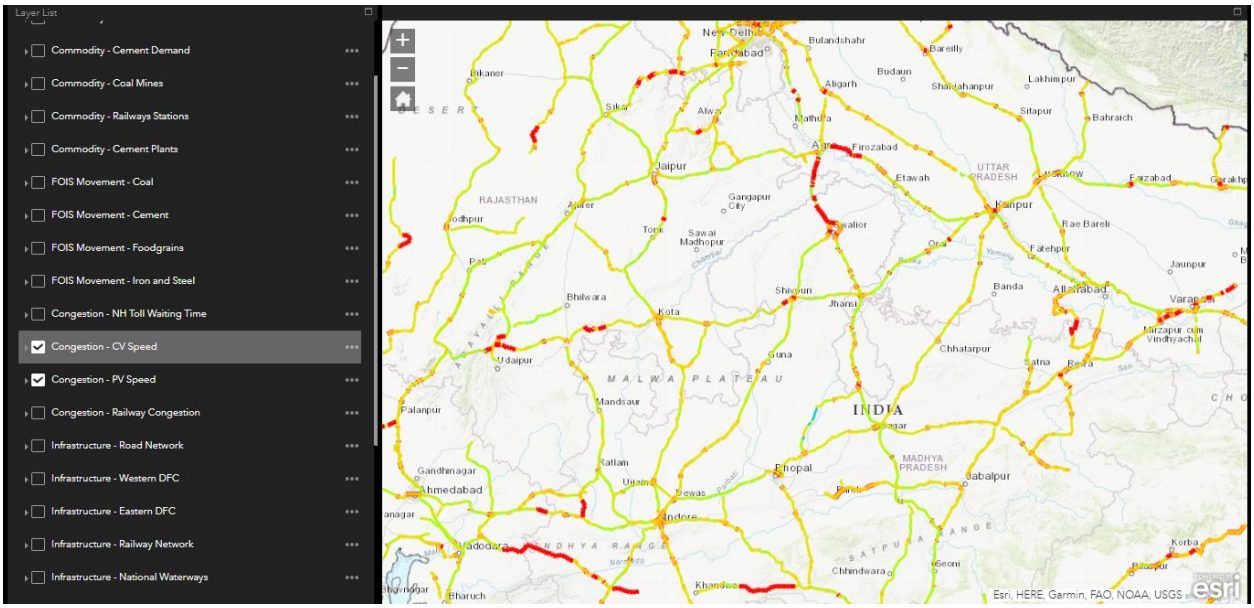


Figure 5: Data layers – Road congestion

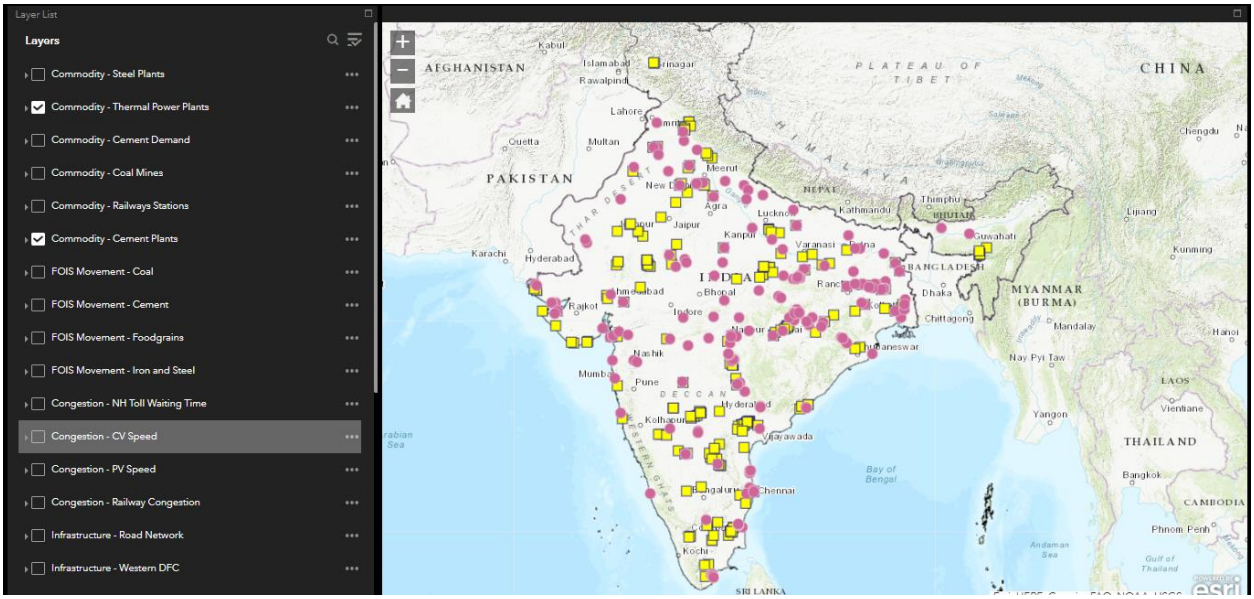


Figure 6: Data layers – Cement plants and Thermal power plants

5.2 Use Cases

18 use cases are planned to be added to the final LPPT. Of these, five use cases were added to the PoC. These are as shown in the figure below.

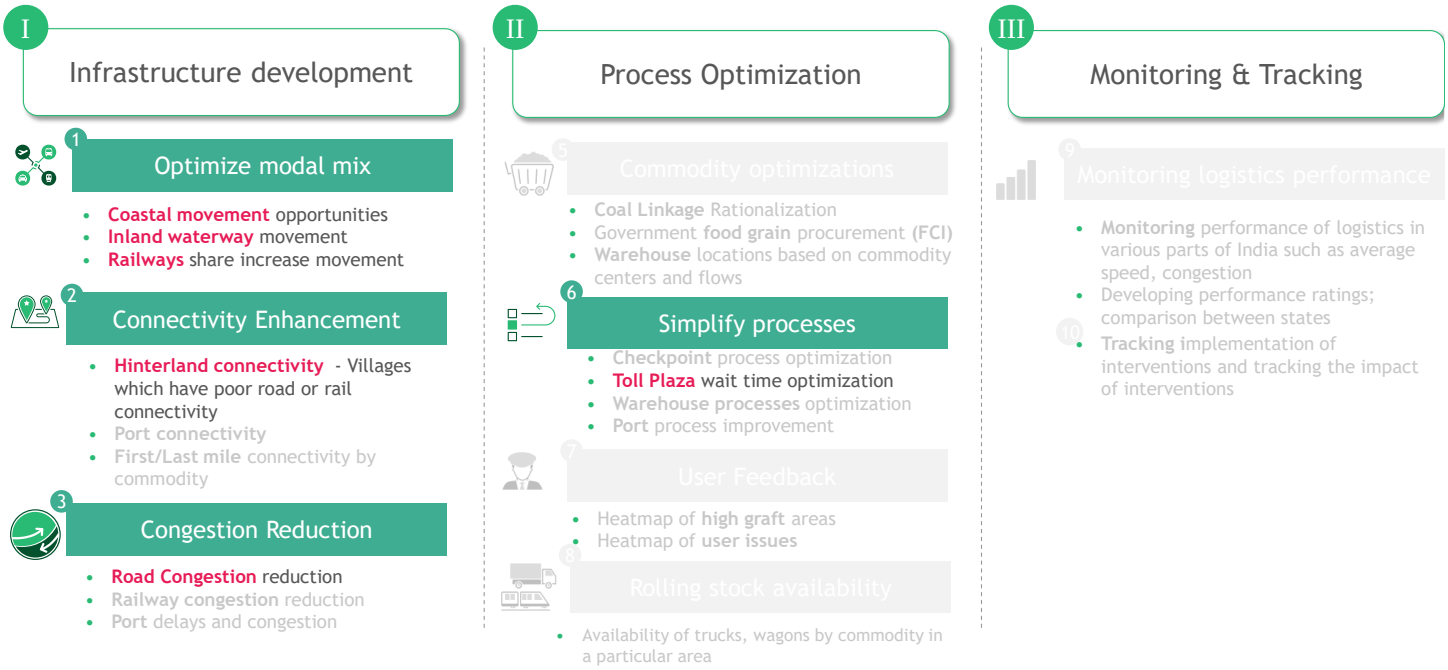


Figure 7: Use cases added to PoC of LPPT

The working of each of the use case has been explained in the appendix in the detail.

5.2.1 Use Case 1: Determine hinterland connectivity

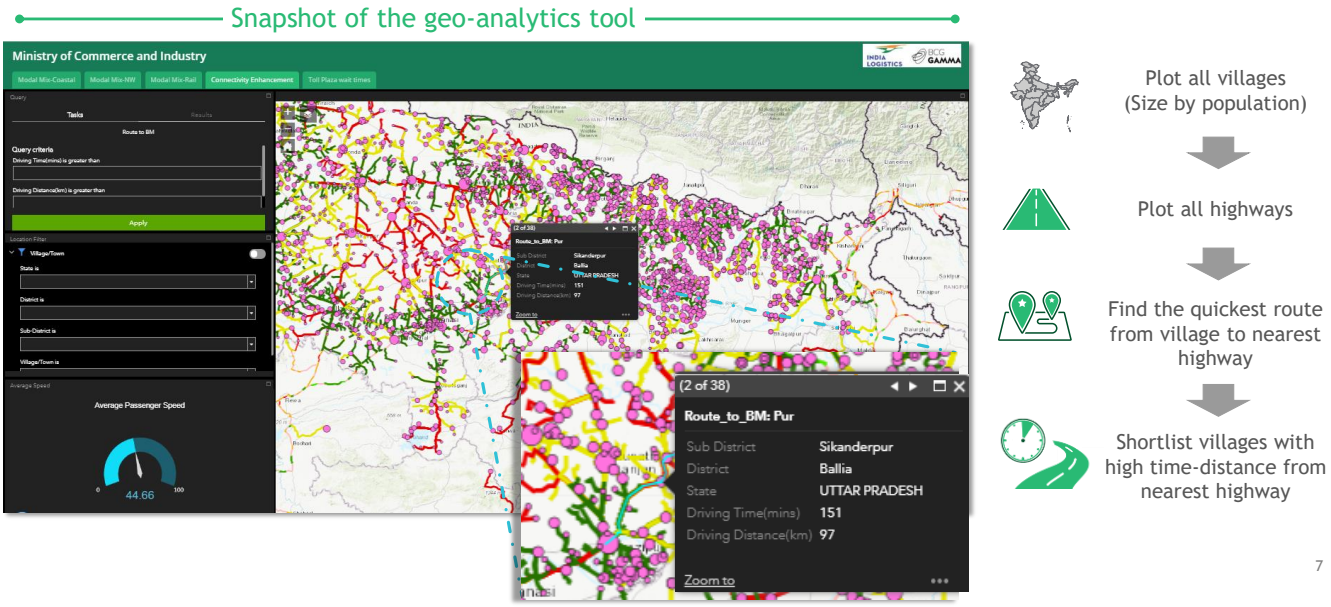


Figure 8: Use case in PoC to determine hinterland connectivity

5.2.2 Use Case 2: Increase share of coastal movement

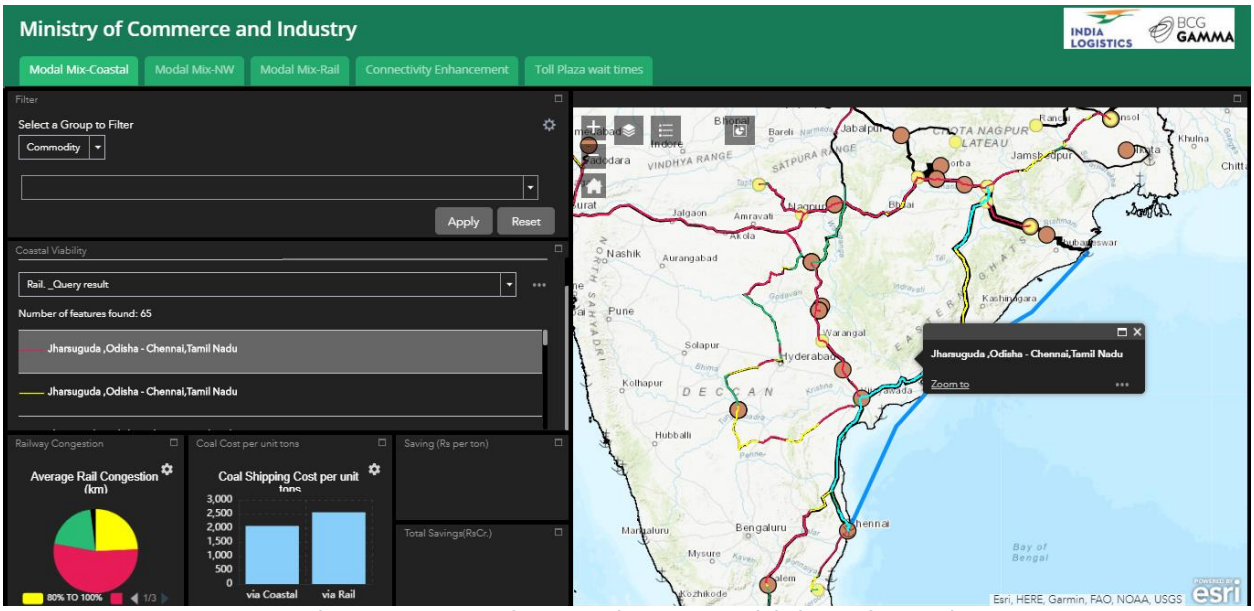


Figure 9: Use case in PoC to increase modal share of coastal

5.2.3 Use Case 3: Increase share of inland waterways

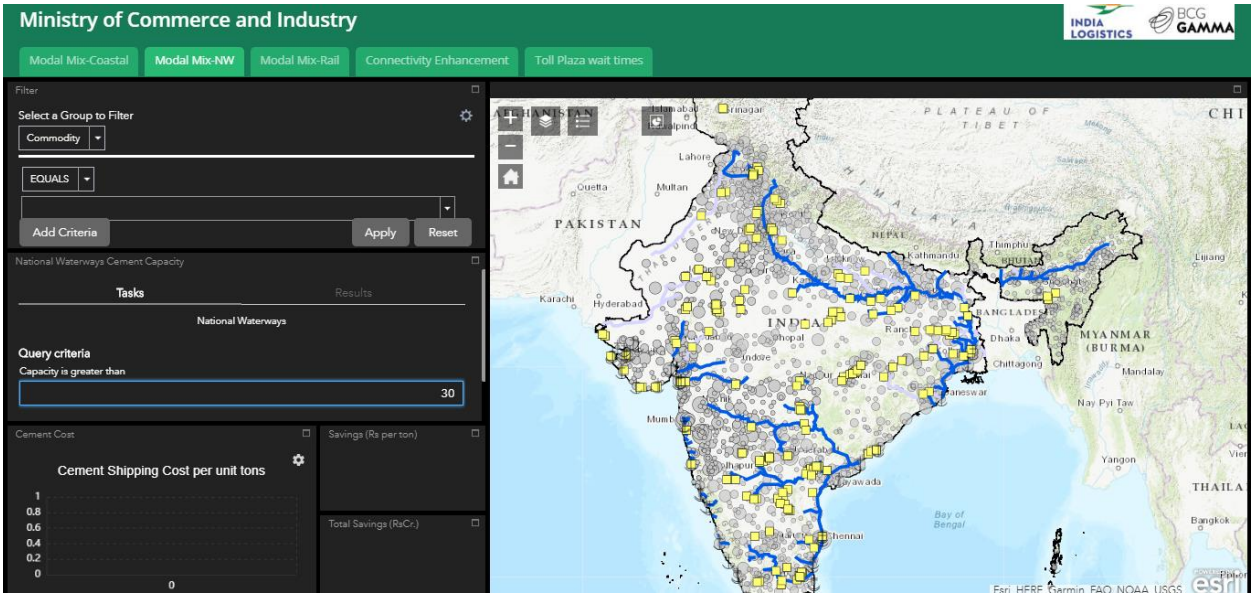


Figure 10: Use case in PoC to increase modal share of inland waterways

5.2.4 Use Case 4: Increase modal share of railways

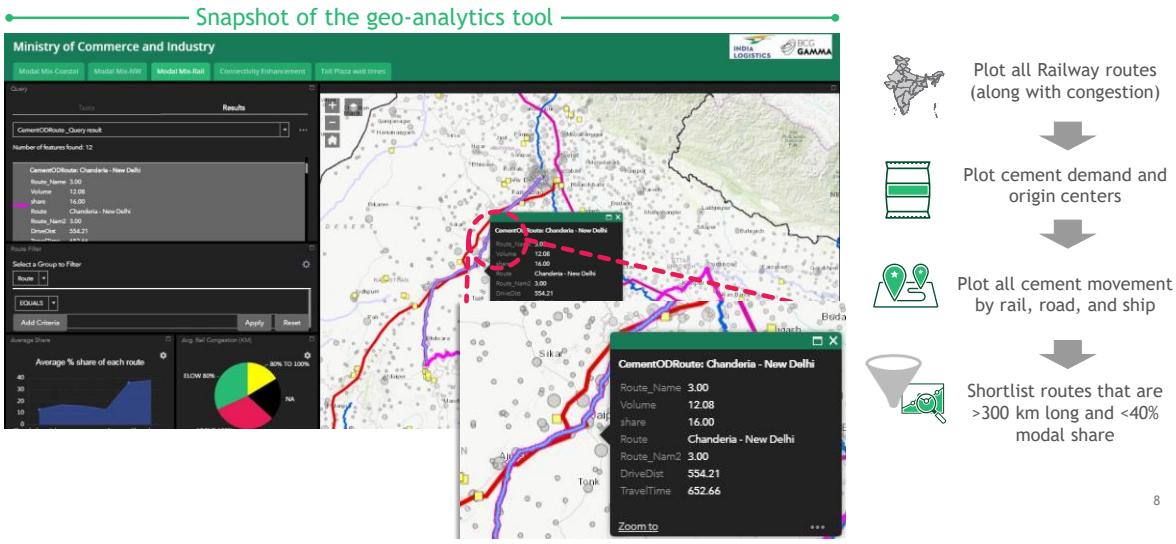


Figure 11: Use case in PoC to increase modal share of railways

5.2.5 Use Case 5: Toll plaza wait time optimization

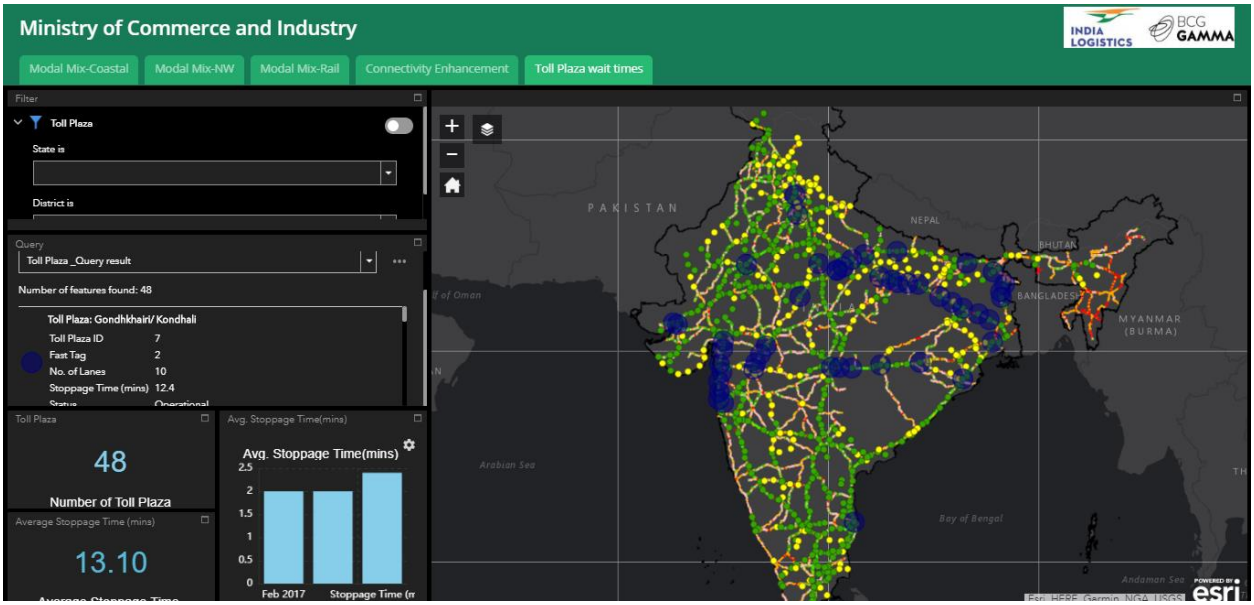


Figure 12: Use case in PoC to optimize toll plaza wait time

6 Elements of LPPT

The Logistics tool will have two broad areas – the Input Section and the Output section. The input section consists of

1. Data layers and
2. Data connections

Whereas the output section consists of three outputs as shown in the figure below. The three outputs are as follows

1. Integrated geo-analytics tool
2. Performance Monitoring Dashboards
3. Intervention tracking for National Logistics Action Plan

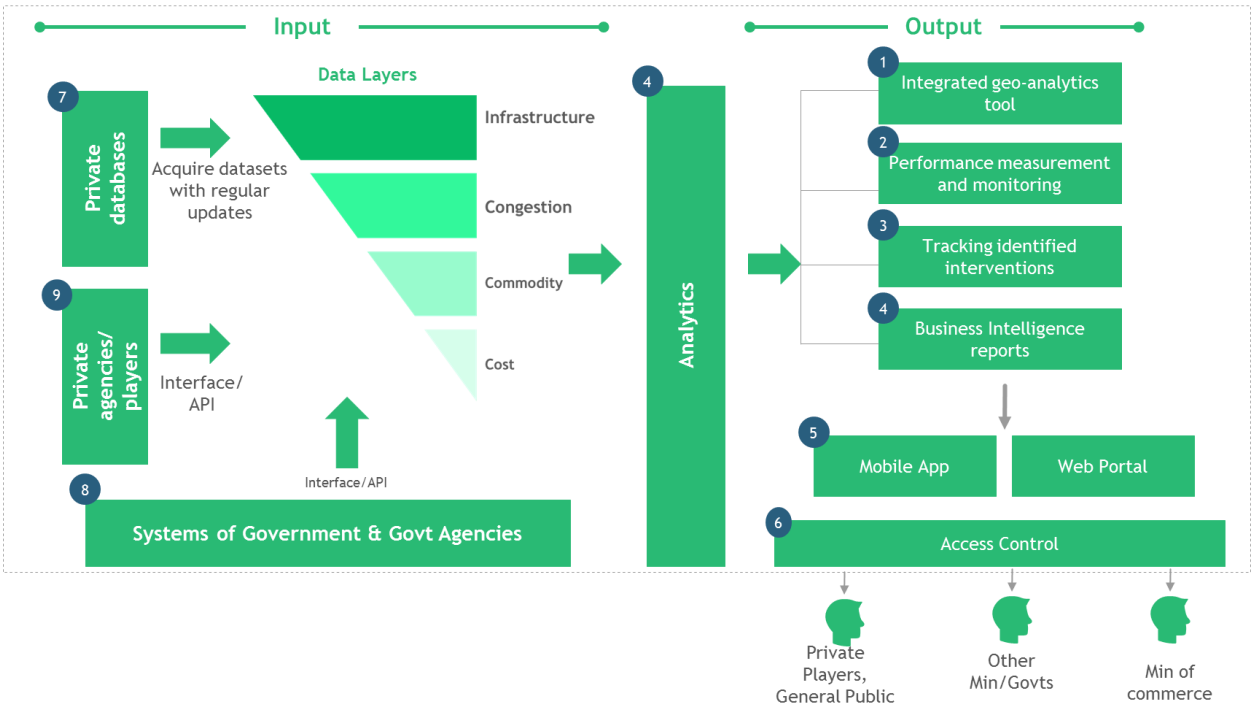


Figure 13: LPPT Architecture

Each of the outputs and the inputs have been discussed in detail below.

6.1 Geo-analytics tool

The integrated geo analytics tool is to be used by various Ministries, government agencies, and private entities as a comprehensive geo analytics based planning tool. It is to serve three objectives. These are

a) Logistics Infrastructure development

The aim of the tool is scientifically identify exact locations for development of infrastructure to reduce cost of logistics. There are three main types of infrastructure development needs that the tool needs to identify. These are

- Optimizing modal mix – this includes identifying locations where infrastructure needs to be developed to make modal mix optimum. It could be to increase coastal movement or to increase inland waterway movement, or increasing share as appropriate.
- Connectivity enhancement - This includes identifying hinterland areas with low connectivity or industrial areas with poor first mile connectivity or ports with poor rail/road connectivity etc.

- Congestion Reduction – This includes identifying areas of high congestion and the areas for infrastructure development for maximum impact on congestion for all modes of transport including roads, railways, shipping.

b) Process Optimizations

The aim of the tool is to identify exact locations where process optimizations can lead to reduction in logistics costs. Some of the areas where analysis can be used among others is,

- Commodity Optimizations - Optimize movements of commodities such as coal, food grains etc. This would require identifying the current origin, destinations
- User feedback - Identify areas of logistics issues such as graft or high waiting time or poor infrastructure
- Process simplification – Identify areas where simplification or technology introduction to improve process can help improve logistics such as high wait time toll plazas, high dwell time ports, high wait time checkpoints etc.
- Rolling stock availability - Identify areas of shortage or excess rolling stock for rail and road data

c) Query Tool

In addition to pre-defined use cases, the integrated geo-analytics to have a custom query tool. The custom tool is to be used to run queries on the geo-data as and when required This will be an access controlled web-portal and the integrated geo-analytics tool shall only be available to users post login. Three categories of use cases will be developed. These are as shown in the table below. Each category has further multiple use cases. **18 use cases will be developed as base use cases for the Logistics tool**. Further use cases shall be developed as and when required. Details of exact requirement from each of these use cases has been provided in appendix

Infrastructure development	**Process Optimization**	**Query Tool**

Optimize modal mix across commodities **1 Increase Coastal Share** **2 Increase Inland waterway share** **3 Increase railways** share	**Commodity optimizations** **9 Coal Linkage** Rationalization 10 Government **food grain** procurement **(FCI)** **11 MMLP** locations based on commodity centers and commodity flows	**Custom Query tool** 18 Tool to run live queries based on geo-data
Connectivity Enhancement **4 Hinterland connectivity** - Villages which have poor road or rail connectivity **5 Port connectivity** **6 First/Last mile** connectivity by industry clusters	**Simplify processes** **12 Checkpoint** wait time (state borders) **13 Toll Plaza** wait time optimization **14 Port** process improvement	
Congestion Reduction **7 Road Congestion** reduction **8 Railway congestion** reduction	**User based use cases** 15 Heatmap of **high graft** areas 16 Heatmap of **user issues** 17 Availability of trucks, wagons by vehicle type/size/commodity in a particular area	

Table 2 List of use cases to be developed for LPPT

6.2 Performance dashboards

The objective of the performance dashboards is to provide a holistic view on logistics in India. They are critical to monitor and track performance of key stakeholders across the logistics value chain. They would also support the key stakeholders in measuring progress against identified objectives, resolve any bottlenecks along value chain and make better data-backed investment decisions.

The tracking of these metrics would drive swifter and more impactful decision making and will lead to debottlenecking of choke points across the logistics value chain and can potentially lead to faster resolution of issues which impact turnaround time and costs.

There are seven categories of performance dashboards, six of which are for central ministries and one for the states. The performance dashboards for central ministries are for Roads, Rail, Ports, Airports, Warehouses and Partner Government Agencies (PGAs). The metrics for the each to be tracked have been outlined in the Appendix **1** along with source and frequency of data collection.

6.3 Intervention tracking

The Logistics Division is drafting and integrated National Logistics Action Plan (NLAP). The NLAP lists a number of initiatives along with its details such as timelines, targets, responsible agency etc. The Logistics Tool is expected to track the status of each initiative. The action plan is to be updated annually and the list of initiatives shall accordingly change annually.

NLAP is expected to have upto a maximum of 100 initiatives for tracking. The logistics tool will track these interventions. The initiatives tracking dashboard will be part of the same web portal as the performance monitoring dashboard.

6.4 Data Layers

A data layer is a logical grouping of a varied independent datasets. Each dataset further defines a key component of the overall logistics tool. Even though the datasets of one data layer are independent, datasets from each layer are linked to datasets in other layers

and all the layers together are used to define a logistics component. As an example, the infrastructure data layer consists of rail network, road network, and other elements which are independent and make up transport infrastructure of the country. The road network present in infrastructure layer, road congestion present in congestion layer, freight costs present in costs layer, and road commodity movement present in commodity layer together define the road movement of the country. The layers are only logical grouping of datasets and data structure can be different. The data layers and sample datasets have been given below. Details of exact requirements and the source of data has been discussed in business requirements section. The data layers are as follows -

1. Infrastructure layer

- Contains geo-data and information on the infrastructure elements relevant to logistics
- Example - Complete India Road Network, Complete Rail Network with railway stations, National Waterways with terminals, Toll Plazas Major and Minor ports, Population centers and villages, GDP – village wise, ICD/CFS and warehouses, Post offices, DFC Corridors

2. Congestion Layer

- This layer is linked to infrastructure layer and provides information of average congestion on the infrastructure identified earlier
- Example - road congestion, rail utilization or congestion, port dwell time

3. Commodity Layer

- This layer contains information on the major origin and destination of the principal commodities of India
- This also contains the information of movement of the selected commodities between the identified origin and destinations
- The commodities include Coal, Cement, Steel, Iron ore, Food grains, parcels, fertilizers, etc. The exact list of commodities along with data sources has been provided in the business requirements section

4. Cost Layer

- This layer is linked to major modes of commodity movement in the country, namely – road, rail, shipping, inland waterways, air, and pipeline.
- This contains the average cost information for movement of each commodity by mode including the costs of handling, trans-shipment, re-packaging, long haul etc.
- The costs vary by commodity and also by region

5. Unclassified data layer

- This layer consists of other data which cannot be classified in any of above layers but is required for implementing LPPT

6.5 Data Connections

There are four data connections required for collecting the above mentioned data. These connections are

1. Independent Data sources (Readily Available data)

These are independent data agencies which sell/license data. These are the agencies which map infrastructure like road network, rail network.

2. Government and Government Agencies

These are various Ministries and government agencies which have their own systems which collect logistics data such as Railways, Ministry of Road Transport and Highways. A connection to these extract the relevant data is required.

3. Private Agencies

These are private agencies which do not sell data but can provide linkage to particular datasets. These linkages help in obtaining and refreshing data that does not belong to the government. The data of road congestion from large mapping agencies, telematics companies is an example of such a source.

4. Select surveys to collect data from Individuals or entities or for crowdsourcing data

Certain information is currently not collected and organized in a data set either by government or by private agencies. Such information like information of road freight, handling charges, shipping freight etc. is essential for building the integrated logistics

model. Such information is to be collected through select and targeted surveys or through desktop research.

List of data connections required along with minimum resolution and refresh frequency has been provided in the appendix 2.

7 Action Agenda

As discussed earlier, the implementation of LPPT requires an implementation partner which has a deep understanding of the logistics and transportation infrastructure sector along with extensive experience in implementing large scale IT projects involving multiple stakeholders. For the same, Logistics division to release an RFP to on-board implementation partner for Design, Development, Implementation, Operation & Maintenance of Integrated Logistics Planning and Performance Monitoring Tool (LPPT). Some of the steps taken in the RFP

A strong internal team is also needed, which will be created in extension to the Logistics Division in the Indian Institute of Foreign Trade (IIFT). This will involve the following

a) Ensuring all data for the respective metrics is collated in a time bound manner and
b) Running basic quality checks on the collected data
c) Analyzing the data, identifying trends to arrive at meaningful and actionable insights for key stakeholders
d) Creating and publishing reports, and facilitating reviews on the analyzed data from the data center

Some of the steps taken in the RFP to overcome the challenges mentioned above are

a) The RFP mandates that the Implementation partner has expertise in logistics sector along with experience of implementing IT projects.
b) The data sources for all the use cases, performance dashboards and metrics have been divided into four data connections. The tentative data source for each has

been provided in the RFP along with clear responsibilities of implementation partner and that of Logistics division

c) The project is to be implemented in an agile manner with stakeholder workshops to be conducted at defined intervals to ensure close coordination with all stakeholders. A tentative list of stakeholders – Central Government Ministries, industry bodies, PSUs, state governments has also been added for each development.

7.1 Implementation Timelines

A detailed timeline outlining the key steps in the implementation of LPPT is defined below:

S No	Implementation Step	Timeline
1	Conceptualization of LPPT and its elements	November 2018
2	Development of a proof of concept	December 2018
3	Release of draft RFP and vendor consultation	February 2019
4	Release of RFP	March 2019
5	Selection and on-boarding vendor	May 2019
6	Inception Report including mobilization of Resources and commencement of work	June 2019
7	Phase 1 : Development of 1 use case, 1 performance monitoring dashboard	September 2019
8	Phase 2 : Development of 3 use cases, performance dashboards, and intervention tracking dashboard	November 2019
9	Phase 3 : Development of 4 use cases and dashboards	January 2020
10	Phase 4 : Development of 5 use cases and dashboards	March 2020

11	Phase 5 : Development of 5 use cases and dashboards	May 2020

8 Appendix 1 –Global benchmarks of Logistics Portals

8.1 Logistics portal evaluation of Colombia

Under Colombia Logistics performance tracking, detailed metrics are tracked by the Logistics Observatory. Some of the metrics tracked are

Indicator Family	Metrics Tracked
Costs	Transportation costs /km in the main mode of transport corridors Logistics costs of enterprises Fuel costs
Modal mix	Distribution of intermodal national transport system Distribution of the type of cargo transported on modes of transport other than road Distribution of transported cargo movements in the main national corridors mode Distribution of foreign trade by mode of transport Distribution of foreign trade point of entry / exit
Distribution of logistics players	Geographical distribution of businesses Dimensioning and composition of the sector Technology in logistics
Fluidity and service delivery	Import and export time for the main corridors Travel times for different modes of transport Number of documents for import and export processes of a container Assessment of level of transportation service Percentage of deliveries on time and correct Traceability of cargo

The national portal of Colombia offers a number of functionalities to its users including governments, general public, and private players. Some of the functionalities are as follows.

Logistics infrastructure	The portal offers information on the following logistics infrastructure: Dimensioning of the road, rail and river network per thousand inhabitants Investment in transport infrastructure Kilometers of double carriageways nationwide
Geographic viewer	The portal offers GIS views of the following: Key logistics corridors Location of free trade zones Import / export trade flow Port concessions
Big data and analytics (partnership with private & academia)	The portal offers big data analysis results to users such as: Origin destination visualization on map using GPS data provided by cargo vehicles Traffic intensity viewer in the form of heat maps using satellite tracking data

8.2 Logistics portal evaluation of Spain

Under Spain's Logistics performance tracking, metrics tracked by the logistics portal are as follows

Indicator Family	Metrics tracked
Modal mix	Modal split (domestic freight) Modal split (international freight) Modal distribution of land transport (domestic)

	Modal distribution of land transport (international) Distribution of unimodal and multimodal split of freight traffic Distribution of containerized traffic by mode
Employment	% share of logistics sector in national employment Productivity per employee in logistics sector Personnel expenses per employee in logistics sector
LPI	Logistic Performance Index (LPI) component scores of Spain with respect to the country with the highest score (%)

The functionalities available to its users are as follows –

Data	The portal offers users access to the following data categories: Mobility Socioeconomic information Capital and infrastructure Safety Environmental information Metro
Report and Conference proceedings	The portal offers users access to the following reports: Annual Reports Monographic report Proceedings of annual conference
News, events and resources	The portal offers information on: News and events from the transport sector Documents of interest Related international organizations Related business associations

8.3 Logistics portal evaluation of Panama

Panama' tracks its performance as a score on a variety of global indicators. These indicators are

1. Logistics performance index

2. Global competitiveness index
3. Global innovation index
4. Liner Shipping Connectivity index
5. Doing Business index

The functionalities available in the logistics performance tracking portal of Panama are –

Tools	The portal offers tools on logistics infrastructure to provide: Comparison of detailed specifications of different ports Data for ocean liner services with direct calls to Panamanian container seaports Air connectivity details for passenger and air freight to all airports
Interactive maps	The portal offers interactive maps of the following: Logistics Assets Customs Transit times Container Liner Services Air connectivity Land connectivity Cold chain network Canal real time traffic
Trade data	The portal offers the following trade data: Panama import statistics Panama export statistics World trade statistics Colon free trade zone Agreements with trade partner nations
Logistics assets	The portal offers overview, concepts and statistics related to the following logistics assets: Panama Canal Airports Seaports Special Economic Zones

	Logistics Parks Railroad
Logistics services	The portal offers contact details of the following directory of logistics services: Service providers (e.g. Warehousing. Freight forwarders. Customs Brokers, etc.) Organizations (e.g. Govt. Agencies and Business Associations) Research and Education (e.g. Universities, Research Centers)

8.4 Logistics portal evaluation of Canada

Canada defined fluidity indicator to measure end-to-end transit times on key corridors in 3 levels

Level 1	End to end aggregated total
Level 2	Ocean transit Gateway dwell Rail transit Inland destination dwell
Level 3	Ocean transit Destination port dwell Port drayage/ rail transit Rail dwell at departure yard Long distance rail transit Rail dwell at arrival yard Drayage to DC

The fluidity indicator also involves a wide array of data partnerships across Ocean, Ports, Trucking and Rail which leads to comprehensive data collection on each of these logistics sectors.

9 Appendix 2: List of use cases to be developed

9.1 Use case 1 Optimize modal mix (Coastal)

Basework Required

(These are not the data requirements Data requirements are present in appendix B)

- Plot the major origin-destination (O-D) movement of all available commodities on an India Map.(>60% of movement by weight)
- Ensure to plot the exact route and not just a straight line connecting origin-destination
- Calculate the cost of movement between the O-D by road and by rail
- For all the available commodities, plot the movement between the same origin-destination through coastal route (wherever possible) and calculate the cost of the same.
- Ensure to include the first/last mile while calculating cost

Working of the Use Case

- The overall layout to contain dropdowns and options to identify the optimum coastal route as shown in the figure
- Have an option to select commodity in the first dropdown
- Based on commodity selection, plot all the existing movement of the commodity as identified earlier.
- Ensure the thickness of the route connecting the O-D varies by the total weight of commodity movement on the route
- Have an option to select the desired mode in the second dropdown : coastal, national waterway, road, rail, air
- On selecting coastal, highlight the routes where cost of coastal is lesser than the cost of existing movement as per current O-Ds

- Also display the list of such coastal routes
- On selecting, any of these routes display the route properties such as breakup of costs, total quantity, savings etc.
- Have an option to export such routes for further analysis

9.2 Use case 2 Optimize modal mix (Railways)

Basework Required

- Plot the major origin-destination (O-D) movement of all available commodities on an India Map by road and by rail (>60% of movement by weight) as done earlier.
- Ensure to plot the exact route and not just a straight line connecting origin-destination along with indicative quantity.
- Calculate the cost of movement between the O-D by both - road and by rail
- Ensure to include the first/last mile in the route
- Plot rail congestion for all rail routes
- Plot DFC- Dedicated freight corridors (current and upcoming), inland waterways, coastal route and the cost of movement of each commodity by IW and coastal

Working of the Use Case

- The overall layout to contain dropdowns and options to identify the optimum route as shown in the figure
- Have an option to select commodity in the first dropdown
- Based on commodity selection, plot all the existing movement of the commodity as identified earlier by road and by rail
- Option 1: Identify non-optimal rail routes
    - Calculate the modal share of railways on ODs
    - Shortlist ODs where rail is cheaper than road
    - Check if alternate modes –coastal, IW is cheaper than rail for the selected ODs
    - Check if DFC is present here

- If rail is the cheapest route among all routes for an OD pair, then display the OD pair along with its rail modal share
- Have an option to export routes and data for further analysis

9.3 Use case 3 Optimize modal mix (Inland Waterways)

Basework Required

- Plot the major origin-destination (O-D) movement of all available commodities on an India Map. (>60% of movement by weight) as explained earlier.
- Ensure to plot the exact route and not just a straight line connecting origin-destination
- Calculate the cost of movement between the O-D by road and rail.
- For all the available commodities, plot the movement between the same origin-destination through Inland Waterways (IW)(wherever possible) and calculate cost of the same
- Ensure to include the first/last mile in the IW route

Working of the Use Case

- The overall layout to contain dropdowns and options to identify the optimum IW route as shown in the figure
- Have an option to select commodity in the first dropdown
- Based on commodity selection, plot all the existing movement of the commodity as identified earlier.
- Ensure the thickness of the route connecting the O-D varies by the total weight of commodity movement on the route
- Have an option to select the desired mode in the second dropdown : coastal, national waterway, road, rail, air
- On selecting IW, highlight the routes where cost of IW is lesser than the cost of existing movement as per current O-Ds
- Also display the list of such routes

- On selecting, any of these routes display the route properties such as breakup of costs, total quantity, savings etc.
- Have an option to export such routes for further analysis

9.4 Use case 4 Hinterland connectivity

Basework Required

- Plot all population centers in India –villages, towns, districts etc.
- Plot the detailed road network with village connectivity roads, district roads, state and national highways etc.
- Calculate the congestion on the detailed road network using historic congestion data.

Working of the Use Case

- Dropdown to select Origin – National Highway, state highway, major cities
- On selecting the 'Origin' calculate the time taken from origin to all population centers. For example, on selecting National highway – time taken to reach a village from the nearest point on the closest national highway should be calculated
- Have an option to filter population centers which are more than *x* mins or *x* km away from the origin
- Plot and display the filtered population centers and the corresponding route
- Have an option to export such routes for further analysis

9.5 Use case 5 Port connectivity

Basework Required

- Plot major industry clusters in India
- Plot all ports – major and minor ports
- Plot the detailed road network with village connectivity roads, district roads, state and national highways etc.
- Plot the rail network, IW network, coastal routes.

- Calculate the congestion on the detailed road network and congestion on rail network

Working of the Use Case

- Dropdown to select Port
- On selecting a port, plot the route and time taken to/from industrial clusters to/from the port
- Have an option to filter industry clusters which are more than x mins or x km away from the port
- Ensure to include both rail congestion and road congestion while calculating the travel time
- Plot inter-port comparison of time taken to reach port from major industry clusters
- Have an option to export such routes for further analysis

9.6 Use case 6 First/Last mile connectivity by industry clusters

Basework Required

- Plot industry clusters in India along with its manufacturing locations. Ensure to include MSME and other rural industries in it
- Plot the detailed road network with village connectivity roads, district roads, state and national highways etc.
- Plot the rail network, IW network, coastal routes
- Calculate the congestion on the detailed road network, congestion on rail network

Working of the Use Case

- Calculate the average time taken from manufacturing locations to reach closest national highway and railway station
- Plot the route and time taken to/from industrial clusters
- Have an option to filter industry clusters which are more than x mins or x km away from the highway or railway station

- Have an option to export such routes for further analysis

9.7 Use case 7 Road Congestion

Basework Required

- Plot the detailed road network with village connectivity roads, district roads, state and national highways etc.
- Calculate the congestion on the detailed road network using historic traffic data
- Identify network by NH, SH, district roads and other information such as number of lanes etc.
- Plot all commodity movement by road

Working of the Use Case

- Have an option to filter all major roads for road freight movement
- Identify areas/stretches where road speed is low or congestion is high
- Compare states for average road speed comparison
- Display speed information by number of lanes, type of road etc.
- Have an option to export such routes for further analysis

9.8 Use case 8 Railway Congestion

Basework Required

- Plot the detailed rail network and rail congestion using historic railway traffic and congestion data.
- Identify network by railway zones, division and type of track etc.
- Plot all commodity movement which should go by rail as identified in use case 2

Working of the Use Case

- Identify the major routes of current/potential rail movement

- Identify areas/stretches where rail congestion is high
- Plot and show the exact areas of high congestion and calculate opportunity cost of congestion for each routes basis potential movement
- Compare railway regions, divisions for average rail congestion comparison
- Have an option to export such routes for further analysis

9.9 Use case 9 Coal Linkage rationalization

Basework Required

- Plot all coal mines, and power plants and their linkages along with type/grade of coal
- Plot the rail network, first/last mile network and calculate cost of movement between all mines and power plants

Working of the Use Case

- Run optimization to determine-
    - The pair of mine to power plant which is most efficient
    - The most efficient route of transportation
- Build in option to enter constraints in the model such as addition of a washery in the supply, restriction on certain pairs, boiler technology constraints etc.
- Have an option to export such routes for further analysis

9.10 Use case 10 Government food grain procurement (FCI)

Basework Required

- Plot all major food grain growing areas along with grade/type
- Plot food grain demand centers
- Plot the rail network, first/last mile network and calculate cost of movement between all source and demand

Working of the Use Case

- Run optimization to determine-
  - The pair of source to demand which is most efficient
  - The most efficient route of transportation
- Build in option to enter constraints in the model
- Have an option to export such routes for further analysis

9.11 Use case 11: MMLP locations based on commodity centers and commodity flows

Basework Required

- Plot current MMLP, ICD & CFS locations and tag commodity to each, wherever feasible
- Plot available land parcels already identified as warehouse zones/MMLP zones, ICD or CFS and tag them by commodity
- Plot O-Ds by commodity as explained earlier
- Plot the rail network, road network, IW network, coastal network

Working of the Use Case

- Plot existing warehouse zones color coded by commodity along with capacity/area. Have an option to search warehouses by commodity, area, city, state etc.
- Plot the available zones for new warehouses/new MMLPs/ICD/CFS. Have an option to search warehouses by commodity, area, city, state etc.
- Run optimization to determine the optimum locations of warehouses, MMLPs, ICD, warehouses
- Have an option to export such routes for further analysis

9.12 Use case 12: Checkpoint process optimization

Basework Required

- Plot all checkpoints – inter-state checkpoints and other checkpoints where trucks are stopped
- Plot road network and plot road congestion and speed for freight vehicles
- Calculate wait times at check points. Wait times to be based on historical congestion data. The time period to be mutually agreed with Logistics division
- Plot O-Ds by commodity as explained earlier
- Plot the rail network, road network, IW network, coastal network

Working of the Use Case

- Option to shortlist checkpoints where wait time is greater than x minutes
- Display information about the checkpoints such as inspecting authority, proximity to closest NH toll plaza
- Calculate opportunity cost of wait times basis freight flow
- Have an option to export such routes for further analysis

9.13 Use case 13: Toll plaza wait time optimization

Basework Required

- Plot all toll plazas – NH and SH toll plazas
- Plot road network and plot road congestion and road speed for freight vehicles
- Calculate wait times at toll plazas. Wait times to be based on historical congestion data. The s time period to be mutually agreed with Logistics division
- Plot O-Ds by commodity as explained earlier
- Plot the rail network, road network, IW network, coastal network

Working of the Use Case

- Option to shortlist toll plazas where wait time is greater than x minutes
- Display information about the toll plazas such as national or state highway toll plazas, number of toll lanes, number of ETC lanes
- Calculate opportunity cost of wait times basis freight flow

- Have an option to export such routes for further analysis

9.14 Use case 14: Port process improvement

Basework Required

- Plot all ports – major and minor
- Plot detailed port layouts and information of port dwell times, custom release times
- Plot the rail network, IW network, coastal routes.

Working of the Use Case

- Dropdown to select Port
- On selecting port, plot times taken for different processes at the port along with benchmarks
- Plot inter-port comparison of various parameters
- Have an option to export such routes for further analysis

9.15 Use case 15: Heatmap of high graft areas

Basework Required

- Get data of graft as reported by users
- Plot the detailed road network with village connectivity roads, district roads, state and national highways etc.
- Plot all checkpoints, toll plazas as identified earlier

Working of the Use Case

- Plot a heatmap of the graft instances reported
- On clicking a particular area in the heatmap, provide details such as checkpoint name, inspecting authority etc.
- Provide inter-state comparison

- Have an option to export such routes for further analysis

9.16 Use case 16: Heatmap of user issues

Basework Required

- Get data of logistics issues as reported by users
- Plot the detailed road network with village connectivity roads, district roads, state and national highways etc.
- Plot all checkpoints, toll plazas as identified earlier

Working of the Use Case

- Plot a heatmap of logistics issues as reported
- On clicking a particular area in the heatmap, provide details such as checkpoint name, inspecting authority, highway name etc.
- Provide inter-state comparison
- Have an option to export such routes for further analysis

9.17 Use case 17: Rolling stock availability

Basework Required

- Plot near-real time data of commodity movement (Less than 2 days old)
- Plot near real time data of railway wagon movement (Less than 2 days old)
- Plot historical demand of trucks and of wagons for major demand centers
- Plot current and expected supply of trucks and wagons basis the data above to major demand centers
- Plot the detailed road network with village connectivity roads, district roads, state and national highways etc.
- Plot rail network

Working of the Use Case

- Option to select rolling stock - truck or rail wagons
- On selecting an option, calculate the shortage/surplus of the rolling stock using current supply, historical supply and historical demand
- Plot the shortage/surplus a heatmap
- Provide inter-state comparison
- Have an option to export such routes for further analysis

9.18 Use case 18: Custom query tool

Basework Required

- Plot all data as plotted earlier

Working of the Use Case

- Custom query tool to be used to run geo-based queries on data plotted above
- Query input to be in easy to understand English syntax
- Query tool to be easy to operate without coding/technical background
- All results of query to be plotted on a map instantaneously
- Have an option to export such routes for further analysis

10 Appendix 3: Performance Dashboards

10.1 Performance Metrics for Roads

Type of Metric	Objective	Metric	Frequency
Outputs	Increase Average Speed	1. Measure average speed on top 30 O-D stretches at peak intervals, (9am to 12pm) and (6pm to 10pm) every day for 1 month	Half Yearly
	Reduce Average Wait time at tolls, and checkpoints	2. Average wait time at peak intervals, (9am to 12pm) and (6pm to 10pm) at NH tolls – on the above ~30 O-D stretches	Half Yearly
Input-Infrastructure	Improve Fleet mix	3. % interstate movement > 300 km on 26T-40T trucks	Half Yearly
	Improve Fleet mix	4. % interstate movement > 300 km on > 40T trucks	Half Yearly
	Improve road infrastructure	5. % lane configuration of top 50 corridors (6 NC and 44 Economic corridors) (by km) a.% 2 lane b.% 4 lane c.% 6 lane d.% 8 lane e.% expressways	Yearly
		6. % on time completion of projects to address specific choke points on the top 50 corridors - Target date for	Half yearly

Type of Metric	Objective	Metric	Frequency
		each project and % projects on track to complete within xx (tbd) months of target	
		7. % completion of MoRTH driven port and airport connectivity projects	Quarterly
Input-Processes	Reduce idle time at tolls	8. % toll plazas Hybrid ETC enabled a)PPP toll plazas b)NHAI/MoRTH managed toll plazas	Quarterly
		9. % toll plazas fully ETC enabled a)PPP toll plazas b)NHAI/MoRTH managed toll plazas	
		10. ETC transactions as a % total transactions a)PPP toll plazas b)NHAI/MoRTH managed toll plazas	Quarterly
		11. % trucks ETC enabled	Quarterly
	Increase no of drivers	12. Total number of registered drivers for HCV and LCV	Quarterly

10.2 Performance Metrics for Rail

Type of Metric	Objective	Metric	Frequency
Output	Increase Average Speed	1. Average speed on top 50 stretches	Monthly
	Improve Predictability	2. % variation from agreed service levels on top 50 stretches	Monthly

Type of Metric	Objective	Metric	Frequency
Input - Processes	Fast-track construction of rail sidings	For rail sidings- 3. % projects completed on time 4. Average time projects are pending for approval 5. Average time from approval to start of construction 6. Average time for construction	Quarterly
	Improve rake ordering service levels	7. Wagon lead time – ordering a rake to receiving it for top 100 corridors	Monthly

Table 3 Performance metrics for rail

- **Performance metrics for Ports**

Type of Metric	Objective	Metric	Frequency
Output	Reduce vessel turnaround time for all major ports	Container	Monthly
		1. Average vessel turnaround time for container ports	
		Bulk cargo	
		2. Average vessel turnaround time for bulk cargo ports	
		3. Avg. vessel turnaround time (hours) (coal- conventional)	
		4. Avg. vessel turnaround time (hours) (coal- mechanized)	
		5. Avg. vessel turnaround time (hours) (iron ore)	

Type of Metric	Objective	Metric	Frequency
		6. Avg. vessel turnaround time (hours) (fertilizers)	
		7. Avg. vessel turnaround time (hours) (POL)	
		8. Avg. vessel turnaround time (hours) (Other Liquids)	
	Reduce port dwell time	IMPORTS	Monthly
		Total containers	
		9. % DPD containers	
		Port dwell time (import)	
		10. Port Dwell Time for CFS Bound Containers (Imports)	
		11 Port Dwell Time for ICD Bound Containers (Imports)	
		12. Port Dwell Time for DPD Containers	
		13. Transit time (CFS)	
		14. Transit time (ICD)	
		Average customs clearance time	
		15. CFS (gate in at CFS to customs clearance)	
		16. ICD (rake discharge to customs clearance)	
		17. DPD (queuing time1 + processing time)	
	Reduce port dwell time	EXPORTS	Monthly
		Port dwell time (export)	

Type of Metric	Objective	Metric	Frequency
		19. Port Dwell Time for CFS Origin Containers (Exports)	
		20. Port Dwell Time for ICD Origin Containers (Exports)	
		21. Port Dwell Time for Factory stuffed Containers	
		22. Transit time (CFS)	
		23. Transit time (ICD)	
		Average customs clearance time	
		24. CFS (gate in –OOC)	
		25. ICD (rake discharge at ICD to OOC)	
		26. Factory stuffed containers (queuing time1 + processing time)	
Input -Processes	Improve berth productivity	Container ports	Quarterly
		27. Gross berth productivity (TEU / hour)	
		Bulk cargo ports	
		28. Gross berth productivity (gross MT/ day) (coal- conventional)	
		29. Gross berth productivity (gross MT/ day) (coal- mechanized)	
		30. Gross berth productivity (gross MT/ day) (iron ore)	
		31. Gross berth productivity (gross MT/ day) (fertilizers)	
		32. Discharge rate (MT per hour) (POL)	

Type of Metric	Objective	Metric	Frequency
		33. Discharge rate (MT per hour) (Other Liquids)	

10.3 Performance Metrics for Air freight

Type of Metric	Objective	Metric	Frequency
Outputs	Reduce aircraft turnaround time	1. Average turnaround time for all-cargo aircrafts for top 10 airports	Monthly
		2. Average turnaround time for combination aircrafts for top 10 airports	
	Reduce airport dwell time	DOMESTIC	Monthly
		3. Average dwell time at airport for domestic inbound cargo	
		4. Average dwell time at airport for domestic outbound cargo	
		IMPORT	
		5. Average dwell time at airport for inbound cargo	
		6. Average time for customs clearance	
		EXPORT	
		7. Average dwell time at airport for outbound cargo	
		8. Average time for customs clearance	
	Improve Gate	9. Gross Gate Productivity(MT/day)	Monthly

Type of Metric	Objective	Metric	Frequency
Inputs - Processes	Productivity3	10. ULD2 Gate Productivity(ULDs)(MT/day)	
		11. Pallet Gate Productivity(MT/day)	
		12. Bulk Gate Productivity(MT/day)	

10.4 Performance Metrics for PGAs

Type of Metric	Objective	Metric	Frequency
Output	Reduce dwell time with PGAs	Import clearance time	Monthly
		FSSAI(total)	
		1. BoE to Application	
		2. Application to Scrutiny	
		3. Scrutiny to Payment	
		4. Payment to Sample	
		5. Sample to NOC	
		Plant Quarantine (total)	
		1. BoE to Application	
		2. Application to Sampling	
		3. Sampling to Report	
		4. Report to NOC	
		Animal Quarantine (total)	
		1. BoE to Application	
		2. Application to Sampling	
		3. Sampling to Report	
		4. Report to NOC	
		Drug Control (total)	

Type of Metric	Objective	Metric	Frequency
		1. BoE to Application	
		2. Application to Sampling	
		3. Sampling to Report	
		4. Report to NOC	
		% of consignments examined	
		1. FSSAI	
		2. Animal Quarantine	
		3. Plant Quarantine	
		4. Drug Control	

10.5 Performance Metrics for Warehouses

Type of Metric	Objective	Metric	Frequency
Inputs - Infrastructure	Increase Capacity	Total Capacity	Yearly
		1. Cold chain Capacity as a % of fresh produce production	
		2. ICD/CFS Capacity as a % of EXIM cargo handled	
		3. Agri-WH Capacity as a % of agricultural production	
Inputs - Processes	Increase Standardization	4. % WH graded	Yearly
		5. Of which, % WH graded A	

10.6 Performance Metrics for States

Type of Metric	Objective	Metric	Frequency
Output	Increase Average Speed	1. Average speed for roads connecting district HQs to state capitals	Half Yearly/Yea rly
Inputs – Infrastructure	Improve first mile/ last mile connectivity	2. % villages at 2011 census population >1K connected by continuous stretch of 2-lane paved shoulder road at minimum - to a state highway/ national highway	Half yearly/ Yearly
		3. % village at census population >10k connected to the nearest rail head through a 2 lane pave shoulder road	
	Capacity and Quality of State Highways	4. NH + SH density per 100 sq.km	Half yearly/ Yearly
		5. Lane configuration of state highways % 2 lane % 4 lane % 6 lane and above	
		6. % completion of identified projects to decongest state highways (In addition to laning - e.g. Bypasses/ flyovers)	
		7. % district HQ to be connected to nearest port by atleast 4 lane road	

Type of Metric	Objective	Metric	Frequency
		8. % district HQ to be connected to nearest airport by atleast 4 lane road	
		9. % district HQ to be connected to nearest rail head by atleast 4 lane road	
	Improve Quality of storage and handling	Cold chain: 10. Total cold chain capacity as a percentage of total production of fruits, vegetables, marine products and other perishables	Yearly
		ICD/CFS: 11. Total ICD/CFS capacity as a percentage of EXIM cargo	
	Increase number of MMLPs	12. % consumption centers (> xx population) with at least 1 MMLP	
		13. % production centers (Industrial cluster> xx sqkm) with at least 1 MMLP	
		14. If the state has ports; % ports with MMLP	
Inputs – Processes	Reduce waiting times at checkpoints	15. Number of checkpoints on key prioritized O-D stretches running through the state(SH and NH)	
	Reduce idle time at State highway tolls	16. % toll plazas ETC Enabled PPP toll plazas State PWD managed toll plazas	Quarterly
		17. ETC transactions as	Yearly

Type of Metric	Objective	Metric	Frequency
		a % total transactions PPP toll plazas State PWD managed toll plazas	
		18. % trucks ETC enabled	
	Reduce barriers to entry to logistics industry	19. Time taken to obtain a commercial driving license	
	Increase number of drivers and logistics personnel	20. No of people trained in skill center on logistics	
		21. Total number of registered drivers for HCV and LCV	

11 Appendix 4: Data Required for LPPT

11.1 List of data required from independent source

This appendix provides the list of data to be acquired from independent sources.

S. No	Data Layer	Geo-data Required	Description/Resolution of data	Purpose	Data Source	Minimum refresh frequency
1	Infrastructure	Complete Road Network	Location information of all national highways, state highways,	- Required for the geo-analytics	Private mapping databases such as	Annual

			district roads, city roads, and village roads with names/numbers of roads, lane information '- Information such as lanes	tool - Lane information required for performance dashboards	TomTom, HERE Maps and MapMyIndia	
2	Infrastructure	Complete Rail Network	Completed network of Indian railways	- Required for geo-analytics tool	Private mapping databases	Annual
3	Infrastructure	Major and minor Ports	All government and private ports	- Location required for geo-analytics tool	Private mapping databases	Annual
4	Infrastructure	Towns and Villages with population and GDP	All cities, towns, villages with population and GDP information	- Location data required for geo-analytics tool	Private mapping databases	Annual

Some of the agencies among others which provide the above data in India are TomTom, HERE Maps and MapMyIndia, NATMO, and Survey of India.

11.2 List of datasets required from government and government agencies

This appendix provides the tentative list of datasets required from government and government agencies.

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
1	Infrastructure	Toll Plazas-State and NH	All toll plazas of state and national highways with number of lanes, number of ETC lanes	- Number of ETC lanes - ETC collection details	- MoRTH databases - State PWD	Annual
2	Infrastructure	Major and minor Ports	All government and private ports	- Layout required for geo-analytics tool - Wait times/process times	Ministry of Shipping partnership	Annual

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
				data required for dashboards and geo-analytics tool		
3	Infrastructure	Post Offices	Location of the post offices of India Post	- Location data required for geo-analytics tool	Bhuvan, India Post	Annual
4	Infrastructure	National Waterways	Mapping of the identified national waterways along with terminals	- Location data required for geo-analytics tool	IWAI	Annual

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
5	Infrastructure	Dedicated freight corridor	Dedicated freight corridor routes with its feeder routes	- Location data required for geo-analytics tool	DFCC	Annual
6	Infrastructure	ICD/CFS	All ICD and CFS with capacity of each	- Location data along with capacity and required for geo-analytics tool	Ministry of commerce/Customs	Annual
7	Infrastructure	Warehouses, MMLP, cold chains	Warehouses location, capacity, commodity, area, ownershi	- Location data along with capacity, commodi	State governments, Ministry of commerce '- Various govt bodies such as CRWC, FCI etc	Annual

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
			p structure, grading, and other parameters for all India	ty, area etc and required for geo-analytics tool		
8	Infrastructure	Airports	All airports in India with their cargo handling capacity	- Location data required for geo-analytics tool	Ministry of Civil Aviation	Annual
9	Congestion	Rail congestion – Near real time	Average speed, congestion, or utilization of the rail network identified earlier - Averaged	- Required for geo-analytics tool - Required for performance dashboar	Indian Railways API	Monthly

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
			over 1 week	ds and logistics interventions		
10	Congestion	Airport Congestion	Average airport performance parameters such as dwell time - Averaged over 1 week	- Required for performance dashboards and logistics interventions	Ministry of Civil Aviation partnership	Monthly
11	Congestion	Railway service levels	- % variation from agreed service levels on top 50 stretches - Wagon lead time	- Required for performance tracking	- Railways partnership	Monthly

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
			– ordering a rake to receiving it for top 100 corridors			
12	Congestion	Railway coach utilization	- Average utilization of luggage compartment of SLR on top 50 OD stretches - Diesel Locomotive Utilization on top 50 OD stretches - Electric Locomoti	- Required for performance tracking	- Railways partnership	Monthly

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
			ve Utilization on top 50 OD stretches			
13	Congestion	Dwell time with PGAs	- Process time for FSSAI, plant quarantine, animal quarantine, drug control,	- Required for performance tracking	- Partnership with PGAs	Monthly
14	Commodity	O-D movement route for commodities by rail	- The principal routes of movement along with quantity on each for major commodit	- Required for geo-analytics tool	- Ministry of railways	Annual

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
			ies by rail - Wagon type, time taken for movement - Total of 3 years			
15	Commodity	O-D movement route for commodities by road	- The principal routes of movement along with quantity on each for major commodities by road - Truck sizes - Total of 3 years	- Required for geo-analytics tool	- Eway bill data - Road survey	Annual

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
16	Commodity	O-D movement route for commodities by ship/coastal movement	- The principal routes of movement along with quantity on each for major commodities by coastal/ship - Total of 3 years	- Required for geo-analytics tool	- Ministry of shipping partnership - Independent surveys	Annual
17	Commodity	O-D movement route for commodities by air	- The principal routes of movement along with quantity on each for major commodit	- Required for geo-analytics tool	- Ministry of civil aviation partnership - Independent surveys	Annual

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
			ies by air - Total of 3 years			
18	Commodity	Industrial Clusters	- Geo-information of industrial clusters by commodity	Required for geo-analytics tool	- DIPP	Annual
19	Cost	Rail Cost	Cost of movement of goods by rail for each commodity	- Required for geo-analytics tool	Indian Railways	As and when the cost updates
20	Cost	Shipping Cost	Cost of movement of goods through sea for each	- Required for geo-analytics tool	- Ministry of shipping partnership - Independent surveys - API with National logistics portal	As and when the cost updates

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
			commodity			
21	Cost	IWW Cost	Cost of movement of goods on national waterways for each commodity	- Required for geo-analytics tool	- Ministry of shipping partnership - Independent surveys - API with National logistics portal	As and when the cost updates
22	Cost	Air cargo cost	Cost of movement of goods through air for each commodity	- Required for geo-analytics tool	- Ministry of civil aviation partnership - Independent surveys - API with National logistics portal	As and when the cost updates
23	Infrastructure	Infrastructure project status	- Project details like lane augmentation, rail	- Required for performance	- Partnership with various ministries executing the project - To be updated by nodal officials in the Ministry	Monthly

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
			track doubling - Expected completion date - Planned completion date - Cost - Lat/long of project	dashboards and tracking		
24	Other	Vehicle data - % of trucks which are ETC enabled	- Monthly information	- Required for performance tracking	MoRTH databases	Monthly
25	Other	Number of registered drivers for HCV and LCV	Number of registered drivers for HCV and LCV	- Required for performance tracking	MoRTH databases	Monthly

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
				of skilling initiatives		
26	Other	Skill training	No of people trained in skill center on logistics	- Required for performance tracking of skilling initiatives	- Partnerships with state governments	Monthly
27	Other	Local Weather information	Historical average weather information over last 3 years	- Required for geo-analytics tool	- Partnership with IMD	Monthly

11.3 List of datasets required from private partnerships

This appendix provides the tentative list of datasets required from private partnerships.

S. No	Data Layer	Geo-data Required	Minimum Data resolution	Description	Data Source	Minimum refresh frequency
1	Congestion	Road Congestion – Near real time	Average speed or congestion on the road network identified earlier - Averaged over 1 week	- Required for geo-analytics tool - Required for performance dashboards and logistics interventions	Google API or telematics partnership with large truck operators	Monthly
2	Congestion	Toll Waiting Time- Near real time	Average waiting time at toll plazas identified earlier - Averaged over 1 week	- Required for geo-analytics tool - Required for performance dashboards and logistics interventions	Google API or telematics partnership with large truck operators	Monthly

11.4 List of datasets required from stakeholder surveys, interviews, and secondary research

This appendix provides the tentative list of datasets required from stakeholder surveys, interviews, and secondary research. These datasets may overlap with datasets

mentioned above. Multiple sources of the same dataset may be used to enhance accuracy of data.

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
1	Commodity	Commodity Production centers	Manufacturing locations and capacity of major commodities and of micro, small, and medium enterprises(MSME)	- Required for geo-analytics tool	- Ministry of commerce - Partnership with stakeholders	Annual
2	Commodity	Commodity Demand centers	Demand centers with demand of the major commodity and for products of MSME	- Required for geo-analytics tool	- Ministry of commerce - Partnership with stakeholders	Annual
3	Commodity	O-D movement route for commodities by road	- The principal routes of movement along with quantity on each for major commodities by road	- Required for geo-analytics tool	- Eway bill data - Road survey	Annual

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
			- Truck sizes - Total of 3 years			
4	Commodity	O-D movement route for commodities by ship/coastal movement	- The principal routes of movement along with quantity on each for major commodities by coastal/ship - Total of 3 years	- Required for geo-analytics tool	- Ministry of shipping partnership - Independent surveys	Annual
5	Commodity	O-D movement route for commodities by air	- The principal routes of movement along with quantity on each for major commodities by air - Total of 3 years	- Required for geo-analytics tool	- Ministry of civil aviation partnership - Independent surveys	Annual
6	Cost	Road Cost	Cost of movement of goods by road for each commodity for various truck sizes	- Required for geo-analytics tool	- Large Truck vendors survey - API with National	As and when the cost updates

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
					logistics portal	
7	Cost	Shipping Cost	Cost of movement of goods through sea for each commodity	- Required for geo-analytics tool	- Ministry of shipping partnership - Independent surveys - API with National logistics portal	As and when the cost updates
8	Cost	IWW Cost	Cost of movement of goods on national waterways for each commodity	- Required for geo-analytics tool	- Ministry of shipping partnership - Independent surveys - API with National logistics portal	As and when the cost updates
9	Cost	Air cargo cost	Cost of movement of goods through air	- Required for geo-analytics tool	- Ministry of civil aviation partnership	As and when the cost updates

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
			for each commodity		- Independent surveys - API with National logistics portal	
10	Cost	Handling charges	Handling charges for the commodity at port, station, siding, warehouse as the case may be. This includes costs such as loading charges, unloading charges, port handling charges, airport handling charges etc.	- Required for geo-analytics tool	- Independent surveys - API with National logistics portal	As and when the cost updates

S. No	Data Layer	Geo-data Required	Description	Remarks	Data Source	Minimum refresh frequency
11	Congestion	Road Congestion – Near real time	Average speed or congestion on the road network identified earlier - Averaged over 1 week	- Required for geo-analytics tool - Required for performance dashboards and logistics interventions	Google API or telematics partnership with large truck operators	Monthly
12	Congestion	Toll Waiting Time- Near real time	Average waiting time at toll plazas identified earlier - Averaged over 1 week	- Required for geo-analytics tool - Required for performance dashboards and logistics interventions	Google API or telematics partnership with large truck operators	Monthly

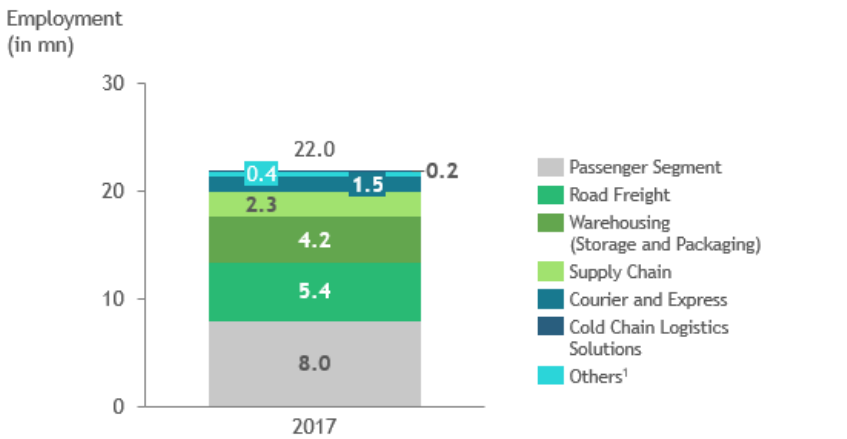
Chapter 12: Logistics Skilling

Contents

1 Context

Logistics sector is one of the most employment intensive sectors in India and provides jobs to more than 22 million people[1] across passenger and cargo segments. It is estimated that the jobs in logistics sector would grow to ~45 million by 2022[2] driven by increasing industrial output, ecommerce sector growth, FDI in retail and growth in warehousing industry.

Logistics sector as per Logistics Skill Council (LSC) has been classified into 12 subsectors - Land Transportation, Warehsousing, Supply Chain, Courier and Express, Cold Chain, EXIM, Inland Waterways, Port Terminals, Air Cargo, E Commerce, Liquid Logistics and Rail Logistics.



Source: Estimated current employment in subsector of Logistics sector - Logistics Skill Council
1. Others include Exim Logistics-Freight Forwarding & Customs clearance, Inland Waterways and Marine Services, Port Terminals, ICD and CFS, Air Cargo Operations, E-Commerce, Liquid Logistics, Rail Logistics

Figure 1: Logistics sector employment (2017-2018)

As per LSC estimates, of the 8.8 million new jobs to be created in logistics by cargo segment in 2022 - land transportation subsector (46% of new jobs) and warehousing subsector (30% of new jobs) will comprise the most significant part.

[1] Chapter 8: Industry and Infrastructure, Indian economic Survey 2017-18
[2] Logistics Skill Council estimates

	Logistics Sub Sectors	Employment in 2017 (in million)	Estimated growth	Employment in 2022 (in million)	Additional Jobs(in million)	(%)
	Cargo Segment	14	10%	22.74	8.74	*100%*
1	Land Transportation (~97% comprises drivers)	5.32	*12%*	9.38	4.06	*46.4%*
2	Warehousing (Storage and Packaging)	4.22	*10%*	6.80	2.58	*29.5%*
3	Supply Chain	2.33	*7%*	3.27	0.94	*10.7%*
4	Courier and Express	1.51	*10%*	2.43	0.92	*10.5%*
5	Cold Chain Logistics Solutions	0.17	*12%*	0.30	0.13	*1.5%*
6	Exim Logistics-Freight Forwarding and Customs clearance	0.13	*7%*	0.18	0.05	*0.6%*
7	Inland Waterways and Marine Services	0.11	*4%*	0.13	0.02	*0.3%*
8	Port Terminals, ICD and CFS	0.09	*4%*	0.11	0.02	*0.2%*
9	Air Cargo Operations	0.07	*4%*	0.08	0.01	*0.2%*
10	E-Commerce	0.02	*3%*	0.03	0.00	*0.0%*
11	Liquid Logistics	0.02	*2%*	0.02	0.00	*0.0%*
12	Rail Logistics	0.01	*2%*	0.01	0.00	*0.0%*

Figure 2: Estimated employment in 2022 by cargo segment

As a part of the Integrated National Logistics Action Plan, National Occupational Standards (NOSs) and detailed Qualification Packs (QP) are being created for curriculum, and assessment requirements in each subsector to meet the new demand of jobs. This chapter defines the key elements and approach methodology for creation of the QPs.

Also basis discussions with stakeholders, and LSC estimates, land transportation has been identified as the largest and most critical contributor to employment generation and

this chapter deep dives into the commercial vehicle driver skilling landscape and suggests interventions to tackle the challenges facing this sub sector.

2 National Occupational Standards (NOSs) and Qualifications Packs (QPs)

Ministry of Skill Development and Entrepreneurship through LSC is undertaking the creation of NOSs and QPs. National Occupational Standards (NOSs) specify the standard of performance, knowledge and understanding when carrying out a particular activity in the workplace. Each NOS defines one key function in a job role. Example: For a Sales Associate, one of the NOS would be to 'To help customers choose right products'. A set of NOSs, aligned to a job role constitute the Qualifications Pack (QP). These drive both the creation of curriculum, and assessments. Example would be Qualification Pack of a Sales Associate . These QPs are also aligned to the National Skills Qualifications Framework (NSQF)[3].

2.1 Approach Methodology

LSC conducts in depth interviews with more than 50 players in the small, medium and large segment for each sub sector for identifying and developing the QPs for each of the entry level job roles.

A detailed **occupational mapping** is undertaken to identify job roles for each sub sector. For example, for the land transportation subsector, following job roles are created basis detailed occupational mapping undertaken by LSC:

NSQF Levels	Ground Operations	Vehicle Operations	Customer Support /	Documentation and Reporting

[3] NSQF is a competency-based framework that organizes all qualifications according to a series of levels of knowledge, skills and aptitude. These levels, graded from one to ten, with the entry level being 1, and the highest level being 10, are defined in terms of learning outcomes which the learner must possess regardless of whether they are obtained through formal, non-formal or informal learning

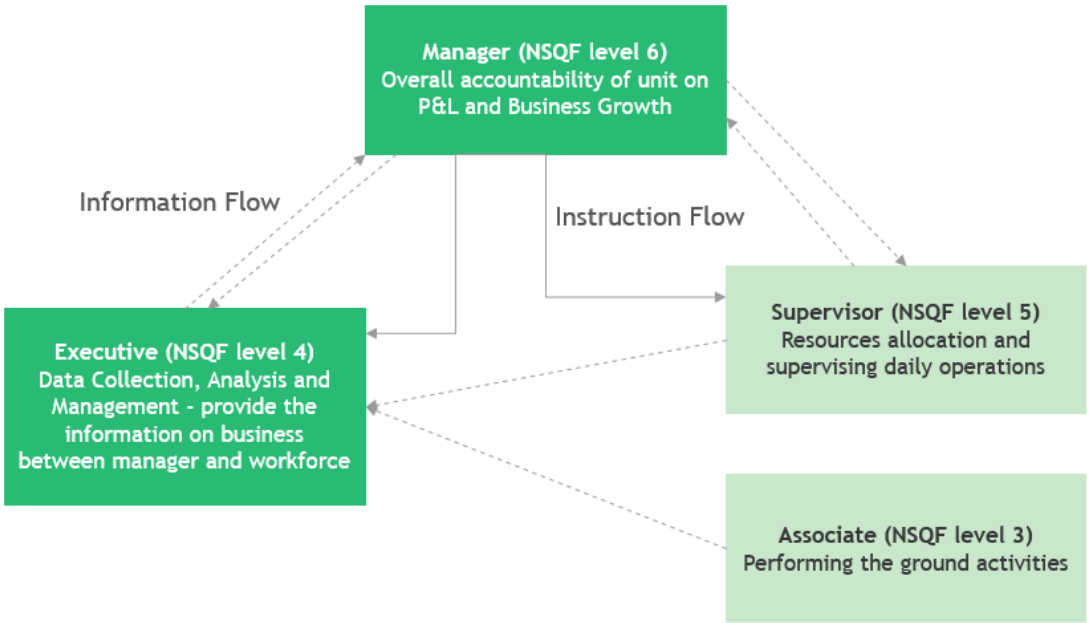
	(Vendor coordination, gate operations, consolidation, route planning)		**Relations (Consignment Booking)**	**(Documentation, Quality Assurance and Claims)**
Level10	MD / President, VP, Global / Country Head, Chief General Managers			
Level 9				
Level 8				
Level 7	Transport Lead			
Level 6	Transport Manager (Hub and Multimodal operations) Warehouse cum inventory cum Transport Manager (hub and multimodal operations)			
Level 5	Transport Supervisor (Operations)	Transport Supervisor (Vehicle tracking, ODC Transport)		Transport Supervisor (Documentation and reporting)
Level 4	Transport Executive (Coordination, consolidation)	Transport Executive (Cargo, tracking, route optimization)		Transport Executive (Documentation)
Level 3	Transport Associate (Vendor Planning, Gate operations)	Transport Associate (Vehicle and consignment tracking)	Transport Associate (Consignment booking)	
Level 2				
Level 1				

Functional mapping for each of the job is then undertaken to define the minimum educational requirement and experience needed, skills needed, career progression etc. A **functional analysis** is undertaken to define the relevant attitude, skills and knowledge (ASK) for the job profile.Basis the functional analysis, National Occupational Standards needed for each job role are identified to create the QP.

The QPs being developed have to go through various quality checks and stakeholder consultations before getting final approval :

1. Qualification Review Committee approval (National Skill Development Corporation)
2. National Skills Qualifications Committee approval (Industry Stakeolder Discussions)
3. Line Ministry validation by Logistics Division, Ministry of Commerce (Industry Stakeholder Discussions)

2.2 QP Structure and Design



Each QP comprises of the following NOS :

1. **Compulsary NOS** – Core and common requirements
    a. Associate – On ground activities
    b. Executives – Data management and tracking
    c. Supervisors – Resource supervision and daily operations
    d. Manager – Facilitating operations, performance review and business development
2. **Elective NOS –** Multiple roles / related to specific products handling

a. Executives – Various roles performed – stevedoring, mooring, signalman
b. Supervisors – Various activities supervised – documentation, yard, planning etc
c. Manager – Various disciplines – key accounts, nominated sales etc. different sub segments – bulk cargo FMCG etc

3. **Optional NOS –** Provide value addition for Career Advancement which will be taken during the employment

2.3 Current Status

Currently more than 56 QPs have been developed for the 12 subsectors and 17 QPs have been approved for 4 sub sectors – Courier/express, E Commerce, Warehousing and Land Transportation
(Details in **appendix 2**)

3 Skilling for Land Transportation Subsector

3.1 Approach Methodology

The Commercial Vehicle driver landscape comprising ~97%[4] of the total land transportation related employment in India was analysed. The analysis was supplemented by detailed discussions with relevant stakeholders including large, medium and small scale transporters, truck drivers, automobile manufactures, skill development councils, driver training institutes, government authorities and industry associations to understand the issues and identify possible interventions. More than 35 interviews were conducted across 3 stakeholder consultations to get inputs from the industry.
World Bank report[5], research reports by academia[6] and Logistics Skill Council were also referred to while understanding challenges. Relevant government schemes of MoRTH

[4] Logistics Skill Council Estimates: M&HCV Drivers – 49% of total land transportation jobs ; LCV Drivers – 41%; Tractor Drivers – 7% and Support System (Route planners, Booking executives, Documentation executives etc.) – 3%
[5] World Bank - Logistics Competencies, Skills, and Training
[6] The endemic issue of truck driver shortage - A comparative study between India and the United States

(Ministry of Road Transport and Highways) and MSDE (Ministry of Skill Development and Entrepreneurship) were also considered while drafting interventions. The initiatives identified focus on both commercial vehicle driver shortage and skilling aspects. (See **appendix 2** for details on the interviews and workshops)

3.2 Current Landscape

Commercial vehicle drivers (non-transport) are often classified as either 'owner-operators' (small business people who own, maintain and drive their own commercial motor vehicles) or 'company-drivers' (who work as employees in a company), for the purpose of this report we do not make a distinction between the 'owner-operator' or 'company-drivers' and discuss the challenges and interventions as a whole

3.2.1 Gaps / shortage in availability of commercial vehicle drivers

As per data published by Ministry of Road Transport and Highways (MoRTH)[7], the number of HCV (multi axled/Articulated Vehicles/Trucks and Lorries) vehicles registered in India till 2015 was 4.5m and LCV vehicles was 4.8m adding to a total of 9.3 m.
MoRTH also estimated that there is **22%[8] shortage of drivers in the country**. Recent studies by various academia[9] have also estimated that truck driver shortage in India is in the range of 20%-26%.

3.2.2 Commercial vehicle driver license procurement process

Basis discussions with various transporters and truck drivers, the driving license procurement process has been outlined in the following table:

S.no	License Type	Process
1	Light Commercial	• Application – online through Sarathi / physically through RTO

[7] Road Transport Year Book (2015-16), MoRTH
[8] "There is a 22% shortage of drivers in the country today." - Nitin Gadkari (Nov 2015 – CII event EXCON)
[9] The endemic issue of truck driver shortage - A comparative study between India and the United States (Neha Mittala, Prashanth D. Udayakumar, G. Raghuram, Neha Bajaj)

	Vehicle Learners' license	• Learners' license test (color blindness test and a written exam)
2	Light Commercial Vehicle Permanent license	• Hold LL for min. 1 month before applying for permanent license Driving test • Pursue mandatory training course from a government authorized motor school (fee, duration can vary across schools and states) • Application online / physical mode • Driving Test
3	Heavy Vehicle Learners' license	• Hold the permanent LCV/MCV license for 1-2 years minimum (state-wise difference - Delhi requires LCV for 2 years; Maharashtra requires LCV for 2 yrs or MCV for 1 yr; Haryana and UP require LCV for 1 yr) • Application – online through Sarathi / physically through RTO • Learners' license test (color blindness test and a written exam)
4	Heavy Vehicle Permanent license	• Hold LL for min. 1 month before applying for permanent license Driving test • Pursue mandatory training course from a government authorized motor school (fee, duration can vary across schools and states) • Apply for permanent license • Take driving test • License to be renewed every 3 years
5	Other vehicle type license (Trailers, trolleys etc)	• Apply for endorsement through online (Sarathi) / offline mode

- Obtaining a Heavy vehicle driving license can take up to 2.5 years
- Government authorized small – mid scale schools don't have the infrastructure required to impart recommended trainings including large driving tracks, simulators, qualified trainers etc. Certificates are issued without trainings being actually imparted on payment of illegitimate fees
- Lengthy process encourages circumventing the official procedure by paying Rs.30-35,000 in agent fees etc to get license made quickly without undertaking the official process, driver training, and driving test.

3.2.3 Landscape of current driver skilling infrastructure

As per estimates by MoRTH[10] more than 20% of the accidents in India involve trucks, Lorries, tempos, tractors and other articulated vehicles and occur due to driving related reasons. Despite having adequate provisions in Central Motor Vehicle Rules (CMVR) which directly as well as indirectly promote good driving skills among drivers, the level of driver skilling in India has great scope for improvement. Driver skilling in India comprises of the following training infrastructure:

3.2.3.1 Driver Training Schools

Truck drivers in India have to get a mandatory driver training certificate in Form 5[11] to obtain commercial vehicle driving license. There are currently three type of driver training schools in India:

i. **Private Training Institutes authorised by Government:** These schools are generally small-mid scale institutions having area less than 1 acre in size and having basic minimum infrastructure required as per state government rules. Rule 24 of the CMVR 1989 provides for establishing Driving Schools and Establishments for which an application shall be made to the relevant state licensing authority. These schools are authorised by the respective state

[10] Road Accidents in India (2017) – MoRTH Transport Research Wing
[11] Rule 14(e).17(1)(b),27(d) and 31-A(2) of the Motor Vehicle Rules

governments to provide the mandatory training certificate needed for application of commercial vehicle license. (See **appendix 3** for details)

ii. **Tier-1 large scale driver training institutes set up by automobile manufacturers, MoRTH and State Governments:** MoRTH has sanctioned setting up of Institute of Driving Training & Research (IDTRs) in the 10th, 11th and 12th five year plans. The DTIs are being set up and operated by the private sector or on PPP mode - covering **10-15 acres** and encompassing complete infrastructure support required for a modern IDTR. They have the modern infrastructure and equipment including tracks and simulators. MoRTH is encouraging setting up of IDTRs through capex incentive of upto 17 Cr, land is being provided/subsidized by State Govt.

iii. **Tier-II regional driver training centres set up by private companies through support from government**- These are being developed across State (excluding district in the State where IDTR is proposed or developed) preferably on land measuring **~ 1 acre** (minimum built up area of 2,500 sq.ft.) with basic support infrastructure.

(See **appendix 4** for details)

3.2.3.2 Driver Training Types

These schools provide various trainings through the available infrastructure –

iv. **Induction Training Course** – To train heavy vehicle drivers in a systematic manner on scientific lines by selecting the candidates who complete 1 year in Light Motor Vehicle Driving Licence. This training should span over 30-45 days. Practical training be for 20 hrs. and theory for 16 hrs. since such trainees are people who have first held the LMV licence for a period of min 1 yr.

v. **Refresher & Orientation Training Course for Drivers who are in service** - Short duration of 2-3 days may also be conducted periodically in the Training Institute for the drivers who are in service

vi. **Fuel Efficiency training** - One day Fuel Efficiency training to HMV drivers who are appearing for PDL test. (This training is conforming to PCRA recommendations and Maharashtra state has authorised to issue Form 5A to the successful

participants under the notification of Ministry of Road Transport and Highways, New Delhi dated 15th May 2018)

vii. **Specific Trainings** - Some training institutes also provide specific trainings like trainings for carrying hazardous goods, overdimention trucks etc

3.3 Key challenges

Basis discussions with stakeholders, the following key challenges have been identified causing both shortage of and lack of skilled drivers:

3.3.1 Nature of Profession

Truck driving as a profession is one of the least respected professions in India. Various reasons make the profession less lucrative and less dignified than others:

3.3.1.1 Lack of competent Salary

Truck drivers on an average receive lower salaries (10-40 thousand per month) as compared to cab drivers (ola / uber) (30 – 70 thousand per month)[12] causing India's younger generation to no longer aspire to become a truck driver. With the new generation opting for other professions and experienced truck drivers moving to urban areas to drive taxis attached to app-based taxi services, the shortage of truck drivers is only compounding by the day

3.3.1.2 Difficult working hours

Long working hours away from home (~12% return to base at a frequency of less than 2-days ; At least 85% of long-distance drivers spend 8 days or more for one round trip)

[12] Basis stakeholder consultations and industry inputs

3.3.1.3 Contract based employment

In the Indian trucking industry, most truck drivers are contracted labor and not covered by existing laws and acts such as Minimum Wage Act, medical insurance, retirement or gratuity benefits. This lack of security demotivates people to opt for truck driving as a career opportunity

3.3.1.4 Inhospitable driving conditions on road

Lack of proper resting facilities for drivers, harassment by RTOs / Police and poor road conditions lead to higher number of road accidents and fatalities.

3.3.1.5 Health related issues

Given the long working hours away from home on road the truck drivers suffer from multiple health disorders. Also addiction to narcotic substances, drinking and gambling is very common.

3.3.2 Driver licensing related issues

The Heavy vehicle driver licensing process in India constitutes a lengthy process of 1.5-2.5 years across states. Major pain points as highlighted by the industry are listed below:

- The need to hold LCV for minimum 1-2 years before applying for Learner license of HCV
- Average of Rs 15,000 paid as non-official payments, encourage circumventing the official procedure by paying Rs.30-35,000 in agent fees, to get license made in 72 hours instead of 2.5 years
- Mandatory educational requirement of 8th /10th std across states - challenge in finding educated drivers

3.3.3 Driver Training Infrastructure

3.3.3.1 Non-standard training curriculum

The current training curriculum is not standardized / not - approved by any government authorized body, hence necessary behavioral skills, simulation training etc. are not being administered at all training centers.

3.3.3.2 Underutilization of training infrastructure

Existing IDTRs and DTIs set up under MoRTH / State Governments are underutilized and non-sustainable

3.3.3.3 Difficulty in setting up driver training institutes

Inspite of MoRTH and MSDE schemes, difficulties in getting approvals for setting up of large scale training institutes as there is lack of coordination between center and state

3.3.3.4 Inadequate infrastructure in Government authorized small – mid scale schools

The authorized schools lack the infrastructure and equipment required to impart recommended trainings including large driving tracks, simulators, qualified trainers etc. Certificates are issued without trainings being actually imparted on payment of illegitimate fees

3.4 Recommendations and action agenda

With the increase in demand for road freight and e-commerce operations there is a need to overcome the aforementioned challenges of driver shortage and driver skilling in a structural manner. Discussions with several stakeholders identified a list of possible initiatives to improve the perception of the truck driving profession and improve the skilling.

To reduce entry barriers and increase the number of drivers in the workforce, the following measures can be explored by the various ministries specifically MoRTH and MSDE:

1. Explore setting up of **mobile truck training units** for training LMV drivers in remote locations to drive HMV :
    - The limitation of government driver training institutes and government authorized institutes is that they are mostly established in towns and cities and requiring huge investment. Most of the driver aspirants come from rural areas where this kind of infrastructure is not available
    - New 11-18 tonner trucks cost 12 – 20 lakh rupees when converted into containerized trucks depending upon the truck size. These trucks have a defined life cycle of 10 years, however the condition of it may deteriorate owning to its extensive use on Indian terrain within 4-5 years of use. These old trucks are sold at half the price in the second hand market
    - It would be economical and scalable if the training institutes convert these trucks into Mobile Driver Training Units which would reach the learner's place and provide training for the stipulated duration as per the curriculum
    - The curriculum would largely focus on developing personal and professional attributes rather than technical/hard skills
    - The truck container would be a classroom providing the soft skills training using the latest multimedia trainings tools and equipment to maintain the interest level and attention of the learners
    - The possibility of installing simulators and other equipment can be explored
2. Explore a **public campaign** to improve the perception of the trucking profession. For e.g. Truck Moves America Forward (TMAF) raised $1 million for running PR campaign for improving perception of truck drivers in USA. The money was used to run billboard campaigns throughout the year that were seen by 17.4 million people, radio advertising that was heard by 26.6 million people during the year, and online advertising seen by more than 500,000 people

To improve the skill level of commercial vehicle drivers in the country:

1. Explore developing a comprehensive process for authorization and monitoring of motor driver training institutes. This shall be standardized across states.
    a. Set up an accredited national agency which will have the responsibility for the following:
        - Prescribing a standard curriculum for commercial drivers which has to be approved by the respective ministries and will be mandated across driver training institutes
        - Driver training institutes have to be certified by this agency as per the norms defined by them (vetted by the ministry)
        - Periodic checks on the authorized / approved driver training schools to ensure that they are having the requisite infrastructure, curriculum and trainers to undertake the trainings.
    b. Explore setting up an independent driver testing body separate from the training institutes and RTOs to test the drivers for the application of driving license.

4 Conclusion

As a part of the Integrated National Logistics Action Plan, QPs are being developed by Logistics Skill Council for each of the Logistics Sub Sectors. Various stakeholder discussions are being held to validate these QPs by the Logistics Division. There is a need for the industry to adopt these QPs and NOSs for bridging the gap in the Logistics sector Skilling landscape.

Also stakeholder discussions highlighted the need for interventions in both commercial vehicle driver shortage and skilling aspects and hence the Integrated National Logistics Action Plan lays out a preliminary set of key recommendations for reducing commercial vehicle driver shortage and improving skilling in commercial driver landscape. Given that the requirement for drivers is going to increase exponentially by 2022, it’s imperative that the recommendations are adopted by the respective ministries.

5 Appendices

Appendix 1 – National Occupational Standards (NOSs) and Qualification Packs (QPs) for Logistics

Illustrative List of QPs' under the Courier & Express Services and E-Commerce

SI.NO.	SUB-SECTOR	QP NAME	NSQF LEVEL
1	Courier & Express	Courier Associate	3
2	Courier & Express	Courier Executive	4
3	Courier & Express	Courier Supervisor	5
4	Courier & Express	Courier Manager	6
5	Ecommerce	Ecommerce Operations - Team Lead	5
6	Ecommerce	Ecommerce Operations - Manager	6

Illustrative List of QPs' under the Warehousing and Land Transportation

SI.NO.	SUB-SECTOR	QP NAME	NSQF LEVEL
1	Warehousing	Warehouse Associate	3
2	Warehousing	Warehouse Executive	4
3	Warehousing	Warehouse Supervisor	5
4	Warehousing	Warehouse Manager	6
5	Warehousing	Inventory and Materials Manager	6
6	Warehousing	Warehouse, Inventory and Transport Manager	6
7	Warehousing	Material Handling Operator and Technician	4
8	Land Transportation	Land Transportation - Associate	3

9	Land Transportation	Land Transportation - Executive	4
10	Land Transportation	Land Transport Supervisor	5
11	Land Transportation	Land Transport Manager	6

Appendix 2 – List of stakeholders interviewed and workshops conducted

S.no	Stakeholder	Type
Consultation 1: Transporters, E Commerce, Express and Warehousing players organized by Logistics Skill Council in Chennai		
1	Asian Development Bank	Academia
2	TVS LSL	Warehousing Industries
3	CII - Institute of Logistics	Industry Association
4	Logistics Sector Skill Council	Skill Council
5	Express Industry Council of India (EICI)	Industry Association
6	Bluedart	Courier and Express Services Player
7	DTDC	Courier and Express Services Player
8	Fedex	Courier and Express Services Player
9	EXIM Consultants	Courier and Express Services Player
10	DHL Express	Courier and Express Services Player
11	E- commerce Express	E- Commerce Industries
12	UPS	E- Commerce Industries
13	GATI	E- Commerce Industries
14	Janta Roadways Pvt Ltd	Land Transportation Player
15	Agarwal Packers & Movers	Land Transportation Player
16	Kesineni Cargo	Land Transportation Player
17	Kintetsu World Express	Land Transportation Player
18	Om Logistics	Land Transportation Player

19	KT Telematics	Land Transportation Player
20	Associate Road Carriers	Land Transportation Player
21	Transport Corporation of India	Land Transportation Player
22	E Mojro	Land Transportation Player
23	DB Schenker	Warehousing Industries
24	Flexol	Warehousing Industries
25	FM Logistics	Warehousing Industries
26	Future Supply chain Solutions	Warehousing Industries
27	Proconnect	Warehousing Industries
28	E Cargo	Warehousing Industries
Consultation 2 – Auto Manufacturers		
29	SIAM - Society of Indian Automobile Manufacturers	Industry Association
30	ASDC - Automotive Skill Development Council	Skill development council
Consultation 3 – All India Motor Transport Congress		
Other Individual Consultations		
31	IDTR Pune	Driver Training Institute
32	Safeducate	Driver Skilling Company
33	TCI	Transporter
34	Rivigo	Logistics Startup
35	Blackbuck	Logistics Startup
36	Truck Drivers	Truck Drivers
37	East India Transporters	Small Transporter

Appendix 3 - Requirements for opening a Driver Training School

Requirements for opening a Driver Training Schools have been prescribed in rules (Haryana Motor Vehicle Rules):-

(1) The applicant and the staff working under him should be of good moral character and qualified to give driving instructions.

(2) The premises where the school or establishment is proposed to be conducted should be either owned by the applicant or taken on lease by him or hired in his name and should have adequate provision for conducting lecture and demonstration of models besides adequate parking area for the vehicles meant to be used for imparting instructions in driving.

(3) The financial resources of the proposed school or establishment should be sufficient to provide for its continued maintenance.

(4) The applicant should own and maintain a minimum of one motor vehicle each of the type in which instruction is imparted in the school or establishment.

(5) The vehicles should be available exclusively for purposes of imparting instruction and all such vehicles, except motor cycles, are fitted with dual control facility to enable the instructor to control or stop the vehicle.

(6) The applicant should maintain the following apparatus, equipment and other requirements, namely:—

(a) a blackboard,

(b) a road plan board with necessary model signals and charts,

(c) traffic signs chart,

(d) chart on automatic signals and signals given by traffic controllers where there are no automatic signals,

(e) a service chart depicting a detailed view of all the components of a motor vehicle,

(f) engine gear box, brake shoe and drums (except where the applicant desires to impart instruction in the driving of motor cycles only),

(g) puncture kit with tyre lever, wheel brace, jack and tyre pressure gauge,

(h) spanners (a set each of fix spanners, box spanners, pliers, screw drivers, screw spanners, and hammer),

(i) driving instructions manual,

(j) benches and tables for trainees and work bench,

(m) a collection of books on automobile mechanism, driving, road safety, traffic regulations, laws relating to motor vehicles and related subjects

(n) a fully equipped first-aid box for use in emergency at the premises.

(7) The applicant or any member of the staff employed by him for imparting instructions should possess the following qualifications, namely:—

(a) a minimum educational qualification of a pass in the 10th standard,

(b) a minimum driving experience of five years in addition to a certificate in a course in motor mechanics or any other higher qualification in mechanical engineering from an institution established by the Central or a State Government or from an institution recognised by the Board of Technical Education of a State Government,

(c) thorough knowledge of traffic signs specified in the Schedule to the Act and the regulations made under section 118,

(d) ability to demonstrate and to explain the functions of different components, parts of the vehicles,

(e) adequate knowledge of English or the regional language of the region in which the school or establishment is situated.

Appendix 4 - Illustrative list of Large Driver training Institutes with world class infrastructure being run by private organisations with government support:

Sno	**Name**	**Owners**
1	Chhindwara IDTR	Ashok Leyland MoRTH State Govt (Madhya Pradesh)
2	Jajpur IDTR	Ashok Leyland MoRTH Govt Of Odisha

Sno	Name	Owners
3	Rail Magra, Rajsamad IDTR	Ashok Leyland MoRTH State Govt (Rajasthan)
4	Burari (Delhi)	Ashok Leyland MoRTH Delhi Govt
5	Dharwad (Karnataka)	Ashok Leyland
6	Bengaluru (Karnataka)	Ashok Leyland
7	Ranoli (Gujarat)	Ashok Leyland
8	Kaithal (Haryana)	Ashok Leyland
9	Nammakal (Tamil Nadu)	Ashok Leyland
11	Aurangabad IDTR	Maruti Suzuki MoRTH Transport Department, Govt of Bihar
12	Dehradun IDTR	Maruti Suzuki
13	Bahadurgarh IDTR	Maruti Suzuki
14	Sarai Kale Khan, New Delhi IDTR	Maruti Suzuki
15	Institute Of Driving & Traffic Research at Rohtak, Haryana	Maruti Suzuki
16	All Gujarat Institute Of Driving Technical Training & Research at Vadodara, Gujarat	Maruti Suzuki
17	Institute of Driving & Traffic Research at wazirabad Road,	Maruti Suzuki
18	IDTR Bihar	Maruti Suzuki
25	Agartala IDTR	Tata Motors Transport Department, Govt Of Tripura
26	Bhivani IDTR	Tata Motors Govt Of Haryana
27	Pune IDTR	Tata Motors MoRTH CIRT

Sno	Name	Owners
28	Ajmer (Rajasthan)	Tata Motors
29	Silchar (Assam)	Tata Motors
30	Mauhana (Punjab)	Tata Motors
31	Dimapur DTI	Tata Motors Govt of Nagaland
32	Vijayawada IDTR	The Krishna District Lorry Owners Association STFC MoRTH
33	Indore DTI	Volvo Eicher
10	Kolkata JIS Institute for Traffic Management	JIS Foundation West Bengal Infrastructure Development Corporation
34	Bellary North Eastern Karnataka Road Transport Corporation Driving Training	Karnataka State Road Transport Corporation
35	Bedkuchi, Assam Principal Driver's & Conductor's Training School	Transport Department, Govt Of Assam
36	Edappal IDTR	MoRTH Kerala Motor Vehicles Department
37	Mandi IDTR	HRTC+Telco

Chapter 13: Governance Mechanism

Contents

1 Context

The Integrated National Logistics Action Plan lists a large number of initiatives concerning variety of Ministries, government bodies and industry stakeholders. Different parts of the logistics value chain currently are being managed by many ministries including Road Transport and Highways, Shipping, Railways, Civil Aviation, D/o Posts, Commerce and Industry, Finance and Home Affairs. In addition, a large number of government agencies such as Central Drug Standard Control Organization, Food Safety and Standards Authority of India, Plant and Animal Quarantine Certification Service provide relevant trade clearances and impact the value chain.

Also, the National Logistics Policy has been drafted and released with the aim of enabling integrated development of the logistics sector in the country.

In order to drive the above thrust areas, a robust governance framework is critical to ensure effective coordination across the various stakeholders and track progress against the defined national logistics plan and the key objectives

2 Elements of governance mechanism

Governance, particularly in public sector, is defined as the *set of responsibilities and practices, policies and procedures, exercised by an agency's executive to provide strategic direction, ensure objectives are achieved, manage risks and use resources responsibly and with accountability*.

In this sense, good governance is about both performance -- how an organization delivers goods or services -- and risk management, how an organization reduces the risk of failure. Effective governance, thus, is essential if any organization wants to set and meet its strategic goals.

In practice, an effective governance mechanism achieves the above objectives by defining the following elements :

- **Structure** : Organize and divide responsibilities and reporting processes such that the executive at each level receives the appropriate information it requires to make decisions

- **Oversight responsibilities** : Define responsibilities and set of activities at each level
- **Engagement and involvement** : Define level of engagements at each level to ensure that each level is able to fulfil its commitments

In the context of Logistics division, a governance mechanism aims to fulfil the following requirements –

1. Obtain in-principle acceptance of initiatives identified
2. Define and set targets for each initiative
3. Track the progress of initiatives
4. Intervene and resolve issues in a timely manner to ensure the integrated national logistics action plan meets its targets

3 Institutional framework for governance

The Logistics division under the Department of Commerce, will have the primary responsibility to drive the key thrust areas as per the National logistics policy and facilitate alignment across the key central ministries. This will involve extensive coordination, data gathering and monitoring across central ministries (e.g. Roads, Railways, Shipping, Civil Aviation, Food processing and Consumer Affairs, Finance, Home Affairs, D/o Posts), Partner Government Agencies, respective State governments, and industry stakeholders

For this purpose, four committees/councils will be constituted:

- National Council for Logistics, chaired by the Prime Minister
- Apex inter-ministerial Committee, chaired by the Minister of Commerce and Industry
- India Logistics Forum chaired by the Commerce Secretary with representation from key industry/business stakeholders and academia.
- Empowered task force on logistics will be created, as a standing committee chaired by the head of the Logistics Division

A summary of the 4 committees has been shown in the below –

	Chair	Frequency
National Council for Logistics	Prime Minister	Every 6 months
Apex inter-ministerial Committee	Minister of Commerce & Industry	Every 3 months
India Logistics Forum	Commerce Secretary	As required
Empowered task force on logistics	Head of Logistics Division	Monthly

Figure 1 Institutional framework for governance

3.1 National Council for Logistics

Given the complexities and inter-ministerial nature of logistics, National Council for Logistics will be set up and chaired by the Prime Minister of India. The Council would be composed of the Minister of Commerce and Industry, Minister of Road Transport and Highways, Minister of Railways, Minister of Shipping, Minister of Civil Aviation, Minister of Communications and Minister of Finance. Additionally, as required, respective State Chief Ministers shall participate on invitation basis. The Council will provide overall direction and guidance for the integrated development of logistics in the country. Further, it will review the progress made against the Integrated National Logistics Action Plan every six months. The Logistics Division will provide secretarial support to the operations of the Council

3.2 Apex inter-ministerial Committee

An Apex Inter-Ministerial Committee will be setup under the chairmanship of the Minister of Commerce & Industry. This will include a core committee who will advise, provide,

approve and implement projects on logistics and will comprise of Secretaries of Ministry of Road Transport & Highways, Ministry of Civil Aviation, Ministry of Shipping, Ministry of Railways, D/o Revenue, Ministry of Environment & Forests & Climate Change, Ministry of Development of North Eastern Region, Ministry of Home Affairs, D/o of Legal Affairs, D/o Posts, Ministry of Agriculture & Farmers' Welfare(FSSAI, Plant Quarantine) & Ministry of Health & Family Welfare(CDSO). Also, the APEX Inter-Ministerial Committee with constitute a group of user ministries/departments consisting of Secretaries from Ministry of Steel, Ministry of Coal, Ministry of Food & Consumer Affairs, Ministry of Agriculture & Farmers' Welfare, Ministry of Mines, D/o of Chemicals & Petrochemicals and Ministry of Power. They will attend the Inter-Ministerial committee meetings on an invitation basis, depending on the matter under discussion. Chief Secretaries of state governments will also be made a part of this committee on an invitation basis. This Committee will review the progress against the Integrated National Logistics Action Plan on a quarterly basis, with secretarial support from Logistics Wing. They would also resolve cross ministerial issues and bottlenecks, thus facilitating seamless co-ordination between Ministries

3.3 India Logistics Forum

A National Logistics Forum will be created to be chaired by the Commerce Secretary with representation from the government including D/o Posts, academia, industry/business stakeholders, for example, logistics service providers like fleet operators, freight forwarders, Customs agents, shipping lines, warehouse operators, 3PLs etc. as well as from users of logistics services including industry and manufacturing associations, e-commerce players etc. The Forum will be leveraged to hear the voice of the industry on key challenges faced, as well as to understand best practices which could be implemented. Additionally, through this Forum, the Logistics Wing will facilitate industry buy-in and feedback for key interventions in the Integrated National Logistics Action Plan

3.4 Empowered task force on logistics

An empowered task force headed by the head of the Logistics Wing, Department of Commerce will be created. It will have representation at the Joint Secretary (or equivalent) level from Ministry of Road Transport & Highways, Ministry of Civil Aviation, Ministry of Shipping, Ministry of Railways, Ministry of Finance, D/o Posts, Ministry of Food & Consumer Affairs and Joint Secretary (or equivalent) from the Partner Government Agencies (FSSAI, Drug Control, Plant and Animal Quarantine, and others as required).

This task force shall be the primary level of tracking interventions to ensure that NLAP meets its targets and timelines.

The task force will meet on a monthly basis to review progress against the Integrated National Logistics Action Plan at each intervention level, and also enable inter-ministerial coordination/ information exchange required. The activities that the task force shall include the following

1. Obtain in-principle acceptance of initiatives identified
2. Define and set targets and timelines for each initiative
3. Track the progress of initiatives
4. Highlight issues related to each interventions
5. Intervene and resolve issues in a timely manner and escalate wherever required

An illustrative snapshot of the activities the empowered task force shall undertake for each intervention has been shown below.

Illustrative

Intervention	Activity	Timeline	Status
Integrated Cement Terminals	In-principle approval	Nov-2018	
Integrated Cement Terminals	Identify and finalize land parcels for Wave 1 terminals	TBD	
Integrated Cement Terminals	Draft RFP for bidding terminals	TBD	
Integrated Cement Terminals	Solicit interest and bid out for Wave 1	TBD	
Integrated Cement Terminals	...		

Figure 2 Snapshot of activities to be undertaken by empowered task force on logistics

4 Conclusion

As discussed earlier, an effective governance model serves both the purposes of delivering performance and managing risks. The governance model above has been defined to maintain sufficient stakeholder engagement to ensure high performance. At the same time, the model defines multiple levels to manage and reduce the risk of failure. Although the governance model above aims to fulfil the objectives of the integrated national logistics action plan in the best possible manner, it is always evolving in response to the growing complexity of the challenges.

Appendix A

Stakeholder wise interventions various ministries and government bodies as defined in the action plan.

1 Ministry of Railways

Sl. No	Area	Intervention
1	Cement	Develop 22 cement integrated warehouse terminals for bulk and bagged cement to realize the estimated annual cost optimization potential of INR 1700-1800 Cr • In consultation with cement manufacturers, identify land parcels where available for setting up the integrated terminals for cement • Invite private participation to develop the terminals • Clarify the MoU with CRWC allowing it to construct cement silos
2	Cement	Upgrade rake handling capacity and facilities for cement handling at identified 21 public railway sidings to deliver an estimated impact of INR 300-350 Cr • Facilitate discussions of cement players with railways to discuss the plan of upgradation • Respective zonal railways to share the upgradation plan with Logistics wing, MoC
3	Cement	Decrease congestion and improve rake availability on prioritized rail routes where volume of cement movement is high, especially for corridors where potential to move to coastal shipping, National Waterways or DFC is low (Routes covered in the detailed chapter)
4	Steel & iron ore	Facilitate development of iron ore slurry pipeline to increase its share for iron ore movement from 3-4% to 15%(60MTPA) to deliver an estimated annual cost optimization potential of INR 6000 Cr • Ministry of Railways to develop policy and approval process for granting RoW for slurry pipelines and other associated industrial utility services • DoC, MoRTH, Ministry of Railways, Ministry of Environment and respective state governments to facilitate single window clearance for RoW • Ministry of Steel to evaluate option of developing common user

		facility pipelines • Department of Commerce to be nodal agency for facilitating single window clearances
5	Steel & iron ore	Explore development of modified BFNSM wagons to allow steel coils to be loaded perpendicular to track direction to deliver estimated annual cost optimization potential of INR 300 Cr • Ministry of Railways to work in coordination with RDSO, wagon manufacturers and steel manufacturers • Focus on expediting approvals for development of modified BFNSM wagons to allow steel coils to be loaded perpendicular to track direction.
6	Steel & iron ore	Develop integrated logistics park for steel at 23 potential locations to realize estimated annual cost optimization potential of INR 800 Cr • Ministry of Railways in consultation with steel players to identify land parcels (where available) for setting up the integrated steel terminals • Invite private participation for development of terminals • Locations to be combined with integrated cement / other commodities warehouses for common locations
7	Tomato & Banana	All relevant fruits and vegetables: Explore adoption of insulated-ventilated containers attached to passenger trains for transporting tomatoes and other fresh produce from large producing regions to consumption centers
8	Coal	Increase coastal movement of coal to 220 MTPA from current ~30 MTPA to achieve cost optimization potential of INR 8000-8500 Cr annually • Ease railway congestion from Ib Valley and Talcher to Paradip and Dhamra by constructing new line • Mechanisation for capacity improvement at Paradip • Institutional framework for managing end to end logistics from mine to power plant by a third-party aggregator
9	Containers	Increase penetration of dwarf containers for domestic shipments • Logistics Wing to coordinate with CTOs for identification of domestic routes for dwarf container movement • Ministry of Railways to expedite approval of the identified railway routes

10	Containers	Ministry of Railways to explore feasibility of allowing domestic container movement of commodities such as iron ore pellets, soap stone, gypsum, limestone, dolomite, quartzite, manganese ore, beryl, quick lime (burnt lime)
11	Chemicals	Consider allowing pre-booking of RoRo Wagons, increase frequency of RoRo trains

2 Ministry of Shipping

Sl. No	Area	Intervention
1	Cement	Increase cement coastal shipment share from ~1% to 5% by focusing on 11 identified coastal routes to realize the estimated annual cost optimization potential of INR 250-300 Cr. (Routes covered in the detailed section) • Prioritize development of coastal berths for identified east coast ports of HalKumdia, Paradip, Vizag, and Chennai • Develop connectivity to east coast ports to ease congestion; Focus on rail connectivity to identified ports – Haldia, Paradip, Vizag, Chennai • Develop plans to run scheduled vessels to enable aggregation
2	Steel & iron ore	Increase coastal movement for steel from current ~1% to 6% (13MTPA) by focusing on 8 identified coastal routes to realize estimated annual cost optimization potential of INR 300 Cr • Develop plans for running scheduled vessels along west and east coast ports to enable aggregation • Improve rail connectivity to identified ports – Haldia, Paradip, Vizag, Chennai • Expedite completion of select projects identified under Sagarmala and Bharatmala • Develop a policy to promote creation of smaller jetties with captive cargo supported through VGF if required and through an accelerated approval process
3	Food Grains	Increase coastal shipment of food grains share from current ~0.15 MnT to ~7 MnT by focusing on 11 identified coastal routes to realize estimate cost optimization potential of INR 300-400 Cr • FCI to tender out identified routes for coastal shipment to enable price discovery and comparison with current conventional rail freight costs • Explore potential for bulk movement of food grains by the coastal route

4	Coal	Increase coastal movement of coal to 220 MTPA from current ~30 MTPA to achieve cost optimization potential of INR 8000-8500 Cr annually • Ease railway congestion from Ib Valley and Talcher to Paradip and Dhamra by constructing new line • Mechanisation for capacity improvement at Paradip • Institutional framework for managing end to end logistics from mine to power plant by a third-party aggregator

3 Inland Waterway Authority Limited

Sl. No	Area	Intervention
1	Cement	Increase cement inland waterways share to 6% (18MTPA) by focusing on identified national waterways – NW-4, NW-55 & NW-21 to realize the estimated annual cost optimization potential deliver estimated impact of INR 250-300 Cr • Expedite development of terminals at prioritized locations. Seek feedback from manufacturers for prioritizing terminal locations, extent of mechanization, and facilities required at terminals • Develop a stakeholder communication plan to communicate the ongoing/planned developments to industry players to enable them to make their logistics plan accordingly.
2	Steel & iron ore	Increase national waterways share for steel from <1% to 7% (15MTPA) by focusing on NW-96, NW-5, NW-1, NW-110 and iron ore share from <1% to 12% (40MTPA) by focusing on NW-64, NW-5, NW-96, NW-1 to realize estimated annual cost optimization potential of INR 1800 Cr • IWAI to develop policy to promote development of jetties through PPP/ other modes • IWAI to expedite development of terminals at locations prioritized by steel players through stakeholder feedback discussions • IWAI to develop a stakeholder communication plan to communicate the ongoing/planned developments to industry players

3	Coal	Increase share of inland waterway movement of coal to ~25 MTPA by focusing on identified NWs –1, 5, 4, 100, 110, 64, 73 to realize annual cost savings of INR 550-700 Cr • In short term, IWAI to expedite development of NW1 to start movement of coal. • IWAI to seek feedback from coal producers and power producers for prioritizing terminal locations, extent of mechanization, and facilities required at terminals • IWAI to develop a stakeholder communication plan to communicate the ongoing/planned developments to industry players to enable them to make their logistics plan accordingly • IWAI to prioritize development of NW-5 which is a critical element in coastal shipment of coal

4 Ministry of Road Transport and Highways

Sl. No.	Area	Initiative
1	Chemicals	Consider revising CMVR rules in line with UN Model Recommendations for DG transportation with extensive consultation with the industry
2	Chemicals	Explore designing certification and authorization trainings for handling DGs during warehousing and transport on the lines of courses as provided by IATA
3	Parcels	Explore relaxation of city entry restrictions for electric commercial vehicles to facilitate first/last mile connectivity
4	Interstate Movement	Explore possibility of enabling E-way bill only if a vehicle has all valid documents including valid fitness certificate (including high security number plate, RFID (FAStag), Pollution Under Control certificate), Vehicle Registration certificate, relevant National/ State Permit and has no pending challans greater than 1 month
5	Interstate Movement	Explore feasibility of providing access to data captured in various toll systems (such as automated vehicle classifier, weigh in motion, number plate recognition system, RFID) to RTO systems

6	Interstate Movement	MoRTH to coordinate with State Governments to: • Facilitate 100% adoption of Vahan and E challan systems • Mandate standardized high security registration plate, FASTag and Pollution Under Control certificate for issuance of Vehicle Fitness Certificate • Mandate standardized high security registration plate, FASTag for issuance of National Permit • Mandate issuance of Fitness Certificate, National Permit only through Vahan
7	Skilling	Curriculum prescribed by ASDC for commercial drivers in National Quality Packs to be made mandatory for trainings
8	Skilling	Facilitate single window for setting up driver training institutes comprising MoRTH, state governments and Logistics Division to streamline approvals required for setting up the institute
9	Skilling	Explore the idea of mobile truck driving schools for remote locations (LMV to HMV training)
10	Skilling	Explore making truck driver training mandatory through ASDC / LSC approved IDTRs / DTIs
11	Skilling	Enable transparency in driver licensing process across states by making it completely online and transferring driving test authority from RTOs to driver training institutes approved by ASDC or other third party -Recommend policy modifications eg. checking for literacy during driving test instead of educational qualification

5 Ministry of Coal

Sl. No.	Area	Initiative
1	Coal	Increase use of conveyors for first mile transportation of coal from mine to rail sidings at existing mines, for rail sidings with loading greater than 4 MTPA to realize estimated cost optimization potential of INR 1200-1400 Cr annually • ~200 MTPA capacity across 27 mines identified • Ministry of Coal/ Coal India to explore feasibility and plan for the development of conveyors for first mile movement of coal (from mine to siding) at existing mines

2	Coal	Ministry of Coal and Ministry of Power in discussion with the various power plants to explore potential for using washing coal for power plants which are >500 km away from pithead, use lower grade of coal, and where boiler is suitable to use beneficiated coal to realize annual cost savings of INR 3000-3200 Cr • Based on potential identified, develop an action plan for setting up washing capacity. • Explore appropriate contracting and ownership transfer model for washed coal

6 States

Sl. No	Area	Initiative	Participating States or State Entities
1	Apple	Apple: Reduce packaging costs by using collapsible plastic crates instead of carton boxes for transporting apple. This has the potential to reduce the cost of logistics for apples by 12 % (annual optimization of INR 30-40Cr) and increase farmer margin by 7 % • Conduct trial run with a packaging solutions company including farmers, traders & retailers in ecosystem for promoting RPCs • Document learnings and develop an institutional plan for country wide roll out	Himachal Pradesh and Jammu & Kashmir Agri-Marketing Boards
2	Apple	Apple: Develop aggregation hubs to consolidate, auto-grade and certify produce to reduce the cost of logistics for apples by 15% (annual optimization of ~INR 400 Cr) and increase farmer margin by 20% • To be set up near the farms, in J&K and Himachal with auto-grading lines in large apple growing regions • Explore the feasibility of increasing vehicle fleet	State Government of H.P. & J&K

		size mix at aggregation hubs due to enhanced road access • Potential for e-trading at the aggregation hubs can be explored	
3	Apple	Apple: Install Controlled Atmosphere Storages (CA) as common user facilities for farmers, and facilitate working capital financing for the farmers to enable farmers to sell produce in the lean season to improve farmer margin by 50% and reduce annual imports by 800 cr. • State governments of HP & J&K to identifying locations and invite private investors to develop CA stores as common user facilities • State governments, Ministry of Agriculture and Logistics Division to work with financial institutions to develop a plan for facilitating financing to farmers to encourage adoption of CA facilities through Negotiable Warehouse Receipts(NWRs) • Explore facilitating tapering subsidies for farmers to encourage adoption of CA facilities	State Agricultural Marketing Board (HP & J&K)
4	Tomato	Tomato and other perishables: Setup low-cost washing and drying lines at local mandis to improve sanitation and increase shelf life in transit or storage to improve farmer income by 14% - • Respective state governments to identify locations in local mandis and work with APMCs to set up washing & drying lines • Initiate pilots at select Mandis to demonstrate a proof of concept • APMCs to invite companies to setup and run the lines and charge farmers on a pay per use model	States local APMCs & FPOs

5	Tomato	Tomato and other perishables: Setup low-cost cold room facilities as common user facilities for farmers as well as traders at local mandis for short term, transit and distribution storage to improve farmer income by 20% and reduce wastages by 10% • Respective state governments and state agricultural marketing boards to pilot select micro cold storages as a proof of concept • On-board startups and relevant partners, and offer space at local mandis to provide the facilities in a pay per use scheme	Agri- marketing boards - Maharashtra & Karnataka
6	Tomato & Banana	All relevant fruits and vegetables: Explore adoption of insulated-ventilated containers attached to passenger trains for transporting tomatoes and other fresh produce from large producing regions to consumption centers	M/o Railways Trader Associations
7	Banana	Banana: Install mechanical cableways in dense banana plantations to reduce farm to packhouse/collection center transportation cost to improve farmer margins by 15% • To start with, initiate a pilot in one large plantation in Jalgaon region to test efficacy of the mechanization in partnerships with the farmer producer organizations • Based on success of the pilot institutionalize the specifications and locations for country wide rollout in banana plantations	APEDA, MSAMB for Pilot
8	Banana	Banana: Improve first mile road infrastructure to reduce damages in transporting banana bunces from farm to packhouse/mandi to save 260 crore logistics cost every year • State governments to seek feedback from farmer producer organization to prioritize projects to improve quality and width of roads, while also enabling larger trucks to collect produce from near the farm • Re-evaluate load capacities of bridges in dense banana plantation areas for supporting entry of larger vehicles near the farm	Maharashtra and Karnataka State PWDs

9	Parcels	Explore relaxation of city entry restrictions for electric commercial vehicles to facilitate first/last mile connectivity	All states
10	Parcels	Introduce well-defined time lines and objective check-list criteria for evaluating the express terminal proposals • Rationalize multiple permissions required from Customs even if the facility is within existing Customs bonded area • Allow operators to start operations using own security as airport access control at airside is already manned by CIS	All states
11	Interstate Movement	Explore feasibility of providing access to data captured in various toll systems (such as automated vehicle classifier, weigh in motion, number plate recognition system, RFID) to RTO systems	All states
12	Interstate Movement	MoRTH to coordinate with State Governments to: • Facilitate 100% adoption of Vahan and E challan systems • Mandate standardized high security registration plate, FASTag and Pollution Under Control certificate for issuance of Vehicle Fitness Certificate • Mandate standardized high security registration plate, FASTag for issuance of National Permit • Mandate issuance of Fitness Certificate, National Permit only through Vahan	All states
13	Skilling	Curriculum prescribed by ASDC for commercial drivers in National Quality Packs to be made mandatory for trainings	All states
14	Skilling	Facilitate single window for setting up driver training institutes comprising MoRTH, state governments and Logistics Division to streamline approvals required for setting up the institute	All states
15	Skilling	Explore making truck driver training mandatory through ASDC / LSC approved IDTRs / DTIs	All states

16	Skilling	Enable transparency in driver licensing process across states by making it completely online and transferring driving test authority from RTOs to driver training institutes approved by ASDC or other third party -Recommend policy modifications eg. checking for literacy during driving test instead of educational qualification	All states

7 Customs

Sl. No	Area	Intervention
1	Containers	Explore feasibility for domestic containers to enter custom bonded area and leverage technological solutions (such as RFID) for segregation between EXIM and domestic goods
2	Containers	Department of Customs to explore possibility of allowing small value additions (eg packaging, labelling, marking, branding, quality testing etc) to be undertaken in ICDs
3	Containers	Department of Customs and Ministry of Railways to coordinate to facilitate linkage of the weight of container mentioned in ICEGATE to all licensed CTO systems and FOIS
4	Parcels	Introduce SWIFT module in Express Cargo Clearance System (Courier EDI) for e-clearance
5	Parcels	Remove restrictions on perishable / commodities goods from Regulation 2 (2) (d) of Courier Imports and Exports (Clearance) Regulations, 1998
6	Parcels	Permit ramp to ramp transfer from domestic to international aircrafts and vice versa
7	Parcels	Modify policy to facilitate time-bound auctions, disposal and destruction of caged shipments to decongest the express facilities
8	Parcels	Modify suspension of license rules of authorized couriers without preliminary investigation under the Regulation 14 of Courier Imports and Exports (Clearance) Regulations, 1998
9	Parcels	Increase staffing of custom officers at Mumbai, Delhi, Bangalore and Chennai courier terminals

10	Parcels	In case of courier service or mail services provided by Indian transporters to Indian registered customers exporting goods from India, the IGST tax charged should be available to the registered Indian exporter as input tax credit, even in case where the place of supply under Section 12(8) of the IGST Act is reported as 97-Other territories
11	Parcels	Introduce well-defined time lines and objective check-list criteria for evaluating the express terminal proposals • Rationalize multiple permissions required from Customs even if the facility is within existing Customs bonded area • Allow operators to start operations using own security as airport access control at airside is already manned by CIS

8 GST Council

Sl. No.	Area	Initiative
1	Parcels	Explore extension of validity period of e-way bills for distances less than 100km
2	Parcels	Modify holding of shipment rules to allow truck release and issue notice for holding only the problematic parcels/consignment at the checkpoint or at service center
3	Parcels	Explore possibility of liability limit for carriers based on the commercial obligation in the entire transaction
4	Parcels	In case of courier service or mail services provided by Indian transporters to Indian registered customers exporting goods from India, the IGST tax charged should be available to the registered Indian exporter as input tax credit, even in case where the place of supply under Section 12(8) of the IGST Act is reported as 97-Other territories
5	Interstate Movement	Explore possibility of enabling E-way bill only if a vehicle has all valid documents including valid fitness certificate (including high security number plate, RFID (FAStag), Pollution Under Control certificate), Vehicle Registration certificate, relevant National/ State Permit and has no pending challans greater than 1 month
6	GST	Notify single GST rate for Multimodal transportation and value added services for Logistics industry (for non-EXIM trade)

7	GST	Allow input tax credit for warehousing & related services for service recipient outside State
8	GST	Continue exemption to international air / sea freight to ensure level playing field for Indian businesses
9	GST	Provide zero-rating of services for transhipment of goods at ports
10	GST	Grant IGST exemption for import of vessels by Indian flag carriers
11	GST	Allow seamless input tax credit for GST paid on bunkers and spare parts for coastal shipment

9 Logistics Wing

Sl. No.	Area	Initiative
1	Steel & iron ore	Facilitate development of iron ore slurry pipeline to increase its share for iron ore movement from 3-4% to 15%(60MTPA) to deliver an estimated annual cost optimization potential of INR 6000 Cr • Ministry of Railways to develop policy and approval process for granting RoW for slurry pipelines and other associated industrial utility services • DoC, MoRTH, Ministry of Railways, Ministry of Environment and respective state governments to facilitate single window clearance for RoW • Ministry of Steel to evaluate option of developing common user facility pipelines • Department of Commerce to be nodal agency for facilitating single window clearances
2	Steel & iron ore	Develop integrated logistics park for steel at 23 potential locations to realize estimated annual cost optimization potential of INR 800 Cr • Ministry of Railways in consultation with steel players to identify land parcels (where available) for setting up the integrated steel terminals • Invite private participation for development of terminals • Locations to be combined with integrated cement / other commodities warehouses for common locations
3	Containers	Explore feasibility of developing a web based platform to facilitate interchange of containers and vessel slots between leasing companies, shipping lines, logistic companies etc (check feasibility of leveraging the Logistics e-marketplace portal)
4	GST	Continue exemption to international air / sea freight to ensure level playing field for Indian businesses

5	Skilling	Curriculum prescribed by ASDC for commercial drivers in National Quality Packs to be made mandatory for trainings
6	Skilling	Facilitate single window for setting up driver training institutes comprising MoRTH, state governments and Logistics Division to streamline approvals required for setting up the institute
7	Skilling	Explore the idea of mobile truck driving schools for remote locations (LMV to HMV training)
8	Skilling	Explore making truck driver training mandatory through ASDC / LSC approved IDTRs / DTIs
9	Skilling	Enable transparency in driver licensing process across states by making it completely online and transferring driving test authority from RTOs to driver training institutes approved by ASDC or other third party -Recommend policy modifications eg. checking for literacy during driving test instead of educational qualification

10 Food Corporation of India

Sl. No.	Area	Initiative
1	Food Grains	Facilitate bulk movement of food grains with the focus to reduce wastages by upto 40% and reduce logistics costs of food grains with the potential to realize annual cost optimization of INR 2000- 2200 Cr • FCI to expedite setting up of 10MT of wheat silo next to rail sidings at identified locations • FCI to define a plan for migrating from traditional storage to silo based storage for all food grain storage in the country • FCI to fast track the procurement of bulk BCBFG wagons in line with silo capacity • FCI to lead pilot for set up of bulk silos for Rice and further plan for setting up country wide network silos

		• Ministry of Railways in consultation with FCI and CWRC identify land parcels for setting up wheat silos Food Corporation of India, CRWC, MoR
2	Food Grains	Increase coastal shipment of food grains share from current ~0.15 MnT to ~7 MnT by focusing on 11 identified coastal routes to realize estimate cost optimization potential of INR 300-400 Cr • FCI to tender out identified routes for coastal shipment to enable price discovery and comparison with current conventional rail freight costs • Explore potential for bulk movement of food grains by the coastal route
3	Food Grains	Reduce all inter-state / long haul movement of paddy by 50% and ensure only milled rice is moved, by developing milling capacity in Tamil Nadu

11 Ministry of Steel

Sl. No.	Area	Initiative
6	Steel & iron ore	Enhance iron ore slurry pipeline share from 3-4% to 15%(60MTPA) by focusing on 19 potential routes -Ministry of Railways to develop policy, standards and approval process for granting RoW for slurry pipelines -Ministry of Steel to evaluate option of developing common user facility pipelines -Department of Commerce to be nodal agency for facilitating single window clearances

12 Ministry of External Affairs

Sl. No.	Area	Initiative
1	Containers	Ministry of External Affairs to coordinate with the Ministry of Railways, Department of Customs to modify the Rail Service Agreement to allow all licensed CTOs to run EXIM trains to terminals in Nepal, Bangladesh etc

13 BCAS

Sl. No.	Area	Initiative
1	Parcels	Introduce well-defined time lines and objective check-list criteria for evaluating the express terminal proposals • Rationalize multiple permissions required from Customs even if the facility is within existing Customs bonded area • Allow operators to start operations using own security as airport access control at airside is already manned by CIS
2	Parcels	Allow foreign cargo airlines to self-handle security functions and obtain Regulated Agent Certification to facilitate ease of doing business (presently, International express cargo airlines registered in India are not permitted to carryout x-ray screening and security functions for their own cargo aircrafts)

14 PESO

Sl. No.	Area	Initiative
1	Chemicals	Revisit rules of DG transportation to consider allowing ISO containers for domestic transportation of chemicals via rail, coastal and inland waterway

Appendix B

List of stakeholders from whom inputs were gathered in designing the comprehensive Integrated National Logistics Action Plan.

S No	Stakeholder Name	Type
1	SICAL	3PL player
2	Dr Ajinkya Tanksale	Academician
3	Vinayak Dixit	Academician
4	Professor DG Mogale	Academician
5	Pidilite	Adhesive Manufacturing Company
6	Godrej Agrovet	Agribusiness company
7	APMC Junnar, Manchar	Agriculture Markets
8	Agnext	Agriculture Startup
9	Delhi International Airport Limited	Airport Operator
10	Tata Motors	Automobile Manufacturer
11	Ultratech Cement	Cement Manufacturer
12	India Cement	Cement Manufacturer
13	Dalmia Cement	Cement Manufacturer
14	ACC	Cement Manufacturer
15	JK Lakshmi Cement	Cement Manufacturer
16	Ambuja Cement	Cement Manufacturer
17	JK Cement	Cement Manufacturer
18	Brentag	Chemical Manufacturer
19	BASF	Chemical Manufacturer
20	Sadbhav, Achhad	Civil engineering company

21	Avana Logistics	Coastal Shipping line
22	Ecozen Solutions	Cold Chain Startup
23	Vacker Global	Cold Chain Startup
24	EY	Consulting Company
25	PwC	Consulting Company
26	KPMG	Consulting Company
27	Deloitte	Consulting Company
28	Accenture	Consulting Company
29	Mckinsey	Consulting Company
30	Container xChange	Container Platform
31	Container Corporation of India	Container Train Operator
32	EXIM Consultants	Courier and Express Services Industries
33	DHL Express	Courier and Express Services Industries
34	Blue Dart	Courier and Express Services Industries
35	Asian Development Bank	Development Bank
36	Mr. Vijay	Document expert at a Trucking Company
37	Amazon Logistics	E Commerce Player
38	Firstcry.com (e-commerce)	E-commerce player
39	Firstcry.com (e-commerce)	E-commerce player
40	Manjul Organics	Exporters
41	KIEGA Pvt Limited	Exporters
42	UPS	Express Player
43	Safexpress	Express Player
44	DHL	Express Player
45	Kullu Growers Association	Farmer Groups

46	Progressive Growers Association	Farmer Groups
47	Nestle	FMCG Player
48	Coca Cola	FMCG Player
49	Walmart	FMCG Player
50	ITC	FMCG Player
51	Arun	Foodgrain logistics consultant
52	Gateway Rail Freight Limited	Freight Forwarder
53	Bablani Clearing Forwarding & Logistics Pvt Ltd	Freight Forwarder
54	Hind Terminals Pvt. Ltd	Freight Forwarder
55	East West Cargo Delhi	Freight operator
56	Fresh and Healthy Enterprises Limited	Fresh Logistics Player
57	Reliance Fresh	Fresh Retail
58	Dev Bhoomi Foods	Fresh Retail
59	Indian Institute of Packaging	Government body
60	NTPC Ltd	Government Body
61	Paradip port trust	Government Body
62	Sarathi	Government Body
63	Maharashtra Motor Vehicle Department	Government Body
64	UP Transport Department	Government Body
65	Haryana Transport Department	Government Body
66	India Post	Government Body
67	Inland Waterways Authority of India	Government Body
68	Central Railside Wareousing Corporation	Government Body
69	Coal India Ltd	Government Body

70	Food corporation of India	Government Body
71	Central Warehousing Corporation	Government Body
72	Ministry of Shipping	Government Body
73	CONCOR	Government Body
74	Shipping Corporation of India	Government Body
75	CWC	Government Body
76	Railtel	Government Body
77	Food Corporation of India, Punjab office	Government Body
78	Food Corporation of India, Tamil Nadu office	Government Body
79	Adani Agrilogistics	Grain logistics company
80	KamalJeet	Head of FPO
81	Vikas Munjal	Head of FPO
82	National Investment and Infrastructure Fund (NIIF)	Indian Sovereign Wealth Fund
83	SIAM - Society of Indian Automobile Manufacturers	Industry Association
84	AIMTC - All India Motor Transport Congress	Industry Association
85	EICI - Express industry Council of India	Industry Association
86	Association of State Road Transportation Undertakings	Industry Association
87	CII - Logistics	Industry Association
88	Indian Chemicals Council	Industry Association
89	Vegetable Growers Association	Industry Association

90	Refrigerated Truck Owners Welfare Association	Industry Association
91	Indian National Shipowners Association	Industry Association
92	Cement Manufacturing Association	Industry Association
93	Mumbai Cement Dealer Association	Industry Association
94	All India Motor Transport Congress	Industry Association
95	Coal Preparation Society of India	Industry Association
96	Indian National Shipowners Association	Industry Association
97	Association of Container Train Operators	Industry Association
98	Apeejay Infralogistics Private Limited	Infrastructure and Logistics Company
99	Brookfield	Infrastructure Player
100	JLL	Infrastructure Player
101	To the New digital	IT Compamy
102	Rapidsoft Technology	IT Company
103	Neosoft	IT Company
104	GeoSpoc	IT Company
105	Tech Mahindra	IT Company
106	TCS	IT Company
107	Infosys	IT Company
108	Microsoft	IT Company
109	Adobe	IT Company
110	Wipro	IT Company
111	DXC	IT Company
112	SAS	IT Company
113	OTSI	IT Company

114	Janta Roadways Pvt Ltd	Land Transportation Industries
115	Agarwal Packers & Movers	Land Transportation Industries
116	Kesineni Cargo	Land Transportation Industries
117	Kintetsu World Express	Land Transportation Industries
118	Om Logistics	Land Transportation Industries
119	KT Telematics	Land Transportation Industries
120	Associate Road Carriers	Land Transportation Industries
121	E Mojro	Land Transportation Industries
122	Delhivery	Logistics Service Provider
123	Transport Corporation of India	Logistics Service Provider
124	Dangerous Goods Management Private Limited	Logistics Service Provider
125	Allcargo Logistics	Logistics Service Provider
126	Varuna Logistics	Logistics Service Provider
127	LF Logistics	Logistics Service Provider
128	TVS Logistics	Logistics Service Provider
129	Ecom express	Logistics Service Provider
130	Aramex	Logistics Service Provider
131	DP World	Logistics Service Provider
132	Transtopics	Logistics Service Provider
133	Maersk	Logistics Service Provider
134	Varuna Logistics	Logistics Service Provider
135	LF Logistics	Logistics Service Provider
136	Adani Logistics	Logistics Service Provider
137	TVS Logistics	Logistics Service Provider
138	Arshiya Limited	Logistics Service Provider

139	FedEx	Logistics Service Provider
140	Blue Dart	Logistics Service Provider
141	GATI	Logistics Service Provider
142	Bablani Clearing Forwarding & Logistics Pvt Ltd	Logistics Service Provider
143	Society of Indian Automobile Manufacturers (SIAM)	Logistics Service Provider
144	India Linx	Logistics Service Provider
145	Cargo People Logistics And Shipping Private Limited	Logistics Service Provider
146	MSC Shipping Company	Logistics Service Provider
147	ASDC - Automotive Skills Development Council	Logistics Skilling Body (Promoted by SIAM, ACMA, FADA and NSDC)
148	Logistics Skill Council	Logistics Skilling Body (Society under MSDE and NDSC)
149	Safeducate	Logistics Skilling Company (Arm of Safexpress)
150	Rivigo	Logistics Startup
151	Blackbuck	Logistics Startup
152	Transtopics	Media House
153	Ministry of Railways	Ministry
154	Ministry of Road Transport & Highways	Ministry
155	Ministry of Environment and Forest	Ministry
156	Ministry of Civil Aviation	Ministry
157	Department of Customs	Ministry

158	Society for Driver Training Institute Burari	Motor Driving Training School
159	Birbal MDTS	Motor Driving Training School
160	Flexol Packaging	Packaging Player
161	Brambles (CHEP)	Pallet Manufacturer
162	DP World	Port Operator
163	Macemet conveyor	Private conveyors company
164	Vineet Maigaonkar - Armstrong Machine Builders Pvt Ltd	Private conveyors company
165	Everstone Capital Advisors Pvt Ltd	Private equity and real estate investment firm
166	Karaikal Port	Private Port
167	Gateway Rail freight Ltd.	Rail Logistics
168	Tilda	Rice distributor
169	Dhingra Rice Exports	Rice miller
170	Cargo Coastal	Shipping line
171	State Warehousing Corporation	State Body
172	Tamil Nadu Civil Supplies Corporation	State corporation
173	Technical Head - Maharashtra State Border Checkpost	State Government
174	Deputy Commissioner, Enforcement – Maharashtra State Transport Office	State Government Transport Department
175	JSW Steel	Steel Manufacturer
176	SAIL	Steel Manufacturer
177	Tata Steel	Steel Manufacturer
178	Kalinganagar Steel Association	Steel Manufacturer

179	NMDC	Steel Manufacturer
180	Essar Steel	Steel Manufacturer
181	Mecon	Steel Manufacturer
182	Jindal Steel & Power Ltd	Steel Manufacturer
183	BRPL	Steel Manufacturer
184	Beumer Group	Supply Chain Automation Company
185	Miebach	Supply Chain Consultant
186	LFL logistics	Supply Chain Logistics Company
187	TVS Logistics	Supply Chain Management Co
188	Ascendas Firstspace Development Management Pvt Ltd	Supply Chain Management Co
189	Loconav	Telematics Provider
190	Observer Research Foundation	Think Tank
191	Vishwakarma	Traffic Enforcemnet Solution Provider
192	Vehant Systems	Traffic Enforcemnet Solution Provider
193	Transport Corporation of India	Transport Company
194	Kullu Transport Union	Transport Union
195	VR Logistics	Transportation & Logistics Company
196	Vijay Lakshmi TRansport	Transporter
197	Parminder Singh	Truck Driver
198	Gurmeet Singh	Truck Driver
199	Ajeet Kumar	Truck Driver
200	Ridhi Sidhi Transporters	Trucking Company
201	Shailendra Gupta Transport	Trucking Company
202	East India Transport	Trucking Company
203	Safety Carriers Transport	Trucking Company

204	Sangha Transporters	Trucking Company
205	Walia Transporters	Trucking Company
206	OTPC	Trucking Company
207	Okara Roadways	Trucking Company
208	Karni Transporters	Trucking Company
209	DB Schenker	Warehousing Industries
210	FM Logistics	Warehousing Industries
211	Future Supply chain Solutions	Warehousing Industries
212	TVS Logistics Services Limited	Warehousing Industries
213	Proconnect	Warehousing Industries
214	E Cargo	Warehousing Industries
215	Continental Warehousing Corp Nhava Sheva	Warehousing Player
216	Triplerock SCS	Warehousing Player
217	Ware Now	Warehousing Startup
218	ACB Washeries	Washery Operator