ADB

Technical Assistance Consultant's Report

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Democratic Socialist Republic of Sri Lanka: National Port Master Plan
(Financed by the Japan Fund for Poverty Reduction)
The National Port Directions – Volume 1 (Part 5)

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The project mentioned that at least 70-75 TEU trains where required to meet long term capacity of about 1 million TEU handled by trains to and from Enderamulla.

MTBS Assessment:
The dry port location is based on the use of rail mainly. Several issues had to be solved before this project could be lifted, major components were the railhead connection to Peliyagoda included in the proposal, land ownership issues, rail path allocation constraints, and lack of readiness by Sri Lankan Rail Authority has stalled the project in an early stage. Meanwhile the Elevated Highway project has come and is expected to solve part of the todays congestion issues.

Further, according to analysis on multimodal connectivity in the port, the efficiency component can be only be achieved when railheads are located near the terminals of the port to avoid double handling. This has been further detailed in the port of Colombo Masterplan. Should the Rail Authority implement the rail cargo solutions for the nation and the port in particular, then the port should be ready to accommodate by providing railheads near terminals. For South Port a rail track reservation is made for future connectivity (South port was basically designed without rail). The same applies to the proposed North Port development which should be planned with railhead connections. It is however to the Rail Authority developing a Rail Cargo section in their Masterplan to accommodate rail cargo transportation on the tracks in Sri Lanka. Especially in view of increased exports and port development is focussed first at South Port, increased truck traffic congestion maybe countered by shuttle trains to the Dry port(s). However due to the limited distances to Dry ports near Colombo, decisions to implement the multi modal connectivity are likely to be driven by economic returns rather than financial returns.

7.4.3   SLPA logistic hubs proposal near Port of Colombo.

- **SLPA Master Plan 2016 –** The SLPA "Cargo Village Concept" is designed at 450 ha located north-east of the port and south of the Kelani river in line with North Port development.

MTBS Assessment:
Though, logistics facilities adjacent to the port are preferable over an inland location, the area indicated is heavily populated. It seems unlikely that this land can be obtained. The assessment of 450 ha is reasonable in line with expected forecasts on container traffic and export and value added ambitions of the nation. The area should however be secured preferably at less inhabited land.

Figure 7-7 SLPA Cargo Village Concept
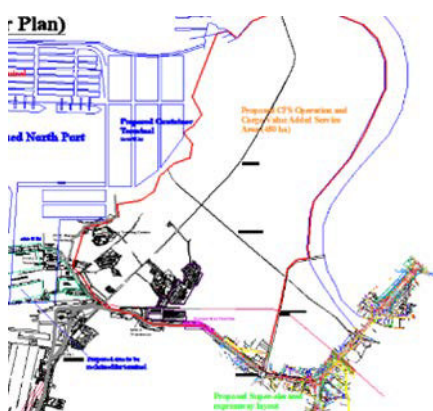
7.4.4   The role of SLPA in Dry Port Development and Exploitation

Currently, SLPA is involved in warehousing and handling of cargo. In a landlord port model, this activity should be performed by private parties. This development has already taken place in Sri Lanka, where cargo handling is recently liberalised. This frees up SLPA to fulfil a role as land lord in the dry port. The benefits for SLPA include:

- Being able to act as an impartial public entity.
- Port efficiency goals can be met by aligning dry port and port activities.
- Some revenues can be obtained from rent to invest in maintaining the dry ports.

7.4.5 Logistics road map

The above reviews of the multi modal studies and logistics concepts leads to a generic conclusion.
In order to have logistics functioning well within Sri Lanka a dry port concept should be introduced including ample space for the development of warehousing and logistics industries. These new locations have to be strategically addressed in view of the new export strategies of the Government.

First short term actions are required to improve current logistics. This includes quite a number of actions including new warehouse space in the port as short term solution and the development of Bloemandhal area for logistics as short to medium term solution. This is the only area where still ample space can be obtained in the proximity of the port and near rail connections. In the long run considerable space for logistics and related added value industries have to be created to cater for projected additional demand. Due to the fact that this is closely related to port expansion it should be secured well in advance. This area could be found close to the power station with hinterland connections to North port development by road and rail in the future. According to the Trincomalee – Colombo Economic corridr concept new dry ports can be created as part of the overall strategy on logistics. Each dry port should have a Free trade zone and shall act as "extended gates"[19] for the port.

The road map for logistics is here briefly described. It should be noted that this road map is closely related to the other part of this document such as the Trincomalee corridor development, the trade facilitation chapter, the warehousing chapter and the customs chapter, as issues and and discussions on these topics all contribute to an efficient logistics system.

In this paragraph the main actions for implementing an efficient logistics system are presented.
The main steps to improve the logistics in Sri Lanka are illustrated by the following activities split in short term actions, medium term action and long term actions. The activities marked with an asterix (*) would indicate that these actions would be in collaboration with other parties, authorities and institutions.

Short term actions (within one year):
1. Increase MCC warehousing capacity in the Port of Colombo
2. Improve the administrative documentation through acceptance of E-signature, digitalisation of documents and simple acceptance protocols
3. Improve customs related procedures (*)
4. Digitalisation of licenses
5. Ensure E-payment is allowed for all services
6. Create port community system (*)
7. Full electronic processing by Customs E-declaration, E-clearance, E-Payments (*)

[19] An extended gate is a facility in which the sea-going procedure on exports is already processed in the dry port. Customs clearance and sealing is already taken care of. The container should be able to be moved to the terminal without any additional administrative issues.

8. Customs to develop AEO scheme (*)
9. Improve efficiency on container scanning (*)
10. Implement electronic gate pass
11. Transfer MCC warehousing from BQ to new location[20]
12. Remove MCC and dangerous goods storage from BQ
13. Prepare for Bloemandhal area to develop warehouses and logistics
14. Install automation solutions (warehouse software) for goods descriptions and locations and introduce hand scanners systems.
15. Prepare for warehouse software to be connected to the to-be made port community system
16. Facilitate improvements on Free trade zones and investment incentives (*)
17. Formulate dry port action plan including defining strategically located land plots (incl. like locations, multi modal connectivity, free trade zone, bonded transport, warehouse strategies)
18. Ensure skilled labour for warehouse division

Medium term actions (2-3 years)
19. Establish modern warehouse facilities at Bloemandhal area.
20. Close warehouse IV and V and move to Bloemandhal area
21. Establish port community system for warehouse goods
22. Full electronic processing
23. Assign new areas for logistics in the neighbourhood of ports (For Colombo near power station)
24. Improve ease of doing business[21] through collaboration with authorities (*)
25. Prepare for land acquisition to become landlord on the dry ports
26. Prepare for green policies for logistics

Long term actions (>5 years)
27. Improve warehouse part of the port community system
28. Establish additional dry ports in line with formulated strategy and demand
29. Improve the green factor of logistics by implementing rules and regulation on engines used, type of fuel and concession regulation for private sector participation in the warehouse sector.

In Appendix X a detailed overview on timing of this roadmap is provided.

7.4.6 Recommendations

The container handling and Logistic activities in the port hinterland are dispersed and in heavily urban areas with little room for expansion.

R1. New logistics areas have to be assigned to complement the Port of Colombo and to facilitate the export strategy of Sri Lanka. Zoning for this should cover an area of about 450 ha in the first phase with options for further expansion.

R2. A case for centralisation of dry port areas should be made and less inhabited land seems available West of the E03. This would create optimal location to connect to New North Port development with dedicated cargo roads and linking the existing highways. Rail connection should be planned for in line with Sri Lankan rail Authority rail cargo transportation plans. Operational and financial feasibility studies with an underlying transport plan which includes the PAEH could offer further guidance.

[20] Unity terminal is the proposed location for short term additional warehousing

[21] The DB indicator is compiled with factors such as, starting an new business, dealing with construction permits, getting electricity, registering property, getting credit, paying taxes trading acress borders enforcing contracts, resolving insolvency.

R3. It is recommended to assign SLPA as land lord of the single or multiple dry ports to enable to maintain a close connection with port planning.

R4. As mentioned in the "logistics road map" a detailed scheme or road map is proposed to create efficient logistics system. A timing overview is also presented in Appendix X . This entails the various steps to create efficient logitics in the future.

R5. Develop Bloemandhal area for logistics. This will ensure the option to develop in line with short term demand. The area should become a dry port area with bonded transport and with the development of a railhead in future.

R6. Secure additional land area near the power station for logistics developments in the future.

7.5 Colombo – Trincomalee Economic Corridor

The Colombo – Trincomalee Economic Corridor (CTEC) is a concept researched through ADB consultants and is based on supporting economic growth through facilitating with a network of FTZ/ EPZ along a main spine of highway expressway as a corridor connecting the Western Region including Colombo Port with the East Coast including Trincomalee Port.

The influence area is spread across 9 districts and impacts 14.2 million of population, about 70% of the total population and covers about 91% of the total industrial output of the country, according to the CTEC reports. The corridor is about 275km long or about 6 hours transit time at average speed of 45 km/h.
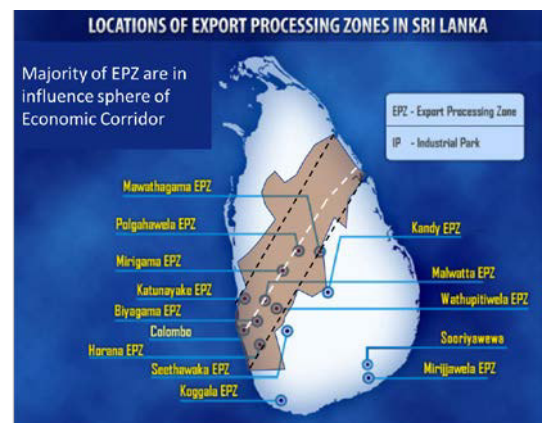
The Colombo - Trincomalee corridor is recommended to be supported by at least five elements on infrastructure:

R1. Connectivity to central region and industrial hinterland, proposed nodes and urban centres: A central Expressway along corridor spine A01-A06 with a 50km influence area on either side. Further multimodal strengthening of rail connectivity of trincomalee to dambulla and direct connectivity to Kurunegala would improve rail connectivity for Bulk-users near Colombo

R2. Urban infrastructure to support increase in urbanisation and enhanced quality of life. The Eastern corridor region infrastructure is one of the least developed with low road density and low level of urban infrastructure.

R3. Efficiency and effectiveness of water and power supply to support the competitiveness of industrial activity.

R4. Support infrastructure for Dry ports & inland terminals: Domestic container handling at the port could move inland to FTZ zones to reduce congestion at the port and to incentivize value added services along nodes at the corridor. These logistics hubs need warehouses and basic infrastructure on roads, watersupply and electricity (power) including waste managementplant and waste treament plants.

R5. Gateway capacity and efficiency: Port of Colombo will continue to remain the primary gateway for goods as well as for passeger traffic expansion with BIA and a second runway and Colombo Port is set to expand capacity and bring efficiency improvements.

Figure 7-8 Export Processing Zones

The Colombo – Trincomalee Economic Corridor encompasses the following main assets:

- Central Expressway and corridor development (to be developed)
- Focusing on Industrial sectors and value added industries (to be developed)

- One existing international airport, Bandaranike International Airport (BIA) (8.5 million passengers and growing at 6% CAGR with aircargo growing at 7% CAGR) to be expanded by a second runway to support future growth
- Two existing deepsea ports Colombo (dominant in EXIM containers and transhipment, 5.6 million TEU, 82 million tons) and Trincomalee dominant in bulk clinker, wheat, coal and refined products, 3.4 million tons). Both ports will be expanded in future leading to additional required logistical zones.
- Key existing tourism locations with historic sites, wildlife parks, beaches and religious sites.
- Skill development potential. Today trainings centres are now mainly concentrated in the western part of the corridor and eastern part needs capacity development of skill and vocational training.

Central Expressway and corridor development

The concept supports the national vision of creating a network of logistics hubs through main corridors attracting existing industries and new industries and to boost tourism in the region. The corridor would boost economy development through integration and synergizing industry, infrastructure, logistics and urbanisation through connecting urban zones with industrial zones and providing a favourable and competitive business environment. Furthermore, the corridor unlocks poorer provinces in the North Central and North Western and Eastern regions of the country.

Figure 7-9 Central Expressway and influence zone
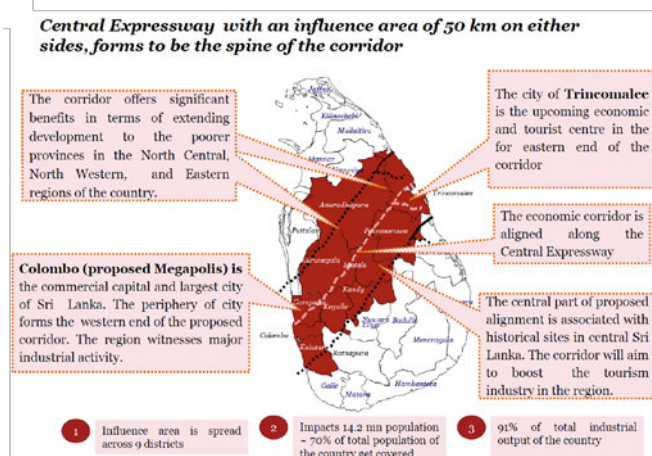
Focusing on Industrial sectors and value added industries (to be developed)

Through a two way method industry sectors and industries have been identified leading to the selection of 11 industries across 5 sectors for diversification apart from traditionally strong sectors like food, apparels etc. This have been illustrated in next figure.

Figure 7-10 Industrial Sectors development
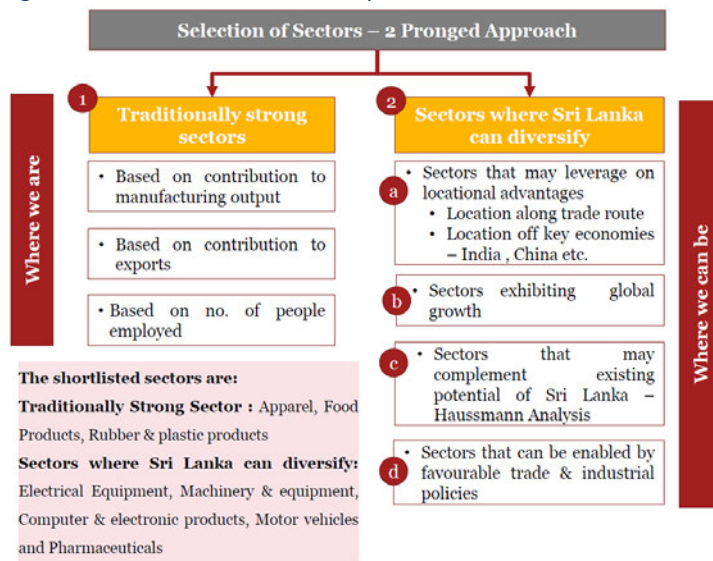
The approach led to the following selection of industry sectors.

Table 7-4 Potential Industries

Sector	Industry	Trade route proximity	Regional synergies	Hausmann analysis	Global Growth	Final selection
Computer, electronic & optical instruments	Communication equipment	✓	✓		✓	✓
	Computer and peripheral equipment	✓	✓		✓	✓
	Electronic components	✓			✓	✓
Machinery & equipment	General purpose machinery	✓			✓	✓
	Special purpose machinery	✓				✓
Electrical equipment	Electric motors, generators, transformers	✓			✓	✓
	Electric lighting equipment	✓				✓
	Wiring& devices			✓		✓
Motor vehicles	Motor parts and accessories	✓	✓	✓		✓
	Motor Vehicles	✓	✓			✓
Pharmaceuticals	API & Formulations	✓	✓			✓

Source: CTEC report

Airport(s)

Central corridor region could utilise air cargo facilities to promote food processing, precision tools and luxury goods industry.

Figure 7-11 Ports and Economic Corridor
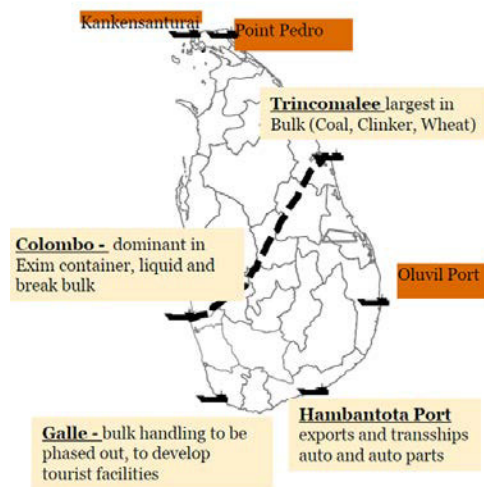
- Air cargo growing at 7% would require additional logistics facilities near the airport.
- A second runway will be required in future to accommodate growth.
- Integration with handling of sea cargo in coordination with port authority and operators could open up Sea-to-air transhipment potential.
- The current airstrip at Trincomalee is in restricted land area. Polonoruwa would need to connect with direct Road/rail links for air travel to become viable.
- Cruise passengers connect directly to the planned passenger terminal at Colombo port
- Crew changes for shipowners can be made easily through the airport and road connections
- Domestic airstrips could be developed to become part of the corridor network when feasible.

Source: CTEC report & MTBS

Ports

The two ports are relevant for the corridor concept: Port of Colombo and Trincomalee.

- About 35% of the total of 82 million tons cargo handled at Sri Lankan ports was Export-Import cargo (EXIM). Of which the majority handled by Colombo port.
- Gateway cargo is expected to increase also through the new Export Strategy of the Government
- Colombo port will be expanded to cater for future growth both on the gateway containers as well as for transhipment.
- Port of Trincomalee will be expanded to cater for larger break bulk commodities and bulk commodities
- The tourism function (cruise is developed in both ports).
- From a corridor perspective Colombo will continue to be the primary gateway for container traffic while Trincomalee on mainly bulk and break bulk cargoes. As such Trincomalee may specialize as "Energy Port"
- For Colombo the priority is to have direct highway connection through the PAEH and the New Kelani Bridge connecting to E02 and E03.
- For Trincomalee a port road is required to connect to logistic land near the port, A06 and the future expressway.

Source: CTEC report & MTBS

Logistic Nodes / FTZ / EPZ selected

After an assessment of the nodes based on a selection framework and shortlisting of nodes based on cost of development, a potential overview of nodes was prepared by the CETC report. The following nodes were selected along the corridor: Gampaha, Colombo-Kalutara, Kurunegala, Matale, Anuradhapura and Trincomalee. This is displayed in next figure.
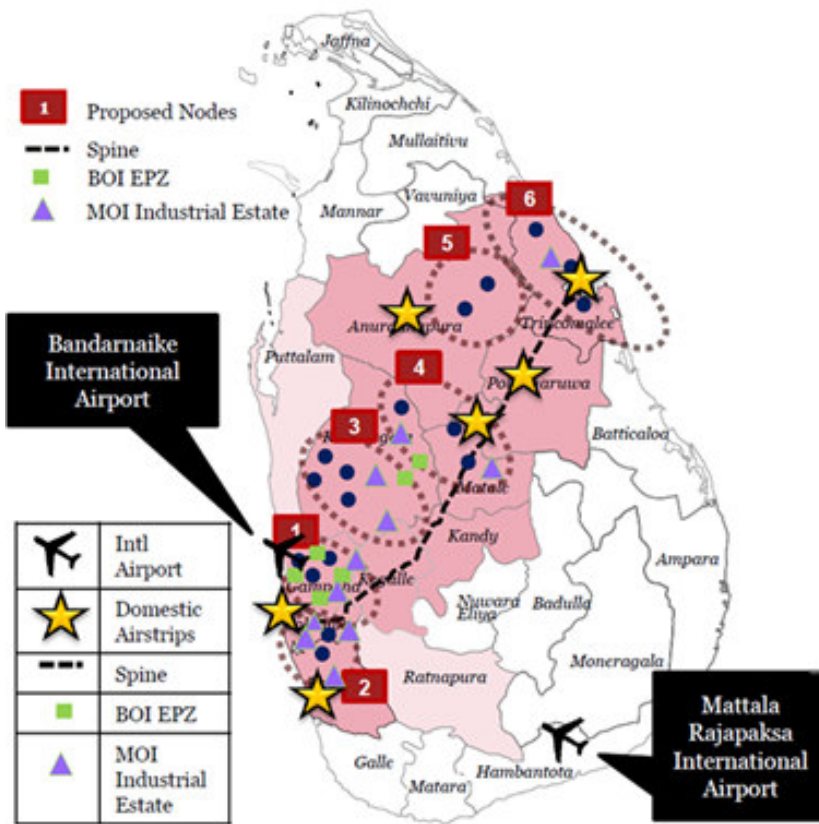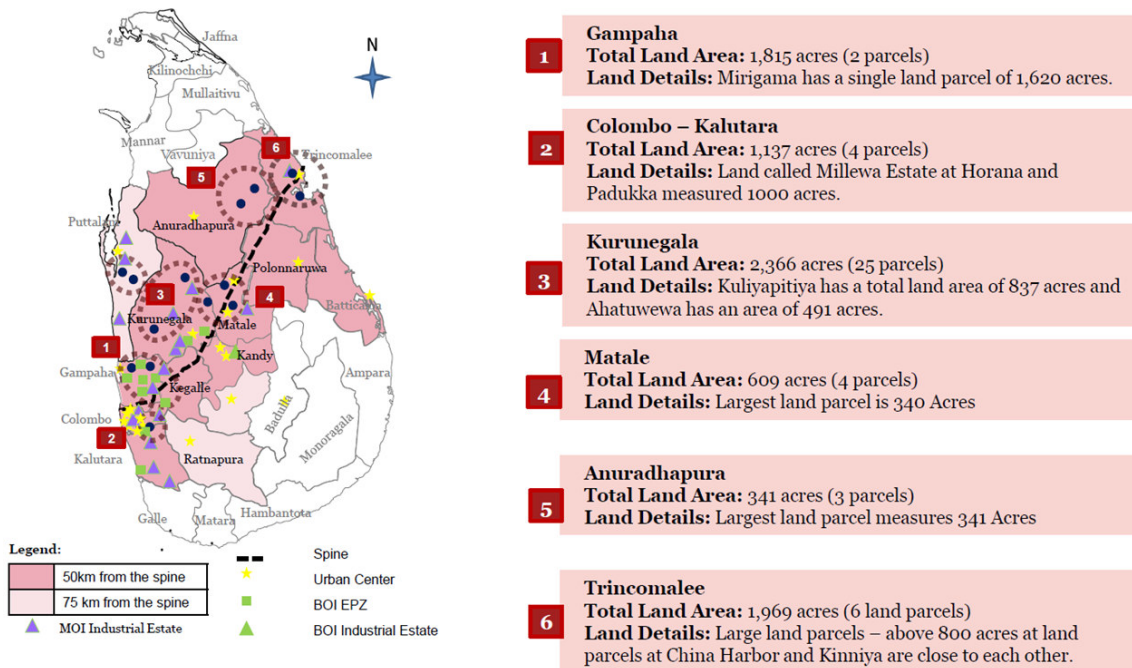
Figure 7-12 Airport and Economic Corridor

Figure 7-12 Airport and Economic Corridor

Figure 7-13 Industrial and logistics Nodes at Economic Corridor

Potential nodes that may be considered basis availability of land

1 Gampaha
Total Land Area: 1,815 acres (2 parcels)
Land Details: Mirigama has a single land parcel of 1,620 acres.

2 Colombo – Kalutara
Total Land Area: 1,137 acres (4 parcels)
Land Details: Land called Millewa Estate at Horana and Padukka measured 1000 acres.

3 Kurunegala
Total Land Area: 2,366 acres (25 parcels)
Land Details: Kuliyapitiya has a total land area of 837 acres and Ahatuwewa has an area of 491 acres.

4 Matale
Total Land Area: 609 acres (4 parcels)
Land Details: Largest land parcel is 340 Acres

5 Anuradhapura
Total Land Area: 341 acres (3 parcels)
Land Details: Largest land parcel measures 341 Acres

6 Trincomalee
Total Land Area: 1,969 acres (6 land parcels)
Land Details: Large land parcels – above 800 acres at land parcels at China Harbor and Kinniya are close to each other.

**Roads in the Colombo Trincomalee Economic Corridor**

As mentioned, the main spine should be the Central Express Highway connecting the nodes with the two ports.

To connect the nodes with the express way the following connectivity observations have been made:

Figure 7-14 Nodes and Connectivity

Table 7-5 Existing Connectivity at Nodes

| No	Node	Existing Connectivity
1	Gampaha	Connected through B class roads and E03 (toll road), Heavy congestion along major urban roads also due to container traffic.
2	Colombo – Kaltutara	Connected through both A, B and expressway (E01, E02), Heavy congestion along major urban roads connecting to the expressway.
3	Kurunegala	Land parcel at Kuliyapitiya and hettuwewa are not directly connected to Highway but B road connectivity to A10, A28 and A6 exists. Last mile connectivity may be an issue for some land parcels
4	Matale	Connected through A class and B class roads. No capacity issues identified.
5	Anuradhapura	Connected through A class roads with little traffic but last mile connectivity may be an issue for some land parcels.
6	Trincomalee	Low road density north of the corridor may require development of new tertiary and B roads. Trincomalee port road required towards the west to connect to A6 and future central expressway
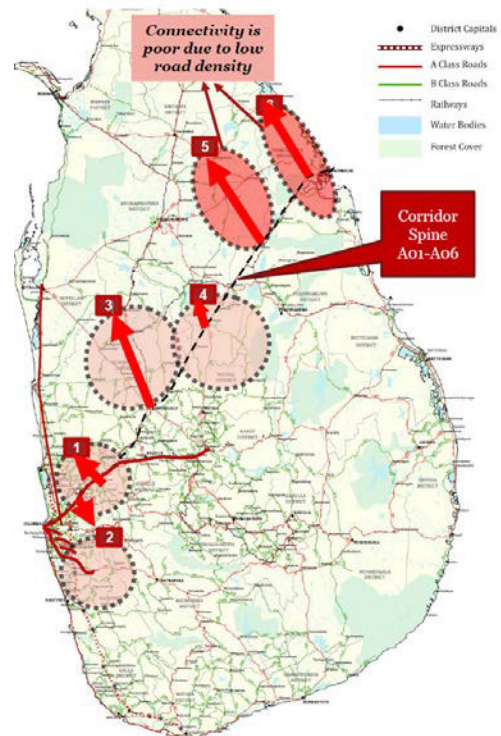
Source: CTEC report

Other observations on roads:
- Major truck road stretches of A01 and A02 near Colombo are heavily congested with mix of urban, suburban and regional traffic.
- A01 Colombo- kandy stretch faces congestion and capacity issues as primary access route for local industrial areas.
- A06 Highway to dambulla passes through urban settlements and experiences congestion due to mixing local short distance traffic with long distance traffic.
- A06 stretch between Dambula and Trincomalee is not very congested and further land area is available for expansion in the future to a full expressway.
- Majority of the industrial centres are 30-50km at distant from the spine.
- Most industrial areas have good connectivity through E01, E02, A01 and B class roads.
- Anuradhapura has the least road density in Sri Lanka and the local node will require connectivity to the spine and gateways.

Rail in the Colombo Trincomalee Economic Corridor

The following observations have been made:

Figure 7-15 Rail Upgrades

- Railways work with old rolling equipment.
- Rail freight movements are limited to specific arrangements for the supply of Oil, Coal and Wheat flour.
- Urgent need for track improvements to enhance track speed from 30 km/h to 100 km/h.
- Polgahewala to Maho junction has become a constraint to North-South as well as East-West connectivity. Line doubling is required.
- New line planned between Kurunegala and Habarana via Dambulla will reduce travel time by 1.5 hours to Trincomalee.
- Additional junction relay capacity is required between maho and Kurunegala to improve transit times.
- More than 40% of trains face more than 30 min delay.
- More than 60% delays are caused by infrastructural issues on rails and sleepers.
- About 30% of the overall track is under speed restrictions of 30 km/h due to significant safety risks.
- Existing rail mode share of passengers (5%) and freight (1%) is low due to network inefficiency and delays.
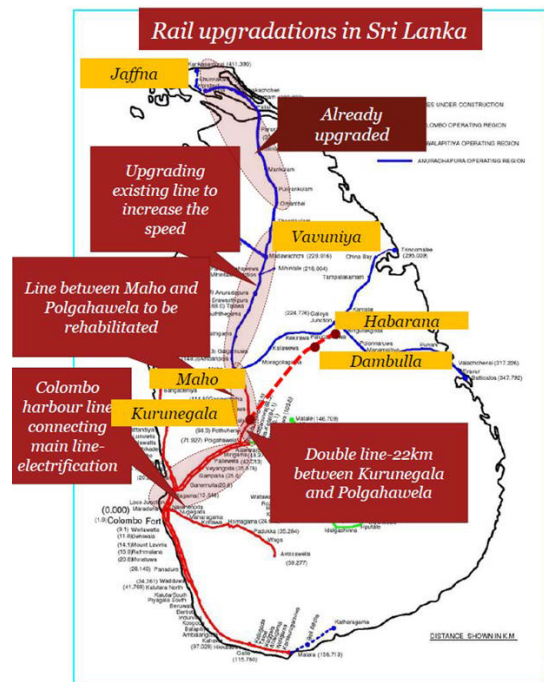
Improved rail connectivity to Trincomalee are required to facilitate efficient corridor with nodes connected through multi modal connectivity of rail and roads.

7.5.1 Recommendations

Above paragraphs on Dry ports / FTZ and Corridors lead to the following recommendations:

R1. The Central Expressway between E03 and Trincomalee needs to be developed and it's design and land acquisition is in process.

For the Colombo Trincomalee Economic Corridor, the Central Expressway needs to be developed (see picture below). It connects through Colombo Port, the PAEH, the 2nd New Kelani Bridge, to Gampaha and Kurunegala and follows A6 towards Trincomalee.

Figure 7-16 Proposed Central Expressway

R2. Identification of land areas for new logistics zones/ industrial export processing zones in the proximity of Port of Colombo port (Colombo-Gampaha region).

The following priority applies:

• The first priority is to develop MCC warehousing in the port and near Bloemandhal Area (as specified in the Port of Colombo Masterplan)

• The second priority is to select land areas for new logistics zones in the proximity of the port. Proposals have been made in the masterplan of the Ministry Megapolis and Western Development but a centralised logistics land North of Kerawaiapitiya power station would also be proposed. In total about 450 to 600 ha may be required upto 2050.

Following loaction is an option to develop a custom zone area which could be expanded to a cargo village or logistic zone or dry port/FTZ.

Figure 7-17 Proposed Central Expressway
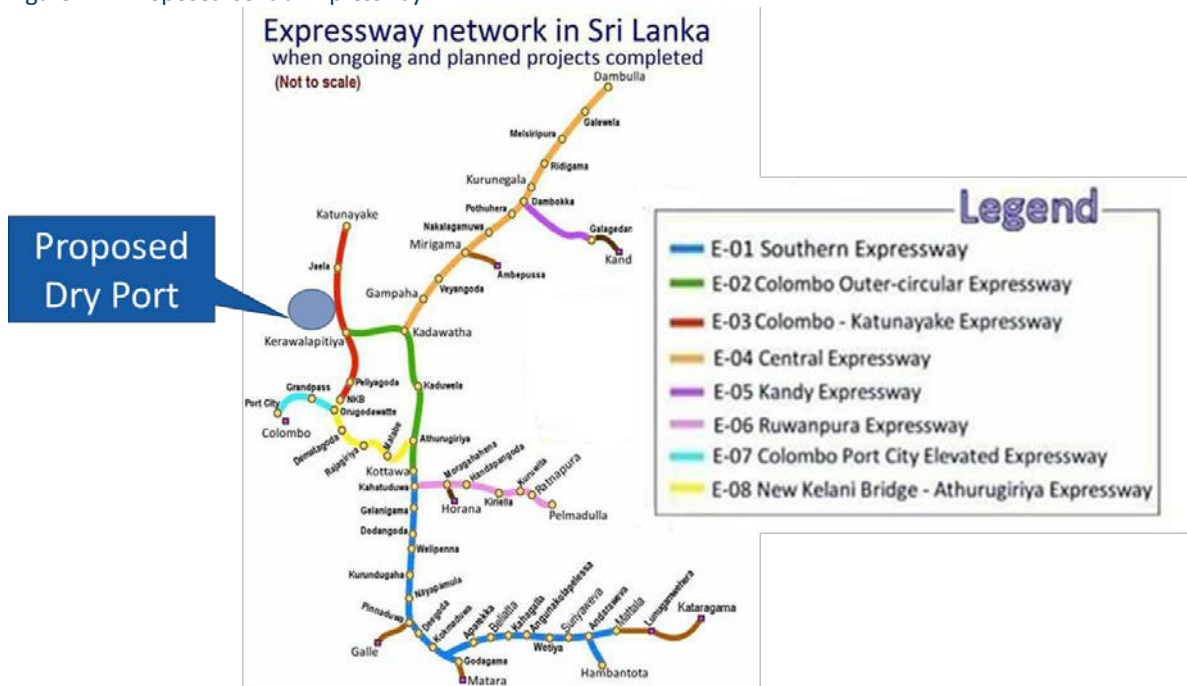
Steps to identify these areas are as follows:

- Landuse planning : Identification of nodes and formalisation of land-use planning on logistics zones/industrial zones and urban zones through Governmental institutions like UDA and local districts councils.
- Land consolidation: Identification of specific land areas (acquisition and land consolidation)
- Creating institutional framework: develop institutional framework, who develops, operates and maintains the to be developed lands. Which PPP structures could be applied?
- Investment promotion and facilitation: Set up proper promotion for the marketing to potential investors.
- Create the appropriate trade facilitation to support the targetted industries choosen for settlement in Sri Lanka.
- Land area development: Develop logistical and or industrial land based, in lign with demand, with settlement requirements such as water, power, drainage and road connections to the Central Expressway and local communities. Operate and maintain areas.
- Urban infrastructure development: development of urban infrastructure, in lign with demand, in identified zones, operate and maintain.

R3. Identification of land areas for new logistics zones/ industrial export processing zones in the proximity of Port of Trincomalee.

The following priority applies:

The first priority is to select and secure land areas for new logistics zones in the proximity of the port. Proposals been made in the Trincomalee Masterplan. Similar steps apply as above.

R4. Additional dry ports / FTZ / EPZ and logistic zones should be developed along the spine of the Colombo – Trincomalee corridor.

The priority steps apply, similar to the steps mentioned above.

R5. Develop multimodality with rail connecting to the nodes with first priority to the western region selected logistical hubs. The rail development should follow the National Rail masterplan.

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PART D: Innovation, Technological Developments & Trade Facilitation

8 Technology and Port Community Systems

8.1 Introduction

This chapter describes the international best practice on Port Community Systems. Technology has advanced quickly and data is more easily shared between systems due to established protocols and uniform data elements. Moreover, many systems today are based on open software which allows users to create their own front end for monitoring and sharing information. In the Port sector challenges exists as there is discrepancy between state of the art systems having electronic front ends and dated systems often based on centralized main frame systems. The port community systems are introduced to create easy communication between varies parties in the port community so that information is entered only once and shared in the right fashion at the right time with each other.

The following approach has been used for this chapter:
- Paragraph 8.2 describes the institutional best practice on Port Community Systems;
- Paragraph 8.3 describes the current situation in Sri Lanka;
- Paragraph 8.4 covers the IT Way forward; and
- Paragraph 8.5 provides the recommendations.

8.2 International best practice

Across the world, the implementation of port community systems (PCS), either in individual ports or as national systems is widespread. A Port Community System is an electronic platform that connects the multiple systems operated by various organisations that operate in a seaport or inland port community. It is shared in the sense that it is set up, organised and used by firms in the same sector – in this case, a port community.

A PCS offers for the electronic exchange of information amongst all port and logistics sectors and is recognized as the most advanced method for the exchange of information within a single or national port community infrastructure. A PCS has the ability to serve as a National Single Window or to integrate into a National Single Window. A PCS is therefore pivotal in the Single Window concept and will reduce duplication of data input through efficient electronic exchange of information. Moreover, it will cut communications and paper administration as information is enter once and re-used in multiple formats for users in the logistic chain.

The diagram on the left hand side shows the high level of communication and information exchange. The right hand picture shows the Port Community system where information is securely stored and shared between respective port stakeholders.

Figure 8-1: Schematic Overview PCS
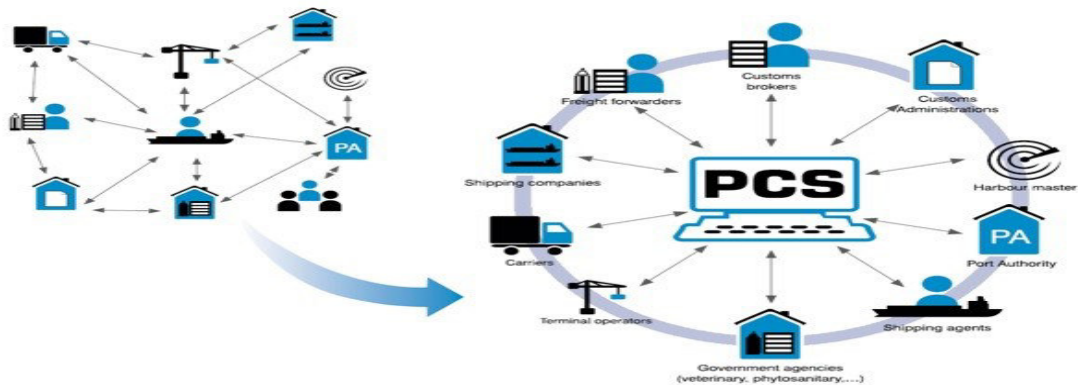
In Singapore, South Korea and most of the European ports in which a PCS has been implemented, the port authorities in those ports played a key role in the creation and setting-up of the PCS or single window. The PCS in Rotterdam, Amsterdam, Antwerp, Barcelona, Hamburg, Le Havre and various other ports have been set up through involvement of the port authority.

Innovation drives automation and digitalisation

Today automation has come to a new era of development with the introduction of SMART applications mobile apps and the use of GPS data. The latter can bring advantages through for example:

- Tracking and tracing;
- Truck routing and avoidance of congestion;
- Truck on-demand (reduce waiting times at gate);

Information technologies also drive the modern information flows. Therefore, Port Authorities focus on digital information platforms such as port community systems to inform the port users.

Four main systems are mainly implemented by port authorities:

- Port community systems;
- Paperless custom;
- Digital bill of ladings (not only in container shipping but also in bulk shipping); and,
- Digital orders in the transport chain (container release orders, pick up orders etc.).

It should be noted that automation reduces unskilled labour employment, resulting in higher skilled labour requirements. This development changes the common labour setting in ports from low skilled to high skilled labour.

There is cultural resistance to change hence from an authoritative practice to system and procedure driven introduction takes time. For the Port Community System and related automation to reach the expected superior standards, there are requirements such as legal compliances, investment, approvals, customization and acceptances by parties involved. Introduction, implementation, alter course to provide an efficient process flow, investment on hardware, skill based training. These will therefore require, announcements and conferences to educate all stake holders.

A replacement of existing systems, methodology, computer hardware, operating systems, databases is therefore minimised if the missing but critical software is selected and introduced with a road-map. Therefore, a gradual but a prioritized project has to be constructed with clear objectives and milestones and determined investment. This will let selectors to use Data on a platform free environment, Computer resident or Cloud

Based, Mobile Technology supported, Push and Pull features for fast decision making. Information sharing, supervised payment gateways and meet legislations, please the regulators and supervisory bodies to receive alerts are a few procedures that need to be change in order to provide an excellent port community base solution.

A Port Community System has the advantage of linking other ancillary services using the benefits of "5G Wi-Fi connections set to be three times faster than 4G, starting with 450Mbps in single-stream, 900 Mbps (dual-stream) and 1.3G bps (three-stream). This huge growth in IoT and smart devices, 5G's speed and capacity will enable an even more rapid arrival of this connected future."

With the introduction of a Port Community System, parallel functions linking through automation to an electronic platform is achieved that connects the multiple systems operated by a variety of organisations that make up a seaport and extend to other business and national organizations engaged with national economic drive.

Port Community Systems can play a major role as Countries move towards the Single Window environment; adoption of new regulation and make valuable contribution to the harmonisation and coordination of reporting formalities, processes and procedures. Countries such as the Netherlands and Spain started their PCSs in the 1990s.

A Port Community Systems offers a standardised communication platform in order to improve the systems in terms of punctuality, reliability or costs and, on the other hand, the need to increase competitive position among ports. It lets good collaboration with the key authorities, as well as with stakeholders, potential customers and local trade associations. Users to the Port Community System will be trained through workshops with the end users allowing a fresh group of academics in modern logistics in supply chain.

Since the Port Community System (PCS) is ideally placed to form the foundation or backbone of the Single Window vision the number of ports connected to a PCS can integrate functions of Port of Colombo and extend to all national ports of Sri Lanka. Through this neutral and open electronic platform enabling intelligent and secure exchange of information between public and private stakeholders it lets improve the competitive position of the sea ports' communities leading to optimising, manages and automates port and logistics processes through a single submission of data and connecting transport and logistics chains.

Direct influence and immediate benefits of having a Port Community System
- Easy, fast and efficient EDI information exchange, re-use and centralisation, available 24/7/365;
- Customs has "service level agreements" with PCS users to manage the electronic exchange of information between different parties on their behalf;
- The Single Window allows parties involved in trade and transport to lodge standardised information and documents tightly integrated with reduction of paperwork by electronic handling of all information relating to exports, imports, transhipment, consolidations, hazardous cargo and maritime statistics reporting and declarations;
- Status information maritime and other statistics, control, tracking and tracing through the whole logistics chain;
- Transparency of Port procedures and processes and practices; and,
- Support the ambitions to meet global carbon reduction requirements.

The functionality of a PCS is aimed at eliminating unnecessary paperwork which can clog up cargo handling. Using electronic data exchange, the PCS is an effective real-time information system; fast, focused, flexible and multifaceted, it aims to improve efficiency at all stages of the process of manifesting, through vessel discharge and loading, Customs clearance, port health formalities and delivery in and out of the terminal. As well as the above, the PCS offers improved security, cost reduction and potentially more competitiveness for each user.

A Port Community System links the different actors of the logistic community and acts as a Risk Management platform for regulatory bodies like the Customs and the Ports Authority. It is an Inter-Organisation Information System, namely a Business-to-Government one that sits in between the key players of the Logistics Supply Chain to enforce the World Customs Organisation SAFE Framework around the world. The success of a Port Community System depends on factors ranging from its acquisition to the complete satisfaction of the different Stakeholders that form the Logistics Supply Chain. The success of such a system plays a fundamental role in positioning as a competitive regional trade hub in the region and providing at the same time, considerable benefits to the local business processes and the local logistics conglomerate.

The demands expressed can be facilitated with the use of advance information technology based programmes and equipment. Where it is possible, cloud based shared services and resources need to be considered. Proven products with the least modifications must be considered and where the manual practices were directly automated needs to be revisited and deeply analysed. With the findings introduction of simplified upgrades implementable at the shortest time can be considered. Where it allows, duplication work practices must be stopped. Drive for excellence and quality ISO and IMO objectives must be declared as goals and linked to the performance measuring matrix.

Reliance on handwritten notes, VHF messages, Voice Calls need to be regulated through data mapping and clearly entered to applications that are easy to use. Extra attention on mobile technology based apps will serve the customers in the foreseeable future.

Table 8-1: Proven Port Community Systems

Product Name	Origin	Modules	Remarks web site
PCS	Singapore	Multiple	https://www.portnet.com/WWWPublic/products.html
PORTBASE	Netherlands	Multiple	https://www.portbase.com/en/
Uni-Pass0	South Korea	Multiple	https://www.customs.go.kr
Global Institute of Logistics	U S A	Multiple	www.globeinst.org
Actual I T	Slovenia	Multiple	http://www.actual.si/?main=2
Indra	Madrid, Spain	Multiple	http://www.indracompany.com/en

Two examples will be mentioned here:
Please also note that the single window is also addressed in the chapter on Customs. There the South Korean example on their single window "UNI-Pass" is discussed.

Example: Singapore Port Community System

A PSA flagship IT solution – PORTNET PCS is the world's first nationwide business to business (B2B) port community solution and a winning entry in the National Infocomm Awards (2006). It has provided the logistics industry with a single sign-on network portal. Through it, PSA has connected shipping lines, hauliers, freight forwarders and government agencies, helping them to manage information better and synchronise their complex operational processes. From managing complex transhipment processes of shipping lines (EZShip), supporting slot exchanges among alliance partners (ALLIES™), enabling companies to monitor performance and make critical business decisions (TRAVIS™), integrating port documentations seamlessly with the haulage processes and workflow (Haulier Community System™) to providing a documentation portal between

shipping lines and shippers (CargoD2D™), PCS simplifies and synchronises millions of processes for customers moving their cargo through Singapore. Over 10,000 integrated users rely on the system's unparalleled capability to provide real-time, detailed information on all port, shipping, and logistics processes crucial to their businesses. PCS processes more than 220 million transactions a year. It saves about S$ 1 billion (USD 667 million) annually for the trading community … together with Singapore Telecoms, Port of Singapore Authority, and Civil Aviation Authority of Singapore … shipping agents, and air cargo agents), financial institutions (e.g., banks), and port and airport.

The efficiency of the Port is enhanced by IT and operational systems, and by the infrastructure Singapore provides in general. While one could develop parts of this system easily, it is their combination that makes it difficult for another Port to compete …

PORT OF SINGAPORE AUTHORITY's more complex plans can also be handled, by automating the communication between the port users and PSA as well as among port users themselves, PSA further extended the usefulness of PCS to the maritime community by linking it to various users and authorities.

Figure 8-2 PSA port community system

The PCS supports features such as:
- Flow-Through gate
- CITOS (ship and yard planning)

Flow-Through Gate
The Flow-Through Gate, introduced in 1997, is a fully automated system that identifies container trucks and gives drivers instructions within 25 seconds. It handles an average traffic flow of 700 trucks per peak hour, and 9,000 trucks per day.
After a manifest is submitted through PCS, the fully automated and paperless process at the gate clears trucks entering the port within 25 seconds, with the following steps:
- The truck arrives at the in-gate. The driver taps his PSA pass on the Self Service Terminal (SST) and verifies his identity through a fingerprint biometric reader or keys in his Personal Identification Number (PIN).
- The truck is weighed at the weighbridge.
- The gate picks up the truck's identity from the In-vehicle Unit (IU) at the dashboard.
- The gate's Container Number Recognition System (CNRS) captures the container number via Closed-Circuit Television (CCTV) cameras.
- The system checks the driver's identity, truck's identity, weight and the container number against the manifest and clears the truck for entry.
- The system sends a message to the driver's mobile phone or Mobile Data Terminal (MDT) on the exact position in the yard where the container will be stacked.

CITOS

Few examples of how CITOS directs port operations:

- Berthing System
- Ship Planning System
- Yard Planning System
- Resource Allocation System
- Flow-through gate
- Reefer monitoring

On a typical day, 60 vessels of different sizes call at the port. Although a high number of them arrive out of schedule, berth planning system allows most of them to be berthed on arrival. Planning begins 72 hours before the ship arrives, when the shipping line applies for a berth and sends ship stowage and connection instructions to PSA Singapore through PCS. Once berthed, the quay cranes unload boxes destined for other ports and load boxes brought in by other vessels. The prime movers are tracked individually via the Global Positioning System (GPS) and distributed dynamically among the vessels. The prime mover moves off to a container holding area in the yard. There, the yard cranes lift containers from prime movers and stack them in the yard. The sequence is reversed for delivery out of the yard to a connecting vessel. Containers are not stacked in a random manner. When the information is keyed into the system through PCS, CITOS automatically generates ship stowage plans and yard layout plans based on factors, such as:

- Ship stability (for stowage planning)
- Weight
- Destination
- Size
- Special requirements (e.g. reefers, dangerous goods, out-of-gauge cargo, tight connections)

This allows PSA Singapore to:

- Maximise land use and optimise container retrieval
- Track the location of each container
- Maximise resource productivity by planning ahead

Example: Rotterdam Port Community System

Through the Rotterdam Port Community System, Portbase offers over 40 different services to approximately 3,200 customers in all sectors in the logistics chain. The system is the digital connection to all smart Dutch ports, has a national coverage and is available for all port sectors: containers, general cargo, dry bulk and liquid bulk. Everyone in the logistics chain can exchange information through PCS easily and efficiently.

Previously, companies had to organize matters such as pre-reporting a vessel, the status of a shipment, export documentation, loading/unloading papers or communication separately and by e-mail, fax or telephone. Thanks to the Port Community System, those days are over. Everything is now merged into a single system. This results in increased efficiency, lower planning costs, better and transparent planning, faster handling and fewer errors.

The services within the Port Community System focus on all port sectors: containers, break bulk, dry bulk and liquid bulk. All the links in the logistics chain can easily and efficiently exchange information through these services. The Port Community System offers each of these target groups its own package of tailor-made services. Through a service selector you can easily find the service you want.

Figure 8-3: Actors PCS
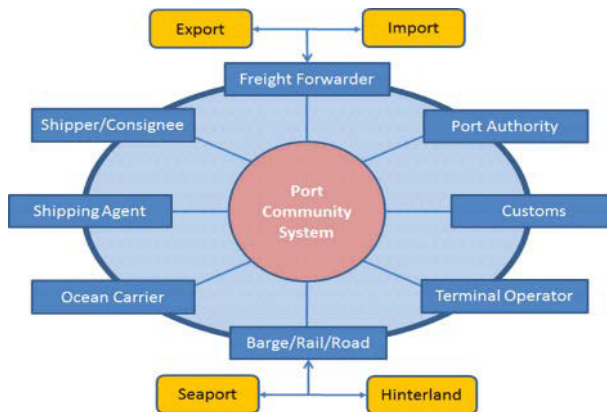
Source: Port of Rotterdam

The port base systems organize for example the flow of information to allow containers to swiftly move between terminals and modes of transport.

On Maasvlakte 2 for example, there are two new container terminals RWG and APM Terminals MVII and they request carriers, forwarders and shippers to electronically notify all relevant container information in advance. Portbase is the portal for this. The submission of all necessary information in advance applies equally to import and export cargo, as to trucks, trains and inland barges. Through correct pre-notification, the delivery and/or collection of containers becomes easier than ever. Every terminal visit by proceeds efficiently. Neither RWG nor APM Terminals MVII has a reception building or pneumatic dispatch; neither is set up to solve administrative issues or Customs matters at the gate.

The main features of Portbase in this case are:
- Organise export documentation
- Organise import documentation
- Truck and cargo arrival notifications
- Organize arrival and cargo to be delivered / collected by truck
- Organize arrival and cargo to be delivered / collected by train
- Organize arrival and cargo to be delivered / collected by barge

Other functions of Portbase are sharing information and send notifications between systems and between persons such as:
- Ship arrival/departure
- Barge arrival/departure
- Exchange notice of readiness
- Customs procedures
- Container Freight station notifications
- Container depots notifications
- Container and tank cleaning notifications
- Container arrival/departure notification
- Equipment interchange messages
- Container released for pick-up
- Finding information on auxiliary services such as agents and ship agents, bunkering, water supply, power supply, ship maintenance and repair, ship waste, supply industries, chandlery (spare part, provisions, nautical equipment, cleaning products etc.

How Portbase Works

Each service includes multiple service processes. These processes describe the required message exchange and interaction between the parties. This involves messages between systems (system messages) and messages between people (notifications). The platform ensures that the processes are in accordance with the established rules. Thanks to the central database is optimal reuse of data. Companies need to provide data, but only once.

Benefits

The Port Community System centralizes all information and the days in which companies had to develop and maintain a whole range of bilateral connections by telephone, fax and paper are over. All the information exchange in the ports now runs efficiently through a single hub. The services available in the Port Community System provide concrete savings in time and money from day one. The benefits:

- Greater efficiency;
- Lower costs;
- Better service provision;
- Better, more transparent planning;
- More rapid throughput times;
- Fewer mistakes;
- Optimal re-use of information;
- Available 24/7.

Security

Security is at very high standards with features such as: Information security manager, security audits, and the system is ISO-27000 (datacentre security) certified and the system has dual redundancy, so if one physical system fails the other takes over in real time.

Costs

Portbase is a non-profit organization. Companies only pay a fee for the use of services with demonstrable added value. These costs are minor compared to the advantages offered by the services. Financial support for services of strategic importance to the port is obtained from the general revenues of Port of Rotterdam and Port of Amsterdam shareholders. The service pages of this website in the services or a personal contribution.

Invoicing

Billing is monthly. Portbase makes prepay customer a realistic estimate of the number of anticipated transactions. Once a year off place (similar to the billing method of energy companies).

8.3   Current situation

Today no port community system is available. Digital communication is still limited and mainly through email. A lot of communication is done through phone and even fax is still used.
Many procedures require original documents stamped and signed which hamper the administrative efficiency and causes many delays.

The following tables illustrate the documentations required in the import of an LCL and the import of an FCL container.
It clearly shows that the system is too much depending on paper documents, inefficient and cumbersome.

Paperless procedures through digitalisation and innovation is required to create more efficient and transparent import and export procedures. A single window through a Port Community system is considered the way forward.

8.3.1   Manual documentation in the activity chain

In this paragraph two activity chains are explained:

1. LCL cargo clearance & delivery process
2. FCL import container: cargo clearance & container delivery process

The number of manual documents applied in this chain is illustrated. In the same table the modern practises are detailed to understand the difference between systems applied. The results are quite obvious; the number of administrative documents in the manual process is numerous, **up to seven copy documents to get to a delivery order, involving a lot of process time and administrative checks and administrative burden and limited transparency.** This compares to a **semi-automated paperless solution** in which approvals are made through the systems through status checks and status updates. In this way the administrative flow is reduced and paper is eliminated. Further the system becomes very transparent, each party involved knows the same status.

Table 8-2: LCL cargo clearance & delivery process

Process / Activity	Current situation Colombo	Benchmark International best practices
Cargo declaration	E-declaration or manual	E-declaration
Container arrival notification	Fax/Email from shipping line to agent	Automatic notification
Agent request for de-stuffing	From agent to terminal; advanced guarantee payment to SLPA	Online request from agent to terminal; based on existing guarantee running account
Cargo unloading/de-stuffing (out of container)	Manual check Consignee comes to BQ administration building to check (in cargo booklets) if the cargo has been de-stuffed from the container and moved to the SLPA warehouse	Online notification after de-stuffing
Import dues (to Customs)	Payment (cash or transfer); payment slip stamped by Customs. If cargo has been submitted to the warehouse, the consignee goes to Customs office (outside port) to pay the customs fee	Online payment
Port dues (to Port Authority)	Payment (cash or transfer); payment slip stamped by Port Authority. Consignee pays port dues to Port Authority at SLPA office (outside port)	Online payment
Delivery order (request from Consignee to SLPA to deliver)	Manual (3 stamps required) Consignee returns to BQ administration office to obtain a	Online

Process / Activity	Current situation Colombo	Benchmark International best practices
	stamp for the delivery order (after showing payment receipts of Customs dues and Port dues)	
Cargo delivery to Consignee	Manual Consignee goes to SLPA warehouse to pick up the cargo upon submission of • delivery order Customs • delivery order SLPA • customs declaration • copy bill of lading • gate pass • landing & delivery payment slip • storage payment slip Consignee waits outside warehouse until SLPA port employees bring (unpalletised) cargo to the entry of the warehouse; Consignee loads cargo into truck	Palletised Warehouse operator loads cargo with forklift into consignee's truck

Table 8-3: FCL import container: cargo clearance & container delivery process

Process / Activity	Current situation Colombo	Benchmark International best practices
Ship arrival; ETA from shipping line to Port Authority	Email/Fax	EDI (Electronic Data Interchange)
Manifest	E-manifest (BAPLIE) 99% online – 1% manual	E-manifest (BAPLIE) Online
Cargo customs declaration by consignee	E-declaration	E-declaration
Import dues (Customs)	Payment (cash or transfer) If container has been discharged at the terminal, the consignee goes to Customs office (outside port) to pay the customs duty	E-payment
Port dues	Pro-forma disbursement account Advanced payment (online) Ship's agent pays port dues to Port Authority	E-payment
Container arrival notification	Shipping agent informs consignee on arrival container in stack	Automatic notification
Handling dues	Terminal charges shipping agent for the handling Monthly settlement Shipping agent charges to consignee:	

Process / Activity	Current situation Colombo	Benchmark International best practices
	• Quay move • Stack move • Storage • Delivery move	
	Consignee settles payments (cash or online) before pick-up of the container; obtains landing a delivery payment slip	E-payment
Delivery order (request from Consignee to SLPA/terminal operator to deliver)	Consignee has to complete the delivery order by obtaining approval by: • Customs • Terminal operator • Ship agent	E-notification to Port Community System and/or Terminal Operating System
Port in-gate process: Truck sent for pick-up	Manual • Customs issues copy of gate pass (paper) to the agent/importer upon payment of custom declaration • Trucker needs port access pass from SLPA (sticker) • Wharf clerk provides copy of gate pass to truck driver (paper)	Security check • Automatic identification truck driver • Truck license plate
Terminal in-gate process: Container delivery to Consignee	Manual Truck drives to terminal to pick up the container upon submitting: • Delivery order Customs • Delivery order terminal operator • Dustoms declaration • Copy bill of lading • Dustoms payment slip • Copy of gate pass • Landing & delivery payment slip	(semi-) Automated Truck driver is invited to pick-up the container after finalisation of the online container delivery order Security check • Automatic identification truck driver • Truck license plate • Connecting container number to truck license plate
Terminal out-gate process	Trucker receives Equipment Interchange Report (EIR) after collection of the container	Trucker receives Equipment Interchange Report (EIR) after collection of the container, including gate pictures of equipment
Port out-gate process	Truck drives to Main Gate at port boundary Customs checking procedures • Wharf clerk delivers original gate pass to Customs (including truck license plate number and seal number)	Truck drives to port gate Security check • Automatic identification truck driver • Truck license plate

Process / Activity	Current situation Colombo	Benchmark International best practices
	• Truck driver delivers loading pass to Customs • Custom issues customs seal Customs issues new gate pass (to drive to Customs Inspection area)	
Customs Inspection	Three examination modes: • Green: no examination (5-7%) • Amber: quick examination (+90 %) • Red : full examination (3-5%)	Upon Custom request, truck driver needs to visit Custom scanning facility for examination

8.3.2 Key observations and bottlenecks

The following key observations and bottlenecks on systems are mentioned in this table. The emphasis has been made on the guidance of revenue generating support systems but also the observations on cost control systems aspects are included.

Table 8-4 IT systems on revenue stream - Key Observations

Category	Issue	Severity
IT systems on revenue stream		
General	Manual processes and paper based approvals cause high administration and time consumption	High
TOS	The TOS of JCT (Navis Sparcs 3.10 and Navis Express) are outdated and do not support modern yard utilisation, real time yard planning and web based applications, GPS and modern gate applications	High
TOS	TOS system to provide a dashboard management system with relevant management information (productivity and performances)	High
TOS	Ability to upload files and amend records within the permitted timeframe	High
TOS	System should be able for to bill activities directly on handlings and storage and share the invoice lines with the finance system.	High
TOS	Babplie files often have errors leading to communication, corrections by shipping agents	High
TOS/ harbourmaster	Berth planning system to be shared between container terminals and harbourmaster and linked to scheduling system of vessels on calendar planning	High
Gate automation	JCT has no gate automation, once TOS system is updated OCR gate systems become feasible (OCR and automated truck driver passes).	High
Damage control	Equipment Interchange Reports (EIR) are made manually. These reports lack photo's. Accident reports and claim handling is subject to become more efficient through OCR scanning.	Medium
Harbour master	Tug and pilotage recording and invoicing is subject to manual registration.	High
Harbour master	Ship registry, berth planning, mooring and de-mooring is not integrated with invoice recording. A Harbour Information Management System (HaMIS) is required integrating the ship registry file with actual ship history call records. The ship registry file is to be linked with the international ship file from IHS/Fairplay or Clarksons.	High

Category	Issue	Severity
Harbour master	HaMis system is lacking and planning on tugs and pilots including statistical data should be provided from HaMis to a management web based dashboard. Turnaround times to be integrated into the dashboard with information provided by the TOS systems (productivity & performances)	High
Warehouse	The warehouse LCL system is a manual driven process, no automation available (no barcodes scanning, no receipt alerts, no damage control systems, no track and trace)	High
Single window	There is no single data window for port users. Approvals in the information chain are based on manual procedures and stamped documents. Communication in the process consists of several rounds via phones and even by fax. System should share specific and allowed data between terminal operators and management information systems	High
Single window	Publications on procedures, rules and practices	High
Legal	Contract management system with alerts should be linked with TOS to respond effectively on disputes	Medium
Payment control	Systems to be linked with unrestricted Payment Gateway and Pay online and submit digital receipts.	Medium

Table 8-5 IT systems on costs stream - Key Observations

Category	Issue	Severity
IT systems on costs stream		
CRM	A Customer Relation Management system is lacking.	High
Manual document management	The manual document management system should be digitalised to avoid business based on hard copies.	High
Shift planning & rostering	Shift planning and rostering is done on a manual basis whilst services have to offered 24/7 optimisation is required in this respect.	Medium
WIFI networks	WIFI networks are lacking at various locations	High
Cable internet	Cable internet is often not reliable causing file transfer to fail	High

8.4   IT Way Forward

The new applications will use a common interface to push or pull only the relevant transaction to complete the business cycle of a process. Hence, the new applications run as independent stand-alone software solutions. They meet the mandatory condition of being "cloud based, modular, made for the purpose, mobile and internet ready, arrives with common interfaces to share transactions with other computer databases and applications, available 365x24, stores only the relevant information to provide the absolute information to the seekers. All applications such selected will meet "365x24 hours, stores only the relevant information provides the absolute information to the seekers. The efficient planning processes and procedures follow a strict logic, triggers recommendations, apply best practices of professional projections. Through digital certification, it linked to electronic transaction identification, records are visible to authorized organizations or officials. The information is transparent, reliable and traceable & reusable to the originating source for further analytics to improve productivity and efficiency".

With this approach SLPA will not need to customize and alter the design architecture of the new applications to interface to the currently used applications. This saves huge investment and time and prevents data mismatch, failure and downtime.

By negotiation SLPA is able to obtain the most favourable terms that will expedite the selection process and make the project to be based on a cost effective PPP with revenue generation ability. The software will arrive with interoperability and digital data interchange hence will be able to push information per the directives of SLPA. These applications arrive with many built in extra features, language translators, multiple calendars, email, ability to send out SMS, digital image storing, and many other built in functions. It also will continue to be enhanced as the owner cum operator will want to keep port users attracted to the application and make them becomes adoptive. E.g. (Current web based banking applications and internet banking software). These will simultaneously lead to applications able to provide national information for local and international trade through user friendly GUIs.

Though these applications can be replicated, if any other Port in Sri Lanka wishes to use the select the same application, it should be treated independently and should be altered to meet the requirements of that port.

The immediate benefit will be observed by JCT users. They will use the designated application for the purpose that is available real time, with no human intervention. For a service provided of the Port of Colombo, the provided service will be captured, measured, outcome recorded, invoiced, payment received through the automated payment gateway. There will be less disputes, no personal favours, alteration of levies or rates, and unauthorized intervention that brings disrepute or losses to SLPA. Since the private terminals have already automated, the service level improvement will be in par. Where there are inter-terminal charges, SLPA fees to collect for Harbour Master Services etc, this change will help to standardize and commonly improve professional service standards.

**Mandatory Electronic Data Interchange by IMO - FAL convention**
SLPA should take the offer that is in the horizon. The IMO will be promoting EDI as a mandatory requirement under the "FAL convention" for vessels to produce and shared with the Port of Call. This will be a Data Push Activity for the Port to update the TOS and also share with the other partners (Customs, Agent, Line, Harbour Master, etc). This promotion increases the efficiency of shipping and regulatory measures for safety, security and environmental protection contributing to clean oceans by elimination of unnecessary, disproportionate or obsolete administrative requirements. FAL 40 adopted new mandatory requirements on Electronic Data Interchange. According to the new standard, Public Authorities have to establish systems for the electronic exchange of information by 8 April 2019. A period of no less than 12 months for transition to the mandatory use of the systems shall be provided from the date of the introduction of such systems. A new Recommended

Practice encourages the use of the "single window" concept, to enable all the information required by public authorities in connection with the arrival, stay and departure of ships, persons and cargo, to be submitted via a single portal without duplication.

Figure 8-4: IMO FAL Convention

Recent amendments to FAL Conventions

- Amendments adopted in 2016
- It will enter into force in 2018
- **Mandatory** establishment of systems for electronic exchange of information **by 8 April 2018**
- Transition period of not let than 12 months (paper and electronic)
- States are encouraged to implement SW Systems
- Special event on ports on 4 June 2018
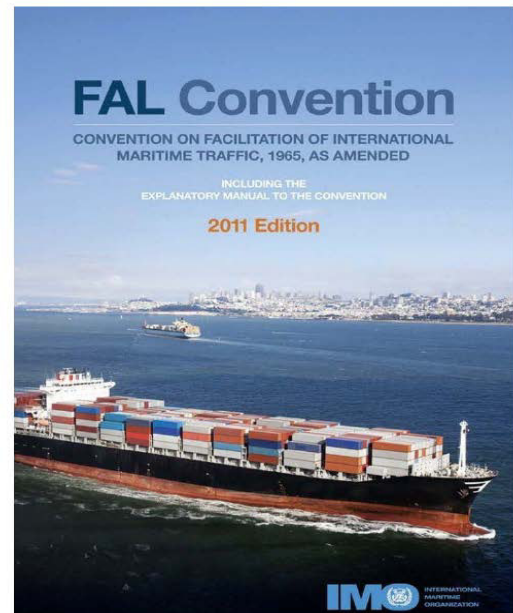
To facilitate the clearance of an inspection period for ships in ports, the FAL Committee has taken joint initiative together with other IMO bodies for the 'online access to certificates and documents required to be carried on board ships'. According to this new decision, electronic certificates should be treated as equivalent to traditional paper certificates, forms and the many local variants of these 'standard' documents around the world, and replace practices leading to bureaucratic overload and adding to the challenges that a master finds when the ship calls at a port.

The result of a possible future platform is illustrated here below. Note that the Single window or port community systems has been created on the left next to a new warehouse system, a new TOS system and a Management information system.

The systems are connected through web based cloud communication and has secured layers so that each data element has the right ownership whilst information can be shared and re-used by others. It is recommended to introduce a proven technology regarding the single maritime window.

To implement the system the following steps are required:
1. Information flow from ship agents to Maritime Single Window
    a. Streamlining the FAL conventions and the ship documentations according to international formats
    b. Mapping the information flow between ship agent's and port authorities
    c. Mapping any relevant other data elements in accordance with national legislation and procedures applicable to port levels.
2. Mapping all relevant data elements in accordance to other organisations
3. Determine status changes and time in the chain and authority of the data elements to update data elements

4. Ensure all logic situations related to the status of container are covered
5. Prevent from Cyber security
6. Data exchange through EDI
7. Test runs with major clients
8. Revise according to test runs
9. Go-life and roll-out

Figure 8-5: Possible Future Platform
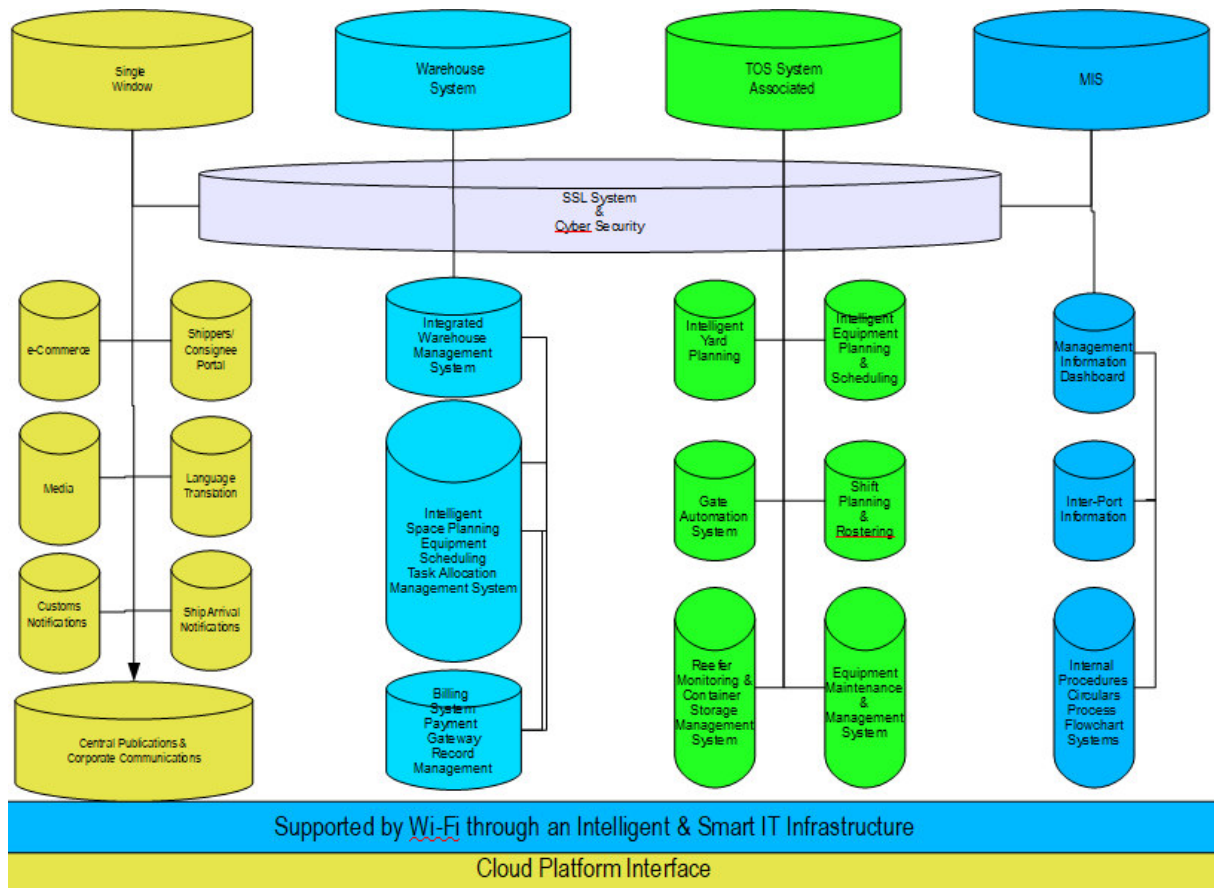
8.5 Recommendations

Following IT system introductions are recommended to increase business efficiency and introduce paperless business environment:

R1. **MIS – develop MIS information system linked to single window**

- Management Information Dashboard - With functions to drill down and compare projected vs actual. Provide warnings for action, emails and alerts for action, division specific for quick action.
- Inter Port Information - To provide statistics and utilization, demands, productivity and performances. Other technical and business information, which only needs to be shared between terminals, will reside here.
- Internal procedure manuals, circulars, process flow diagrams, handbooks, business information, notices boards are enabled.
- Rental & Lease Agreements

- Business Intelligence for management decision making

R2. **TOS – Upgrade Navis Sparcs to N4**
- Intelligent Yard, Equipment, Shifts Planning and Gate Automation
- Operation & Utilization - of the Quay, Yard, Equipment, Storage, Business Intelligence, his allows pre-planning of the yard, assigning of cranes, and other handling equipment, manpower planning for optimum throughput.
- For billing information to be generated without human interference, instead to run as a procedure, and process based.
- Reservation and Priority services

R3. **Warehouse Management System**
- Introduction of a fully automated warehouse system that will systematically receive the cargo, and store in the pre-defined space. Automatically calculate storage and demurrage charges, advise to shuffle cargo to optimize floor utilization. This system to automatically send out the cargo information to the single window system to advice consignee to follow instructions and to make arrangements, includes booking reservation to clear after the dues are paid to a bank.

R4. **Single Window – Including sub systems works to provide the essential information**. They can be gradually incorporated and will be unrestricted for time of introduction and automation. The system and the demand will automatically drive the need. Always a proven system is recommended. Knowledgeable people have done this before.
- FAL convention – electronic data from ship to port
  Mapping data elements with various organisations and institutions.
- Customs link with Portal
  - Customs procedures
  - Information required by the consignee to clear his cargo
  - Customs e-declaration
  - Customs e- payment
  - Customs clearance notifications

- Shippers & Consignees Portal
  - Organise export documentation
  - Organise import documentation
  - Check status of the container
  - Truck and cargo arrival notifications
  - Vessel arrival/departure notifications
  - Exchange notice of Readiness
  - Container release notification

- e-Commerce - The list is unlimited and each subsystem can be selected from the master page. The business portal for all service providers and service seekers enabling a transparent fair playing ground customer service
  - Competitive and fair to all
  - Links approval granting organizations to speed up processes
  - National business Port information and data published for information sharing
  - Truck & Transport Services
  - CASA (Ceylon Association of Ships Agents)
  - Banks & Payment Gateways

- Contract Labour
- Private warehouses

- Media
  - Web Sites
  - Language Translation
  - Customs Notifications
  - Business Announcements
  - Financial Notifications
  - Contact page

- Central Publications & Corporate Communication
  - Port Legal Policies Procedures & Rules
  - Language Translator
  - Call Centre, Complaint Handling & Customer Services
  - Social Media & Library of References and Business Publications
  - Safety Rules, location maps & Calendar
  - Registration formats & online data input forms
  - Space Availability, public announcements, procurement & charts

9 Warehousing

9.1 Introduction

This section provides the current overview of logistics infrastructure (operated by SLPA) within the Colombo Port area, and defines the development needs to cope with future demand in terms of warehousing activities.

The following approach has been used for this chapter:
- Paragraph 9.2 describes the institutional best practice on Port Community Systems;
- Paragraph 9.3 describes the current situation in Sri Lanka;
- Paragraph 9.4 reviews warehousing demand; and
- Paragraph 9.5 provides the recommendations.

9.2 International best practices

Basically, all SLPA warehouses currently in use are very old and in a poor state except for the recently developed CFS I warehouse. It is important that future design and development of additional warehouses should be based on modern standards.

Design characteristics
In terms of design, the following typical dimensions are used in state-of-the-art warehouses:
- Length between 100m and 250m (depending on the type and size of products).
- Width between 80m and 120m.
- Height between 7m and 15m (free stacking height).

To facilitate a high performing truck loading and unloading process, the warehouses need to be equipped with truck loading bays or docks.

The docking platforms can be levelled to enable accessibility for various types of trucks and trailers. The (un)loading area is fully covered or sheltered, allowing for efficient all-time and all-weather operations, also for weather sensitive cargo.

Figure 9-1 Warehouse Truck Loading Bays

To minimise the required land area, the use of high stacking infrastructure and equipment is required. Modern logistic warehouses are designed for a free stacking height varying between 7m and 15m, depending on the type and size of the products.

Figure 9-2 Warehouse Storage Racks

The installation of storage racks will allow for multi-level stacking of the palletised goods and products. Depending on the configuration of the storage racks and the assumed maximum stacking height of a standardised pallet with corresponding maximum pallet weight, stacking will be allowed at 4 to 7 levels (including ground level).

Equipment

For each of the activities at the warehouse and logistics centre, specific types of equipment will be required:

Stuffing and stripping of containers: forklift 1.0-2.0 ton
A container with palletised cargo can be unloaded (stripping) or loaded (stuffing) with specifically designed small forklifts with a loading capacity between 1.0 and 2.0 ton.

Figure 9-3 Forklift

Due to its limited dimensions, this type of forklift is able to drive in and out the container and requires limited manoeuvring spaces. Depending on the type of products or commodities, the engine of the forklift can be either diesel-driven, gas-driven or even electric driven.

Loading and unloading trucks: electric pallet truck
This type of equipment is specifically designed to unload a truck or container filled with palletised cargo. Due to the availability of loading bays, the electric pallet truck can easily drive into and out of the truck, trailer or container chassis.

Figure 9-4 Electric Pallet Truck

This type of equipment is electrically driven, powered by a battery system. Current capacity of the battery system allows for an 8-hour shift of normal operations before (re)charging is necessary. Proper equipment fleet management and follow-up will be required.