

# ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ



## ΤΜΗΜΑ ΝΑΥΤΙΛΙΑΚΩΝ ΣΠΟΥΔΩΝ ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ ΣΤΗΝ ΝΑΥΤΙΛΙΑ

### ΕΞΕΛΙΞΗ ΤΟΥ ΡΟΛΟΥ ΤΩΝ DRY PORTS (EVOLUTION OF THE ROLE OF DRY PORTS)

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Διπλωματική Εργασία

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Πειραιάς

Ιούλιος, 2016

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# **EVOLUTION OF THE ROLE OF DRY PORTS**

**University of Piraeus  
MSc in Shipping**

**Under the supervision of Professor S. Papadimitriou**

*July, 2016  
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### Abstract

When the term dry port is used nowadays, what interested parties actually refer to, is “a seaport directly connected by rail to inland intermodal terminals, where shippers can leave and/or collect their goods in intermodal loading units as if directly at the seaport”<sup>1</sup>.

This paper shall present how dry ports have evolved in recent years, always with a view to improve and accommodate the shipping and logistic industries’ needs and requirements.

The purpose that is served, is to show how dry ports, sometimes referred to as the “backbone” of the system, actually impact the overall performance of the entire transportation network.

Although this is not a new concept, it, along with any related activities, has come to the fore because of the rising needs of the international economy and the many advantages they could offer.

Proper implementation could bring astonishing results in various fields such as the environment, time which could be utilized otherwise and even lower the risks on the roads while trucks carry various materials. Such examples of basic advantages could be the decrease of CO2 emissions, reduction of queues and long waiting times at now congested seaport terminals.

The above would, in turn, achieve regional sustainability and the terminals’ competitiveness would increase.

One possible way to go about bringing those results would be the utilization of rail transportation, which would need to become partially automated (in the sense that it grows to the point, that it becomes cheap, scheduled and reliable).

The very special nature and the complex way in which they are structured, makes the evaluation of any possible improvements very challenging and hard to establish. Processes are inter-connected and no change in any parameter could avoid impacting others<sup>2</sup>.

The basic pre-requisite is that, dry ports’ evolution, needs to be consistent and continuous, instead of partial and fragmentary. Their operable performance can be gauged through the evaluation of the effectiveness and efficiency of those dry ports’ processes.

The methodology used in this paper is based on extended literature review and pieces of information obtained from the respective worldwide organizations. The validation, regarding their implementation, has been cross-checked and is based on the various reviews, researched options and real-life results.

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<sup>1</sup>[https://www.researchgate.net/publication/227465813\\_Defining\\_Dry\\_Ports\\_by\\_the\\_Logistic\\_Performance\\_Index](https://www.researchgate.net/publication/227465813_Defining_Dry_Ports_by_the_Logistic_Performance_Index)

<sup>2</sup> <http://core.ac.uk/download/files/153/6263229.pdf>

“Performance assessment in operating dry ports”

Author: Ciortescu Cezar-Gabriel, University of Iasi, Faculty of Economics and Business Administration

**Target of this paper:**

This essay deals with the various aspects of the existence and efficiency of the dry ports around the world.

There are various reasons why this concept benefits the concerned parties.

However their implementation and smooth daily operation is not a simple task.

Through this essay the following point shall be taken up and the results shall be presented:

1. How the dry ports are set up and operated in various parts of the world
2. How the need for optimization of hinterland logistics arises
3. What the role of the dry ports is
4. What the benefits of the dry ports' implementation is
5. Who shall benefit from their day-to-day operation and what those benefits are going to be
6. How the problem of the empty containers and trucks shall be handled, after the cargo they had been transported has been delivered
7. How fuel prices are connected and affect the dry ports (depending on various factors)

It remains to be seen whether the cost-effectiveness of this concept shall have the expected results as well as the calculated returns for the respective investors.

Time along with long term planning shall play a major role.



### What is a dry port?

“A dry port (sometimes inland port) is an inland intermodal terminal directly connected by road or rail to a seaport and operating as a center for the transshipment of sea cargo to inland destinations”<sup>3</sup>.

Within these terminals a wide range of services could be offered to interested parties (such as carriers or shippers) beyond what has been traditionally offered for a long time e.g. handling and/or storage of loading units.

In addition to their role in cargo transshipment and similar to sea ports, dry ports may also include functions, facilities and services in an inland area that connects to one or more modes of transport, for storage and consolidation of goods, maintenance for road or rail cargo carriers and custom’s clearance<sup>4</sup>. This concept (of actually incorporating an extended gateway, which could operate effectively, thus facilitating the various operations increasingly integrated sea-land intermodal network systems<sup>5</sup>) could provide the option of duplication or enhancement at hinterland locations. The location of these facilities at a dry port relieves competition for storage and customs space at the seaport itself.

In order to achieve this, a simple shift to alternative transport solutions would not be enough. Commitment is required, along with the expansion of trains’, trucks’ and barges’ maximum and innovative utilization would simple be the beginning of the desired, and worked-hard-for, results. This would also result in:

1. Spreading out the operations after various types of cargo are unloaded on to the dock (Thore 2007)
2. Accessibility and connectivity of seaports, would be much enhanced
3. Congestions in various points of the logistics’ chain would be relived

Thus a major step would be taken towards improving the efficiency of the supply chain itself (both cost- & service-wise), promoting sustainable development along with regional economic growth and improving the competitive level on which seaports currently stand.

The term intermodal is defined as: “Intermodal freight transport” which involves the transportation of freight in an intermodal container or vehicle, using multiple modes of transportation (rail, ship, and truck), without any handling of the freight itself when changing modes. The method reduces cargo handling, and so improves security, reduces damage and loss, and allows freight to be transported faster. Reduced costs over road trucking is the key benefit for intra-continental use. This may be offset by reduced timings for road transport over shorter distances<sup>6</sup>. Concepts as “dry port” and “extended gateway” are continuously gaining momentum.

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<sup>3</sup>[https://en.wikipedia.org/wiki/Dry\\_port](https://en.wikipedia.org/wiki/Dry_port)

<sup>4</sup><https://www.msc.com/fra/help-centre/guide-to-international-shipping/new-to-international-trade-intermodalism?lang=tr-tr>

<sup>5</sup>[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2317295](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2317295) (Franc and Van der Horst, 2010; Iannone and Thore, 2010; Rodrigue and Notteboom, 2009, 2011; Roso and Lumsden, 2010; Veenstra, 2006)

<sup>6</sup>[https://en.wikipedia.org/wiki/Intermodal\\_freight\\_transport](https://en.wikipedia.org/wiki/Intermodal_freight_transport)  
“Feasibility Study on the network operation of Hinterland Hubs (Dry Port Concept) to improve and modernise ports’ connections to the hinterland and to improve networking”. InLoc. January 2007. Retrieved 2008-03-10

## History

The first shipping container was invented and patented in 1956 by Malcolm McLean. After these units started being used and trading continued in this way, the need for dry ports started being born. This concept was only sporadically implemented in the beginning and fell into major neglect, as initially its functions were insufficient and without improvements neither the transport chain nor the seaport terminals, could be positively affected (McCalla, 1999).

However, this concept was a prospective solution that emerged more and more often both in theory and in practice and in 1991 UNCTAD decided that it had evolved to be closely associated with the rapid expansion of containerization and related changes in cargo handling and consequently any required expansion of a port needs to be re-directed from a seaward to an inland location.

On the practical side and for this to work, the above option should be feasible, through the existence of available and suitable physical site locations and the appropriate means of connectivity to the port itself, which of course need to already be present or could be implemented if required.

Since its appearance (mid 1960's) the container shipping industry's performance has shown major improvement at an impressive pace<sup>7</sup>.

Ballis et al. (1997) stated that such an increase in demand could be accommodated by adding conventional equipment or improving the productivity by utilizing new technological forms.

What van Klink and van den Berg (1998) believed, was that the increasing flows of incoming and out-going containers strained the interior regions served by the major ports.

McCalla (1999) believed that such an increase in port capacity demand can be accommodated by physically expanding existing ports or establishing new ones.

What gave things a major push in the right direction was initially the need to de-compress the world's major ports, with demand growing at fast paces and the worldwide growing interest in environmental issues.

By 2000 Cullinane and Khanna reported that the maritime part of the intermodal transport chain employed larger ships, in order to be able to cope with the increasing transport demand and facilitate potential lower unit costs. The negative side of this aspect was that the results would be noted in the long run and at considerable present cost and endeavors (Pellegram, 2001 and the TT Club, 1996).

More specifically and when split into regions, the way dry ports developed through the years is:

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<sup>7</sup> The dry port concept – connecting seaports with their hinterland by rail, JOHAN WOXENIUS\*, VIOLETA ROSO, KENTH LUMSDEN, Department of Logistics and Transportation, Chalmers University of Technology

### EUROPE

The projection for 2010 was that the volume of European hinterland transport related to trans-ocean maritime transport would increase by 140% since the 2000's (European Commission, 2000).

Sweden's most important container port – the largest seaport in the Nordic countries – is the Port of Gothenburg, which is situated in the city of Gothenburg. The city is located in Southwestern Sweden by the sea of Kattegat, which is an arm of the North Sea. There are 24 daily rail shuttles that transport freight from Port of Gothenburg to different inland terminals in Sweden. Some of them can be seen as dry port implementations, while majority of them are basic inland intermodal terminals, because they lack services that dry ports are supposed to offer.

### US

Initially the Virginia Port Authority developed the Virginia Inland Port located along the Norfolk Southern line near Front Royal in the late 1980s.

The VIP was designed and marketed to compete with Baltimore's more attractive inland location to handle Mid-Atlantic bound or originated cargo.

Since then, as global trade expanded and the supply chains of large manufacturers as well as retailers in the United States reached farther, many railroads, ports, and other industry providers began to collaborate to develop terminals similar to VIP, with direct rail connections between seaports and "inland ports." Columbus Rickenbacker Airport developed an inland port with rail service to East, Gulf, and West Coast ports. Huntsville, Alabama, also developed a rail facility at its airport. Other recent examples include: the Greer, SC, Inland Port and proposed inland port developments in Cordele, GA; Pt. St. Lucie and Miami, FL; Casa Grande, AZ; Joliet, IL; etc.<sup>8</sup>

The tradition of land-bridges, mini-bridges and micro-bridges has a long history in the US (Coyle et al., 2000, pp. 244-245 and Muller, 1999)

### ASIA

In recent decades fast growth has been witnessed where the volume of international trade and freight transport is concerned, the downside of it being the major environmental impact.

More recently, intermodal transport gained prominence due to its potential door-to-door service, only if specific modes of transport were integrated in the logistics' chain, the coordination and offered services were improved and the intermodal interfaces were developed<sup>9</sup>.

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<sup>8</sup> Dry Ports – A Global Perspective: Challenges and Developments in Serving Hinterlands, Rickard Bergqvist, Gordon Wilmsmeier, and Kevin Cullinane

<sup>9</sup> Promoting Intermodal Freight transport through the development of dry ports in Asia: An environmental perspective (Shinya Hanaoka, Madan B. Regmi)

### Dry port concept

“A well applied *dry port concept* can shift freight volumes from road to more energy efficient traffic modes that are less harmful to the environment, relieve seaport cities from some congestion, make goods handling more efficient in seaports and facilitate improved logistics solutions for shippers in the port’s hinterland<sup>10</sup>.”

This concept can be split into three categories: close, mid-range and distant. For each category the benefits are defined from the perspectives of involved actors such as seaports, rail and road operators, shipping lines, shippers, local authorities and the society as a whole.

As shown on the below diagram, the port and its surrounding city can be relieved from all road connections referring to locations outside the city area. One can see, that the shippers closest to the port (1, 2, 9 and 10) call the close dry port, two at medium distances (7 and 8) call the mid-range dry port through another intermodal terminal while the shippers furthest away from the port (3-6) use the distant dry port.

Previously only the shippers very close to the conventional intermodal terminal used rail services.

The distant dry port is here directly connected to the port since the flows were already before large enough to ensure a full train service. If any of the mid-range or close dry port is used as a consolidation point coordinated with ship calls by dedicated trains, then the distant dry port would be served by a shuttle to the consolidation point. The same principle applies for the mid-range dry port if the close dry port is used for coordination or sequenced loading related to individual ships. Regardless of if the containers pass several dry ports, they can obviously use the same railway line into the port.

It is not only the number of direct road connection that changes. There are opportunities to transfer activities currently causing congestion at the seaport gates to the dry ports.

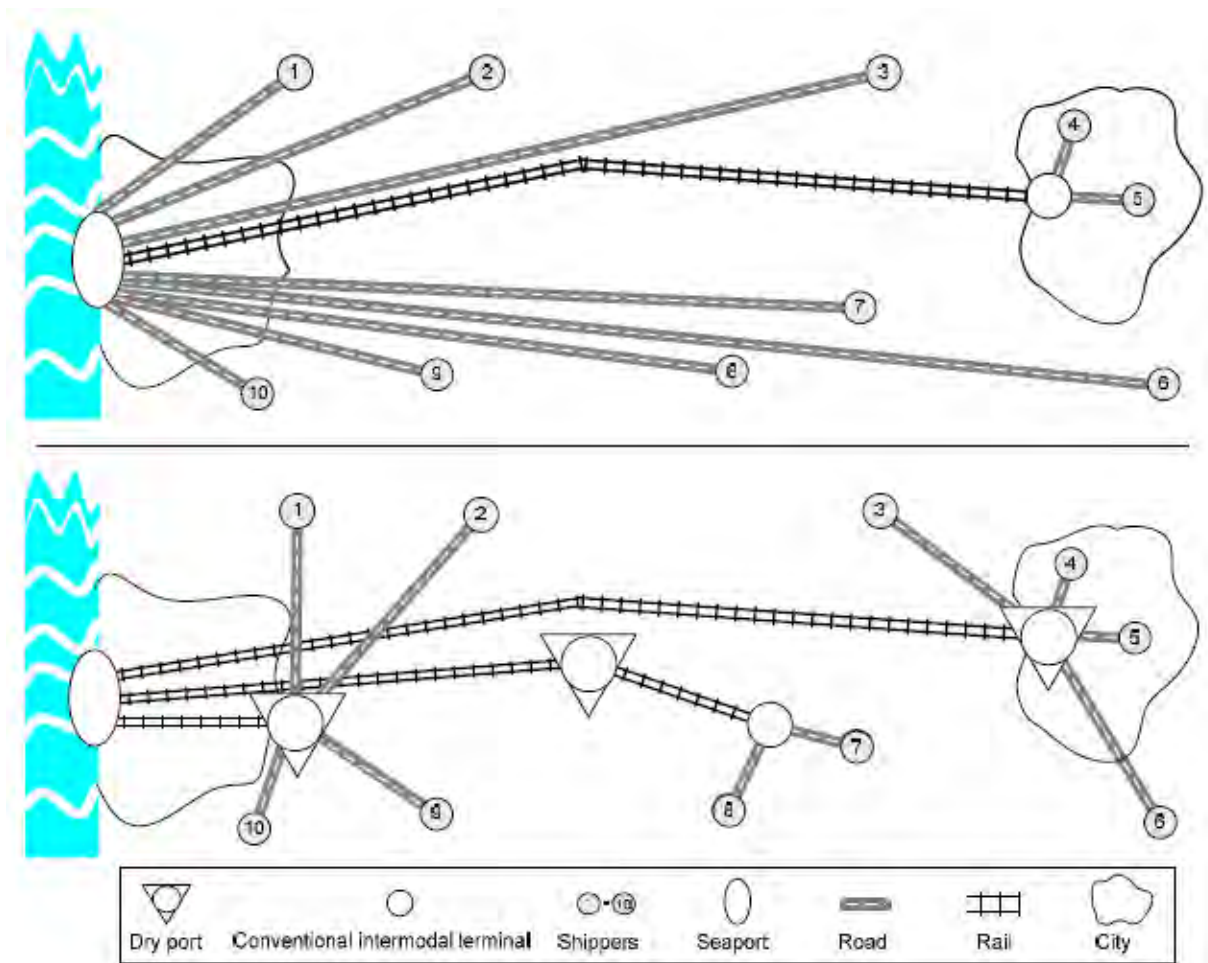
The regulatory inspection of goods moving in international trade and execution of applicable customs formalities is the key function that should be available at dry ports of international importance. This would avoid double handling and inspection of international goods at border check points and greatly facilitate international trade, thus expediting the movement of goods and reducing costs<sup>11</sup>.

These activities include customs clearance, security checks and information handling. Also physical handling such as stuffing and stripping as well as buffering laden and empty containers can be done at the dry port and thus saving precious space in the port.

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<sup>10</sup> Dry Ports – A Global Perspective: Challenges and Developments in Serving Hinterlands, Rickard Bergqvist, Gordon Wilmsmeier, and Kevin Cullinane

<sup>11</sup> <https://www.unescap.org/sites/default/files/pre-ods/intro-dry-ports-e.pdf>



**Figure 8: Comparison between conventional hinterland transport and an implemented dry port concept.**

## Intermodal Transport and dry ports

Intermodal transport refers to the movement of goods in the same single loading unit or road vehicle that successively uses two or more modes of transport, without the goods being handled in a change of transport mode<sup>12</sup>. Intermodal transport is also defined as the use of at least two different modes of transport in an integrated manner, in a door-to-door transport chain.

In order to promote intermodal transport, it is essential to develop transport links and nodes, which include ports, airports, river ports, and inland dry ports, as well as to improve the efficiency of transport services<sup>13</sup>. Intermodal transport nodes provide opportunities for a modal shift, as implied by its definition. In the following sections, we outline the development of transport links, nodes, and services in Asia and review the environmental benefits that can be derived from improved intermodal transport.

In order to promote intermodal transport, it is essential to improve transport links such as highways, railway networks, and inland waterways<sup>14</sup>. In Asia, there has been good development of transport networks such as the Asian Highway and the Trans-Asian Railway. The Master Plan on ASEAN Connectivity, which includes the Singapore–Kunming Rail Link and other transport corridors, is an example of the attention that national governments are giving to transport links.

Railways were first invented to carry freight, and they now run on clean forms of energy. The energy intensity and long life cycle of rail cars, along with new innovations that offer increased speed, have put railways in a competitive position to fulfill a major share of the growing transport demands in terms of both freight and passengers.

Efforts by policy makers and railway operators are needed, though, to maintain railways' environmental superiority over other modes of transport. Common factors likely to influence consumers' choice of transport mode are the relative cost, time and reliability, and for passenger services, the degree of comfort.

Another important issue related to international railway transport is break-of-gauge. Railway tracks in many countries have been developed using different track gauges, for instance, 1676 mm; 1520 mm; 1435 mm; 1067 mm; and 1000 mm. Different gauges at borders of countries prevent rolling stock from passing through and create the need for goods to be transferred across these borders in a separate operation. These operations include the manual or mechanical transshipment of goods from wagons of one gauge to wagons of a different gauge, the change of bogies, and the use of “variable-gauge” wagons.

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<sup>12</sup> [http://www.unescap.org/sites/default/files/pub\\_2285\\_Ch1.pdf](http://www.unescap.org/sites/default/files/pub_2285_Ch1.pdf)

<sup>13</sup> Promoting intermodal freight transport through the development of dry ports in Asia: an environmental perspective, Shinya Hanaoka – Madan B. Regmi

<sup>14</sup> <http://www.unescap.org/our-work/transport>

Transport nodes such as airports, seaports, logistics intermodal terminals, and dry ports need to be developed in order to promote intermodal transport. From among these, seaports have developed rapidly in Asia, as evidenced by the fact that 19 of the top 30 container ports in the world are located in Asia. Inland dry ports are also important transport nodes, particularly for landlocked countries. The development of these dry ports in hinterland areas can promote intermodal transport and provide transfer and transshipment functions along with customs-clearance facilities.

Various interchangeable terms are used to refer to dry ports: inland ports, inland container depots, freight terminals, etc. Several definitions have been established for inland transfer points/dry ports and inland terminals.

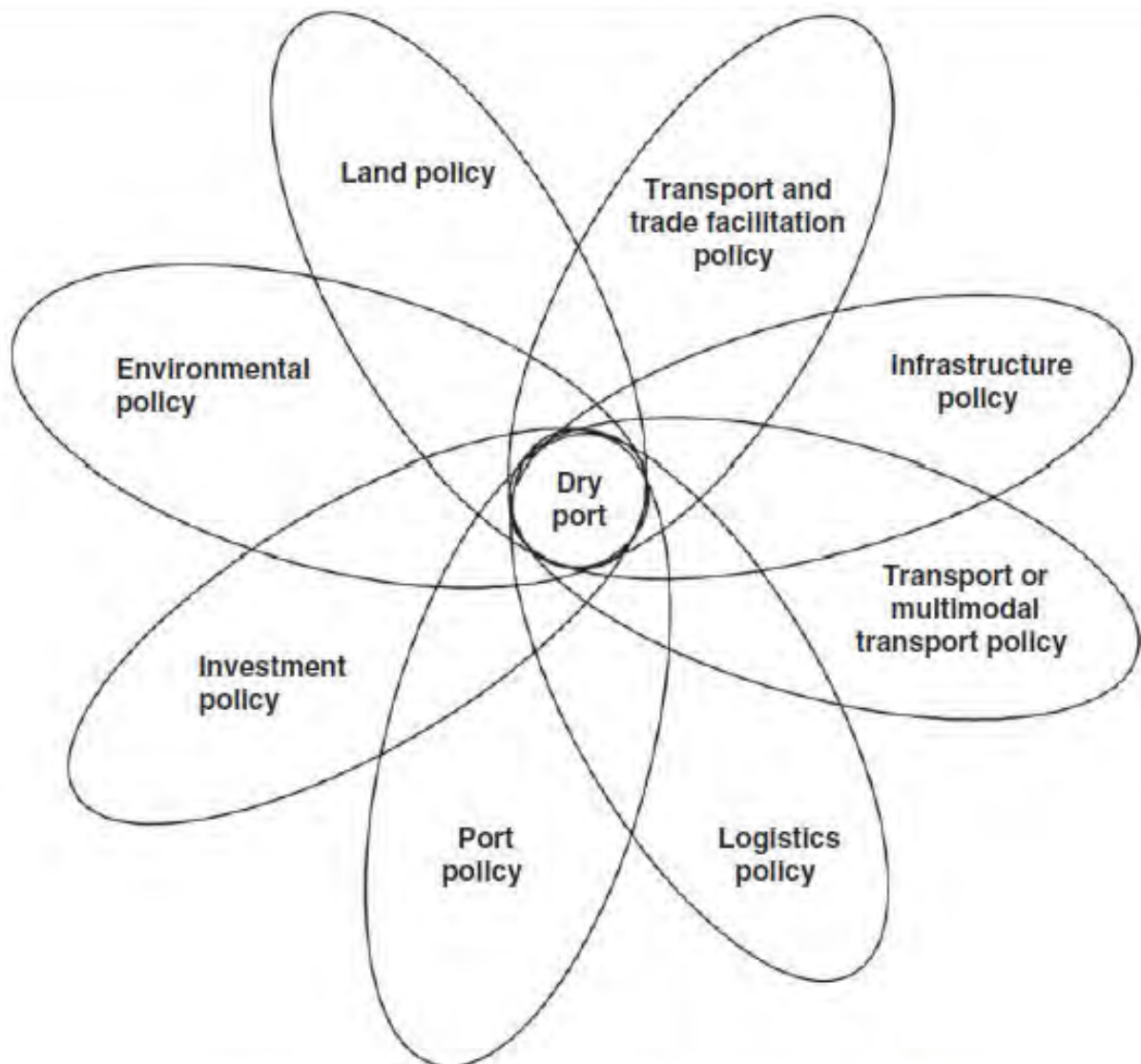
The Economic and Social Commission for Asia and the Pacific (ESCAP) proposed the following working definition of dry ports during a regional meeting of dry ports in Asia:

**“A dry port provides services for the handling and temporary storage of containers, and general and/or bulk cargoes that enter or leave the dry port by any mode of transport, including roads, railways, inland waterways or airports. Full customs-related services and other related services, such as essential inspections for cargo export and import, should be put in place in a dry port whenever possible.”<sup>15</sup>**

Dry ports/freight stations are a key component of intermodal transport. Existing government policies and regulations associated with dry ports influence their development. ESCAP is working to develop an intergovernmental agreement on dry ports to promote coordinated development.

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<sup>15</sup> Roles of Dry Ports in Economic Corridors – Transport Division, UNESCAP



**Fig. 1.** Policies and regulations related to dry ports [15].

The figure above shows the links between dry ports and various sectorial policies that may be relevant to the development of dry ports.

The abovementioned policies are those affiliated with various sectors and ministries. In addition, different levels of government—central, provincial, and local—will also have different policies. For these reasons, coordination among the various sectors and different levels of government is essential. Designating a lead or coordinating agency and thus providing potential developers of dry port projects with “one stop” services and advice, including all necessary government approvals during both planning and operation, will facilitate the development of dry ports.



There are also many actors and issues that need to be considered in the planning and development of dry ports. A lack of clear policies and institutional arrangements, or competing interests among actors, can pose severe threats to the selection of locations for inland dry ports.

Some common factors that affect the location of dry ports are proximity to seaports; connections to other modes of transport; cost of development, operation, and transport; potential for encouraging mode shift; environmental concerns; potential for attracting manufacturing and distribution facilities; and economic stimulus for regional economic development. Furthermore, special economic zones and free trade areas that provide special tax incentives are also being created adjacent to dry port locations.

ESCAP has recognized the importance of dry port locations and suggests that the following criteria be considered when deciding upon a location:

- (a) inland capitals, provincial/state capitals;
- (b) existing and potential industrial and agriculture centers;
- (c) major intersections of railways, highways, and inland waterways; and
- (d) intersections along trunk railways lines, major highways, inland waterways, and at airports.

## Categories of dry ports<sup>16</sup>

As mentioned above, a dry port can be categorized according to its function as distant, mid-range and close.

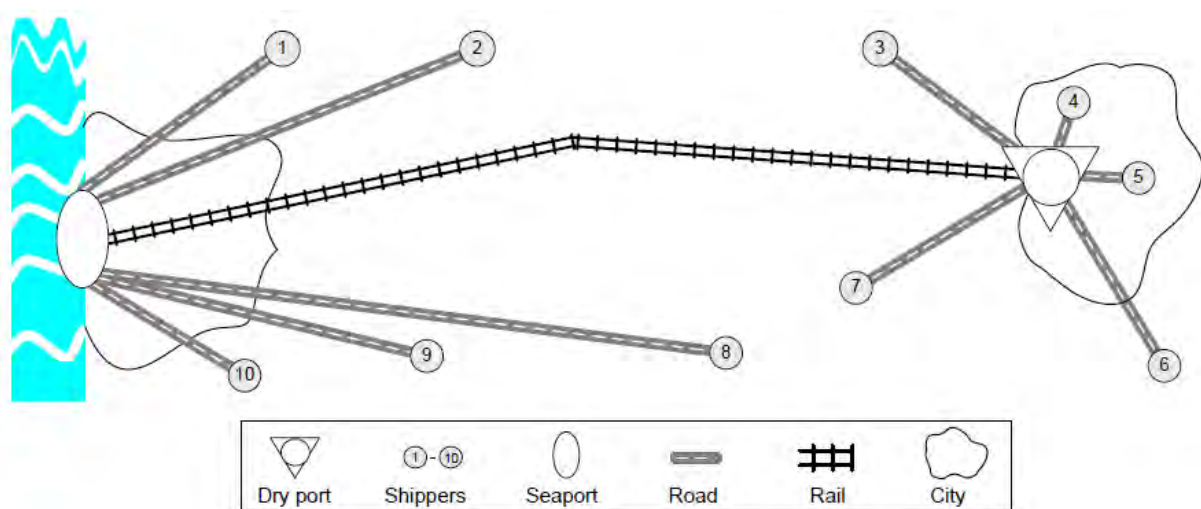
### Distant dry ports

A *distant dry port* is the most conventional of the three and has the longest history. The main reason for implementing it, is simply that the distance and the size of the flow make rail or barge viable from a strict cost perspective.

Their role should be focused upon feeding cargo to the seaport (exports).

It would be to everyone's advantage to have them located at a transport modal change point (rail/IWT) and they should have cargo consolidation facilities.

Figure 5 shows a seaport and its hinterland with the implementation of a distant dry port.



**Figure 5: A seaport with a distant dry port.**

Compared to conventional rail shuttles to and from ports, the difference mainly refers to the functions offered at the distant dry port and the interface towards shippers.

The more structured approach increases the competitiveness of rail against road and the shippers 3, 6 and 7 are now served by the dry port. Parts of the benefits of distant dry ports relate to the modal shift from road to rail that results in reduced congestion at the seaport gates and its surroundings (one train can substitute some 40 lorries in Europe and more than 100 in the US) and reduced external effects along the route. The main reason for the

<sup>16</sup> The dry port concept: connecting container seaports with the hinterland, Violeta Roso, Johan Woxenius, Kenth Lumsden

seaport to engage in a distant dry port, however, is that a wider hinterland can be secured by offering shippers low cost and high quality services.

Hence, the main benefit is attributed to seaports and the shippers using it. van Klink (2000, p. 127) states that the pressures for good inland accessibility come from various, interrelated, directions like the growth of containerized transport, resulting in congestion in the ports themselves and on the routes to the hinterland. In addition, shippers and carriers increasingly rate ports on their accessibility, for example the frequency of inland transport services and transit times, or because of society's demand for more environmentally friendly transport. To benefit from the opening up of new markets, ports need to improve their access to areas outside their traditional hinterland. Mourão *et al.* (2002) agree and argue that ports compete not only in terms of transshipment efficiency and tariffs, but also in terms of speed and reliability of shipments to destinations on the continent. That competition requires seaports to focus on transport links, on the demand for services in its traditional hinterland and also on development in areas outside their immediate market. A good example, according to van Klink, (2000, p. 132), is the introduction of a block train service between Rotterdam and Barcelona, which makes it possible for time-critical products from Asia, destined for North-West Europe, to be transshipped in Barcelona and transported over the final leg of the transport chain by rail instead of doubling the Iberian Peninsula.

Rail operators obviously benefit from distant dry ports because it increases the scale of their business. This is particularly important for rail transport depending on economies of scale and can make continental services, for instance between the inland conurbation and the seaport city, viable although ports are reluctant to bring in ILUs not relating to shipping.

At least, the fixed costs of the intermodal terminal itself can be distributed between more transshipments when adding the dry port flows. Road transport operators are not benefiting from this configuration directly since the aim is to move transport of containers from road to rail, but they are still involved in the intermodal transport chains. As they are not particularly paid for waiting in congestion or at crowded gates at the port, they can serve the dry port surroundings with shorter hauls with better total revenues.

From the shippers' perspective, a well implemented distant dry port offers a greater range of logistics services in the dry port area. For environmentally conscious shippers it brings a possibility of using rail instead of road and thus decrease the environmental impact of their products. The seaport city benefits from decreased road traffic saturating the streets and decreasing the quality of life for the citizens. Less traffic might also leave valuable area around the city center for other purposes than traffic.

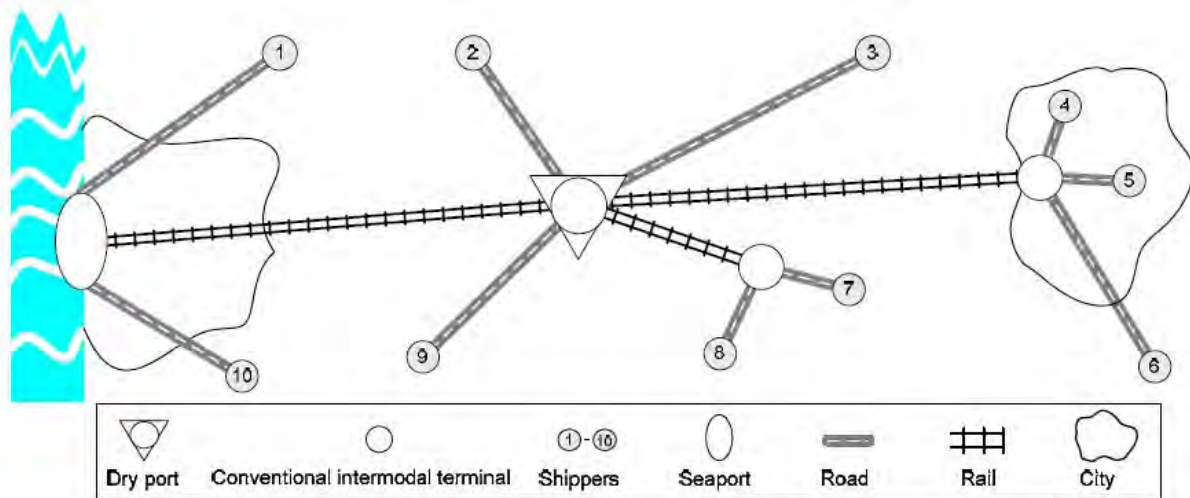
One example of a distant dry port is Isaka Dry Port in Tanzania, which used to be a conventional intermodal terminal (Tanzania Railways Corporation, 2004): Isaka Dry Port is an inland container terminal, which acquired the Dry Port status in 1999. The conversion of Isaka into a Dry Port means that all the customs documentation may be

done at Isaka instead of Dar es Salaam Port. Importers can now accomplish all the necessary documentation and take delivery of their cargo at Isaka. (...) Isaka provides a convenient interface for traffic to Rwanda and North Eastern Democratic Republic of Congo.

According to Mande (2000), the Isaka facility is very profitable because of the increasing exchange of containers that is done with neighboring land-locked countries such as Rwanda and Burundi. Before the conversion, shippers had to do custom and port clearance directly in the seaport of Dar es Salaam some 800 km away. Instead of a week it now takes only two days to send a container to the seaport.

### Mid-range dry ports

Besides the price-quality ratio of competing traffic modes, the competitiveness of intermodal road-rail transport depends on geographical and demographical conditions. Continental services are generally competitive at distances above 500 km (see, e.g. van Klink and van den Berg, 1998) while maritime services can compete on slightly shorter distances (Rutten, 1998) due to the concentration of flows, less tight demands for transport time and frequency and that one transshipment is required also for the combination road-sea (Woxenius and Bärthel, 2002). A *mid-range dry port* is consequently situated within a distance from the port generally covered by road transport as shown in Figure 6.



**Figure 6: A seaport with a mid-range dry port.**

Here shipper 2, 3 and 9 are served directly by the dry port while shippers 7 and 8 are served by a closer conventional intermodal terminal. The mid-range dry port here serves as a consolidation point for different rail services, implying that administration and technical equipment specific for sea transport, for example x-ray scanners needed for security and customs inspections, are just needed in one terminal. The high frequency achieved by consolidating flows together with the relatively short distance facilitates loading of containers for one container vessel in dedicated trains. Hence the dry port can

serve as a buffer relieving the seaport's stacking areas. If this is a severe constraint, shippers with comparable distance to the seaport and the dry port (e.g., shipper 9) can then be directed to the dry port if it is made cost neutral to them. In other dimensions, the benefits are similar to those of a distant dry port.

The Virginia Inland Port (VIP) is an example of a mid-range dry port that moves the interface between lorry and rail for the transport of containers to and from the Port of Virginia, mainly their terminals in Hampton Roads. The VIP is located at Front Royal some 330 km from Hampton Roads and serves as a "US customs designated port of entry" where the full range of customs services is available to shippers. It has been consciously developed in order to increase the hinterland of the Port of Virginia (Bray, 1996) serving the Ohio valley in competition with Port of Baltimore (Woodbridge, 2004/b). The VIP has attracted investments of some 100 MUSD in distributions centers for Home Depot and Sysco securing import container flows for the seaport (Woodbridge, 2004/c).

An example also served by barge is the Edouard Herriot Port in Lyon some 300 km inland from the Port of Marseille. The ports are connected by both rail and barge shuttles, of which the barge service is considered the more important. The Lyon terminal hosts an office operated by Port of Marseille and a wide range of services like customs clearance and forwarding are provided qualifying it to be an Advanced Port as defined above (Port of Marseilles, 2004).

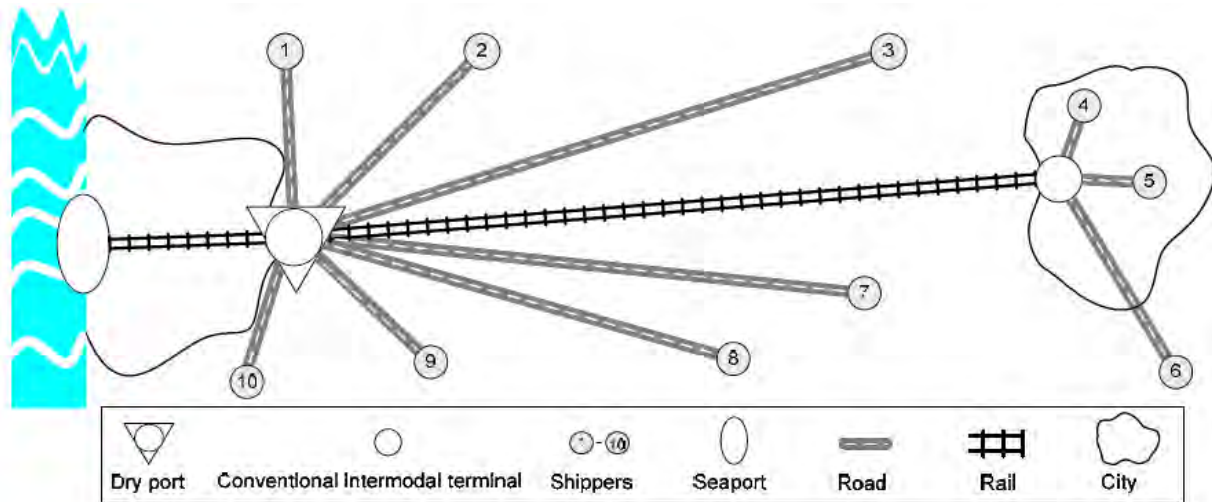
### **Close dry ports**

This type relieves congestion within seaports thereby allowing more cargo to enter/exit the port/country.

Transport hubs are significant generators of freight traffic both between and within major cities impacting ever more severely on local communities (Slack, 1999). Solving the local traffic problems related to ports is of particular interest to public bodies that most often also control the port authorities although the private sector is increasingly involved in port operations (Baird, 2002/b, Cullinane *et al.*, 2001, Notteboom, 2002 and Woxenius, 2003).

Of measures for mitigating congestion, long-distance road operators and those using intermodal rail services seem to favour arterial priority schemes, dedicated streets for port access and longer operation hours by ports (Golob and Regan, 2000). In addition, most ports suffer from a lack of a space and capacity, problems for which conventional mitigation measures were outlined in the introduction of this article.

Another option is to introduce a *close dry port* at the rim of the seaport city. The close dry port consolidates road transport to and from shippers outside the city area offering a rail shuttle service to the port relieving the city streets and the port gates as shown in Figure 7.



**Figure 7: A seaport with a close dry port.**

In this case, shippers 1-3 and 7-10 use the dry port and the seaport generates no road transport or gate congestion from shippers at long or mid-range distances. Compared to the other types of dry ports, a close dry port offers larger possibilities for buffering containers and even loading them on the rail shuttle in sequence to synchronize with the loading of a ship in the port. This obviously requires a very reliable rail service not to risk increased dwell times of container vessels and then, at least at a start, the short distance with a dedicated track is a prerequisite. In the longer run, direct transshipment between trains and ships can be implemented as is done by HHLA in Lübeck (HHLA, 2004) or full container terminals can be specialized for rail-sea transshipment as proposed by Ashar (World Cargo News, 2004/b).

Road haulers lose a marginal market share in terms of road-KMs but would still benefit from speedier operations. In cities not allowing long or polluting road vehicles, calling a close dry port is an alternative for splitting up road vehicles or changing to less polluting ones.

The 32 km long Alameda Corridor connects the ports of Los Angeles and Long Beach to intermodal terminals near downtown Los Angeles. It can be referred to as an example of a close dry port project since the containers were previously trucked between the terminals and the ports or used degraded small railway lines. Some 200 street-crossings were eliminated by letting the tracks run in a trench. Road congestion is significantly decreased and the containers move at more than double the speed than before. The ports carry about 20% of the construction costs amounting to 2.4 billion USD and the railway operators are supposed to pay it by user fees (ACTA, 2004).

Before improving the local road network, containers were also moved by a just 15 km rail shuttle between Schenker's general cargo terminal and the Port of Gothenburg. Moreover, a close dry port is planned at Enfield some 18 km from Sydney's Port Botany (Sydney Ports,

2003). The Enfield Intermodal Terminal should facilitate more effective clearance of containers from the port and increase the productivity and capacity of existing port lands. A special dimension is that the expansion of the port is questioned for ecological reasons and the dry port is one of many measures to mitigate the consequences.

## Dry port implementation

The dry port concept is an intermodal transportation system<sup>17</sup>. The dry port itself is an inland intermodal terminal with additional services located inland. It is directly connected by rail to seaport or in some cases two or more seaports. In a dry port concept the maximum possible amount of freight transportation is accomplished by rail between the dry port and the seaport. Only the final leg of the door-to-door transportation is carried out by road transport. In an optimal dry port implementation the whole freight transportation between seaport and dry port is carried out by rail. However, that is not usually possible due to capacity constraints of rail connection. (Roso, 2009a, b)

A flawless connection between road, rail and seaport enables fast and reliable movement of freight. The performance of a dry port is measured from the quality of access to the dry port and the quality of the road-rail interface (Roso *et al.*, 2008, p.341).

The dry port offers value-creating services (e.g. consolidation, storage, depot, maintenance of containers and customs clearance) to actors which operate within the transportation system i.e. there is a whole range of administrative activities that could be moved inland with implementation of a dry port. Outsourcing activities from seaport to dry port relieves seaport, and hence seaport can concentrate in its core tasks and competencies.

Summarized main features of a dry port are listed below:

- inland intermodal terminal
- rail connection between seaport
- offers services that have traditionally been performed at seaports (Roso, 2009a, p.302)

In order to meet greater demands from shipping lines, ports are forced to respond by enlarging hinterland areas, with the creation of inland terminals such as dry ports, to enhance or sustain their relative competitiveness (Lee *et al.*, 2008, p.373). As container transport volume continues to grow, seaports' inland accesses become more critical factors for the seaports' competitive advantage, because inland access easily becomes a constraint for a seaport, if it is not developed enough (Roso, 2009b, p.3).

There are differences in dry ports according to their geographical location. Woxenius *et al.* (2004) and Roso *et al.* (2008) have categorized different dry ports according to their functions and distances from the seaport. There are three different definitions for different kinds of dry ports, and they are:

- close dry port
- midrange dry port
- distant dry port

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<sup>17</sup> Dry port concept, <http://www.kuivasatama.fi/fi/dryport>



All the dry ports are located at the seaport's hinterland areas, because they serve them. It is possible that different dry ports serve more than one seaport. In that case seaports share areas of their hinterland with other seaports. There is a comparison of a conventional transport and an implemented dry port concept in Figure 4. A conventional transport is illustrated in the upper part of Figure 4. A seaport and all three types of dry ports are presented in the lower part of Figure 4.

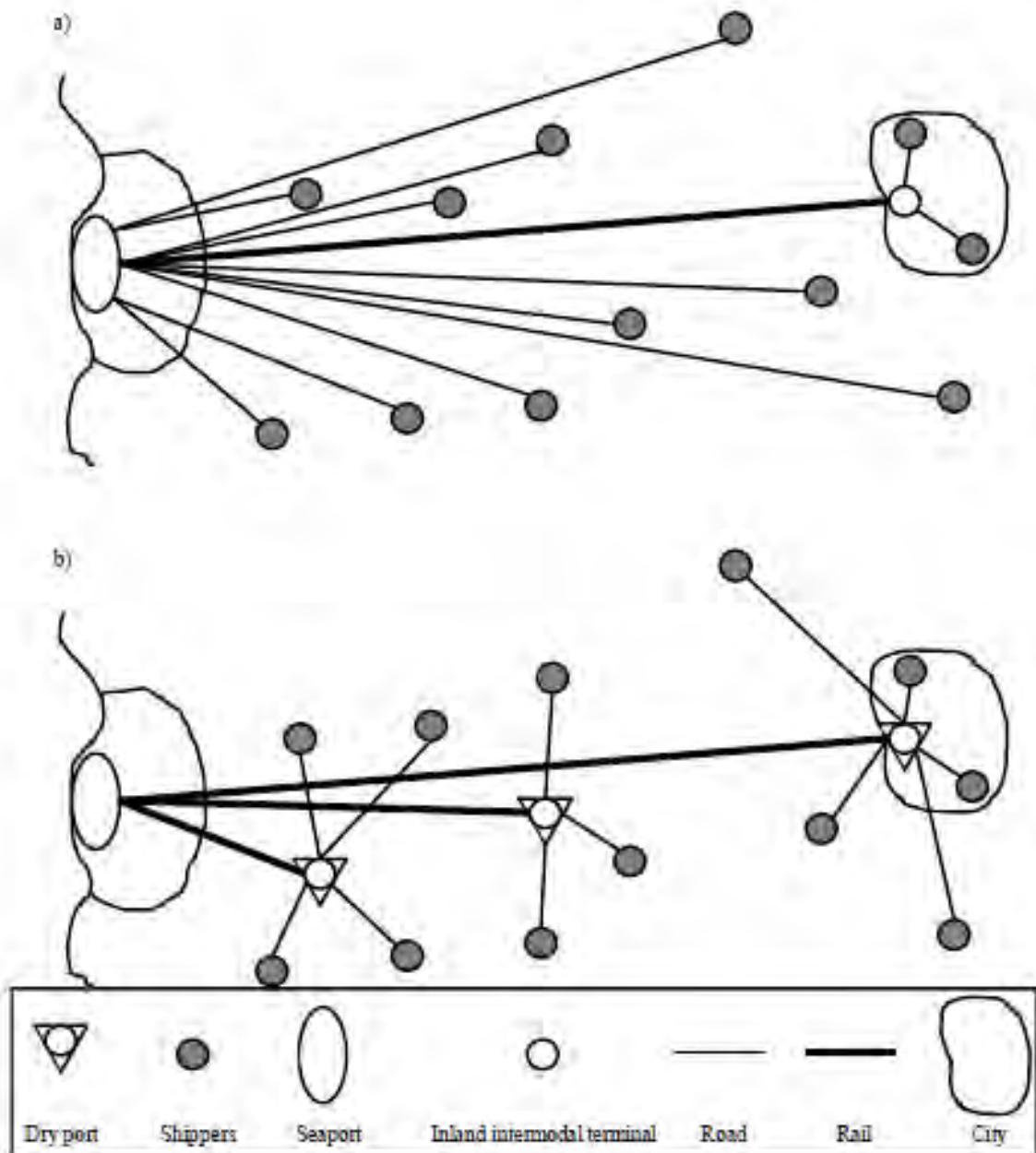


Figure 4 Comparison of a conventional transport and an implemented dry port concept.  
Source: Modified from Roso (2009a, p.303)

From Figure 4 it can be seen that the distance travelled by road transport shortens, because shippers can use the nearest dry port instead of always carrying freight to seaport city. Also the number of freight connections to seaports lessens. There are 10 road connections and one rail connection to and from seaport in the upper part of Figure 4. With dry port solutions there are only three rail connections to and from seaport. Dry ports relieve the transportation system.

All dry port categories share many common benefits. There are several actors, which gain varied benefits of a dry port concept. Different actors are listed below:

- seaports
- seaport cities
- rail operators
- road operators
- shippers
- society

An implemented dry port reduces congestion at the seaports immediate closeness by modal shift from road to rail. The congestion is also reduced at the seaport cities and roads connecting cities as road transportation diminishes while transportation at rail increases. Rail operators gain more market share, because more freight is being transported by rail. Shippers gain a greater range of logistics services thanks to dry ports. For the society the dry port enables lower environmental impacts, job opportunities and regional development. The most apparent benefit from environmental perspective comes from the modal shift from road to rail, which results in less congestion and less pollution. (Woxenius *et al.*, 2004; Roso *et al.*, 2008)

Distant dry ports are located over 500 kilometers from the seaport. The main advantage of distant dry port is its capability to provide vital transportation over long distances from a strict cost perspective i.e. rail transport is more cost-efficient transportation mode than road transport especially at long distances. Part of the benefits relate to the modal shift from road to rail that results in reduced congestion and environmental impacts. Distant dry ports improve seaports' ability to offer a more efficient inland access. (Roso *et al.*, 2008; Roso 2009b)

Midrange dry ports are situated between close and distant dry ports. The distance from the seaport is approximately 100 – 500 kilometers. Midrange dry ports usually offer depot facility. All the other advantages are similar to distant dry ports. (Roso *et al.*, 2008; Roso, 2009b)

Close dry ports are located near the actual seaport. Distance between seaport and dry port is less than 100 kilometers. Close dry ports offer seaports a place for depot and also an increased terminal capacity. The close dry port offers consolidation for road transport to

and from the seaport. Straight rail link between dry port and seaport relieves the seaport cities' streets. (Roso *et al.*, 2008; Roso, 2009b)

**Table 1 Impacts generated by dry ports for the authors of the transportation system.**

	Distant	Midrange	Close
Seaports	Less congestion	Less congestion	Less congestion
	Expanded hinterland	Dedicated trains	Increased capacity
	Interface with hinterland	Depot Interface with hinterland	Depot Direct loading ship-train
Seaport cities	Less road congestion	Less congestion	Less road congestion
	Land use opportunities	Land use opportunities	Land use opportunities
Rail operators	Economies of scale	Day trains	Day trains
	Gain market share	Gain market share	Gain market share
Road operators	Less time in congested roads and terminals	Less time in congested roads and terminals	Less time in congested roads and terminals Avoiding environmental zones
Shippers	Improved seaport access "Environment marketing"	Improved seaport access "Environment marketing"	Improved seaport access
Society	Lower environmental impact	Lower environmental impact	Lower environmental impact
	Job opportunities	Job opportunities	
	Regional development	Regional development	

Source: Roso (2009b, p.47)

All the benefits of each type of dry ports regarding different actors are summarized in Table 1 above.

## Pre-Development Considerations<sup>18</sup>

While thinking into how such a concept can evolve from an idea to actual development, there some considerations, which will need to be taken into account:

1. A dry port must fit into a complex system:
  - a. where the necessary supporting infrastructure (roads, railways) is in place
  - b. there is an accommodating legislative, regulatory and institutional system
  - c. the involvement of both the public and private sector is optimized

More specifically and in order to clarify the above points, we need to always take into account the following:

Firstly, the investments in infrastructure can be so important that they can actually influence the price setting not to mention that the cargo may bypass the dry port.

Secondly, the institutional framework is another major part. Its absence would most probably bring financial uncertainty.

The initiative to set up the framework lies with the government, whose role needs to be very well defined, or the local authorities.

In either case a friendly environment towards Public-Private Partnerships needs to be created.

The necessary procedures are being depicted in the below sketch.

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<sup>18</sup> <http://www.unescap.org/sites/default/files/4.1.Pre-Development-Considerations.pdf>

## PROCEDURES



Apart from the obvious role that a dry port plays in the way the various major ports are assisted and de-congested, there are also some secondary points, where its usefulness can be better appreciated:

- intermodal transport
- promotion of regional economic activity
- job creation
- land use improvement

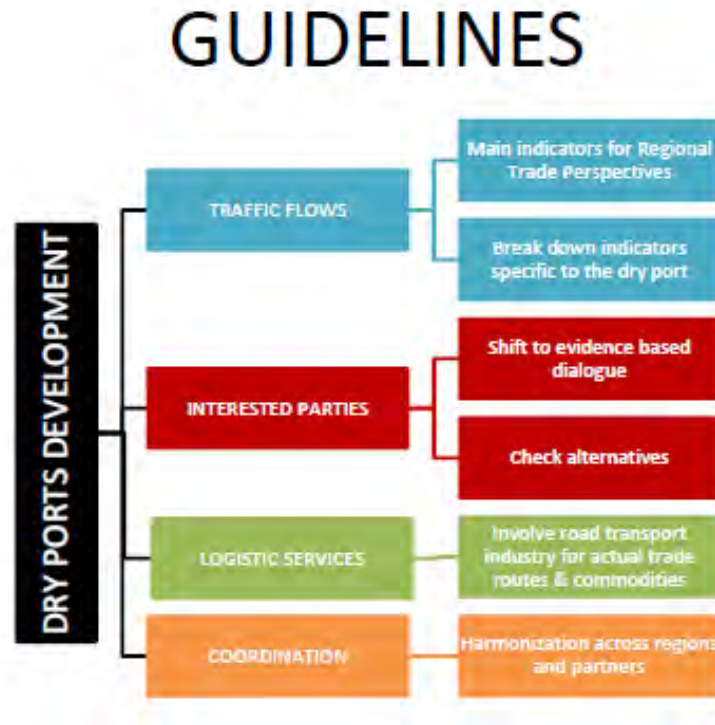
While the need for dry ports' development has arisen, there exist some pre-requisites which would be to the advantage of all concerned parties.

The major thing would be, to actually be able to foresee the expansion as early as the planning phase, while being in line with the retail sector's demands on quality and reliability. This would satisfy the industry's general demand for more sophisticated services which the dry ports offer.

In view of the above, an action plan should be developed, before proceeding the development of the dry ports, which would assist in the below:

- ❖ Identify local Advantages
- ❖ Identify interested parties
- ❖ Identify potential functions
- ❖ Establish operational quality
- ❖ Identify potential operational problems
- ❖ Establish a framework of assessment

The diagram below, shows an analysis of the parameters that need to be taken into account and the suggested ways to bring out the best results.



## Customs control and formalities

Before proceeding with the dry port's development, it is very important to take into account the importance of customs' control and the formalities, the procedure of goods passing through the port, involves.

The main queries involved are the following:

1. Why is there a need for efficient customs formalities at dry ports?
2. How to make movement of goods to and from dry ports more efficient?
3. What customs authorities need to do at dry ports for enhanced customs facilitation?

### 1. Need for efficient customs formalities at dry ports

- ✚ Containerization and inter modal transport has given boost to development of ICDs
- ✚ Having Customs facility locally can help **SMEs/e-commerce/trading community** to take advantage of global markets<sup>19</sup>
- ✚ Inefficient Customs procedures can delay clearances, increase transaction costs, pose security risk<sup>20</sup>
- ✚ To realize the vision of international, integrated and intermodal transport system

*How containerization has changed the course of international trade?*



<sup>19</sup> [http://www.apec.org/~media/files/groups/cti/07\\_2ndtfap\\_fnl.pdf](http://www.apec.org/~media/files/groups/cti/07_2ndtfap_fnl.pdf)

<sup>20</sup> [http://unctad.org/en/Docs/sdtetlb20052\\_en.pdf](http://unctad.org/en/Docs/sdtetlb20052_en.pdf)

The rise and rise of e-commerce in emerging markets



**2. Movement of goods to-and-fro dry ports – National & international transit**

Challenges to international/national transit<sup>21</sup>

- National security
- Trafficking (Drug and Human)
- Smuggling
- Diversion of goods in transit leading to loss in revenue
- Counterfeited goods and currency
- Lack of capacity of officials

<sup>21</sup> [http://www.unescap.org/sites/default/files/11.3.a.ESCAP\\_.pdf](http://www.unescap.org/sites/default/files/11.3.a.ESCAP_.pdf)



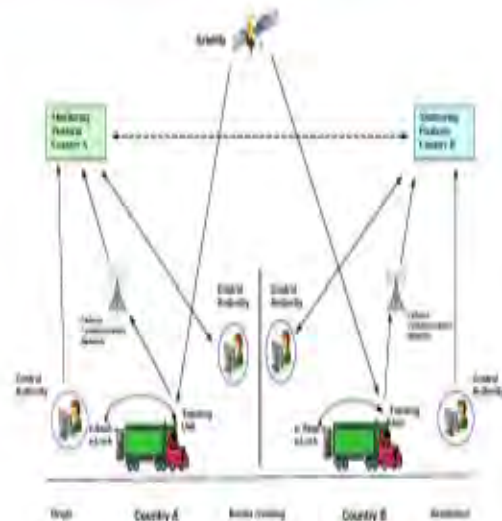
*ESCAP transport facilitation models for seamless movement of goods and vehicles across borders en-route to the dry ports*

➤ *Secure cross border transport model*

- ❖ Uses new technologies GPS, RFID, GPRS, Electronic Seals,
- ❖ Physical inspection at origin/destination
- ❖ Balances control requirements of regulatory agencies and facilitation requirement of trading community

➤ *Efficient cross-border transport model*

- ❖ Trailer swap: Trailer is detached from the prime mover and attached to another prime mover
- ❖ Container swap: Container is moved from one trailer to another, with cargo inside
- ❖ Manual transloading: Cargo transferred by hand or equipment from container or truck to another
- ❖ No transloading: Cargo carried by the same trailer and prime mover in both countries



### ***3. Customs facilitation at the dry ports<sup>22</sup>***

- Pre- arrival intimation of the cargo/containers destined for dry port from the gateway port or an LCS preferably by an electronic means
- Provision for filing of advance import manifest and Bill of Entry in the Customs law/code
- Have a Customs risk management system to decide in advance to either facilitate the goods or subject them to physical examination, based on a predefined criteria
- Separate release of goods from payment of taxes
- A dry port should function like a virtual border with regard to the import and export of the goods

<sup>22</sup> <http://www.unescap.org/sites/default/files/4.6.Customs-control-and-formalities.pdf>

### Development of dry ports<sup>23</sup>

At present, both road- and rail-based intermodal dry ports are nearing production, and industrial centers are being developed with the aim of effectively consolidating and distributing cargo. Some countries have established well-functioning dry ports, while other countries are still at an early stage of development. The following sections present the key financial, operational, environmental, regulatory and institutional factors involved in their development and operation.

Rapid growth in export and import volumes has led to an expansion of the nation's ports. The pace of port expansion, however, was slower than the growth of trade: this led to congestion at gateway ports, which handled the majority of foreign trade. In response, in 1980, governments initiated a policy to develop inland logistics centers.

One option was the public-private partnerships (PPP) in 1993. For example, the Korean Railroad Company and private transportation companies have invested in the Uiwang ICD. It has a capacity of 1.3 million TEU and spans 417,000 m<sup>2</sup>.

In addition to the private-sector facilities and operating companies, customs, food inspection, plant quarantine, and railway operations are located within the complexes. Shippers send goods by road, where they are consolidated and sent to seaports by rail. When there is a bigger rail capacity of both modes of transport can be utilized, which helps ease road congestion and enable the facility to serve as a clearance depots.

Figure 2 shows the containers handled at Uiwang ICD, which exceeded 2 million TEU in 2006. As can be seen in the figure, there was a decrease in the volume of containers handled after 2008 due to the economic recession. Furthermore, the road mode share was approximately 75%, except for a drop in 2008. The rail mode share of throughput handled by the ICD was about 25% in 2010, even though the ICD was running over capacity. This use of railways for transport from the ICD to seaports has helped ease road traffic congestion and reduce vehicle emissions. An expansion of the ICD's capacity would further enhance the environmental benefits, as would an increase in the rail mode share of freight.

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<sup>23</sup> Promoting intermodal freight transport through the development of dry ports in Asia: An environmental perspective, Shinya Hanaoka, Madan B. Regmi

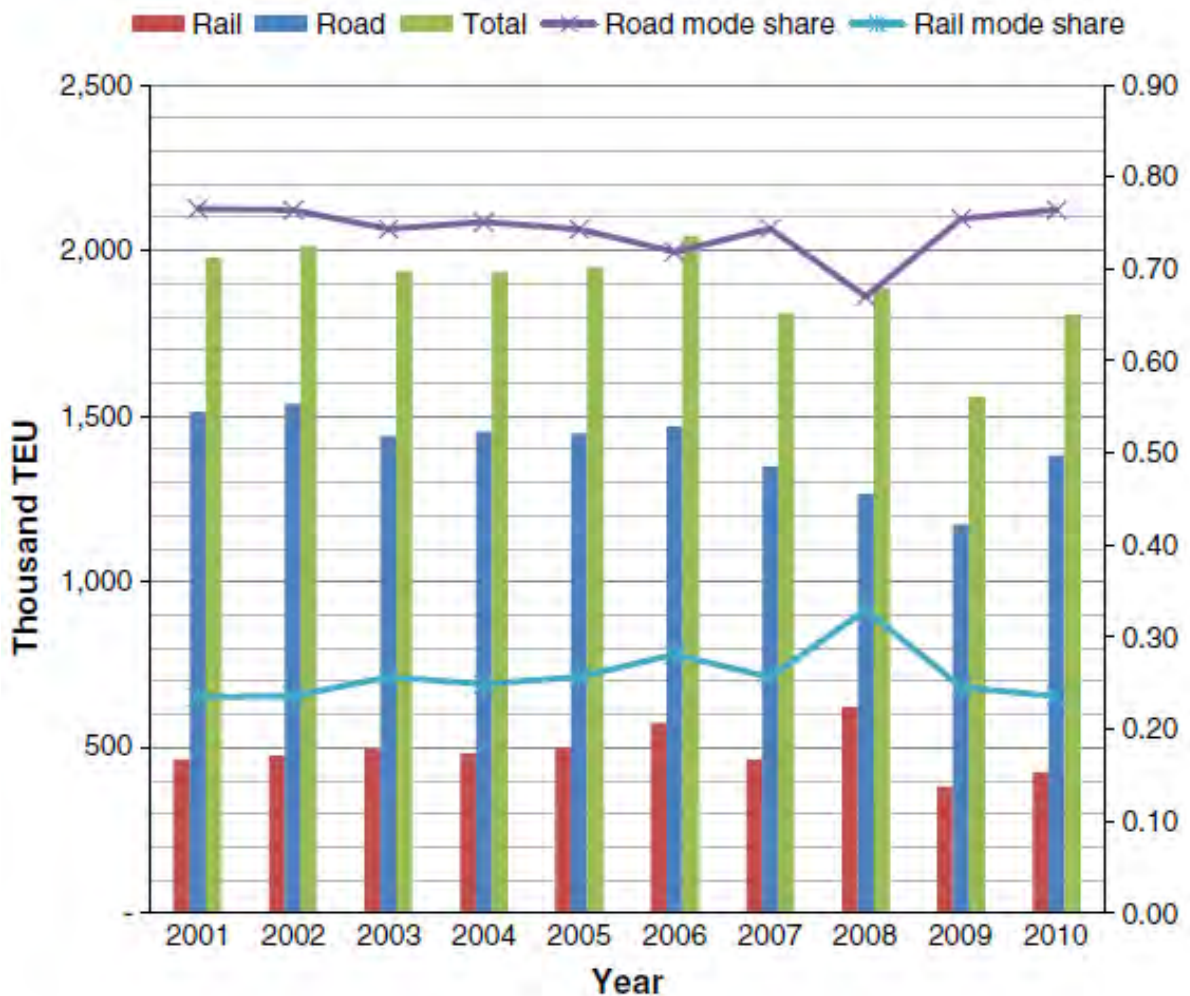


Fig. 2. Container throughput at Uiwang ICD and mode share of road and rail [32].

The various Ministries of Land, Transport and Maritime Affairs (MLTM) are mostly the regulatory authorities responsible for the planning, construction, and management of dry ports. These authorities encourage the private sector investment in the development of dry ports and logistics centers. Large-scale infrastructure project proposals from the private sector are reviewed to determine whether they are consistent with the government's long-term plans and investment priorities. The government provides some support for the development of dry ports by assuming part of the land acquisition and project costs. Infrastructure projects under PPP are either selected by the government or proposed by the private sector.

Government logistics policies and PIMAC have played a supportive role in this development.

The table below depicts a comparison of selected issues related to the dry port development.

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More specifically it summarizes some characteristics of dry ports related to their development and operation. These ports were valued in terms of:

- modes served;
- environmental benefits/concerns;
- potential for mode shift opportunities;
- ownership;
- operational arrangements;
- government policies and incentives for the development of dry ports;
- lessons learned from the development and operation of intermodal transport.

**Table 1**  
Comparison of key features of selected dry ports.

	Uiwang Republic of Korea	Birgunj Nepal	Lat Krabang Thailand	Alashankou China	Tughlakabad India
Modes served	Rail, road	Rail, road	Rail, road	Rail, road	Rail, road
Environmental benefits/concerns, potential for modal shift	The use of railway to transport freight to/from ports to ICD contributes to a reduction in road congestion and vehicle emissions.	The modal shift to railway for transport between port and ICD, with collection and distribution of cargo by truck, contributes to emission reduction.	Contributes to reduced road congestion and vehicle emissions, but the share of rail freight is decreasing due to vehicle queues, ICD congestion and limited railway capacity.	Long-haul freight is mainly by rail. Development of dry ports, improvement of railway links and efficiency would contribute to environmental benefits.	Transportation to/from ports is mainly by rail, with roads used for collection and distribution. Increasing trend of container handled at ICDs and transport to ports by railways shows overall positive environmental benefits
Ownership	Public-private partnership (PPP)	Government	Public-private partnership	Chinese Railway, CRCTC	CONCOR, a subsidiary of Indian Railway
Operational arrangement and incentives	Private Promotion of PPP projects through PIMAC	Private (leased) Government investing in facility and has developed other dry ports as well.	Private (concession) Concessions to private sector for development and operation. Considering capacity enhancement.	Public-private CRCTC Operations entrusted to CRCTC, a public-private venture.	Public CONCOR investing in the modernization of facilities and better efficiency through fleet improvements, dedicated platforms, and the use of ICT for container tracking.
Lessons learned from the development and operation of intermodal transport	Good example of PPP. The role of PIMAC in connecting port and ICD with high-capacity railway can reduce road congestion.	Operation delayed due to delays in concluding rail service agreement with Indian Railways.	Congestion at ICD and limited rail capacity connecting to port.	Government policy in developing railways and dry ports attract a higher share of freight to railways. Capacity enhancement ongoing. Starting double stack freight trains.	Good ICD and railway network Dedicated freight corridors to enhance efficiency.

## Differences and Imbalances<sup>24</sup>

When attempting to compare a sea port to a dry port, the following differences seem to be noted:

	<b>Sea Ports</b>	<b>Dry Ports</b>
1	Increased size of vessels	Cargo arriving “bunched up”
2	Increased pressure to provide speedy ship turnaround times	Increased pressure to provide speedy cargo handling services
3	Lack of financial resources to invest (deeper approach channels/berths, wider turning basins etc.)	Lack of financial resources to invest in more cargo handling equipment, bigger storage facilities)
4	Increased pressure to be environmentally sensitive (less water & air pollution)	Increased pressure to be environmentally sensitive (less noise, air, water and light pollution)

There are some countries for which the dry ports are the main solution for the handling and storing of cargoes. These are categorized as LLDCs (Land-Locked Developing Countries).

As useful as these ports in such countries are, there are some challenges, which eventually shall need to be overcome.

- A. The average GDP per capita in LLDCs is lower than their neighboring coastal countries’
- B. Transport costs for LLDCs represent an average of three quarters’ worth of the value of exports<sup>25</sup>
- C. The costs of international transport of goods can be 50% higher in LLDCs than in transit countries<sup>26</sup>
- D. 44 landlocked countries in the world
- E. 31 classified as LLDCs: 15 in Africa, 10 in Asia, 2 in Latin America and 4 in Central and Eastern Europe.
- F. Sixteen are also classified as least developed countries (LDCs)<sup>27</sup>

The most important challenge that these countries face, is the topography.

Such examples are Ethiopia and Djibouti.

Their specific cases can be seen in the below Table.

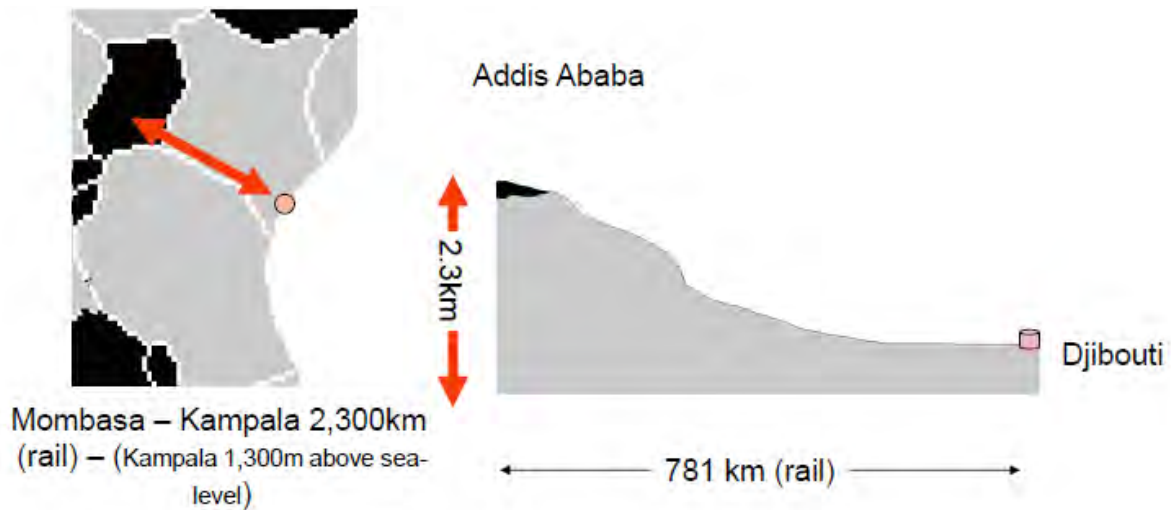
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<sup>24</sup> Dry ports as an enabler of trade – UNCTAD’s experience by Vincent Valentine, Officer-in-Charge, Transport Section, Trade Logistics Branch, Division on Technology and Logistics, United Nations Conference on Trade and Development

<sup>25</sup> Infrastructure Consortium for Africa. 2007. Annual Report 2007

<sup>26</sup> Radelet S., Sachs J.D. 1998. Shipping Costs, Manufactured Exports, and Economic Growth, Mimeo

<sup>27</sup> The Republic of South Sudan is not included in these figures



The Djibouti-Addis Ababa Railway

There are 79 curves with a radius smaller than 200 metres which seriously limits the carrying capacity of the trains. The railway is jointly owned by the governments of Ethiopia and Djibouti with approximately 681 km lying within Ethiopia and 100 in Djibouti.

When discussing LLDCs the important thing is to note that there are different types of restrictions that these countries face, depending on their location and their market share (per case as when they are customers of the ports)

1. Long distance from port and low volume of trade VS short distance but high trade
2. Small customer of the port VS big/main customer

Such examples could be the case of East and West Africa respectively where almost 90 % of the international trade of Burundi, Rwanda, and Uganda is handled by the port of Mombasa, but combined this represents not more than 15 per cent of the port's traffic and around 75 % of the international trade of Burkina Faso and Mali transits through Abidjan (Côte d'Ivoire), yet this figure represents only 10 per cent of total traffic at the port. Kolkata monopolizes Nepal's foreign trade transit and therefore holds them captives<sup>28</sup>.

These differences and imbalances should and need to be addresses and treated accordingly.

This can be achieved through a number of ways such as research (by listening to users' concerns), understanding of underlying issues (competing government demands, cultural change such as safety first, record keeping-reviewing, financial viability/sustainability, priorities' definition such as trade/passengers/environment etc.), gathering of political and institutional support & development of a multi-stakeholder plan.

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<sup>28</sup> Malakar SB (2009). Presentation to the UNCTAD Ad Hoc Expert Meeting on Transit Ports Servicing Landlocked Developing Countries, 11 December 2009

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An example of such a port where initially no effort was made towards improvement is Dar Es Salaam, Tanzania, where a lot of congestion was experienced due to insufficient container storage space, long container dwell times, sharp increase in container volumes, not fully paved roads resulting in long travel times, poor inland transport especially railway systems and low availability of locomotives and rolling stock.

The measures taken in order to counteract and fight against all the afore-mentioned issued, resulted in a very substantial improvement in the worldwide trading value as per below schedule.

Exporter	2006	2007	2008	2009	2010	2011
World	12134707	14015751	16137233	12518117	15257877	18211356

## Assessing the performance of dry ports

In order to assess how valuable the dry ports and the role they play are, the most important index we should look into, is their performance.

According to Gronalt, Benna, and Posset, 2006, a simulation model can be used, which is actually based on three standard processes. The items which are taken into account are:

1. The delivery and pick-up process of train/truck
2. The storage of containers in the yard
3. The handling of empty containers

The basic reason why this model is used, is to first quantify and then evaluate the performance indicator which are used for the evaluation of the dynamic cause and effects' model by setting the following parameters:

- ❖ Throughput (ITU/Year)
- ❖ Rate of fast movers and non-stackable ITU (%)
- ❖ Average storage time of fast movers (days)
- ❖ Average storage time of slow movers (days)

The better the operating efficiency of the dry port equipment and staff, the more customers the terminal can attract and the more customers will place handling orders<sup>29</sup>.

Ciortescu Cezar-Gabriel stated that "More handling orders result in an increase of the storage usage rate which also induces a greater order fulfill-rate. The higher the order fulfill rate, the higher the available capital of the terminal and the greater the resources budget. A greater resources budget allows the management for more staff training to increase equipment exploitation which again results in an increase of operating efficiency. An increase in the operating efficiency induces extra handling orders which generates more gains and further allow for more staff training and better equipment exploitation. As a result, an increase in the operating efficiency has a reinforcing impact on the customer's handling orders."

This whole process goes to show that inland terminals have to be considered complex systems which are continuously growing and are in need of constant attention.

Another two main tools for the performance assessment of the dry ports are TRANS-TOOLS and ASYCUDA (Gronalt, Posset and Benna, 2008).

TRANS-TOOLS "TOOLS for Transport Forecasting and Scenario Testing" is a European transport network model that has been developed in collaborative projects funded by the European Commission Joint Research Centre's Institute for Prospective Technological Studies - IPTS and Directorate-General for Transport and Energy – DG TREN. It covers

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<sup>29</sup> <http://steconomiceuoradea.ro/anale/volume/2010/n2/148.pdf>



passengers and freight transportation, as well as intermodal transport. It combines advanced modeling techniques in transport generation and assignment, economic activity, trade, logistics, regional development and environmental impacts. It can be used both by public and private bodies, for prediction and forecast for traffic and evaluation on environmental impact.

The implementation of the ASYCUDA – Automated System for Customs Data) software, developed by UNCTAD, will be a future standard for the operation of dry ports. This is a computerized customs' management system which covers most foreign trade procedures. The system handles manifests and customs declarations, accounting procedures, and warehousing manifests, as well as suspense procedures. It generates detailed information about foreign trade transactions which can be used for economic analysis and planning. The system project is directed at reforming the customs' clearance process. It aims at speeding up customs clearance through the introduction of computerization and simplification of procedures and thus at minimizing administrative costs to the business community and the economies of countries. It also aims at increasing customs revenue, which is often the major contributor to national budgets in most countries, by ensuring that all goods are declared, that duty/tax calculations are correct and that duty/exemptions, preference regimes, etc. are correctly applied and managed.

Furthermore, it aims at producing reliable and timely trade and fiscal statistics to assist in the economic planning process as a by-product of the customs clearance process. An important objective of the ASYCUDA projects is to implement the systems as efficiently as possible with a full transfer of know-how to national customs administrations at the lowest possible cost for countries and donors (UNCTAD, 2009).

The other macroeconomic indicator which will include dry ports performance will be the LPI – Logistic Performance Index. It is a joint venture of the World Bank, logistics providers, and academic partners. The LPI is a comprehensive index created to help countries identify the challenges and opportunities they face in trade logistics performance. This index works *from the integrated solutions for freight containerized intermodal transportation point of view, as part of the world trade*. The World Bank conducts the LPI survey every two years. The LPI uses standard statistical techniques to aggregate the data into a single indicator. This approach makes it possible to conduct meaningful comparisons across countries, regions, and income groups, as well as to undertake country-specific diagnostic work. Because these vital aspects of logistics performance can best be assessed by operators on the ground, the LPI relies on a structured online survey of logistics professionals from the companies responsible for moving goods around the world: multinational freight forwarders and the main express carriers. Freight forwarders and express carriers are in the privileged position to assess how countries perform. It helps by directly affecting the choice of shipping routes and gateways and influencing firms' decisions about production location, choice of suppliers, and selection of target markets (Arvis et al., 2010). Implementing dry ports and increasing their performance will increase LPI of the country, which will bring a higher rating in the world freight trade. Just as dry ports are called the backbone of the system, the performance of logistic centers or

intermodal hubs has a significant impact on the overall performance of the whole transportation network.

With the dry ports implementation, CO2 emissions can be decreased and other positive environmental impacts can be achieved, queues and long waiting times at congested seaport terminals avoided, and the risk of road accidents can be reduced. As an overall result, regional sustainability and competitiveness will increase<sup>30</sup>. Cheap, scheduled and reliable high-capacity rail transportation to and from the seaport is a necessity for improved seaport inland access. Integrating and combining the above mentioned indicators will provide a better picture regarding the performance of a dry port, and to what extent this will constitute part of the solution for the future of transportation, climate change, regional sustainability, security and safety.

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<sup>30</sup> <https://ideas.repec.org/a/ovi/oviste/v10y2010i2p116-120.html>

## Indicators of time, cost and complexity

Apart from the above more complex indicators, there are also some simpler but also indicative ways to measure how well or badly a dry port operates.

First of all, there is the matter of time which has a lot of different parameters.

When considering the port times and all the different ways in which a container can be delayed:

1. Time taken to import a 20ft/40ft container from major ports of loading internationally
2. Vessel's arrival and waiting time to berth
3. Vessel's turnaround time
4. Port dwell times (from berthing to release)
5. Average moves per hour
6. Times for customs procedures within the port (verification and scanning, customs paper works etc.)
7. Exit procedures
8. Transfer to CFSs for domestic cargo
9. CFS dwell time (customs procedures at CFSs, re-marshalling)

When considering the inland ways through which a container can be delayed:

1. Total inland transport time (road/rail/air) to various destinations – while identifying the various points on the corridor where much time is spent
2. By road
3. Weighbridges
4. Police checks
5. Resting points
6. Rail wagon capacity
7. Cargo waiting time at the port for
  - a. Rail transport
  - b. Road transport
8. Cold storage space for air cargo etc.

Another very important parameter which should be taken into account, is that of cost.

When considering the port costs:

1. Cost of importing a 20ft and 40ft container
2. International Ship and Port Security (ISPS)
3. Port and terminal related charges
4. Total cost for trade document procedures
  - a. Import declaration form
  - b. Certificate of origin
  - c. Certificate of conformity
  - d. Bill of lading

- e. Physio-sanitary certificate
- f. Customs bonds

When considering the inland costs:

- 1. Road
- 2. Rail
- 3. Pipeline

Finally, there is another indicator, that of complexity, which would likely provide interested parties with a few interesting points.

- A. Total number of documents per trade transaction
- B. Number of signatures per trade transaction
- C. Number of agencies that have the authority to inspect goods
- D. Number of times consignments are typically inspected
- E. Percentage of containers electronically scanned
- F. Percentage of containers physically inspected
- G. Level of customs' inspection

## Case study: How to determine the investment return of a dry port

Regarding the return that the investment brings off the implementation of a dry port we shall utilize the example of the ICD of Lat Krabang, Thailand.

The pictures below indicate the general area<sup>31</sup> where the dry port is situated and the facilities of the dry port itself<sup>32</sup>, through which the state railway of Thailand passes.



The way this dry port was set up, was through the following process:

- Was inaugurated on March 06<sup>th</sup>, 1996
- The contractors were selected as the lowest bidders (the winner being the service provider with the lowest service offer)
- 6 modules different in size and configuration
- 6 different module operators

And this was all because of the various emerging needs such as the developing role of a dry port, the evolving need to have the port's facilities upgraded along with the ever-existing requirement to improve the lifting pieces of equipment at the railhead.

<sup>31</sup> <http://www.nnt.co.jp/LatKrabang.htm>

<sup>32</sup> [https://people.hofstra.edu/geotrans/eng/ch4en/appl4en/latkrabang\\_icd.html](https://people.hofstra.edu/geotrans/eng/ch4en/appl4en/latkrabang_icd.html)

The aim towards which all these efforts were directed had a lot of facets.

To begin with, the country needed an infrastructure in order to promote rail transport so that the gasoline consumption on the transport sector could be eventually and effectively reduced.

When this was achieved, the next step in the chain would be that the cost of transportation would be reduced and apart from that, the situation (both cost- and otherwise) would be improved from the aspect of road traffic and accidents.

The country's competitive advantage in export cargo would be enhanced and all kinds of the dry port's users would benefit and so would the shipping lines, as the main ports would be de-congested.

Finally the GHG emissions would be impressively reduced.

To sum up the above, the conclusions of such a case study go to show that there are two parties which shall benefit from such an implementation, each in their own way:

1. Government:

- a. Through fewer traffic and road usage, the demand for imported gasoline shall be severely diminished especially where the transport sector is concerned
- b. Again through the reduction of road usage, the cost in lives and materials (through various types of accidents) shall be depleted
- c. The transport mode shall go green (fewer GHG emissions)
- d. Through the above, the country's GDP shall be boosted
- e. When there are more opportunities of expansion and easier handling of materials, then business looks up and the result would be increasing revenue for the country's people which would result in more taxable revenue

2. Exporters & Importers:

- a. Major cost reductions through the implementation of railroad utilization
- b. Service fees shall be minimal at the dry port compared to those at the seaport
- c. Enhancement of the competitive advantage

## Environmental impact of intermodal transport/dry ports

One of the main advantages of a dry port's implementation and usage maximization, is the GHG emissions' reduction, as was also shown on the above segment.

The planning and development of dry ports can extend the reach of the rail mode through intermodal services. Rail-based intermodal freight transport is more environmentally friendly than truck-only transport, particularly in terms of CO<sub>2</sub> emissions and other pollutants produced by long-distance hauling<sup>33</sup>.

Freight carried by rail emits much less CO<sub>2</sub> than freight transported by heavy goods vehicles (HGV).

Rail is considered an ideal mode of connection between seaports and dry ports.

The construction of consolidation centers/dry ports near strategic urban locations can also help reduce the number of freight trips.

Positive environmental benefits can be offered through the establishment of dry ports close to manufacturing and distribution facilities due to the reduced travel distance for manufacturing goods that are distributed through dry ports and raw material that are transported to factories.

One example of this is the Freight Construction Consolidation Center in London. Established to consolidate construction freight and minimize construction traffic for building and development, it has resulted in fewer freight trucks and a 75% reduction in CO<sub>2</sub> emissions.

Another study of freight emissions in London revealed that the establishment of consolidation and distribution centers led to combined 25.7% reduction in emissions.

The average CO<sub>2</sub> emission per ton/km is 28.3 g for rail freight, 118.6 g for HGV, and 400 g for light goods vehicles.

The implementation of a dry port concept in Sweden—in which freight transported from seaport to dry port by truck was replaced by railway transport—led to as much as a 25% reduction in CO<sub>2</sub> emissions as well as reduced port congestion.

Activity-based emission modeling of an intermodal transfer point in north Taiwan compared distribution by intermodal transport using coastal shipping and trucks to distribution by trucks alone. The results indicated that the efficiency of coastal shipping led to 60% less emissions.

Freight and consolidation centers/dry ports also have the potential to reduce empty truck trips. For example, 12%–30% of trucks run empty in Pakistan and 43% run empty in China. Improved logistical organization, coordination, and route planning could reduce CO<sub>2</sub> emissions by as much as 10–20% worldwide.

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<sup>33</sup> Promoting intermodal freight transport through the development of dry ports in Asia: An environmental perspective – Shinya Hanaoka

In some instances, however, dry ports may generate an increase in cargo, leading to the possibility of increased truck hauling that increases both noise and the emission of pollutants such as CO, NO<sub>x</sub>, SO<sub>2</sub>, volatile organic compounds (VOCs) and hydrocarbons that contribute to local air pollution. The noise and vibrations generated by freight vehicles, and the operation of handling equipment, may also be a nuisance to locals living in the area. The quality of fuel used by transport modes and vehicle congestion on roads as well as at dry ports can have additional environmental impacts. Therefore, consideration should be given to the utilization of cleaner and greener forms of fuel/energy in transport and to the improvement of the operational efficiency of transport services and dry ports by adopting an integrated and holistic approach.



## Benefits of dry ports

The dry ports are by definition an effort to substitute and de-congest the major sea ports.

This setting usually involves both private and public interests<sup>34</sup>.

Such facilities can promote regional economic and social development, including employment and income generation.

Such benefits can be categorized as per below<sup>35</sup>:

- a. Economic
- b. Business
  - a. For port authorities
  - b. For industries
  - c. Road operators
- c. Social and environmental
  - a. For people in hinterland areas
  - b. For port cities
  - c. For society

Regarding the economic benefits, there are some major items which need to be taken into account:

1. Reduced transport costs reflected in lower prices for traded goods
2. Lower prices for traded goods providing stimulus for trade and GDP growth
3. Investment in facilities is likely to generate other economic activities in the vicinity (Dry Ports can grow into SEZs)
4. Reduced transport cost of moving freight inland by rail rather than road

As far as the business indicator is concerned, one can note that the approach combines both the qualitative and the quantitative aspects:

- A. For port authorities
  - a. More efficient operation (less congested quay-side)
  - b. Greater expansion opportunities
- B. For industry
  - a. Reduced transport cost of moving freight inland by rail rather than road
  - b. Greater integration of transport into the supply chain
  - c. Improved access to seaports Cheaper logistics
  - d. More efficient access to services (Customs)
  - e. Access to additional logistics services (packaging, labelling, warehousing)
- C. For road operators
  - a. Less time in congested roads and terminals (greater asset utilization)
  - b. Reduced cost of road maintenance (through fewer trucks)

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<sup>34</sup> [http://archive.northsearegion.eu/files/repository/20130301142236\\_WPC-TheDryPortConcept.pdf](http://archive.northsearegion.eu/files/repository/20130301142236_WPC-TheDryPortConcept.pdf)

<sup>35</sup> <http://www.unescap.org/sites/default/files/2.2.Importance-of-Dry-Ports.pdf>

Finally, the social and environmental benefits mostly deal with the finer aspects of how dry ports benefit societies and the people themselves.

- i. For people in hinterland areas there is the potential for enhanced employment opportunities
- ii. For port cities
  1. Less road congestion
  2. Better land use opportunities
- iii. For society
  1. Reduced GHG through modal shift
  2. Reduced number of road accidents through fewer trucks on highways
  3. Reduced congestion on road network

The first column of the table lists a wider variety of concerned parties, whereas the second column presents the associated advantages deriving from the implementation and operation of dry ports.

<b>Seaport terminals</b>	Less congestion, increased capacity Expanded hinterland Terminal operator haulage opportunities
<b>Seaport cities</b>	Lower road congestion Land use opportunities
<b>Shipping lines</b>	Liner shipping service schedule reliability improvement Cheaper empty depot services Better empty repositioning Carrier haulage opportunities
<b>Shippers</b>	Improved seaport access Supply chain benefits Green marketing
<b>Third party logistics providers</b>	New business opportunities Economies of scale
<b>Customs</b>	Less congestion in port-related activities Higher volume of activities resulting from the increasing of seaport competitiveness for international cargo transits
<b>Rail and barge operators</b>	Economies of scale Gain market share
<b>Road operators</b>	Less time in congested roads and terminals
<b>Society</b>	Lower environmental impact of inland distribution Regional economic development and growth

## Importance of Dry Ports

The importance of dry ports is something which would be raised from the results not only when one considers them from the aspect of revenues but from the more qualitative indicators as well.

For example, from a purely economic context<sup>36</sup> it is worth mentioning that since the start of the millennium, the average growth rate in the emerging world is triple than in the already developed countries (e.g. the Asia-Pacific region's share of the global GDP has been steadily increasing and is currently 28%).

Even though there has been a grave debt crisis within Europe and the growth of the United States has been sluggish of late, the growth tendency has not been derailed as cash reserves still exist and there is partial policy flexibility on a global level.

There has been a major increase in the globalization of the trade.

When discussing the Asian trade monetary achievements, the below numbers more than suffice on their own:

1. **India-China trade**  
2001: US\$ 2.31 billion  
2010: US\$ 61.7 billion
2. **ASEAN-China trade**  
2000: US\$ 39.5 billion  
2010: US\$ 293 billion
3. **ASEAN-India trade**  
2000: US\$ 5.9 billion  
2010: US\$ 50 billion

The main aim of such a concept's implementation is for people to gain easier and better access to goods and services, which up till now were wholly or partially inaccessible while minimizing the various negative impacts of the rapidly growing transport sector.

The general areas where such ports have been developed, along with the wider surrounding areas, have the advantage of being in a position to:

- A. Maintain or promote their global economic position
- B. Distribute the benefits of economic prosperity
- C. Develop efficient logistics industry
- D. Reduce transport industry's carbon foot print

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<sup>36</sup> <http://www.unescap.org/sites/default/files/2.2.Importance-of-Dry-Ports.pdf>

## Intergovernmental Agreement on Dry Ports

The Intergovernmental Agreement on Dry Ports is a 2013 United Nations treaty designed to promote the cooperation of the development of dry ports in the Asia-Pacific region. It was concluded under the auspices of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) and is open to ratification by any state that is a UNESCAP member<sup>37</sup>.

The Agreement was adopted in Bangkok on 1 May 2013 by a resolution of UNESCAP and was opened for signature on 7 November 2013. It will remain open for signature until 31 December 2014 and will enter into force after being ratified by eight states.

This agreement shall provide benefits on two different levels:

- Nationally &

The countries will be guided by the agreement and they will be enabled to understand the minimum requirements that dry ports have, in order to be effective and productive.

- Regionally

The development of intermodal facilities is essential to the integration of high- and railway networks, being the key to realization of the vision of the internationally integrated intermodal transport and logistics system<sup>38</sup>.

Additionally:

- The promotion of dry ports shall be internationally promoted
- Investment in infrastructure has been facilitated
- The operational efficiency of intermodal transport services shall be improved
- Principles for the development and operation of dry ports; shall be established and
- The environmental sustainability of freight transport shall be enhanced
- The countries shall better appreciate the importance of strategically-located dry ports and will assist in the advocacy of policies that promote and facilitate the development of these facilities
- A better understanding of the minimum technical and operational requirements for dry ports shall be established. This will lead to more efficient and cost-effective transport, which will enable dry ports to better capture business and investment opportunities.
- Jobs shall be created with the associated economic and social benefits for the people of the region

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<sup>37</sup> [https://en.wikipedia.org/wiki/Intergovernmental\\_Agreement\\_on\\_Dry\\_Ports](https://en.wikipedia.org/wiki/Intergovernmental_Agreement_on_Dry_Ports)

<sup>38</sup> [https://www.google.com.cy/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUK Ewju5-ywitrNAhXkLMAKHcgCDzQQFggvMAI&url=http%3A%2F%2Fdocbox.un.org%2FDocBox%2Fdocbox.nsf%2FGetFile%3FOpenAgent%26DS%3DE%2FESCAP%2FFAMT\(2\)%2F2%26Lang%3DE%26Type%3DDOC&usg=AFQjCNGs72OrvDwngI6Q\\_rszBDK35IQFuQ](https://www.google.com.cy/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUK Ewju5-ywitrNAhXkLMAKHcgCDzQQFggvMAI&url=http%3A%2F%2Fdocbox.un.org%2FDocBox%2Fdocbox.nsf%2FGetFile%3FOpenAgent%26DS%3DE%2FESCAP%2FFAMT(2)%2F2%26Lang%3DE%26Type%3DDOC&usg=AFQjCNGs72OrvDwngI6Q_rszBDK35IQFuQ)

## PPP in Infrastructure Development & Funding

Dry ports have been characterized as long term infrastructure investments, which is mostly large, capital intensive, asset specific, stand-alone entity (not always) and has high operating margins and significant cash flows.

These projects are usually monitored and regulated by the government but monitored by 3<sup>rd</sup> parties under long term leases.

In order to decide whether the implementation of such an idea would be feasible, a very detailed study should be arranged.

There are socio-economic consequences for the specific regions to be taken into account, interviews with interested parties and whether a Public-Private Partnership should be considered.

The actual question though, after all the pre-decisional queries have been answered, is whether such a project is actually feasible.

This investigation needs to be accurate and involve the checking of the traffic flows, evaluation of the existing transport infrastructure evaluation, availability of transport modes, evaluation of the reduction of the percentage ton/km carried through roads, functions that can be accommodated and the possibility & need of future expansion.

After the decision has been made, there comes the most important factor to decide on and that is the way of funding the project.

The obvious answer would lie among the various options of donors, international financial institution, national and local governments, state owned entities (railway) and private/independent investors.

These funding and thus operating options can be split as per below:

1. Totally public funding

The funds under this option are mostly obtained either through the national budget or international funding institutions.

An important factor is that most of a dry port's infrastructure (road, rail, pavement), superstructure (offices, warehouses, gates) and pieces of equipment (forklifts, trucks, trailers) belong/account to the government

2. Totally private funding

Funding goes through the normal channels of debt & equity, with the debt being repaid through cash flows generated through the port operations, or through loans

3. Public-Private Partnership

This partnership offers a lot of advantages over the other options as they combine each one's positive aspects.

The public sector offers the basic infrastructure, promotes the integration with the seaports, monitors how much the environment is affected, facilitates the trade process and supports the correct labor relationship.

The private sector offers the bigger part of the funding and so increases the operational facilities' capacity, thus enabling the trade to a larger degree, improves the customs' regulations and practices and harmonizes the trade documentation<sup>39</sup>.

#### 4. Joint stock company

This option is the most business-like approach where the financial risks are shared, a board of directors represents the government and a joint committee plans everything.

Relating to the way that dry ports are organized and operated and in view of the fact that some specific ports' examples shall follow, it would be useful to mention and analyze what the PPP – Public Private Partnerships are.

According to UNESCAP a PPP is:

“A long-term contract between a private party and a government agency, for providing public services and/or developing public infrastructure, in which the private party bears significant risk and management responsibility.”

In simpler terms this could be explained as a relationship of different types that continues far beyond the construction phase where the greater amount of the existing risk is transferred to the private sector.

The motivation behind such a move explains why this mechanism is used, which is to involve the private sector in the public transport infrastructure<sup>40</sup>.

This way almost unlimited access to private capital is gained, risk is evenly allocated and efficiency gains (such as innovation & modern inventory techniques and new sources of revenue, consolidation and distribution) are realized.

This option is mostly suitable for dry ports as their development would stand to lose a lot if the funding and organization was purely one-sided.

On the one hand, that of the purely public structure, the private capital, efficiency gains and risk transfer would be starkly missing while on the other hand, that of purely private structure the supporting public infrastructure, commercial viability, land acquisition and customs' service would be almost entirely absent.

The most current trends in the transport sector where a PP has been effected, are depicted within the below diagram:

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<sup>39</sup> <http://faolex.fao.org/docs/pdf/afg149445.pdf>

<sup>40</sup> <http://www.ub.edu/graap/Final%20Papers%20PDF/Siemiatycki%20Matti.pdf>

## EVOLUTION OF THE ROLE OF DRY PORTS – University of Piraeus/MSc in Shipping



In recent year (past decade) the use of PPP around the globe has been noticeable and on a big scale.

32% of the international percentage has been applied in India while 26% in the republic of Korea.

Almost half that is 14% has been implemented in Australia and a bit less, 13% in China leaving the rest 15% to be split between Turkey, the Russian Federation and other Asian countries.

The influencing factors for such a decision, that creates the difference between the various countries, are<sup>41</sup>:

5. Policy formulation (it is a well-known fact that the private sector needs clarifications before entering a market)
6. Legal framework
  - a. As above-mentioned everything has to be clear regarding the competent authorities, sector & private partner eligibility<sup>42</sup>
  - b. Procurement rules have to be clear and fairness and openness of bids and contract changes need to be established
  - c. Effective and quick dispute-resolution mechanisms, such as arbitration & compensations, have to be set in motion
7. Institutional capacity
  - a. This involves the project development process which basically asserts who approves what and when
  - b. Expertise on PPP solutions is offered where transaction advisor lead the way
8. Financial support as without funding the projects shall not be feasible and these projects need to be made attractive for the private investors' benefit

<sup>41</sup> <https://www.oecd.org/regreform/policyconference/46270065.pdf>

<sup>42</sup> <https://www.google.com.cy/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUK Ewi4vofj79fNAhWJF8AKHSdCBK0QFgggMAA&url=http%3A%2F%2Fwww.ebrd.com%2Fdocuments%2Flegal-reform%2F2012-assessment-of-the-quality-of-the-ppp-legislation-and-effectiveness-of-its-implementation.pdf&usq=AFOjCNHPj4CnfUHCAG2nHmlq6UJGXeAB4g&bvm=bv.126130881,d.ZGg>

- a. Tax and customs' benefits like exemptions, or reductions of income duties shall be applied
- b. Sovereign guarantees shall be offered
- c. Viable gap funding shall be granted

To conclude, it would be correct to mention that the PPP is significant for the infrastructure development of dry ports and is actually a suitable model for them.

This might be a complex solution, due to the fact that political support and specific expertise is required, but the end results would be to the benefit of all involved parties.



## CASE STUDIES

### Example of China:

Over the years China has shown one of the greatest growth rates among the trading countries.

Eventually her total import and export volume reached \$4.16 trillion in 2013<sup>43</sup>, thus making China the world's largest trading nation<sup>44</sup>.

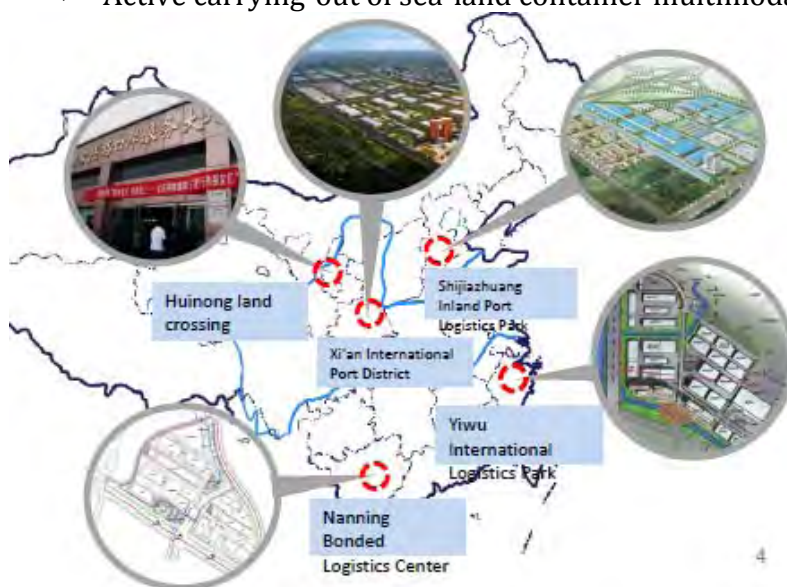
Her foreign trade cargo throughput in 2013 was 3.31 billion tons, which showed an actual increase of 9.2% over 2012 and her container throughput was 188.78 million TEUs in 2013.

The above results, gave the country an incentive to promote the construction of dry port logistic parks in specific inland areas.

In order to achieve the desired results, innovative new transport and service modes shall need to be developed.

These options shall range among<sup>45</sup>:

- ✓ Enhancement of inter-regional cooperation with the coastal ports and border crossings
- ✓ Promotion of speedy customs' clearance and one-stop service
- ✓ Active carrying-out of sea-land container multimodal transport



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<sup>43</sup> <https://www.theguardian.com/business/2014/jan/10/china-surpasses-us-world-largest-trading-nation>

<sup>44</sup> <http://www.ft.com/cms/s/0/7c2dbd70-79a6-11e3-b381-00144feabdc0.html>

<sup>45</sup> [http://www.unescap.org/sites/default/files/6.3.China\\_.pdf](http://www.unescap.org/sites/default/files/6.3.China_.pdf)

The force that drives the trade and its needs, to rise to such heights, that expansion and diversification is needed, could be explained by three basic driving modes:

9. The coastal ports build or assist in the process of developing dry ports in inland areas, so that the source of goods can be sought and the businesses can be expanded into the hinterland<sup>46</sup>. A very indicative example is the one of the port of Tianjin<sup>47</sup>.

**Dry Ports and Intermodal Train Lines of the Port of Tianjin**

**Legend**

- Dry Port
- Terminus of dedicated container train line
- National Port Hinterland

**Case** Tianjin Port helped build inland dry ports

- **mechanism** — establishing coordination mechanism for the construction, operation and management of dry ports between the coastal ports and the inland areas
- **effect** — seamless connection of inland areas to international transport
- **Number** — Till now Tianjin Port has built and helped build 21 dry ports in Northern China and Western China

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10. The inland trade-oriented areas build or assist in the development of dry ports, in order to promote the local export-oriented economies. Such is the case of Xi'an International District.

**Case** Project of Xi'an International Port District (under construction)

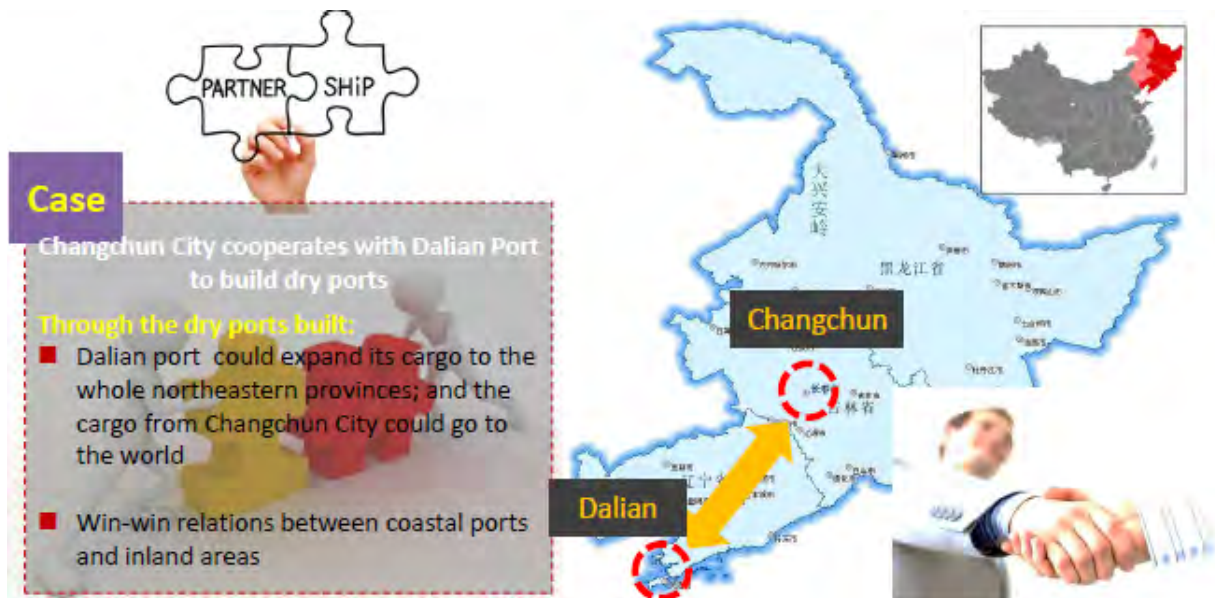
**This project will:**

- Promote effective connection between aviation, rail, road and water transport
- Enable Xi'an to play the role of central city in the Economic Belt of the New Eurasian Continental Bridge
- Facilitate the import and export trade in Western China to get direct link to the international logistics service system

<sup>46</sup>[http://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/Portoolkit/Toolkit/module3/port\\_functions.html](http://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/Portoolkit/Toolkit/module3/port_functions.html)

<sup>47</sup> [http://www.unescap.org/sites/default/files/6.3.China\\_.pdf](http://www.unescap.org/sites/default/files/6.3.China_.pdf)

11. The third option serves to establish strategic partnerships and jointly promote the construction of dry ports based on the needs that the coastal ports and inland areas have developed on their own<sup>48</sup>. A major example is the Changchun city cooperation with the port of Dalian.



China's original vision for this kind of developments, when the country started looking into the option and the actual implementation started, was for several dry port clusters to be built, so that the better functioning of international logistics' services could be completed and the local economies could develop and become major driving forces<sup>49</sup>.

This could be achieved only through the support and implementation of standards, policies, laws and regulations.

If the objective could be reached through the successful use of the policy structure then the result would be astounding and the created networks would rank among the top!

Their main characteristics would be the advanced infrastructure, efficient transportation, highly regulated market competition and increased environmental friendliness.

The strategies that China followed, so that the afore-mentioned results could be achieved, involve the effort to fulfil 4 basic requirements.

### 1. Refinement of overall layout planning

In order to achieve the desired results, the factors that need to be taken into account are the administrative division, the economy and geography and the traffic condition while the situations which need to be avoided are the unbalanced development, repeated construction, disordered competition and the waste of resources.

<sup>48</sup> <https://people.hofstra.edu/geotrans/eng/ch4en/appl4en/ch4a4en.html>

<sup>49</sup> <http://web.mit.edu/sheffi/www/documents/LogisticsClustersV4.pdf>

### 2. Exploration and experience accumulation

The fruits of everybody's efforts shall come through a combination of adopting various cooperation modes, innovative operation management methods and optimization of financing modes.

This will manage to retain the required survival and sustainable development methods while offering services to the greater markets.

### 3. Improvement of policies, regulations and standard systems

The systems' standards mostly relate to planning, construction and operations' management while the policies, which undoubtedly have to be favorable, have to do with taxes, use of land and financing.

Through the adoption of the above, China managed to realized a perfectly balanced interface among the infrastructure, transport equipment, information systems and management services.

Except for the above, higher operations' efficiency and capability of integrated services started standing out always combined with better information system integration among the different management departments of transport, customs and e-commerce<sup>50</sup>.

### 4. Strengthening of International cooperation

Last but not least, what played a major role in China's dry ports' development, was the strengthening of the international cooperation with her neighboring countries in order to further expand her opening.

The complexity of how many factors needed to be taken into account can be noted through the below diagram.



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<sup>50</sup> [http://www.adi.pt/docs/innoregio\\_supp\\_management.pdf](http://www.adi.pt/docs/innoregio_supp_management.pdf)

It is obvious that dry ports in China have shown dramatic development during the past twenty years, as they needed to respond to the rapidly increasing demand for Chinese exports.

The target though, is to further improve and extend the dry ports all around the country and not just close to the major sea ports, which is also something that is being fully supported from a political point of view as well<sup>51</sup>.

Beresford et al (2011) stated that “China is proving to be a dynamic and fertile arena for the implementation of the dry port concept where they are used primarily as ‘extended gates’ through which flows can be better managed (Roso and Lumsden, 2010)”.

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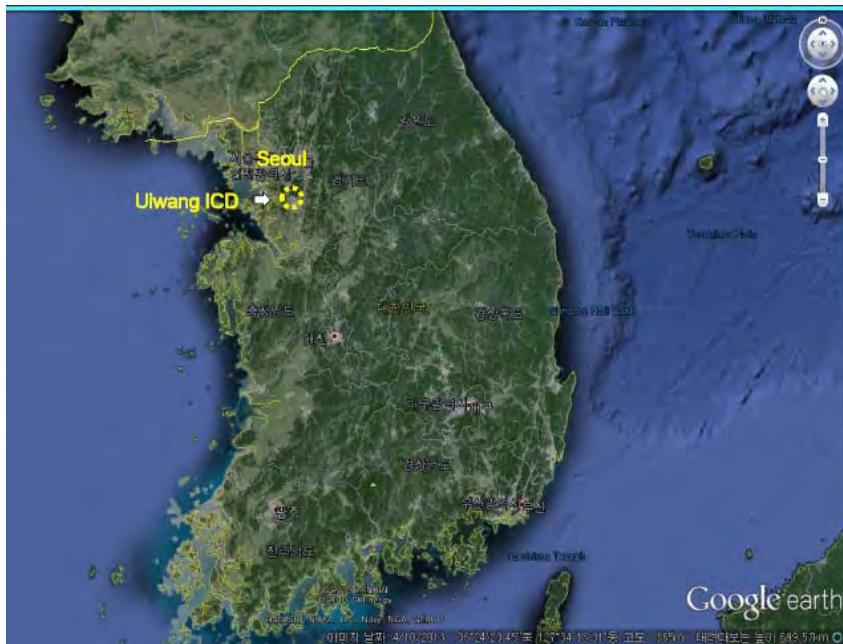
<sup>51</sup> <https://www.imf.org/external/np/speeches/2006/030706.htm>

**Example of Korea:**

Korea is and has been one of the leading countries from the aspect that they were one of the first to develop an ICD (Inland Container Depot)<sup>52</sup>.

Through this concept, they were able to effectively develop a logistic place which is established as an inland not a sea port and performs consolidated logistic functions such as storing, transporting, stevedoring and customs' clearance.

The map here-below depicts the exact location of the Uiwang ICD with the expanse of Korea.



Additionally, general and more specific views of the Uiwang ICD can be seen below.



<sup>52</sup> <http://www.unescap.org/sites/default/files/4.5.Experience-of-Korea.pdf>

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For Korea to be able to achieve the successful and profitable operation of such a depot, the basic requirements, which were taken into account were the strengthening of national competitive power by minimizing logistics' costs through the improvement of nation's ocean-going container logistics system.

The ICD started being developed within the early 90s.

For example the founding of the corporation took place during 1991 and 1992.

During May, 1991 the construction plan was finalized (through the SOC Investment Committee – Government body) while during April, 1992 the corporation was finally established.

Regarding the funding which was required, there was the invitation of the stockholder at 25-75%. The minority of the stocks went to the Public Sector (Korea Railroad/Government owned corporation) whereas the majority was provided by the Private Sector (15 Companies, the 2 largest being national flag shipping lines, another 12 container transportation companies and finally 1 container repair company)

What followed was the securing of the site.

The construction started during December, 1994 and finished during October, 1996.

The total cost came up to US\$30 million which was provided by both the Public and the Private sectors.

The Public sector catered for the base facilities (road, railroad, electricity, water, and sewage) while the Private sector took care of the Building, CY (Container Yard), Warehouse, Equipment.

The result of all of the above was a depot with Container Handling Capacity: 1.3 Million TEUs/year.

The benefits of the Investment were great, as the ICD obtained the right of monopolistic using of the CY by paying charge and of office room by free of charge because the type of investment was build&operate (for 30years) and then transfer.

The leasing period was July, 1993 to July, 2023.

The characteristics of the facility can be seen below:

Item	Description
Total of Lands (Area)	753,000 m <sup>2</sup>
Container Yard	417,000 m <sup>2</sup>
C.F.S (Bonded Warehouse)	10,700 m <sup>2</sup> (3 bldgs)
Operation Building	140,000 m <sup>2</sup> (8 bldgs)
Automobile Maint. Shop	1,720 m <sup>2</sup> (1 bldgs)
Container Maint. Shop	1,220 m <sup>2</sup> (1 bldgs)
Reefer Plug	96 Unit
Railway	6,262 m (11 lines)
Gas Station	480 m <sup>2</sup>

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Initially, the pieces of equipment utilized in the ICD were:

- A. Transfer Cranes
- B. Reach Stackers
- C. Tractors
- D. Trailers

The operational structure was split in to many pieces such as Uiwang ICD Co., Ltd, the stockholders' company, the government, customs' clearance brokers, transportation brokers and other convenient facilities.

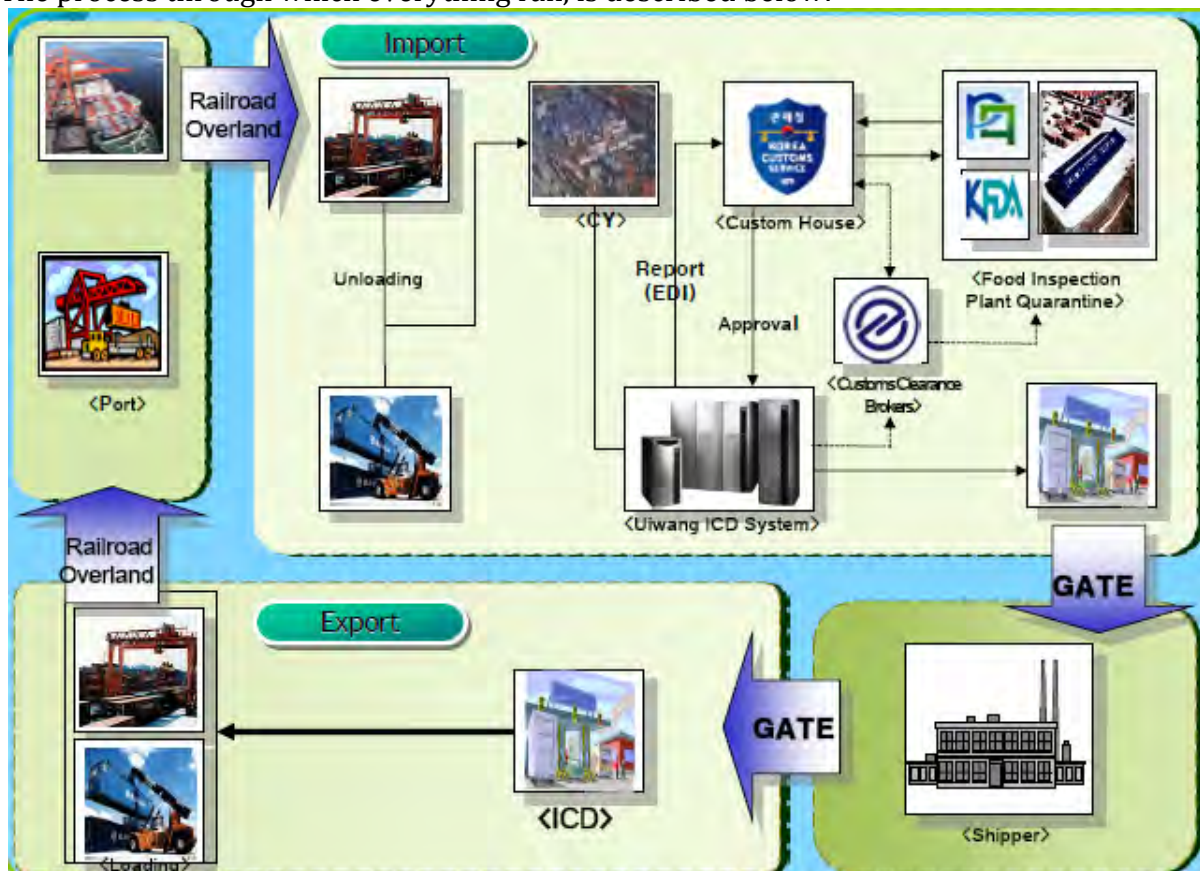
Uiwang handled the management of the facility, the (un-)loading of railroad containers, the operation of the public container yard and the sale of the petroleum.

On the other hand the stockholders arranged for the transportation of the containers, the operation of the CY and the CFS along with the maintenance of the automobiles and the containers.

The governmental field was split into 4 different procedures which are

1. Customs' house responsible for the relevant clearance
2. Inspection of foodstuff responsible for the inspection of the relevant imported items
3. Plant quarantine responsible for the relevant procedures against imported agri-products
4. Railroad transport responsible for the relevant containers' transportation

The process through which everything ran, is described below:





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The general map below, shows how the Uiwang ICD is connected and interacts with the major sea ports of the country as well as the general location of sea and dry ports over the expanse.



The function which this depot developed and the purposes it served are various and are partially integrated with one another:

### A. That of the Inland Container Terminal

Through this function the container yard along with the container freight station are operated and thus function like ports<sup>53</sup>.

The results measured in TEUs handled on a yearly basis can be seen below.

Item	2009	2010	2011	2012	2013
Railroad	382,391	425,769	502,366	527,732	495,464
Overland	396,165	477,132	493,368	481,044	583,659
Total	943,073	902,901	995,734	1,008,776	1,079,123

### B. That of Railroad transportation

This way of transporting containers has offered many advantages over having them moved directly from the sea ports via the trucks.

Additionally it is an eco-friendly, fast, safe and mass way to transport the units.

The actual capacity of the port is an average of 48 trains per day (2.800 TEUs).

More specifically the below table depicts the number of how many TEUs were handled over the years.

<sup>53</sup> [http://www.worldportsource.com/ports/commerce/KOR\\_Port\\_of\\_Gwangyang\\_1917.php](http://www.worldportsource.com/ports/commerce/KOR_Port_of_Gwangyang_1917.php)

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Item	2009	2010	2011	2012	2013
Arrival	197.608	205.160	230.685	243.066	227.721
Dispatch	184.783	220.609	271.681	284.666	272.743
Total	382.391	425.769	502.366	527.732	495.464

### C. That of customs' clearance

This way, the commotion at the sea ports is lessened to a much smaller degree, as now, a one-stop service is offered and the whole range of activities can be supported (customs' house, food inspection office, plant quarantine office).

The whole procedure is monitored and checked in real time through an Integral Logistics' Network.

Again measured in TEUs the imported numbers and their categorization respectively.

Record (TEU)				
Item	2010	2011	2012	2013
Import	39.202	43.989	46.862	48.946
Commodity				
Machinery	Electric	Footwear	Others	
25%	23%	10%	42%	

### D. That of Inland transportation

The containers which have been emptied are delivered through the shortest distance through a combination of railroad and overland transport.

The future vision that Uiwang wants to achieve is to expand not over their country only but across the rest of Asia and Europe as well.



The republic of Korea, is one of the ratifying countries of the inter-governmental agreement thus putting herself in the position of promoting the development of economic and logistical activities at intermodal interfaces, especially within the various production and consumption centers and around sea- and dry ports.

This gives them priority to investment in Asian Highway and Trans-Asian Railway networks, including intermodal interfaces to link them with water and air transport networks and as a result, developing an international integrated intermodal transport system that contributes to long-term objective of regional cooperation in support of international trade<sup>54</sup>.

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<sup>54</sup> [http://www.unescap.org/sites/default/files/pub\\_2556%20Promoting%20intermodal%20transport.pdf](http://www.unescap.org/sites/default/files/pub_2556%20Promoting%20intermodal%20transport.pdf)

### Example of India:

Another major example is the one of India.

India is a country with a coast line over 7500km long whose ports handle around 90% of the total volume and 70% of total value of EXIM trade.

She has 12 major seaports<sup>55</sup> (6 on the east and another 6 on the west), which handle about 60% of the total seaborne traffic, leaving the 176 lesser ports to handle the other 40%<sup>56</sup>.

On the inside part of the land, there exist 247 Dry Ports [170 functional and the rest under continuous development] with nearly 40% owned by CONCOR & CWC, and owned by the private sector.

The containerization level is just above 50% while it would only be fair to mention that the containers' traffic at the major functioning ports has almost doubled in the past 5 to 6 years with an average growth rate of 13.27% per year.

The development of such ports was not the easiest solution but after a while, it definitely became necessary.

On the one hand the high costs for development the relevant facilities along with the old-fashioned/traditional procedures for cargo movement must be considered but on the other there were the major congestions in port traffic and the time delays in the customs' clearance activities.

The factors which would inhibit the option of such implementation would be:

- ✚ Need for Environment & Forest clearance
- ✚ Huge rehabilitation cost
- ✚ Land acquisition – Inordinate delay due to court cases etc.
- ✚ Clearances of Railways for Rail Over Bridges [ROBs] and Rail under Bridges [RUBs]
- ✚ Poor performance by some contractors due to cash flow problem
- ✚ Transportation delays due to city traffic congestion
- ✚ Trailer idle time due to wait at city entry point for roads to open
- ✚ Severe (warehousing) space shortages<sup>57</sup>

Despite the difficulties faced, dry ports were developed and successfully implemented.

An example of such success was the ICD of Tughlakhabad which is the largest one in India, takes up 44 hectares of land in the NCR region of India and by 2012 450.000 containers were handled annually.

Since the first approaches were successful, the future plans aim to also include within the existing depots agri parks, cold chains, bulk handling facilities, collateral warehousing as well as liquid logistic facilities (liquid silos).

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<sup>55</sup> [http://www.academia.edu/5949844/CHAPTER\\_1\\_ECONOMIC\\_DEVELOPMENT\\_THROUGH\\_PORTS](http://www.academia.edu/5949844/CHAPTER_1_ECONOMIC_DEVELOPMENT_THROUGH_PORTS)

<sup>56</sup> <http://www.slideshare.net/kanicagola1/indian-ports-17331839>

<sup>57</sup> [http://www.unescap.org/sites/default/files/6.4.India\\_0.pdf](http://www.unescap.org/sites/default/files/6.4.India_0.pdf)

### Example of Cambodia:

A country of smaller levels of trade than the previously discussed but of equal importance due to high levels of trade going through her ports, is Cambodia.

Her main ports of Sihanoukville (autonomous sea port) and Phnom Penh (capital city autonomous river port) play a major role in the country's economy supported by 13.824 km of national road and 652km railroad length respectively.

Their annual capacity is container throughput is 350,000 and 104,000 TEUs respectively.

Within the PPAP a new container terminal<sup>58</sup> was established and put to operation during the year 201359.

This was scheduled to be developed into a Special Economic Zone being able to facilitate bonded warehouse areas, agricultural processing zones and industrial zones.

The dry port concept has been a bit slow in the development within Cambodia.

In 1993 the Sihanoukville port introduces the idea of an ICD within the greater Phnom Penh area.

During 1996, Meng Sreang Express Import-Export Transportation Company managed to achieve the first dry port's viability and there it all started.

It did not take long, and the second dry port showed up under the Singapore-Cambodia joint venture – the Cambodia-CWT dry port<sup>60</sup>.

After that, more and more dry ports started showing up on the map.

Dry ports in Cambodia, even though they started being developed somewhat later than the ones in other countries made an obvious effort to conform with international standards by following the relevant procedures and trying to include all the side departments within the complex.

Their efforts paid off and a lot of needs were satisfied through offices for customs and cam-control, customs' inspection, declaration and clearance, cargo consolidation, warehousing and storage services, container yard, distribution, transfer and door-to-door delivery of goods and other facilities.

The dry ports' development and management lies under the General Directorate of customs and excise of the Ministry of Economy & Finance.

As mentioned before, an intergovernmental agreement took place so that dry ports could be established and successfully operated which included the basic guiding principles.

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<sup>58</sup> [http://www.ppap.com.kh/ppap\\_terminal.htm](http://www.ppap.com.kh/ppap_terminal.htm)

<sup>59</sup> <http://www.asiacargonews.com/en/news/PrintVersion?id=506>

<sup>60</sup> [http://www.business-in-asia.com/cambodia/cambodia\\_ports.html](http://www.business-in-asia.com/cambodia/cambodia_ports.html)

## Example of Bangladesh:

To sum up, the last case which this essay deals with, is the one of the country of Bangladesh.

The Bangladesh Land Port Authority (BSBK) was established under Bangladesh Sthala Bandar Kartipaksha Ayin during the year 2001 which is a 'statutory public authority' as defined in the Bangladesh Constitution<sup>61</sup>.

The vision behind the idea of dry ports' development within Bangladesh was to facilitate the export and import with neighboring countries through land routes.

This would be facilitated through the implementation of the below functions:

1. Development of the necessary infrastructure within the land ports;
2. Efficient handling of cargo;
3. Storing of cargo; and
4. Fostering of public-private partnership for effective and better service delivery.

Their aim was for the port to be able to function correctly and achieve the desired results.

The basic functions would be<sup>62</sup>:

- a. Formulation of policy for development, management, expansion, operation and maintenance of all land ports.
- b. Appointment of operator for the cargoes' imports' and exports' handling.
- c. Functioning as a warehouse keeper.
- d. Schedule's preparation of tariff, toll, rates and fees chargeable upon the port users having prior approval of the Government.
- e. Fostering of public-private partnership for effective and better service delivery.

The trends of the imported and exported volumes over the years, can be seen within the below diagram.



<sup>61</sup> <http://www.bangladeshdir.com/government/agencies-and-departments/bangladesh-land-port-authority/>

<sup>62</sup>

[http://bsbk.portal.gov.bd/sites/default/files/files/bsbk.portal.gov.bd/page/aff207ea\\_8eaa\\_470b\\_9280\\_c939c972cf7d/overview%20\(june'15\).pdf](http://bsbk.portal.gov.bd/sites/default/files/files/bsbk.portal.gov.bd/page/aff207ea_8eaa_470b_9280_c939c972cf7d/overview%20(june'15).pdf)



The processes for the cargo handling are very strict within the dry ports.

On the one hand we have the actual importing process, which actually starts with the customs' checks (where the imported cargoes' manifests as well as the crew manifests are scrutinized), continues with the receipt of the cargoes by the truck terminal, where they are weighed and a parking slip is assigned to each one, moves on to the posting section and after getting the required clearance, are moved to their respective sheds/yards to be unloaded.

On the other hand, we have the dispatch of the cargoes towards their different destinations. This has to do with the documents' checking, whereby the release order is obtained by the customs, after the bill of entry, invoice, packing list & manifests have been run through.

These documents also serve to fulfill the billing section's procedures where the port dues are assessed and remitted and the release order is obtained from the port.

Finally, the exit pass is provided and the cargoes leave the dry ports.

Below, a list of the available provided facilities of the country's main dry port is analyzed:

- i. No. of Sheds/Warehouses/Yards: 60 (divided according to their types: general, chemical/hazardous, acid, open, transshipment)
- ii. No. of Yards: 24
- iii. Storage Capacity (MT): 48,800
- iv. No. of labors: 7,100
- v. No. of pieces of equipment: 25 (Forklift & Crane)

- vi. Handling Capacity (MT/Yearly): 7,800,000
- vii. No. of Weighbridge Scales: 11

The cargo is handled through manual and mechanical (pieces of equipment used are the fork lifts and the cranes) ways.

However, the port has still not reached its maximum handling capacity and the manual working method is mostly applied, even though the relevant equipment exists, which makes cargo handling more time consuming than it should be.

A lot of efforts have been made, so that Bangladesh's dry ports can conform to the Agreement's principle for their development and operation and have already managed to implement functions (i.e. handling, storage, transshipment) in line with the basic principles although the maximum handling capacity has not been achieved.

A lot of things have to be adjusted, so that dry ports' operation can be facilitated, starting with the national laws & regulation (including customs, various pieces of required documentation and formalities).

This would also make trading within and without the country easier and more competitive, which has already been achieved to a bigger extent through the attention paid to design & layout of the dry ports in order to secure the nature and ease of movement for the cargoes, while taking into account any future needs for expansion.



**Example of Pakistan:**

Another case of the larger dry ports are the ones in Pakistan and specifically the Wagah dry port.

Trading through land routes reaching Wagah started in July, 2005.

As a result of trucks’ cross border movement between India and Pakistan resulted in a joint statement which was established in August, 2007 and major truck exports were then initiated and the process was firmly implemented during October, 2010<sup>63</sup>.

This agreement provided a lot of advantages between the two countries which had been on difficult terms because of the war in 1971.

For example, cross border movement of trucks became allowed and a hotline between the customs’ administrations of the two countries was created.

Additionally, mutually agreed trade times were agreed along with seven working days’ timetables.

In addition to the above, a Customs’ Liaison Border Committee (CLBC) was established in order to be in a position to resolve operational issues on a field level and further the joint statement’s purposes<sup>64</sup>.

Now that the Wagah dry port is under development, it would be worth mentioning that there are some major activities’ areas there such as a passenger facilitation center, a rail station and a land freight unit.

This passenger facilitation center is in a position to offer bus movement for passengers during most weekdays which is a great improvement, in view of the fact that nowadays the average number of passengers, including those crossing border on foot in a day, is less than 100.

The establishment of the railway’s use is also very important as there is an express which facilitates transportation twice a week and the average number of passengers per week is 500 (Incoming & Outgoing).

Finally, the Land Freight Unit was established on the 24<sup>th</sup> of March, 2009 and handles the trade between India and Pakistan, through the road link at Wagah. The traded items can be seen on the right and the relevant statistics are analyzed below.

IMPORTS	EXPORTS
Soybean Meal	Dry Dates
Fresh Tomato	Rock Gypsum
Raw Cotton	Soda Ash
Fresh Onion	Hydrogen Peroxide
Mixed Vegetables	Caustic Soda
Cotton Yarn	Herbs
Polypropylene	Rock Salt
Boneless Buffalo Meat	Cement
Raw Jute	Clinker
Newsprint	Coal

<sup>63</sup> [http://www.saarctrade.info/pubs/saarctpnpubs/FINAL\\_Indo-Pak.pdf](http://www.saarctrade.info/pubs/saarctpnpubs/FINAL_Indo-Pak.pdf)

<sup>64</sup> [https://www.google.com.cy/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiaouWr29nNAhUkJJoKHa1-D9kQFggjMAA&url=http%3A%2F%2Fwww.commerce.gov.pk%2FDownloads%2FJoint\\_statement\\_between\\_Pak-India.docx&usg=AFQjCNEzsVqX3Kk1qAG8N5tUAjF7KLUGfg&bvm=bv.126130881,d.bGg](https://www.google.com.cy/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiaouWr29nNAhUkJJoKHa1-D9kQFggjMAA&url=http%3A%2F%2Fwww.commerce.gov.pk%2FDownloads%2FJoint_statement_between_Pak-India.docx&usg=AFQjCNEzsVqX3Kk1qAG8N5tUAjF7KLUGfg&bvm=bv.126130881,d.bGg)

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Financial Years	IMPORTS	EXPORTS
	Value (Rs. in Million)	Value (Rs. in Million)
2007-08	3,035	-
2008-09	11,385	-
2009-10	16,373	-
2010-11	20,994	1,332
2011-12	28,814	6,235
2012-13	62,684	12,895

Wagah's infrastructure deals with all three items which were mentioned above.

In this respect, the passenger facilitation center which was inaugurated on the 09<sup>th</sup> of February, 2008, accommodates both customs' and immigration areas, duty free shops, required clearance for any who are traveling by road transport or crossing the border on foot along with a main gate used for crossing.

The railway station is owned and operated by Pakistan Railways accommodating a platform and passenger hall, customs' and immigration areas.

The commercial cargo is processed at the Lahore railway station.

The land freight unit consists of small shed and some hard standing for trucks and cargo without any cranes or other pieces of cargo handling equipment (total of 7 sheds).

As a result the loading and unloading process is mostly labor based.

Additionally, a scanner and three weighing bridges have been installed along with a dedicated trade gate for the traded goods movement.

The extra number of facilities are three generator sets, two fork lifters, one reach stacker, one fire tender and two mechanical broom sweepers.

The terminal are covers a total land space of 371,550 sq. meters out of which the total covered area is 38,600 sq. ft. with another 56,700 sq. ft. under construction.

It is in the future plans of the terminal operators to add hard-standing areas & additional storage sheds, to further develop the existing road infrastructure and to add more scanners, cranes, fork-lifters and weigh bridges.

### Example of Europe:

The first breakthrough in the case of Europe was the unpredicted surge in demand in all the ports of the Hamburg-Le Havre range in 2004/2005, when the trading opportunities between Europe and China grew to a great extent and as a result the unprecedented congestion which resulted from the above, especially where the port of Rotterdam is concerned<sup>65</sup>.

This is where the “extended gate” concept was experimentally implemented for the first time through the container terminal operator would on their own and independently forward blocks of containers towards various hinterland locations (primarily via barges and rail), from where they would be re-directed, without third-parties’ involvement.

These hinterland locations can boast direct connection to the seaports, where the aforementioned concept applied.

Europe benefited greatly from the implementation of such locations because the positive results would be reductions in transport of freight in-and-out of ports, as well as the relocation of non-seaport-related activities towards hinterland locations thus providing sea ports with more breathing space to concentrate on their specifically related activities<sup>66</sup>.

Rotterdam is a good example of the changes that are gaining momentum in the hinterland container logistics industry. The marine and inland terminals of Europe Container Terminals (ECT) and their connecting barge and rail services have been around for a long time, but are now being made more attractive through the development of its extended gateway and terminal operator haulage concepts<sup>67</sup>.

Apart from Rotterdam another part of Europe bears some looking into and that is the Southern Italian region of Campania, as it has been analyzed by Iannone (2011).

There is a direct connection between the coastal seaports of Naples and Salerno and the inland dry ports at Nola and Marcianise regarding the import and export container movements.

The main objective here is the minimization of generalized logistics’ costs including transportation costs (by both road and rail), terminal handling and storage costs, customs control costs, in-transit inventory holding costs and container leasing costs.

What was required here was the best utilization of the existing facilities so that respective solutions could be yielded for every troubling factor<sup>68</sup>:

- a. Optimal routing of import and export (after having distinguished whether they are empty or full) to-and-fro the containers’ respective transshipment locations
- b. Demand allocation as necessary

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<sup>65</sup> [http://www.joc.com/port-news/european-ports/port-rotterdam/europe%E2%80%99s-ports-brace-intra-terminal-rivalries-and-overcapacity\\_20141107.html](http://www.joc.com/port-news/european-ports/port-rotterdam/europe%E2%80%99s-ports-brace-intra-terminal-rivalries-and-overcapacity_20141107.html)

<sup>66</sup> <https://www.portofrotterdam.com/en/news-and-press-releases/transport-via-northern-european-ports-more-sustainable-than-via-southern>

<sup>67</sup> <https://www.portofrotterdam.com/en/cargo-industry/container-port-of-europe>

<sup>68</sup> [http://www.adam-europe.eu/prj/7095/prj/Couriel\\_WP2\\_Chapter2\\_final.pdf](http://www.adam-europe.eu/prj/7095/prj/Couriel_WP2_Chapter2_final.pdf)

- c. Split between rail and road flows in order to generate the optimum results
- d. Decision of where customs' clearance would take place

Initially though, not everything turned out as expected within the Campania region. This was due to the fact that the existing railway was not utilized to its maximum capacity and the containers stayed for long periods within the seaport of Naples, because of congestion- and customs'-borne delays.

Nowadays, a new project has been set in motion in Europe and that is the "Tiger Project". This involves the creation of an inland dry port, linked to other maritime ports by efficient shuttle trains.

These shuttles shall be long trains, either created from one port or being the combination from two different ports.

This dry port would be a freight village which would include an intermodal terminal, a marshalling yard or hub, a conventional terminal and a logistics' area.

Trains would depart from here to serve the hinterland.

Demonstrators are currently available at Munich Riem for Hamburg and Rivalta Scrivia for Genova<sup>69</sup>.

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<sup>69</sup> <http://www.newopera.org/tigerproject>

### Example of Brazil:

Another country worth mentioning would be Brazil, which has one of the fastest growing trading economies on an international scale.

It has been suggested by Padilha and Ng (2011) that Brazilian dry ports' role is not only a way to achieve the competitive advantage by utilizing and continuously improving hinterland access for freights.

Based in the major port of Santos, in the general state of Sao Paulo dry ports have been set to motion and are in constant need of improvement but there are major issues preventing them from being all they could<sup>70</sup>.

There is an absence of intermodal systems (i.e. railways), the freight flows are concentrated within the port of Santos where de-concentration is slow on the go.

The above inefficiency could be avoided and things would get noticeably better if only the below could be achieved, even to a small extent:

- a. Integrated planning should be implemented
- b. Regulations should be become clear in order to provide incentives to invest in infrastructure improvements
- c. Collaboration between sea and dry ports should be encouraged through new legislation
- d. More efficient use of inland logistics' infrastructure

It is understood that there is grave difficulty in the above factors' implementation, however, everybody should put in some effort and goo-will, so that the desired results can slowly emerge.

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<sup>70</sup> [http://www.scielo.br/scielo.php?pid=S0104-530X2016000100219&script=sci\\_arttext&tlng=en](http://www.scielo.br/scielo.php?pid=S0104-530X2016000100219&script=sci_arttext&tlng=en)

### Obstacles

However, no road is always smooth and there shall always be obstacles, which need to be overcome.

There are many different policies, regulations, planning and construction standards that need to be in continuous improvement and consolidation mode.

When the trade percentages and the actual volumes increase, it is logical that more intermodal transport facilities shall need to be constructed, same as the cargo collecting and distributing systems shall be in constant need of refinement.

A wider application of the available information technology, including the data exchanges and the sharing of development and operation of these ports, is always recommended, so that the ports' efficiency can improve.

On the one hand the high costs for development the relevant facilities along with the old-fashioned/traditional procedures for cargo movement must be considered but on the other there were the major congestions in port traffic and the time delays in the customs' clearance activities.

The factors which would inhibit the option of such implementation would be:

- ✚ Need for Environment & Forest clearance
- ✚ Huge rehabilitation cost
- ✚ Land acquisition – Inordinate delay due to court cases etc.
- ✚ Clearances of Railways for Rail Over Bridges [ROBs] and Rail under Bridges [RUBs]
- ✚ Poor performance by some contractors due to cash flow problem
- ✚ Transportation delays due to city traffic congestion
- ✚ Trailer idle time due to wait at city entry point for roads to open
- ✚ Severe (warehousing) space shortages

## Conclusions

The increase in demand for containerized cargo creates congestions in the harbors and by association on the roads towards major port cities throughout the world.

This by itself makes the need for optimization of hinterland logistics of paramount importance.

Dry ports are gaining momentum and rising through the layers of importance in the logistics' supply chain<sup>71</sup>.

They are part of complex shipping and trading networks where the competition rages and efforts are made from all side to improve on all their characteristics.

The concept of the dry port could also be substitute to a small extent by the extended gateway concept which is also a way to duplicate or enhance containers' seaport activities.

These can also relieve the port congestions, support the loading and transfer of containers to hinterland location, their re-direction from secondary location thus being in a position to have both internal and external costs reduced and promoting the regional economic growth.

Aside from the obvious advantages to the implementation of dry ports, the general benefits to the ecological environment and the quality of life by shifting flows from road to rail should be assessed<sup>72</sup>.

This way there is a distinct possibility to increase the throughput without physical expansion as well as better services to shippers and transport operators.

Irrespective to the extent of its direct involvement, the government has a major role to play where dry ports are concerned, not only through controlling the policies and regulations but also through the facilitation for their development, while all the while achieving the environmental goals which have been set<sup>73</sup>.

As a result, environmentally, CO<sub>2</sub> emissions decrease, because road transports are replaced by dispatch of containers through electric railways and seaport terminals' gates are de-congested.

One other major improvement would be the decrease of accidents (on the roads or from fatigue or exhaustion).

By applying both the dry ports' and the extended gateways' options, regional sustainability evolves, new jobs are created and value-added services become cost-effective.

On other major issue, that of the handling of empty containers, shall be resolved, through their re-allocation and direct handling.

Additionally, the efficiency of hinterland terminals shall need to be improved to a level expected from terminals in a seaport.

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<sup>71</sup> <https://people.hofstra.edu/geotrans/eng/ch4en/appl4en/ch4a4en.html>

<sup>72</sup> [http://www.pol.gu.se/digitalAssets/1344/1344857\\_2004\\_iclsp\\_dalian\\_wox-ros-lum.pdf](http://www.pol.gu.se/digitalAssets/1344/1344857_2004_iclsp_dalian_wox-ros-lum.pdf)

<sup>73</sup> [http://www.un.org/en/ecosoc/docs/pdfs/fina\\_08-45773.pdf](http://www.un.org/en/ecosoc/docs/pdfs/fina_08-45773.pdf)

The above conclusions are always to be combined with the ever-existing issue of the transport costs which largely depend on current fuel prices. The longer distances are especially vulnerable to this factor.

To sum it up, dry ports can be credited with the below<sup>74</sup>:

- Reduces urban congestion
- Reduces fuel costs
- Reduces pollution
- Reduces equipment capacity requirements
- Increases equipment utilization rates
- Decreases freight costs
- Decreases traffic congestion on freight corridors
- Reduces road maintenance costs
- Enhances security of trucks, cargo, and drivers
- Enhances driving safety
- Reduces insurance costs
- Creates micro economies -- local employment opportunities
- Reduces total logistics costs
- Enhances global competitiveness

It would be fair to say that: “Success stories are the result of careful planning and funding”<sup>75</sup>.

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<sup>74</sup> [http://www.oas.org/cip/docs%5Cdocumentos\\_importantes%5CPresentacionesIxtapa%5CKent.pdf](http://www.oas.org/cip/docs%5Cdocumentos_importantes%5CPresentacionesIxtapa%5CKent.pdf)

<sup>75</sup> <http://www.unescap.org/sites/default/files/Introduction%20-%20Relevance%20of%20Dry%20Ports.pdf>



## APPENDIX I: Intergovernmental Agreement and List of Ratifying ports

Other article: Resolution 69/7

*The Economic and Social Commission for Asia and the Pacific*

*Recognizing* the vital role of transport in promoting international trade and economic and social development.

*Also recognizing* that transport is central to sustainable development and that sustainable transport achieves better integration of the economy, as affirmed in the outcome document of the United Nations Conference on Sustainable Development, held in Rio de Janeiro, Brazil in June 2012, entitled to the “The future we want”.

*Further recognizing* the importance of the Joint Project on Developing Euro-Asian Transport Linkages, which is aimed at facilitating access to markets, economic opportunities and social services for the countries situated along the Euro-Asian transport routes, including landlocked and transit developing countries.

*Acknowledging* that dry ports of international importance along with the Asian Highway and the Trans-Asian Railway networks constitute important building blocks of a sustainable international integrated intermodal transport and logistics system.

*Keeping in view* the role of dry ports in integrating modes of transport, reducing border-crossing and transit delays and associated costs, facilitating the use of energy-efficient and environmentally sustainable means of transport and creating new opportunities for the growth and establishment of development clusters in inland areas, and addressing the specific needs of landlocked, transit and coastal States.

*Recalling* its resolution 66/4 on the implementation of the Bangkok Declaration on Transport Development in Asia and the request contained therein to work towards the development of an intergovernmental agreement on dry ports.

*Also recalling* the Regional Expert Group Meeting on the Development of Dry Ports along the Asian Highway and Trans-Asian Railway Networks and the second session of the Committee on Transport, both held in Bangkok from 1 to 3 November 2010, which initiated the process of drafting an intergovernmental agreement on dry ports.

*Further recalling* the outcomes of negotiations and consultations held among member States on the draft agreement during three sub-regional meetings held in 2011 — for South-East Asia in Vientiane, for South and South-West Asia in Dhaka, and for Central and North-East Asia in Dushanbe.

*Welcoming* the finalization of the draft intergovernmental agreement on dry ports by the Ad hoc Intergovernmental Meeting on an Intergovernmental Agreement on Dry Ports, held in Bangkok from 20 to 22 June 2012, and the subsequent approval of the finalized draft agreement by the Committee on Transport at its third session, held in Bangkok from 10 to 12 October 2012.

*Expressing its appreciation* to the Government of the Russian Federation for the valuable support it provided in the process of developing the intergovernmental agreement on dry

ports, including the convening of the expert group meeting, the sub-regional meetings and the Ad hoc Intergovernmental Meeting.

*Encouraged* by continued commitment of member States to coordinated development of the regional transport networks, within the framework of the Intergovernmental Agreement on the Asian Highway Network<sup>6</sup> and the Intergovernmental Agreement on the Trans-Asian Railway Network.

*Welcoming* the proposal to organize a signing ceremony for the Intergovernmental Agreement on Dry Ports<sup>8</sup> during the second session of the Forum of Asian Ministers of Transport, which will be held in Bangkok from 6 to 8 November 2013.

*Convinced* that the Intergovernmental Agreement on Dry Ports will strengthen regional cooperation among member States to promote inclusive and sustainable development through coordinated development of the transport and logistics system and have a substantial positive impact on the region by helping to achieve the internationally agreed development goals, including those contained in the United Nations Millennium Declaration.

1. *Adopts* the Intergovernmental Agreement on Dry Ports, the text of which is contained in the annex to the present resolution;
2. *Invites* all relevant members of the Commission to become parties to the Agreement in order to ensure its rapid entry into force;
3. *Invites* the international and regional financing institutions and multilateral and bilateral donors to consider providing financial and technical support for the development and operation of dry ports of international importance;
4. *Invites* international organizations to continue to collaborate with members of the Commission to promote the development and operation of dry ports of international importance;
5. *Encourages* member States to develop dry ports of international importance as a means of facilitating the implementation of the Almaty Program of Action;
6. *Requests* the Executive Secretary:
  - To assist member States in the process of becoming parties to the Agreement;
  - To accord priority to the development of dry ports of international importance within the program of work of the Commission;
  - To collaborate effectively with international and regional financing institutions, multilateral and bilateral donors and international and sub-regional organizations for the development and operation of dry ports of international importance;
  - To continue to work towards the development of a sustainable, international, integrated, intermodal transport and logistics system for the region, including through the development of the Asian Highway, the Trans-Asian Railway and dry ports of international importance, as appropriate;
  - To discharge effectively the functions of the secretariat of the Agreement;
  - To report to the Commission at its seventy-first session on the implementation of the present resolution.

## **Annex**

### **Intergovernmental agreement on dry ports**

*The Parties to this Agreement,*

*Recalling* Economic and Social Commission for Asia and the Pacific resolution 66/4 of 19 May 2010 on the implementation of the Bangkok Declaration on Transport Development in Asia and the request contained therein to work towards the development of an intergovernmental agreement on dry ports.

*Conscious* of the need to promote and develop an international integrated intermodal transport and logistics system in Asia and with neighboring regions.

*Mindful* of the expected increase in international goods transport as a consequence of growing international trade in the ongoing process of globalization.

*Determined* to strengthen connectivity and seamless international movement of goods, facilitate increased efficiency and reduce the cost of transport and logistics as well as to extend its reach to inland areas and wider hinterlands, *Encouraged* by the successful regional cooperation that led to the entry into force of the Intergovernmental Agreement on the Asian Highway Network and the Intergovernmental Agreement on the Trans-Asian Railway Network.

*Considering* that, in order to strengthen relations and promote international trade among members of the Economic and Social Commission for Asia and the Pacific, it is essential to develop dry ports of international importance to the requirement of international transport and to reduce the adverse impact of transport on the environment.

*Recognizing* the need to develop guiding principles for the development and operation of dry ports of international importance for harmonization and facilitation of intermodal transport in Asia and the Pacific.

*Keeping in view* the role of dry ports of international importance as an important component of an effective and efficient international integrated intermodal transport and logistics system, especially in addressing the specific needs of landlocked, transit and coastal States.

*Have agreed* as follows:

#### **Article 1**

##### **Definition**

For the purposes of the Intergovernmental Agreement on Dry Ports (the “Agreement”), a dry port of international importance (“dry port”) shall refer to an inland location as a logistics 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 control and formalities.

#### **Article 2**

##### **Identification of dry ports**

The Parties hereby adopt the list of dry ports, contained in annex I to the Agreement, as the basis for the coordinated development of important nodes in an international integrated intermodal transport and logistics system. The Parties intend to develop these dry ports within the framework of their national programs and in accordance with national laws and regulations.

### **Article 3**

#### **Development of the dry ports**

The dry ports listed in annex I to the Agreement should be brought into conformity with the guiding principles for the development and operation of dry ports as described in annex II to the Agreement.

### **Article 4**

#### **Signature, ratification, acceptance, approval and accession**

1. The Agreement shall be open for signature to States that are members of the United Nations Economic and Social Commission for Asia and the Pacific at Bangkok, Thailand, on 7 and 8 November 2013, and thereafter at United Nations Headquarters in New York from 11 November 2013 to 31 December 2014.

2. The Agreement shall be subject to ratification, acceptance or approval by signatory States.

3. The Agreement shall be open to accession by non-signatory States which are members of the United Nations Economic and Social Commission for Asia and the Pacific.

4. Instruments of ratification, acceptance, approval of or accession to the Agreement shall be deposited in good and due form with the Secretary-General of the United Nations.

### **Article 5**

#### **Entry into force**

1. The Agreement shall enter into force on the thirtieth day following the date on which the eighth instrument of ratification, acceptance, approval of or accession to the Agreement is deposited pursuant to Article 4, paragraph 4 of the Agreement.

2. For each State which deposits its instrument of ratification, acceptance, approval of or accession to the Agreement after the date on which the eighth instrument of ratification, acceptance, approval of or accession to the Agreement is deposited, the Agreement shall enter into force for that State thirty (30) days after the date of its deposit of the said instrument.

### **Article 6**

#### **Working Group on Dry Ports**

1. A Working Group on Dry Ports (the “Working Group”) shall be established by the United Nations Economic and Social Commission for Asia and the Pacific to consider the implementation of the Agreement and to consider any amendments proposed. All States which are members of the United Nations Economic and Social Commission for Asia and the Pacific shall be members of the Working Group.

2. The Working Group shall meet biennially. Any Party may also, by a notification addressed to the secretariat, request that a special meeting of the Working Group be convened. The secretariat shall notify all members of the Working Group of the request and shall convene a special meeting of the Working Group if not less than one third of the Parties signify their assent to the request within a period of four (4) months from the date of the notification by the secretariat.

### **Article 7**

#### **Procedures for amending the main text**

1. The main text of the Agreement shall be amended by the procedure specified in this Article.

2. Amendments to the Agreement may be proposed by any Party.

3. The text of any proposed amendment shall be circulated to all members of the Working Group by the secretariat at least forty-five (45) days before the Working Group meeting at which it is proposed for adoption.

4. An amendment shall be adopted by a two-thirds majority of the Parties to the Agreement present and voting at the meeting of the Working Group. The amendment as adopted shall be communicated by the secretariat to the Secretary-General of the United Nations, who shall circulate it to all Parties for acceptance.

5. An amendment adopted in accordance with paragraph 4 of the present Article shall enter into force thirty (30) days after it has been accepted by two thirds of the number of States which are Parties to the Agreement at the time of adoption of the amendment. The amendment shall enter into force with respect to all Parties except those which have not accepted the amendment. Any Party which does not accept an amendment adopted in accordance with this paragraph may at any time thereafter deposit an instrument of acceptance of such amendment with the Secretary-General of the United Nations. The amendment shall enter into force for that State thirty (30) days after the date of deposit of the said instrument.

#### **Article 8**

##### **Procedures for amending annex I**

1. Annex I to the Agreement shall be amended by the procedure specified in this Article.

2. Amendments shall be proposed by any Party in whose territory the subject of the proposed amendment is located.

3. The text of any proposed amendment shall be circulated to all members of the Working Group by the secretariat at least forty-five (45) days before the Working Group meeting at which it is proposed for adoption.

4. The proposed amendment shall be deemed adopted if the Party in whose territory the subject of the proposed amendment is located reconfirms the proposal after consideration of the proposal at the Working Group meeting. The amendment as adopted shall be communicated by the secretariat to the Secretary-General of the United Nations, who shall circulate it to all Parties.

5. The amendment adopted in accordance with paragraph 4 of the present article shall be deemed accepted and shall enter into force for all Parties after a period of forty-five (45) days following the date of the circular notification of the Secretary-General of the United Nations.

#### **Article 9**

##### **Procedures for amending annex II**

1. Annex II to the Agreement shall be amended by the procedure specified in this Article.

2. Amendments may be proposed by any Party.

3. The text of any proposed amendment shall be circulated to all members of the Working Group by the secretariat at least forty-five (45) days before the Working Group meeting at which it is proposed for adoption.

4. An amendment shall be adopted by a two-thirds majority of the Parties to the Agreement present and voting at the meeting of the Working Group. The amendment as adopted shall be communicated by the secretariat to the Secretary-General of the United Nations, who shall circulate it to all Parties.

5. An amendment adopted in accordance with paragraph 4 of the present Article shall be deemed accepted if during a period of ninety (90) days from the date of the notification, less than one third of the Parties notifies the Secretary-General of the United Nations of their objection to the amendment.

6. An amendment accepted in accordance with paragraph 5 of the present Article shall enter into force for all Parties thirty (30) days after the expiry of the period of ninety (90) days referred to in paragraph 5 of the present Article.

**Article 10**

**Reservations**

Reservations may not be made with respect to any of the provisions of the Agreement, except as provided in Article 13, paragraph 5 of the Agreement.

**Article 11**

**Withdrawal**

Any Party may withdraw from the Agreement by written notification addressed to the Secretary-General of the United Nations. The withdrawal shall take effect twelve (12) months after the date of receipt by the Secretary-General of such notification.

**Article 12**

**Suspension of validity**

The operation of the Agreement shall be suspended if the number of Parties becomes less than eight (8) for any period of twelve (12) consecutive months. The provisions of the Agreement shall again become operative thirty (30) days after the number of Parties reaches eight (8). In such situations, the Secretary-General of the United Nations shall notify the Parties.

**Article 13**

**Settlement of disputes**

1. Any dispute between two or more Parties which relates to the interpretation or application of the Agreement and which the Parties in dispute are unable to settle by negotiation or consultation shall be referred to conciliation if any of the Parties in dispute so requests and shall, to that end, be submitted to one or more conciliators to be mutually agreed by the Parties in dispute. If the Parties in dispute fail to agree on the choice of conciliator or conciliators within ninety (90) days after the request for conciliation, any of those Parties may request the Secretary-General of the United Nations to appoint a single independent conciliator to whom the dispute shall be submitted.

2. The recommendation of the conciliator or conciliators appointed in accordance with paragraph 1 of this Article, while not binding in character, shall become the basis of renewed consideration by the Parties in dispute.

3. The Parties in dispute may agree in advance to accept the recommendation of the conciliator or conciliators as binding.

4. Paragraphs 1, 2 and 3 of the present Article shall not be construed as excluding other measures for the settlement of disputes mutually agreed between the Parties in dispute.

5. Any State may, at the time of depositing its instrument of ratification, acceptance, approval or accession, deposit a reservation stating that it does not consider itself bound by the provisions of the present Article relating to conciliation. Other Parties shall not be bound by the provisions of the present Article relating to conciliation with respect to any Party which has deposited such a reservation.

**Article 14**

**Limits to the application**

1. Nothing in the Agreement shall be construed as preventing a Party from taking such action, compatible with the provisions of the Charter of the United Nations and limited to the exigencies of the situation, as it considers necessary for its external or internal security.
2. Each Party shall make every possible effort to develop the dry ports in accordance with national laws and regulations in a manner that is consistent with the Agreement. However, nothing in the Agreement shall be construed as acceptance of an obligation by any Party to permit the movement of goods across its territory.

**Article 15**

**Annexes**

Annexes I and II to the Agreement shall form an integral part of the Agreement.

**Article 16**

**Secretariat**

The United Nations Economic and Social Commission for Asia and the Pacific shall be designated the secretariat of the Agreement.

**Article 17**

**Depositary**

The Secretary-General of the United Nations shall be designated the depositary of the Agreement.

IN WITNESS WHEREOF, the undersigned, being duly authorized thereto, have signed the present Agreement, in a single copy in the Chinese, English and Russian languages, the three texts being equally authentic.

**Annex I**

**Dry ports of international importance**

1. The dry ports are normally located in the vicinity of: (a) inland capitals, provincial/state capitals; and/or (b) existing and/or potential production and consumption centers with access to highways and/or railways including the Asian Highway and/or Trans-Asian Railway, as appropriate.
2. Dry ports have transport connections to other dry ports, border posts/land customs stations/integrated check posts, seaports, inland waterway terminals and/or airports.
3. Dry ports are listed below.
4. The name of a dry port is followed by its location or the name of the nearest town/city.
5. Potential dry ports are indicated below in square brackets.

**List of dry ports**

**Afghanistan**

Haqueena, Mimana Heiratan Dry Port, Mazar-e-Sharif

Islam Qala, Herat Kabul Dry Port, Kabul

Shirkhan Bander Dry Port, Konoz Speenboldake Chaman Dry Port, Kandahar

Torkham Dry Port, Jalalabad Turghundi, Herat

**Armenia**

Akhuryan Logistic Center

Gyumri Airport

Karmir Blur/ Apaven Cargo Terminal  
Zvartnots International Logistic Center

**Azerbaijan**

Baku Cargo Terminal of Heydar Aliyev International Airport, Baku  
Balakan Cargo Terminal, Azerbaijan-Georgia border  
Bilasuvar Cargo Terminal, Azerbaijan-Islamic Republic of Iran border  
Gabala International Airport, Gabala Ganja International Airport, Ganja  
Heydar Aliyev International Airport, Baku  
Julfa Cargo Terminal, Azerbaijan-Islamic Republic of Iran border  
Lenkoran International Airport, Lenkoran  
Nakhichevan International Airport, Autonomous Republic of Nakhichevan  
Silk Way Cargo Terminal, Baku Zagatala International Airport, Zagatala  
[Baku City Goods Depot, Khirdalan Station]  
[Cargo Terminal on frontier point at state border, Samur]  
[Cargo Terminal on frontier point at state border, Sinig-Korpu]  
[Container Terminal of Baku International Sea Trade Port, Baku]  
[Ganja Station, Ganja]  
[International Logistics Centre, Alyat] [Keshla Station, Baku]  
[New Baku International Sea Trade Port, Alyat]  
[South Terminal on frontier point at state border (Astara)]  
[Sumgait Station, Sumgait]

**Bangladesh**

Akhaura, Brahmanbaria Benapole, Jessore  
Bibirbazar, Comilla Burimari, Lalmonirhat  
Hili, Dinajpur Kamalapur ICD, Dhaka  
Sonamasjid, Chapai Nawabganj Teknaf, Cox's Bazar  
[Bangladbandh, Panchagargh] [Bhomra, Satkhira]  
[Bilonia, Feni] [Dhirasram ICD, Gajipur]  
[Gobrakura, Mymensingh] [Koraitali, Mymensingh]  
[Nakugao, Sherpur] [Ramgarh, Khagrachari]  
[Tamabil, Sylhet]

**Bhutan**

Phuentsholing Dry Port, Phuentsholing [Gelephu, Sarpang]  
[Gomtu, Samtse] [Nganglam, Samdrupjongkhar]  
[Samdrupjongkhar, Samdrupjongkhar] [Samtse, Samtse]

**Cambodia**

CWT Dry Port, Phnom Penh Olair World Wide Dry Port, Phnom Penh  
Phnom Penh International Port, Phnom Penh  
Phnom Penh Special Economic Zone, Phnom Penh  
So Nguon Dry Port, Bavet Tech Srun Dry Port, Phnom Penh  
Teng Lay Dry Port, Phnom Penh

**China**

Changchun Xinglong Bonded International  
Logistics Port, Changchun  
Erenhot South International Logistics



Center, Erenhot  
Harbin Highway Freight Hub Station (Harbin  
Longyun Logistics Park) Hekou Port Transport Logistics Park, Hekou  
Horgos International Logistics Park, Horgos Hunchun International Logistics Park,  
Hunchun  
Jinghong Mengyang International Logistics  
Trading Center, Jinghong Kashi International Logistics Park, Kashi  
Tengjun International Land Port, Kunming Manzhouli New International Freight Yard,  
Manzhouli  
Nanning Bonded Logistics Center, Nanning Pingxiang Border Trade Logistics Center,  
Pingxiang (Youyi Guan)  
Ruili Cargo Centre, Ruili Suifenhe Cargo Centre, Suifenhe  
Xinjiang Railway International Logistics Park,  
Urumqi Yiwu Inland Port Station, Yiwu  
Zhangmu Port Warehouse Logistics Trading  
Center, Zhangmu

**Georgia**

Poti Free Industrial Zone, Poti [Tbilisi International Logistics Centre, Tbilisi]

**India**

Ajni, Nagpur, Maharashtra Amingaon, Guwahati, Assam  
Aroor, Kerala Ballabgarh, Faridabad, Haryana  
Bhadoli, Sant Ravidas Nagar, Varanasi, Uttar Pradesh  
Bhagat Ki Kothi, Jodhpur, Rajasthan Chhretta, Amritsar, Punjab  
Dadri, Noida, Uttar Pradesh Daulatabad, Aurangabad, Maharashtra  
Dhandarikalan, Punjab Dhannad Rau, Indore, Madhya Pradesh  
Dronagiri Node, Navi Mumbai, Maharashtra Durgapur, West Bengal  
Garhi Harsaru, Gurgaon, Haryana Irugur, Coimbatore, Tamil Nadu  
Jamshedpur, Jharkhand Janory, Nasik, Maharashtra  
Kanakpura, Jaipur, Rajasthan Kanpur, Uttar Pradesh  
Khodiyar, Gujarat Loni, Ghaziabad, Uttar Pradesh  
Majerhat, Kolkata, West Bengal Mandideep, Bhopal, Madhya Pradesh  
Moradabad, Uttar Pradesh Patli, Gurgaon, Haryana  
Pithampur, Dhar, Madhya Pradesh Raipur, Chhattisgarh  
Sachin, Surat, Gujarat Sanath Nagar, Hyderabad, Andhra Pradesh  
Senewal, Ludhiana, Punjab Tondiarpet, Chennai, Tamil Nadu  
Tughlakabad, Delhi Vadodara, Gujarat  
Whitefield, Bangalore, Karnataka

**Indonesia**

Gedebage Dry Port, Bandung Cikarang Dry Port, Bekasi

**Iran (Islamic Republic of)**

Imam Khomeini International Airport, Tehran Province  
Motahari Rail Station, Mashhad, Khorasan Razavi Province  
Salafchegan Special Economic Zone, Qom Province  
Sirjan Special Economic Zone, Kerman Province  
[Arvand Free Industrial Zone, Khozestan Province]

[Sahlan Special Economic Zone, Tabriz, East Azerbaijan Province]  
[Sarakhs Special Economic Zone, Khorasan Razavi Province]  
[Shahid Dastgheyb International Airport, Shiraz, Fars Province]  
[Zahedan Logistics Centre, Sistan and Baluchistan Province]

**Kazakhstan**

Aktobe Centre, Aktobe Damu Industrial and Logistics Centre, Almaty  
[High Tech Logistics, Almaty Region]  
[Korgas International Border Cooperation Centre, Almaty Region]  
[Tau Terminal, Almaty Region]

**Kyrgyzstan**

Alamedin, Bishkek Osh, Osh

**Lao People's Democratic Republic**

Thanaleng, Vientiane [Houyxi, Bokeo]  
[Laksao, Borikhamsai] [Luangprabang, Luangprabang]  
[Nateuy, Luangnamtha] [Oudomsai, Muangxai]  
[Pakse, Champasack] [Seno, Savanakheth]  
[Thakhek, Khammouane]

**Malaysia**

Inland Clearance Depot Kontena Nasional, Prai Inland Container Depot, Padang Besar  
Internal Clearance Depot Seri Setia, Kuala Lumpur  
Ipoh Cargo Terminal, Ipoh Nilai Inland Port, Nilai  
Tebedu Inland Port, Sarawak [Pulau Sebang Inland Depot, Pulau Sebang]

**Mongolia**

Altanbulag Sainshand  
Ulaanbaatar Zamyn-Uud  
[Choibalsan]

**Myanmar**

[Bago] [Mandalay]  
[Mawlamyine] [Monywa]  
[Muse] [Pyay]  
[Tamu] [Yangon]

**Nepal**

Bhairahawa ICD, Bhairahawa Biratnagar ICD, Biratnagar  
Birgunj ICD, Birgunj Kakarbhitta ICD, Kakarbhitta  
[Tatopani ICD, Larcha]

**Pakistan**

Customs Dry Port, Hyderabad Customs Dry Port, Peshawar  
Faisalabad Dry Port Trust, Faisalabad Lahore Dry Port, Mughalpura  
Margalla Dry Ports, Islamabad Multan Dry Port Trust, Multan  
National Logistics Center Container Freight Station, Lahore  
National Logistics Center Dry Port, Quetta Pakistan Railways Prem Nagar Dry Port, Kasur  
Railways Dry Port, Quetta Sambrial Dry Port, Sialkot  
Silk Route Dry Port, Sost, Gilgit, Baltistan

**Philippines**

Clark, Angeles City, Pampanga, Luzon Davao City, Eastern Mindanao

Koronadal City, South Cotabato  
Laguindingan, Misamis Oriental, Northern Mindanao  
Zamboanga City, Western Mindanao

**Republic of Korea**

Uiwang ICD, Uiwang

**Russian Federation**

Janino Logistic Park, Saint Petersburg Region  
Multimodal Logistic Complex “Rostov universal port”, Rostov-on-Don Region  
Terminal Logistics Centre “Baltiysky”, Leningrad Region  
Terminal Logistics Centre “Kleshchiha”, Novosibirsk  
Terminal Logistics Centre “Doskino”, Nizhny Novgorod,  
[Dmitrovsky Multimodal Centre, Moscow Region]  
[Kaliningrad] [Kazan]  
[Multimodal Logistic Complex “Southern Primorsky Terminal”, Primorsky Region]  
[Svijazhsky Multimodal Logistic Centre, Tatarstan]  
[Terminal Logistics Centre “Primorsky” Ussuriysk, Primorsky Region]  
[Terminal Logistics Centre “Tamansky”, Krasnodar Region]  
[Terminal Logistics Centre “Beliy Rast”, Moscow Region]  
[Volgograd] [Yekaterinburg]

**Sri Lanka**

[Peliyagoda, Colombo] [Telangapata, Colombo]

**Tajikistan**

Dushanbe, Dushanbe Karamyk, Jirgital  
Khujand, Khujand Kurgan-Tube, Kurgan-Tube  
Nizhniy Panj, Qumsamgir Tursunzade, Tursunzade  
Vakhdat, Vakhdat

**Thailand**

Lat Krabang ICD, Bangkok [Chiang Khong, Chiang Rai]  
[Natha, Nong Khai]

**Turkey**

Gelemen, Samsun Kazan, Ankara  
[Bogazkopru, Kayseri] [Bozuyuk, Bilecik]  
[Gokkoy, Balikesir] [Habur]  
[Halkali, Istanbul] [Hasanbey, Eskisehir]  
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[Kayacik, Konya] [Kosekoy, Izmit]  
[Mardin] [Palandoken, Erzurum]  
[Sivas] [Turkoglu, Kahramanmaras]  
[Uzak] [Yenice, Mersin]  
[Yesilbayir, Istanbul]

**Viet Nam**

ICD Lao Cai, Lao Cai Province ICD Song Than, Binh Duong Province  
ICD Tan Cang-Long Binh, Dong Nai Province ICD Tien Son, Bac Ninh Province  
[Hanoi] [ICD Gia Lai, Gia Lai Province]  
[ICD Vinh Phuc, Vinh Phuc Province] [Lang Son]

## **Annex II**

### **Guiding principles for the development and operation of dry ports**

#### **1. General**

The development and operation of dry ports, as listed in annex I of the Agreement, shall be guided by the principles described below. Parties shall make every possible effort to conform to these principles in constructing, upgrading and operating dry ports.

#### **2. Functions**

The basic functions of dry ports shall include the handling, storage and regulatory inspection of goods moving in international trade and the execution of applicable customs control and formalities. Additional functions of dry ports may include, but are not limited to:

- (a) Receipt and dispatch;
- (b) Consolidation and distribution;
- (c) Warehousing;
- (d) Transshipment.

#### **3. Institutional, administrative and regulatory framework**

Parties shall initiate institutional, administrative and regulatory frameworks that are favorable to the development and smooth operation of dry ports, including procedures for regulatory inspection and the execution of applicable customs control and formalities in line with the national laws and regulations of the Party concerned. Dry ports, as listed in annex I of this Agreement, may be designated as points of origin or destination in transport and customs documentation. The Parties shall collaborate with relevant transport service providers, international organizations and institutions to ensure recognition of dry ports. The ownership of dry ports can be public, private or public-private partnerships.

#### **4. Design, layout and capacity**

Dry ports shall be developed with adequate capacity and layout to allow for the secure and smooth flow of containers, cargoes and vehicles within and through the dry port and to make provision for expansion of capacity, as appropriate, taking into account the modes of transport served, the requirements of the users of the dry port and expected future container and cargo volumes.

#### **5. Infrastructure, equipment and facilities**

Dry ports shall have infrastructure, equipment and manpower commensurate with existing and expected freight volumes at the discretion of the Parties in accordance with their national laws, regulations and practices.

This provision is recommendatory in nature and shall not be binding with respect to the following:

- (a) A secure area with a gate for dedicated entrance and exit;
- (b) Covered and open storage areas separated for import, export and transshipment, and for perishable goods, high-value cargoes and dangerous cargoes, including hazardous substances;
- (c) Warehousing facilities, which may include customs bonded warehousing facilities;
- (d) Customs supervision, control, inspection and storage facilities;
- (e) Appropriate cargo and container handling equipment;
- (f) Internal service roads and pavement for use in the operation and stacking area;
- (g) Vehicle holding areas with adequate parking space for freight vehicles

- (h) An administrative building for customs, freight forwarders, shippers, customs brokers, banks and other related agencies;
- (i) Information and communication systems, which include electronic data interchange systems, scanners and vehicle weighing equipment;
- (j) A container, vehicle and equipment repair yard, if necessary.

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