Bangladesh Regional Connectivity Project-1
Ministry of Commerce

Needs Assessment Study on the Necessity of More Off-dock/Dry Ports

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Preface

The study titled “Needs Assessment Study on the Necessity of More Off-dock/Dry Ports” is a part of trade facilitation initiatives in Bangladesh under the BRCP Project 1. The primary aim of this study is to provide policymakers with insights into the need for additional off-dock or dry ports in Bangladesh in order to facilitate trade and improve freight transport efficiency.

In alignment with the Government’s ambitious target to achieve 100 per cent of export and import activities through dry ports by 2030, this study serves several key objectives aimed at enhancing Bangladesh’s logistic infrastructure and trade efficiency. Firstly, the study conducts a thorough review of the current off-dock facilities, evaluating their effectiveness and identifying operational shortcomings. This assessment forms the foundation for understanding the future demand for off-dock facilities and highlights areas where improvements are necessary to meet growing trade needs. Secondly, the study offers a comprehensive overview of both global and national infrastructure requirements for off-dock facilities. Along with that, the study also proposes optimal locations for the establishment of new dry ports across Bangladesh. These recommendations are designed to support strategic development that aligns with international standards and serves Bangladesh to evolve trade demands. Additionally, the study addresses the legislative, administrative, and policy reforms required for the effective operation of dry ports. It provides a detailed discussion of necessary reforms to streamline processes, improve regulatory frameworks, and ensure that dry ports operate efficiently and sustainably. Furthermore, the study explores potential financing sources for the establishment and development of new off-dock/dry port facilities. By evaluating various funding mechanisms, including public-private partnerships and international support, it aims to identify viable options for securing the financial resources needed for future infrastructure projects.

The objective of this paper is to provide decision-makers with essential support, practical suggestions, and strategic analysis to facilitate the establishment of an effective, contemporary, and environmentally-friendly dry port infrastructure in Bangladesh. Through the examination of both present deficiencies and future requirements, the research aims to make a substantial contribution to the trade efficiency and economic development of the country.

We are hopeful that the policy recommendation of this study will be beneficial for the policymakers and other relevant stakeholders to enhance institutional strength, policy reform, and efficient infrastructure that accelerates trade and investment in the country.

Shaila Yasmin

Project Director (Joint Secretary)

Bangladesh Regional Connectivity Project 1 (BRCP-1)

Ministry of Commerce

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Dr Mohammad Abdur Razzaque

Chairman

Research and Policy Integration for Development (RAPID)

Acronyms and Abbreviations

ACBPS	Australian Customs and Border Protection Service
ADB	Asian Development Bank
ADT	Average Daily Traffic
AEOs	Authorised Economic Operators
ARIMA	Autoregressive Integrated Moving Average
ARMA	Autoregressive Moving Average
BAFFA	Bangladesh Freight Forwarders Association
BEZA	Bangladesh Economic Zones Authority
BGMEA	Bangladesh Garment Manufacturers and Exporters Association
BICDA	Bangladesh Inland Container Depot Association
BIDA	Bangladesh Investment Development Authority
BIWTA	Bangladesh Inland Water Transport Authority
BKMEA	Bangladesh Knitwear Manufacturers and Exporters Association
BLPA	Bangladesh Land Port Authority
BOC	Bureau of Customs
BR	Bangladesh Railway
BRCP	Bangladesh Regional Connectivity Project
BRTC	Bangladesh Road Transport Corporation
BSAA	Bangladesh Shipping Agents' Association
CBIC	Central Board of Indirect Taxes & Customs
CCTV	Closed-Circuit Television
CEPZ	Chattogram Export Processing Zone
CFS	Container Freight Stations
CILT	Chartered Institute of Logistics and Transport
CMOs	Customs Memorandum Orders
CONCOR	Container Corporation of India Ltd
CPA	Chattogram Port Authority
CSR	Corporate Social Responsibility
CY	Container Yards
DICD	Dhaka Inland Container Depot
DLI	Dryport Location Index
DoS	Department of Shipping
DPD	Direct Port Delivery
DPEs	Direct Port Entry
DT	Dwelling Times
DTI	Department of Trade and Industry
DWT	Deadweight Tonnage
EDI	Electronic Data Exchange
EPZ	Export Processing Zones
ESCAP	Economic and Social Commission for Asia and the Pacific
EZ	Economic Zones
FBCCI	Federation of Bangladesh Chambers of Commerce and Industry
FDI	Foreign direct investment
FGDs	Focus Group Discussions
FLTs	Forklift Trucks
FND	Final Delivery
GDP	Gross Domestic Product
GST	Goods and Services Tax

HSSE	Health, Safety, Security, and Environment
ICD	Inland Container Depot
ICP	Integrated Check Post
ICT	Inland Container Terminal
IFC	International Finance Corporation
IFIs	International Financial Institutions
IMC	Inter-Ministerial Committee
IMF	International Monetary Fund
IMO	International Maritime Organisation
IPOs	Initial Public Offerings
ISO	International Standards Organisation
IT	information technology
KII	Key Informant Interviews
LC	Letter of Credit
LCL	Less-than-container Load
LOI	Letter of Intent
LPI	Logistics Performance Index
MHEs	Material Handling Equipment
MSAB	Marine Surveyors Association of Bangladesh
NBR	National Board of Revenue
NIMPT	National Integrated Multimodal Transport Policy
NLAP	National Logistics Action Plan/Policy
NSICT	Nhava Sheva International Container Terminal
ODCYs	Off-dock Container Yards
PCS	Port Community Systems
PCT	Patenga Container Terminal
PICT	Pangaon Inland Container Terminal
PP2041	Perspective Plan 2024
PPP	Public-private Partnerships
RAPID	Research and Policy Integration for Development
RFID	Radio Frequency Identification
RHD	Roads and Highways Department
RICTs	Riverine Inland Container Terminals
RMG	Ready-made Garments
RTG	Rubber-tired Gantry Cranes
SMEs	Small and Medium-sized Enterprises
SOPs	Standard Operating Procedures
STS	Ship-to-Shore
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TEUs	Twenty-foot Equivalent Units
UNCTAD	United Nations Conference on Trade and Development
UNECE	United Nations Economic Commission for Europe
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
WB	World Bank
WTO	World Trade Organisation

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Chapter 1: Introduction

Background

Bangladesh's marine region covers a total area of 207,000 square kilometres, which is 1.4 times larger than its land area. Strategically located on the Bay of Bengal, Bangladesh is a crucial maritime hub for international trade, relying heavily on efficient cargo movement. The Chattogram port handles about 90 per cent of the nation's trade but often faces congestion, causing delays and increased costs. To address this, experts recommend greater utilisation of off-docks and dry ports, which offer services like container storage and customs clearance, reducing port traffic. Modern seaports increase productivity through intermodal freight systems by utilising off-docks or dry port facilities, which reduce costs and save time. Thus, this study aims to explore the need for more off-dock/dry ports to support Bangladesh's growing trade. Currently, 18 dry ports operate near Chattogram, but assessing their effectiveness and exploring further development, particularly in regions like Dhaka, is crucial for improving efficiency and addressing congestion. This assessment informs future infrastructure development, ensuring a balanced and effective supply chain system for Bangladesh.

Objectives and Scope

The study sets out multiple objectives aimed at enhancing Bangladesh's logistics infrastructure. It begins with a thorough analysis of existing dry ports to pinpoint operational shortcomings. Additionally, the study aims to evaluate the potential benefits of expanding dry port facilities across the country, emphasising their role in facilitating trade and driving economic growth. By identifying essential requirements for establishing and efficiently operating dry ports, including infrastructure and regulatory frameworks, the study seeks to lay the groundwork for future development. It also intends to recommend suitable locations for new dry ports, assess optimal transport linkages, and establish operational standards aligned with international best practices. Furthermore, the study explores integrating dry ports into national transport policies, proposes customs clearance strategies, and recommends policy and legislative measures to ensure effective planning and sustainable growth. Lastly, it assesses the infrastructure needs of dry ports and explores various financing options to support their ongoing operations and development efforts.

Chapter 2: Description and Analysis of Existing Dry Port Facilities

The existing dry port facilities in Bangladesh, aimed at easing trade, reflect a dynamic landscape with both strengths and challenges. Over the past decade, Bangladesh has experienced significant growth in maritime trade, notably with container port throughput increasing six-fold to 3 million TEUs. Despite this growth, the intermodal system, primarily centred around Chattogram Port, remains modest, with less than 5 per cent of containers transitioning to one rail Inland Container Depot (ICD) in Dhaka and two Riverine Inland Container Terminals (RICTs). Challenges identified by researchers underscore the competitive nature of the transport industry, highlighting the need for effective coordination among stakeholders and substantial infrastructure investments. Specifically, the poor integration of Riverine Inland Container Depots (RICTs) with seaports hampers hinterland management, contributing to longer time and inefficiencies.

The reliance on road transport exacerbates congestion and environmental concerns, with significant CO2 emissions. Emphasising railway transport offers a dual solution of congestion alleviation and environmental sustainability, aligning with global efforts to reduce carbon footprints. The current dry port facilities in Bangladesh play a critical role in enhancing logistical efficiency by acting as extensions of seaports, and optimising cargo handling and clearance processes. However, persistent challenges include inadequate infrastructure and connectivity, particularly evident in Chattogram's dry ports failing to meet international standards due to capacity constraints and limited transport modalities like rail and air.

In Bangladesh, there are presently 20 functional Inland Container Depots (ICDs) and off-docks, with significant government and private ownership distinctions. Notably, the Pangaon Inland Container Terminal (PICT), initiated through collaboration between Bangladesh Inland Water Transport Authority (BIWTA) and Chattogram Port Authority (CPA), was established in 2013. Positioned in Keraniganj, Dhaka, along the Buriganga River, PICT aimed to enhance economic opportunities by facilitating inland transport of goods via waterways, thus easing pressure on Dhaka-Chattogram railway and highway routes. Despite initial successes, challenges like declining business interest, attributed to operational limitations, have emerged.

Stakeholders recommend technological upgrades, enhanced intermodal facilities, skilled manpower deployment, and effective management policies to address these challenges. Despite bureaucratic hurdles, off-docks continue to offer faster service compared to traditional seaports, yet improvements are crucial to optimising trade efficiency. Collaboration among stakeholders and the implementation of a unified software platform are advocated to streamline operations, ensure timely cargo movement, and unlock the full potential of Bangladesh's dry ports.

Chapter 3: Identify the significance of more dry ports in Bangladesh

The container handling landscape in Bangladesh has witnessed notable growth, particularly at 18 private depots (dry ports) in 2021. These facilities saw a 16 per cent increase in container handling, surpassing 1 million TEUs for the first time. This growth rate exceeded that of Chattogram Port by 3 Per centage points, highlighting the increasing importance of dry ports in Bangladesh's trade ecosystem. In terms of volume, these private depots managed 709,196 TEUs for exports and 303,016 TEUs for imports during the year. Despite a robust 25 per cent growth in export handling following economic reopening in key markets like Europe and North America, imports experienced a slight decline of 2.3 per cent, attributed to import restrictions and supply chain challenges.

Dry ports play a crucial role in supporting Chattogram Port, handling a significant portion of export containers and alleviating pressure on the main port. They enhance Bangladesh’s position in regional and global trade by improving logistics efficiency, reducing costs, and enhancing overall trade ecosystem reliability. As Bangladesh continues to grow economically and expand its international trade footprint, the development of more modern off-docks with state-of-the-art facilities such as scanning, automation, and lab testing becomes imperative to meet future demands and maintain competitiveness on the global stage. Stakeholders emphasised the need for more quality off-docks to handle increasing demand effectively, particularly in light of projections indicating the need to handle about 8 million TEUs by 2041—several times the current capacity.

Chapter 4: Identification of Basic Requirements for Establishing a Dry Port

A dry port, or inland port, must meet three key criteria: an intermodal terminal, active logistics operations, and a corridor leading to a well-connected gateway. An intermodal terminal facilitates the transfer of goods between different transportation modes, such as rail and truck. Essential logistics activities include storage, consolidation, maintenance for freight transporters, and customs clearance services. A corridor to a gateway, like a seaport or airport, is necessary for connectivity, reducing the need for extensive freight transport from ocean ports to final destinations. This setup often involves significant real estate development for goods distribution operations, emphasising the benefits of co-location.

Effective cargo exchange among dry ports requires meeting specific infrastructural and operational standards. These include robust hinterland conditions with improved transport connectivity, competitive freight markets, and strategic seaport relationships. Customs clearance services are vital to reduce container congestion at seaports, while a sound infrastructure with modern equipment ensures efficient cargo handling. Government policies supporting public-private partnerships (PPP) can enhance operational efficiency, and effective information systems improve collaboration and operational reliability.

Stakeholders highlighted the need for strategic location planning for dry ports near major transport routes and industrial zones. Adequate infrastructure, including modern cargo handling equipment and advanced IT systems, is essential. Training for workers and strong regulatory frameworks are also crucial. Environmental considerations should be integrated into dry port operations. Support services from logistics companies, effective integration with trade networks, and customer service are essential for efficient operations. Regulatory compliance and specific infrastructure needs like perimeter walls and fire-hydrant systems were also emphasised. Respondents noted that while some infrastructure components like land availability exist, the overall infrastructure often falls short of international standards. Advanced technological facilities and proper equipment are needed for optimal operations. There is a disparity in the development and quality of existing off-dock facilities, indicating a need for consistent upgrades and investments.

Chapter 5: Assessment and Recommendation for Dry Port Locations

The multi-objective decision-making process for selecting dry port locations involves evaluating several key factors. Environmental criteria include proximity to natural spaces and the impact on urban areas and hydrology. Economic and social factors consider land prices, demand growth potential, population levels, and accessibility to transportation networks like railways, highways, seaports, and airports. Geographical features such as weather, terrain, and geological conditions also play a role. Additionally, the integration into supply chain infrastructures and relationships with other logistics platforms are significant considerations.

A structured two-stage approach is used to identify potential locations and determine the optimal site based on standard scoring models. Key proposed locations in Bangladesh include areas around Chattogram, such as Mirsharai, Sitakund, and Anowara, as well as Dhirasram near Dhaka, Ishwardi in the northwest, and Khulna. These locations are chosen based on their strategic connectivity to key infrastructure, industrial zones, and transport corridors. Based on economic activity, six clusters with 34 sites have been identified for optimal dry port locations. The Chattogram zone, including Mirsharai, Sitakund, Anowara, and Raozan, is a key cluster. Proposed locations in Mirsharai, Sitakund, Anowara, and Cumilla consider future developments and

connectivity to key infrastructure like the Dhaka–Chattogram Highway and the "Karnaphuli Tunnel".

Field studies and stakeholder consultations emphasise the importance of proximity to major transit routes like highways, railroads, and waterways. Rail transport is preferred for its efficiency, cost-effectiveness, and sustainability. The necessity of dry ports outside Chattogram is debated. Some stakeholders support expanding infrastructure to enhance efficiency and decentralise logistics, while others believe Chattogram's current facilities are adequate. Challenges include establishing shipping facilities, container tracking, operational control, regulatory issues, investment returns, connectivity, and monitoring. Key locations for new dry ports outside Chattogram include Dhirasram near Dhaka, Ishwardi in the northwest, and Khulna. Dhirasram's strategic position along the Dhaka-Chattogram railway corridor and existing infrastructure make it an optimal choice. Ishwardi's junction of prominent railway routes and potential for boosting regional trade with India is significant. Khulna's multimodal transport connections and proximity to Mongla Port make it a viable logistics hub.

Chapter 6: Analysis of Transport Linkages to Dry Ports

Identifying suitable dry port locations and establishing efficient connections with seaports, highways, and railroads is critical for maximising transportation efficiency and reducing costs. In Bangladesh, the majority of dry ports are concentrated in specific locations, presenting challenges in balancing accessibility to cargo sources and transportation networks with land availability and infrastructure costs. The categorisation of dry ports into distant, mid-range, and close-range based on their distance from seaports helps tailor their functionalities. Distant dry ports focus on optimising rail transport, mid-range dry ports address seaport congestion, and close-range dry ports aim to mitigate cargo congestion and reduce urban traffic.

Transport linkages to dry ports involve ensuring connections with port terminals via rail, barge, or truck services. Challenges include the limited ability of seaports to handle full-length trains, necessitating additional handling for rail-delivered containers, which puts rail transport at a competitive disadvantage. Improvements in railway access within seaports and dry ports, as well as high-quality road connections, are crucial. Stakeholder feedback highlights the need for enhanced infrastructure, streamlined regulatory processes, and better coordination among government agencies, port operators, and transport companies. Addressing these challenges can significantly improve the efficiency and sustainability of Bangladesh's transportation network.

Chapter 7: Principles and standards for the dry port design and operations

Key infrastructures necessary for a dry port include fenced customs-secure areas with segregated traffic points, container yards (CY) for container receipt, dispatch, and storage, container freight stations (CFS) for cargo loading and unloading, customs inspection areas, bonded warehouses, and administration buildings. Rail connectivity is crucial, with specific design requirements for rail sidings and container yards to ensure efficient loading, unloading, and movement of containers. A well-designed dry port must include a secure customs area with segregated entry and exit points for different traffic types to manage flow efficiently. The customs inspection area is critical for compliance checks, supported by container yards and freight stations to handle container and break-bulk cargo. The container yard's size depends on dwelling times for import, export, and empty containers. Proper paving and infrastructure for handling heavy equipment are necessary.

The container freight station must have facilities for handling different types of cargo, including dangerous goods, and ensure efficient storage and handling.

Effective management of dry ports involves a well-structured organisation with a skilled management team. The general manager plays a crucial role in overall success, supported by security officers, IT managers, operation managers, and account managers. Training and skill development programmes are essential to enhance workforce capabilities and operational efficiency. The implementation of advanced technologies in Bangladesh's dry ports can significantly enhance efficiency and operations. Technologies such as automated customs procedures, advanced tracking systems, and efficient inventory management are crucial. Developing a common digital system for seamless tracking and monitoring, led by government or port authorities, is recommended. However, challenges include initial investment costs, technical integration, and data security. Sustained investment and wider adoption of these technologies are necessary to achieve their full potential and improve Bangladesh's logistics performance and global competitiveness.

Chapter 8: Incorporation of dry ports into transport documents and legal instruments

Incorporating dry ports into Bangladesh's national transport policies and legal frameworks is crucial for enhancing logistical efficiency and economic growth. However, this process faces delays due to slow adjustments in domestic regulations, particularly concerning customs and control formalities. Current transport policies, while addressing significant infrastructural developments like the Padma Bridge and Karnaphuli Tunnel, do not adequately include inland cargo transport services and dry ports. Research highlights the importance of dry ports in freight distribution and intermodal transport, emphasising the need for a more integrated and comprehensive approach.

Stakeholders, including government agencies, transport operators, and trade associations, unanimously call for a dedicated legal framework for dry ports to attract investment, streamline operations, and integrate seamlessly with other transport modes. Recommendations include clear definitions and classifications for dry ports, establishing a regulatory oversight body, incorporating dry ports into national transport policies, harmonising customs procedures, encouraging public-private partnerships, and aligning with international standards. A phased implementation approach, involving legal reviews, stakeholder consultations, capacity building, pilot projects, and robust monitoring, is suggested to address these challenges and create a conducive environment for dry port development in Bangladesh.

Chapter 9: Review of Best Practices of Dry Ports Around the World

Dry ports play a crucial role in enhancing logistical efficiencies and supporting trade in both developing and developed countries. In developing nations, such as Nepal, Birgunj Dry Port serves as a vital link between seaports in India and inland destinations, facilitating the movement of goods via rail networks. It handles substantial cargo volumes annually and features warehouses equipped for container handling and customs clearance, bolstering trade operations, particularly during peak seasons. Similarly, in Laos, Savannakhet Dry Port serves as a regional transhipment hub, strategically located to facilitate trade flow between Thailand and Vietnam. It boasts modern logistics facilities, including customs clearance services and a free trade zone, which streamline import-export processes and enhance operational efficiency.

In contrast, developed countries like Germany showcase advanced dry port infrastructure. Bayernhafen Nürnberg exemplifies this with its extensive capabilities in multimodal freight transport. Situated strategically within urban areas, it integrates road, rail, and inland waterway networks efficiently. Bayernhafen Nürnberg handles millions of tonnes of cargo annually through high-performance facilities like quaysides, dedicated rail networks, and specialised handling equipment. This exemplifies how developed dry ports can effectively manage large-scale cargo operations while minimising environmental impacts by maximising the use of environmentally friendly transport modes.

Overall, these examples illustrate the diverse roles and capabilities of dry ports worldwide, from facilitating international trade in landlocked regions to optimising multimodal transport networks in developed countries. Each contributes uniquely to their respective economies by enhancing connectivity, operational efficiency, and trade facilitation through modern infrastructure and strategic positioning.

Chapter 10: Proposed arrangements for customs clearance at dry ports

The study discusses strategies and current practices aimed at optimising customs clearance operations at dry ports. A central proposal is the consolidation of border control procedures, including customs, quarantine, and health checks, under unified authority at each dry port. This approach, often referred to as the "single window" system, seeks to streamline operations by reducing redundant procedures and minimising the need for multiple personnel. It emphasises the importance of equipping on-site inspection personnel with IT systems for conducting risk assessments of imported shipments. The study also highlights existing regional practices, such as pre-clearance systems that assess cargo risk before arrival, using customer profiles to evaluate clearance suitability. Another significant aspect covered is the infrastructure and regulatory framework required for efficient dry port operations. It advocates for the permanent presence of border inspection officers at dry ports or ensuring their immediate availability when needed. This infrastructure focus aims to facilitate swift and comprehensive customs clearance while minimising intermediate border checks that can delay cargo transhipment.

Proposed initiatives include the introduction of the Authorised Economic Operator (AEO) programme, which aims to expedite customs clearance for compliant enterprises. Technological advancements are also emphasised, including digital clearing systems, enhanced phytosanitary procedures, and GPS-based vehicle tracking systems to improve operational efficiency and security at dry ports. Stakeholders' expectations underscore the need for fast and reliable customs services at dry ports, with streamlined procedures that reduce bureaucracy and ensure transparency in fee structures. They advocate for the presence of customs officials to facilitate timely assessments and proper documentation handling. The study highlights the importance of adherence to standard operating procedures (SOPs) tailored to dry port operations, ensuring consistent compliance with international trade regulations while enhancing overall efficiency and reliability in customs clearance processes.

Chapter 11: Policy and Legislative Solutions for Effective Dry Ports

The study presents a comprehensive overview of dry port policies across Bangladesh and other developing countries, highlighting their regulatory frameworks and operational criteria. In Bangladesh, the National Board of Revenue (NBR) governs the development of inland container depots (ICDs) and off-docks, emphasising stringent eligibility criteria. These include recognition by authorities, a minimum five-year track record in cargo handling, specific land and handling

capacities, security clearances, and robust infrastructure standards. Proximity to Chattogram Port and emergency preparedness are crucial, with phased operational permissions and compliance with customs regulations forming integral parts of the policy. While the policy strengthens certification processes and mandates proximity guidelines, it faces criticism for location limitations and lacks environmental oversight.

In India, the Central Board of Indirect Taxes & Customs categorises potential dry port locations into green, blue, and red zones based on existing ICD density and industrialisation levels. This zoning aims to balance logistics capacities and enhance rail transport competitiveness by specifying distances from seaports for new ICD setups. Requirements include minimum land area, operational history, infrastructure development, and alignment with national logistics plans, emphasising economic viability and regulatory compliance to foster efficient cargo movement across diverse geographical zones. Tanzania's policy mandates stringent licensing criteria under the Companies Act for establishing dry ports. Applicants must demonstrate ownership, security credentials, and operational capabilities, including cargo handling, customs clearance, and infrastructure development. The policy outlines specific operational rights and responsibilities for ICD licence holders, ensuring compliance with regional customs management regulations and fostering a conducive environment for logistics and trade growth.

Chapter 12: Infrastructure Requirements and financing sources of dry ports

This study provides a detailed exploration of infrastructure requirements and financing sources for dry ports. The selection of optimal dry port locations involves multidisciplinary considerations aimed at minimising transport and setup costs while maximising accessibility and operational efficiency as discussed previously. Once a location is determined, infrastructure focuses on physical components essential for efficient operations. This encompasses a range of equipment such as heavy forklift trucks, straddle carriers, transtainers, and mobile cranes, each tailored to specific handling needs from container movements to general cargo. Custom facilities within dry ports are vital for seamless customs clearance and cargo handling processes, requiring dedicated spaces equipped with advanced technology for inspections and documentation.

Financing dry ports involves diverse strategies, with public-private partnerships (PPPs) emerging as a favoured model to combine public funding with private sector expertise and capital. Government funding remains crucial, supported by grants and subsidies, particularly in developing countries where infrastructure development is pivotal for economic growth. International financial institutions like the World Bank and Asian Development Bank provide loans and technical assistance, facilitating large-scale infrastructure projects. Foreign direct investment (FDI) and innovative financing mechanisms such as infrastructure bonds further diversify funding options, ensuring sustainable development and operational viability. Bangladesh's experience underscores the complexity and potential of these approaches, with recent collaborations involving development banks signalling optimism for future investments. Challenges include high initial costs, long payback periods, and regulatory uncertainties, necessitating robust government policies and supportive frameworks to attract private sector participation and ensure project success.

Key Recommendations

Based on the desk research, Key Informant Interviews (KIIs) and stakeholder meetings, the study highlights many essential policy intervention areas for enhancing container handling and shipping in Bangladesh. Key recommendations are as follows:

1. Expand Export Shed Capacity: The shortage of export shed space in Chattogram dry ports causes delays and potential damage to goods during peak seasons. It is recommended that at least two-thirds of the area in new off-docks or dry ports be designated for export sheds to ensure adequate storage capacity and smooth operations.

2. Prioritise Rail Networks for Logistics: To address traffic congestion on highways and inefficiencies in container transportation by lorries, rail networks should be prioritised as the primary mode of transport in new dry port terminals. Rail systems can handle significantly larger volumes of freight, reducing congestion and enhancing logistics efficiency.

3. Boost Investment in Railway Infrastructure: Investment in railway infrastructure, including track upgrades, electrification, and improved rolling stock, is essential for sustainable freight movement. Dedicated freight corridors and intermodal terminals should be developed to make rail freight services more competitive, cut traffic congestion, and reduce carbon emissions.

4. Unify Policies for Dry Port Operations: Overlapping policies from the National Board of Revenue (NBR) and the Chattogram Port Authority (CPA) create confusion among stakeholders. A unified policy, collaboratively developed by the NBR and CPA, would streamline operations and provide clear guidelines for stakeholders.

5. Promote Authorised Economic Operators (AEOs): Increasing the number of Authorised Economic Operators (AEOs) and dedicating specific lanes for them at ports can alleviate congestion, enhance efficiency, and reduce processing times, benefiting overall port operations and logistics systems.

6. Implement a Single Window System: Introducing a single-window system at ports would allow all stakeholders, including customs, shipping lines, and port authorities, to process documentation and clearances through a unified platform. This system would simplify procedures, reduce bureaucratic delays, and expedite goods movement.

7. Integrate Dry Port Development into National Plans: To meet the government's goal of handling 100% of exports through dry ports by 2030, dry port infrastructure projects must be included in national planning documents, such as the Five-Year Plans and the Perspective Plan. This integration ensures alignment with broader developmental goals and secures funding for necessary expansions.

8. Enhance the Capacity of Existing Dry Ports: With container traffic expected to increase significantly by 2044, the capacity of existing dry ports near Chattogram must be expanded now to prepare for future demand. Upgrades to current facilities are essential to handle the projected growth effectively.

9. Adopt Green Technologies for Sustainable Logistics: Developing environmentally friendly dry ports by incorporating energy-efficient infrastructure, waste reduction systems, and

renewable energy sources is crucial. Emphasising sustainable practices minimises environmental impact and contributes to a greener logistics sector.

10. Develop Dedicated Software for Tracking and Monitoring: Customs or port authorities should create software tailored to tracking and monitoring seaport-to-dry port logistics. This solution would improve data accessibility, enhance efficiency, and ensure seamless coordination among relevant stakeholders.

11. Focus on Workforce Training and Development: A well-trained workforce is vital for efficient dry port operations. Training programmes should focus on technical skills, such as customs procedures and digital tools, as well as soft skills, including teamwork and communication. Enhanced training would improve operational efficiency and help workers adapt to technological advancements.

Conclusion

In conclusion, the study underscores the critical role of dry ports in bolstering Bangladesh's logistics infrastructure amidst burgeoning international trade demands. With Chattogram Port handling the majority of the nation's trade but facing chronic congestion issues, the expansion and effective utilisation of off-docks and dry ports emerge as pivotal solutions. The study emphasises the need for strategic development across key regions like Dhaka, mirroring global best practices to enhance efficiency and reduce costs. By examining existing facilities and proposing robust recommendations, including technological upgrades and improved intermodal connectivity, the initiative aims to establish a resilient supply chain network aligned with international standards. Ultimately, integrating these recommendations into national policies and fostering public-private partnerships will be instrumental in driving sustainable growth and bolstering Bangladesh's competitive edge in global trade dynamics.

Chapter 1: Background and Introduction

1.0 Background:

Shipping is a global activity that extends beyond traditional seaport areas, with maritime logistics now reaching the last mile of shippers and consignees, regardless of port locations or national boundaries. To introduce highly efficient container terminals, major seaports of the world are using off-docks or dry port facilities by using intermodal freight transportation systems that will save time and cost for the port users. Bangladesh, positioned strategically on the Bay of Bengal, plays a crucial role as a maritime hub for international trade in the region. The nation's economy heavily depends on efficient cargo movement to support its growing import-export operations. The marine territory of Bangladesh spans an area 1.4 times larger than its land area, which is in total 207,000 square kilometres.[1] Sea routes facilitate about 90 per cent of the nation's international trade.

The Chattogram port stands as the primary maritime gateway, handling approximately 90 per cent of Bangladesh's total international trade. However, congestion often plagues the key seaport of Chattogram, which consequently results in delays in cargo handling and increased logistics expenses[2]. Ships frequently had to wait in Chattogram Port for more than a week to load or unload their cargo throughout the months of April through October, a major delay that began in 2017. The situation worsened by mid-April 2020 when 30 ships were waiting to dock, and some 49,000 containers were stuck in the Chattogram Port. There was a significant waiting period, with vessels needing approximately five days to acquire a berth, even after the busiest season had ended.

In order to address the ongoing congestion, the National Board of Revenue (NBR) in collaboration with other experts made several recommendations, including a greater utilisation of off-docks and dry ports for seamless operation at the Chattogram port.[3] Dry ports, sometimes referred to as off-dock facilities, present a viable option. By offering services like container storage, customs clearance, and cargo consolidation, these inland expansions of seaport terminals serve as a buffer to reduce the traffic load at the seaports. The objective of this study is to investigate the need for more off-docks/dry ports in Bangladesh to support the rapid growth in international trade in Bangladesh and the region.

1.1 Introduction

A Dry Port, often termed an inland port, functions as an inland intermodal terminal, enhancing the efficiency of seaports and catalysing economic activities on both local and international scales. In the context of Bangladesh, Dry Port means other than seaports, such as container off-dock, CFS (Container Freight Station), ICD (Inland Container Depot), ICT (Inland Container Terminal) and so on. These inland intermodal terminals are intricately connected to seaports via road or rail links, facilitating the seamless transfer of goods between maritime vessels and inland

[1] Sea Ports of Bangladesh: Contributing to National and Regional Economic Interest

[2] Congestion at Chattogram Seaport: Causes and Consequences. A case study in Malaysia

[3] Port disruption and resilience: A closer look

transportation networks. Dry ports play a vital role for coastal regions and landlocked countries by enabling the smooth transportation of goods. They replicate key seaport functions in areas far from the coast (Rosmaizura Mohd Zain, 2022). Dry ports were initially introduced to alleviate congestion within ports and were viewed as crucial for redistributing sea-based commodity trade flows (Erica Varese et al., 2020). The concept of dry ports originated in the 1980s, leading to numerous definitions proposed by various institutions and individuals. However, a unanimous definition remains elusive due to differing interpretations across regions, influenced by locational and infrastructural complexities. The term was first used by the United Nations Conference on Trade and Development in 1982, defining it simply as a physical extension of storage facilities in seaports. They described a dry port as an inland terminal where shipping companies handle import and export cargo, assuming full responsibility for costs and conditions. They suggested that a dry port is "an inland terminal to which shipping companies issue their import bills of lading for import cargo assuming full responsibility of costs and conditions and from which shipping companies issue their bills of lading for export cargo". The definition allows for the implementation of dry ports in both coastal and landlocked countries. However, UNCTAD revised this definition in 1991, specifying a dry port as a depot situated apart from seaports but equipped with customs clearance facilities. This modified definition emphasises the inland positioning of dry ports.

Jaržemskis and Vasiliauskas (2007) define the dry port as "a port situated in the hinterland servicing an industrial/commercial region connected with one or several ports by rail and road transport and offering specialised services between the dry port and the transmarine destinations. Normally the dry port is container and multimodal oriented and has all logistics facilities, which is needed for shipping and forwarding agents in a port." Ng & Gujar (2009) define dry ports based on their core functions, which encompass multimodal transport and the range of services provided to various stakeholders. Roso et al. (2009) have come up with the most comprehensive definition; it says 'dry ports are an inland intermodal terminal directly connected to seaports with high-capacity transport means, where customers can leave and pick up their standardised units as if directly to seaports.' UNESCAP (2012, p.4) defines dry ports from a logistics perspective: It states that a dry port is an inland logistic center connected to one or more modes of transport for the handling, storage, and regulatory inspection of goods moving in international trade and the execution of applicable customs controls and formalities.

Table1.1: Variation in dry port definitions from 1982–2012

Serial	Author(s)	Definition(s)
1.	UNCTAD (1982)	An inland terminal to which shipping companies issue their import bills of lading for import cargo assuming full responsibility for costs and conditions and from which shipping companies issue their bills of lading for export cargo.

2.	Ng & Gujar (2009)	An inland setting with cargo-handling facilities allows several functions to be carried out. For example, consolidation and distribution, temporary storage, customs clearance, and connection between transport modes, agglomeration of institutions (both private and public) which facilitates the interactions between different stakeholders along the supply chain.
3	Jaržemskis and Vasiliauskas (2007)	A port situated in the hinterland servicing an industrial/commercial region connected with one or several ports by rail and/or road transport and offering specialised services between the dry port and the transmarine destinations. Normally the dry port is container and multimodal-oriented and has all the logistics facilities, which is needed for shipping and forwarding agents in a port
4.	Roso et al. (2009)	An inland intermodal terminal directly connected to seaport(s) with high-capacity transport mean(s), where customers can leave/pick up their standardised units as if directly to a seaport.
5.	UNESCAP (2012)	An inland location logistic centre connected to one or more modes of transport for the handling, storage and regulatory inspection of

		goods. Moving in international trade and the execution of applicable customs controls and formalities

Source: Compiled by the author

The use of the term varies worldwide owing to scale, complexity, and area of specialisation (Roso & Lumsden 2010). Americans use the term inland port (Rodrigue 2011), Africans call it forward ports (Ahamed 2010) while in India, they call it inland container depots (UNESCAP 2006). They also differ in their functions, facilities, and roles.

Inland Container Depot: According to UNECE (1998, P.3), an Inland Container Depot is ' a common user facility, other than a port or an airport, approved by a competent body, equipped with fixed installations and offering services for handling and temporary storage of any kind of goods (including containers) carried under customs transit by any applicable mode of transport, placed under customs control and with customs and other agencies competent to clear goods for home use, 28 warehousing, temporary admission, re-export, temporary storage for onward transit and outright export'. As the above definition suggests ICD's range of facilities includes container, freight station, bonded and non-bonded storage, customs, and container repair facilities. However, non-containerised cargoes are generally given less priority at ICDs.

Container freight Station: A freight station is a concentration of stakeholders' activities operating in the freight transport industry located in the hub of various transport units (Andrius Jaržemskis 2007). There are no locational restrictions for freight stations. This can be located near or far away from the seaports (JAGAN JEEVAN et al. 2016). Container freight station provides facilities such as container freight space, and bonded and non-bonded storage. Services provided by this terminal are container stuffing and destuffing, freight forwarding, and consolidation (UNESCAP 2009).

Inland Container Yard: An inland container yard is a site where storage, cleaning, and repair of empty containers are facilitated. As such, this is generally located near the seaports. This is usually designed to provide better services and turnaround time (Rimienė & Grundey 2007). Inland container yards provide basic facilities to the clients such as container yard space, container repair facilities, and to facilitate the clients in domestic and international trade (UNESCAP 2009). As the above definitions suggest, they provide no customs clearance or value-added services.

Freight Village: A freight village is defined as the hub of various transport and logistic facilities to maximise the efficiency of seaports (Galloni 1999; Nam & Song 2011). It's an intermodal terminal with shared access to different services (Rimienė & Grundey 2007). Freight villages are usually located in metropolitan areas to access improved human capital, reducing truck congestion and leading to capacity sharing among different stakeholders (Higgins & Ferguson 2011). Moreover, container management, storage (bonded and unbonded), and customs clearance services are performed at freight villages. According to UNESCAP (2009), freight villages provide storage facilities for both containerised and non-containerised cargo, freight forwarding, customs inspection and financial services.

Table 1.2: Component of Facilities

Intermodal terminals	**Component of facilities**								
	Container Yard	Container Freight Station	Break Bulk Storage	Bonded Storage	Non-Bonded Storage	Bulk Storage	Customs	Repair Facilities	Trade facilities
Inland Container Depot	√	√	--	√	√	--	√	√	√
Inland Container Yard	√	--	--	--	--	--	--	√	√
Container Freight Station	--	√	--	√	√	--	--	--	--
Dry Ports	√	√	√	√	√	√	√	√	√
Freight Village	√	√	√	√	√	--	√	√	√

Source: JAGAN JEEVAN (2016)

Table1.3: Component of Services

Intermodal Terminals	Container handling & Storage	Container stuffing and de-stuffing	Non-containerized break-bulk cargo handling	Bulk cargo handling and storage	Customs inspection And clearance	Freight forwarding and cargo consolidation	Financial Services
Inland container depot	√	√	--	--	√	√	√
Container freight station	--	√	--	--	--	√	--
Inland container yard	√	--	--	--	--	--	--
Freight village	√	√	√	--	√	√	√
Dry ports	√	√	√	√	√	√	√

Source: JAGAN JEEVAN (2016)

A substantial proportion, approximately 70 per cent, of container cargoes passing through Chattogram Port either have origins in or are destined for the capital, Dhaka. Notably, the predominant mode of transportation for these goods involves road networks, constituting 67 per cent of the total container throughput volume, while rail transport accounts for a mere 3 per cent. The Dhaka Inland Container Depot (ICD), operational since 1987, has played a role in rail transport, but its capacity is currently constrained due to the challenges posed by extensive urban development surrounding the terminal, resulting in congestion issues.

To address these concerns and enhance efficiency, the Chattogram Port Authority took proactive measures by encouraging the establishment of off-docks/dry ports. Presently, 18 such terminals are operating in close proximity to Chattogram Port, each operated by different private investors, collectively contributing to a more diversified and streamlined approach to container handling and transport.

The importance of dry ports in improving cargo efficiency and reducing congestion is evident. While Chattogram has made strides with 18 dry ports nearby, there's a growing need to assess if more are necessary, especially in places like Dhaka. A study should look at how well the existing dry ports are working, tackle issues like limited infrastructure, and explore opportunities for expansion to better connect different regions. This assessment is crucial for making informed decisions about future infrastructure development, ensuring a more balanced and effective supply chain system for Bangladesh. The main objective of this study is to investigate the potential of developing a dry port network to expand trade opportunities by facilitating the uninterrupted movement of trade considerations.

1.2 Objectives and Scope:

The study titled "Needs Assessment Study on the Necessity of More Off-dock/Dry Ports" aims to achieve the following objectives:

1. **Description and Analysis of Existing Dry Port Facilities:** The study seeks to thoroughly examine and analyse the current dry port facilities in Bangladesh, identifying any shortcomings or inefficiencies that may hinder trade facilitation.
2. **Identification of Significance of Dry Ports**: An assessment has been conducted to determine the importance and potential benefits of establishing additional dry ports in Bangladesh, considering their impact on trade facilitation and economic development.
3. **Identification of Basic Requirements for Establishing a Dry Port**: The study identifies the fundamental requirements for establishing and operating dry ports effectively, including infrastructure, logistics, and regulatory frameworks.
4. **Assessment and Recommendation for Dry Port Locations**: Through comprehensive analysis, the study provides recommend suitable locations for new dry ports and assess the most viable modes of connection to enhance connectivity and efficiency.
5. **Analysis of Transport Linkages to Dry Ports**: The study analyses the connectivity of dry ports with seaports, rail networks, and road infrastructure to ensure seamless transportation and logistics operations.
6. **Principles and Standards for Design and Operations of Dry Ports**: By examining international best practices, the study aims to establish principles and standards for the design and operations of dry ports in Bangladesh.
7. **Incorporation of Dry Ports into Trasport Policy**: The study explores the integration of dry ports into relevant transport documents and legal frameworks to ensure compliance and facilitate smooth operations.
8. **Review of Best Practices of Dry Ports Around the World**: Through a review of successful examples from other countries, the study identifies best practices in dry port development and management to inform decision-making in Bangladesh.
9. **Proposed arrangements for customs clearance at dry ports:** This study suggests customs clearance arrangements at dry ports in Bangladesh based on an in-depth review of the literature and in consideration of the current scenario.
10. **Policy and Legislative Solutions for Effective Dry Ports**: The study proposes comprehensive policy and legislative solutions for planning and developing dry ports, including customs clearance procedures and regulatory frameworks.
11. **Infrastructure Requirements and Financing for Dry Ports**: Finally, the study assesss the infrastructure needs of dry ports and explore potential sources of financing for their development and ongoing operations to ensure sustainability and effectiveness.

1.3 Methodological process of the study

The study started with a comprehensive literature review on the infrastructure requirements and financing sources for dry port development and operations globally. This was followed by Key Informant Interviews (KIIs) with officials from the Chattogram Port Authority, Dry Port Authority, and Bangladesh Customs to understand the specific infrastructure needs and potential financing

sources for dry ports in Bangladesh. The information gathered from the literature review, and interviews were then analysed to identify gaps and opportunities in the current infrastructure and financing arrangements. Based on this analysis, recommendations are made for the required infrastructure and sources of financing for dry port development and operations in Bangladesh.

a. **Desk Research:** In the initial phase of our research approach, extensive desk research is conducted, delving into literature and reports on the various aspects of dry ports/off-docks. This phase serves as the foundation, fostering a deep understanding of the current guidelines set by the transport policy for dry docks. By meticulously gathering data from authoritative sources such as the Bangladesh Bureau of Statistics, and the World Bank, our method aims to gain insights into the state of dry ports in Bangladesh. The desk research serves as our guide, directing the team toward nuanced insights to explore opportunities and comprehensively address policy challenges. This phase also concentrated on reviewing the possibilities for extending the dry port network across the country.
b. **Stakeholder Mapping and Interviews:** The second phase entails stakeholder mapping and interviews. RAPID adopts a systematic approach to identify and chart key stakeholders involved in dry ports management and usage. This encompasses officials from the Bangladesh Inland Container Depot Association (BICDA), Chattogram and Mongla port authority, dry port management, exporters and importers using try ports, customs officials, customs and forwarding agents, Off-dock owners, etc. By engaging with stakeholders from diverse fields such as government officials, logistics service providers, and customs offices, as well as transport experts, RAPID aims to uncover legal and policy constraints, along with challenges in assessing off-dock/dry ports requirements for the country and design a model for off-docks/ Dry Ports network. There were 4 FGDs conducted in this study and the proposed places are Dhaka, Chattogram and Khulna. Annexure is added to state the participants of FGDs and KII's contributors to explore the necessity of more off-docks/ dry ports in Bangladesh.

Three factors were used to choose stakeholders:

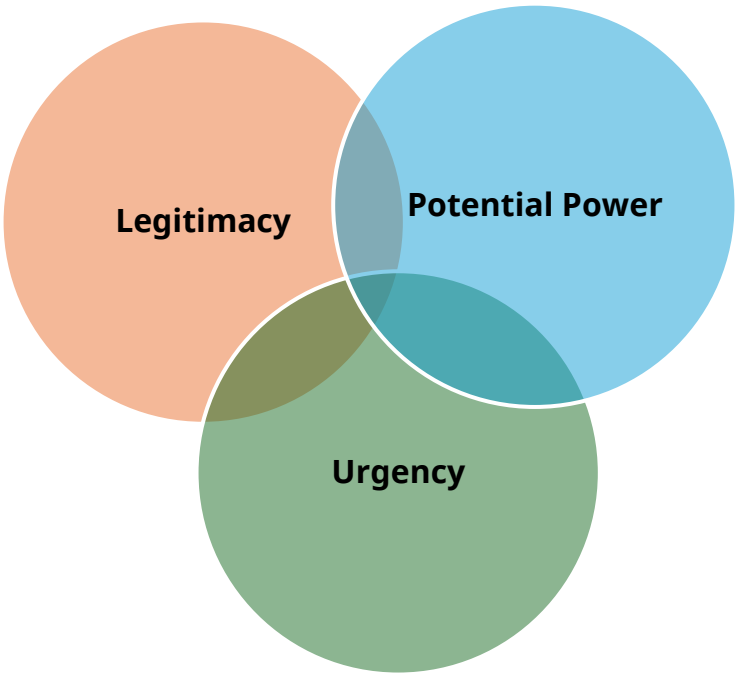
1) Legitimacy.
2) Actual and potential power.
3) Level of urgency they ascribe to the issue.

Legitimacy: The value of stakeholder contributions—those with in-depth knowledge and insights are considered more legitimate—the interests they serve—societal good over personal gain—their representativeness—formal representatives are more legitimate than informal ones—and the legitimacy obtained through research participation—which can strengthen the voice of marginalised groups—are the four areas in which legitimacy is evaluated. These factors aren't necessarily equal because certain stakeholders could be strong in some areas but weak in others.

Potential Power: Three types of power are recognised as real and potential; normative power (symbolic resources like endorsement or prestige), coercive power (influence or force to direct or impede research), and utilitarian power (access to resources or practical help).

Urgency: The degree of urgency of a situation is determined by how urgent it is for the parties involved. This is especially true when there is a limited "window of opportunity" for action or when the problem has irreversible effects, such as risks to life, economic security, or environmental biodiversity.

Figure 1.1: Three Criteria for Selecting Stakeholders



Source: RAPID's desk research

Table 1.4: Stakeholders from different fields associated with dry ports

Sl. No	Stakeholders	FGDs	KIIs
1.	Chattogram and Mongla Port Authority	FGD-1 in Chattogram and FGD-2 in Mongla	8
2.	Dry Port Authority		10
3.	Importers and Exporters (Dry Port users)	FGD-3 in Dhaka	5
4.	Importers and Exporters (Dry Port non-user)		4
5	Roads and Highway Department, Bangladesh Railway/Related Ministries		5
6.	Bangladesh Custom Office	FGD-4 in Chattogram	3
7.	Clearing and Forwarding Agents		5
	Total	**4**	**40**

Source: RAPID Presentation

KII resource persons

SL#	Designation/Others	Institution/Others	Place
01	Chairman/Nominated-Secretary or others	Chattogram Port Authority, Ministry of Shipping	Chattogram
02	Director -Traffic	Chattogram Port Authority, Ministry of Shipping	Chattogram
03	Chairman or Nominated	Bangladesh Land Port Authority (BLPA), Ministry of Shipping	Dhaka
04	Chairman/Nominated	Mongla Port Authority, Ministry of Shipping	Khulna
05	Chairman/Nominated	Payra Port Authority, Ministry of Shipping	Dhaka
06	Chairman/Nominated	Bangladesh Inland Water Authority (BIWTA), Ministry of Shipping	Dhaka
07	Terminal Operator	Saif Powertec/Others, Chattogram Port	Chattogram
08	Additional Chief Engineer-Planning	Roads and Highways Department (RHD), Ministry of Road Transport and Bridges	Dhaka
09	Chief Engineer /Nominated	Roads and Highways Department (RHD), Ministry of Road Transport and Bridges	Dhaka
10	Secretary/Chief Planning Officer	Bangladesh Railway	Dhaka
11	Managing Director CCBL	Bangladesh Railway	Dhaka
12	Secretary/Nominated	Ministry of Commerce	Dhaka
13	Bangladesh Trade and Tariff Commission	Ministry of Commerce	Dhaka
14	Export Promotion Bureau	Ministry of Commerce	Dhaka
15	CCI and E	Ministry of Commerce	Dhaka
16	WTO Cell	Ministry of Commerce	Dhaka
17	Secretary/Nominated	Ministry of Shipping	Dhaka
18	President or nominated	Bangladesh Inland Container Depot Association (BICDA)	Chattogram
19	Secretary	Ministry of Plannings	Dhaka
20	Managing Director	Main Line Operator, MSC	Chattogram
21	Managing Director	Main Line Operator, MAERSK LINE	Chattogram
22	President or nominated	Feeder Association in Chattogram	Chattogram
23	Asst. Commissioner of Customs, Dhaka	National Board of Revenue, Ministry of Finance	Dhaka
24	Asst. Commissioner of Customs, Chattogram	National Board of Revenue, Ministry of Finance	Chattogram
25	Asst. Commissioner of Customs, Khulna	National Board of Revenue, Ministry of Finance	Khulna

SL#	Designation/Others	Institution/Others	Place
26	Chairman or nominated	Bangladesh Road Transport Authority, Ministry of Road Transport and Bridges	Dhaka
27	President or nominated	CILT Bangladesh	Dhaka
28	President or nominated	Chattogram C&F Association	Chattogram
29	President or nominated	Bangladesh Freight Forwarders Association (BAFFA)	Dhaka
30	President or nominated	The Bangladesh Shipping Agents' Association (BSAA)	Chattogram
31	Owner/Managing Director	Private Off-dock Owner-Patenga	Chattogram
32	Owner/Managing Director	Private Off-dock Owner-Saltgola	Chattogram
33	Owner/Managing Director	Private Off-dock Owner-Batiary	Chattogram
34	Owner/Managing Director	Private Off-dock Owner-EPZ	Chattogram
35	President or nominated	Exporters and Importers Association of Bangladesh	Dhaka
36	President or nominated	Bangladesh Garment Manufacturers and Exporters Association (BGMEA)	Dhaka
37	President or nominated	Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA)	Dhaka
38	Chairman or nominated	Bangladesh Investment Development Authority (BIDA)	Dhaka
39	Chairman or nominated	Bangladesh Economic Zones Authority (BEZA)	Dhaka
40	President or nominated	Khulna Chambers of Commerce	Khulna
41	President or nominated	C&F Association, Khulna	Khulna
42	Governor, Nominated	Bangladesh Bank, Ministry of Finance	Dhaka
43	President or nominated	Chattogram Chamber of Commerce and Industry	Chattogram
44	President or nominated	Federation of Bangladesh Chambers of Commerce and Industry (FBCCI)	Dhaka
45	President or nominated	Bangladesh Bus Truck Owners Association, Dhaka, Bangladesh	Dhaka
46	President or nominated	Marine Surveyors Association of Bangladesh (MSAB)	Chattogram
47	President or nominated	Bangladesh Ship Handling & Berth Operators Association	Chattogram
48	President or nominated	Mongla Bandar Master Stevedores Association	Khulna

Source: RAPID's analysis and presentation

FGD locations and participants

FGD#`	Place	Facilitation	Participants
1	Chattogram	Chattogram Facilitator. Port Management Specialist Assisted by Data Collector-Study-2 Monitoring and Supervision Team Leader (Rapid) or nominated person BRCP-1 nominated	Chattogram Port Authority, Ministry of Shipping
			Bangladesh Inland Container Depot Association (BICDA)
			Private Off-dock Owner
			Main Line Operator
2	Khulna	Khulna Facilitator. Port Management Specialist Assisted by Data Collector-Study-2	Mongla Port Authority, Ministry of Shipping
			National Board of Revenue, Ministry of Finance
			Khulna Chambers of Commerce
			C&F Association, Khulna
			Mongla Bandar Master Stevedores Association
3	Chattogram	Chattogram Facilitator. Port Management Specialist Data Collector-Study-2 Team Leader (Rapid) or nominated person BRCP-1 nominated	Saif Powertec/Others, Chattogram Port
			Main Line Operator, MSC
			Feeder Association in Chattogram
			National Board of Revenue, Ministry of Finance
			Chattogram C&F Association
			The Bangladesh Shipping Agents' Association (BSAA)
			Chattogram Chamber of Commerce and Industry
			Marine Surveyors Association of Bangladesh (MSAB)
			Bangladesh Ship Handling & Berth Operators Association
4	Dhaka	Dhaka Facilitator. Port Management Specialist Assisted by Data Collector-Study-2 Monitoring and Supervision Team Leader (Rapid) or nominated person BRCP-1 nominated	Bangladesh Land Port Authority (BLPA), Ministry of Shipping
			Payra Port Authority, Ministry of Shipping
			Bangladesh Inland Water Authority (BIWTA), Ministry of Shipping
			Roads and Highways Department (RHD), Ministry of Road Transport and Bridges
			Bangladesh Railway
			Ministry of Commerce

FGD#`	Place	Facilitation	Participants
			Ministry of Shipping
			Ministry of Plannings
			National Board of Revenue, Ministry of Finance
			Bangladesh Road Transport Authority, Ministry of Road Transport and Bridges
			CILT Bangladesh
			Bangladesh Freight Forwarders Association (BAFFA)
			Exporters and Importers Association of Bangladesh
			Bangladesh Garment Manufacturers and Exporters Association (BGMEA)
			Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA)
			Bangladesh Investment Development Authority (BIDA)
			Bangladesh Economic Zones Authority (BEZA)
			Bangladesh Bank, Ministry of Finance
			Bangladesh Bus Truck Owners Association, Dhaka, Bangladesh

Source: RAPID's analysis and presentation

c. **Data Analysis:** The phase of data analysis entails a thorough examination of dry port data collected from the selected dry ports using qualitative and quantitative data collection instruments, and economic indicators to quantify both the current status and the potential for future growth in the utilisation of dry ports in the country. Employing statistical tools, a comprehensive analysis has been conducted to identify the usage and demand of dry ports. The analysis extends to secondary-level data analysis and prioritises addressing policy and regulatory issues for improvement. It outlines plans and policies aimed at enhancing logistics facilities, incorporating stakeholder analysis to automate border management and customs procedures as well.

Survey instruments: The study adopts a mixed method approach. Mainly, semi-structured key informant interviews were conducted. Different checklists of questions were used for different stakeholder types. Chapter 2: Existing dry port facilities and shortcomings to ease trade:

Bangladesh has witnessed a substantial surge in maritime trade, with container port throughput experiencing a six-fold increase to 3 million TEUs over the past decade (Saha, 2021).[4] Despite operating a relatively modest intermodal system around the primary seaport of Chattogram, less than 5 per cent of intermodal containers find their way to one rail Inland Container Depot (ICD) in Dhaka and two Riverine Inland Container Terminals (RICTs). Binsbergen et al. (2014) identified that the transport industry is very competitive with lower profit margins and intermodal requires effective coordination of different stakeholders as well as a massive investment in infrastructure. Lee et al. (2018) identified that hinterland management is another big obstacle created by a poor network of Riverine Inland Container Depots (RICTs) with seaports which usually consume a great deal of time. Hence, Bangladesh needs to prioritise the utilisation of railways to alleviate congestion on highways and promote environmentally sustainable practices. The heavy reliance on trucks for transportation not only exacerbates congestion on highways but also imposes a significant toll on the environment, with a substantial emission of CO2. Embracing railway transportation not only offers a solution to congestion but also aligns with efforts to reduce carbon emissions and mitigate the adverse impacts on the environment (Saha 2021).

The existing dry port facilities in Bangladesh exhibit a blend of strengths and shortcomings in facilitating trade. On a positive note, these facilities play a pivotal role in improving logistical efficiency by acting as inland extensions of seaports and streamlining cargo handling and clearance processes. Nevertheless, persistent challenges include insufficient infrastructure and limited connectivity. The dry ports in Chattogram are susceptible to constant failures in meeting international standards. They also suffer from capacity constraints and limited availability of transformation modes as highlighted by the lack of transport through rail and airways.

[4] The role of Chattogram Port to support MSR in providing maritime transport facilities through intermodal freight transportation system in Asia | Maritime Technology and Research (tci-thaijo.org)

Chapter 2: Description and Analysis of Existing Dry Port Facilities

2.0 An overview of the major off-docks/ dry ports in Bangladesh:

At present, Bangladesh has a total of 21 Inland Container Depots (ICDs) and Off-docks. Dhaka Inland Container Depot (ICD) and Pangaon Inland Container Terminal (ICT) are both owned and operated by the government. The government has recently undertaken an initiative to construct an Inland Container Depot (ICD) near Ghorashal. The proposed Inland Container Depot (ICD) will be constructed on a 20-acre plot of land held by the Bangladesh Railway. It will have the capability to handle 100,000 twenty-foot equivalent units (TEUs) of containers annually[5]. In addition, the remaining 19 Off-docks are privately owned and are closely managed and situated in close proximity to the Chattogram Sea Port.

Table 2.1: List of ICDs/ Off-docks/ Dry Ports in Bangladesh

SL	Name of the Off-docks/IDCs/ICTs	Location	Ownership
1.	Pangaon Inland Container Terminal	Zazira, Shariatpur	Government
2.	Dhaka Inland Container Depot	Kamalapur, Dhaka	Government
3.	Ghorashal ICD (Construction ongoing)	Ghorashal, Narshindi	Government
4.	Port Link Logistics Centre Limited	Chattogram	Private
5.	Summit Alliance Port Limited (East)	Chattogram	Private
6.	Summit Alliance Port Limited (West)	Chattogram	Private
7.	K&T Logistics Limited	Chattogram	Private
8.	Shafi Motors Limited	Chattogram	Private
9.	KDS Logistics Limited	Chattogram	Private
10.	Haji Saber Ahmed Timer Company Limited	Chattogram	Private
11.	Eastern Logistics Limited	Chattogram	Private
12.	Summit Alliance Port Limited (North)	Chattogram	Private
13.	Vertex Off-dock Logistic Services Limited	Chattogram	Private
14.	Summit Alliance Port Limited (East)	Chattogram	Private
15.	Summit Alliance Port Limited (West)	Chattogram	Private
16.	BM Container Depot Limited	Chattogram	Private
17.	Incontrade Limited	Chattogram	Private
18.	Chattogram Container Transportation Co. Ltd. (Unit 2)	Chattogram	Private
19.	Esack Brothers Industries Limited (Container Yard)	Chattogram	Private

[5] Govt to build rail ICD in Ghorashal

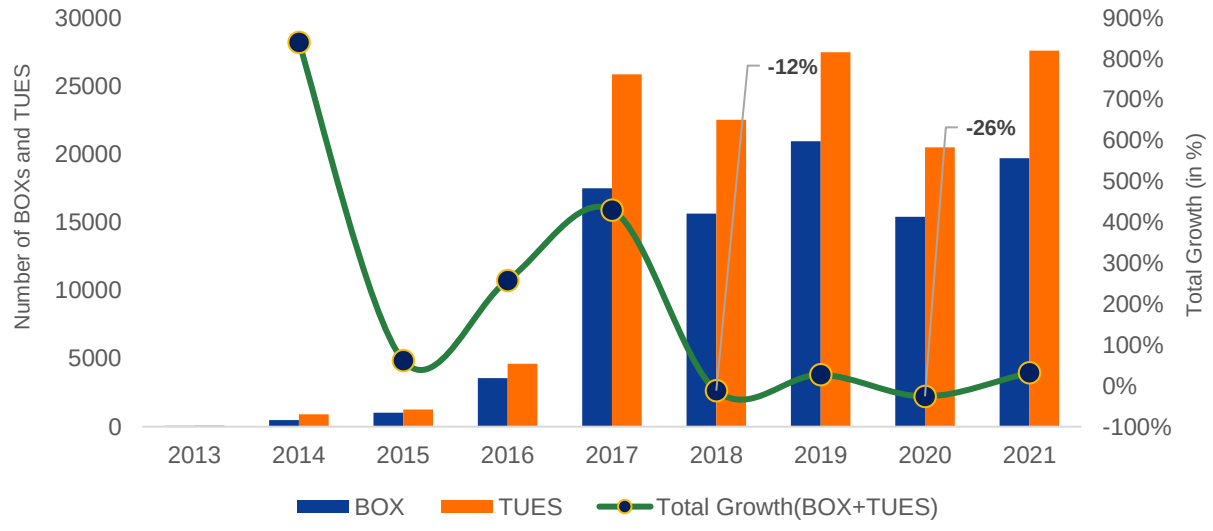
20.	Golden Containers Limited	Chattogram	Private
21.	QNS Container Services Limited	Chattogram	Private

Source: Bangladesh Inland Container Depots Association (BICDA)

2.1 Pangaon Inland Container Terminal (PICT):

The Bangladesh Inland Water Transport Authority (BIWTA) and the Chattogram Port Authority (CPA) collaborated to construct an inland terminal in Pangaon, located in the southern part of Keraniganj, Dhaka. The terminal is situated adjacent to the Buriganga River. This is the country's first inland container terminal which was inaugurated in 2013. The terminal was anticipated to have a favourable impact on the country's economic growth by expanding opportunities for the transportation of exported and imported goods via waterways. The project sought to alleviate the congestion of goods transportation along the Dhaka-Chattogram railway and highway routes. The river route distance between Chattogram and Dhaka is roughly 157 nautical miles(Habib and Noor 2016). The average depth of the river is approximately 4-5 meters, except for specific areas near Swandip. However, during high tide, vessels with a draft ranging from 4-5 meters can navigate the river without any issues. Currently, small vessels transport bulk cargo, petroleum, and other types of goods along this route. The main objective of the Pangaon Inland Container Terminal (PICT) was to streamline the operations of these ships and minimise the time spent in Dhaka-Chattogram railway and highway corridors. Nevertheless, PICT is seeing a decline in popularity among businessmen as a result of many limits and constraints[6].

Figure 2.1: Yearly container handling statistics of PICT[7]



Source: Author's analysis based on the data from the PICT cargo handling report

[6] About PICT

[7] Both BOX and TEUs represent the total count of incoming and outgoing containers.

Since its inception, Pangaon ICT has performed admirably. Over time, there has been a steady increase in the volume of container shipments at PICT. Nevertheless, the fluctuating expansion suggests an uncertain prognosis. From 2018 to 2020, the total growth of container shipments reduced by 26 per cent (Figure 2.1). The stakeholders blame the decrease on factors such as time delay, lack of off-doc facilities, and insufficient vessel numbers.

2.2 Current Infrastructure in PICT:

The terminal has a storage capacity of 3,500 20-feet equivalent units (TEUs) for containers and is capable of handling 116,000 TEU containers every year. The capacity will steadily increase to 160,000TEU.

Yeard and Jetty: The Pangaon Inland Container Terminal (ICT) features a jetty that is 180 meters long and 26 meters wide, accommodating two ships simultaneously, each with a length of 70-75 meters. The terminal's total yard area, enclosed within a boundary wall, spans 55,000 square meters, supplemented by an overflow yard area of 9,100 square meters designated for vanpooling. The yard has a container holding capacity of 2,400 TEUs (Twenty-foot Equivalent Units). Additionally, the Container Freight Station (CFS) occupies 5,815 square meters, and there are 48 reefer plug-in points available for refrigerated containers.

Equipment for container handling and Power supply:

Currently, PICT has One mobile harbour crane, two saddle carriers, four forklifts, two tractor trailers, one cargo lifting crane with a capacity of ten tonnes, and one cargo lifting crane with a capacity of twenty tonnes (which are in the process of being moved from Chattogram Port to PICT).

Power supply: The Pangaon Inland Container Terminal (ICT) ensures 24-hour uninterrupted electricity and water supply for container handling activities. To achieve this, the terminal has installed two generators, each with a capacity of 1250 KVA (1 MW), and another generator with a capacity of 2.5 MW is currently under construction. Additionally, a pump house has been installed to facilitate a reliable water supply.

Table 2.2: Container handling equipment in PICT

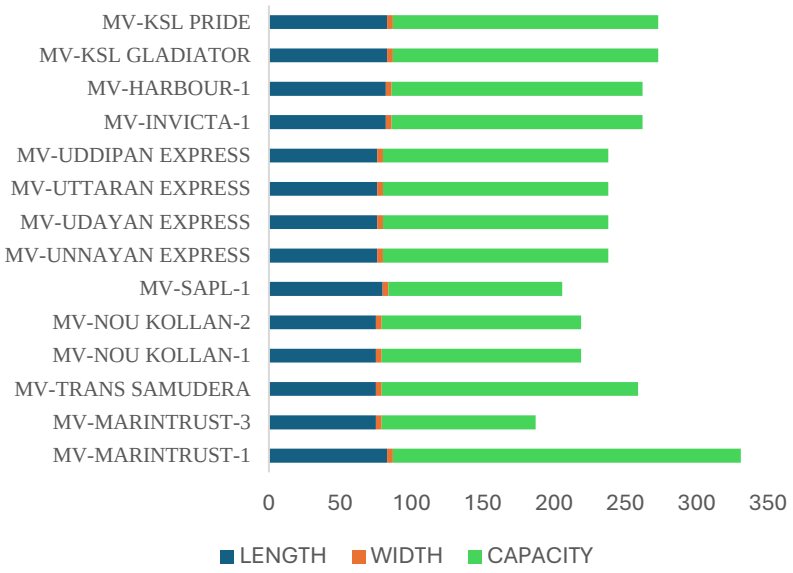
Name of the equipment	Unit in nos
Mobile Harbor Crane	2nos
Straddle Carrier	2nos
Forklift (16 Ton)	4nos
Forklift (5 Ton)	4nos
Forklift (3 Ton)	4nos
Forklift (10 Ton)	4nos
Tractor trailer	2nos
VRT	1nos
Man Lift	1nos
MC(50 Ton)	1nos
MC(20 Ton)	1nos
MC(10 Ton)	1nos
TM(50 Ton)	2nos
TT(40 Ton)	4nos
Cargo Lifting Crane	1 nos. of 10 ton capacity
Cargo Lifting Crane	1 nos. of 20 ton capacity (under process for shifting to PICT from Chattogram Port)

Source: Pangaon ICT web portal

Vessels for container shipment: The effectiveness of water transportation is directly influenced by its size. Vessels have a capacity to transport a minimum of 16 containers, while trucks can only accommodate two containers, causing inconvenience to commuters on the Chattogram route. If the cost of road depreciation is fully accounted for in container transportation by trucks, the cost of transporting containers by road is 50 times greater than that of river transport (Ahmed 2012).

To run the terminal, the three vessels, Pangaon Express, Pangaon Success, and Pangaon Vision, have already been procured from China. 128 containers (20-foot equivalent units, or TEUs) can be carried by each vessel. However, other vessels also operate in PICT for the shipment purposes. As to the authorities of PICT, there are now 19 vessels occupied at Pangaon ICT. Out of all the vessels, MV-Marintrust-1 has the greatest capacity (Figure 2.2), while the other vessels are comparable in size. The majority of the vessels had a width of approximately four meters. There are issues with overloading due to capacity constraints, which have resulted in some vessels being loaded beyond their limits and causing damage. For example, the Pangaon Express capsized in 2022 ue to the overloading issues.

Figure 2.2: Length, Width and, Capacity of the dedicated vessels in PICT



Source: Pangaon Inland Container Terminal web portal

Note: Length and width are measured in meters, and capacity is specified in TEU (Twenty-Foot Equivalent Units)

Other Facilities in PICT: Apart from the physical infrastructure, the ICT also have the facilities for banking operations and, customs procedures.

Road and bank facilities: A 5-kilometre route has been built with adequate width to connect ICT Pangaon to the main road. This road facilitates the transit of containers and freight to and from other locations through Dhaka. In addition, a branch of SONALI BANK LTD. has been established in the terminal building and is currently operating to facilitate the payment of various charges.

Customs facility: ICT is a designated region where customs regulations apply. A custom workstation has been established and is currently operational to handle all import and export-related tasks.

Limitation in PICT: Figure 2.1 clearly shows that Pangaon ICT had a decline in container shipment. There are multiple factors contributing to this. Among these factors, the most common ones are cost, time delay, lack of off-doc facilities, import tax, and insufficient number of vessels.

Cost and time delay: The businessmen claim that leveraging the Pangaon terminal is not feasible due to its cost inefficiencies. Transporting containers from the terminal to manufacturers is an additional cost for importers, who must lease trailers or vans for this purpose. In addition, the unfavourable conditions are exacerbated by the imposition of double port taxes and higher rates for container storage at Pangaon. On the other hand, the cost of transporting goods to Chattogram port via rail is considerably lower ($78.88) compared to the cost of road transport from Pangaon, which amounts to $204.14. In addition, the shipping ministry increased the tariffs for cargo vessels on the Pangaon-Chattogram Port route in October 2015. Notwithstanding these difficulties, certain traders find the terminal unattractive because of time lags(Habib and Noor 2016). The transportation of commodities from factories to Pangaon, their storage, loading into ships, unloading at Chattogram port, and transfer to feeder vessels all contribute to the prolonged duration of the process, as compared to road transport. The duration of a container

journey from Chattogram to Pangaon is 1.5 days, but a vehicle may cover the distance from Dhaka to the main seaport in about eight hours.

Disorganised committee: Port users, however, expressed doubt regarding the effectiveness of the authorities' recent actions, asserting that consignees will only utilise the port if they deem it appropriate for their needs. It is said that the CPA excluded the main line operators, who handle approximately 70 per cent of container traffic with Bangladesh, from the committee. Other issues encompass the feeling of vulnerability about imported commodities transported via waterways from Chattogram to Pangaon, as well as the poor state of the road stretching from the Postagola rail crossing to the Hanif Flyover at Jatrabari.

Vessel Condition: None of the rivers originating from Dhaka flow directly into the Chattogram Port. Instead, they must traverse a distance of around 60 km across a treacherous sea passage. In order to comply with IACS/IMO requirements and transport international cargo covered by international marine insurance, the vessels must be sea-river container vessels(Habib and Noor 2016). Recently, the Department of Shipping (DoS) directed the shipbuilding companies in the country to build the ships for the Chattogram-Pangaon route under the oversight of the classification societies. The most recent decision has resolved intricacies pertaining to ship construction. Once the main line operators have ships constructed under the supervision of the classification societies, it is anticipated that businessmen will no longer hesitate to utilise the Pangaon terminal. The cost of constructing the vessels will vary from Tk 240 million to Tk 250 million.

Import tax: An import tax was imposed on vessels with a capacity of up to 3,000 DWT. However, in the fiscal year 2014-15, this tax was extended to vessels with a capacity of up to 5,000 DWT. The implementation of taxes could potentially lead to higher prices for refurbished container ships. The businesspeople and business agencies, particularly those who were granted licences for the 44 container vessels, have not stepped forward due to concerns about potential losses resulting from the newly implemented tax regime on imported vessels. Businessmen and shipping companies recommend using vessels with a capacity ranging from 2,200 to over 5,000 DWT for transporting cargo from Chattogram Port to Pangaon ICT.

2.3 Findings from field visits: Existing off-dock/ Dry port Facilities and shortcomings in Bangladesh:

The off-dock facilities in Bangladesh at present exhibit a varied and ever-changing environment. The facilities differ greatly in terms of their size, the quantity and types of sheds they contain, and the equipment they use. The data has been acquired from the Bangladesh Inland Container Depots Association (BICDA) and other stakeholders who are currently involved, either directly or indirectly, in the off-dock operation. The combined area provides a comprehensive understanding of these facilities, suggesting their ability to manage large amounts of freight. The sheds, which are essential for the functioning of these facilities, are specifically constructed to accommodate a diverse range of items, hence there is room for increasing the flexibility of these facilities.

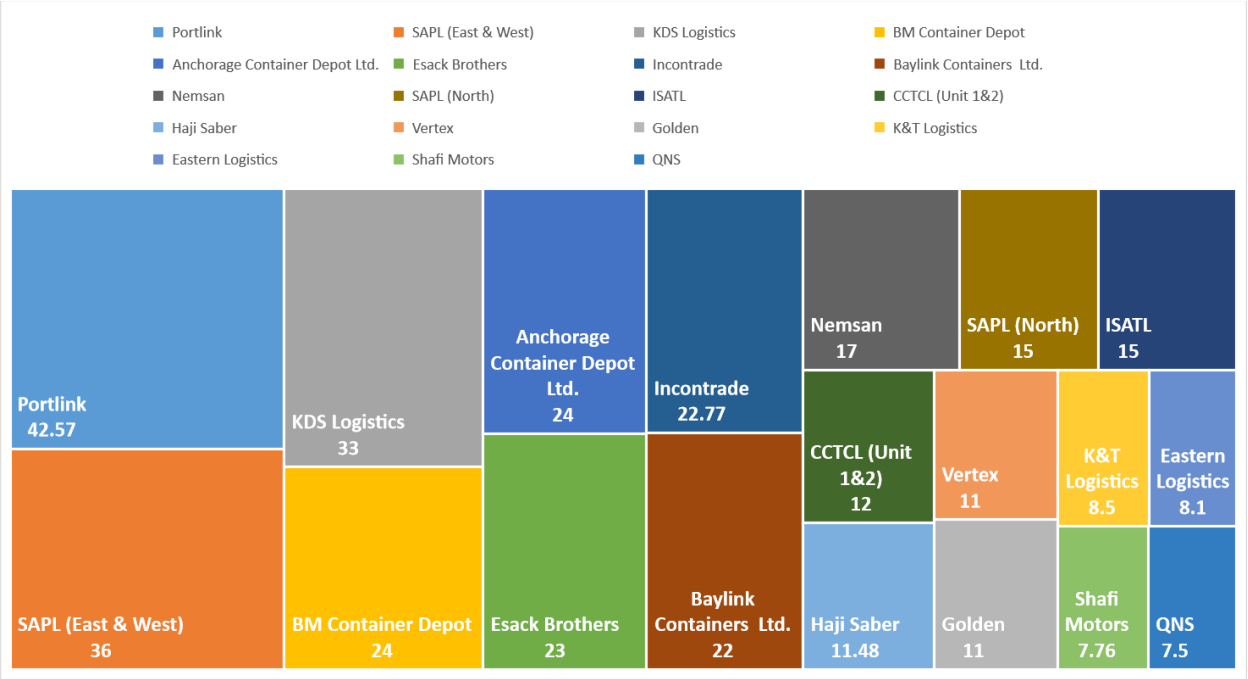
Dhaka Inland Container Depot:

This container handling facility is located adjacent to Kamalapur Railway Station in Dhaka, at a distance of roughly 320 kilometres from Chattogram Port (CIN). It plays a crucial role as a key junction in the logistical network connecting these two significant destinations. The facility is effectively served by two specialised train services that enable the transportation of containers. One train departs from CIN at 10:00 hrs in the morning and arrives at Dhaka ICD after a 12-hour voyage. This facility has a ground handling capacity of 4000 TEUs and can accommodate containers stacked up to 2.5 high. It is capable of managing several types of containers, including 20'GP, 40'GP, 40'HQ, and Flack Rack (20', 40'). While the handling of 45'HQ containers is not currently in place, there are plans in place to accommodate them in the future. To ensure proper delivery of cargo heading for Dhaka, the Final Delivery (FND) on the Bill of Lading (B/L) is clearly indicated as ICD, Kamalapur, Dhaka and/or Dhaka, ICD. It is important to mention that the facility does not allow refrigerated containers because there are no additional power connection points available. Additionally, the facility does not provide any cargo storage options. The operational hours and holidays are aligned with those of Chattogram Port, maintaining operational continuity. Moreover, Dhaka ICD serves as a crucial connection for container transportation between Chattogram Port and Dhaka, supporting the efficient management of large container quantities.

State of privately owned Off-docks:

The off-dock areas in Chattogram play a significant role in the country's export-import trade, despite facing several challenges. As per (Figure 2.3), five off-docks, namely Portlink, SAPL, KDS Logis, and BM occupy 43 per cent of the total area designated for off-docks. However, the capacity of these off-docks is limited. With 19 off-docks across Bangladesh, the total capacity is only 78,000 TEU, which often falls short of meeting the demands of the growing trade industry. This limitation is particularly evident during periods of high trade activity or holidays, leading to congestion and subsequent delays and inefficiencies in container handling. In the past, the Chattogram Port Authority had to enforce the shipment of empty containers to decongest the yard, a practice uncommon in global shipping trade, resulting in financial losses for foreign shipping liners. Despite these challenges, the off-dock areas remain a crucial part of Chattogram's trade infrastructure.

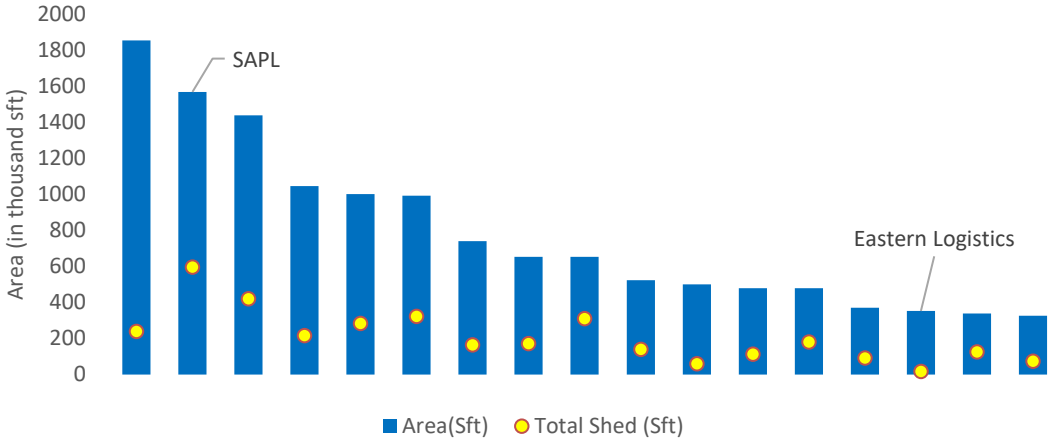
Figure 2.3: Area of privately owned Off-docks in Bangladesh (Area in acre)



Source: Author's presentation based on the data from BICDA

A sufficient number of export sheds is a crucial requirement for all off-docks, particularly in Chattogram, where almost 100 per cent of export items pass through these facilities. Export sheds provide a dedicated space for storing goods that are ready for export, helping to keep them organised and easily accessible. They protect goods from environmental factors such as rain, sun, and dust, preventing damage or spoilage. These sheds facilitate efficient handling and loading of goods onto shipping vessels, as they are typically located close to the docks, reducing the time and cost associated with transporting goods from storage to the ship. Additionally, export sheds support regulatory compliance by allowing for easy and efficient customs inspections, ensuring adherence to export regulations. They also aid in inventory management, enabling companies to track their stock, manage their supply chain more effectively, and plan their production and distribution activities accordingly. Limited export sheds have caused severe problems for some exporters, with the average container delay in Chattogram port being three days. Some exporters claimed that, during this waiting period, many export items have been damaged due to the lack of adequate export sheds.

Figure 2.4: Area of privately owned Off-docks vs the area of the export shed



Source: Author's analysis based on the data from BICDA

Figure 2.4 presents a concise summary of the current Off-docks' export shed. The horizontal axis reflects the Off-docks, arranged in ascending order based on their total area. Generally, SAPL, Portlink, BM, and KDS Logistics are regarded as the most well-equipped off-docks in Bangladesh. The majority of off-docks have a smaller area of sheds in comparison to their total land size. It is essential to maintain an appropriate ratio between the area of the Off-docks and their export sheds.

Table 2.3: Details regarding privately owned Off-docks' export and import sheds and Trailer:

SL	ICD	Export Shed (Sqft)	Import Shed (Sqft)	Trailers (No)
1	SAPL (East & West)	570,000	26,600	95
2	SAPL (North)	160,000	12,000	50
3	ISATL	294,000	16,000	25
4	Portlink	233,452	6000	80
5	Vertex	95,000	18,000	27
6	Incontrade	300,000	22,200	89
7	Nemsan	90,000	75,000	50
8	QNS	50,000	25,000	24
9	KDS Logistics	401,235	18,500	97
10	Haji Saber	50,000	10,000	30
11	Golden	155,000	25,000	30
12	BM	200,000	17,000	50
13	Esack Brothers	270,000	14,000	45

SL	ICD	Export Shed (Sqft)	Import Shed (Sqft)	Trailers (No)
14	K&T Logistics	85,000	7000	23
15	CCTCL (Unit 1&2)	45208	95000	72
16	Shafi Motors	115,000	10000	37
17	Eastern Logistics	9500	8750	36
18	Bay link Containers Ltd.	Under Construction	Under Construction	5
19	Anchorage Container Depot Ltd.	Under Construction	Under Construction	79
TOTAL		**3,128,395 Sft**	**406,050 Sft**	**939**

Source: BICDA

Table2.4: Details of the existing equipment in privately owned Off-docks:

SL	ICD	Equipment (Number)
1	SAPL (East & West)	Load Reachstacker: 4, Empty Reachstacker: 2, Forklift: 13 (10-Ton: 3, 5-Ton: 1, 3-Ton: 3, Electric: 6)
2	SAPL (North)	Load Reachstacker: 3, Empty Reachstacker: 2, Forklift: 7 (10-Ton: 2, 3-Ton: 5)
3	ISATL	Load Reachstacker: 2, Empty Reachstacker: 1, Forklift: 9 (10-Ton: 1, 3-Ton: 4, Electric: 4)
4	Portlink	Load Reachstacker: 5, Empty Reachstacker: 1, Forklift: 13 (10-Ton: 1, 3-5-Ton: 8, Electric: 4)
5	Vertex	Reachstacker: 3, Side-Lifter: 1, Forklift: 6 (10-Ton: 1, 3-5-Ton: 5), Crane: 2
6	Incontrade	Reachstacker: 5, Side-Lifter: 7, Forklift: 19 (10-Ton: 2, 5-Ton: 1, 3-Ton: 16), Crane: 1
7	Nemsan	Reachstacker: 2, Side-Lifter: 2, Top-Loader: 4, Forklift: 5 (3-Ton), Crane: 2
8	QNS	Reachstacker: 1, Side-Lifter: 4, Top Loader: 3, Forklift: 8
9	KDS Logistics	Reachstacker: 6, Side-Lifter: 7, Forklift: 16 (10-Ton: 2, 5-Ton: 2, 3-Ton: 12), Hydraulic Trolley: 10
10	Haji Saber	Crane: 4, Empty Handler: 1, Forklift: 4
11	Golden	Reachstacker: 3, Side-Lifter: 1, Top-Loader: 1, Forklift: 7, Crane: 2
12	BM	Reachstacker: 4, Side-Lifter: 3, Forklift: 8
13	Esack Brothers	Reachstacker: 6, Side-Lifter: 2, Forklift: 12 (10-Ton: 2, 5-Ton: 3, 3-Ton: 7), Crane: 8
14	K&T Logistics	Reachstacker: 3, Side-Lifter: 3, Forklift: 25 (10-Ton: 2, 5-Ton: 2, 3-Ton: 21)

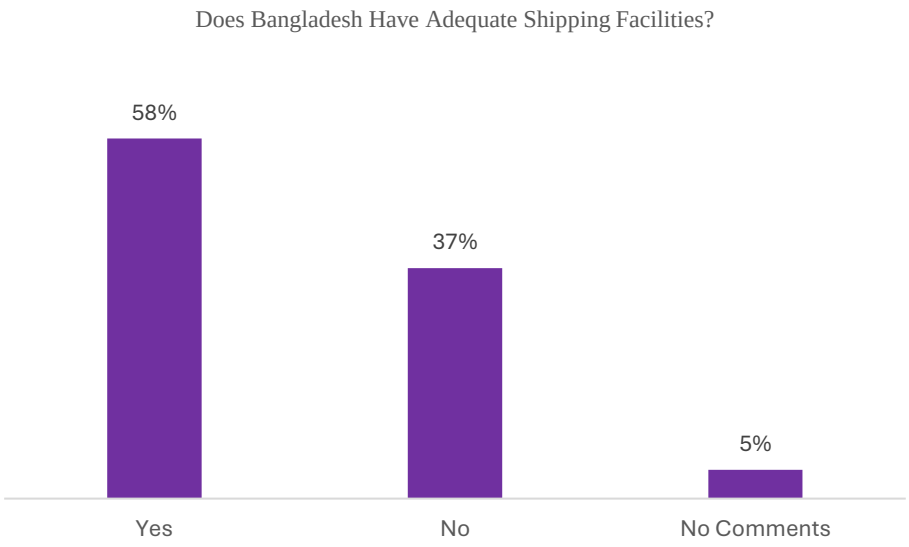
15	CCTCL (Unit 1&2)	Reachstacker: 2, Sife-Lifter: 3, Forklift: 6 (10-Ton: 1, 5-Ton: 2, 3-Ton: 3)
16	Shafi Motors	Reachstacker: 2, Empty Container Handler/Crane: 7, Forklift: 8
17	Eastern Logistics	Reachstacker: 2, Side-Lifter: 2, Forklift: 8 (10-Ton: 2, 5-Ton: 1, 4-Ton: 1, 3-Ton: 4)
18	Baylink Containers Ltd.	Side-Lifter: 1, Prime Movers: 5
19	Anchorage Container Depot Ltd.	Side-Lifter: 2, Reachstcker: 1, Forklift: 1; Prime Movers: 75
TOTAL		**Container Handling Equipment: 173, Cargo Handling Equipment: 158**

Source: BICDA

Stakeholders view on the existing dry port facility and its shortcomings

a) The study team explored the state of shipping facilities in Bangladesh. Key informant interviews and focused group discussions have been leveraged to understand the shipping facility in Bangladesh. The responses are provided in the chart below:

Figure 2.5: Stakeholders' opinion.

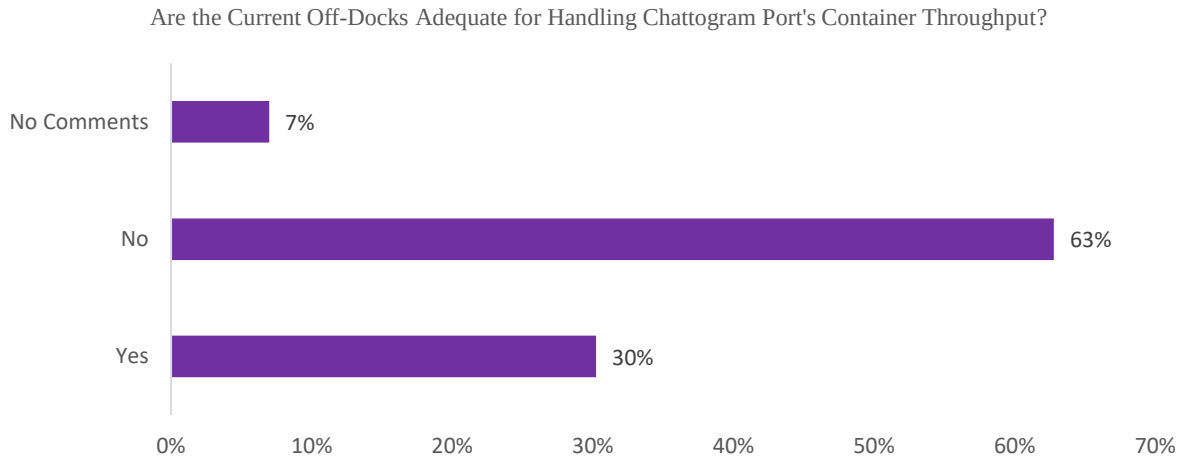


Source: RAPID's presentation using the data from field survey

The figure 2.5 above indicates that 58 per cent of the 25 respondents are satisfied with the shipping facilities provided by the three seaports, 22 off-docks/dry ports (including 18 operational, 2 newly licensed, 1 closed, and 1 empty yard) in Chattogram, as well as one ICD in Dhaka and two ICTs nearby Dhaka. However, approximately 37 per cent of respondents believe that these facilities are inadequate. Additionally, 5 per cent of respondents did not express any opinion on this question.

Capacity of Dry Ports in Managing the Operations of Chattogram Port.

Figure2.6: Capacity of dry port in managing the operations of Chattogram port



Source: RAPID's presentation using the data from field survey

According to Figure 2.6, 30 per cent of respondents believe that the 19 operational off-docks are sufficient to handle Chattogram Port's container throughput. In contrast, 63 per cent of respondents feel that the current number of off-docks is inadequate. Additionally, 7 per cent of respondents did not provide an answer to this question.

b) Customs Procedures in Dry Ports of Bangladesh

Several respondents acknowledge that customs procedures at off-docks and dry ports can be complex, similar to those at main ports. However, they emphasise that clearance processes can often be faster than at traditional ports, based on collected responses regarding the complexity of customs procedures in these facilities. Despite this potential for speed, bureaucratic hurdles within these procedures can hinder operational efficiency and adversely impact trade activities.

Efforts to streamline processes have been made, yet administrative challenges persist, affecting the smooth flow of imports and exports in off-dock facilities. Surprisingly, some respondents indicated that the complexity of customs procedures at off-docks and dry ports significantly contributes to delays in exports and imports. While off-docks may offer quicker clearance, the bureaucratic nature of customs operations remains a significant obstacle to optimal trade efficiency.

Interestingly, respondents do not consider customs procedures at off-dock ports to be more complicated than those at main ports. In their opinion, these procedures can be as straightforward as at traditional ports if appropriate customs manpower is deployed and efficient management is maintained. Effective management can unlock significant efficiency benefits at off-docks. This perspective suggests that the complexity of customs procedures is not an inherent characteristic but a challenge that can be overcome through strategic improvements.

Additionally, opinions differ on whether further simplification of customs procedures is necessary. Several participants argued that, although complexities exist, they can be handled with more customs personnel and better off-dock services. As a result of this stance, resource allocations, and operational practices must be targeted to improve customs efficiency across off-dock facilities. The responses provide an overview of the customs procedures at Off-docks and Dry Ports, highlighting both challenges and opportunities for improvement. According to the consensus, further efforts need to be made to streamline bureaucratic processes, improve manpower deployment, and ensure consistency of service across all off-dock facilities. As a result of these measures, Bangladesh can reduce trade barriers and also maximise its potential for supporting seamless international shipping operations.

Stakeholders have also identified several shortcomings of the existing dry port facility. They are as follows:

Limited Infrastructure: The limited infrastructure at Bangladeshi off-docks leads to inefficiencies in cargo documentation and inspection. Most dry ports/off-docks lack sufficient manpower to handle the customs clearance process efficiently. Attracting and utilising skilled manpower would significantly improve the handling capacity of dry ports.

Limited Technology and Facilities: The majority of dry ports/off-docks in Chattogram do not use sophisticated tools for inspection and clearance procedures, complicating the clearance process. Stakeholders advise establishing inspection sheds and using scanning equipment at dry ports to streamline operations.

Insufficient Storage facilities and handling equipment: The majority of off-docks in Chattogram lack sufficient storage facilities and adequate handling equipment to efficiently manage cargo. While some off-docks, such as those belonging to the Summit Group, utilise sophisticated tools and modern handling equipment, there remains a clear shortage of modern infrastructure and equipment across Bangladeshi dry ports according to a majority of the stakeholders interviewed.

Lack of Coordination: The lack of coordination between dry port authorities, customs officials, and road transport authorities is a significant obstacle to efficiently handling the customs clearance process. Although this issue also affects seaports, stakeholders believe that dry ports/off-docks could offer better clearance services if such obstacles are addressed. They recommend implementing a common software platform for dry port and customs authorities to enhance coordination between these two critical agencies.

These shortcomings often lead to delays in obtaining Bills of lading, resulting in delays in payments and receipt of foreign currency, disrupting the flow of capital and thereby efficiency of the market.

To ensure the flourishing of off-docks in Chattogram, stakeholders suggest several improvements:

- **Technological Upgrades**: Better technological equipment should be introduced.
- **Intermodal Facilities**: Implementation of intermodal facilities is necessary.
- **Adequate Manpower**: Employing sufficient and skilled manpower is crucial.

- **Proper Management Policies**: Effective management policies should be practised.

Despite these challenges, off-docks still provide relatively fast services compared to traditional seaports due to strict monitoring and accountability. However, bureaucratic issues at off-docks remain a major obstacle to achieving optimal trade efficiency. Stakeholders emphasised the need to increase the number of export stack yards at Chattogram Port to enhance the capacity of off-docks in the area. They argued that the insufficient number of export stack yards and intermodal facilities is limiting the efficiency of off-docks and preventing the full potential of dry ports from being realised.

Collaboration among the major players in dry port projects is also deemed crucial. Relevant stakeholders have advocated for a unified system to streamline operations across various authorities. They emphasised the need for a common software platform that would allow better handling of cargo at dry ports. This software should provide access to multiple agents, including the Chattogram Port Authority, the dry port authority, and customs. Such collaboration is expected to enhance the timely and economical movement of cargo and containers to both hinterland and foreland areas.

Chapter 3: Identify the significance of more dry ports in Bangladesh

3.0 Existing scenario of Bangladesh

In 2021, container handling at 18 private depots (dry ports) in Bangladesh experienced a notable increase of approximately 16 per cent, surpassing 1 million TEUs for the first time. This growth exceeded that of Chattogram Port's container handling by at least 3 Per centage points. The private depots managed a total of 709,196 TEUs for exports and 303,016 TEUs for imports during the year. The export-cargo handling demonstrated a robust rebound, growing by over 25 per cent in 2021, following the economic reopening in Europe and North America. However, import handling exhibited a negative growth of nearly 2.3 per cent, as reported by a Bangladeshi newspaper. Apart from Chattogram, Mongla stands out as an active port in Bangladesh that lacks a nearby dry port which handles roughly 1 lac TEUS per year.

Table 3.1: Performance of Chattogram Port for 2014-2023 period

Serial	Year	Import (TEUs)	Export (TEUs)	Total (TEUs)	Source
1	2023	1674424	1376369	3050793	CPA Annual Report 2022-23
2	2022	1660375	1482129	3142504	CPA Annual Report 2022-23
3	2021	1689131	1525417	3214548	CPA Annual Report 2022-23
4	2020	1491228	1348749	2839977	CPA Annual Report 2022-23
5	2019	1587343	1500844	3088187	CPA Annual Report 2022-23
6	2018	1461700	1442296	2903996	CPA Annual Report 2021-22
7	2017	1338948	1328275	2667223	CPA Annual Report 2019-20
8	2016	1221420	1200460	2421880	CPA Annual Report 2019-20
9	2015	1019072	1005135	2024207	CPA Annual Report 2015-16
10	2014	870960	860259	1731219	CPA Annual Report 2015-16
11	2013	772451	769066	1541517	CPA Annual Report 2015-16
12	2012	708419	698037	1406456	CPA Annual Report 2015-16

Source: Chattogram Port Authority

The table above shows the handling trend of Chattogram Port in recent years. It is evident from the above table that both the exports and import grew steadily in the abovementioned years. Calculations point out that the growth rate was 6.75 per cent on average with 2022 remaining as an exception which recorded a negative growth rate, due to supply chain issues and import restrictions, while the export growth was also slow and steady in these years, ultimately averaging 4.71 per cent in last 10 years. As the trade volume in Bangladesh has rapidly increased in recent years, it is imperative to understand the demand for more cargo handling at Chattogram port.

3.1 The forecasting methods

The forecasting of cargo handling can be done following several methods. They include:

- Time series analysis
- Container Traffic forecast following Port Authority estimates
- Forecast of Container traffic with regard to movement of GDP
- Container Traffic Forecasting using regression analysis

Time Series Analysis

The time series analysis begins with the assumption that the cargo handling capacity and dynamics of ports and dry ports will remain the same. The first step of this method involves the estimation of linear, parabolic, and exponential equations. Afterward, the appropriate representativeness of each equation is generally extracted. The 2nd step then follows with the forecasting of future trajectories with the extracted parabolic equation indicating proper representativeness. In the third step, the trend obtained from forecasting is used as a base for predicting future traffic movements.

Container traffic forecast following Port Authority estimates

in this method, the forecasting is usually performed using the average annual growth rate as the base for forecasting. The first step in this case involves calculating the average growth rate of container handling in ports. The 2nd step consists of obtaining projections using the average annual growth rate as a base. Then, the final cargo handling forecasting results are based on the 2nd step.

Forecast of Container traffic with regard to movement of GDP

In this method, the periodical growth in GDP is considered as a basis for forecasting the traffic movements in ports. The first step here calculates the periodical growth rate in gross domestic product (GDP), then in the 2nd step, this growth rate is projected to the current TEUs in ports, yielding the ultimate forecast of traffic movements in ports.

Container traffic forecast by regression analysis

The regression model takes the overall economic development of ports and foreign trade neighboring countries with forecast traffic into account and puts them into a functional relationship. The volume of foreign trade occurring in the port is often considered a proxy for the overall development of the port. Transit traffic is obtained to represent foreign exchange revenue. These variables are used as an independent variable and explain a lot about the container traffic movement.[8]

The forecasting is also done by machine learning methods. One of them is genetic programming which is a method to generate computer programs. (Shih-Huang Chen et al. 2010) used automatic programming and machine learning to forecast containers throughout ports in South Korea.[9]

[8] Traffic Demand Forecasting for Port Services (srce.hr)

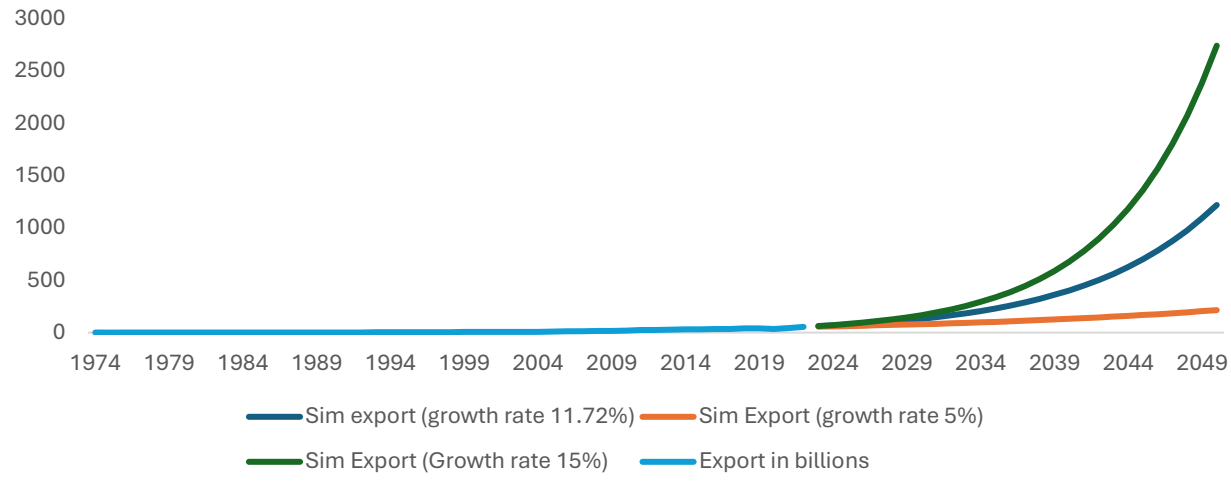
[9] Forecasting container throughputs at ports using genetic programming - ScienceDirect

One can also use the advanced methods of time series analysis such as the autoregressive moving average (ARMA) model to carry out the forecasting of container movements at dry ports. Yanhui Chen et al. 2020 used the ARMA model to forecast China's freight index. ARIMA model requires stationary data. So, data has to be transformed into stationary if it is not already in stationary form by differencing, transforming, or smoothing data. Afterward, the model fitting and evaluation process needs to be performed before finally preparing it for forecasting.

3.2 Demand Analysis

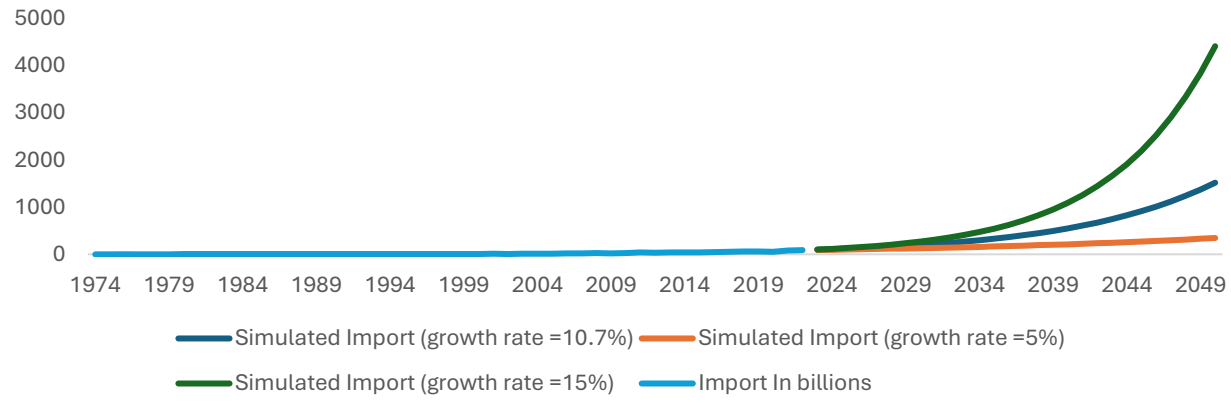
In our study, we used the port authority estimates to perform forecasting simply to maintain the simplicity and discernability of the method. The team conducted demand analysis utilising the data from the world development indicators for the timeframe 1974 to 2022 on export and import of merchandise, followed by calculating growth rates of exports and imports for each year, yielding an average growth rate of 10.7 per cent for imports and 11.72 per cent for exports. Projections were made based on the historical average growth rate of imports and exports. It also conducted projections using 5 per cent and 15 per cent growth rates to account for different scenarios. In the graphs below, we see the projections for the export and import of merchandise in Bangladesh.

Figure 3 1: Forecasting of merchandise export (billion US$) until 2050 in Bangladesh



Source: RAPID's analysis using the data of BICDA

Figure 3 2: Forecasting merchandise imports (billion US$) until 2050 in Bangladesh



Source: RAPID's analysis using the data of BICDA

The projections clearly show that with an ongoing rate, the export is projected to reach around 150 billion in 2050 while the import of merchandise will exceed 150 billion in 2050. To accommodate this rising volume of imports and exports, Bangladesh needs to develop more dry ports, especially in the industrial zones.

TEU Projection:

In our study, we utilised the port authority's estimates to maintain simplicity and clarity in our forecasting methodology. Data from the Chattogram Port Authority website was employed for demand analysis, given that Chattogram Port handles 90 Per cent of Bangladesh's international trade. This allows us to reasonably infer the demand for dry ports and off-docks in the country by estimating the TEUs (Twenty-foot Equivalent Units) demand at Chattogram Port.

For this purpose, data on Export, Import, and Total TEUs from the Chattogram Port Authority were extracted for the period 2012-2023. Due to the impact of COVID-19 restrictions beginning in 2020, which significantly reduced export and import volumes, we excluded data from 2020-2023. Bangladesh's international trade has yet to recover fully, largely due to a sharp decline in foreign currency reserves, leading to restrictions on letters of credit (LC) issuance and consequently hampering trade activities.

To make projections, we focused on the period 2012-2019. In the first step, we calculated the annual growth rates for export, import, and total trade, which yielded average growth rates of 10.23 Per cent for imports, 10.83 Per cent for exports, and 10.56 Per cent for overall trade. In the second step, we applied these average growth rates to estimate the potential scenario for import, export, and total trade demand in Bangladesh through 2050.

The average growth rates in TEUs for imports, exports, and overall trade were 10.83 Per cent, 10.23 Per cent, and 10.56 Per cent, respectively. These growth rates were applied to perform linear projections over the next 30 years. The forecasted TEU volumes for each year were then used to assess the potential need for additional dry ports and off-docks in Bangladesh. By extrapolating future trade demand, we can provide insights into the required expansion of infrastructure to accommodate the increasing trade volumes.

Figure 3.3: Forecasting TEU Import at Chattogram Port

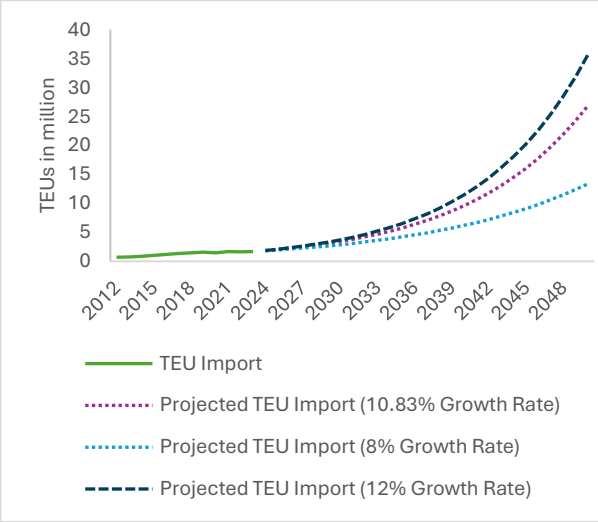
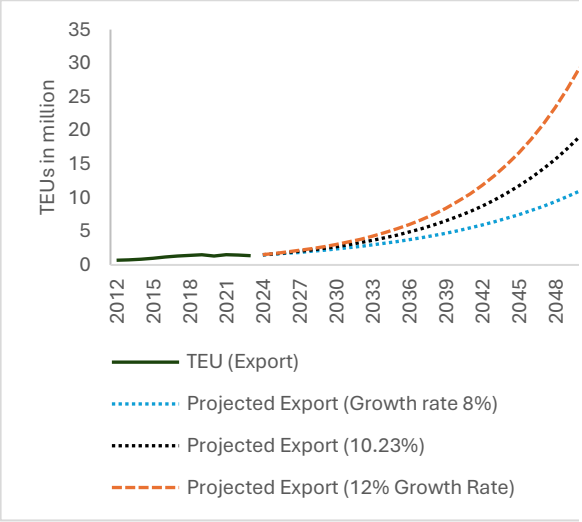


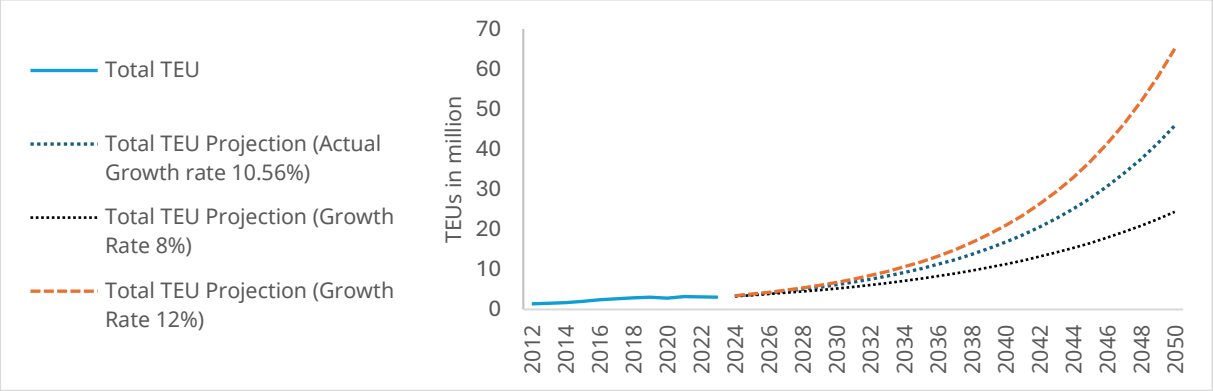
Figure 3.4: Forecasting TEU Export at Chattogram Port



Source: Author's estimation using data from Chattogram Port Authority (CPA)

The projections indicate that Bangladesh will need to handle over 40 million TEUs by 2050, almost 25 million in imports and 15 million in exports assuming the current growth trend continues, with Chattogram Port managing 90 per cent of the country's trade.

Figure 3.5: Forecasting total TEUs at Chattogram Port



Source: Author's estimation using CPA data

Matarbari deep seaport is expected to handle over 5 million TEUs by that time, while the Bay Terminal in Patenga will have a capacity of around 0.5 million TEUs.[10] [11]This suggests Chattogram Port's overall capacity could reach 10-12 million TEUs by 2050, while projected demand will exceed 40 million TEUs.

[10] Matarbari Deep Sea Port in Bangladesh for Economic Growth (lightcastlepartners.com)

[11] Patenga Container Terminal commences operations | The Daily Star

An ideal dry port or off-dock facility, like Summit Alliance Port Limited (SAPL), can handle around 300,000 TEUs annually (Report, 2023). Based on this, Bangladesh would require approximately 80 additional dry ports by 2050, assuming no further expansions of Chattogram or Mongla dry ports or off-dock facilities are planned to meet the rising demand.

However, due to current import restrictions, Bangladesh may face a less steady growth in imports in the coming years than expected which is portrayed by the following figures.

Figure 3.6 Forecasting import (billion USD) until 2050 in Bangladesh

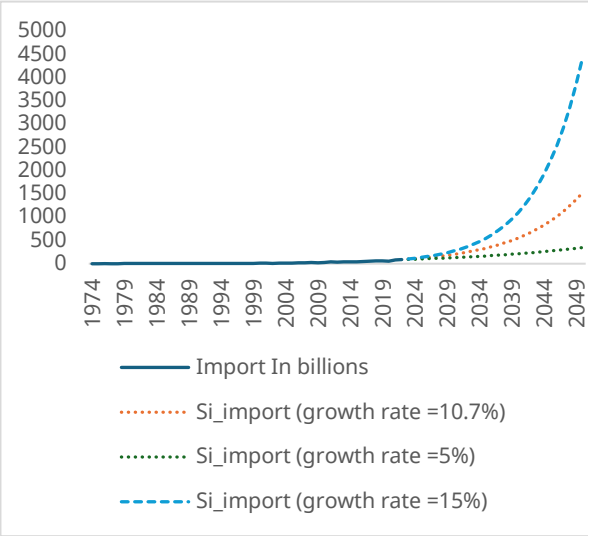
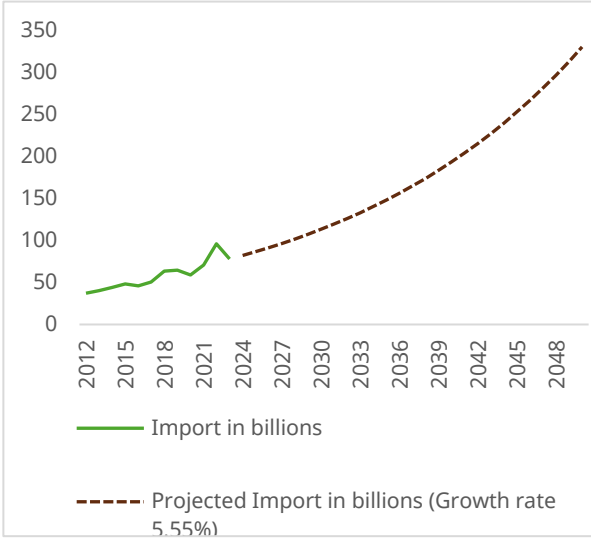


Figure 3.7: Forecasting import (in billion USD) until 2050 using the last 12 years' historical growth in import



Source: Author's estimation using CPA data

The import growth over the past 12 years was calculated at 5.55 per cent, significantly lower than the historical average of 10.7 per cent since Bangladesh's independence. This discrepancy leads to a substantial gap in the projected imports when using different growth rates. Given the challenges of recent years, including restrictions on imports due to foreign reserve issues, the projections based on historical trends may be overstated. The recent dip in TEUs and ongoing trade restrictions are likely to persist for several more years, meaning the total TEUs handled could be lower than initially forecasted.

Taking into account the more realistic scenario of slower growth, we recalculated using an 8 Per cent growth rate, which reflects a more conservative estimate. This adjustment reveals that the total TEUs handled could reach around 25 million by 2050. Consequently, Bangladesh will likely need around 30 additional dry ports/off-docks by 2050, assuming no significant expansion of Chattogram Port or other facilities occurs.

The increasing number of off-docks in Chattogram has become a growing concern. It is recommended that Bangladesh establish dry ports and off-dock facilities outside Chattogram city, in locations such as Dhaka and other industrialised areas. This would help decentralise operations, reduce congestion, and better accommodate the rising demand for trade infrastructure across the country.

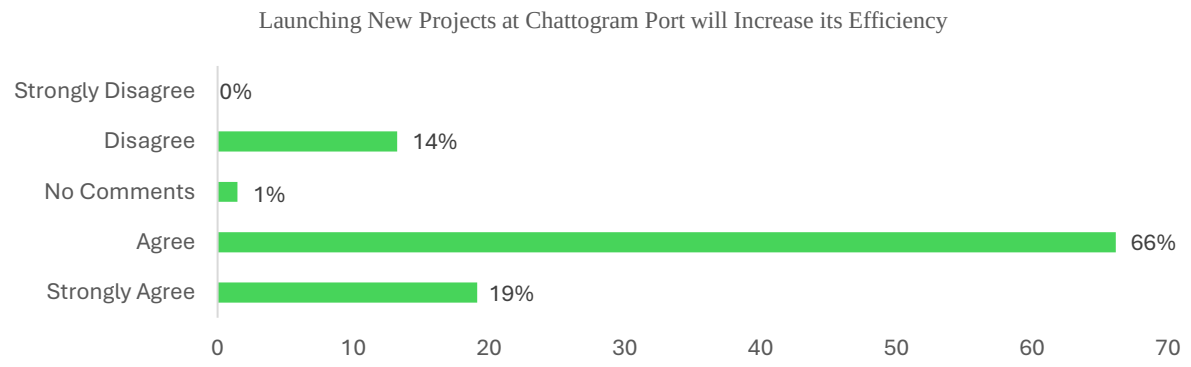
3.3 Findings from field visits: Identify the significance of more dry ports in Bangladesh

Performance of Chattogram Port and Forecasting

The majority of stakeholders are satisfied with the performance of Chattogram Port, which now handles around 3.05 million TEUs. However, it is forecasted that container handling will reach around 6.76 million TEUs by 2050. Therefore, stakeholders associated with port activities were asked whether the current expansion plan of the Chattogram Port Authority (CPA), including the Patenga container terminal (PCT), bay terminal, and others, will add the required capacity to meet the additional demand. The responses were mixed and varied among stakeholders. Customs officials believe that the existing dry ports lack sufficient infrastructure and that more quality off-docks need to be established to meet the requirements of a modern dry port. The Chattogram Port Authority has mentioned the need for 10 additional dry ports in Chattogram before 2030, emphasising the lack of quality off-docks in the area. Representatives from the Ministry of Commerce mention that off-docks are performing extraordinarily despite infrastructural barriers. However, he raised concerns about the recent monopolistic behaviour by leading off-docks and emphasised bringing fair competition to this sector. The lack of coordination between customs officials and the dry port authority has been the highlight of his discussion.

One participant in the Focus Group Discussion (FGD) pointed out the standard of current off-docks. Most dry ports were established in the 20th century and hence lack modern equipment and infrastructure. Therefore, additional modern off-docks are needed to cater to the current demand of exporters and importers. Furthermore, import restrictions have hampered import growth, while the low buying capacity of foreign buyers of domestic commodities significantly reduced export growth. However, the economy is recovering now, as exports and remittances have increased rapidly in the last few months. Consequently, additional off-docks will be needed to handle the increased demand. The representatives from the Ministry of Commerce advised the dispersion of ICD across the country, because of the lack of proper site in Chattogram City and neighbouring areas. The respondents' views are illustrated in the following figure.

Figure 3.4: Stakeholders' opinion



Source: RAPID's presentation using the data from KIIs

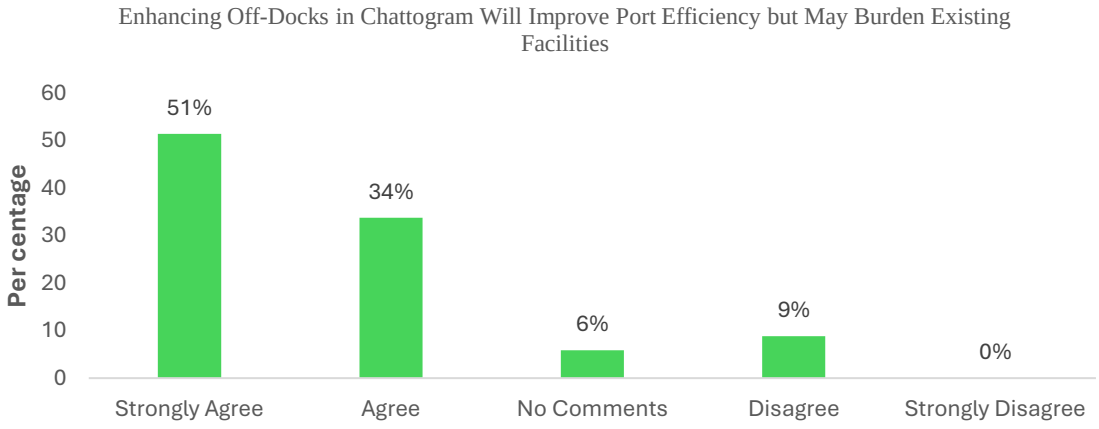
The figure above shows that the maximum number of respondents (Approximately 66 per cent) are satisfied with the performance of Chattogram Port. They believe that new projects of the port will minimise the demand for port services by expanding the port infrastructure through the PCT,

Bay Terminal, and others. However, 14 per cent of respondents were disagreed and not comfortable with new projects but nobody disagreed strongly.

Performance of off-docks in Chattogram:

In 2023, all Off-docks in Chattogram handled 41.12 per cent of Imports compared to 71.30 per cent of Export Containers in Off-docks. They are allowed to handle only 38 registered commodities. Clearing and forwarding agents as well as exporters and importers in Chattogram expressed their concern about the lack of import commodities allowed to be handled in off-docks. The custom wing of NBR posit that the quality of off-docks in Chattogram is not up to date and lacks the necessary infrastructure to handle more imports. Moreover, controlling money laundering is currently a national urge. As a result, it is crucial to establish proper customs facilities before the approval of more commodities. They also emphasised the need for more quality off-docks as Bangladesh is hugely dependent on imports. The lack of customs officers recruited recently contributes to the problem as well. Bangladesh needs more quality off-docks with proper scanning and automation lab testing and other facilities to handle importing goods. A system, however, has recently been developed for managing import containers by off-docks. BICDA applied to add 15 more import commodities and all Off-docks are capable of handling these additional TEUs. The stakeholders were questioned whether they think this will increase the efficiency of Chattogram Port at the cost of burdening the existing off-docks. The result is summarised in the following figure.

Figure 3.5: Stakeholders' opinion



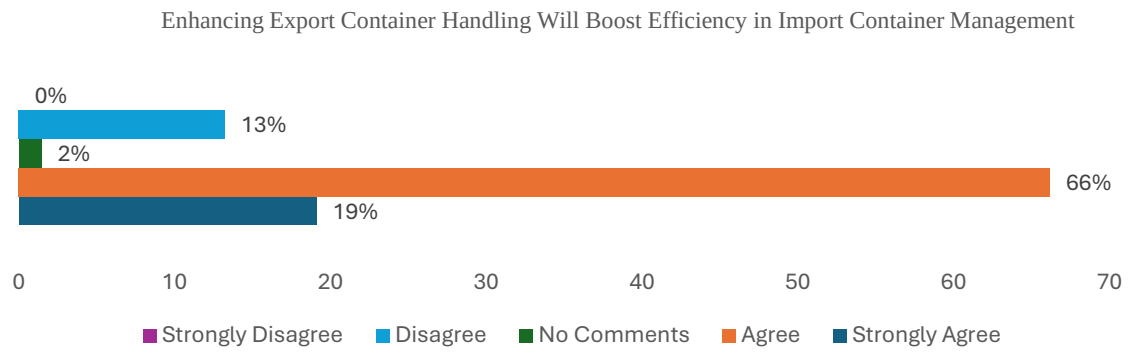
Source: RAPID's presentation using the data from KIIs

The above figure demonstrates that the majority of stakeholders (85 per cent) are convinced adding more import commodities to the list of import goods handled by off-docks will increase the efficiency of Chattogram Port without burdening the existing off-docks. However, a small Per centage of stakeholders (9 per cent) still believe that it will come at the cost of burdening the existing off-docks and without additional quality off-docks, taking such a big step is a risk not worth taking. No stakeholders strongly disagreed with raising the number of commodities handled by off-docks. However, they opined in favour of exercising caution before establishing more dry ports because some of them become inactive due to the lack of capital or standard equipment and manpower. This obviously is a significant challenge for the policymakers on whether to introduce public funding to establish more dry ports. Owners of dry ports pointed out the lack of coordination among the port authority, dry port authority as well as the policymakers. They expressed their concerns about the sub-optimal communication.

Impact of Proper Export Container Handling on Managing Import Containers

A demonstration of handling export containers with the right equipment and staff is expected to convince authorities and policymakers. This could lead to allowing more import containers to be managed by the dry ports in Chattogram. When dry port authorities were asked if improving their facilities would lead to this, most said they need some assurance from decision-makers before making changes. The survey results are shown in the following chart.

Figure 3.6: Stakeholders' opinion



Source: RAPID's presentation using the data from KIIs

The above chart shows the bearing of good handling of export containers on the handling of import containers. The chart was constructed using the data from different focus group discussions (FGD) and key informant interviews (KII) conducted in places like Chattogram, Dhaka, Khulna and Pabna. It is shown in the above chart that a strong 85 per cent of stakeholders are in favour of the view a strong demonstration in handling export containers will have a positive bearing on handling export containers. It is interesting that 13 per cent of stakeholders disagreed with the view, with a large portion of them coming from the dry port authority personnel.

Role of Dry Ports in Supporting Chattogram:

Several stakeholders highlighted the importance of off-docks/dry ports in enhancing Bangladesh's import and export trade and supporting Chattogram Port as well. By making use of these facilities, the Chattogram Port Authority (CPA) has been able to improve its efficiency and productivity in a significant way. It is possible to ship, unload, and handle cargo in an off-dock/dry port, which simplifies operations reduces the turnaround time of feeder vessels, and streamlines operations. They support almost 100 per cent of exports and about 15 per cent of imports in the ready-made garments (RMG) sector where they handle 90-95 per cent of containerised exports.

Moreover, Off-dock/dry ports provide logistics support, value-added services, and multimodal transport options, thus increasing Bangladesh's trading capability. Also, these are crucial for clearing customs, storing empty containers, and maintaining smooth operations to ensure that the port does not malfunction. This facility plays an important role in Chattogram Port's global competitiveness and ranking, as well as facilitating economic growth and employment by handling a significant share of the port's containerised trade.

According to the stakeholders, seaports are the most preferred option for agents, followed by dry ports, with the Inland Container Depot (ICD) and Pangaon Inland Container Terminal (ICT) in Dhaka being less favoured. This preference can be attributed to the lack of sufficient facilities at both the ICD and ICT in Dhaka. The reliability, infrastructure capabilities, and operational efficiencies offered by seaports in Bangladesh make them the preferred hubs for international

trade activities. Despite the emergence of dry ports and off-docks as more accessible options for international shipping, seaports remain the top choice for agents in the region.

Current Demand for Dry Ports in Bangladesh:

In Bangladesh, there is a growing demand for off-dock and dry port facilities, driven by improved logistics, enhanced connectivity, and contemporary infrastructure projects. Economic and international trade growth has led to overcrowded existing ports, prompting the expansion of off-dock facilities. As a result, many businesses now rely on these facilities to bypass port congestion and reduce turnaround times, making them essential for efficiently managing the increasing volume of cargo traffic.

Stakeholders in Chattogram are convinced that more off-dock facilities are needed for the timely handling of imports and exports, especially given the dramatic increase in container port throughput over the last decade. This demand has been further fueled by the rise in trade volume, particularly in the Ready-Made Garment (RMG) sector, with businesses seeking solutions that provide fast and reliable shipment handling services. The development of off-dock and dry port facilities in Bangladesh has also been spurred by improvements in infrastructure and supportive government policies, underscoring their importance in the country’s emerging trade ecosystem. Overall, more dry ports are demanded by respondents as port throughput continues to increase each year.

Role of Dry Port in enhancing Bangladesh's Position in regional and global trade

Survey responses indicate that off-dock and dry port facilities play a significant role in enhancing Bangladesh's position in regional and global trade. These facilities expedite trade processes and reduce costs, thereby supporting economic growth. By streamlining import and export activities, they allow for smoother and more efficient cargo handling, bolstering the overall trade ecosystem.

Several respondents highlighted that strategically placing offshore off-dock facilities near cross-border areas could facilitate international shipping and make Bangladeshi seaports more accessible to neighbouring countries. This would not only increase regional cooperation but also enhance Bangladesh's role as a key transit point in South Asia.

Moreover, off-dock and dry ports are crucial for ensuring compliance with international standards, enhancing Bangladesh's credibility in global markets. By managing a significant portion of export activities, these facilities improve supply chain efficiency and reliability, making Bangladeshi products more competitive on the global stage. Additionally, off-dock and dry ports support port authorities in managing terminal operations more effectively, ensuring timely shipments, and maintaining quality assurance. This contributes significantly to the country's logistics performance and helps meet the demands of international buyers, further solidifying Bangladesh's standing in global trade. Overall, the development and efficient management of off-dock and dry port facilities are vital for sustaining and enhancing Bangladesh's trade capabilities on both regional and global scales.

Role of Dry Port in Reducing Container Handling Pressure of Chattogram Port

According to respondents, it is evident that off-dock and dry ports can significantly alleviate the pressure on Chattogram Port caused by container traffic. Several key points were highlighted by the respondents. Off-dock facilities are recognised as valuable partners for seaports, offering significant operational efficiencies that make them a worthwhile investment. Shifting some container handling activities from Chattogram Port to off-dock locations can effectively reduce congestion at Chattogram Port, thereby improving overall port throughput.

Advocates of off-dock and dry ports argue that these facilities enhance productivity by consolidating container operations away from the main port. This allows Chattogram Port to streamline logistics, manage container flow more effectively, and reduce vessel turnaround times. Additionally, respondents noted that off-dock facilities facilitate the smooth handling and clearance of containers, ultimately contributing to the seamless operation of Bangladesh's primary seaport. Overall, respondents agreed that off-dock and dry ports significantly alleviate the pressure on Chattogram Port when handling containers. Their ability to optimise efficiency and streamline operations is instrumental in maintaining a smooth and efficient trade logistics process in Bangladesh.

Role of Dry Port to support and benefit small and medium-sized enterprises (SMEs) in Bangladesh

Responses varied widely regarding the benefits of increased access to Off-dock/Dry Ports in Bangladesh for small and medium-sized enterprises (SMEs). Many respondents deemed the question not applicable or chose not to reply, contributing to the limited insights gathered. However, a few respondents provided valuable perspectives on the matter.

One respondent emphasised that improved access to Off-docks/Dry Ports in Bangladesh would enable small businesses to trade more efficiently and at reduced costs. Another highlighted that establishing Off-dock facilities nationwide could catalyse an industrial revolution, facilitating easier international trade access for small businesses. Additionally, another respondent noted that expanding Off-dock facilities across the country would enhance competitiveness for SMEs.

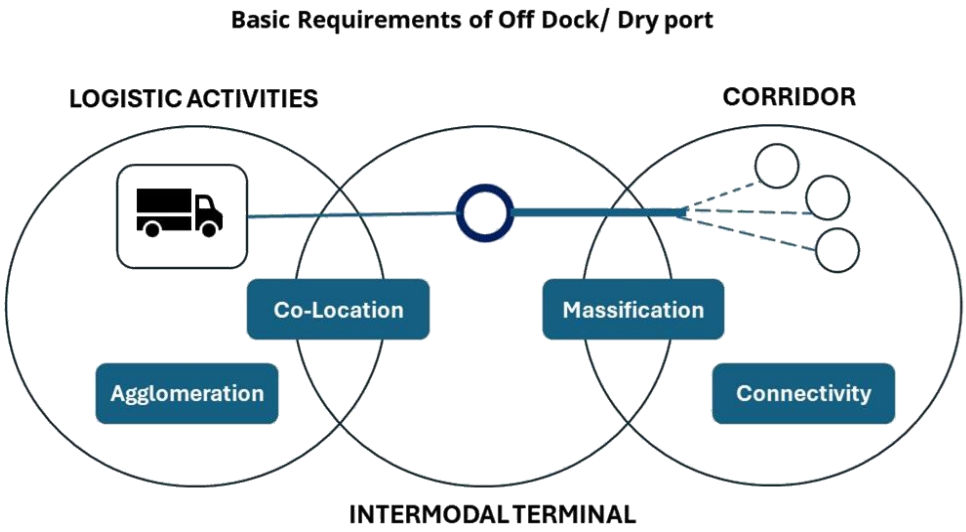
Furthermore, another respondent highlighted that enhancing access to Off-dock and Dry Port facilities could profoundly benefit SMEs by enhancing their logistics efficiency, reducing costs, and bolstering their competitiveness. This insight underscores the potential for improved Off-dock/Dry Port accessibility to strengthen SME capabilities in Bangladesh, facilitating smoother trade operations and potentially driving industrial growth in the region.

Chapter 4: Identifying the Basic Requirements of Dry Port

4.0 Fundamental requirement of a dry port

In order to serve a significant commercial function, a rail-based dry port (also known as an inland port) must meet three essential criteria: it must have an intermodal terminal, logistics operations must be present, and there must be a corridor leading to a gateway that provides a high level of connectivity. Economies of scale, which refer to the reduction in average costs that occurs as production volume increases, and economies of agglomeration/scope, which refer to the benefits gained from clustering economic activities in a certain geographic area, both result in significant amplification of effects. An intermodal corridor with a large capacity and regular maintenance, along with an effective rail terminal, can lower transportation costs and ensure reliable services. This is especially beneficial for the clients of the Off-dock/dry port, who are primarily involved in logistics operations such as distribution centres. The concept of co-location enhances the benefits of an inland port, specifically by reducing the need for the transport of freight from an ocean port to a destination. It entails establishing a real estate infrastructure that may be either sold or leased to conduct goods distribution operations.

Figure 4.1: Basic Requirements for Off-dock/dry port



Source: Author's presentation using the information from Port Economics, Management and Policy[12]

Intermodal terminal: It is a location where the transfer of commodities occurs between different modes of transportation, such as from rail to truck or vice versa.

Logistics Activities: Logistics activities are essential. These activities involve the storage and consolidation of commodities, maintenance for road or rail freight transporters, and services related to customs clearance.

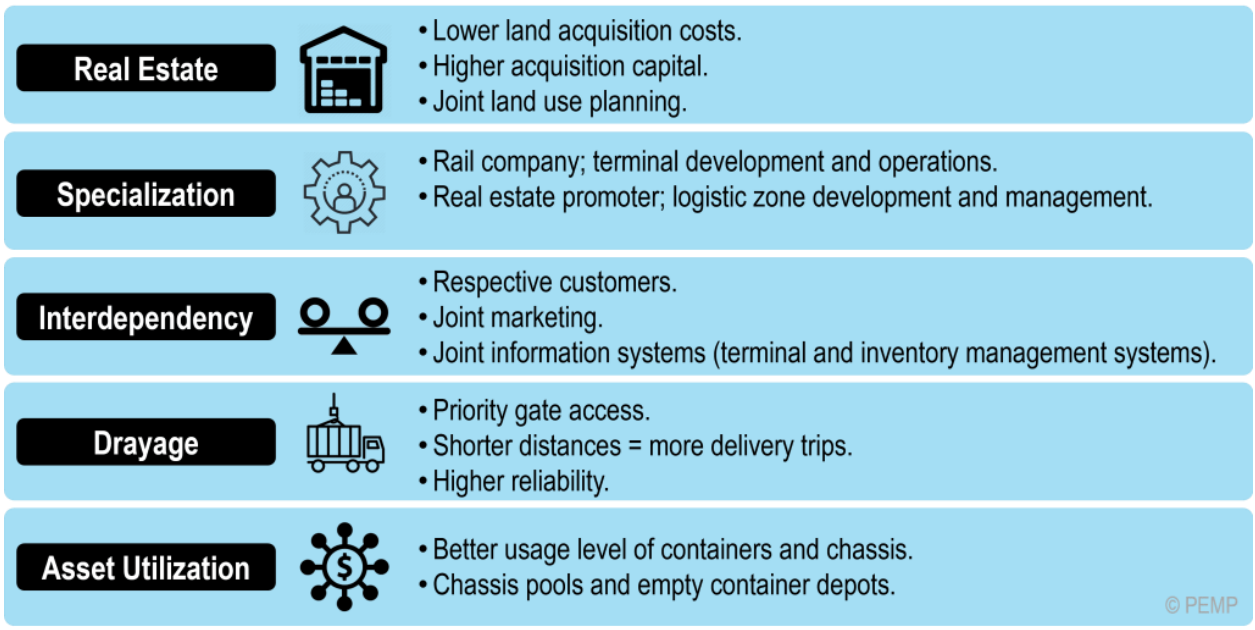
[12] Port Economics, Management and Policy

Corridor to a Gateway: A route leading to an entrance that provides a certain amount of connectivity is required. A transport corridor is a path that links a dry port to a seaport, airport, or another gateway.

4.1 Co-Location Advantages for Dry Ports

The majority of dry ports that were originally established served as intermodal facilities, acting as hubs for regional freight distribution. They facilitated a shift from road transportation or modal shift and diverted freight away from congested locations. Modal shift involves using alternative, less congested transport modes like rail or barge for shipments through inland terminals, while freight diversion uses satellite terminals to intercept shipments, avoiding congested areas and expanding the gateway's hinterland (Notteboom, Pallis, and Rodrigue 2022). These two fundamental paradigms have been broadened with a more inclusive approach that emphasises the notion of co-location. Due to its large scale, necessary equipment, and infrastructure, a dry port project has become more capital-intensive and susceptible to risk. Therefore, the importance of a greater value proposition now relies on the concept of co-locations, many of which include public-private partnerships. The primary stakeholders in a typical co-located dry port project typically include a railway operator, a commercial real estate developer, or a municipal public development office. Thus, co-location enhances the market prospects of the intermodal terminal by offering a range of value propositions:

Figure 4.2: Advantages of co-location for Dry Ports



Source: Port Economics, Management and Policy

Real estate: Logistic zone projects require significant terrain to support both current and expected freight distribution operations. The majority of co-located projects occupy a minimum of 100 hectares, with few projects exceeding 400 hectares. Typically, larger projects incur reduced expenses for acquiring land. Furthermore, co-located projects, which involve a commercial real estate developer and a railway firm, have the advantage of accessing capital pools with more favourable conditions compared to smaller actors, such as lower loan rates. This ownership

arrangement allows CenterPoint Properties to have access to long-term capital pools. Another crucial factor is that a co-located logistic project allows for the collaborative planning of facilities.

Specialisation: A co-location project allows both parties involved to concentrate on their main areas of expertise, resulting in synergistic effects. For example, the railway authority can concentrate on the development and operations of terminals, while the real estate promoter can handle the development and management of freight distribution facilities.

Interdependency: The port operator and cargo distribution businesses serve as clients for each other, indicating that both partners have a shared interest in ensuring the effectiveness of their operations. Joint marketing is often employed to promote the logistic zone as a unified intermodal package, as the terminal is presented as a valuable offering to potential clients.

Dryage: Dryage refers to the transportation of cargo from a seaport to its final destination. A co-location project provides significant operational benefits for drayage, not only due to its close proximity but also because trucks can be given preferential access via the terminal's gates (e.g. pre-registration, advance notification, RFID). Drivers can increase their daily delivery capacity, resulting in enhanced reliability of the deliveries.

Asset utilisation: Optimal utilisation of assets. Intermodal transportation assets need a significant amount of cash, and there is a need to boost their utilisation in order to generate higher returns on investment. Containers and chassis are the assets that are most susceptible to these techniques, particularly through the establishment of chassis pools and empty container depots.

A drawback of co-located logistics activities is their reliance on the terminal's performance and the quality of service provided by the rail operator. In the context of Bangladesh, it is necessary to harmonise both the Chattogram port authority and Railway authority in order to determine the fundamental requirements of a dry port. If the rail operator has competing priorities inside its network, then the effectiveness of the co-located logistic zone is compromised.

4.2 Additional Criteria for Dry Port

According to the previously outlined criteria, effective cargo exchange among dry ports within a network necessitates that these ports meet specific requirements related to the fundamental services they offer and the facilities they are equipped with. The essential prerequisites can be summarised as follows:

Table 4.1: Basic Requirements of Dry Port

Requirements	Sub Requirements
Hinterland Infrastructure	Location Transport connectivity Freight Market Sea Port Dry Port Relationship
Service Features	Customs, Immigration, and police inspection facilities Container storage, maintenance, and transfer Value added services
Capacity	Facilities and Infrastructure Safety Workforce Space
Govt Policy	PPP Policy Cabotage Policy Transport Infrastructure Policy Multimodal Transport Policy Seaport Policy
Information System	Information Sharing Condition

Source: Jagan Jeevan et al. (2018)[13]

Hinterland Condition: Hinterland infrastructure is one of the primary requirements for dry ports. It includes sub-sectors such as location, transport connectivity, freight market, and seaport dry port relationship. The proximity of dry ports to the connected seaport has a substantial bearing on the capacity of the dry ports while improved transport connectivity via different modes can prove to be very effective for the operation of dry ports. They effectively reduce congestion and transport costs incurred by stakeholders. For instance, a study conducted by Bergqvist et al.

[13] Determining the influential factors of dry port operations: worldwide experiences and empirical evidence from Malaysia | Maritime Economics & Logistics (springer.com)

(2010) has highlighted dry port practice in Sweden, where placing dry ports adjacent to industrial zones has greatly reduced transport costs.[14]

Additionally, dry ports need structural rigidity and high transport frequency to effectively manage the distribution of containers. For instance, the introduction of railways and roads saw an increase in the frequency and volume of container distribution. Again, the presence of an improved freight market sufficiently eases the activity of dry ports. A healthy competition between dry ports and seaports is desired that keep the operation efficiency intact. However, unhealthy competition may result in seaports dominating the dry ports which may in turn reduce the effectiveness of dry ports. Therefore, contractual arrangements and legal frameworks must be laid out to ensure the operational efficiency of dry ports.

Customs Clearance: Customs clearance services are the most demanded service provided by the dry ports which ultimately helps reduce container congestion in seaports, increase the volume of containers reduce the container dwelling time, and improve the efficiency of seaports (Roso and Lumsden, 2009).[15] Dry ports also provide services such as container storage, warehousing, container management, empty container depots, and transfer facilities between multiple modes (Roso and Lumsden, 2010).[16] The availability of value-added services including sorting, mixing, blending, barcoding, and packing adds an extra layer of attractiveness to dry ports.

Capacity: A sound infrastructure and facilities are a prerequisite for dry ports to oversee the transport of valuable cargo. Customers will be unwilling to use dry ports if they don't have the infrastructural capacity and sophisticated equipment to unload and reload the containers. Safety and security issues need to be resolved by the dry ports to gain customer confidence (Jarzemskis and Vailiauskas, 2007), while a skilled workforce is imperative to achieve operational efficiency.[17]

Govt Policy: Govt policies regarding the size and structure, investments, operation, and sustainability can affect the dry port operation (Hanaoka and Regmi, 2011).[18] Introducing public-private partnerships (PPP) with govt catering for land and private organisations undertaking the development of a dry port project is a popular practice across the world and Rodrigues et al (2009) posit that allowing PPPs can greatly increase the operational efficiency of dry ports by providing them with legal and financial competence to operate smoothly.[19] `

A multimodal transport policy is desirable as it is based on modal shifts in the freight transport system. Thus, seaport policies are formulated with inland container depots. Without a structural base, however, dry ports will fail to deliver primary services such as container storage and empty container maintenance.

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[14] Inderscience Publishers - linking academia, business and industry through research

[15] The dry port concept: connecting container seaports with the hinterland - ScienceDirect

[16] A review of dry ports | Maritime Economics & Logistics (springer.com)

[17] Research on dry port concept as intermodal node: Transport: Vol 22, No 3 (tandfonline.com)

[18] Promoting intermodal freight transport through the development of dry ports in Asia: An environmental perspective - ScienceDirect

[19] The Geography of Transport Systems - Claude Comtois, Brian Slack - Google Books

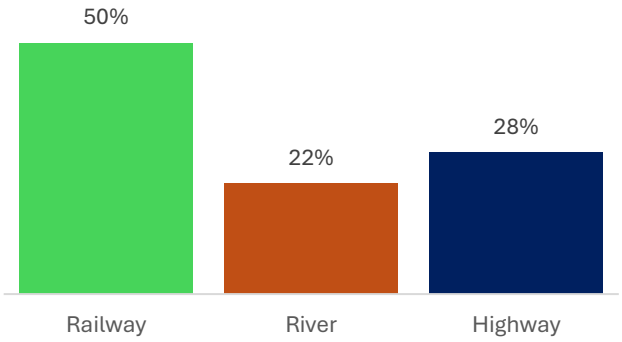
Information Systems: Effective information sharing among stakeholders, dry ports, and seaports improves operational efficiency, cargo safety, and reliability of the dry ports and provides momentum to the supply chain (Panayides and Song 2009).[20] Stakeholders must share risk, and collaborate in asset management, and decision-making to improve the reliability of dry ports (Christiaanse and Kumar 2000).[21] To enhance collaboration among the stakeholders, dry ports across the world are adopting port community systems (PCS).

4.3 Findings from filed visits: Identifying the Basic Requirements of Dry Port

Strategic location and mode of transportation:

Dry ports, often referred to as inland container depots (ICDs) or intermodal terminals, play a crucial role in a nation's logistics and supply chain infrastructure. Efficient and functional dry ports are crucial for supporting Bangladesh's commerce and economic growth. Strategic location planning is necessary for the building of dry ports in Bangladesh. They ought to be situated in close proximity to prominent motorways, rail lines, and internal water routes to expedite convenient entry to maritime terminals such as Chattogram and Mongla. Exporters in Bangladesh have a preference for using the rail network over other modes of transportation (Figure 4.3). By road, a lorry can transport a maximum of two containers. On the other hand, when using rail transport, the capacity for moving goods is significantly greater. The optimal placement for Off-docks should be in close proximity to the railway station. Furthermore, it is essential for them to be located in areas with substantial industrial and commercial operations in order to function as effective hubs for transferring goods.

Figure 4.3: Stakeholder's preference on the mode of transportation of dry port



Source: RAPID's presentation using the data from KIIs

[20] Port integration in global supply chains: measures and implications for maritime logistics: International Journal of Logistics Research and Applications: Vol 12, No 2 (tandfonline.com)

[21] ICT-enabled coordination of dynamic supply webs | Emerald Insight

Infrastructure requirement:

Infrastructure is an essential necessity. Dry ports require sufficient infrastructure to facilitate the handling of containers, which entails the presence of cranes, forklifts, reach stackers, and other essential equipment. In addition, they necessitate facilities for warehousing and storage, accommodating various categories of merchandise. Several stakeholders have expressed concerns about the insufficient number of export sheds at the current off-dock facilities. Another group of stakeholders also advocated for the implementation of refrigeration facilities in Off-docks. The implementation of on-site customs offices is necessary in order to optimise the clearing process and minimise any potential delays. In addition, it is imperative to have properly maintained road and rail networks in order to facilitate the efficient transit of commodities to and from the dry port. Advanced information technology (IT) systems are necessary for the tracking and management of cargo, electronic data exchange (EDI), and interaction with port and customs systems. To guarantee the protection of goods, it is necessary to implement strong security measures such as surveillance cameras, access control, and secure fencing. Based on the respondents' feedback regarding the essential infrastructures and operational requirements for establishing a functional Off-dock/Dry Port in Bangladesh, several key themes emerged. Firstly, accommodating container yards, warehouses, and necessary operational equipment was highlighted as crucial. This underscores the importance of having sufficient land space to handle and store cargo efficiently.

Secondly, there was a consensus on the necessity of modern cargo handling equipment such as container gantry cranes, rail-mounted gantry cranes (RMGs) as well as advanced 5G software systems for logistics management. These technological investments are seen as essential for enhancing operational efficiency and ensuring compliance with global cargo handling standards.

Training and development of the workers:

A skilled workforce is another essential requirement, encompassing trained labour in logistics, cargo handling, customs procedures, and IT systems, along with experienced managers and administrative staff to ensure efficient operations. It is important to train the workers about their activities. Additionally, a robust regulatory framework is crucial, with well-defined government policies and regulations supporting the establishment and operation of dry ports. Potential incentives for private sector participation, such as tax breaks or subsidies, could also be beneficial.

Environmental regulation:

Environmental considerations are also important. Dry ports should implement environmentally friendly practices to minimise their ecological impact, such as waste management and pollution control measures. Most responses to the question about the environmental impact of current Off-dock/Dry Port facilities and potential sustainability improvements lacked clarity and depth. However, some insightful points were made by those with a clear understanding of the potential consequences. They stated that Off-dock facilities currently do not adequately consider environmental concerns. For instance, one respondent mentioned that the environmental

department certified all Off-docks that comply with environmental regulations. Another highlighted the importance of highway access near Off-docks to mitigate operational costs.

There were also notable suggestions for potential sustainability improvements. One respondent emphasised the importance of planting trees and managing the ecology effectively to enhance environmental sustainability. Another suggested introducing noise-proof equipment to reduce noise pollution and minimise environmental impact. Despite the limited response rate, these insights underscored the significance of regulatory compliance and the potential for targeted environmental initiatives to foster sustainable operations at Off-dock/Dry Ports in Bangladesh.

Other requirements:

Support services are another crucial requirement, including logistics companies, freight forwarders, transport services, and access to banking and insurance services for trade finance and risk management. Integration with national and regional trade networks is also important, necessitating effective coordination with sea ports for seamless goods movement and alignment with regional trade agreements to facilitate cross-border trade. Lastly, customer services are essential, providing efficient support to assist businesses with logistics needs and maintaining transparent communication channels to keep stakeholders informed about policies, procedures, and operational changes.

Additionally, respondents emphasised the importance of regulatory compliance, particularly with policies set forth by the Chattogram Port Authority and the National Board of Revenue (NBR). This compliance process involves obtaining necessary permissions and licenses, as well as adhering to guidelines related to Health, Safety, Security, and Environment (HSSE). These measures are crucial for ensuring operational safety and regulatory adherence.

Furthermore, there were concerns raised about specific infrastructure requirements such as a perimeter wall, a central parking area for trucks, and fire hydrant systems. These provisions are essential for maintaining security and organisation within Off-dock facilities.

Overall, the responses underscored that establishing a functional Off-dock/Dry Port facility is a complex endeavour. It requires integrating physical infrastructure needs with technological advancements to support efficient logistics operations in Bangladesh. Such developments are seen as pivotal for fostering economic growth and enhancing trade activities in the country.

Alignment of infrastructures and operational requirements with the existing infrastructure landscape in Bangladesh.

Based on respondents' feedback regarding how the requirements for Off-dock/Dry Port facilities align with the existing infrastructure landscape in Bangladesh, several perspectives emerged. Some respondents noted that the current infrastructure falls short of meeting the rigorous standards necessary for international shipping and efficient off-dock operations. Specifically, there were concerns raised about the inadequacy of available land for establishing such facilities, highlighting a significant gap in land availability.

However, some respondents highlighted that while certain infrastructure components such as land availability and investment potential exist, the overall state of infrastructure in Bangladesh does not meet the necessary standards for optimal Off-dock/Dry Port operations. Specifically, modern logistics operations demand advanced technological facilities and proper equipment,

which are often lacking in existing off-dock facilities. Additionally, it was noted that the distribution and quality of infrastructure vary significantly among different Off-docks. Despite the availability of raw materials and investment opportunities, there is inconsistency in the development and upgrades of these facilities. This disparity underscores the need for more consistent efforts in developing and upgrading infrastructure to ensure that all facilities meet the required standards for efficient operations.

Some respondents were optimistic, commenting that large lands are available near rail tracks, particularly in Sitakunda, which could be utilised for the development of off-dock facilities. This indicates potential expansion opportunities. The existing infrastructure can support the development of functional Off-dock/Dry Port facilities; however, significant improvements and investments are required to meet Bangladesh's growing trade sector demands and align with international standards.

Chapter 5: Assessment-based recommendation for potential dry port location and transport mode connection

The strategic location of industry primarily aims to minimise transport and labour costs (Weber, 1929).[22] Additionally, in location selection, the establishment of a minimum demand threshold is considered crucial (Christaller, 1966).[23] Dry port location selection stands as a pivotal decision due to its significant impact on reducing transport costs, alleviating cargo congestion, and enhancing the overall efficiency of seaports. These location problems are inherently multiobjective, encompassing factors ranging from profitability to environmental sustainability. Consequently, the selection of dry ports hinges on a comprehensive assessment of various factors.

Table 5.1: Key criteria for selecting a dry port location

Category	Factors
Environmental factors	Impact on the natural environment Impact on the urban environment Hydrology
Economic and social factors	Land Price Potential demand growth Hosting Municipality range
Accessibility factors	Accessibility to the rail network Accessibility to high-capacity road network Accessibility to ports Accessibility to Airports Accessibility to supplies
Geographical factors	Weather Orography Geology
Location factors	Relation with other logistics platforms Integration into main supply chain infrastructure Potential optimisation of the modal shift

Source: Samir Awad-Núñez et al. (2015)[24]

[22] Theory of the location of industries | CiNii Research

[23] Central places in Southern Germany | CiNii Research

[24] How should the Sustainability of the Location of Dry Ports be Measured? - ScienceDirect

Environmental Factors: Designers need to consider several environmental factors while optimising dry port location. These include the impact on the natural environment, the impact on the urban environment, and hydrology. The impact on the natural environment can be measured by certain criteria: distance to natural spaces, connectivity to the natural environment, the number of isolated spaces within the extent of the dry port, and the density of the facility area. The impact on the urban environment is measured by the area's distance to urbanised areas. The dry port's connectivity with the urban environment is also a key determinant of its impact on the urban environment. The hydrology of the dry port, which consists of variables such as distance to surface water, flooding level, and groundwater presence in the dry port area, has a significant impact on nature. Any mishap at any level can lead to disastrous events.

***Economic and Social Factors*:** Economic and social factors are major determinants in selecting dry port locations. The price of land, for example, has one of the biggest influences on this decision. When developing a model for dry port location selection, potential demand growth—consisting of variables like the industrial production index, gross domestic product (GDP), and the projected employment rate—must be considered. Additionally, the population level and population density in the areas being considered for the dry port location have a significant impact on the selection process.

***Accessibility factors*:** Accessibility factors include accessibility to the rail network, accessibility to high-capacity roads, accessibility to airports, accessibility to seaports, and accessibility to supplies and services. Accessibility to rail networks is determined by the number of railway accesses to the dry port, the importance of the railway environment to dry port facilities, the centrality of demand for dry ports, as well as the quality of the railway neighbouring the dry port location. Accessibility to quality highways is one of the most crucial components in determining the location of dry ports. This includes the distance to high-capacity roads and the number of lanes on highways. Accessibility to ports is largely determined by the distance to and connectivity with ports. Accessibility to supplies and services is defined by the availability and quality of supplies and services.

Geographical factors*:* Geographical factors should also be incorporated when making a comprehensive decision about the location of dry ports. These factors include weather, orography, and geology. The weather factor consists of variables such as climatic variety, rainfall levels in the dry port area, and winter frosts. The orography of dry ports also needs to be considered to prevent unwanted events. Orography is defined by the terrain curvature and the slope of the dry port location. This feature is particularly important for Bangladeshi dry ports, as most of them are based in Chattogram, where hill tracts are numerous, especially in the industrial areas. Geological features such as excavability, compressive strength, and resilience also need to be considered.

Location Factors: Location factors such as the relationship with other logistics platforms, integration into main supply chain infrastructures, and potential optimisation of the modal shift are also significant in selecting the location of dry ports. The relationship with other logistical platforms includes components such as the number of nearby logistics platforms, the number of middle-distance logistics platforms, and ensuring the dry port is neighbouring a heavily industrial area. Key variables to consider for potential optimisation of the modal shift include the distance

to a principal freight corridor, distance to a principal passenger corridor, number of passenger trips, nearest roads' Average Daily Traffic (ADT), and the distance to the TEN-T core network corridors.

The selection of a dry port location entails a meticulous process often characterised by various methodologies. These methodologies typically involve a two-stage approach. Initially, potential locations are identified based on predetermined criteria delineated by stakeholders, alongside the assignment of weights to these criteria by subject matter experts. Subsequently, in the second stage, a pertinent mathematical model is employed to ascertain a score, thereby facilitating the determination of the optimal location among those shortlisted. This methodical procedure ensures a systematic and informed decision-making process in the selection of a dry port location, thereby optimising logistical efficiency and enhancing stakeholder satisfaction (Samir Awad-Núñez et al. 2015).

Recommendation from National Integrated Multimodal Transport Policy, 2013

These recommendations align with the National Integrated Multimodal Transport Policy, 2013, which prioritises the establishment of integrated and effective transport networks to facilitate commerce and economic expansion. The objective of this strategy is to bolster infrastructure, maximise multimodal connectivity, and foster public-private collaborations in order to enhance the effectiveness of transport systems, especially dry ports. The focus on legislative changes, adherence to environmental standards, and capability development also corresponds with the policy's goals of updating logistics and enabling seamless trade movements both within the country and with neighbouring nations. The selection of optimal sites for dry ports requires careful consideration of many crucial aspects to guarantee improved operational efficiency, connection, and long-term sustainability. The subsequent recommendations are derived from contextual evaluations and correspond to important logistical and developmental objectives:

Location in close proximity to major transportation hubs: Dry ports should be strategically located in close proximity to important transportation hubs in order to maximise the efficiency of commodities transit. Positioning in close proximity to significant rail and road intersections offers distinct advantages. As an illustration, it is possible to establish a connection between the river port in Ashuganj and the adjacent railway junction in Akhaura, which serves as a crucial terminal in the Brahmanbaria District. These linkages guarantee smooth integration among various modalities of transportation, therefore enabling the efficient and economical transportation of commodities both within a country and across international boundaries. The close proximity to these centres will facilitate improved coordination between dry ports and established trade routes.

Inland Waterway Access: The selection of sites that have direct access to navigable interior rivers offers a notable logistical benefit. Waterways offer a sustainable and economically viable means of moving commodities across extensive distances. The current emphasis on rail as the most efficient and high-capacity mode of transportation aside, the integration of dry ports with navigable rivers such as the Titas and Kushiyara can significantly augment trade potential. This amalgamation facilitates the expansion of transportation alternatives, therefore diminishing dependence on overcrowded road networks and providing supplementary pathways for the transfer of goods. Incorporating inland waterways into an already robust rail network can

enhance the efficiency of trade, reduce transportation expenses, and establish a more robust and adaptable logistics system.

Integration with Current Ports: Strategically, new dry port sites should be positioned in close proximity to existing seaports, such as Mongla Port. The connection enables dry ports to function as logistical extensions of current port facilities, therefore optimising their ability to accommodate both general cargo and container traffic. The establishment of a unified network connecting dry ports and seaports enhances the efficiency of the whole supply chain, alleviating bottlenecks and enhancing turnaround times. Furthermore, the strategic alignment improves the competitiveness of Bangladesh's trade operations by guaranteeing the rapid and dependable transportation of commodities.

Market Opportunity and Competitive Advantage: The strategic placement of dry ports in Bangladesh should bolster its status as a prominent regional trade centre by offering dependable and effective logistical infrastructure that caters to the needs of both domestic and global markets. Selection of ideal sites should be based on their capacity to enhance market entry for crucial export sectors, such as prawns and fish, which rely significantly on efficient logistics to uphold product quality. Strategic selection of competitive locations will facilitate the expedited transportation of commodities to both regional and global markets, therefore enhancing Bangladesh's total trade volume and competitiveness.

Environmental Factors to Consider: Ensuring sustainable growth should be the foremost consideration when choosing potential sites for dry ports. Each prospective location must undergo an assessment of its environmental consequences, especially in vulnerable regions adjacent to ecosystems or bodies of water. Compliance with environmental rules and adherence to International Maritime Organisation (IMO) standards are essential for dry port development in order to control marine pollution. To reduce their environmental impact and support Bangladesh's sustainable development objectives, dry port developments should integrate green technologies and prioritise the conservation of local ecosystems. This emphasis on environmental compliance will not only safeguard biodiversity but also foster worldwide trade alliances, particularly with markets that prioritise environmental welfare.

Engagement with Stakeholders: An essential element for the effective development of dry ports is the active participation of local communities and pertinent stakeholders in the planning and decision-making procedures. Securing the involvement of stakeholders such as municipal authorities, enterprises, and community organisations guarantees that the chosen locations are in accordance with the requirements and preferences of all involved parties. The adoption of this cooperative strategy promotes confidence and openness, resulting in a more seamless execution of the project and sustained backing from the community. Strategic involvement of stakeholders also facilitates the early detection of possible obstacles, so allowing project planners to minimise risks and guarantee the fair allocation of advantages.

Through the detailed evaluation of these aspects, the best possible dry port sites may be selected to facilitate effective trade logistics, enhance Bangladesh's competitive standing in regional commerce, and foster sustainable economic growth. By means of strategic planning and active involvement of stakeholders, dry ports will function as crucial hubs in both the domestic and

global supply chain, therefore stimulating economic expansion and enhancing the movement of manufactured products across international boundaries.

5.0 Clustered zone for Off-dock/ dry port location:

Based on the highly active economic regions, six clusters have been identified for optimal dry port locations, with 34 sites selected. The Chattogram zone, which includes Mirsharai, Sitakund, Anowara, and Raozan, is considered one of these clusters. The Chattogram Port Authority has mandated that new off-dock facilities must be located at least 20 kilometres from Chattogram Port, and all proposed sites adhere to this regulation.

In anticipation of future developments, including the "Bangabandhu Sheikh Mujib Shilpa Nagar" in Mirsharai, which spans approximately 30,000 acres, we have proposed off-dock facilities in this area25. Additionally, the Dhaka–Chattogram Highway, which passes through Sitakund, connects the two largest cities in Bangladesh and offers ample space for new infrastructure development. Anowara is another potential location for off-dock facilities due to its proximity to the entrance of the "Bangabandhu Sheikh Mujibur Rahman Tunnel," which will enhance freight transportation.

We have also proposed three locations in Cumilla, strategically situated between Dhaka and Chattogram. Approximately 98 per cent of the RMG industries are concentrated in four specific districts, with Dhaka accounting for 38 per cent, Gazipur at 28.9 per cent, Chattogram at 16.1 per cent, and Narayanganj at 14.7 per cent. (Moazzem and Radia 2018). Given that most ready-made garments (RMG) exports pass through Chattogram port, Dhaka and Gazipur have been considered as additional clusters(Shaikh 2020). To support freight transport at Mongla Port, five locations have been proposed in Bagerhat. Since Mongla's usage needs to be upscaled to take some loads off Chattogram port, some locations near Mongla port should be explored. Moreover, a cluster in Jessore has been introduced to facilitate trade at the Benapole land port, one of the busiest land ports in Bangladesh.

Table 5.2: Cluster-wise proposed location:

SL	Cluster	Respective substations	Number of locations
1	Chattogram zone	Mirsharai, Sitakund, Anowara	17
2	Cumilla Zone	Chandina, Debidwar, Brahman Para	3
3	Gazipur Zone	Gazipur Sadar	3
4	Jessore Zone	Jhikargacha, Jessore Kotwali, Keshabpur	3
5	Dhaka Zone	Kaliganj, Palash, Rupganj	3
6	Khulna Zone	Bagerhat	5
Total			**34**

Source: RAPID's desk research

5.1 Methodology to select off-doc/dry-port location:

In order to determine the optimal locations for dry ports, our research team has conducted a thorough analysis of various geographical regions in close proximity to the Chattogram and

[25] Bangabandhu Sheikh Mujib Shilpa Nagar

Mongla commercial centres, as well as other key economic hubs. Subsequently, taking into account these considerations, the research team identified the most advantageous places and evaluated them using multiple criteria. The assigned weight has been determined through the analysis of field data.

Table 5.3: Multiple criteria for selecting optimal locations for dry ports:

Distance factor	Assigned weight
Distance from Railway	0.50
Distance from Highway	0.28
Distance from River	0.22
Time factor	**Assigned weight**
Time from Railway	0.50
Time from Highway	0.28
Time from River	0.22

Source: RAPID's Desk Research

$$\boldsymbol{Dry\ Port\ Location\ Score} = \{(0.50 * DR) + (0.28 * DH) + (0.22 * DW)\} + \{(0.50 * TR) + (0.28 * TH) + (0.22 * TW)\}$$

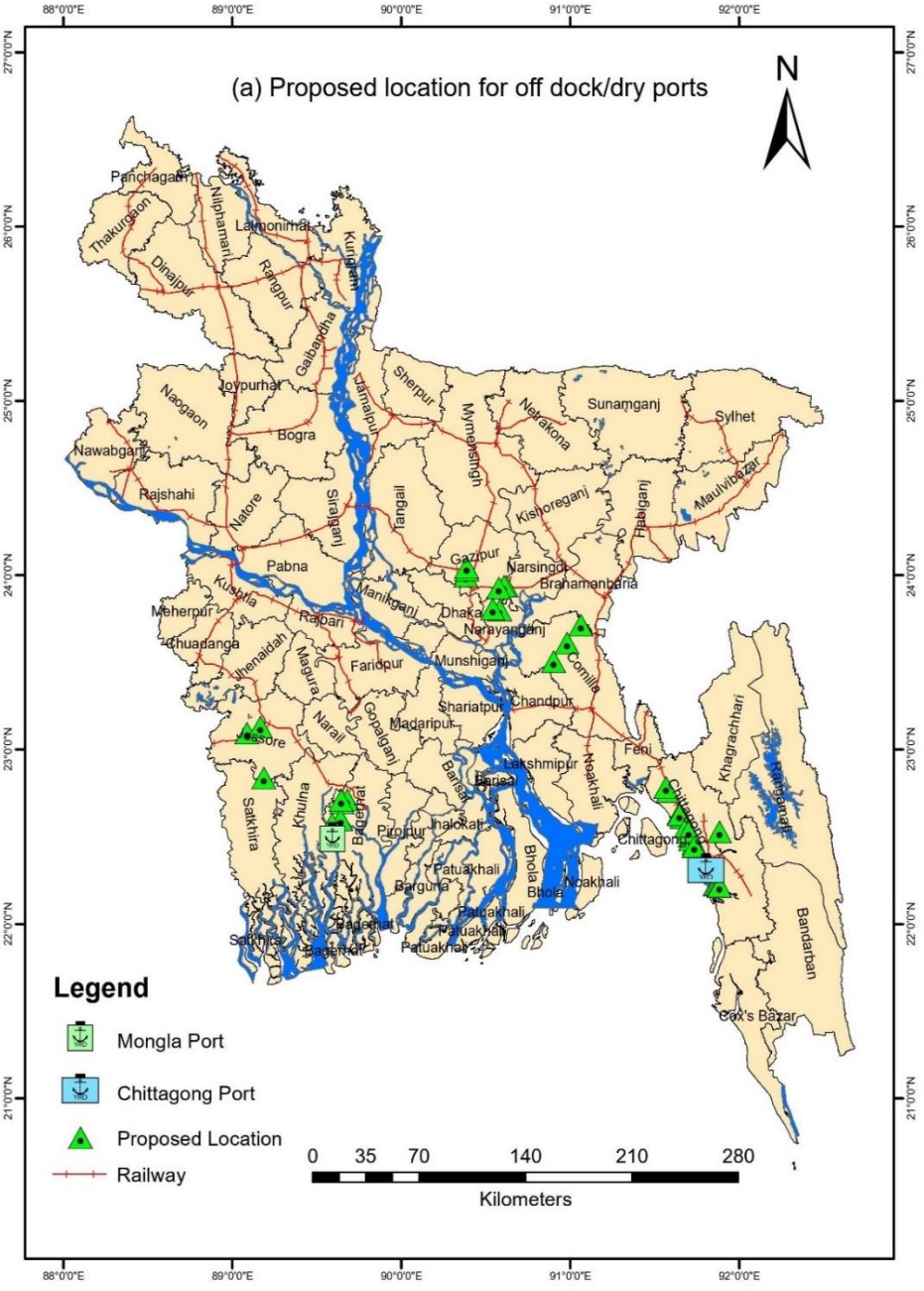
In this case, DR represents the spatial parameter that indicates the distance to adjacent railway stations. DH signifies the spatial metric that refers to the distance to highways. DW represents the spatial parameter that reflects the distance to river ports. To enhance its robustness, the inclusion of the time factor has been implemented. The efficiency of any port is ultimately contingent upon both transit time and cost.(Malchow and Kanafani 2004). TR denotes the projected journey time to the railway from Off-dock, while TH and TW indicate the estimated transit time to the highway and neighbouring river, respectively.

After formulating the location scores, we normalise these scores within each cluster. This procedure yields an index ranging from 0 to 1 for each proposed location. A lower index indicates a more suitable location.

$$Dryport\ location\ index\ (DLI) = \frac{S_{ic} - \min\{c\}}{\max\{c\} - \min\{c\}}$$

Here S_{ic} denotes the score of i location within c cluster. $\max\{c\}$ and $\min\{c\}$ are the maximum and minimum values of c cluster respectively.

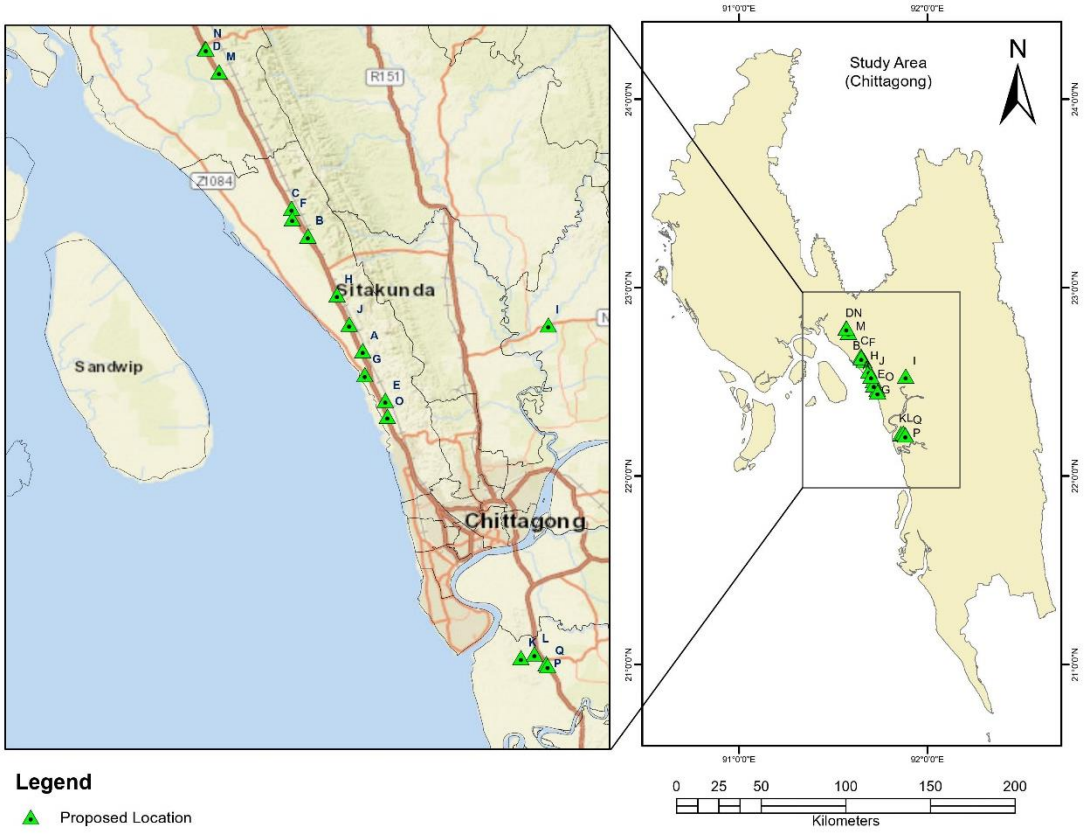
Figure 5.1: Proposed location for dry ports in Bangladesh



Source: RAPID's presentation using the location analysis

5.2 Chattogram Zone:

Figure 5.2: Proposed location of Off-dock/dry port at Chattogram industrial zone



Source: RAPID's presentation using the location analysis

Table 5.4: Location index for proposed off-dock/dry port at Chattogram Industrial Zone

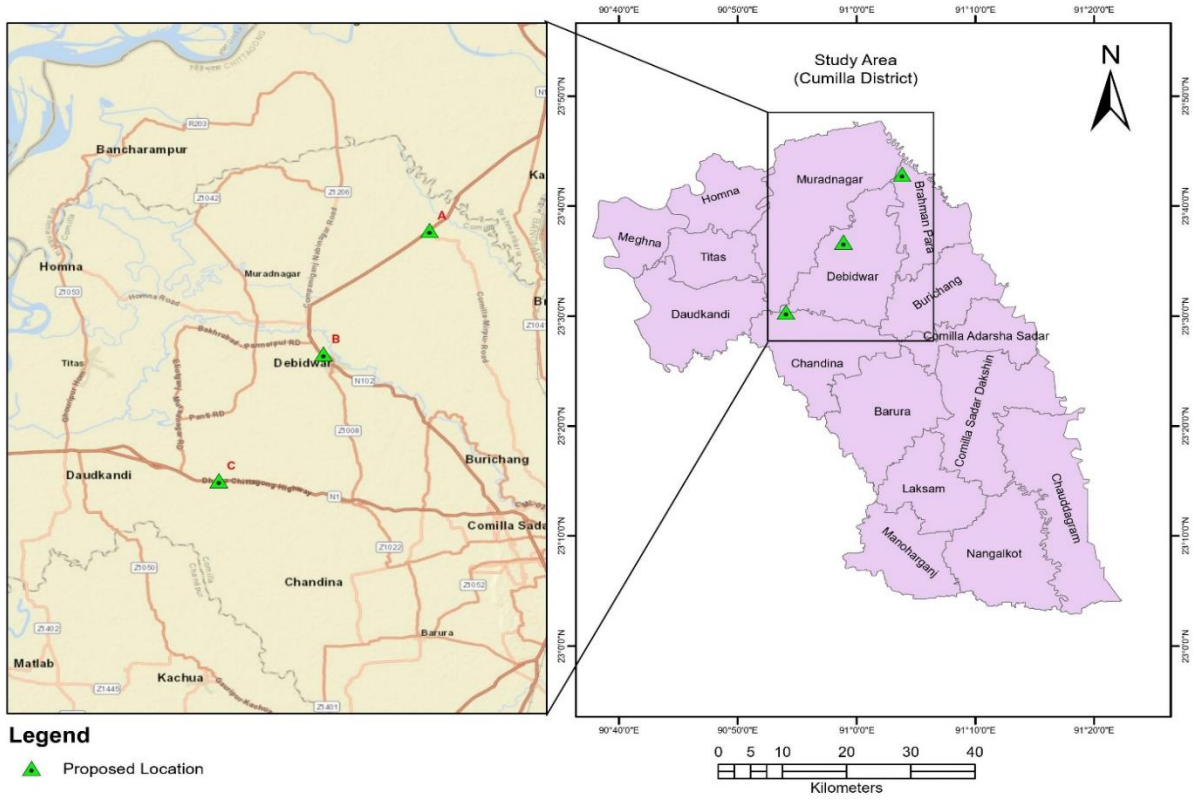
Rank	Location ID	Location	Location Score	Location Index
1.	O	Bhatiari	16.25228	0.00
2.	M	Mirshorai	16.64828	0.01
3.	E	Near PH Steel	18.496	0.08
4.	K	Karnaphuli Tunnel	19.822	0.13
5.	P	Anwara	20.772	0.16
6.	Q	Anwara	21.484	0.19
7.	N	Mirsharai	21.73828	0.20
8.	J	Dhaka Chattogram Highway	22.23628	0.22
9.	A	Bara Kumira Road	23.09276	0.25
10.	D	Dhaka Chattogram Highway	25.27228	0.33

11.	H	Dhaka Chattogram Highway	26.2076	0.36
12.	I	Hathazari	26.554	0.37
13.	G	Dhaka Chattogram Highway	26.858	0.38
14.	B	Dhaka Chattogram Highway	29.73856	0.49
15.	C	Dhaka Chattogram Highway	36.18428	0.72
16.	F	Dhaka Chattogram Highway	40.84828	0.89
17.	L	Karnaphuli Tunnel	43.842	1.00

Note: The location index prioritises proximity to railways, followed by highways and rivers. Lower values indicate closer proximity to railways.

5.3 Cumilla Zone:

Figure 5.3: Proposed off-dock/dry-port location for Cumilla



Source: RAPID's presentation using the location analysis

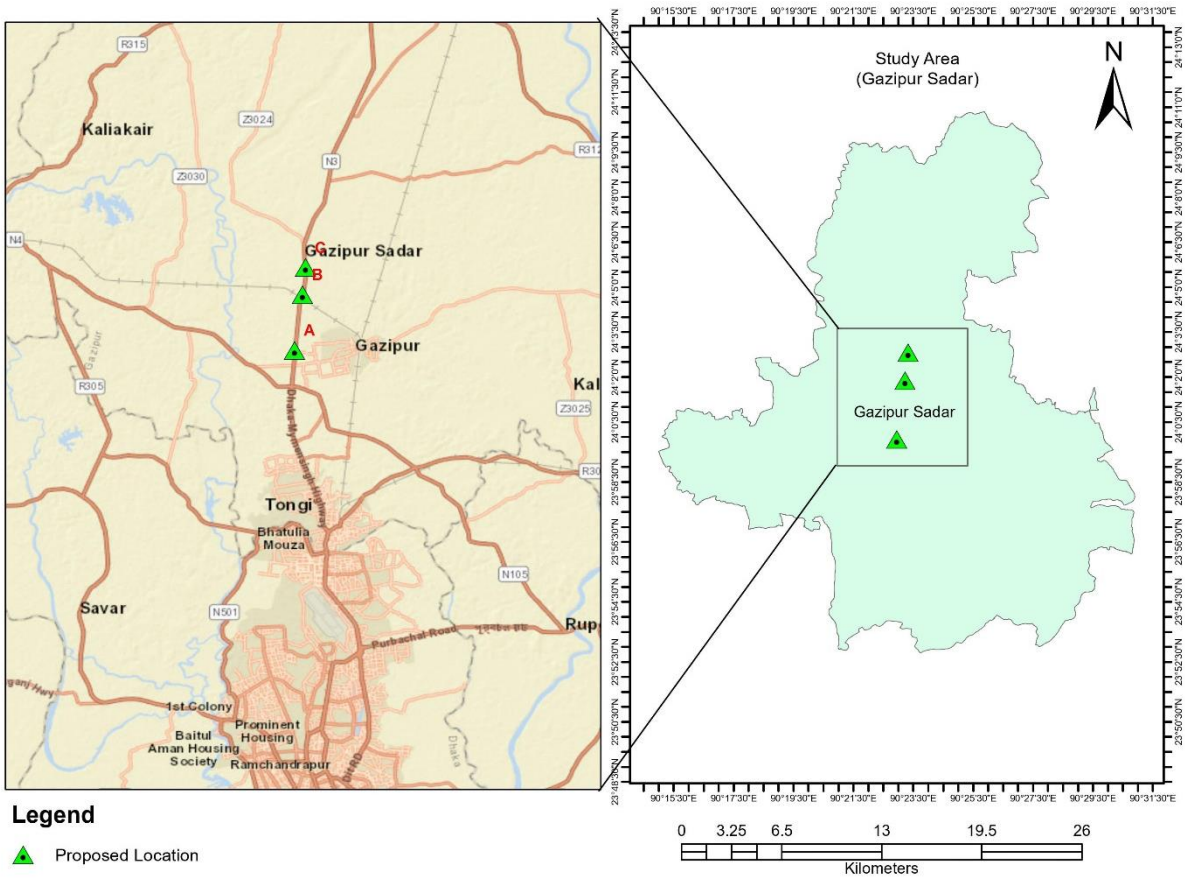
Table 5.5: Location index for proposed off-dock/dry port at Cumilla

Rank	Location ID	Location	Location Score	Location Index
1	A	Comilla Sylhet Highway	18.83228	0
2	B	Debidar	43.52856	0.400247251
3	C	Comilla	80.53484	1

Note: The location index prioritises proximity to railways, followed by highways and rivers. Lower values indicate closer proximity to railways.

5.4 Gazipur Zone:

Figure 5.4: Proposed Off-dock/dry-port location for Gazipur



Source: RAPID's presentation using the location analysis

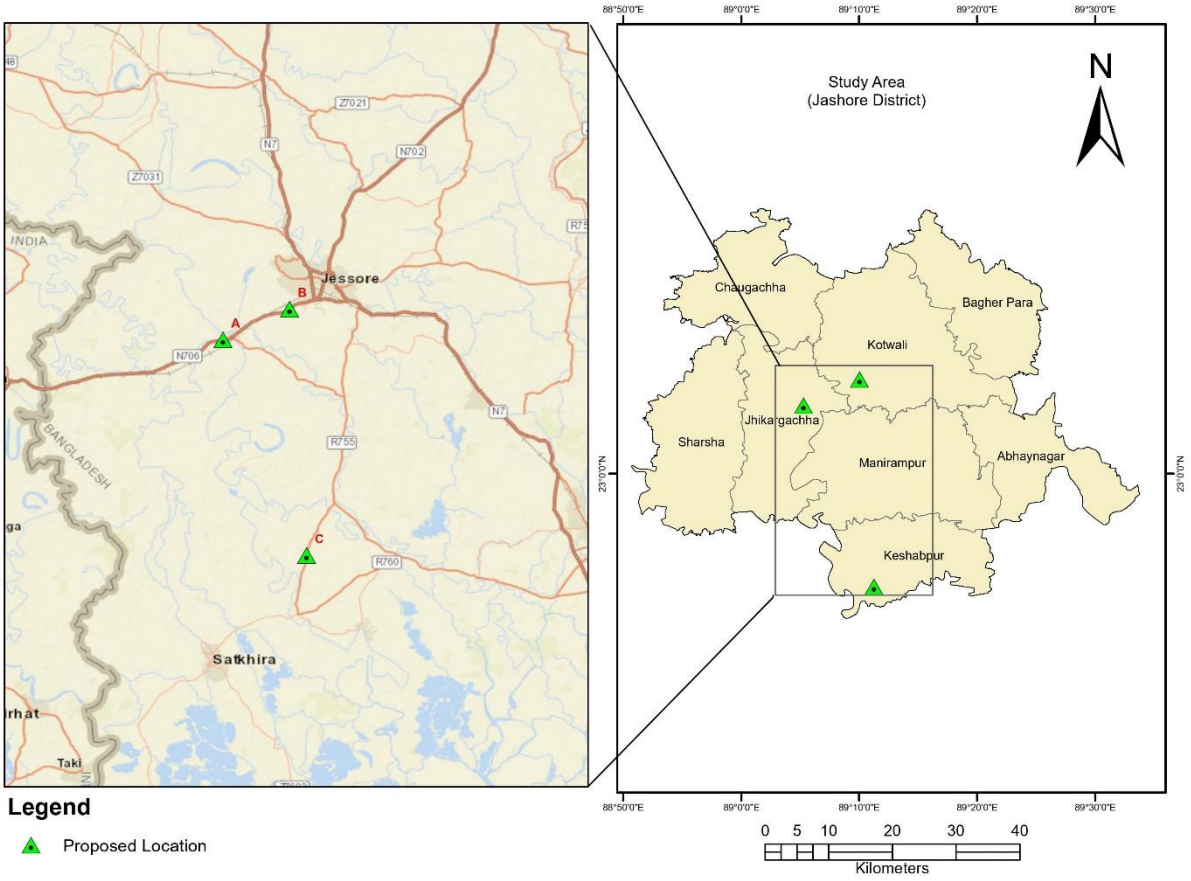
Table 5.6: Location index for proposed off-dock/dry port at Gazipur:

Rank	Location ID	Location	Location Score	Location Index
1	A	Mymensing Rd, Gazipur 1702	21.2836	0
2	C	Mymensing Rd	21.32028	0.006447893
3	B	Mymensing Rd	26.97228	1

Note: The location index prioritises proximity to railways, followed by highways and rivers. Lower values indicate closer proximity to railways.

5.5 Jashore Zone:

Figure 5.5: Proposed off-dock/dry-port location for Jashore



Source: RAPID's presentation using the location analysis

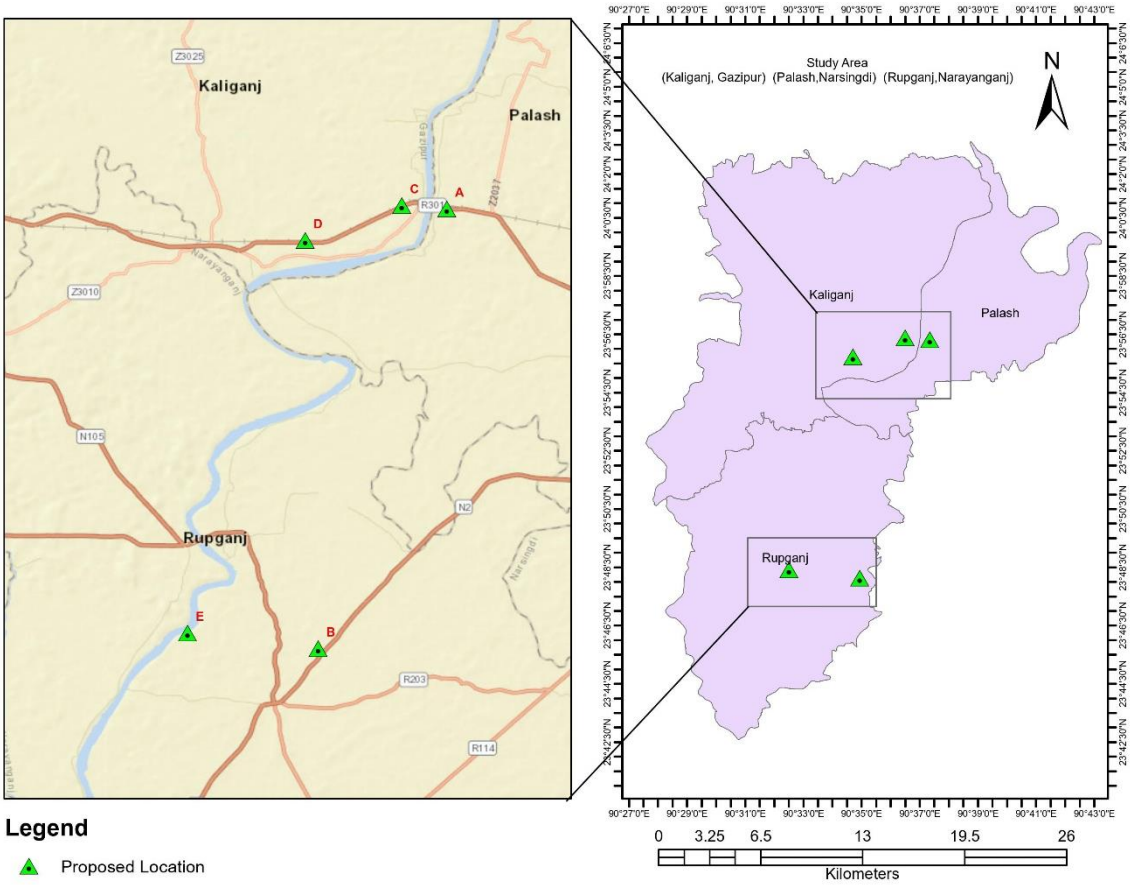
Table 5.7: Location index for proposed off-dock/dry port at Jessore:

Rank	Object-ID	Location	Location Score	Location Index
1	A	Jashore Road	3.98428	0
2	B	Jashore Road	14.03228	0.110714443
3	C	Jashore Satkhira Road	94.74028	1

Note: The location index prioritises proximity to railways, followed by highways and rivers. Lower values indicate closer proximity to railways.

5.6 Dhaka Zone:

Figure 5.6: Proposed Off-dock/dry-port location for Dhaka



Source: RAPID's presentation using the location analysis

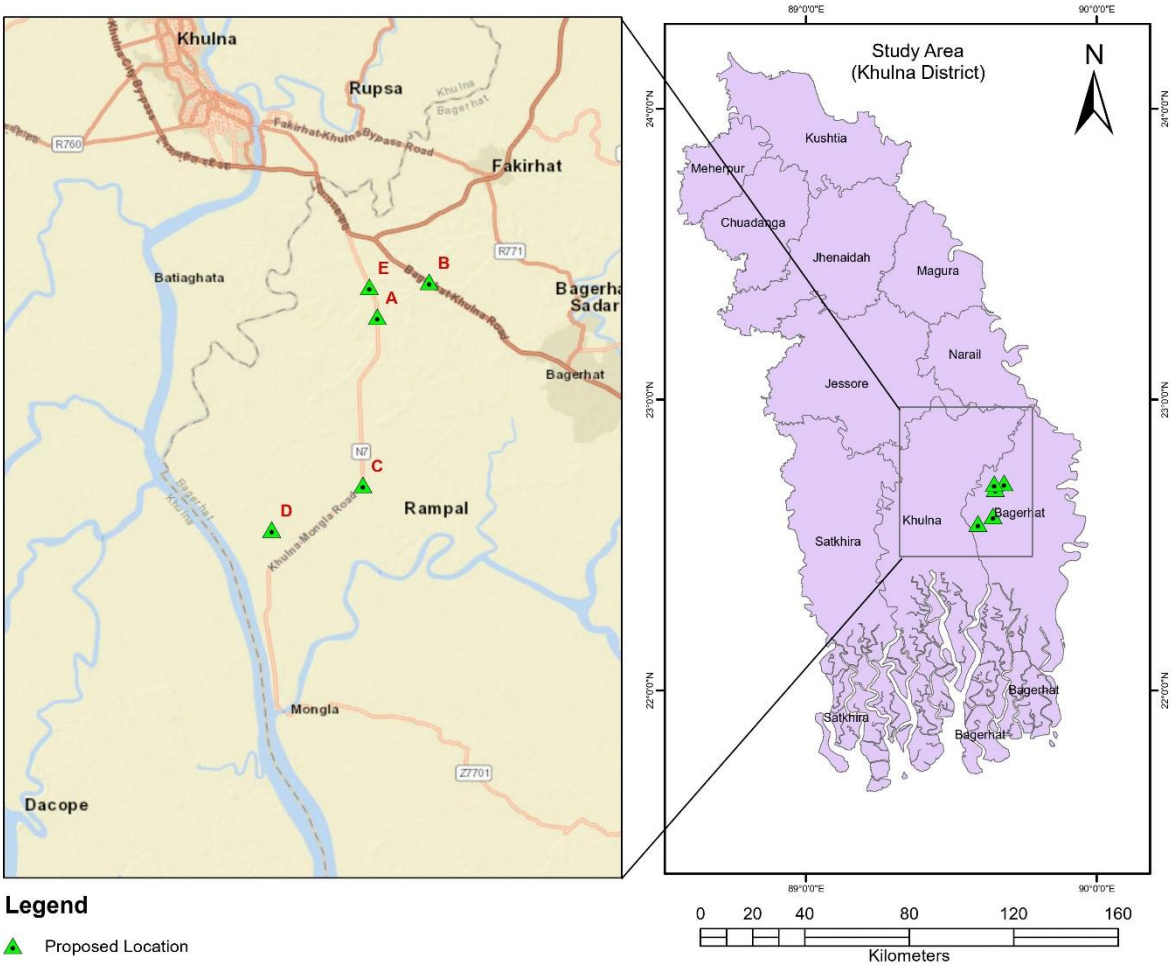
Table 5.8: Location index for proposed off-dock/dry port at Dhaka

Rank	Location ID	Location	Location Score	Location Index
1	A	Ghorashal West Charpara	3.90292	0
2	D	Tongi- Ghorashal Highway	14.24656	0.31263004
3	C	Tongi- Ghorashal Highway	19.32628	0.466161396
4	E	Rupganj-Kanchan Bridge	35.63398	0.959051414
5	B	Adhuria, Ghorashal	36.9888	1

Note: The location index prioritises proximity to railways, followed by highways and rivers. Lower values indicate closer proximity to railways.

5.7 Khulna Zone

Figure 5.7: Proposed off-dock/dry-port location for Khulna



Source: RAPID's presentation using the location analysis

Table 5.9: Location index for proposed off-dock/dry port at Khulna

Rank	Object-ID	Location	Location Score	Location Index
1	D	Gonabelai	12.75	0
2	B	Khulna- Bagerhat Highway	24.25456	0.38942695
3	E	N7, Ashoknagar Kalyangarh	33.75228	0.710922786
4	A	Khulna- Mongla Road	40.696	0.945966256
5	C	Khulna- Mongla Road	42.29228	1

Note: The location index prioritises proximity to railways, followed by highways and rivers. Lower values indicate closer proximity to railways.

5.8 Findings from field visits: Assessment-based recommendation for potential dry port location and transport mode connection

While performing a field study, gathering information through Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) with different stakeholders provided useful insights into the assessment-based recommendations for potential dry port locations and transport mode links in Bangladesh. The main objective was to locate significant areas for dry ports that can greatly improve the effectiveness of the transportation and logistics system, bolstering the country's economic expansion and regional connectivity.

Key Considerations for Selecting Dry Port Locations

The survey results highlight key factors to consider when selecting dry port locations. Stakeholders emphasised the importance of being near major transit routes like highways, railroads, and waterways. Rail connectivity was ranked highest, followed by highways and then waterways. Rail transport is efficient, cost-effective, and sustainable, moving heavy loads over long distances more cheaply than road transport. Additionally, railroads are reliable, and less affected by bad weather and traffic.

Key criteria for selecting an Off-dock/Dry Port location and determining its mode of connection, focusing on logistical efficiency, land availability, connectivity, and operational support were identified by the respondents. The criteria are:

1. **Land Availability:** A significant area of unused land is essential, with specific recommendations for at least 15 acres. Land should be elevated to avoid flooding.

2. **Proximity to Main Roads and Ports:** The location should be within a reasonable distance of major ports, ideally within 20 km. It should also be situated 2-3 km away from main roads to ease accessibility and reduce traffic congestion.

3. **Space and Facilities:** The location must have sufficient space for container storage, truck terminals, and waiting areas for trailers arriving at the port. Additional facilities, like commercial spaces and truck terminals, are crucial for smooth operations.

4. **Connectivity:** Easy and efficient connectivity to seaports and industrial areas is critical. This includes having proper transportation facilities and being situated in areas with high cargo volumes.

5. **Traffic Considerations:** The location should be in traffic-free zones to facilitate unhindered cargo movement. This also includes ensuring the area is free of residential congestion.

6. **Operational Support:** The off-dock should have essential amenities like food canteens, drinking water, and restrooms for customs and freight staff to support the workforce.

7. **Industrial and Commercial Access:** The location should be in or near industrial areas to enhance cargo volume. This includes considering the area's population and industrial connectivity.

8. **Financial Stability of Owner:** Ensuring the financial stability of the owner or the entity managing the off-dock is crucial for sustainable operations.

9. **Additional Amenities:** Other amenities, such as proper transportation services and distance from residential areas were also highlighted as key factors.

Potential environmental and social impact of new Dry Port locations (Ref. KII 4.25)

The respondents consider the potential environmental and social impact of new Off-dock/Dry Port locations. Here are the key points summarised:

1. **Environmental considerations:**

Land Use: Prioritise avoiding agricultural and residential land to prevent disruption to food production and community life.

Eco-friendly Technology: Implement eco-friendly technologies to ensure sustainable operations.

Connectivity: Develop Road and rail connectivity from seaports to new off-docks to minimise environmental impact.

Water and Air Pollution: Address potential water and air pollution issues through proper management and preventative measures.

Tree Plantation and Ecosystem Management: Engage in tree plantation and maintain a proper ecosystem to mitigate environmental impact.

Environmental Certifications: Obtain the necessary environmental certifications and comply with guidelines from relevant authorities.

2. **Social Considerations:**

Community Impact: Avoid urban areas to prevent disruption to city dwellers and ensure that the social impact on nearby communities is minimal.

Employment Opportunities: Consider the potential for creating employment opportunities for local residents, which can have positive social benefits.

Health and Safety: Prioritise the long-term sustainability and health and safety of the surrounding communities.

3. **Infrastructure and Location:**

Non-agricultural Land: Emphasise the use of non-agricultural and non-residential land to mitigate social and environmental impacts.

Avoid Urban Areas: Select locations away from urban areas to avoid negative impacts on urban populations.

Rail Transport: Use rail as an environmentally friendly freight transport mode.

4. **Regulatory and Planning Considerations:**

Environmental Impact Assessment: Conduct thorough environmental impact assessments to identify and address potential environmental risks.

Social Impact Assessment: Perform social impact assessments to understand and mitigate negative effects on local communities.

Importance of Locations to Use Dry Ports.

The responses to whether Off-dock/Dry Port locations affect their usage reveal that location is indeed a significant factor impacting their effectiveness. Several respondents highlighted that the strategic positioning of these facilities could save time and money in export and import processes. This makes them more attractive and beneficial for businesses. Several respondents suggested that businesses might avoid Off-dock/Dry Ports if they are located far from main trading routes or poorly connected by infrastructure. Instead, they might choose to use the main ports to save money and time. This indicates that better infrastructure and connectivity could increase the popularity and usage of Off-dock/Dry Ports, thereby improving trade efficiency.

Necessity of Dry Ports outside of Chattogram

The main objective of this chapter is to assess the dry port location and recommend some names as per the methodology or parameters that are applied in this study. The study team conducted comprehensive KIIs and FGDs to understand the stakeholders' view on establishing dry ports outside Chattogram and the stakeholders revealed several opinions on the establishment of dry ports/off-docks outside Chattogram. The majority of them opposed the idea while some portion of people were in favour of establishing dry ports outside Chattogram. Those in favour of establishing dry port outside Chattogram said that Off-docks/Dry Ports outside of Chattogram are necessary. Despite the current facilities in Chattogram performing well, this group suggests that an expansion of the infrastructure is necessary. Enhancing overall efficiency in the national supply chain network, along with decentralising logistics, can significantly reduce congestion in Chattogram. Those who opposed the idea explained that Chattogram's existing infrastructure is adequate to meet current demands, suggesting that further expansion is unnecessary. They cited several reasons to not support the idea. They are as follows:

1. **Availability of shipping facilities**: Establishing shipping facilities outside of Chattogram will be a laborious task, requiring significant investment. Therefore, a thorough cost-benefit analysis is necessary before the government can consider establishing these facilities outside Chattogram.
2. **Container tracking challenges:** Issues related to tracking containers have prevented the establishment of Off-docks/Dry Ports outside Chattogram previously. The lack of tracking facilities remains a significant obstacle.
3. **Operational Control**: A preference for local concentration of efforts and resources was expressed regarding operational control within the Chattogram area.
4. **Regulatory Challenges**: There were challenges associated with managing logistics outside of Chattogram due to road transport regulations by the National Board of Revenue (NBR).
5. **Investment Returns**: According to some respondents, Chattogram's Off-docks/Dry Ports are still aiming to achieve satisfactory returns on investment, and an immediate expansion of dry ports will not be wise.

6. **Connectivity and Monitoring**: Ease of connectivity and monitoring from port authorities within Chattogram was cited as a reason to focus efforts locally rather than expanding elsewhere.
7. **Lack of customs personnel**: Establishing customs offices and convincing authorities to deploy personnel in remote areas will be a significant challenge.

This reflects the belief that the current facilities are sufficient to handle present needs. The diversity of opinions highlights the complexity of logistical planning in Bangladesh. Balancing current efficiency with future growth requires careful consideration of regional economic dynamics, transport connectivity, and industrial development strategies. A cautious approach to infrastructure expansion is advised by the majority of respondents.

Dhirasram: A Strategic Hub Near Dhaka

Based on the Key Informant Interviews (KIIs), several places were identified as the best options for dry ports. The area around Dhirasram, near Dhaka, gained attention due to its location along the existing railway network. Its strategic position near the busy Dhaka-Chattogram railway corridor makes it an optimal choice. Dhirasram's current infrastructure and planned expansions make it a vital hub for container traffic. This will help reduce congestion at Chattogram Port and improve cargo movement in the area. Although the government has started building an ICD there, it must be operated efficiently.

Ishwardi: Strengthening India- Bangladesh Regional Trade

Ishwardi, located in the northwestern region of Bangladesh, has been proposed as another possible location. Ishwardi's strategic significance arises from its location at the junction of multiple prominent railway routes, notably the international railway connection with India. This position presents substantial opportunities for boosting regional trade, especially with the adjacent Indian states of West Bengal and Bihar. The establishment of a dry port at Ishwardi has the potential to leverage this inter-country connectivity as well as facilitate efficient trade and minimise transit durations for commodities transported between Bangladesh and India.

Khulna: Multi-Modal Transport Advantage

Stakeholders also highlighted the port city of Khulna as a viable option. Khulna's advantage lies in its multi-modal transport connections, encompassing rail, road, and river networks. The city's proximity to the Mongla Port, the second busiest seaport in Bangladesh, further strengthens its case. A dry port in Khulna could serve as a critical logistics hub, streamlining the movement of goods to and from the Mongla Port and providing an alternative to the heavily congested Chattogram Port. Furthermore, the Padma Bridge rail project, upon its completion, is expected to significantly improve road connectivity between Khulna and Dhaka, thereby it can be the best option for a dry port.

Stakeholders' opinion on the modes of transport for dry port:

Railways: Backbone of the Dry Port Network

In terms of transport mode connections, the stakeholders advocated for an integrated approach that leverages the strengths of each mode. Railways were universally recognised as the backbone of the dry port network, with suggestions to enhance rail connectivity to key industrial zones and

border points. The stakeholders recommended upgrading existing rail lines, constructing new tracks where necessary, and investing in modern rail terminals equipped with advanced cargo handling facilities. These improvements would ensure efficient and reliable rail services, reducing transit times and costs for businesses.

Highways: Complementary Short-Haul and Last-Mile Connectivity

Highways were identified as complementary to the rail network, particularly for short-haul and last-mile connectivity. Stakeholders emphasised the need to improve road infrastructure leading to the proposed dry port locations, ensuring smooth and efficient movement of goods between the ports and their final destinations. This includes widening existing roads, constructing new bypasses to avoid urban congestion, and implementing robust maintenance programs to keep the road network in optimal condition.

Rivers: Enhancing Multi-Modal Transport Solutions

Rivers, although less prioritised, were still considered an important component of the transport network. Bangladesh's extensive river system offers untapped potential for cost-effective and environmentally friendly cargo transport. Stakeholders suggested developing river ports in conjunction with dry ports, specifically in the Narayanganj and Munshiganj areas. It is expected to enable multi-modal transport solutions that combine rail, road, and river routes. Investments in dredging, modernising river terminals, and enhancing navigational aids were recommended to utilise the river transport potential fully.

Chapter 6: Linkage Analysis of the dry ports, seaports, highways, and railroad

One of the primary challenges lies in identifying suitable dry port locations that balance accessibility to cargo sources and transportation networks with land availability and infrastructure costs. Additionally, determining the most appropriate mode of connection between seaports, dry ports, and inland destinations is essential for maximising efficiency and minimising transportation costs. Road, rail, and inland waterway connections each offer distinct advantages and disadvantages, requiring careful consideration of factors such as cargo type, distance, and infrastructure availability. Additionally, the majority of dry ports in Bangladesh are centred around a single location.

Table 6.1: List of Off-docks and their distance from sea port in Bangladesh

SL	Name of the Off-dock	Location	Distance from Chattogram Sea Port (Km)
1	ESACK BROTHERS INDUSRIES LTD. (CONTAINER YARD)	Middle Halishahar, Chattogram (near Old Port Market)	**0.74 Km**
2	CHATTOGRAM CONTAINER TRANSPORTATION COMPANY LTD. (UNIT-1 & 2)	Middle Halishahar, Chattogram (near Port Stadium)	**1.5 Km**
3	SUMMIT ALLIANCE PORT LTD. (EAST & WEST)	Katgor, North Patenga, Chattogram	**8 Km**
4	SUMMIT ALLIANCE PORT LTD. (NORTH) [PREVIOUS KNOWN AS OCEAN CONTAINERS LTD. (OCL)]	Katgor, North Patenga, Chattogram	**7.5 Km**
5	VERTEX OFF-DOCK LOGISTIC SERVICES LTD.	Katgor, North Patenga, Chattogram	**7.5 Km**
6	QNS CONTAINER SERVICES LTD.	CEPZ, Chattogram	**4 Km**
7	K&T LOGISTICS LTD.	CEPZ, Chattogram	**3 Km**
8	EASTERN LOGISTICS LTD.	Katgor, North Patenga, Chattogram	**7.5 Km**
9	INCONTRADE LTD.	Laldiar Char, North Patenga, Chattogram	**8 Km**
10	GOLDEN CONTAINERS LTD.	City Gate, Chattogram	**8.5 Km**
11	KDS LOGISTICS LTD.	Sitakunda, Chattogram	**22 Km**
12	PORTLINK LOGISTIC CENTRE LTD.	Bhatiary, Chattogram	**16 Km**
13	SHAFI MOTORS LTD.	Sagorika, Chattogram	**6 Km**
14	ISPAHANI SUMMIT ALLIANCE TERMINALS LTD.	AK Khan, Chattogram	**7.5 Km**
15	BM CONTAINER DEPOT LTD.	Sitalpur, Sitakunda, Chattogram	**22 Km**
16	HAJI SABER AHMED TIMBER COMPANY LTD. (CONTAINER YARD)	Kalurghat Industrial Area, Chattogram	**12.5 Km**
17	NEMSAN CONTAINERS LTD.	Kumira, Sitakunda, Chattogra	**26 Km**

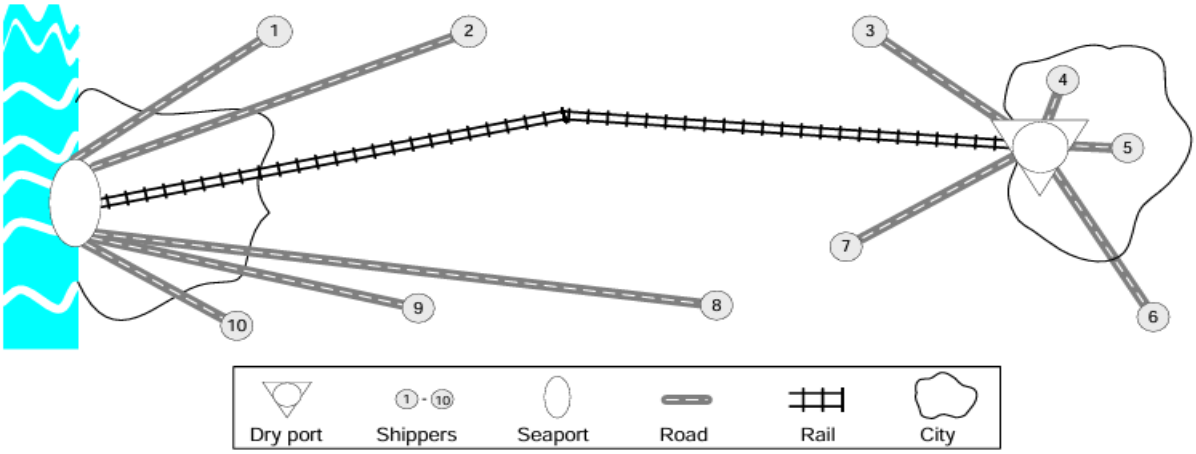
18	Anchorage Container Depot Ltd.	Kattoli, Chattogram	**9 Km**
19	Baylink Containers Ltd.	Barabkunda, Chattogram	**37 Km**

Source: BICDA

The determination of the distance between dry ports and seaports is predicated upon the operational functionality of the ports themselves, leading to their classification into three distinct categories: distant, mid-range, and close-range dry ports (Jagan Jeevan et al. 2016).[26]

Distant dry ports, for instance, are strategically positioned with the primary objective of facilitating the seamless transition of cargo from roadways to railways. The rationale behind their establishment is multifaceted, incorporating factors such as the optimisation of rail transport, wherein the cost-effectiveness of such transportation modalities hinges upon achieving an optimal cargo volume (Johan Woxenius et al. 2004).[27] The shift from roadways to railways not only mitigates congestion on highways but also significantly reduces CO2 emissions, highlighting the environmental sustainability inherent in such logistics solutions. Furthermore, the reliability and speed inherent in rail operations serve as additional motivators for the establishment of distant dry ports (Mourão et al. 2002)[28].

Figure 6.1: A seaport with a distant dry port



Source: RAPID's desk research

An illustrative example of a distant dry port is the Isaka dry port in Tanzania, strategically situated to cater to neighbouring landlocked countries such as Rwanda and Burundi. Prior to its inception, the logistical landscape necessitated shippers to undergo customs and clearance procedures at the distant Dar Es Salaam port, located over 800 kilometers away from the Isaka dry port.

In contrast, mid-range dry ports are typically situated approximately 50 to 150 kilometers away from seaports. The imperative for their existence stems from the congestion experienced at seaports, coupled with a relatively less stringent demand for precise transport time management

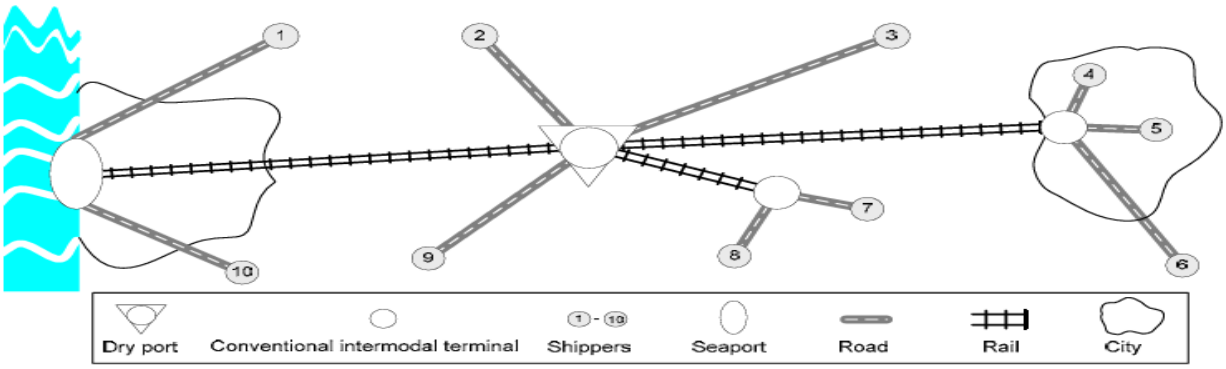
[26] Malaysian Container Seaport-Hinterland Connectivity: Status, Challenges and Strategies - ScienceDirect

[27] Microsoft Word - 2004 ICLSP Dalian Wox-Ros-Lum lev 040607.doc (psu.edu)

[28] Ship assignment with hub and spoke constraints: Ingenta Connect

and flow frequency. Serving as pivotal consolidation points, mid-range dry ports offer an array of administrative and technical services, including scanning and clearance facilities.

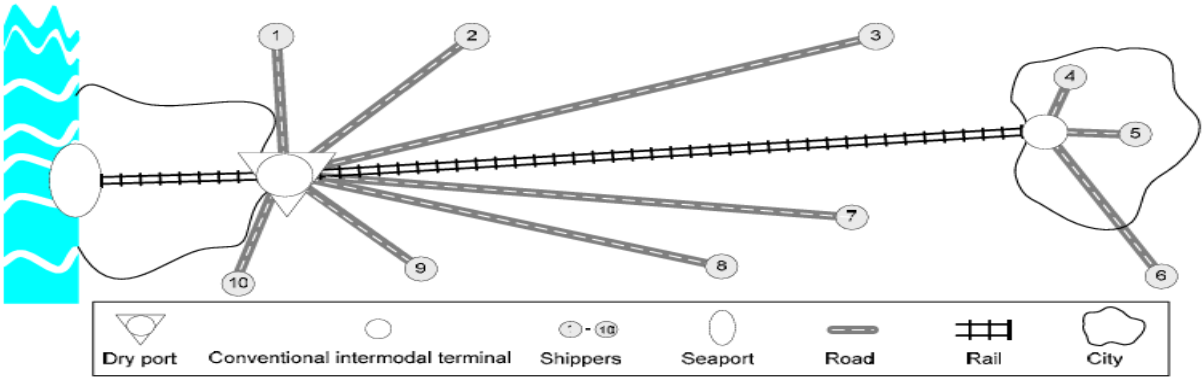
Figure 6.2: A seaport with a mid-range dry port



Source: RAPID's desk research

An example of a mid-range dry port is the Virginia Inland Port, strategically positioned to serve as a consolidation nexus between the Port of Virginia and its terminals situated in Hampton Roads. Offering comprehensive customs services to shippers, this dry port was conceived with the overarching objective of extending the hinterland reach of the Port of Virginia (Bray, 1996)[29].

Figure 6.3: A seaport with a close-range dry port



Source: RAPID's desk research

Close-range dry ports on the other hand are located less than 50 kilometres away from the seaports. The majority of close dry ports are connected to seaports through roadways and designed to mitigate cargo congestion address capacity constraints in seaports and reduce traffic in the neighbouring city (Roso et al. 2009).[30] Bangladeshi dry ports located in Chattogram can be classified as close-range dry ports. By locating off-docks near the port, cargo can be swiftly transferred between ships and off-dock facilities. This minimizes transportation and handling time and costs, leading to quicker vessel turnaround times and reduced congestion at the port.

[29] Bray, J.R., 1996. Virginia Inland Port: The Case... - Google Scholar

[30] The dry port concept: connecting container seaports with the hinterland - ScienceDirect

Table 6.2: Characteristics of distance-based dry ports

Specification	Close dry Ports	Mid-range dry ports	Distant dry ports
Activities	Transit	Rail link between seaport and market	Rail link between seaport and market
Location	• Decongestion of city access • Pollution reduction • Increased intermodal transportation	• Region attracts industries • Increased intermodal transportation	• Acquiring a new hinterland of the seaport • Increased intermodal transportation
Infrastructure	• Reduction of road maintenance costs • Rail infrastructure development	• Reduction of road maintenance costs • Rail infrastructure development	• Reduction of road maintenance costs • Rail infrastructure development
Transport	• Activity reduction from /to seaports • Reduction of waiting time for transport operators	• Coordination with rail traffic • Reduction of waiting time for transport operators	• Decrease of transport costs • Coordination with rail traffic
Logistic	• Increased inland access and city distribution • Intermodality	• Increased inland access • Decrease of costs	• Increased inland access • Reduction of cost

Source: Jagan Jeevan (2017)[31]

6.0 Transport linkage to dry port:

A transport linkage to a dry port involves setting up a connection with a port terminal using rail, barge, or truck services, typically through a high-capacity route. The intermodal terminal often contains a range of logistical tasks that support and coordinate the transportation of freight. UNESCAP identifies four fundamental linkages that a dry port or Off-dock possesses: 1. Connection between seaports and dry ports, 2. Railway infrastructure within dry ports, 3. Connectivity of road transport, 4. Road infrastructure within dry ports[32].

Connection between seaports and dry ports: Dry ports play a crucial role in allowing landlocked countries and hinterland regions to reach the sea by concentrating cargo and offering cost-effective land transport connections to seaports. However, only a limited number of seaports have the capability to handle trains of full length within their port limits for the purpose of loading

[31] The role of Malaysian dry ports in the container seaport system (utas.edu.au)

[32] Learning Materials on Dry Ports

and unloading. Most of the seaports in the region do not have rail sidings located near the container stacks next to the docks. Typically, these rail sidings are situated 500 meters to 2 kilometers away. This leads to the need for additional handling of rail-delivered containers, often requiring 3 lifts per container for stacking, compared to only one lift for road-delivered containers. As a result, rail has a substantial competitive disadvantage.

Target and Process: Port operators must prioritise improving railway access within seaports, ensuring its proximity to the container stacks to minimise the requirement for multiple container handling. Alongside this, transport planners should give priority to integrating railway access in close proximity to container stacks within ports. Prioritising the improvement of current rail access or the implementation of new rail infrastructure is crucial for existing ports.

Railway infrastructure within dry ports: Rail-served dry ports require a connection to the closest main railway line through a short access line, which is usually provided by the appropriate infrastructure providers. The internal rail network of the dry port ought to have adequate infrastructure to allow trains of maximum length.

Target and Process: Planners of dry ports should ensure that dry ports with rail service have the required infrastructure to facilitate smooth communication between dry ports, seaports, and other dry ports. The railway infrastructure in a dry port should be capable of handling the arrival and departure of whole unit container trains that go directly between a certain starting point and destination, without requiring any rearrangement of the containers outside the dry port. For efficient operations, it is necessary to have centrally situated sidings with a minimum of 3 tracks. These tracks should be designated for specific purposes: one for loading, one for unloading, and one for the movement and repositioning of engines. The determination of the quantity of loading/unloading tracks should be predicated on projected traffic volumes. Container stacks should be placed on both sides of the tracks, and there should be paved areas that cover the whole length of the rails to make it easier to handle the containers. The length of the loading/unloading tracks is determined by the quantity and dimensions of the wagons. For instance, a train consisting of 40 wagons and one diesel locomotive would necessitate around 660 meters of track. The axle weight in the rail sidings should be consistent with that of the mainline, which is normally 20 tonnes per axle for meter gauge railways and 22.5–25 tonnes for broader gauges. This is necessary to accommodate powerful apparatus and fully loaded wagons.

Connectivity of road transport: High-quality road connections are necessary for dry ports to effectively connect with cargo sources, seaports, and other dry ports. Access to seaports through multi-lane highways is crucial in nations with poorly established rail networks. The Asian Highway Network provides comprehensive connectivity to the dry ports in the region. Nevertheless, the condition of these roads differs greatly across countries, affecting the duration of transportation and adding to the congestion on the highways.

Target and Process: It is crucial for dry port planners to ensure the presence of sufficient primary road connections between seaports, inland trade centers, and dry ports. This is to avoid any gaps in the transportation system that could hinder the smooth and uninterrupted movement of goods. This is particularly crucial in nations where road transport is employed instead of rail for the purpose of transporting containers to seaports. The issue of capacity constraints on

highways, which impede smooth connectivity between dry ports and seaports, needs to be resolved and eradicated.

Road infrastructure within dry ports: The efficient functioning of the dry port primarily depends on the free mobility of trucks across the vast bulk of the dry port facilities. However, it will be important to install automated level crossing barriers and warning devices at the point where the rail access line intersects to ensure safety.

Target and Process: Dry port planners must ensure that the internal road infrastructure is sufficient to support the seamless movement of vehicles working within and entering or leaving the dry ports. The internal roads should be built with a width of 15 meters to accommodate the safe movement of handling equipment and vehicles. Furthermore, it is crucial that these roads are specifically engineered to handle the weight of the axles that are relevant to the nearby highway system. This is because vehicles transporting break bulk cargo from the premises of shippers or consignees to the dry ports need to adhere to these standards.

6.1 Findings from field visits: Linkage Analysis among the dry ports, seaports, highways, and railroad:

During the field study, we conducted Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) with stakeholders to investigate the intricate Linkage Analysis between dry ports, seaports, highways, and railroads in Bangladesh. The main goal was to understand the connections and difficulties involved in linking these important points of the transportation system in order to improve efficiency and enable smooth movement of goods throughout the country. The survey findings demonstrate an intricate interaction of several factors that impact the dynamics of linkage, encompassing limitations in infrastructure, legal frameworks, and logistical needs.

Challenges in Chattogram Port Operations:

The linkage study places great importance on seaports, which serve as crucial gateways for international trade. Chattogram Port, the largest seaport in Bangladesh, has gained attention for its strategic significance in managing the majority of the country's maritime cargo. Nevertheless, stakeholders expressed apprehensions regarding the congestion and inefficiencies observed at Chattogram Port. They emphasised the pressing requirement for infrastructural enhancements and operational optimisations to mitigate bottlenecks and speed cargo processing procedures. The proposition to establish satellite ports and container terminals around the coastline has attracted attention as viable remedies for distributing port activity and alleviating congestion constraints. At the same time, the connection between seaports and dry ports has become a crucial element of the transportation network. Dry ports, which are designed as inland expansions of seaports, have a crucial function in enabling efficient transportation and decreasing the time it takes for cargo to travel to and from inland areas. Stakeholders highlighted the need to carefully locate dry ports in close proximity to prominent industrial centers and transportation routes in order to optimise their efficiency. However, there have been concerns voiced about the insufficient capacity and usefulness of current dry ports. It is necessary to highlight the necessity of investing in infrastructural and operational improvements to fully utilise their capabilities.

Highway and Railroad Integration Challenges in Transportation Network:

The integration of highways and railroads into the linkage analysis further complicates the transportation landscape. Highways serve as vital arteries for transporting goods between ports, dry ports, and inland destinations, particularly for time-sensitive or perishable cargo. However, stakeholders highlighted the challenges posed by inadequate road infrastructure, including congestion, poor road conditions, and lack of bypass routes, which hinder efficient cargo movement and increase transportation costs. Suggestions were put forward to prioritise road upgrades and expansion projects, coupled with improved traffic management strategies, to enhance the reliability and capacity of the highway network.

Boost investment in Railway Infrastructure:

Railways, on the other hand, offer a sustainable and cost-effective mode of transportation for bulk cargo over long distances. The linkage between railroads and seaports/dry ports presents significant opportunities to shift a substantial portion of freight traffic from roads to railways, thereby reducing congestion and carbon emissions. Stakeholders emphasised the need for investment in rail infrastructure, including track modernisation, electrification, and rolling stock upgrades, to enhance the efficiency and capacity of the rail network. Furthermore, the development of dedicated freight corridors and intermodal terminals was proposed to facilitate seamless intermodal transfers and improve the competitiveness of rail freight services.

Regulatory and Institutional Challenges:

Regulatory and institutional challenges also emerged as key determinants of linkage dynamics in Bangladesh's transportation sector. Stakeholders identified cumbersome customs procedures, bureaucratic red tape, and inconsistent enforcement of regulations as major impediments to efficient cargo movement. Streamlining regulatory processes, implementing electronic customs clearance systems, and fostering public-private partnerships were recommended as strategies to enhance trade facilitation and reduce transaction costs. Moreover, the establishment of a coordinated institutional framework involving government agencies, port operators, transport companies, and other stakeholders was deemed essential to foster collaboration, address bottlenecks, and promote a holistic approach to transportation planning and management.

Chapter 7: Principles and standards for the dry port design and operations

In designing a dry port, the key is to choose a strategic location, especially near industrial and manufacturing zones, otherwise, they are expected to be underutilised (Visser et al. 2009).[33] For the dry ports lagging behind in locational characteristics, improving transport connectivity may turn out crucial in its operational efficiency.

Dry ports do not need identical design standards to function effectively as interconnected components of a regional network. However, there must be consistency in the basic services offered and the infrastructure design required to provide these services. Some essential infrastructures must be in place when establishing a dry port.[34]

Fundamental infrastructures:

1. Fenced customs secure area - segregated entry/exit points for different traffic
2. Container Yard (CY) – receipt/dispatch of containers by road and rail, container storage
3. Container Freight Station (CFS) for loading/discharge of cargo to/from containers
4. Customs inspection area where cargo may be discharged for inspection
5. Bonded warehouse for storage of break-bulk under bond cargo (If the dry port is import-dedicated)
6. Administration building (dry port management, customs, freight forwarders)

Fenced customs secure area: A Fenced Customs Secure Area is a key component of the infrastructure in a dry port1. It is an area within the dry port that is secured and monitored to ensure the safety and integrity of the cargo. This area is typically enclosed by a fence to prevent unauthorised access. The term "segregated entry/exit points for different traffic" refers to the design principle where different types of traffic (such as incoming and outgoing cargo, different types of cargo, etc.) are separated and have their own designated entry and exit points. This segregation helps in managing the flow of traffic efficiently, reducing congestion, and minimising the potential for errors or mishandling of cargo. In addition to containers, if there is provision for handling other types of cargo, there needs to be separate working areas and security accesses or gates for each. This ensures that each type of cargo is handled in an area specifically designed for it, further enhancing the efficiency and security of operations.

Customs inspection area: It refers to a specific location within a port or dry port where imported goods are unloaded and scrutinised by customs authorities. This portion of the dry port's infrastructure is responsible for ensuring that cargo complies with local rules and regulations, such as import tariffs, forbidden products, and safety standards. Usually situated in a secure area of the port or dry port, this zone functions in conjunction with other important facilities like the Container Yard (CY) for the transportation of containers by road and rail, the Container Freight Station (CFS) for the loading and unloading of cargo from containers, and a bonded warehouse for storing break-bulk cargo under bond. The administration building, which accommodates dry

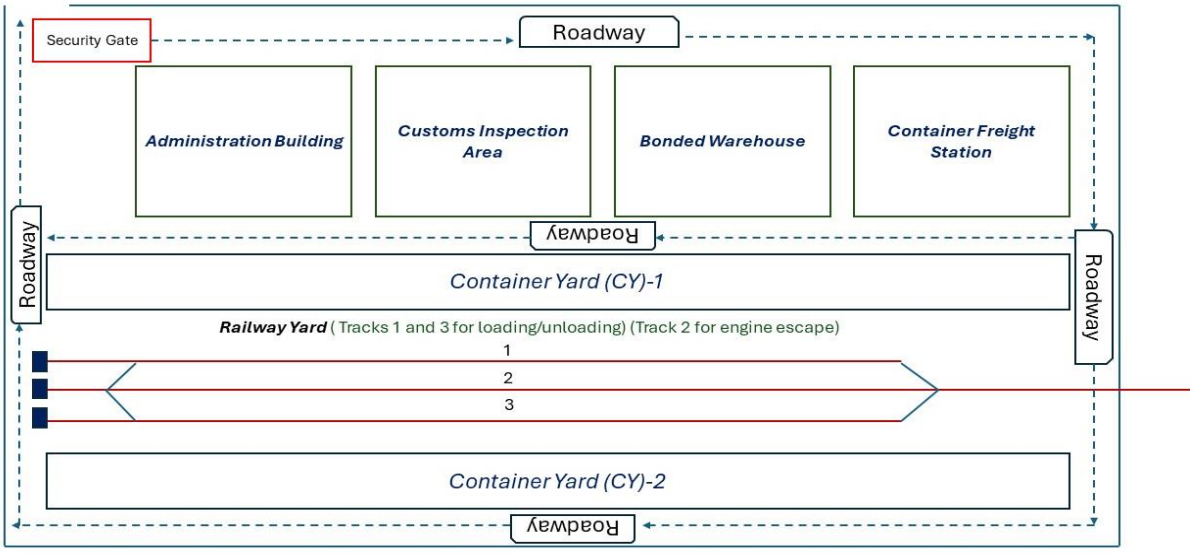
[33] A new hinterland transport concept for the port of Rotterdam: organisational and/or technological challenges? | TU Delft Repositories

[34] Capacity building seminar on planning, design, development and operation of intermodal freight interfaces, including dry ports

port management, customs, and freight forwarders, is typically located in close proximity. The dry port serves as an inland intermodal terminal that is directly linked by road or rail to a seaport. It acts as a hub for the transfer of maritime cargo to destinations located inland.

Rail connectivity is a crucial element of a dry port, and the design of container yards (CY) should prioritise rail access rather than a different approach. The process of loading and unloading trains should take place at sidings that are centrally placed and consist of a minimum of three tracks: one for loading, one for unloading, and one for releasing locomotives. The precise number of tracks is contingent upon projected traffic numbers. In a reach-stacker serviced facility, it is necessary to position container stacks on both sides of the tracks in the container yard (CY). This arrangement enables the separation of import and export containers and facilitates the simultaneous loading and unloading of containers on both sides. The paved surface of the CY, where the stacks are placed, should cover the entire length of the tracks. The rail infrastructure in a dry port should facilitate the arrival and departure of whole unit container trains that travel between a certain starting point and a specific destination, without requiring any disassembly or rearrangement outside the dry port.

Figure 7.1: Principles standard for the dry port design



Source: RAPID's presentation using the material of UNESAP

7.0 Design Detail- the Rail Siding

To carry the International Standards Organisation (ISO) standard containers, railways must include certain physical components. The primary design factors include track gauge, axle load, frequency of services, number of trains, loading, and structural gauge, and number of unit trains. The factors are described as follows: Not all track gauges can be used in dry port facilities. Gauges above 1000 mm are considered ideal for handling ISO standard containers.

- ***Track Gauge:*** Not all track gauges can be used in dry port facilities. Gauges above 1000 mm are considered ideal for handling ISO standard containers.
- ***Axle Load****:* An axle load of 12 tons, coupled with the introduction of four-axle wagons, is a prerequisite for the transport of containers.

- ***Rolling Stock**:* Containers can be transported using one of three types of rolling stock: multi-purpose flat cars, low-sided wagons, and purpose-built container wagons. The choice among these options is determined by tare weight reduction, payload per wagon, and train.
- ***Unit Trains**:* Determining the total capacity of a unit train should be a priority. This can be done by considering the design of rail wagons and the hauling capacity of locomotives. A simple division of the total expected cargo handling capacity throughout a year by the total capacity of a unit train will yield the total number of unit trains needed. Dividing the total number of trains per year by 52 provides the weekly frequency of train services.

The following factors need to be considered while designing the rail siding:

- A direct arrival of trains into the rail sidings will significantly reduce the holding time of wagons in yards.
- Rail siding tracks should be joined at both ends to enable two-way arrival and departure of the rolling stock.
- Arrangements should be made to ensure proper security of the wagons.
- Dimensional clearances between parallel tracks need to be available.

The Container Yard (CY)

Dry ports are generally expected to have separate container yards where containers will be handled for the following reasons:

1. It ensures better productivity of cranes, which in turn reduces the detection of wagons.
2. It establishes proper streams of traffic, one between the siding and the container yard and the other between the container yard and the container freight station.
3. It helps create buffer zones for traffic fluctuations.

Definition of CY

A container yard (CY) is a paved area where containers are generally stacked. It is created to facilitate the smooth transition of containers from roadway vehicles to cargo trains.

Size

The size of a dry port depends on the optimum capacity of the container yard at any point in time. This capacity is a function of container dwelling times (DT), which differ for imports, exports, and empty containers: 7 days for import containers, 3 days for export containers, and 15 days for empty containers.

Paving

The surface area of the railway tracks and rail siding inside the container yard (CY) needs to be paved according to the dynamic axle loads of the equipment and the movement of vehicles across the area. Sometimes, heavy-duty pavements are required, especially where forklift trucks (FLTs) are used, and tracks of a gantry crane are installed.

Container Freight Station (CFS)

A CFS refers to a place where containers holding more than one consignment are loaded and unloaded. The CFS consists of a covered shed with a loading apron for trucks handling containers inside the shed. Storage facility efficiency is a must. Without its efficiency, a total breakdown will occur in the operation of the shed, which can lead to cargo damage, steady cargo handling, and congestion. The shed generally has two parts: one for handling export cargo and the other for handling import cargo. The shed is required to have facilities for single packages and small quantities, a robust room for strong cargo, and a special area for storing dangerous cargo as well as cargo with strong odours. The planner must ensure that the shed has adequate ventilation. The shed also needs to have a place for customs officers to directly oversee the loading and unloading of cargo.

Shed Size

The size of the container freight station (CFS), except for the customs clearance office, is determined by the anticipated throughput of less-than-container load (LCL) TEUs and the dwelling time of cargoes. Provisions for the following criteria should also be available:

- The portion of the floor space occupied by an average container load of cargo.
- Forklift truck manoeuvring space.
- A factor for covering peak workloads at certain periods.

The Gatehouse and Security Features

The gatehouse provides proper security to dry ports. The gatehouse should be established on two levels with required access to the roof for security guards. Security personnel should position themselves at the side windows of the gatehouse at a sufficient height so that they can observe the staff inside the vehicles, while the security personnel on the ground can properly check the container seals. The security personnel positioned at the reporting window will direct the traffic in and out of the dry port using moving barriers. The security features should also include requiring vehicles to have a permit authorised by the relevant authority. The designer must ensure security staff are empowered to search any vehicle at any point in time. Perimeter fencing is one of the basic security concerns, and the planner needs to make sure it meets the standard set by the customs officials.

Vehicle Holding Area and Traffic Flows

A standard design includes a paved container area outside the main security area. The area is useful for conveying clear instructions to vehicles moving toward dry ports and checking the primary documentation for the depot. It resists any unwanted intrusions and ensures that vehicles with the right paperwork are allowed onto the dry port premises.

Loading and Unloading

Unloading the inbound containers consists of three stages. In the first stage, STS cranes withdraw the containers from ships and place them in the container yard. In the second phase, the containers are transported to terminals where a brief check-up takes place before they leave for dry ports. The outbound containers possess the opposite characteristics (F. Facchini et al., 2020).

Minimising dwelling time and operational costs depends on how advanced the material handling equipment (MHEs) are, the size and number of vehicles, and the routes they choose. The minimisation problem also revolves around effective scheduling, storage allocation, storage yard design, container re-shuffling, and vehicle maintenance. Mixed integer programming methods can be utilised to find the optimal schedule of quay cranes and yard trucks, allowing the minimisation of the total dwelling time of cargoes.

7.1 Operation and Management of Dry Port

The operation and management of dry ports hinge on the functional interdependencies among different agents and officials at the dry ports. Typically, the development of dry ports forms part of a national plan, such as railway upgrading projects, highway development, and seaport expansion. Therefore, they must align with other national schemes and budgets.

The capital structure (whether it is publicly funded or privately funded) greatly influences the management body of dry ports. The designer of dry ports must integrate personnel with different skill sets for the establishment of dry ports. However, the operation and management of dry ports do not require several of these skills after establishment. Therefore, the controlling body has to ensure:

a) Find a suitable management structure for the size of the facility.

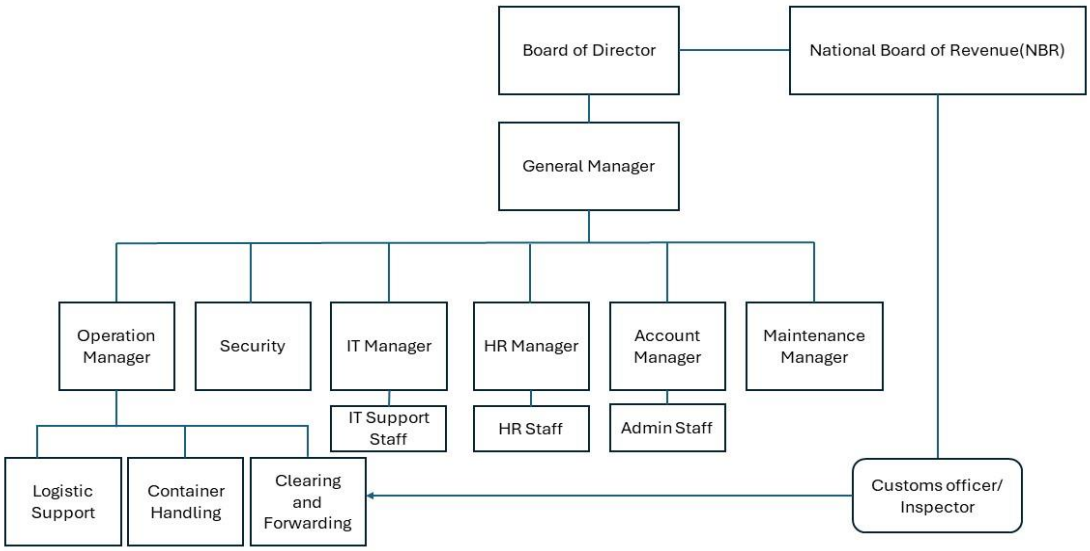
b) Set clear management objectives.

c) Monitor the success of the management.

7.2 Management Structure

The following organogram describes the operational body of management:

Figure 7.2: Proposed organogram for the management of off-dock/ dry port



Source: RAPID's desk research

Note: Whether each of the sections mentioned above needs a separate manager depends on the size of the dry port.

7.3 The Management Team

General Manager

The success of the dry port largely depends on the quality of its manager. The manager should have a skill set and experience in managing labour, preferably with commercial experience in port operations. Additionally, the manager needs to have primary training in a suitable dry port environment and form commercial links with world-class multimodal transport operators, shipping agencies, freight forwarders, railway experts, and the appropriate port authority. The manager will also spearhead the recruitment of site staff, including senior functional managers.

Security

An off-dock facility's security officer plays a vital role in guaranteeing the safety and security of the facilities, individuals, and merchandise. Off-dock facilities, which are commonly utilised for storage, container handling, and logistics operations outside of the primary port zone, necessitate comprehensive security protocols owing to the inherent nature of the operations and the high value of the commodities being managed. The security officer's primary role is to oversee the surveillance of the transportation and storage of commodities in order to prevent theft, loss, or damage. This includes conducting routine inspections of containers, cargo, and storage facilities, as well as devising security protocols to protect valuable or sensitive shipments. The department’s primary task is to ensure no intrusion of unwanted cargo inside the dry port premises. The department staff will be instructed to check all incoming and outgoing vehicles. This is a compulsory arrangement for a functional dry port, which smooths the operations of the dry port.

IT Manager

An IT Manager in an off-dock setting has the responsibility of supervising and controlling IT operations, systems, and infrastructure to ensure their efficient and secure functioning. Their responsibilities include engaging in strategic planning, discerning technology requirements, and formulating a technology roadmap that is in harmony with the organisation's expansion strategies. In addition, they manage the process of selecting vendors and assessing different hardware and software alternatives based on factors such as cost, compatibility, and support. As team leaders, they delegate responsibilities, establish priorities, supervise day-to-day activities, and guarantee that team members are equipped with the requisite tools and resources. They are responsible for managing the network infrastructure, ensuring that all components function seamlessly to fulfill the varied needs of the organisation. They systematically evaluate current processes, technologies, and vendor agreements to identify opportunities for enhancements. Within an off-dock setting, their responsibility is overseeing the IT systems that monitor the movement of goods, maintaining communication with administrative services, and guaranteeing the safety and quality of delivery. They collaborate closely with dock supervisors and other operational staff to ensure that the IT systems efficiently facilitate the dock's operations. In addition, they are responsible for supervising the cloud platform where all the clearance certificates are uploaded.

Operation manager:

The individual selected for this role will take responsibility for the day-to-day functioning of the dry port. The operation manager must have previous professional experience at a highly efficient dry port. This role requires proficiency in container and cargo handling, as well as exceptional managerial abilities. The chief of operations may designate staff assistants to assume various responsibilities under their supervision, contingent upon the scale of the dry port. The operations manager will offer logistical assistance, container handling, customs clearance, and forwarding services. The customs department will also collaborate in the clearing and forwarding procedure. In addition, the operation is responsible for supervising the entire process of maintaining the container lifting equipment, forklift trucks, and transport vehicles. Consequently, the individual must possess a basic proficiency in mechanical abilities. The role of the engineering department leader is equally essential for the progress of site development.

Account Manager:

This position is unrelated to dry port operations. Therefore, the requirements for this role do not necessarily include knowledge of the intricacies of dry ports. However, the person must have a certain level of accountancy training and familiarity with information systems. This department, in addition to carrying out accounting tasks, provides management information to other departments on operational costs and statistics.

7.4 International Best Practices

India

Dry port development in India dates back to 1988 with the establishment of Container Corporation of India Ltd (CONCOR) as a subsidiary for the Indian railways to oversee the operation of the rail-linked Inland Container Depot (ICD) network. India has currently 129 Inland container depots and CONCOR undertakes the design and operation of 59 ICDs. The primary objective of these rail-linked ICDs is to offer conduits for the purpose of transporting containers from seaports to inland destinations and from inland destinations to seaports. Containers are generally handled in trains consisting of standard rakes of 45 container flat wagons with each of the flat wagons carrying two TEUs.

Land and Location

In India, the ICD culture is vastly different in the southern part of the country from that of the northern regions. The north Indian dry ports are located at a distance of around 1500 kilometers from the seaports. For example, the Dardi ICD in the New Delhi region is 1536 kilometers away by road and 1493 kilometers away by rail from the port of Mumbai. However, ICDs in the south are generally closer in distance from the seaport area. Such as the Whitefield ICD in Bengaluru located around 350 kilometres away from the port of Chennai. The land intensity of the ICDs has been an issue in India since acquiring land in India is a cumbersome task. For example, the total area acquired by Dadri ICD is around 105 hectares while only half of the area is currently in use for the operation of Dadri.

Rail Operations

The Inland Container Depots developed by CONCOR receive and dispatch containers. These terminals are primarily linked to the electrified truck-line network used by Indian railways. Block container trains consist of single electric locomotive and 45 flat wagons with each of them loaded with two 20ft or a single 40ft container. The loading and unloading area of containers is generally accessed by long railway sidings, with the first several meters electrified to allow for the rakes to be pushed in under the Rubber-tired Gantry Cranes (RTG) by the electric locomotive.

***Risk Assessment & Cargo Handling*:** Customs documentation is submitted online, and inspections are conducted by customs officials through thorough risk assessments. However, a significant Per centage of import consignments are still manually inspected, in contrast to the very low Per centage in developed countries. The ICDs lack proper X-ray scanners, which limits the digital inspection of import consignments. Additionally, they do not have sufficient laboratory testing facilities, leading to increased container dwelling times.

Operational Efficiency: The level of terminal handling and storage costs, as well as the dwelling time of cargo, can determine the operational efficiency of dry ports. Dry ports in India are usually developed by private organisations. The efficiency of the off-dock is primarily dependent on the location of the dry port/off-dock and the mode of transport. In India, most dry ports are linked with the railway network, and the location characteristics of dry ports in India are more favourable for increasing operational efficiency than those of northern dry ports. However, the customs clearance process is particularly inefficient, which in turn causes operational inefficiencies.

Australia

Most of Australia's international trade volume is not usually transported outside the major cities of Australia, and all of the major cities have seaports. Therefore, the depots established in the hinterland are predominantly domestic freight-oriented. However, export-oriented terminals are still operating at full force in the southeastern region of the country.

Land and Location: These terminals are usually located near the ports, inside or in the suburbs of major cities like Sydney, Melbourne, Brisbane, etc. The longest haul distance is 565 kilometers between the Merbein terminal and the port of Melbourne.

Rail Operations: Australia's premier terminals are not obviously linked to the rail network as they are positioned closer to seaports. However, recent introductions of terminals in Victoria and New South Wales are predominantly rail-served. With industrialisation and urbanisation intensifying in major cities of Australia, it is a state agenda to reduce congestion on the roads as well as in dry ports by constructing railway hubs for the transport of containers. It is assumed that short-haul container movement is sustainable if volumes and the frequency of container movement are considerably high.

Risk Assessment & Operational Efficiency: Australia integrates customs, immigration, quarantine, and border control functions into a single agency to simplify and expedite customs clearance procedures. They introduced a trade consignment approval and clearance process where all the applications and related features are available. A comprehensive customs risk assessment is conducted 72 hours before the arrival of a vessel at the port, based on deciding on physically inspecting consignments. The system conducts security risks in the case of quarantine.

One important limitation is that the Australian Customs and Border Protection Service (ACBPS) doesn't have X-ray tools at their disposal, which are done outside at one of the inspection centers. Therefore, the delays owing to the customs clearance process are minimal in Australian dry ports. There are also pre-clearance services available that allow import containers to be dispatched to their inland destinations fairly quickly. Australia started providing licensing of "B-Double" truck and trailer combinations in the 1990s to transport cargo and containers from seaports to inland terminals and from terminals to seaports. They are now the dominant force in the freight traffic among major cities, drastically reducing operational costs and increasing the efficiency of Australian dry ports.

Performance Metrics

To quantify the usefulness of a dry port, the World Bank has introduced a metric to gauge the performance of a dry port. The logistics performance index is the performance metric that aggregates macroeconomic data into one single index. The logistics performance index (LPI) is a weighted average score of dry ports from multiple countries on six criteria:

1) Efficiency of the clearance process
2) Quality of infrastructure
3) Facilities for arranging competitively priced shipments.
4) Quality of logistic services
5) Ability to track consignments.
6) timeliness of shipments in reaching their destination within the scheduled or expected delivery time.[35]

Efficiency of the clearance process: The efficiency of customs performance is a key determinant of a dry port's performance. The dimensions that determine the efficiency of clearance are speed, simplicity, and predictability of the customs clearance procedure. The quicker, simpler, and more predictable the process, the more efficient the dry port is.

Quality of infrastructure: The main features of the infrastructure are trade and transport-related infrastructure. The public sector plays a key role in ensuring the quality of infrastructure. However, infrastructure requirements relating to the design and operation of a dry port still need to be assessed to measure the performance of a dry port. The infrastructure includes railway, highway, and information technology infrastructure.

Facilities for arranging competitively priced shipments: The ease of arranging competitively priced international shipments is measured by the efficiency with which the local logistics industry operates and the availability of shipping options.

Quality of logistic services: The quality of logistics services hinges on the capability of freight forwarders, customs officials, and transport operators to operate effectively.

[35] Sustainability | Free Full-Text | Engaging Employees with Good Sustainability: Key Performance Indicators for Dry Ports (mdpi.com)

Ability to track consignments: The ability to track and trace consignments is measured by the transparency of cargo transport and the reliability of the supply chain. The ability of the port authority to have updates about real-time information is a crucial component of this performance index.

Timeliness: Ensuring that goods are transported within the scheduled or expected delivery time improves the reliability of the dry port, which in turn adds reliability and efficiency to the overall operation of the dry port by enhancing the supply chain.

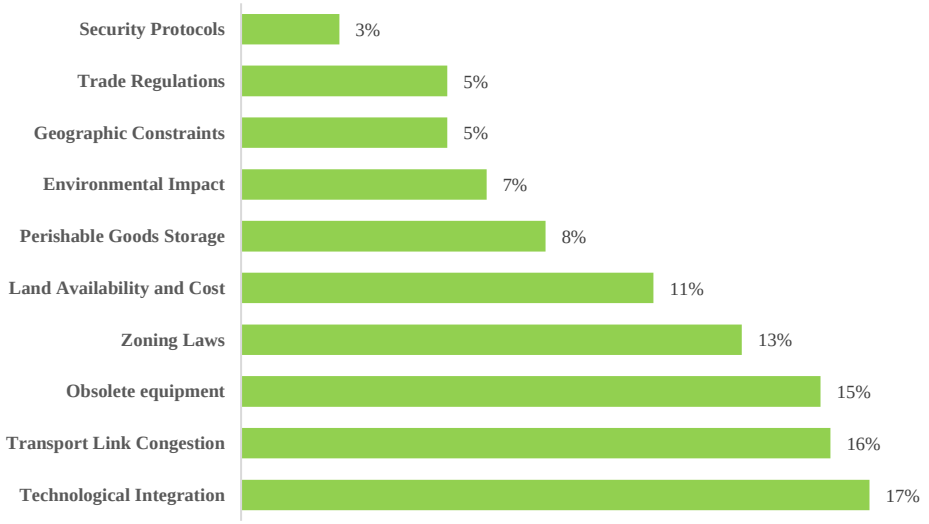
7.5 Findings from field visits: Principles and standards for the dry port design and operations

To improve efficiency and lessen traffic on the roads, Bangladesh must prioritise the rail network above the road and river transit for dry port access. By strategically using the vast railway network, the development of dry ports with strong rail connections will guarantee the efficient and economical transportation of commodities throughout the nation. Furthermore, each dry port ought to have refrigerated rooms in order to accommodate the substantial amount of exports that are perishable, such as seafood, fruits, and vegetables. Bangladeshi exports will become more competitive as a result of these facilities, which will preserve the integrity and quality of items that are sensitive to temperature and guarantee that they reach global markets in ideal shape. These dry ports will become even more environmentally responsible and operationally effective by implementing green technologies and sustainable practices including efficient waste management systems and renewable energy sources. Strong security protocols and cutting-edge ICT technologies for automation and real-time tracking will be essential for streamlining processes and guaranteeing the security of the cargo. Bangladeshi dry ports may play a far bigger part in the world supply chain by following these guidelines and regulations.

Major challenges with Off-docks in Chattogram:

To understand the primary obstacles associated with off-docks in Chattogram, the research team conducted an assessment among 64 stakeholders. They had the freedom to select multiple responses. The stakeholders present comprised individuals from many sectors, such as off-dock operators, importers, exporters, trailer providers, and other relevant parties. The primary challenges they encountered include technological integration, congestion in transport links, obsolete equipment, and zoning laws.

Figure 7.3: Stakeholders' challenges with off-dock in Chattogram



Source: RPID's presentation from KIIs

Technological Integration: Customs must assess every container during the process of importing or exporting. In order to proceed, the customs authority necessitates the submission of the appropriate bills and certificates. Nevertheless, exporters and importers still need to physically carry the paper documents associated with these bills and certifications, resulting in significantly longer processing times compared to the usual procedure. The stakeholders have proposed the establishment of a cloud server to store all approved documentation.

Transportation Link Congestion: Approximately 80 per cent of exports go through the Chattogram port. The substantial amount of freight creates traffic congestion and results in longer travel times than usual. Currently, one container is experiencing an average delay of 3 days. The off-dock owners, exporters, and importers are urging for a prompt resolution to this issue. The proposal involves constructing infrastructure such as elevated expressways and off-dock dedicated railways.

Obsolete Equipment: According to off-dock users, the majority of off-docks in Chattogram are equipped with outdated machinery, such as forklifts and side lifts. This equipment must be replaced with one that is more modern. At the same time, off-docks must be equipped with digital technology.

Zoning Law: Most off-dock owners expressed concerns regarding the zoning laws. The policy should explicitly define the distance criteria and zoning law for newly established dry ports.

Training and skill development programs for Dry Port Staff

According to the responses, it's evident that there is a consensus on the need for specific training and skill development programs for the workforce involved in Off-dock/Dry Port operations in Bangladesh: Details are below:

1. **Training Needs Identified:** Respondents emphasise the necessity for training in various areas such as communication, teamwork, customs procedures, safety protocols, digital tools usage, inventory management, customer service, problem-solving, and staying updated with industry advancements.

2. **Broad Skill Development Scope:** There is a broad spectrum of skills identified as crucial for the workforce, indicating a comprehensive approach to training that covers both technical aspects (customs, digital tools) and soft skills (communication, teamwork) necessary for efficient operations.
3. **Potential Benefits of Training:** Training and skill development programs are essential for enhancing workforce capacity and operational efficiency. It is acknowledged that investing in training can lead to improved performance and adaptation to technological advancements.

Advancements in technology influenced the efficiency and operations of existing Off-dock/ Dry Ports in Bangladesh

From the responses regarding the advances in technology and their impacts on the efficiency and operations of existing Off-dock/Dry Ports in Bangladesh, several important lessons can be learned. Overall, respondents agree that technology is essential for enhancing service efficiency by automating and improving processes. This improvement in efficiency can be attributed to technologies such as automated customs procedures, advanced tracking systems, and efficient inventory management. However, the implementation of these technologies has been inconsistent, and there is still insufficient investment in technological infrastructure, which continues to impede the achievement of optimal efficiency gains. The NBR official, who spoke anonymously, mentioned that dry ports need to start implementing the use of proper scanning, introducing automation processes, and, most importantly, lab testing if they are interested in expanding their import and export basket. He also opined that off-docks in Bangladesh lack sufficient equipment to handle cargo efficiently.

Lastly, off-docks should introduce tracking and tracing to ensure transparency in their transport process. It is believed that introducing tracking and tracing will mark a revolutionary change in cargo handling practices in Bangladesh. The stakeholders also emphasised the importance of introducing tracking and tracing procedures under one software to be monitored by the Chattogram Port Authority (CPA) and National Board of Revenue (NBR). This will solve the long-standing problem of lack of coordination among the concerned authorities. The stakeholders were surveyed regarding the necessity of using RFID (Radio Frequency Identification) to identify the containers from seaport to off-docks and vice versa.

The implementation of a robust digital tracking system that integrates seaports and Off-dock/Dry Ports involves several proposed strategies, including:

1. **Common System/Software Setup:** Stakeholders suggest setting up a common digital system or software platform. This unified system would enable seamless tracking and monitoring of cargo and containers as they move between seaports and Off-dock/Dry Ports. Such a system would facilitate real-time data sharing and improve operational coordination among all involved parties.
2. **Development of Custom/Port Authority Software:** Some respondents propose that customs or port authorities should take the lead in developing a dedicated software solution. This software would be tailored to meet the specific tracking and monitoring needs of seaport-to-dry port logistics, ensuring that data is accessible and utilised efficiently by relevant authorities.

3. **Implementation by ICT Division:** Recommendations include the development and implementation of the digital tracking system by the ICT (Information and Communication Technology) division of the Government of Bangladesh. This approach leverages technological expertise to create a sophisticated, ICT-driven solution capable of handling cargo and container movements across different transport nodes.
4. **Fast Development and Implementation:** Urgency is emphasised on swiftly developing and deploying an ICT-enabled, free system delivery to Dry Port authorities. This accelerated approach aims to quickly establish a comprehensive digital infrastructure that supports efficient logistics operations and enhances overall trade facilitation capabilities.

There may be challenges in implementing a system, including initial investment costs, technical integration challenges, data security, stakeholder alignment, and training. A successful deployment and operation of the digital tracking system requires collaboration among government bodies, private sector partners, and technology providers.

Hence, Bangladesh's seaports and offshore/dry ports must introduce innovative digital tracking systems to enhance transparency, efficiency, and coordination. The trade facilitation infrastructure of Bangladesh can be significantly improved by adopting advanced ICT solutions and establishing common software platforms.

It was noted by some respondents that specific technological implementations such as computerised documentation systems and digital gate systems had been implemented. There is no doubt that technology advancements have played a significant role in speeding up processes as well as reducing manual paperwork, but there are concerns as to the costs associated with implementing and maintaining these technologies. The technology at Off-dock/Dry Ports in Bangladesh has significantly influenced their operations as a result of simplifying services and improving operational efficiency, however, there is still a need for sustained investment and wider adoption of these technologies to fully achieve their full potential across the sector.

Moreover, advancements in technology play a pivotal role in integrating various aspects of supply chain management, from inventory tracking to customer management systems. This integration enhances visibility and coordination, leading to better inventory management and efficiency. Furthermore, respondents noted that improvements in logistics infrastructure contribute to increased capacity for international trade, thereby enhancing Bangladesh's Logistics Performance Index (LPI) and bolstering its competitiveness in global markets. Respondents highlighted the importance of adhering to government policies and regulations, including those set by bodies like the National Board of Revenue (NBR) and the Chattogram Port Authority (CPA). Compliance with these policies ensures that operations are conducted within legal frameworks and regulatory requirements, promoting transparency and accountability. Additionally, infrastructure quality and suitability are strongly stressed. This includes designing ports above flood levels to mitigate risks. It also ensures easy access to national highways and sea ports for efficient connectivity, and modern handling equipment to streamline operations and enhance productivity.

Specific infrastructure for the successful development and operation of Dry Port in Bangladesh

Based on the responses, regarding the specific infrastructure needs for the successful development and operation of Off-dock/Dry Ports in Bangladesh, several key requirements stand out. Respondents emphasised the critical importance of robust transportation links connecting the ports to industrial areas and seaports. Infrastructure for repair, maintenance, and administration services was frequently mentioned, reflecting the operational readiness and resilience required for effective port management. All seaports are an entity of global entrance points and must maintain international standards, especially when handling containers at the port jetty. A dry port is an associated logistics service provider organisation or institution that acts to support seaports by providing ancillary services other than vessel handlike. So, a dry port must maintain the same international standard of seaports and develop a better service organisation as per policies of port authorities, government, and UNCTAD.

Chapter 8: Incorporation of dry ports into transport documents and legal instruments

A dry port is an essential infrastructural addition to the national transport sector, and incorporating them into national transport policies and legal documents is a necessity. However, the incorporation of dry ports into these documents may be delayed due to the slow adjustment of domestic regulations pertaining to customs and other control formalities and procedures. In Bangladesh, we have yet to fully incorporate dry ports into national transport and legal documents. We explore the scenario below.

8.0 Dry Port in Transport Policy

The role of transport and communication systems in the overall mobilisation of a country's trade and economic well-being is far-reaching. Bangladesh, boasting a high number of rivers, adds an extra layer to the country's transport system. Bangladesh has a total of 22,476 kilometres of highways, while the total length of its railways reaches 3,101 kilometres. The country has recently taken several steps to improve the overall capacity of highways and ensure a disciplined road transport sector, including projects such as the Padma Bridge and the Karnaphuli Tunnel. Efforts have also been made to make railways more accessible, customer-friendly, and cost-effective. The recent introduction of metro rail has marked a revolutionary period in the country's railway sector. Additionally, several measures have been proposed and implemented to make noticeable progress in the water transport sector, laying out modern infrastructural facilities to facilitate the seamless transfer of cargo. However, the policy does not adequately include or mention inland components and cargo transport service issues. [36]

Current research trend:

Dry ports have received a great deal of attention in recent years, evident from the emergence of different terminologies related to dry ports, including inland container depot (ICD), inland terminal, container freight station (CFS), and freight village. The concept of dry ports has become popular due to their usefulness in the seamless transportation of cargo. The most researched dimensions of dry ports are freight distribution, the geography of dry ports, container systems, seaport development, rail networks, financing sources for dry ports, transportation services development, and container handling. Dry ports are considered a form of logistical preparation to find the best possible routes and schedules for a fleet of vehicles used in the delivery of transportation services between dry port-based intermodal system terminals (Bektas, Crainic, and Van Woensel 2015). An integrated multi-criteria decision-making approach is generally used to select dry port locations (Komchornrit 2017). A logistic gravity model has been developed to understand the radiated regions in the hinterland, and principal component analysis has been used to determine the logistical efficiency of dry ports (Wei, Sheng, and Lee 2018).

The integration of freight distribution has been one of the areas of interest for researchers, and Jeevan et al. (2019) have extensively studied the role of dry ports and container seaports. Qiu and Xu (2019) showed how a higher price of storage doesn't necessarily lead to an increase in dry port profit. The dry port study evaluates six key areas: port policies and governance, port management

[36] 2021-02-03-17-04-ec95e78e452a813808a483b3b22e14a1.pdf (plancomm.gov.bd)

and strategies, competition and performance, planning and development, dry port operations, and spatial analysis (Miraj et al. 2021)

8.1 National Land Transport Policy

The current trend in Bangladesh's policy framework has little to no place for inland container depots (ICDs). However, there are some policies regarding freight transport and intermodal transport. The Bangladesh road transport plan includes the following provisions for freight transport and container terminals:

1. Where tariff levels for passenger and freight are regulated, these will be reviewed across all modes of transport to ensure that costs to users are at a minimum consistent with other policy objectives
2. Physical integration between water, road, and rail modes is encouraged where there are benefits to users, cost reductions, or environmental improvements.
3. Vehicle taxes and regulations will be changed to encourage larger vehicles and to promote formal freight companies.
4. The government will remove regulations on BR regarding freight traffic so that tariffs can be negotiated to maximise market share. When Government departments wish to use the railway to carry goods at below-market tariffs, they will need to make up the difference between the costs of carrying and revenues.
5. Bangladesh Railway (BR) will also be asked to examine the possibility of operating inter-city freight services to fixed timetables and to establish a joint working team with BRTC and private sector partners with a view to offering integrated rail/road services for freight.
6. In terms of operations, BR will introduce better systems for planning and using rolling stock. The priority call on better quality stock should be in the profitable inter-city and freight sectors.
7. Accordingly, BR will look at increasing the number of container terminals. Options for new terminals in cities outside Dhaka, as well as at Tongi, will be studied.
8. BR will introduce a programme for fitting vacuum braking to freight wagons so that they can be used more efficiently, and a scrapping policy for unused locomotives, coaches, and wagons will be developed.
9. The government will remove regulations on BR regarding freight traffic so that tariffs can be negotiated to maximise market share. When Government departments wish to use the railway to carry goods at below-market tariffs, they will need to make up the difference between the costs of carrying and revenues.
10. BR will also be asked to examine the possibility of operating inter-city freight services to fixed timetables and to establish a joint working team with BRTC and private sector partners with a view to offering integrated rail/road services for freight. [37]

[37] Microsoft Word - NLTP_Bengaly-English _Final_.doc (portal.gov.bd)

8.2 The National Logistic Policy, 2024

The National Logistic Policy, 2024 got the final approval for the first time in Bangladesh to expedite economic progress through building world-class technology-based, time-consuming, efficient, and environment-friendly logistics systems. Institutional capacity, lack of skill demand of manpower in the logistic sector, potential investment in the logistic sub-sector, research-based recommendations for the development of the logistic sector, and work plans have been incorporated into the national logistic policy.

8.3 Bangladesh Perspective Plan

The Bangladesh Perspective Plan includes a provision for establishing a balanced intermodal transport facility. Despite roads being the primary component of the country's transport network, several issues persist within the system, including land constraints, social disruption, environmental concerns, and considerations of unit costs. These factors underscore the need for a more balanced development of the transport network, with a greater emphasis on enhancing inland water transport and railways since both modes are largely underutilised. The Perspective Plan 2024 (PP2041) will prioritise developing these two modes of transport to reduce pressure on roads and amplify the intermodal connection. The port-to-factory gate connection, facilitated by dry ports, is considered a major upgrade in trade logistics in the PP2041. These and other options that help improve the intermodal transport balance will be assessed and improved following an integrated transport planning process. Regular updates on these will reflect the changing transport dynamics.[38]

8.4 National Integrated Multimodal Transport Policy (NIMPT)

The integrated multimodal transport policy has the following aims:

1. Identifying the key infrastructure improvements for the future;
2. Ensuring that multimodal plans are implemented covering ports, barging, dock facilities, customs procedures and associated banking issues so that these all work together;
3. Introducing modern procedures to create new employment in this sector, enhance capacity and raise wages;
4. Developing relationships with trade unions based on mutual trust;
5. Increasing capacity and efficiency of Chattogram and Mongla seaports, including consideration of a deep-sea port, and ensuring that ports are fully connected by rail and inland water transport.[39]

Crucial to the improved trade status of Bangladesh, off-docks or inland container depots have been largely ignored in policy discussions, and policy formulations lack sufficient mention of off-docks or dry ports. Although the Bangladesh transport policy mentions dry ports in a limited way,

[38] PERSPECTIVE PLAN OF BANGLADESH 2021-2041

[39] Inner Makeup Final (portal.gov.bd)

it can be made more comprehensive and realistic with the inclusion of inland container depots/off-docks.

8.5 Findings from field visits: Incorporation of dry ports into transport documents and legal instruments

The existing legal framework controlling transport and logistics in Bangladesh does not have clear rules that define the role, function, and regulatory surveillance of dry ports. Current transportation regulations and policies generally prioritise seaports, airports, and conventional land transportation methods, neglecting to appropriately address dry ports. The absence of regulations in this area creates uncertainties and contradictions in the functioning and administration of dry ports, which ultimately leads to inefficiencies and missed chances to enhance the efficiency of the logistics process.

Stakeholder Perspectives on Legal Incorporation

Stakeholders from government agencies, transport operators, logistics companies, and trade associations unanimously underscored the need for a dedicated legal framework for dry ports. This is because most countries have made necessary advances to introduce off-docks/dry ports into their transport documents, thereby making transport policy more comprehensive. The Bangladesh Inland and Water Transport Authority finds it urgent to introduce them into national documents since it will facilitate trade among nations, especially easing trade with neighbouring countries. The NBR official lamented the lack of coordination in designing such documents among the governmental organisations. He also acknowledged the fact that these transport documents and legal instruments are considered a broad category of entities. Therefore, it is understandable that there is little to no mention of off-docks in transport documents and legal instruments. The Ministry of Commerce official posits that the national logistics policy encompasses all the infrastructural and logistic sectors including inland container depot. The policy mentions around 8 to 10 aspects of logistics. Overall, stakeholders pointed out that without clear legal recognition, dry ports struggle to attract investment, operate efficiently, and integrate seamlessly with other transport modes. The respondents also indicated a preference for paperless documentation accompanied by multimodal bills of lading. This highlights a clear desire for streamlined and digital documentation processes that accommodate multiple modes of transportation within a single legal framework. Multimodal bills of lading are legal documents that cover the shipment of goods over various modes of transport, such as by sea, rail, and road. This unified approach to documentation reduces administrative complexity and enables smoother logistics operations across different segments of the transport industry.

A comprehensive legal framework would provide clarity on the roles and responsibilities of various stakeholders, which could streamline administrative processes, and enhance operational efficiency.

Recommendations for Legal Integration

To address these challenges, stakeholders proposed several key recommendations for incorporating dry ports into transport documents and legal instruments in Bangladesh:

1. **Definition and Classification:** The legal framework should provide a clear definition of dry ports, distinguishing them from other types of inland terminals. It should classify dry

ports based on their functions, capacity, and strategic importance, which would help in formulating targeted policies and regulations. There should be no disagreement or dispute over the implementation of numerous policies concerning dry ports.

2. **Regulatory Oversight:** Establishing a dedicated regulatory body or expanding the mandate of existing authorities like the Bangladesh Land Port Authority (BLPA) to include dry ports is crucial. This body would be responsible for licensing, monitoring, and regulating dry port operations, ensuring compliance with national standards and international best practices.

3. **Inclusion in National Transport Policies:** Dry ports should be explicitly incorporated into national transport policies, such as the National Integrated Multimodal Transport Policy and the National Logistics Policy. This inclusion would ensure that dry ports are considered in national transport planning, investment priorities, and development projects.

4. **Harmonisation of Procedures:** Streamlining customs and administrative procedures specific to dry ports is essential. Stakeholders recommended adopting electronic documentation and customs clearance systems to reduce delays and improve efficiency. Harmonising these procedures with those at seaports and other border points would facilitate smoother cargo movements.

5. **Public-Private Partnerships (PPPs):** Encouraging PPPs in the development and operation of dry ports was a recurrent theme. A robust legal framework should provide guidelines for PPPs, ensuring transparent and fair processes that attract private investment while safeguarding public interests.

6. **Environmental and Social Considerations:** Incorporating environmental and social impact assessments into the legal framework for dry ports is necessary. These assessments would ensure that the development and operation of dry ports adhere to sustainable practices, minimising their environmental footprint and ensuring community engagement and benefits.

7. **International Guidelines:** Considering international guidelines and frameworks, such as those provided by UNCTAD (United Nations Conference on Trade and Development), can offer valuable insights and best practices for setting up and managing Off-dock/Dry Ports at cross-border locations. Aligning with international standards helps harmonise procedures and improve efficiency in global trade operations.

Case Study: Dhirasram Dry Port

One concrete example highlighted during the FGDs was the proposed Dhirasram Dry Port near Dhaka. Stakeholders emphasised that integrating Dhirasram into the legal and regulatory framework could serve as a model for other dry ports in the country. By addressing regulatory challenges and providing a clear operational framework, Dhirasram could optimise its role as a key logistics hub, alleviating pressure on the Chattogram Port and improving cargo distribution efficiency.

Implementation Roadmap

To implement these recommendations, stakeholders suggested a phased approach:

1. **Legal Review and Drafting:** Conduct a comprehensive review of existing transport laws and policies to identify gaps and inconsistencies. Draft new legislation or amend existing laws to incorporate provisions specific to dry ports.
2. **Stakeholder Consultation:** Engage in extensive consultations with all relevant stakeholders, including government agencies, industry representatives, and international experts, to ensure that the legal framework addresses practical needs and aligns with global best practices.
3. **Capacity Building:** Invest in capacity building for regulatory authorities, dry port operators, and other stakeholders. Training programs and technical assistance can enhance their understanding of the new legal requirements and improve compliance.
4. **Pilot Projects:** Implement pilot projects to test the new legal and regulatory framework at selected dry ports. These pilots can provide valuable insights and lessons that can be applied to the broader implementation.
5. **Monitoring and Evaluation:** Establish a robust monitoring and evaluation mechanism to track the implementation of the legal framework, assess its impact, and make necessary adjustments.

Challenges to improving the legal framework may include bureaucratic delays, regulatory complexities, and stakeholder consensus. Overcoming these challenges requires collaborative efforts among government agencies, private sector entities, and international organisations. This is to enact and enforce policies that foster a conducive environment for Off-dock/Dry Port development and integration into the broader transportation network.

Chapter 9: Best Dry Port Examples Around the World

Many dry ports in developing countries are land-driven inland terminals established by local authorities to support local markets and industrial zones, particularly those focused on exports. These ports, typically situated near industrial areas, offer limited services primarily centred around container handling and customs clearance for export-oriented industries. They are strategically positioned approximately 50 to 150 kilometres from seaports. However, similar setups are not uncommon in developed countries.

9.0 Bayernhafen Nürnberg

In contrast to developing countries, developed countries have more functioning, capable, and efficient dry ports where a large number of daily turnovers is a regular phenomenon. One of the examples is Germany's Bayernhafen Nürnberg. This dry port is one of Europe's most improved and busiest freight transport and logistics hubs. The dry port enhances multimodal freight transport by efficiently connecting road, rail, and inland waterways. Bayernhafen Nürnberg provides services to a range of industries, including transport and logistics, recycling, freight handling, warehousing, and trade. It is a multifunctional port which is located inside the city area and offers value-added services as well as handling of containers and loading and unloading of imported cargoes. The dry port's location plays a vital role in the distribution of imported goods on demand to city residents as well as the distribution of raw materials, and intermediate and semi-finished goods. The port oversees the transport of cargo from the outskirts to the urban area, and the transport of goods produced near the port area to the city. The entire Bayernhafen expanse, including Aschaffenburg, Bamberg, Nuremberg, Roth, Regensburg, and Passau, encompasses an area of 800 hectares. The strategic land management of the Bayernhafen group has empowered them to meet both current and future needs.

The heavy-lift service available at Bayernhafen Nürnberg is particularly beneficial for neighbouring companies that deal with heavy materials, such as the Siemens Transformer Plant in Nuremberg. Thanks to its heavy lifting expertise, the dry port has attracted attention from companies around the globe and has become a standout performer in recent years. In the 2023 financial year, an outstanding 3.98 million tonnes of cargo and freight were handled by Bayernhafen Nürnberg and Bayernhafen Roth, using the waterway and rail network. The dry port has been able to cut 230,000 road trips by effectively using environmentally friendly transport modes, namely inland waterways and the rail network. Combined transport amounted to 318,471 TEUs at Bayernhafen Nürnberg in the 2023 financial year.

A majority of Bayernhafen's infrastructure, including Nürnberg, is trimodal, consisting of a rail network, roadways, and inland waterways. The high-performance and versatile tools frequently used include quayside facilities, a dedicated train network with formation facilities, transfer yards for loading, and loading ramps along with roll-on/roll-off services, enabling the transfer of road vehicles from road to ship without using handling machinery. The quayside facilities involve two docks and six quays with more than 10 cargo handling zones. Track facilities in the quayside and the freight yard ease the processes of shunting, assembling, loading, and unloading of block trains. The dry port possesses a high-functioning and publicly accessible rail network. Around 90 per cent of Bayernhafen's land and 80 per cent of the quays are connected to the railway system.

All forms of cargo, such as bulk, break bulk, heavy-lift, liquid cargo, and containers, are usually transported through the port using state-of-the-art technology. This includes high-functioning cranes, modern handling equipment, and special handling tools for heavy-lift cargo. The dry port is home to a range of silos, oil tanks, refrigerators, and modern warehouses. The Bayernhafen group has a trimodal container terminal linking Bavaria to the northern seaports of Germany.[40]

9.1 Birgunj Dry Port

Nepal, one of the neighbouring landlocked countries of India, heavily depends on the ports of Northern India, such as Kolkata port in India's West Bengal province. Birgunj is a multimodal dry port, connected with the rail network of India, designed to handle the transport of goods from seaports to inland destinations as well as to ports from the inland destinations by direct transfer of containers and break-bulk cargo from the port of Kolkata and other popular places of India. Moreover, the dry port activities peak in the winter season when companies start stockpiling their goods and are most dormant in the rainy season (June-August). Expanded around 94 acres of land, the handling capacity of Birgunj dry port exceeds 100,000 TEUs (Twenty-foot Equivalent Units) annually while it has the capacity to store up to 1,568 TEUs. In 2022, the import cargo handled by the port amounted to 55,504 TEUs, and the export cargo handled by the Birgunj Inland Container Depot (ICD) is roughly 1,200 TEUs. Among them, bulk cargoes amount to 520,257 metric tons, and break bulk is 232,198 metric tons. Additionally, Birgunj dry port boasts a moderate level of equipment.

Table 9.1: Equipment at Birgunj dry port

Equipment	Available	Total Quantity and Capacity Available	Comments on Current Condition and Actual Usage
Container Gantries	No	N/A	N/A
Mobile Cranes	Yes	8, 60 mt	Operational and is used for Iron and steel handling
Reach stacker	Yes	3, each of 45 mt capacity 1 of 7 mt capacity for empty containers	Operational and is used for container handling
RoRo Tugmaster (with Trailer)	No		
Grain Elevator with Bagging Machines	No		
Transtainer	No		
Forklifts	Yes	2, 3 mt each	Operational

Source: Birgunj dry port website

[40] bayernhafen - Nürnberg

Table 9.2: Facilities at the Birgunj dry port

Facilities	20 ft	40 ft
Container Facilities available	1 container ice cargo	1 container for bagged cargo
Container Freight Station (CFS)	No but planned to have 3 refrigerated CFS	
Refrigerated Container Stations	No	
Other Capacity Details	N/A	
Daily Take off Capacity	3-4 Racks in a day	
Number of Reefer Stations	2 plug ins for dual services	
Emergency Take-off Capacity	5 fire hydrants around CFS	
Off take Capacity of Gang Shift	N/A	

Source: Birgunj dry port website

Additionally, Birgunj ICD has two warehouses: one is a Container Freight Station (CFS) shed, and the other is a goods shed with sizes of 7,000 square meters and 10,000 square meters respectively. It is a rail-connected terminal located 450 meters away from the Indian border with facilities to handle all types of cargo. The port's security system has also been developed with the addition of a CCTV monitoring system and the placement of security guards at important points. Birgunj Integrated Check Post (ICP) is also available to carry out the customs clearance process.[41]

[41] Nepal - 2.1.2 Birgunj Dry Port | Digital Logistics Capacity Assessments (logcluster.org)

Box 1: Case Study of Savannakhet Dry Port, Laos

Savan Logistics stands as a cornerstone of trade infrastructure within the Southeast Asian region, strategically located along the pivotal east-west corridor linking Myanmar, Thailand, and Vietnam. Spanning an expansive 22,000 square meters, this dry port boasts essential facilities such as warehouses, port offices, and customs houses. Positioned equidistantly between Thailand's bustling Bangkok port and Vietnam's Danang Seaport, it serves as a vital link facilitating seamless trade flow. It houses comprehensive customs and clearance facilities within the confines of the dry port, streamlining trade processes and bolstering efficiency. The dry port provides comprehensive logistics services to domestic and foreign clients, with dedicated area for Full Container Load (FCL) and Less Container Load (LCL) cargo. One of the special features of Savannakhet dry port is the free trade zone designed to facilitate easy movement of cargo. The benefits of the free trade zone include easy re-exporting procedure with minimal duty or duty free re-export, improved compliance, monitoring of inventory and quality control and specious warehouse providing unlimited storage time facilities.

Savan Logistics Co., LTD undertakes all customs clearance processes at dry ports, including warehousing and onward delivery for organisations importing into and exporting out of the country. They offer a one-stop customs clearance service for import and export, providing fast and accurate service to clients. A risk management and information system has been introduced to assist in preserving and strengthening property values, managing claims, policies, and offering tracking devices, as well as management reporting capabilities to enable clients to monitor and minimise the cost of risk management.

The location of the Savannakhet dry port has been optimised to serve as a regional transshipment hub that links carriers, clearance and forwarding agents, importers, and exporters using world-class facilities, including truck, container, and bulk cargo services. The dry port also uses the Inland Container Data Management System (ICDMS), an advanced data management system. This system inspects data containers using Gram Software Solutions, where the real weight is recorded and monitored by customs officers.

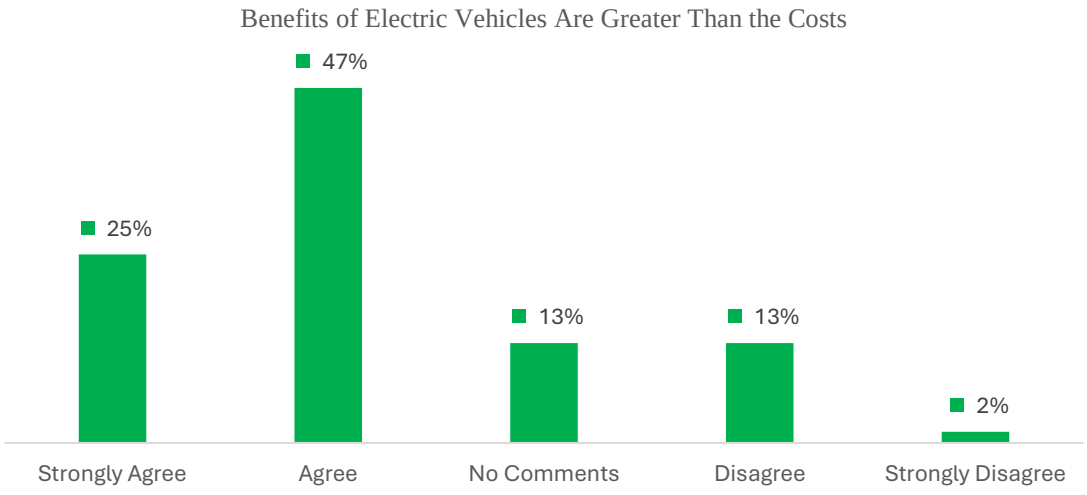
Box 2: Case Study Dosso Dry Port, Niger.

The Dosso dry port in Niger is the premier example from a landlocked country. Situated along the Dori (Burkina Faso)- Cotonou (Benin) corridor, 140 km east of capital Niamey, the port stands as a significant advancement in Niger's infrastructure. Given its landlocked status, Niger heavily relies on the infrastructure of neighbouring countries for import and export, resulting in elevated transport costs. This stands as a significant impediment to the country's economic welfare. The implementation of the Dosso Dry Port project was undertaken by International Finance Corporation (IFC) and the govt of Niger (a public-private partnership) to streamline and expedite international trade processes, minimise bureaucratic hurdles and transportation expenses, and relocate the time-intensive sorting and processing of goods from congested seaports of other countries such as Cotonou (Benin), Lome (Togo), Tema (Ghana), and Abidjan (Côte d'Ivoire) to inland locations of Niger. Anticipated to be multimodal, the dry port is set to link with the new railway project connecting Benin (Port of Cotonou) and Niger. Furthermore, the Dosso dry port platform is poised to become the largest multimodal cargo handling centre for merchandise imported from Benin.

9.2 Findings from field visits: Best Dry Port Examples Around the World

Various insights and data are collected by conducting key informant interviews (KIIs) and focus group discussion (FGD) about the standard of dry ports/ off-docks in Chattogram. Almost every stakeholder mentioned that Bangladeshi dry ports/off-docks lacked sufficient infrastructural requirements to justify the world-class title. According to the intelligence wing of NBR, dry ports need to develop tracking and tracing procedures to instantly find information regarding the location and well-being of cargo. Exporters and importers as well as truck owners' association need to come forward to incorporate tracking and tracing procedures in the operational procedure of dry ports. According to the Ministry of Commerce official, Bangladeshi off-docks need to be spacious to match the most functioning dry ports of the developed world. To materialise this, off-docks should be developed outside Chattogram city. However, it would be difficult to establish customs offices there to manage the customs clearance process. We need to formulate proper policies and implement them carefully. The matarbari deep seaport is a step in that direction, however, to realise its full potential, Bangladesh needs to introduce a transhipment process. It also needs to introduce electric vehicles to transport documents from seaports to off-docks and vice versa to take a step in the direction of becoming world-class dry ports/off-docks. Therefore, stakeholders were asked whether the benefit of introducing electric vehicles would outweigh the cost. The results are summarised in the following chart.

Figure 9.1: Stakeholders' Opinion



Source: RAPID's presentation using the data from KIIs

The above results show that 70 per cent of people reported having positive views on implementing electric vehicles while 13 per cent of stakeholders participated in FGDs and KIIs offered no comments and finally, 13 per cent of the stakeholders opposed the introduction of electric vehicles to the dry port apparatus in Bangladesh while 2 Per centage of people strongly opposed the idea. The stakeholders cited the high cost of electric vehicles as the reason behind their opinion. The electric vehicle will greatly reduce the negative environmental impact on Chattogram City and congestion on Dhaka-Chattogram highways. It is also important for the Port Authority, Ministry of Shipping and RHD (Roads and Highways Department) to jointly take initiatives to implement the decarbonisation process in freight transportation management by introducing electric vehicles.

Chapter 10: Proposed arrangements for customs clearance at dry ports:

To maximise the border clearance operations of dry ports, it is imperative to consolidate the various border control procedures (such as customs, quarantine, and health) and documents under a unified authority for each dry port. The implementation of the "single window" idea is crucial in order to minimise redundant procedures and personnel, as well as to decrease the amount of document processing required in dry ports. To improve the border clearance operations at dry ports, it would be beneficial to equip on-site inspection personnel with the requisite IT systems to conduct risk assessments of imported shipments. Customs agencies in certain countries in the region have implemented a cargo pre-clearance system, where import shipments are evaluated for risk 72 hours prior to the arrival of the vessel at the port. These assessments utilise online customer (or consignee) profiles to determine if the clearance of consignments presents an acceptable degree of risk. There are significant advantages to conducting these inspections by border control personnel stationed at dry ports, especially if these personnel would eventually have the final say in approving the cargo destined for their facility.

10.0 Existing arrangements of ICDs/CFSs in Bangladesh:

In order to address the issue of congestion at the Chattogram seaport, the government supports the establishment of Off-Dock facilities. These are represented as privately owned Container Freight Stations (CFSs) or Inland Container Depots (ICDs). To facilitate the transfer of imported goods, which are loaded in containers, to these private Inland Container Depots (ICDs) for the purpose of completing customs procedures.Three main functions of private ICDs/CFSs in Bangladesh[42]:

1. **Handling of import containers:** The import consignments are scanned at the port gate before being transported on chassis from Chattogram Port to the relevant off-docks. Imported products undergo physical inspections at off-docks using risk management strategies. The Chattogram Chamber of Commerce will implement the LMD system to measure the weight of raw cotton in private ICDs. Customs evaluation is conducted in Chattogram Customs House, where a discharge order is subsequently granted. Merchandise is unloaded and transported from privately owned off-dock facilities.
2. **Export container handling**: Regarding export customs regulations, all containers are permitted to be accessed directly from off-docks. Customs officials stays at the private Inland Container Depots (ICDs) to oversee the process of loading export goods into containers, and if needed, they conduct physical inspections. Evaluation is conducted in Chattogram Custom House. Once the necessary procedures are finished at the private Inland Container Depot (ICD), containers that have been filled are permitted to enter the port region. After the remaining procedures are completed, the containers are loaded onto a ship for export.

3. **Handling empty containers:** Once the imported goods are unloaded and delivered from either the port or private storage areas, the shipping agents move the empty containers to

[42] Main functions of ICDs/CFs in Bangladesh

their chosen storage places. Some of these containers are then filled with goods for export, while others are sent back as empty. If these empty containers aren't removed within a certain time, they can be sold at auction.

10.1 Proposed arrangements by UNESCAP for customs clearance at dry port

Dry ports must have the capability to offer comprehensive services that include customs, quarantine, and health regulations for the efficient processing of international cargo transhipment. To ensure the efficiency of dry ports within a regional framework, it is necessary to provide them with the appropriate infrastructure and regulatory authority. This will facilitate the clearance of international cargo while minimising intermediate border checks that are necessary for security purposes. The optimal approach is to have border inspection officers stationed at dry ports on a permanent basis. If this is not possible, alternative measures should be put in place to ensure their immediate availability for inspections when required. It is important to mention that many existing dry ports in the region already have a regular presence of customs inspection workers.

1. **Full Border Clearance Authority:** Every dry port should possess complete border clearance authority and facilities. Consequently, it is important for dry ports to have the essential infrastructure and staff to efficiently manage customs clearance procedures. Ultimately, it is necessary to have border inspection personnel centred at dry ports on a permanent basis, or alternatively have workers readily available to conduct inspections as needed

2. **Single Window System:** Measures should be implemented to create a unified interface and advanced computer systems in dry ports. A single window system enables all stakeholders in trade and transport to submit standardised information and documents at a central location, thereby meeting all regulatory obligations connected to import, export, and transit. The single window concept comprises the consolidation of all border control activities (including customs, quarantine, and health) and documentation into one integrated office located at each seaport, airport, border post, or dry port. The use of the single window idea is crucial for eliminating redundant procedures and employees, as well as reducing the workload of document handling in dry ports.

3. **Regulations for Transit Cargoes:** The clearance of transit items in destination dry ports has to be regulated. This involves developing policies and guidelines for managing commodities passing through dry ports.

10.2 Findings from field visits: Proposed arrangements for customs clearance in dry port

Authorised Economic Operator

Resource persons from The Ministry of Commerce have proposed the implementation of the Authorised Economic Operator (AEO) program. In order to make customs clearance at dry ports

in Bangladesh more efficient, they suggested a plan involving implementing the Authorised Economic Operator (AEO) program. This program identifies enterprises that are compliant and reliable, allowing them for faster processing and clearance of their cargoes. By implementing an Authorised Economic Operator (AEO) framework, the existing issues of congestion, procedural delays, and bureaucratic bottlenecks can be minimised to a large extent. This would result in a notable reduction in clearance times and a substantial improvement in trade facilitation. The proposed plan would entail establishing exclusive AEO lanes at dry ports, deploying sophisticated risk management technologies to conduct pre-screening of imports, and promoting enhanced cooperation between customs authorities and AEO-certified enterprises. In addition, allocating funds towards the development of digital infrastructure for e-clearance systems and providing comprehensive training to customs officials on Authorised Economic Operator (AEO) processes would significantly improve operating efficiency. Implementing this comprehensive approach would not only simplify the process of clearing goods but also enhance trade security and adherence to regulations, thereby establishing Bangladesh as a more competitive participant in regional and global trade networks.

Technological Efficiency Enhancement

As a way to improve the efficiency of customs clearance at dry ports in Bangladesh, it is necessary to implement a comprehensive system that includes automation, improved phytosanitary procedures, and a reliable vehicle tracking mechanism. The suggested solution aims to address the existing issues of congestion and procedural inefficiencies by introducing an integrated digital clearing system. This system automates the submission, processing, and approval of documents, minimising the need for human involvement and eliminating errors. Enhancing the phytosanitary inspection process through the utilisation of cutting-edge screening technologies and immediate data exchange can guarantee expedited and precise adherence to health regulations, which is essential for the import and export of agricultural products. In addition, the implementation of a GPS-based vehicle tracking system will enable the monitoring of products' passage from the port to their ultimate destination. This will ensure transparency and minimise the likelihood of smuggling and theft. By integrating these technological advancements with the Authorised Economic Operator (AEO) program, which grants expedited processing to businesses that comply with regulations, Bangladesh can greatly improve the efficiency, security, and dependability of its dry port operations, creating a more favourable environment for international trade. While several stakeholders expressed concerns about the extra expenses associated with implementing this vehicle tracking system, it is possible that if the demand for these services grows, economies of scale might be achieved.

Recommendation from stakeholders

Expectations and needs of importers and exporters According to respondents' feedback regarding importers' and exporters' expectations and needs concerning Off-dock/Dry Port facilities, several consistent themes emerged. Importers and exporters have clear expectations and requirements for these facilities to effectively support their operations.

Fast Services: Importers and exporters expect Off-dock/Dry Ports to provide expedited services to ensure quick turnaround times for shipments. This includes prompt customs clearance and efficient handling processes to minimise delays.

Reliability: Operations require reliability in operations, ensuring shipments are handled securely and schedules are adhered to. Reliable service contributes to supply chain consistency and customer expectations.

Easy Customs Procedure: Simplified and streamlined customs procedures are crucial for importers and exporters. They expect Off-dock/Dry Ports to facilitate smooth clearance processes, reducing bureaucracy and paperwork to enhance efficiency.

Clear Fees and Costs: Transparency in fee structures and costs associated with Off-dock/Dry Port facilities is paramount. Importers and exporters expect pricing clarity to manage budgeting and operational expenses.

Advanced Technology: Adoption of advanced technology, such as digital tracking systems and automated processes is important according to them in expediting the customs clearance process. Focus should be given to increasing the use of advanced technology.

Key considerations for customs clearance processes at Dry Port

Respondents highlighted several important factors regarding the key considerations for customs clearance processes at Off-dock/Dry Port facilities.

1. **Presence of Customs Personnel:** One of the recurring themes was the importance of having customs officials present at the Off-dock/Dry Port facilities. This ensures that assessments, examinations, and clearance processes can be conducted promptly and efficiently.
2. **Quick and Timely Assessment:** Respondents emphasised the necessity for customs procedures to be conducted swiftly and on schedule. Timely assessment of cargo and containers is crucial to prevent delays in the logistics chain.
3. **Proper Documentation:** Proper documentation was cited as essential for smooth customs clearance processes. This includes ensuring that all required paperwork is accurate, complete, and submitted promptly to facilitate efficient clearance.
4. **Use of Technology:** There was a call for increased digitalisation and technology adoption to enhance customs clearance processes. Technologies such as automated document processing, digital tracking systems, and online document submission were suggested to streamline operations and reduce manual handling. However, several challenges were noted in implementing digitalisation and technology including costs, training requirements, security concerns, regulatory and policy alignment and infrastructure readiness.
5. **Physical Observation and Sampling:** Some respondents mentioned the importance of physical observation and random sampling during customs inspections. This ensures compliance with regulations and enhances the clearance process integrity.

6. **Manpower and Resources:** The availability of sufficient customs personnel and resources at Off-dock/Dry Ports was highlighted as crucial. Adequate staffing levels ensure clearance operations can be conducted effectively without undue delays.
7. **Standard Operating Procedures (SOPs):** Implementing SOPs specific to Dry Ports at cross-border locations ensures efficient operations handling. SOPs outline clear procedures for customs clearance, cargo handling, security protocols, and compliance with international trade regulations.

Chapter 11: Comprehensive Policy measures, legislation and solution for planning dry port development

11.0 Review of Dry Port Policy by the NBR

The National Board of Revenue (NBR) formulated a policy framework for the development and operational arrangements of off-docks in 1998 and updated it for Inland container depots in 2016. Organisations need to fulfil the following conditions to be eligible to develop Inland container depots/ Off-docks. These regulations are established by the Government of Bangladesh to ensure the efficient and secure operation of dry ports within the country. The regulations are as follows:

Rules and Regulations:

1. Recognition of Designing Organisation: The organisation intending to design a dry port must be officially recognised by the relevant authorities.
2. Experience Requirement: Entrepreneurs or organisations must demonstrate a minimum of 5 years of experience in export/import activities or cargo handling.
3. Minimum Land Requirement: The proposed dry port should encompass a minimum of 3 acres of land.
4. Handling Capacity: The proposed dry port must have the capacity to handle a minimum of 1500 Twenty-foot Equivalent Units (TEUs).
5. Security Clearance: The proposed dry port should obtain clearance for security concerns from the appropriate authorities.
6. Infrastructure Requirements: The proposed dry port should possess containers and ensure decent connectivity with highways.
7. Proximity to Chattogram Port: The proposed dry port should be located within a maximum distance of 20 kilometres from the Chattogram Port.
8. Emergency Preparedness: The proposed dry port should have adequate firefighting equipment and capability to handle emergencies.
9. Banking Facilities: A designated area within the proposed dry port should be allocated for Sonali Bank.
10. Essential Facilities: The proposed dry port must include a container yard, facilities for loading and unloading cargoes, as well as offices for customs officers.
11. Permissions Required: The organisation designing dry ports must obtain permission from the Chattogram Port Authority and Bangladesh Inland Water Transport Authority.
12. Material Support: Applicants may receive necessary materials from the commissioner based on pre-agreements, provided they ensure land availability, road connectivity, and financial viability.
13. Compliance with Terms and Conditions: Pre-approvals will only be granted if the terms and conditions outlined in these regulations are met.

14. Facilities for Cargo Handling: The organisation must provide adequate facilities for cargo and container handling.
15. Tax Certificates: Individuals associated with the organisation must provide their income tax certificates.
16. Solvency Certificates: Individuals associated with the organisation must also provide their solvency certificates.
17. Bonded Warehouse License: The Custom House Commissioner may grant a bonded warehouse license to qualified individuals or organisations.
18. Financial Guarantee: Qualified organisations must submit a 25 crore taka general bond on nonjudicial stamps before obtaining the warehouse license.
19. License Cancellation: Customs reserves the right to cancel licenses in cases of illegal activities, violations of conditions, incompetence, or harassment.
20. Authority of NBR: The National Board of Revenue (NBR) holds the authority to introduce and enforce rules, regulations, and conditions regarding the functionalities of dry ports.
21. Operational Phases: Organisations will initially be allowed to handle empty containers and export facilities. Import facilities will be permitted after demonstrating satisfactory performance over a predetermined period.
22. Explicit Mention of LC Conditions: Import consignments handled or stuffed at privately owned Inland Container Depots (ICDs) must explicitly mention LC conditions.
23. Facility Limitations: Transport, storage, and clearance of imported commodities are limited to privately owned licensed Inland Container Depots (ICDs).[43]

The NBR's customs wing devised Private Inland Container Depot (ICD) and Container Freight Station (CFS) Policy-2021 to accelerate the operational efficiency of Inland container depots. The newly formulated policy has made several changes to the previously followed policy guidelines for Inland container depots. They are as follows:

1) No inland container depot can be developed within a 20-kilometre distance from the seaport.
2) Inland Container depots need to be set up with an area of at least 15 acres instead of 15 bighas.

11.1 Indian Dry Port Policy

To address congestion issues at dry ports and inland container depots (ICDs) in certain urban areas of India, the Central Board of Indirect Taxes & Customs has categorised potential locations into green zones, blue zones, and red zones for establishing new dry ports.

[43] Private ICD/CFS Policy 2016 – Bangladesh Inland Container Depots Association (BICDA)

Green Zone: These are states with a limited number of existing ICDs, primarily encompassing less densely populated regions such as Himachal Pradesh, Bihar, Jharkhand, Sikkim, Assam, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, Telangana, as well as the Union territories of Jammu and Kashmir, Ladakh, and West Bengal.

Blue Zone: States designated as blue zones must meet specific criteria for establishing ICDs. These areas typically have limited existing facilities or are less industrialised compared to other states. Blue zone states include Uttarakhand, Uttar Pradesh, Chhattisgarh, Odisha, Andhra Pradesh, Goa, Karnataka, Kerala, and the Union Territories of Puducherry, Diu, and Daman.

Red Zone: Red zone areas already possess ample infrastructure and facilities for inland container depots. These include major cities like Mumbai, Ahmedabad, Chennai, and the capital, New Delhi.

Distance of ICD from ports

The Central Board of Indirect Taxes & Customs (CBIC) has sanctioned the establishment of new dry ports or inland container depots (ICDs) at locations situated more than 200 kilometres away from seaports. This move aims to foster price competitiveness between rail and road transport networks, with a particular emphasis on bolstering the efficiency of India's rail transport system for cargo movement.

In adherence to this directive, the preference for setting up new dry ports lies with locations exceeding 100 kilometres from existing dry ports. Additionally, to facilitate the establishment of these ports in states with favourable logistical conditions (referred to as green zone states), an inter-ministerial committee (IMC) has been tasked with evaluating potential expansions of facilities in already logistically advanced states. This evaluation process aims to address any shortfall in cargo handling capacity at existing facilities.

In parallel, as part of India's broader strategy to enhance its logistics infrastructure, the incorporation of dry port considerations into the national logistics action plan/policy (NLAP) is underway. This comprehensive approach underscores the nation's commitment to optimising its logistical capabilities to meet the evolving demands of commerce and trade.

Volume:

Applicants seeking approval for the establishment of dry ports must conduct a comprehensive assessment of the project's viability, considering its potential volume and appeal to various stakeholders, such as transport operators, seaport authorities, and freight forwarders. This evaluation process ensures that the proposed dry port infrastructure aligns with the actual demand, preventing any unnecessary overextension of resources.

To maintain efficiency and avoid underutilisation, a minimum threshold has been established: dry ports must handle a minimum of 7200 TEUs per year for both imports and exports in the case of Inland Container Depots (ICDs), and at least 1200 consignments annually for container freight station (CFS). This criterion ensures that newly established dry ports are economically viable and capable of meeting the needs of the logistics network without putting undue strain on resources.

Land

To establish inland container depots (ICDs), a minimum land area of four hectares is necessary for the customs-notified area, along with an additional minimum of one hectare designated for

DPD 8s and space allocated for DPEs. It is imperative that applicants seeking to establish dry ports have legal rights over the proposed construction area. However, in cases where ownership is not feasible, a lease agreement for a duration of at least 30 years can be considered. This requirement ensures the proper allocation of land resources for the development of ICDs while also providing clarity and security regarding land usage rights.

Legal entity

In accordance with Indian law, applicants must be recognised as legal entities with valid GST registration and a minimum operational history of three years. This requirement ensures that applicants have a track record of business activity and compliance with tax regulations, promoting stability and reliability in the establishment and operation of dry ports.

Prior experience

The applicant must possess some level of prior experience in consolidated cargo service providing or trans-border logistics.

Post approval obligations

Applicants are responsible for constructing necessary infrastructure and adhering to regulatory and operational requirements as per Indian Law. Following receipt of the letter of intent (LOI), they must provide monthly progress reports to the jurisdictional commissioner. Upon approval of the infrastructure, the commissioner will issue notifications specifying storage limits and landing areas.

Prior to this, the commissioner must be satisfied with facility arrangements, ensure adequate cost recovery mechanisms are in place, and deploy customs officers once all infrastructure requirements are met. This process ensures compliance with regulations and efficient management of customs operations at the designated dry port sites.

Regulatory and other compliances

The facility operator is obligated to adhere to the provisions outlined in the Customs Act, of 1962, as well as the rules and regulations periodically established by the board. This includes compliance with customs area regulations set forth in 2009. Additionally, operators must adhere to Indian railway laws, labour laws, environmental regulations, and instructions concerning cost recovery charges.

Investors are required to meet all infrastructure facility requirements, which encompass securing land, establishing tracks, and ensuring arrangements for the maintenance of assets for rail-linked Inland Container Depots (ICDs). These regulatory measures aim to uphold legal standards, promote safety, and ensure the effective operation of dry port facilities within the framework of Indian law.

Record-keeping handling, receipt, and storage

The custodian is required to execute a bond with the commissioner of customs, accounting for the value of goods handled in Inland Container Depots (ICDs) and Container Freight Stations (CFSs). They are tasked with providing a secure and spacious environment for cargo handling. In accordance with the Customs Act of 1962, the custodian bears responsibility in the event of any

distortion, pilferage, damage, or loss of imported goods. These provisions ensure accountability and the protection of goods under the custodian's care, maintaining integrity and reliability in cargo handling operations.

Infrastructure and other facilities

The custodian is required to make timely advancements in improving infrastructural facilities and service amenities provided by the dry port or inland container depot, contingent upon the increase in the volume of exports and imports handled by the neighbouring seaport. This expectation ensures that the dry port infrastructure evolves in tandem with the demands of international trade, facilitating efficient cargo handling operations and promoting economic growth in the region.

Performance Monitoring:

The commissioner of customs is tasked with conducting annual or semi-annual inspections to assess the progress made at dry ports and take any necessary actions to ensure proper infrastructural development. This regular oversight ensures compliance with regulations and promotes the continual improvement of dry port facilities, facilitating their efficient operation and contributing to the enhancement of trade and logistics capabilities.

Term, renewal, and de-notification of the facility

The commissioner is responsible for conducting a thorough evaluation of dry port operations to ensure satisfaction with their functionality and progress before approving renewal. Failure to meet minimum performance thresholds may lead to denotification by the commissioner. In cases of severe violations of terms, the jurisdictional commissioner retains the authority to sanction the closure of facilities. These measures uphold standards and accountability within the dry port sector, promoting efficiency and compliance with regulatory requirements.[44]

11.2 Tanzania's Dry Port Policy

Part I: Operations

A) To obtain a valid license, individuals or organisations must meet the following criteria*:*

- Documented under the Companies Act.
- Maintain a minimum share capital of ten per cent held by Tanzanian citizens.
- Have top decision-makers without any criminal record.
- Not been declared bankrupt according to Tanzania's Bankruptcy Act.
- Pose no threat to local or global security.
- Possess a facility outside the central business district for which the license is sought.

[44] Policy and Guidelines for setting up of Inland Container Depots (ICDs), Container Freight Stations (CFSs) and Air Freight Stations (AFSs)-Reg - Custom Notification & Circulars Circular No. 50/2020-Customs (caclubindia.com)

B) A dry port license permits operators to perform specific operations as outlined in the license. For Inland Container Depots (ICDs), the license grants the operator the ability to:

- Receive and deliver cargo.
- Manage the transportation of cargo between dry ports and terminals.
- Provide customs clearance services as per the provisions of the East African Community Customs Management Act.
- Allocate space for the storage of cargo and containers awaiting delivery to consignees or terminals.
- Label, mark, and number containers and cargo.
- Pack, unpack, and sort cargo.
- Fulfill responsibilities outlined by the East African Community Customs Management.
- Conduct cargo handling within the designated area.
- Weigh, gauge, and issue certificates for handled cargoes.
- Clean and fumigate containers.
- Stuff export cargo into containers for delivery to terminals prior to loading onto ships.
- De-stuff import cargo for delivery to consignees.

C) An ICD license permits the following modes of dry port operations:

- Port extension
- Shipper nomination; or
- Port extension and shipper nomination.

Part 2: Application for dry port licence

A) Dry port applications must be accompanied by the following documents:

- Certified copy of the certificate of incorporation or certificate of compliance.
- Certified copy of memorandum and articles of association.
- Certified copy of a valid business license.
- Certified copy of fire safety certificate issued under the Fire and Rescue Forces Act.
- Certified copy of lease agreement or proof of land ownership where dry port is established.
- Proof of availability of cargo handling equipment, working gear, and tools.
- Certified copy of environmental and social impact assessment certificate issued under the Environmental Management Act.
- Certification from concerned authority confirming compliance with urban planning.
- Comprehensive layout plan for the management of vehicle traffic inside and outside the dry port premises.
- Proof of application of modern technology in the dry port compound

B) Renewal of dry port approval is contingent upon satisfaction that license application requirements and conditions have been met in accordance with regulations.

Part 3: Conditions, Validity and Renewal of dry port licence

***A) Conditions of the license include*:**

- Maintain a specified level of solvency as updated by the relevant authority.

- Implement tariffs or charges approved by the authority.
- Operate 24/7, including public holidays and weekends.
- Ensure efficient performance.
- Establish a customer care system for inquiries and complaints.
- Submit quarterly performance reports.
- Adhere to principles of fair competition.
- Comply with port safety and security requirements.
- Maintain accurate books of accounts.
- Refrain from fraudulent activities.
- Operate within approved capacity.
- Employ at least two staff with diplomas in transport logistics, maritime transport, or ports and shipping.

B) The license must ensure the proposed dry port location is connected to all-weather resilient road or railway infrastructure.

C) License renewal may be sought for another five-year term upon expiry.

D) An application for renewal must be accompanied by:

- Certified business license card.
- For Inland Clearance Depot, a certified copy of the license for a customs bonded warehouse under the East African Community Customs Management Act.
- Certified copy of fire and safety certificate issued under the Fire and Rescue Act.
- Certified copy of lease agreement or proof of land ownership.[45]

Part 4: Suspension and Revocation of Dry Port License

The authority holds the right to suspend or revoke a dry port licence where the person fails to comply with conditions, and requirements for which the licence was issued after a comprehensive inspection. However, authorities may provide a notice once they see an anomaly.[46]

11.3 Philippines Off-dock Policy

The Bureau of Customs (BOC) and the affiliated organisations are responsible for formulating policies and guidelines regarding the development of off-dock container yards (ODCYs) and container freight stations (CFS). Below are the key features of the rules and regulations of off-dock policies in the Philippines.

Customs Memorandum Orders (CMOs): The primary regulations regarding the establishment, supervision and control of ODCYs and CFS. They ensure that the stakeholders responsible for the establishment and operation of off-docks are complying with the requirements for infrastructure,

[45] 1476207243-GN 198-THE SURFACE AND MARINE TRANSPORT REGULATORY AUTHORITY (DRY PORT) REGULATIONS, 2016.pdf (parliament.go.tz)

[46] 1476207243-GN 198-THE SURFACE AND MARINE TRANSPORT REGULATORY AUTHORITY (DRY PORT) REGULATIONS, 2016.pdf (parliament.go.tz)

security and operational procedures in the customs laws.[47] The primary objectives of the Customs Memorandum Orders (CMOs) are:

A. To strengthen BOC's ability to preserve and safeguard national borders and facilitate the transport of international cargo by taking proper measures based on relevant information.

B. To create a comprehensive database to provide intelligence support to building up cases, and risk assessment.

C. To establish the key responsibilities and accountabilities of the customs-related offices and off-dock authorities to ensure an efficient system and data security.

D. Finally, to equip the BOC officials with data-driven insights to make informed decisions and ultimately improve the operational efficiency of off-docks and ICDs.[48]

Rate Structures: The BOC brought some updates to the rate structures of off-docks to ensure fair pricing for every stakeholder involved. The CMO 41-2015 made changes to the old rates of structure and formulated a new uniform rate in order to make charges standardised and remove the rebates practice distorting the cost structure.[49]

Electronic Tracking System

ODCYs and CFS need to comply with the requirements of installing electronic tracking systems to control and monitor the container movements which ensures transparency and efficiency of the logistics chain.

Environmental and Safety Standards

The BOC has clear guidelines about maintaining environmental and safety standards while developing and operating ODCYs and CFS. The authorities must ensure the environment is not significantly harmed. It is also required that they have set up sufficient facilities to ensure the safety of the off-dock premises and their personnel.

Performance Monitoring

The BOC and other relevant authorities such as The Department of Trade and Industry (DTI) and the Philippines Shippers' Bureau conduct regular audits and inspections to ensure that the off-docks are adhering to the mentioned guidelines.

1.1.1 Recommendations for a comprehensive national dry port policy of Bangladesh

1. Bangladesh must formulate policies to encourage the establishment of dry ports in major cities outside Chattogram. There is only one inland container depot in Dhaka. Incentives should be provided to private organisations to set up off-docks/ inland container depots (ICDs) in Dhaka as well.

[47] PH off-dock CY/CFS operators to end rebate practice as new rates take effect - PortCalls Asia

[48] 2023CMO-19-2023.pdf (customs.gov.ph)

[49] BOC releases draft order on new offdock CY/CFS rates - PortCalls Asia

2. Bangladesh should relax the distance restrictions so that private ICDs set up can be facilitated far from seaports to ensure environmental sustainability.
3. Bangladesh customs should be advised to conduct performance monitoring and provide semi-annual or quarterly inspection reports on ICDs

11.4 Strengths, weaknesses, opportunities, and threats (SWOT) analysis of Bangladesh ICD policy

Strengths
I. Bangladesh provides certificates for the establishment of dry ports to only recognised individuals and organisations.
II. The maximum and the minimum distance between ICDs and seaports are clearly declared by the authority.
III. The off-dock and ICD officials receive material support from the commissioner based on pre-agreements, provided they ensure land availability, road connectivity, and financial viability.
IV. Bangladesh ICD policy has provisions to ensure the safety of the off-docks and their personnel.
Weaknesses
I. The policy doesn't include provisions to set up ICDs outside Chattogram.
II. The Policy doesn't mention the establishment of ICDs alongside major Economic Zones (EZ) and Export Processing Zones (EPZ).
III. The minimum threshold in terms of handling capacity is significantly smaller than that of international standards.
IV. The policy doesn't ensure that the National Board of Revenue (NBR) conducts periodical monitoring of inland container depots.
V. Bangladesh's ICD policy doesn't require ICDs to possess modern technologies for dry port operations as a part of structural requirements.
VI. Bangladesh ICD policy does not remotely mention the environmental impacts of the Inland Container Depots (ICDs).
Opportunities
I. The volume and efficiency of trade can be improved by setting up Inland Container depots outside Chattogram, especially in Dhaka and the Economic Zone.
II. By monitoring ICD performances more closely, Govt can comprehend whether investments in ICDs will be worthwhile, allowing the NBR to collect more revenues by adding transparency.
Threats
I. Incorporating environmental sustainability into the design and operation of dry ports or inland container depots is essential for the long-term well-being of the region. Neglecting environmental concerns in these facilities could have significant consequences for both the local ecosystem and the surrounding communities.

II. To remain competitive on the international stage, Bangladesh must prioritise the integration of modern technology into its dry port infrastructure. Embracing technological advancements is essential for enhancing operational efficiency, streamlining processes, and meeting the evolving demands of global trade.

11.5 Findings from KIIs: Comprehensive Policy Measures, legislation and Solutions for Planning Dry Port Development

Private ICD/CFS Policy – 2016 by Chattogram Port Authority

A variety of opinions, recommendations, and concerns have been expressed regarding Chattogram Port's "Private ICD/CFS Policy – 2016". Overall, the feedback provides insight into the perceived effectiveness, challenges, and suggestions for improvements to the policy. Most respondents expressed uncertainty about the policy's specifics, indicating a need for better communication and dissemination of information among stakeholders. In response to several respondents' comments, regular reviews and updates to the policy framework are essential. In order to address emerging challenges and ensure alignment with changing regulatory requirements and market dynamics, periodic reviews are necessary to incorporate global best practices, preferably every five years. The policy could be expanded beyond Chattogram Port in some cases. The respondents argued that establishing Off-docks/Dry Ports outside Chattogram would reduce congestion, facilitate easier access to port facilities, and decentralise logistics operations, improving efficiency and reducing costs. The implementation and operational framework of the policy also received specific concerns and criticisms. The policy could be expanded beyond Chattogram Port in some cases. The respondents argued that establishing Off-docks/Dry Ports outside Chattogram would reduce congestion, facilitate easier access to port facilities, and decentralise logistics operations, improving efficiency and reducing costs. The implementation and operational framework of the policy also received specific concerns and criticisms. A more flexible and supportive regulatory environment that promotes entrepreneurship in the logistics industry is needed based on this critique.

However, several respondents expressed positive sentiments about the policy. They said it improved efficiency, enhanced capacity, and contributed to Bangladesh's economic prosperity. These perspectives highlight recognition of the potential benefits of the policy while also suggesting areas where improvements could further enhance its effectiveness. Specifically, one of the respondents recommended improving the Off-dock/Dry Port policy so that more entrepreneurs invest. In line with broader economic objectives, this encourages private sector participation and promotes competitive advantages in logistics and maritime trade.

Private ICD/CFS or Off-dock/Dry Port Establishment and Management Policy, 2021 by NBR

The responses regarding the "Private ICD/CFS or Off-dock/Dry Port Establishment and Management Policy, 2021" by NBR reflect a range of perspectives and critiques from stakeholders involved in Bangladesh's logistics and maritime sectors. A significant number of respondents indicated a lack of familiarity with the policy details. This highlights a need for improved communication and awareness campaigns to ensure stakeholders are well-informed about policy objectives, guidelines, and implications for their operations. Some respondents expressed views

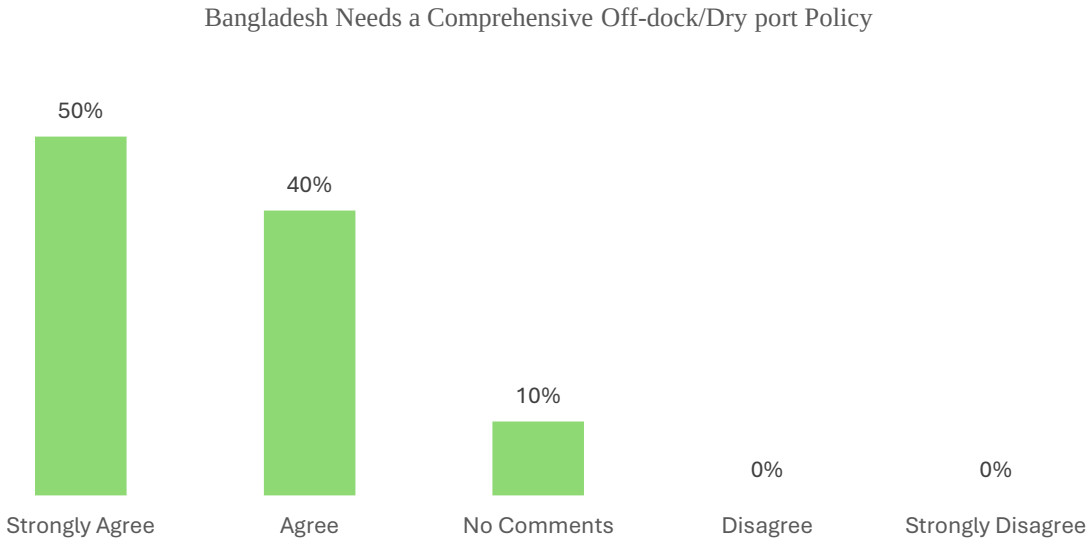
that the policy simply mirrors or closely follows the Chattogram Port policy framework. This perception raises concerns about the policy's adaptability to diverse operational contexts beyond Chattogram. This suggests a need for customisation to address specific challenges and opportunities in other regions of Bangladesh.

Criticism regarding the policy's adoption of global best practices was prevalent among respondents. They argued that the policy lacks innovation and fails to incorporate international standards that could enhance Off-dock/Dry Port efficiency and competitiveness. Suggestions included revising the policy to align more closely with global practices and abolishing restrictive measures that hinder operational flexibility and growth. Positive responses were also noted from those who found the policy acceptable or okay. These respondents acknowledged the policy's potential to encourage private sector participation, improve operational efficiency, and support the logistics and trade infrastructure of Bangladesh. They viewed the policy as a step in the right direction but also suggested areas for refinement to maximise its impact and effectiveness. Several respondents highlighted the importance of making the policy more elaborate, customer-friendly, and supportive of entrepreneurial initiatives in Off-dock/Dry Port businesses. They recommended clarifying guidelines, specifying the roles and responsibilities of stakeholders, and setting clear distance requirements to optimise logistics operations and enhance user satisfaction. There were specific calls to abolish or revise certain committees and tariff structures perceived as barriers to industry growth and competitiveness. This was stated by a few respondents. These suggestions underscore a desire for regulatory reforms that foster a more conducive environment for business expansion and innovation in the logistics sector.

Policy Development for Dry Port in Bangladesh

Several respondents stressed the importance of a common policy framework. It is very difficult for old off-docks to make infrastructural changes instantly to adapt to the recent establishment and operation policy of off-docks. For example, entrepreneurs were advised to establish dry ports within a 20-kilometre distance from Chattogram Port. However, in 2016, the policy mentioned that dry ports/off-docks should be established outside the city, citing that the minimum distance needs to be 20 kilometres. They emphasised the benefits of standardising regulations, procedures, and guidelines across Off-docks/Dry Ports in Bangladesh. By creating a unified policy framework, logistics and international trade stakeholders would be able to streamline operations, reduce bureaucratic hurdles, and ensure a level playing field. The implementation of such a policy would enhance overall efficiency and attractiveness for investors and operators alike by ensuring consistency, clarity, and ease of compliance. This kind of inconsistency should be avoided to ensure better functioning dry ports/off-docks. Customs officials also admitted that a more comprehensive policy is a necessity now, especially a policy that should add features of digitalisation inside dry ports. Representatives from the Ministry of Commerce attributed this inefficiency to the lack of coordination between the port authority and Customs. However, customs officials posit that the implementation of the policy is more important nowadays. The stakeholders were questioned whether a comprehensive Off-dock/ Dry Port policy for Bangladesh is needed that will comply with transport policies, national logistics policy and others. The results are portrayed in the following chart.

Figure 11.1 Stakeholders' Opinion



Source: RAPID's presentation using the data from the KIIs

The chart above presents stakeholders' views on the need for a comprehensive dry port/off-dock policy in Bangladesh where most people agreed with the question posed by the research team. Almost 90 per cent of the people who participated in the survey completely agreed with the proposal, while the remaining 10 per cent provided no comments on this and nobody actually disagreed with the proposal. This explains the urgent need for a comprehensive policy on dry port/off-docks in Bangladesh. Policymakers need to keep investor psychology in mind while designing policies and be less restrictive to let the off-dock industry flourish, opined the off-dock authority representative.

Chapter 12: Infrastructure Requirements and financing sources of dry ports

The key decision in dry port planning is the selection of dry port locations. Setting up dry ports in their most suitable locations is a multidisciplinary problem that requires careful consideration of factors involving various stakeholders. The decision primarily hinges on reducing transport costs, set-up costs, etc. However, there are other several qualitative factors that play vital roles in dry port location selection (Notteboom and Rodrigue, 2009; Nguyen and Notteboom, 2016).[50] [51] Dry ports are generally located near the gateway seaports, industrial zones, or major transportation hubs. Multiple mathematical models have been developed for the selection of optimal locations for dry ports based on the criteria set by the stakeholders. The study team meticulously reviewed the mathematical models, analysing the advantages and disadvantages of each to determine which best aligns with the Bangladeshi context.

Following thorough planning of a dry port's location, the subsequent crucial infrastructural focus lies on its physical components. These encompass the quantity of equipment available at the dry port, the manpower levels, and the technological robustness ensuring efficient tracking, communication, and data exchange. Additionally, the physical aspects include considerations such as land size, storage facilities, container maintenance capabilities, and efficient cargo handling systems.

The design of customs facilities plays a pivotal role in ensuring the smooth flow of cargo handling, inspections, and documentation processes. To achieve this, it is essential to establish custom officer offices within the dry port premises, facilitating seamless customs clearance services. Moreover, adequate warehousing and storage facilities are imperative to accommodate containers and goods efficiently. Robust security measures are also indispensable to safeguard cargo within the dry port environment. In terms of financing, a range of strategies is recommended, including Public-Private Partnerships (PPPs), government funding, support from multilateral institutions attracting Foreign Direct Investment (FDI), collaboration with domestic financial institutions, and the incorporation of dry ports within existing Export Processing Zones (EPZs). Below we discuss the financing sources in depth.

12.0 Basic physical infrastructures of a Dry Port:

Different practices are exercised in different settings in terms of dry port equipment. However, it is not optimal to follow a wholly different system for equipment. It is advised that planners follow different methods for different facilities. In the mixed system, the most optimal equipment is used for a particular operation rather than following a unique system. There are several systems that are followed in this context. The systems are described as follows:

Total storage system (Chassis System)

This system allows containers to remain on the chassis until they are moved for further transportation. The advantages of this system include:

[50] The terminalization of supply chains: reassessing the role of terminals in port/hinterland logistical relationships: Maritime Policy & Management: Vol 36, No 2 (tandfonline.com)

[51] A Multi-Criteria Approach to Dry Port Location in Developing Economies with Application to Vietnam - ScienceDirect

- High flexibility
- Rapid terminal transport
- Random accessibility of containers
- Low pressure on the ground, leading to flexible requirements for soil conditions

However, this system requires a large amount of land and demanding equipment facilities. The sophisticated equipment facilities include:

Heavy fork-lift trucks

Heavy forklift trucks can be used for handling both empty and laden containers. They are typically three tiers with special attachments for container handling, predominantly top-lift spreaders. The advantage of forklift trucks is that they bring flexibility to the operation of the dry port, and their maintenance is relatively easy. Truck personnel can use them without much training. The disadvantage is that they move slowly. It is recommended that these trucks be used for low throughput rates. The large space requirements for heavy forklift trucks also add an extra disadvantage to the operation of the dry port.

Fork-lift trucks with a lifting capacity of 3 tons for CFS

These fork-lift trucks are generally used for handling general cargo, which requires the use of lifting forks, such as palletised cargo, crates, and large bales of cargo. These types of forks are also used for stacking cargo in the CFS as well as container packing and unpacking. CFS uses special attachments for stuffing and unstuffing drums and rolls of paper.

Straddle Carriers

Straddle carriers are designed to straddle containers, lift, and move them. Straddle carriers are multipurpose equipment. They are used for transferring cargo from loading points to unloading points and vice versa. They can also be used for storing and stacking purposes. The straddle carrier performs very fast and efficiently while handling smaller units.

Transtainers

Rubber-tyred or rail-mounted transtainers/gantry cranes facilitate the greatest performance in loading and unloading efficiency as well as storing cargo. The disadvantage of this equipment is that it is not suitable for smaller operations since moving them is laborious.

Side Loaders

Side loaders are fundamentally designed for carrying long-distance containers. They can stack containers three tiers high. One disadvantage is the large space requirement for operation.

Mobile Cranes

Mobile cranes are used in the transfer of containers between floating barges. They can lift up to 50 tons across a distance of 10-12 meters.

Reach Stackers

This is a recent revolution in the equipment facilities at dry ports. This flexible equipment, a mixture of heavy fork-lift trucks and mobile cranes, can be used for load handling at the railhead as well as stacking cargo in small throughput situations.

Tractors, trailers and chassis

This equipment is required for the horizontal transport of cargo over long distances. There are two types of trailers or chassis: 1) the road type and 2) the terminal type. The distinction between the two is that road types are equipped with lights, spring suspension, and brakes, while these features are nonexistent in terminal trailers or chassis. The terminal type, however, is used for heavy transfers.

Special equipment for CFS

Container Freight Stations (CFS) require special equipment facilities for their operation. Major equipment facilities include: stevedoring pallets, hydraulic hand-lift trucks, hand trucks, pallet trucks, and fork-lift trucks with attachments for stuffing and unstuffing drums and rolls of paper[52]

12.1 Financing Sources of Dry Ports

In developed countries, dry ports are commonly funded by maritime entities like port authorities, aiming to enhance port efficiency and alleviate seaport congestion. Conversely, in developing nations, financing typically stems from hinterland actors such as rail authorities or local governments. Government funding predominantly drives dry port development in most developing countries. However, the surge in container movements can strain dry port capacities, prompting governments to engage private sectors in operational activities. These dynamics foster public-private partnerships, which can assume various forms depending on private sector involvement in investment, ownership, and risk management (Nguyen et al., 2017).[53]

The nature of these partnerships can vary significantly based on private sector engagement in investment, ownership, and risk management. Public-private partnerships can take many forms depending on the involvement of the private sector in investment, ownership, and risk. The forms of public-private partnerships are summarised in the following table.

[52] Handbook on the Management and Operation of Dry Ports - Google Books

[53] Public-private partnership model selection for dry port development: an application to Vietnam | World Review of Intermodal Transportation Research (inderscienceonline.com)

Table 12.1: Public-private partnership types and their characteristics

Types of PPPs	Operation and maintenance	Investment	Ultimate Ownership	Market Risk	Duration(years)
Management Contract	Private	Public	Public	Public	3-5 years
Leasing	Private	Public	Public	Semi-Private	8-15 years
Rehabilitate, operate and Transfer	Private	Private	Public	Semi-Private	20-30 years
Rehabilitate, Lease/Rent and Transfer	Private	Private	Public	More-private	20-30 years
Merchant	Private	Private	Public	More-Private	20-30 years
Build, Rehabilitate, Operate and Transfer	Private	Private	Public	Private	20-30 years
Build, Own, and Transfer	Private	Private	Semi-Private	Private	20-30 years
Build, own, operate and transfer	Private	Private	Semi-Private	Private	30+
Build, lease and own	Private	Private	Private	Private	30+
Partial privatisation	Private	Private	Private	Private	30+
Full Privatisation	Private	Private	Private	Private	30+

Source: (Hammami, Ruhashyankiko, and Yehoue 2006)[54]

[54] Determinants of Public-Private Partnerships in Infrastructure by Mona Hammami, Jean-François Ruhashyankiko, Etienne B. Yehoue :: SSRN

Dry ports can also be established using government funds, often strategically located near seaports to mitigate congestion and bolster trade volume. These initiatives are typically led by port authorities. Alternatively, private organisations may finance dry ports in industrial zones, aiming to expedite export and import processes within these zones.

The development of a dry port under the public-private partnership (PPP) model requires a careful distribution of responsibilities to both the public and the private sector. In general, the responsibility to provide access to railway and road links is shouldered by the public sector. However, there are other provisions that need to be factored in while designing an optimal contract(Godoi, Prakash, and Bhandari 2021). They are as follows:

- Land ownership
- Responsibility for providing various utilities and infrastructure
- Demand risk
- Pricing mechanism and tariff determination
- Revenue sharing
- Responsibility of Customs formalities

12.2 Land Ownership

The ownership of land often lies with the public sector. However, cases might arise where both the public and the private sector provide investments in the land along with other assets. They lease the land to the company overseeing the development of the dry port for the duration of the project. However, joint ownership of land is not ideal due to the complexity that the model brings to project completion. These complexities may arise from the fact that it is extremely difficult for the private sector to acquire land, or the cost they would incur to acquire land from local landowners might be significantly higher than the rate at which the public sector is able to buy, especially in the subcontinent where bureaucratic hurdles remain one of the key challenges. In the table below, we outline the strengths and weaknesses of each model.

Table 12.2: Strength and weakness analysis of different models of land ownership of dry port

Option	Strength	Weakness
Public Sector Land ownership	• The public sector is more suitable for controlling the process of land acquisition or purchase	Liability to the public sector will be unreasonably high
	• Reduced risk for the private partner	
	• The project will run smoothly due to the availability of land	
	• Lower cost since the purchase rate for the private partner is higher than the public sector partner	

	• Termination of contract is easier	
Joint Venture	Liability will be shared between the public and the private sector	• The private sector will find it difficult to acquire or purchase land adjacent to the public sector land
		• The project cost will increase as the private partner may have to incur higher costs to purchase land and bribe the officials to acquire land
		• Land valuation at the termination period will be challenging

Source: UNESCAP

12.3 Capital Investment

The development of dry ports entails investments in infrastructure, equipment and facilities. The table below illustrates the equipment and facilities needed for the development of the dry port.

Table 12.3: Facilities, equipment and services provided by a dry port

Facilities and Equipment	Services Provided	Transport Mode
• **Container Yard (CY)** • **Container Freight Station** • **Access to roads, railway network or sidings, Inland waterways** • **Break-bulk receiving and storage area** • **Bulk receiving and storage area** • **Administrative office with space for banks, forwarders and cargo agents** • **Customs office** • **Container light repair facility** • **Secure fence and entry point** • **Cargo handling equipment (RTGs,**	• Container handling and storage • Container stripping and stuffing • Break-bulk cargo handling and storage • Bulk cargo handling and storage • Customs inspection and clearance • Container light repairs • Freight forwarding and cargo consolidation services • Banking / insurance / financial services	• Line-haul: Rail (most), Road (some) and IWT (some) • Local feeder: Road • Inland Water Transport

RMGs, reachstackers, empty lifters, forklifts, container chassis, prime movers etc.)		

Source: UNESCAP

The investments in equipment are generally made by the private sector partner in most cases. For example, the Dosso dry port in Niger is expected to spend around 78 million USD on equipment and civil works, the entirety of which is borne by the private sector partner.

There are also successful instances of sharing the capital investment burden between the public sector and the private sector partner. One premier example is the case of South Korea, where the inland logistics depots operate under PPP with public ownership of 25 per cent and private ownership of 75 per cent, with the ownership of land resting exclusively upon the public sector. The private sector jointly invests in equipment and facilities. Investments in dry ports are a tricky project for the private sector since they can't afford to put all their eggs in one basket. Hence, it is important to reduce risks on their investments by providing security from the public sector.

12.4 Demand Risk

Demand risk is an important factor in determining the attractiveness of the dry port to users. The demand risk is particularly crucial in greenfield projects where the lack of historical data makes demand analysis implausible. People are attracted by public sector investments in determining locations, standards, and quality of facilities, which should increase the attractiveness of the dry port to users. It is recommended that demand risks be shared by both the public sector and the private sector, largely because it serves both groups' interests: the public sector's interest in keeping the attractiveness of the proposed dry port intact and the private sector's interest in reducing the risk associated with such a huge investment. India's Nhava Sheva International Container Terminal (NSICT) project and Dadri dry port project are ideal examples in this respect, where the demand risks are borne by both agents. There are three arrangements in structuring demand risk for the dry ports developed under the PPP contract: 1) Borne by the public sector, 2) Borne by the private sector partner, 3) Shared between the two.

In the case of option 1, traffic volume will grow at a significantly slower rate than it would if the demand risk is borne by the private sector, as the public sector is expected to be risk-averse. Option 2 will be exercised by the private sector only when the profitability of the project is visible to them. In an ideal scenario, the private sector will prefer the 3rd arrangement which strikes a balance between associated risks and the growth in traffic volume.

12.5 Tariff determination

Tariff, or the pricing of services, is a key factor in determining the volume of traffic growth in a dry port. The lower the rate of tariff or pricing of services, the greater the volume of traffic and vice versa. A dry port is more attractive if the private sector shareholders establish the pricing rules and charges for the services they provide. However, the public sector must ensure accountability from the private sector partner. There can still be some fluctuation in pricing, which might distort the incentives. The table below describes the pros and cons of public sector and private sector setup of rules:

Table 12.4: Pros and Cons of different types of tariff determination

Option	Pros	Cons
Tariff determination by the public sector	• Lower chances of monopoly • Lower fluctuation in pricing	• Less attractive to the users due to uncertainty over tariff
Tariff determination by the private sector partner	More attractive to the users since the private sector bears the lion's share of risks.	• Higher Chances of Monopoly • High fluctuation in pricing

Source: UNESCAP

12.6 Revenue Sharing

In the extreme case scenario, revenues can entirely lie with the private sector or entirely with the public sector. Outside these two models, two other revenue-sharing models have been developed - they are the revenue-sharing approach and the least present value approach. The revenue-sharing approach is the most practised model of revenue sharing. The advantages of the model are: 1) In this model, demand risk is usually borne by the private sector partner, which is optimal. 2) The public sector also receives a fair share of the revenue. The major disadvantage of the model is that the administrative control over the project by the public sector is quite limited. While in the least present value approach, no gains are received by the private sector for any increased volume of traffic during the project period. It is understandable that this approach is the least attractive to the private sector partner as it doesn't provide any incentive to the private sector partner to improve the quality of services.

12.7 Customs Clearance Responsibility

The basic customs duties involve the application of national laws and documentation and guarantees to ensure payment of any kind. Inspection is also vital for national security. Therefore, the customs clearance procedure is generally conducted by the public sector. Dry ports need to set up offices for government officials inside their premises.[55]

12.8 Findings from field visit: Infrastructure Requirements and Financing Sources of Dry Ports

Since the introduction of off-dock facilities in 1990, private organisations have predominantly held the responsibility for establishing dry ports in Bangladesh. According to an NBR official, Bangladesh is not yet ready to implement a Public-Private Partnership (PPP) approach for developing dry ports/off-docks. However, recent developments have involved collaborations with the Asian Development Bank (ADB) and the World Bank (WB) to establish land ports, so hope has

[55] Final Report : potential project structuring options for development of dry ports under PPP mode in Asia-Pacific region (unescap.org)

risen on potential investment from the development partners. There are no restrictions on financing dry ports/off-docks, but the official noted that using Corporate Social Responsibility (CSR) funds for this purpose is challenging in Bangladesh.

Potential sources of financing for Dry Port development

Public-Private Partnerships (PPPs) were viewed favourably by respondents because they can combine public funding with private expertise and capital. In order to achieve this, resources for infrastructure development were optimised. This approach spreads financial risk and aligns incentives for long-term sustainability and technological advancement. As an essential source of financing, government investments and grants were also mentioned. Many respondents emphasised the role of government support in kickstarting projects, providing infrastructure subsidies, and creating enabling environments through policy frameworks that attract private investment. By following this approach, Off-docks/Dry Ports can meet international standards while remaining viable and sustainable.

Local and international banks provide reliable financing options for capital-intensive investments in modern handling equipment, digital systems, and infrastructure upgrades. Off-docks/Dry Ports can improve operational efficiency and maintain their competitiveness in the logistics sector with bank loans coupled with favourable interest rates and repayment terms. Another significant source of financing was Foreign Direct Investment (FDI). Respondents emphasised the potential for FDI to provide capital, technology, and managerial expertise, which would accelerate infrastructure development and foster international best practices. As a result of this influx of foreign capital, Bangladesh can expand its facilities and integrate into international supply chains at the same time.

The proposal also included innovative financing mechanisms such as equity investments, initial public offerings (IPOs), and soft loans. In addition to mitigating financial risks, these mechanisms ensure sustainable funding for operations and future expansions while providing alternative avenues for raising capital. It was also recommended to utilise international financial institutions such as the World Bank, Asian Development Bank, and International Monetary Fund (IMF). To implement digital systems and adhere to global standards in Off-docks/Dry Ports operations, these institutions provide concessional financing, technical assistance, and capacity-building assistance.

There are several challenges associated with securing financing for Off-dock/Dry Port projects in Bangladesh, namely, the high costs associated with infrastructure development and operational setup, the long payback period, and the financial risk associated with such projects. As a rule, the availability of suitable financing options, such as bank loans and international investments, depends on the project's financial viability and investor appeal. Investor confidence and the feasibility of a project are also affected by political stability and government policies.

Furthermore, because Off-dock/Dry Port projects are capital-intensive, they must be carefully analysed for project risks, such as economic uncertainties and regulatory changes, to ensure a successful completion. Despite these challenges, stakeholders in Bangladesh emphasise the

importance of government support and conducive policies to facilitate financing and ensure the development of Off-dock/Dry Port facilities in Bangladesh.

Benefits of PPP (Public-Private Partnerships) to secure financing for Dry Port development in Bangladesh.

A number of respondents highlighted the potential benefits and mechanisms of leveraging public-private partnerships (PPPs) to secure financing for Off-dock/Dry Port development in Bangladesh.

1. **Combining Public and Private Resources**: Respondents emphasise that PPPs can effectively fund Off-dock/Dry Port development by blending public resources with private investment. This approach is essential for sustainable financing and project success.
2. **Government Support and Involvement**: Government participation, through land allocation or financial support, is crucial for PPP initiatives. Examples like Bangladesh Railways' Ghorashal ICD project demonstrate successful collaboration between government land provisions and private financing.
3. **Cost Reduction and Efficiency**: PPPs reduce costs associated with land acquisition and infrastructure development. This reduction in costs is crucial for making Off-dock/Dry Ports financially viable and attractive to private investors.
4. **Regulatory Support and Relaxation**: Some responses suggest that regulatory frameworks need to be adapted or relaxed to encourage more PPPs in Off-dock development. Regulatory support is necessary to facilitate easier and faster establishment processes.
5. **Risk Sharing and Innovative Models**: The concept of risk sharing between the public and private sectors is highlighted as a benefit of PPPs. Additionally, innovative financial models are mentioned as ways to further enhance PPP projects' feasibility and attractiveness.

Infrastructure Requirements

Stakeholders identified several key infrastructure components essential for the development and operation of dry ports in Bangladesh:

Transportation Connectivity: The foremost requirement is robust connectivity with major transportation networks, particularly railways and highways. Efficient rail connections to seaports like Chattogram and Mongla are critical to facilitate seamless cargo transfers. Upgrading existing rail lines, constructing new rail links, and ensuring well-maintained road networks leading to dry ports are necessary to support high-volume, reliable cargo movement.

Modern Handling Equipment: Equipping dry ports with advanced cargo handling equipment is vital. This includes cranes, forklifts, reach stackers, and automated container handling systems. Such equipment ensures efficient loading, unloading, and storage operations, reducing turnaround times and increasing throughput capacity.

Warehousing and Storage Facilities: Adequate warehousing space for various types of cargo, including cold storage for perishable goods, is essential. Stakeholders emphasised the need for

modern, climate-controlled storage facilities to maintain the integrity of goods and reduce spoilage.

Customs and Inspection Facilities: Effective customs and inspection facilities are crucial to well-organise clearance processes and reduce delays. This involves setting up dedicated areas for customs checks, quarantine inspections, and security screenings, equipped with advanced scanning and surveillance technology.

Information and Communication Technology (ICT): Implementing robust ICT systems for logistics management, real-time tracking, and electronic documentation is a high priority. These systems enhance transparency, improve efficiency, and facilitate better coordination among stakeholders.

Support Infrastructure: Additional infrastructure, such as access roads, utilities (water, electricity, and internet), and administrative buildings, is necessary to support the overall functioning of dry ports. Ensuring reliable and continuous service provision is essential for smooth operations.

Financing Sources

The survey revealed several potential financing sources and mechanisms to support the development of dry ports in Bangladesh:

Government Funding: Government investment remains a primary source of funding for dry port infrastructure. This includes budget allocations from the national government, grants, and subsidies. Stakeholders suggested prioritising dry port projects in national development plans and budgets to ensure sustained funding.

Public-Private Partnerships (PPPs): PPPs are seen as a crucial mechanism for financing dry ports. These partnerships leverage private sector expertise and capital, reducing the financial burden on the government. Developing a clear regulatory framework and attractive incentives can encourage private investment in dry port projects.

International Financial Institutions (IFIs): Institutions such as the World Bank, Asian Development Bank (ADB), and International Finance Corporation (IFC) can provide significant funding and technical assistance. These institutions offer loans, grants, and advisory services to support large-scale infrastructure projects.

Foreign Direct Investment (FDI): Attracting FDI from international logistics companies, port operators, and infrastructure developers can provide substantial financial resources. Creating a favourable investment climate through policy reforms and investment incentives is essential to attract foreign investors.

Development Aid and Grants: Bilateral and multilateral development aid from countries and organisations can also be a valuable source of funding. Programs aimed at improving trade infrastructure and regional connectivity can be tapped into for dry port development.

Innovative Financing Models: Exploring innovative financing models such as infrastructure bonds, and green bonds can diversify the funding base. These models can attract long-term investors seeking stable returns from infrastructure investments.

Key Recommendations

Based on our KIIs and stakeholder consultation meetings, several recommendations have emerged repeatedly. These are identified as the most important suggestions for improving container handling and shipping in Bangladesh. This section provides a brief discussion of these recommendations.

Minimum Export Shed Threshold: Despite having adequate area, many dry ports in Chattogram have a limited number of export sheds. This shortage of storage space for export goods results in delays and potential damage, particularly during peak seasons. To address this issue, it is recommended that policy mandates require that at least two-thirds of the area in new off-docks or dry ports should be allocated specifically for export sheds.

Prioritise Rail Network: When designing new dry port terminals, prioritise the rail network as the primary mode of transportation. The high-capacity container-carrying vessel was unable to access the waterways from Dhaka to Chattogram due to the low drift. There are traffic congestion issues on the highway, and a single lorry is capable of transporting a maximum of two TEU containers. Nevertheless, rail cargo can transport a minimum of eighteen containers simultaneously without encountering significant traffic congestion. It is recommended that the rail network should be prioritised as the primary mode of transportation for newly proposed dry terminals.

Policy Harmonisation: Currently, there are multiple off-dock policies in place—one issued by the National Board of Revenue (NBR) and another by the Chattogram Port Authority (CPA). These overlapping policies sometimes lead to confusion among the stakeholders. Hence, it is recommended to streamline and establish a single, unified policy. If necessary, the NBR and CPA can collaborate to create a joint policy, but the end result should be one clear and consistent guideline.

Promote Authorised Economic Operator (AEO): Currently, Bangladesh has only a few companies enlisted as Authorised Economic Operators (AEOs). To alleviate pressure on dry ports and off-docks, the number of AEOs needs to be increased. Additionally, each port should have dedicated lanes specifically for AEOs. This measure would reduce congestion at off-docks and improve time efficiency in transportation, benefiting overall port operations.

Single Window System: To streamline port operations and improve efficiency, a single-window system needs to be operationalised at the earliest in every port. This system would allow all stakeholders, including customs, shipping lines, and port authorities, to process documentation and clearances through a unified platform. By simplifying and centralising procedures, the single-window system would reduce bureaucratic delays, enhance coordination, and expedite the movement of goods. This improvement would not only ease congestion at ports but also increase overall time efficiency in trade logistics.

Incorporation in National Planning Documents: The Government of Bangladesh aims to handle 100 per cent of exports through dry ports by 2030. To achieve this target, it is essential to have a comprehensive plan for dry port development. Integrating dry port infrastructure projects into key national planning documents, such as the 8th Five-Year Plan and the Perspective Plan, is crucial. By embedding these projects within strategic frameworks, the government can ensure

that the expansion and modernisation of logistics facilities align with broader economic and developmental objectives.

12.9 Recommendations from KIIs

Training and Development Programme for Dry Port Staff: There is a strong agreement on the need for training and skill development programs for people working in Off-dock/Dry Port operations in Bangladesh. Respondents pointed out that training is needed in areas like communication, teamwork, customs procedures, safety rules, using digital tools, managing inventory, customer service, problem-solving, and keeping up with industry changes. These skills cover both technical aspects like handling customs and using technology, as well as soft skills like teamwork and communication. Providing such training is important for improving the skills of the workforce, making operations run more smoothly, and helping workers keep up with new technologies.

Development of Custom/Port Authority Software: Some stakeholders propose that customs or port authorities should take the lead in developing a dedicated software solution. This software would be tailored to meet the specific tracking and monitoring needs of seaport-to-dry port logistics, ensuring that data is accessible and utilised efficiently by relevant authorities

Boost Investment in Railway Infrastructure: Rail, on the other hand, is a sustainable and cost-effective way to move large amounts of goods over long distances. By connecting trains to seaports or dry ports, there are big chances to move a lot of freight traffic from roads to railways, which would cut down on traffic and carbon emissions. Stakeholders stressed the importance of investing in train infrastructure, such as updating tracks, adding electricity, and improving rolling stock, in order to make the rail network more efficient and able to handle more passengers. It was also suggested that dedicated freight corridors and intermodal terminals be built to make intermodal transfers easier and make train freight services more competitive.

Enhance the Capacity of Existing Dry Ports: A projection shows that the current capacity, along with the upcoming Bay Terminal and Matarbari ports, can handle container traffic congestion until 2044. However, after that period, Bangladesh will need to build additional dry ports. Stakeholders suggest that, in addition to constructing new dry ports, it is crucial to enhance the facilities at existing ones. Notably, all current dry ports are located near Chattogram Port, and the capacity of these off-docks should start being expanded now to prepare for future demand. In addition to that, it is also important to upgrade the facilities in the existing dry ports.

Consider Green Technology: Stakeholders recommend prioritising the development of environmentally friendly dry ports. This includes integrating sustainable practices such as energy-efficient infrastructure, waste reduction systems, and the use of renewable energy sources. Implementing eco-friendly technologies and ensuring compliance with environmental regulations will help minimise the environmental impact of dry port operations, contributing to a greener and more sustainable logistics sector.

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Annexure

Questionnaire for KIIs

Stakeholder	Questions
Chattogram Port Authority	1. In your experience, what are the main obstacles faced by importers and exporters when utilizing the Chattogram port facilities? 2. Can dry ports reduce the container handling pressure on the Chattogram port? 3. What is the current demand for dry ports in Bangladesh, and how has it evolved over recent years? 4. Do you believe that building more dry ports could help alleviate the burden on the Chattogram port?Is there any exclusivity in terms of using dry port? 5. How can additional dry ports address current trade challenges and contribute to the overall economic growth of Bangladesh? 6. What role do you see dry ports playing in enhancing Bangladesh's position in regional and global trade? 7. How can international standards for dry port infrastructure be adapted to align with the local context in Bangladesh? 8. What considerations should be given to the potential environmental and social impact of new dry port locations? 9. How can collaboration with local communities and stakeholders contribute to successful dry port projects? 10. How can improvements in logistics and transportation infrastructure positively impact the overall supply chain efficiency? 11. What role can digitalisation and technology play in streamlining customs clearance processes at dry ports, and what challenges might arise in implementation? 12. What are the key considerations for customs clearance processes at dry ports? 13. How can public-private partnerships be leveraged to secure financing for dry port development? 14. How can collaboration between the Chattogram Port Authority, Dry Port Authority, and Bangladesh Customs contribute to the success of dry port projects?

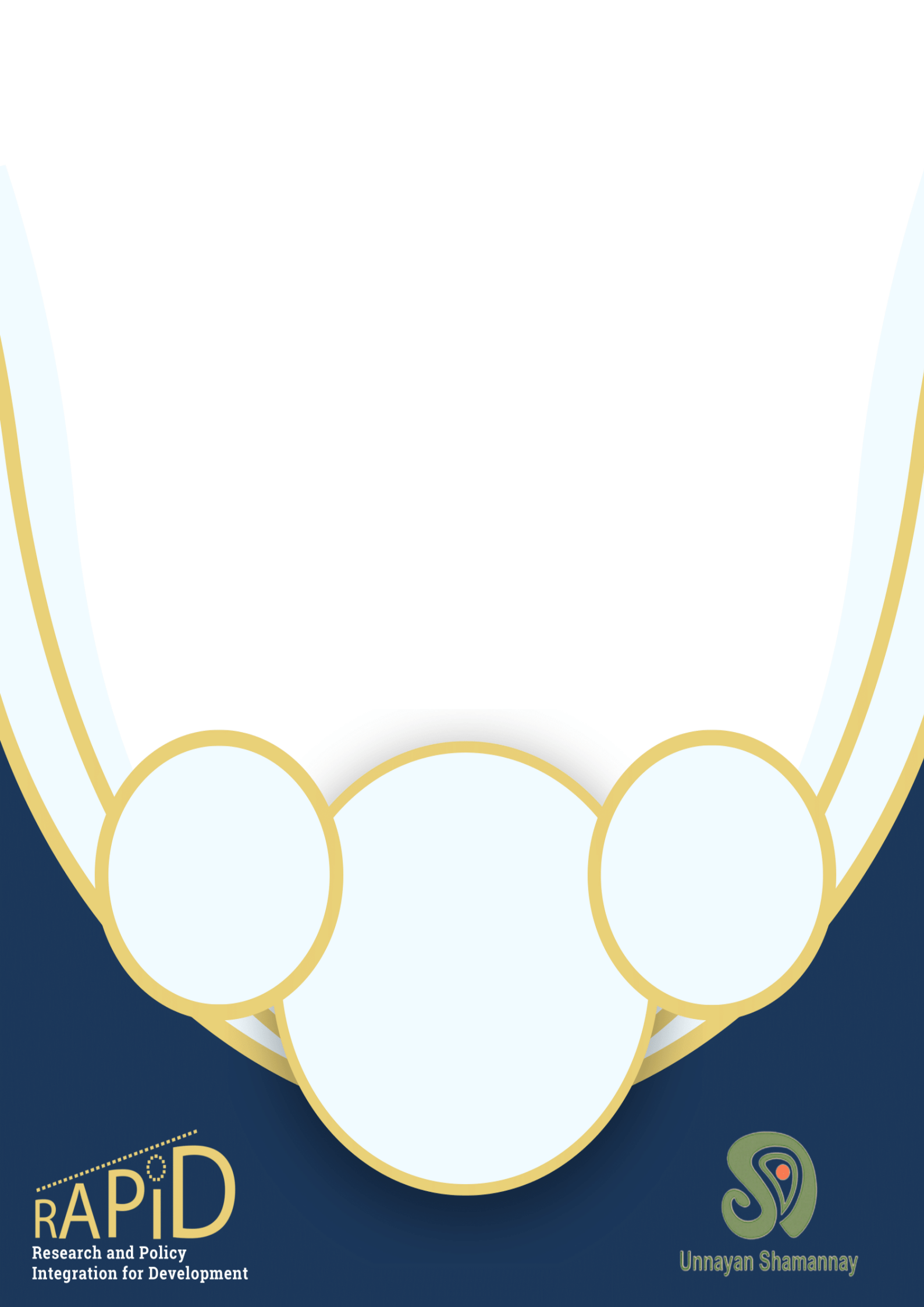
Dry port Authority	1. What are the principal activities/type of service you are providing? 2. Period of providing service(Write the number of year)? 3. Please mention the average number of containers processed in this dry port. 4. Please mention the average time taken to meet the clearance of those containers. 5. Please mention the cost of import or export containers through dry port. 6. Do you think the number of staffs and officials that are currently working in port are sufficient and enough? 7. Do you believe that the current number of employees and officials working at the port is adequate? 8. What is the current demand for dry ports in Bangladesh, and how has it evolved over recent years? 9. How can additional dry ports address current trade challenges and contribute to the overall economic growth of Bangladesh? 10. How would increased accessibility to dry ports benefit small and medium-sized enterprises (SMEs) in Bangladesh? 11. What role do you see dry ports playing in enhancing Bangladesh's position in regional and global trade? 12. What are the essential infrastructure and operational requirements for establishing a functional dry port? 13. How do these requirements align with the existing infrastructure landscape in Bangladesh? 14. Are there specific training and skill development programs needed for the workforce involved in dry port operations? 15. How can international standards for dry port infrastructure be adapted to align with the local context in Bangladesh? 16. What are the key challenges and shortcomings of existing dry port facilities in Bangladesh that impact trade efficiency? 17. How do these challenges affect the overall trade ecosystem in Bangladesh? 18. Can you provide examples of successful practices or innovations in other countries' dry port facilities that could be adapted to address shortcomings in Bangladesh? 19. In your experience, what are the main obstacles faced by importers and exporters when utilizing current dry port facilities? 20. In your opinion, how have advancements in technology influenced the efficiency and operations of existing dry ports in Bangladesh? 21. Can you provide insights into the environmental impact of current dry port facilities and potential improvements in sustainability? 22. What key criteria should be considered when selecting a dry port location and determining its mode of connection? 23. Can you identify suitable locations for new dry ports based on these criteria? 24. In your opinion, what are the key considerations to determine the optimal location of dry port?

	25. Why are all the dry ports situated in Chattogram, even though Mongla port also manages containers?What considerations should be given to the potential environmental and social impact of new dry port locations? 26. How can collaboration with local communities and stakeholders contribute to successful dry port projects? 27. How would you estimate the distances among dry ports, seaports, and rail linkages in Bangladesh? 28. What challenges and opportunities exist in optimizing the linkages between dry ports, seaports, and railroads? 29. What role can technology play in optimizing and monitoring the connectivity between dry ports and other transportation hubs? 30. How can improvements in logistics and transportation infrastructure positively impact the overall supply chain efficiency? 31. Are there international benchmarks or best practices that can guide the development of dry port facilities in Bangladesh? 32. What principles and standards are essential for the design and operations of dry ports? 33. What are the key considerations for customs clearance processes at dry ports? 34. Are there specific lessons learned from the implementation of the Dry Port Policy 2016 that can inform future policy development? 35. How can public-private partnerships be leveraged to secure financing for dry port development? 36. What specific infrastructure needs must be addressed for the successful development and operation of dry ports in Bangladesh? 37. Can you identify potential sources of financing for dry port development, and what challenges might be associated with securing funding?
Bangladesh Custom Office	1. In your experience, what are the main obstacles faced by importers and exporters when utilizing current dry port facilities? 2. How would increased accessibility to dry ports benefit small and medium-sized enterprises (SMEs) in Bangladesh? 3. What role do you see dry ports playing in enhancing Bangladesh's position in regional and global trade? 4. How can the legal framework be improved to better accommodate dry ports and their integration into the broader transportation system? 5. What role can digitalisation and technology play in streamlining customs clearance processes at dry ports, and what challenges might arise in implementation? 6. What are the key considerations for customs clearance processes at dry ports?

Exporters and Importers (Dry Port Users)	1. What are the key challenges and shortcomings of existing dry port facilities in Bangladesh that impact trade efficiency? 2. In your experience, what are the main obstacles faced by importers and exporters when utilizing current dry port facilities? 3. In your opinion, how have advancements in technology influenced the efficiency and operations of existing dry ports in Bangladesh? 4. What are the needs of importers and exporters regarding dry port facilities? 5. Are there specific training and skill development programs needed for the workforce involved in dry port operations? 6. How can international standards for dry port infrastructure be adapted to align with the local context in Bangladesh? 7. What challenges and opportunities exist in optimising the linkages between dry ports, seaports, and railroads? 8. What are the key considerations for customs clearance processes at dry ports?
Exporters and Importers (Dry Port Non-Users)	1. Why don't you use the dry port facility for your exports/imports? 2. What are the expectations and needs of importers and exporters regarding dry port facilities? 3. What are the challenges and barriers you face in exporting/importing through the Chattogram/Mongla port? 4. Do you think dry port can remove these barriers? 5. How can improvements in logistics and transportation infrastructure positively impact the overall supply chain efficiency? 6. Do you think the dry ports' locations are the reason for not using dry ports? 7. Are customs procedures more complicated in dry ports? 8. Do you know how to use dry ports for exporting/importing activities? 9. In your opinion, what are the key success factors for the sustainable development of dry ports based on global best practices?
Forwarding and Clearing Agents	1. In your experience, what are the main obstacles faced by importers and exporters when utilising current dry port facilities? 2. In your opinion, how have advancements in technology influenced the efficiency and operations of existing dry ports in Bangladesh? 3. Are there specific training and skill development programs needed for the workforce involved in dry port operations? 4. What are the key considerations for customs clearance processes at dry ports? 5. What role can digitalisation and technology play in streamlining customs clearance processes at dry ports, and what challenges might arise in implementation?

Roads and Highway Department/ Railway/Related Ministries	1. What rules or regulations pertaining to the inclusion of dry ports in transport documents or legal instruments? 2. Are there examples of successful legal frameworks from other countries that can serve as a model for Bangladesh? 3. How can the legal framework be improved to better accommodate dry ports and their integration into the broader transportation system? 4. What challenges and opportunities exist in optimising the linkages between dry ports, seaports, and railroads? 5. What role can technology play in optimising and monitoring the connectivity between dry ports and other transportation hubs? 6. How can improvements in logistics and transportation infrastructure positively impact the overall supply chain efficiency? 7. How feasible is it to conduct network analysis using geospatial tools to optimise dry port locations and connections? 8. How can collaboration with local communities and stakeholders contribute to successful dry port projects?

Research Team Organogram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