



Promoting intermodal freight transport through the development of dry ports in Asia: An environmental perspective

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ARTICLE INFO

Article history:

Received 2 February 2011

Received in revised form 14 June 2011

Accepted 16 June 2011

Keywords:

Intermodal transport

Freight

Dry ports

Asia

ABSTRACT

The volume of international trade and freight transport in Asia has witnessed fast growth in recent decades. The resulting environmental impact of freight transport operations has become a major cause of concern. Intermodal transport has gained prominence recently due to its potential to offer door-to-door service through the integration of various modes of transport in the logistics chain, improved coordination and services, and the development of intermodal interfaces. However, few studies have focused on this development in Asia.

The development of intermodal transport requires transport links, nodes, and services. The development of dry ports, an important component of intermodal transport, could play a major role in promoting intermodal transport in Asia, including its twelve landlocked countries. Dry ports located in deep inland areas, as opposed to near the sea, would incorporate customs and other related facilities and rail links, as well as provide for transfer, transshipment, and distribution functions for cargo. By encouraging a modal shift, such dry ports would help to ease road traffic congestion and reduce emissions.

This study reviews the status of intermodal freight transport in Asia from an environmental perspective. It examines intermodal transport opportunities presented by the development of inland dry ports in hinterland locations. This paper also reviews selected case studies of dry port development in Asia. Finally, we present the lessons to be learned for the promotion of intermodal freight transport from selected Asian countries as well as the policy options available.

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1. Introduction

Intraregional exports and imports are increasing throughout Asia. Exports and imports grew by over 15% year-over-year from 2007 to 2008 [1]. Asia's share of world containerized exports and imports are expected to rise to 68% and 56%, respectively, by 2015. The total number of containers handled in Asian ports is estimated to reach 492 million twenty-foot equivalent unit (TEU) by 2015, and the transshipment volume will comprise 109 million TEU of this total [2]. The growth of intraregional trade and the expected growth of containerized transport in Asia clearly demonstrate the need for improved intermodal freight transport in the region.

Earlier models of transport development have adopted a unimodal approach in which road and rail projects were planned and constructed separately without much consideration for their possible future integration. Intermodal/multimodal transport uses more than one

mode of transport and delivery of goods from origin to destination. Such transport has been studied in detail by policy makers and transport planners, who are undertaking various policy initiatives to promote the concept and implementation of intermodal/multimodal transport.

The development of intermodalism requires the consideration of three of its attributes: transport links, transport nodes, and the provision of efficient services. While there have been efforts in Asia to develop regional highways, railways, and seaports, inland dry ports remain at an early stage of development. Since Asia is home to twelve of the world's landlocked countries, the development of dry ports could play a major role in promoting intermodal transport. It could also contribute to the improved transshipment and distribution of goods in wider inland areas by improving operational efficiency. Many studies have focused on the development of dry ports, inland terminals, and intermodal transport in Europe and other developed countries [3,4]. Few studies, however, have focused on intermodal transport and the development of dry ports in Asia.

In this context, the present study aims to review (i) the current state of development of dry ports and intermodal transport in Asia, (ii) the role this development can play in addressing environmental concerns, and (iii) some potential modal shift opportunities. Our research takes a case study approach to presenting selected cases of intermodal transport and dry port development in Asia. Key insights

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and policy lessons learned from the development and operation of intermodal transport are also discussed.

2. 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 [5]. 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 [6].

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. 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.

2.1. Transport links

In order to promote intermodal transport, it is essential to improve transport links such as highways, railway networks, and inland waterways. In Asia, there has been good development of transport networks such as the Asian Highway and the Trans-Asian Railway [7,8]. The Master Plan on ASEAN Connectivity [9], 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. Asia includes major countries like China, India, and the Russian Federation, which have extensive railway and highway networks; however, these countries need to upgrade their railways and highways to provide seamless transport connectivity. In addition, certain routes lack capacity and proper maintenance. Therefore, considerable investment will be needed for periodic maintenance if they are to provide efficient services.

Railways were first invented to carry freight, and they now run on clean forms of energy [10]. 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 Asian 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 [11].

2.2. Dry ports as transport nodes

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 [12]. 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 [13]. 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 [14].

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.

Discussions are still taking place to develop an agreeable definition of dry ports in the Asian context.

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. Fig. 1 shows the links between dry ports and various sectoral policies that may be relevant to the development of dry ports [15].

The abovementioned policies presented in Fig. 1 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

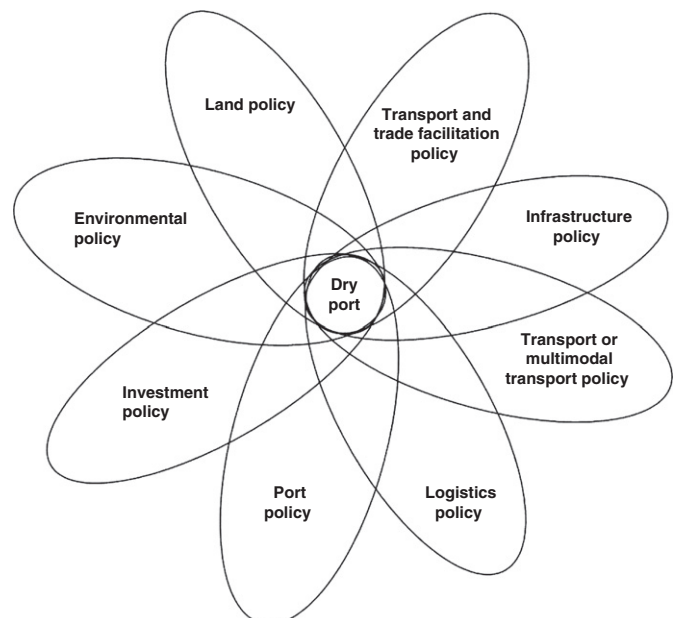


Fig. 1. Policies and regulations related to dry ports [15].

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