

PART 2

PORT DEVELOPMENT STRATEGY

Chapter 1 Introduction

1.1 Study Background

(1) The Republic of Turkey, which is encircled by the Black Sea, Marmara Sea, Aegean Sea and Mediterranean Sea, is located at a crossroads of the trade between Asia and Europe having borders with Greece, Bulgaria, Georgia, Armenia, Iran, Iraq and Syria. There are approximately 400 coastal facilities stretching along its coastal line of around 8,300 kilometers.

International cargo volume through Turkish ports has been increasing while domestic cargo volume has been decreasing. Cargo handling volume through the ports reached 155 million tons including container cargo of 1,347 thousand TEUs in 1998.

A cargo is being handled at small-scale ports that are managed and maintained by different bodies. Consequently, those ports are suffering from inefficient cargo handling operations due to various problems such as space constraint, deteriorated facilities and a lack of modernized operation systems. Thus, the ports are required to be developed to solve the present sufferings and meet the increasing demand for the future.

In addition, correcting the imbalance in regional development is one of the foremost social reforms targeted in the 7th Five-year Development Plan. Therefore, regional development plan related to the port development has to be taken into consideration.

(2) Considering the situation mentioned above, the Government of the Republic of Turkey (hereinafter referred to as 'GOT') requested the Government of Japan (hereinafter referred to as 'GOJ') to conduct a study for formulating a nationwide port development master plan (hereinafter referred to as 'the Study'). The scope of work for the Study was agreed upon between the General Directorate of Railways, Ports and Airports Construction, Ministry of Transport (DLH) of GOT and the Japan International Cooperation Agency (JICA), an official technical cooperation agency of GOJ.

1.2 Objectives of the Study

The objectives of the Study are as follows:

- (1) To formulate the basic policies on port infrastructure development and port management and operation.
- (2) To formulate the Nationwide Port Development Master Plan (ULIMAP) in Turkey, targeted toward the year 2020 including;
 - 1) long term improvement plan of port facilities (Nationwide/Regional)
 - 2) phased plan in selected strategic ports
 - 3) public investment plan
 - 4) port management and operation plan
- (3) To strengthen institutional capacity of relevant organizations.

Chapter 2 Basic Understanding of the Study (ULIMAP)

2.1 Ultimate Objective and Expected Function of ULIMAP

(1) To provide DLH and other related organizations with a well-prepared nationwide master plan of port infrastructure development and port management for future development of the country including local area.

(2) To be a basic proposal for the official port development policy, which is to be established through positive discussions and coordination among the ministries and organizations concerned under the concept of overall transport policies of the country.

2.2 Basic Understanding on the Nature of Recommendations of ULIMAP

(1) The Study proposes the most appropriate policies and strategies after scrutinizing the existing available data and information. These policies and strategies might include ones, which would not necessarily be agreed by some organizations concerned.

(2) Considering the above mentioned objective and function of the Study, policies and strategies to be proposed in the Study should not be considered as the final conclusion of the port development policy. Therefore they are considered as the initial materials and recommendations to be discussed toward the official decision by the Government of Turkey.

2.3 Basic External/ Internal Conditions to be applied to ULIMAP

Under the Study framework agreed upon, detailed and thorough analyses on the basic conditions of the Study* can not be expected. In this sense, such preconditions of the Study should be assumed on a priori basis through discussions, rather than on the basis of broad and deep analyses on the subjects. This means that such general and basic situations are to be assumed as the background of the Study by selecting a likely scenario.

*(ex. international political position of the country, multi or bilateral relationship among/between the countries concerned, basic structure of political, institutional or cultural system of the country, etc.)

2.4 Efficient Implementation of ULIMAP

For securing effective use of available resources (term, staff input, budget and supports) given to the Study;

(1) Step-wised decision/agreement making system should be introduced through the course of the Study.

(2) The number of alternative cases to be developed and examined in the Study should be limited as much as possible.

(3) Discussions on major issues would be held timely and frequently. The Study Team submits a basic idea and related results of analyses to the meeting, which consists of DLH, the Study Team and organization related to the subjects. DLH makes the arrangement for the discussion.

2.5 Flexibility of ULIMAP

(1) The Master Plan should be reviewed timely against possible future contingencies.

(2) Therefore methods and components of the Study should be designed to secure easy modification of the Master Plan in future.

2.6 Control Factors of the Quality of ULIMAP Recommendations

It is important to know that the quality of proposals and reliability of forecasting works are substantially controlled by the input data and information available for the Study. In this context, approaching manner to the Study including forecasting methodology should be selected carefully considering the quality of available data and information.

2.7 Contents and Coverage of ULIMAP

(1) The Study describes the desirable future framework on port infrastructure development, port management and operation mainly from the viewpoint of port sector. Therefore one hundred percent coherency with the existing long-term development plans of other transport infrastructure may not be pursued in some occasions. The existing long-term development plans of other transport infrastructure, however, will be effectively taken into consideration in the sequence of the Study.

(2) In order to avoid any possible misunderstanding on the meaning of “port master plan”, it should be noted that the Study does not cover any detailed physical facility plans and engineering designs of the existing individual ports and new ports including expansion and rehabilitation of these ports. Instead, the Study analyzes overall port hierarchy in Turkey and approximate total development cost.

2.8 Consideration on ongoing Port Development Projects

As a basic condition of the Study, it is assumed that the various ongoing port related projects would be completed as originally scheduled. But the Team will be free to recommend the modification or rescheduling of any identified project, following the discussion between DLH and related agencies.

Chapter 3 Analysis of Future Trends Related to Port Development

3.1 Global Currents

In line with technological advances in electronics, communication, information etc, “globalization” is progressing in every field from manufacturing and services to agriculture and energy. People of the world have come to grasp the developing phenomena on real time, and they fairly perceive the global standards of property, services that they seek, or the roles of government. Consequently global currents have gained universality, and it has now become a primary factor to determine how the world of twenty-first century should be.

Globalization issues related to the future of port administration and development are introduced below:

3.1.1 Emergence of Global Competitive Society

Since the end of World War II, activities of private enterprises have expanded to areas beyond their home countries. Globalization means that competition is spreading around the globe. We are now entering an extremely difficult era, where only those enterprises that can afford to offer goods and services which meet global standards, or at even higher qualities, can hope to survive. If it is considered that each country depends on the activities of the people and various private enterprises, it could be said that the existence and development of each country itself has also entered the era of global competition. In the twenty-first century, the move towards globalization will unabatedly continue.

3.1.2 Changing Roles of the Public and Private Responsibilities

In the past, throughout the world, provisions of services that are indispensable for the well-being of citizens were completely responsibility of public organizations. Capability of the private sector, however, is being improved rapidly, and privatization, particularly in the fields of communication and transportation, is moving forward due to the outstanding improvement of the infrastructure. It is also the global current of the times that the private sector expands its area of activities in accordance with increasing capability.

The roles of public sector is also changing from that of providing services itself directly to that of establishing a propitious condition for the private sector to provide services. In the United States, which has historically promoted privatization, the central government has been fulfilling its duties by means of establishing a propitious condition for smooth operation of private sector activities. In the global sense as well, the public organization’s role of providing fields where the private sector could operate smoothly is not expected to undergo any changes.

3.1.3 Growing Awareness of the Scarcity of World's Natural Resources

In the past, many countries, such as the developed countries, wasted the natural resources and energy as if they were infinite. The energy crisis and the explosion of population growth, however, made people aware, for the first time, of the fact that the natural resources and energy available on earth are indeed limited. It is expected that global population will increase rapidly and the countries with plenty of natural resources will strengthen the effective policies to keep the natural resources in their hands. In this context, stable inflow of energy and natural resources will be one of the most important issues of each government in the twenty-first century.

3.1.4 Growing Awareness of Environmental Problems

People are becoming aware of such environmental problems as the deterioration of the surrounding natural environment, global warming or destruction of the ozone layer. The environment is not just a local problem but one of global concern. Some environmental issues may dominate the future of mankind. People's awareness of environmental problems is becoming more and more deep.

3.2 Basic Direction of Nationwide and Regional Development

3.2.1 Socio-Economic Characteristics of the Country

(1) Economic Situation

- 1) It is clearly observed that there exists great and wide disparity between the east and west in terms of GDP per capita distribution among the 80 provinces. When we compare the richest province of Kocaeli in the Marmara Region to the poorest one of Agri in the East Anatolia Region, the difference in GDP per capita is more than ten times.
- 2) Those Regions which face the Marmara Sea, the Aegean Sea and the Mediterranean Sea stand as economically advanced regions, while among the eastern regions, the Black Sea coastal areas show relatively higher GDP per capita than the inland areas. It is obvious that sea and port have a noticeable effect on the economic growth due to the fact that the coastal areas possess a great advantage in development through exchange with the outer world. On the other hand, the inland areas have far less access to the outer world; in addition, many of the neighboring countries remain unstable.

(2) Transport

1) Road

Total length of highways reached 31,345 km in the early part of 1999, while that of motorways stood at 1,726 km.

2) Railway

The railway was extended up to 10,500 km at the end of 1997. Although there is a plan to extend the railway by 2,700 km, no new investment has been made.

3) Pipeline

Future expansions of crude oil and natural gas pipelines are expected.

3.2.2 Development Objectives

(1) Sustainable development of national economy

According to the SPO's projection, the GNP per capita in 2020 will range from US\$ 6,400 to US\$ 9,600 in 1992 prices, while the one in 1998 stood at US\$ 3,160. The average annual growth rate between 2000 and 2020 will range between 4.7% and 5.9%.

(2) Regional balance

The main objective of regional development is 'to achieve economically, socially, culturally and politically coherent development that would contribute to the strengthening of national unity.' The policy to realize regional balanced development and to reduce regional disparity will be pursued through the years to come.

3.2.3 Development Strategies

(1) From the viewpoint of making full use of national resources and securing sustainable development as a whole and regional balance as well, function of sea and port to promote economic development should be utilized to the maximum extent.

(2) Considering the limited accessibility of the inland areas to the neighboring regions and/or countries, exchange functions should be strengthened through a transport network development.

(3) An agglomeration or concentration of economic activities which derive from masses of people, production activities, transport infrastructure and so on, can be referred as an 'Axis of national land development'. The concept of the 'axis' should be introduced to this Master Plan Study.

Proposed 'axes' and their expected roles are as follows.

1) Europe-Asia Corridor Axis (Marmara - Ankara - Mersin Axis)

As there is already a large degree of economic activity here, the axis will continue to be the driving force of the national economy. Further development of social overhead capital would be needed to cope with increased economic activities and environmental aspects.

2) Aegean -Black Sea Corridor Axis (Izmir - Ankara - Samsun Axis)

The Axis has great development potential due to its proximity to the existing large municipalities. To realize this potential, further social overhead capital should be provided.

3) Aegean Sea Axis, and

4) Mediterranean Sea Axis

As with the Marmara - Ankara - Mersin Axis, the two Axes are expected to play a leading role in stimulating the national economy. Taking advantage of their strategic location, the Axes are required to become more accessible to the outer world, especially to Europe and Asia.

5) Black Sea Axis

The Axis is expected to develop close ties with Eastern Europe and the CIS countries and to guide economic progress of hinterlands in the inland areas. For this purpose, more social overhead capital is required.

6) GAP Axis (Southeast Anatolia Axis)

As the huge-scale regional development project (GAP) is now underway, the Axis has tremendous potential since not only productivity in the region but access to neighboring areas will be increased. Transport network connected to the Mediterranean Sea and the Black Sea should be promoted.

7) Central Anatolia-East Anatolia Corridor Axis

The Axis connects between the advanced region and less developed region. Accessibility to Ankara Municipality is required to be improved so that exchange among neighboring provinces could be promoted.

8) Black Sea-Southeast Anatolia Corridor Axis

Connecting between the central part of the East Anatolia Region and the Black Sea coastal areas (Trabzon etc.), the Axis is expected to develop international exchange through the Black Sea.

9) East Anatolia Frontier Sub-axis

This Axis connects the least developed areas and the Black Sea coastal areas (Hopa etc.). Strengthening of international relations through the Black Sea and the frontier with neighboring countries is expected.

3.2.4 Direction of Development

Under the condition of smooth progress of external relations with foreign countries in addition to changes in the domestic industrial structure, Turkey will take advantage of her geographically strategic position. The country, located at the crossroads of economically attractive centers, will continue to pursue a multi-dimensional foreign economic policy. Foreign trade volumes with EU as well as other OECD, East Europe, CIS and Asian countries are expected to increase sharply. For reference, SPO projection of export and import per GNP is as follows.

SPO Projection (High Case):		<u>1995</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>
Export/GNP (%)	12.8	14.4	16.3	18.9	
Import/GNP (%)	20.8	27.8	33.8	40.3	

In this sense, the ports, which are placed as center cores of the ‘Axes’, are required to be developed to cope with the increasing foreign trade volumes.

3.3 Sectorial Analysis

(1) Agriculture

The agricultural sector has been Turkey's largest employer, and this continues to account for 40% of the country's labor force. Turkey is the largest producer and exporter of agricultural products in the Near East and North Africa. In 1997 agricultural export commodities stood at US\$2.9 billion, or 11.2% of total export earnings.

(2) Manufacturing Industries

Manufacturing accounts for approximately 24% of GNP, and in 1994 accounted for 87.2% of total exports. Successful growth has been achieved by those companies and sectors which have the ability to adapt to changing circumstances. Real GNP growth for 1997 was recorded at 8.3%. Although value added in the agricultural sector declined by 2.2%, in the industrial and service sectors it grew by 10.2% and 8.6% respectively.

(3) Energy

The long-term primary energy development plans prepared by the Ministry of Energy and Natural Resources are summarized as follows.

Primary energy production of 28.8 million tons of oil equivalent (mtoe) was realized in 1998. According to long-term programs of responsible utilities, 28.9, 47.3 and 70.2 mtoe total primary energy production is projected for 2000, 2010 and 2020 respectively with a 4.1% annual average growth rate.

(4) Tourism

There are remains of the successive peoples who have occupied Anatolia over the last 10,000 years, with more than 60,000 sites of historic interest, as well as the natural wonders of Pamukkale and Cappadocia. In spite of its obvious potential, Turkey accounts for only 2% of the world tourist market, but it is widely believed that it could increase its market share significantly.

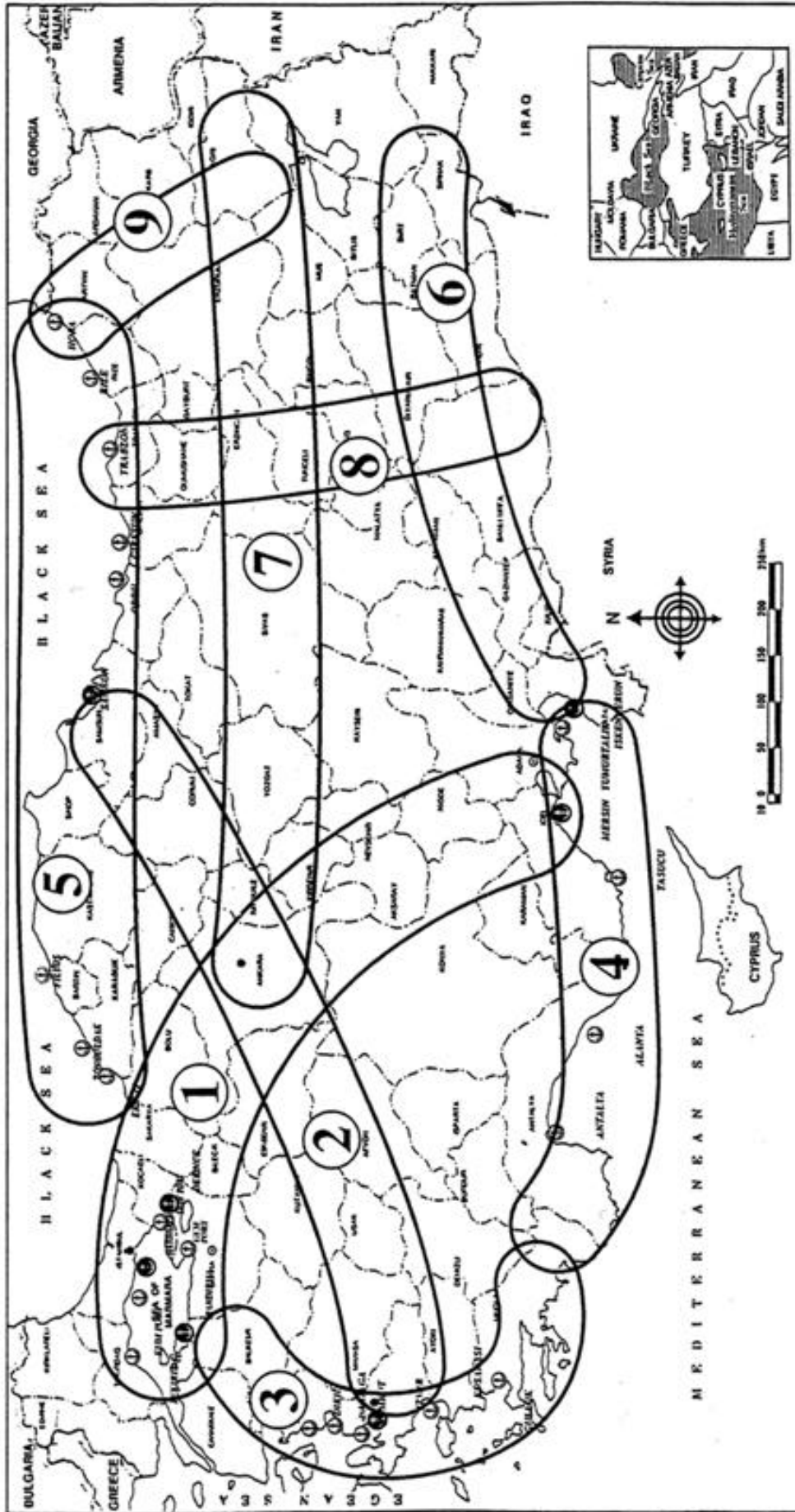


Figure 3.2.1 Axes of National Land Development

- ① Europe-Asia Corridor Axis
- ② Aegean-Black Sea Corridor Axis
- ③ Aegean Sea Axis
- ④ Mediterranean Sea Axis
- ⑤ Black Sea Axis
- ⑥ GAP Axis
- ⑦ Central Anatolia-East Anatolia Corridor Axis
- ⑧ Black Sea-Southeast Anatolia Corridor Axis
- ⑨ East Anatolia Frontier Sub-Axis

3.4 Transport

3.4.1 General

(1) Classification of Trade Area

Prior to analysis, trading partners of Turkey were classified by six areas such as Europe, Africa, America, Asia, and Oceania and Others. Furthermore, Europe was divided into three sub-areas namely EU-countries, Other European countries and CIS countries. Asia was divided into Middle East countries and other Asian countries.

(2) Trading Partners of Turkey

In Turkey, the transportation sector consists of sea, highway, railway, airway and pipeline transportation activities. In terms of domestic transportation share, highway accounted for more than 93% of the total transportation volume in ton/km basis in 1996.

In terms of export volume of Turkey, 72.9% was by maritime lines followed by highway (26.2%), railway and others(0.6%) and Airline(0.4%). Highway accounted for 53.1% of total export value followed by maritime (39.15%), Airline (7.1%) and railway and others (0.7%).

(3) Investment Share by Transportation Sector

Investment in the highway system far exceeded that of other transport systems in recent five years. It is one of the main aims in the transportation policies of national governments and EC platforms that the transportation of freight carried out by highways be shifted to alternative transportation such as railway and maritime systems. Thus, both systems have to be taken into consideration for well-balanced development. Additionally, railway and maritime modes cause less environmental pollution.

3.4.2 Sea Transport

(1) Turkey's Trade by Area

The most important area in terms of international trade volume/value for Turkey's in 1997 was Europe with shares of 50.1%/48.5% for export and 36.6%/48.7% for import.

Asia was also an important area with the share of international trade next to European country. Rate of trade volume/value accounted for 31.1%/23.6% for export and 23.0%/26.4% for import.

(2) Major Trading Partners of Turkey

Major trading partners of Turkey in terms of export volume were Italy (11.2%), USA (8.1%), Spain (7.7%) and Israel (5.2%), while for export value, USA (3.48%), UK (6.6%), Germany (6.5%) and Russia (5.8%) were the main partners.

(3) Volume Share by Trading Area

Europe had a share of 50.1% of the total export volume in 1997, up from 43.2% in 1993 while Asia dropped to 31.1% from 44.2% in the same period. In imports, Africa ranked third with their share increasing 18.9% in 1997 from 8.1% in 1993

(4) Container Shipping Route

1) Container Shipping Route Through the Mediterranean Sea

In terms of calling Turkish ports, direct container service by mother ship is not operated except for CMA(BEN) Line which is calling directly Mersin port with 1,600 ~ 2,200TEUs class full container vessels. Turkish Cargo (Nissin) Line and NYK(conventional service) is calling Turkish ports such as Istanbul, Mersin, Izmir, Derince and other ports with monthly and twice monthly service.

2) Feeder Service to Turkish Ports.

The majority of international container trade in Turkey has been depending on the feeder service mainly from Damietta and Gioia-Tauro

3) Container Flow in East Mediterranean Sea

Total container volume in this region had reached 5.8million TEUs in 1997 with an average annual growth rate of 14.1%. OECD countries, consisting of Turkey and Greece, accounted for 2.1 million TEUs with an average annual growth rate of 14.3% in the same period

4) Container Demand Forecast in East Mediterranean/Black Sea Region

Total container demand in East Mediterranean/Black Sea region at 2020 is forecast to reach 21.8million TEUs consisting of import/export of 16.0 million TEUs and transshipment of 5.8million TEUs. This is an increase of more than four times the volume in 1996. Turkey accounts for 5.2million TEUs, which is handled as import/export, and this an increase of more than five times of the volume handled in 1996.

5) Container Flow by Route

The container share by route is roughly estimated using the data of trading value by country and transportation mode share by country in 1997.

The Mediterranean and European Routes with shares of 26% each of export are the busiest routes. The American Route was also important with approximately one fourth of the traffic. In import container share by route, four routes except for Black Sea route were almost same level at around twenty percent.

6) Ro-Ro Line Service

Ro-Ro service in Turkey, which began in 1977 on the Italy line, has been steadily expanding until recently on mostly Italy line and Black Sea line.

3.4.3 Road Transportation

(1) Road network

In 1999, the total length of road in Turkey was 385,672kms consisting of 1,749kms of motorway, 31,388kms of state road, 29,535kms of provincial road and 323,000kms of village road. The average annual growth of motorway development was 13.41% in the period of 1992-1999 while that of state road was 0.02%.

(2) International trade by Highway

According to the classification of GDH, HSR accounted for 28.5% of total length of national highway, followed by MSR (30.3%) and LSR (41.2%). DGH intends to upgrade its roads to the extent possible.

1) Trans-Turkish Highway (TTH)

Trans-Turkish Highway (TTH), which forms a trunk of a major highway network from the border of Bulgaria to Syria, Iran and Iraq via Istanbul and Ankara, had reached 3,200km in 1996. Existing TTH has been damaged because of rapid increase of heavy traffic and lack of traffic capacity (despite its standing as an important international trunk connecting between Europe, the Middle East and West Asia). Hence, GDH will increase maintenance and expand this highway to meet the traffic demand.

2) Trans-European North-South Motorway (TEM)

Total length of TEM Project is planned to reach 5,897km, although only a stretch of 950km is in operation, and another 105km in the TEM Project under construction.

3) International European Road (E-Road)

E-Road Project has twelve routes including planned project in Turkey. This route is next in importance to the TTH route. E-Road route almost overlaps TEM routes except for a few routes such as Afyon-Konya-Aksaray.

4) Trading Partners

Generally, EU countries have been Turkey's major trading partner by highway transport. Germany had the most significant share of Turkey's exports and imports among the EU countries with the share of 9.4%, 29.4% of volume/value of export and 14.8%/31.0% import.

(3) Highway Development Related to the Major Ports

The construction of the Bosphorus Railroad Tube Tunnel is expected to relieve congestion around the Bosphorus Bridges and Istanbul Region.

A sufficient transport network around the major city regions is expected to relieve traffic congestion between the major city regions and its hinterland.

From a viewpoint of port activities, major routes connected with the major ports have to be developed in order to evacuate the cargoes from/to ports to/from each hinterland smoothly.

Well conditioned roads are needed to attract tourists on board the foreign cruising vessels.

3.4.4 Railway Transport

(1) International Freight Traffic by Railway

Traffic as a whole dropped to 628 thousand tons in 1994 from 3.42 million tons in 1990 but then increased steadily for four years reaching 1.45 million tons in 1998.

In terms of European trade, import cargo reached 678 thousand tons and 162 thousands tons in export, 182 tons in transit. On the other hand, Middle East trade showed 117 thousand tons (export), 470 thousand tons (import) and 21 thousand tons (transit).

(2) Container Traffic by Railway

Total container traffic by railway was 439 thousand tons consisting of 227 thousand tons of international and 212 thousand tons of domestic in 1998.

(3) Railway Development Related to Port Development

Railway operation system has not been conducted in a way as to adapt to meet the market demand. The railway development related to ports is required to meet the container demand so as to smoothly evacuate port traffic to/from the hinterland. Another important element of container transportation by railway is door-to-door service which required good coordination with other modes.

(4) Bosphorus Tube Tunnel

Existing traffic level between the Asian side and the European side is causing many delays in the daily life of those living or working Istanbul. Traffic jams, accidents, polluted air and excessive noise are serious problems.

Turkey's government has decided that a railway transportation system crossing the Bosphorus strait by tube tunnel would be the most effective way to solve the problem. This project will be expected to relieve congestion traffic on and around the Bosphorus bridges.

3.4.5 Other Transport

(1) Pipeline Transport

1) Existing Pipeline

Four crude oil pipelines, one main pipeline and two transmission pipelines for LNG are found in Turkey.

2) Development Plan

Baku-Ceyhan crude oil pipeline project will not only meet Turkey's own demand but also deliver the Caspian Basin's resources to the world market..

(2) Inland Waterway Transport

1) General

Inland waterway transport is the oldest kind of transport. One of its merits is that it's a natural means of transport. Inland waterway transport is a very important way of transport not only in Eastern Europe but also in the west. From its spring to its estuary into the Black Sea, the length of Danube is 2,900Km.

2) Past and Present Condition

Traffic Volume

Traffic volume of the Danube River in the four concerned countries has been decreasing substantially since the end of eighties. According to Danube Commission figures, total traffic volume dropped from 76.7million tons in 1989 to 21.5millions tons in 1994.

commodities

As far as commodities are concerned, major commodities of river traffic were crude minerals (basically sand and gravel dredged in the Danube river), iron ore, solid fuels, industrial products and

miscellaneous.

3) Traffic Forecasts

Traffic volume was forecasted for the nine groups of commodities. The commodity group divided into two categories such as bulk cargo and conventional cargo are normally suitable for combined transport in containers and Ro-Ro etc. The share of conventional cargo has been forecasted to increase to 26% in 2015 from 19% in 1994 while Bulk cargo will decrease to 74% from 80% in the same period.

Chapter 4 Cargo and Passenger Traffic in 2020

4.1 Socio-economic Framework in 2020

Adopted socio-economic framework is shown in Table 4.1.1. According to "The Turkish Economy 2020", Turkey's GDP shows 4.2 to 6.6% of annual growth rate in high case and 3.9 to 5.1% in low case.

Table 4.1.1 ANNUAL GROWTH RATE OF GDP AND EACH SECTOR

YEAR	GDP	AGRICULTURE	INDUSTRY	SERVICES
1999-2000	3.9-4.2	1.0-1.5	2.8-2.9	5.1-5.4
2001-2005	3.7-5.7	1.0-1.5	2.7-6.3	4.6-6.2
2006-2010	4.0-6.0	1.0-1.5	2.5-6.4	5.0-6.5
2011-2015	4.5-6.4	1.2-1.6	2.3-6.5	5.7-7.0
2016-2020	5.1-6.6	1.3-1.6	2.2-6.8	6.3-7.0

Source: SPO

4.2 Methodology of Demand Forecast

Adopted methodologies are showed as follows. In principle, the regression analysis between traffic and socioeconomic indices has been adopted.

- 1) To examine scenarios according to the international relation and the regional development plan.
- 2) To set up socio-economic framework in 2020.
- 3) To conduct macroscopic forecast projects the traffic, which controls total volume, by using main economic indices such as GDP or population as independent variables.
- 4) To conduct microscopic forecast, which projects traffic by each commodity
- 5) After the projection by two methodologies, the nationwide cargo traffic is obtained through a crosscheck both results. Adding the transit cargo to above results, the forecast of cargo and passenger traffic in ports is projected as an end output.

4.3 Cargo and Passenger Traffic in 2020

4.3.1 Cargo Traffic in 2020

Table 4.3.1 shows a forecast of nationwide cargo traffic. In 2020, international cargo will reach 308 millions tons, which becomes 2.6 times as much as current traffic. According to the micro forecast, general cargo and cargoes related to the primary energy resources show relatively high increase rates. Expected transit cargo is mention in notes of the table.

Nationwide domestic cargo will reach 67 million tons, 1.7 times greater than current traffic. Sustainable increase will be expected not only in general cargo but also in bulk cargoes with the development of industries. Commodity-wise cargo traffic obtained through the micro forecast is shown in Table 4.3.2 and 4.3.3.

Table 4.3.1 Cargo Traffic in 2020

	Unit: tons					
	1998		2010		2020	
International Total	117,153,476	1.0	217,000,000	1.8	308,000,000	2.6
Export	30,831,931	1.0	56,000,000	1.8	75,000,000	2.4
Import	86,321,545	1.0	161,000,000	1.9	233,000,000	2.7
Domestic Total	38,715,210	1.0	53,129,000	1.4	66,584,000	1.7
Grand Total	155,868,686	1.0	270,129,000	1.7	374,584,000	2.4

Note. 1. In addition, following transit cargo will be realized.

1) Iraq-Turkey Crude Oil Pipe Line: It is expected 70.9 million ton of crude oil will be transferred with the lifting of the embargo imposed on Iraq.

2) Baku-Ceyhan Crude Oil Pipe Line Project: It is estimated 45 million tons of crude oil will be transferred in the first stage.

2. Figures have been rounded off.

Source: JICA Study Team for ULIMAP

Table 4.3.2 International Cargo Traffic by Commodity

		Unit: tons					
		1998		2010		2020	
Micro Forecast							
Total		117,153,476	1.0	217,000,000	1.8	308,000,000	2.6
Export		30,831,931	1.0	56,000,000	1.8	75,000,000	2.4
Import		86,321,545	1.0	161,000,000	1.9	233,000,000	2.7
General Cargo	Total	50,784,650	1.0	95,000,000	1.9	137,000,000	2.7
	Export	18,971,673	1.0	39,000,000	2.0	55,000,000	2.9
	Import	31,812,977	1.0	56,000,000	1.8	82,000,000	2.6
Dry Bulk	Total	27,761,199	1.0	49,000,000	1.7	75,000,000	2.7
	Export	7,071,665	1.0	12,000,000	1.7	15,000,000	2.1
	Import	20,689,534	1.0	37,000,000	1.7	60,000,000	2.9
Grain	Total	6,376,189	1.0	10,000,000	1.5	12,000,000	1.9
	Export	3,181,212	1.0	5,000,000	1.6	5,000,000	1.6
	Import	3,194,977	1.0	5,000,000	1.5	7,000,000	2.3
Ore	Total	10,263,191	1.0	18,000,000	1.7	28,000,000	2.7
	Export	3,861,659	1.0	7,000,000	1.8	10,000,000	2.6
	Import	6,401,532	1.0	11,000,000	1.7	18,000,000	2.8
Hard Coal	Total	11,121,819	1.0	21,000,000	1.9	35,000,000	3.1
	Export	28,794	1.0	0	0.0	0	0.0
	Import	11,093,025	1.0	21,000,000	1.9	35,000,000	3.1
Liquid Bulk	Total	37,439,806	1.0	71,000,000	1.9	93,000,000	2.5
	Export	4,775,270	1.0	5,000,000	1.0	5,000,000	1.0
	Import	32,664,536	1.0	66,000,000	2.0	88,000,000	2.7
Crude Oil	Total	20,670,236	1.0	31,000,000	1.5	46,000,000	2.2
	Export	313,219	1.0	0	0.0	0	0.0
	Import	20,357,017	1.0	31,000,000	1.5	46,000,000	2.3
LNG	Total	5,498,967	1.0	22,000,000	4.1	24,000,000	4.4
	Export	46,506	1.0	0	0.0	0	0.0
	Import	5,452,461	1.0	22,000,000	4.1	24,000,000	4.4
Oil Products	Total	9,340,010	1.0	15,000,000	1.6	19,000,000	2.0
	Export	4,181,472	1.0	5,000,000	1.2	5,000,000	1.2
	Import	5,158,538	1.0	10,000,000	2.0	14,000,000	2.7
Other Liquid	Total	1,930,593	1.0	3,000,000	1.4	4,000,000	2.2
	Export	234,073	1.0	0	0.0	0	0.0
	Import	1,696,520	1.0	3,000,000	1.6	4,000,000	2.5
Timber	Total	1,167,821	1.0	2,000,000	1.6	3,000,000	2.5
	Export	13,323	1.0	0	0.0	0	0.0
	Import	1,154,498	1.0	2,000,000	1.6	3,000,000	2.5

Note. 1. In addition, following transit cargo will be realized.

1) Iraq-Turkey Crude Oil Pipe Line: It is expected 70.9 million ton of crude oil will be transferred with the lifting of the embargo imposed on Iraq.

2) Baku-Ceyhan Crude Oil Pipe Line Project: It is estimated 45 million tons of crude oil will be transferred in the first stage.

2. Figures have been rounded off.

Source: JICA Study Team for ULIMAP

Table 4.3.3 Domestic Cargo Traffic by Commodity

	Unit: tons					
	1998		2010		2020	
Micro						
Total	38,715,210	1.0	53,129,000	1.4	66,584,000	1.7
General Cargo	11,178,056	1.0	14,898,000	1.3	17,086,000	1.5
Ind. Prod.	5,025,644	1.0	7,898,000	1.6	10,086,000	2.0
Agri. Prod.	1,845	1.0	0	0.0	0	0.0
Other G.C.	6,150,567	1.0	7,000,000	1.1	7,000,000	1.1
Dry Bulk	2,893,290	1.0	3,700,000	1.3	4,700,000	1.6
Grain	542,783	1.0	700,000	1.3	700,000	1.3
Ore	1,745,228	1.0	3,000,000	1.7	4,000,000	2.3
Hard Coal	605,279	1.0	0	0.0	0	0.0
Liquid Bulk	24,608,434	1.0	34,530,000	1.4	44,798,000	1.8
Crude Oil	5,672,948	1.0	9,000,000	1.6	14,000,000	2.5
LNG	682,187	1.0	799,000	1.2	934,000	1.4
Oil Products	18,140,864	1.0	24,531,000	1.4	29,664,000	1.6
Other Liquid	112,435	1.0	200,000	1.8	200,000	1.8
Timber	35,430	1.0	0	0.0	0	0.0

Note. Figures have been rounded off.

Source: JICA Study Team for ULIMAP

4.3.2 Container Traffic in 2020

Table 4.3.4 shows a forecast of container traffic by region. In 2020, nationwide container traffic will reach 6 million TEUs, which is 4.5 times as much as current traffic. Marmara, Aegean, Medcoast, Black Sea region account for 40, 27, 25, 8% of total traffic respectively.

Table 4.3.4 Container Traffic by Region in 2020

		Unit: TEU:				Total
Year		Marmara	Aegean	Medcoast	Black Sea	
1998	Actual Total	700,000	400,000	240,000	5,000	1,345,00
2010	Ave. Total	1,460,000	960,000	800,000	160,000	3,380,00
2015	Ave. Total	1,950,000	1,290,000	1,060,000	200,000	4,500,00
2020	Ave. Total	2,400,000	1,650,000	1,490,000	460,000	6,000,00

Source: JICA Study Team for ULIMAP

4.3.3 Passenger Traffic in 2020

Table 4.3.5 shows forecast of passenger in ports. In 2020, nationwide international passenger will reach 3.3 million, which is 2.4 times as much as current traffic. In particular, it is expected cruising passengers will show remarkable growth, increasing by 4.2 times over the current traffic.

Nationwide domestic passenger will also increase slightly with the growth of population. On the other hand, City Line in Istanbul will lose most of its passengers owing to the completion of the railway tunnel project. Timely preparation for this drastic transformation such as countermeasure for the unemployment is strongly recommended.

Table 4.3.5 Passenger Traffic in 2020

Unit: Passengers

	1997		2010		2020	
International	1,400,000	1.0	2,400,000	1.7	3,300,000	2.4
(of which, cruising)	500,000	1.0	1,220,000	2.4	2,100,000	4.2
Domestic	550,000	1.0	560,000	1.0	620,000	1.1
City Line in Istanbul	64,000,000	1.0	24,000,000	0.4	30,000,000	0.5

Source: JICA Study Team for ULMAP

Chapter 5 Formulation of Basic Policies

5.1 Existing issues of ports

(1) Problems of the port administration and management system

1) Necessity of a “PORT” concept on the legal basis

A “PORT” here is understood as a concept including the development, operation, and management of ports nationwide. In the present legal basis, port itself is taken only as a coastal facility, and is not given a status as basic infrastructure for national economic development. That is, the present port regulations refer to the coastal line protection, but do not treat the systematic development of coastal facilities as ‘PORTs’. This arises because hitherto ports have not been legally defined as basic infrastructure for national economic development. Still more, there is a deficiency in the legal regulation concerning the operation and management of the port once it is constructed.

2) Necessity of the comprehensive port administration authorities

The present division of labor among each specialized authority system in the process of construction, management and operation of ports, seems to be efficient for the administrative organization. However, there are limits to the planning-adjustment functions in this framework, especially taking the future tendency of the maritime transport cargo in Turkey into consideration. In particular, it will be difficult under this system to effectively coordinate a nationwide port development plan. Planning and coordinating function are necessary for achieving policy goals.

3) Port development by the private sector: disorderly port development

Private sector port investment should be evaluated as a quick response to the container demand to compensate for the insufficient capacity of the public ports. However, these small-scale port developments based on private capital could in the medium-long term turn out to be a growth constraint. Concerning the containerization movement that will be prevalent in Turkey from now on, the presence of these small private wharves might cause a structure where handing cargoes are not accumulated at a port from the viewpoint of economy of scale. As a result, possibly it harms efficient distribution of resources by causing investment overlaps. In other words, a national adjustment function is deemed necessary. A nationwide PORT policy that integrates these port investments by the private sector is indispensable.

4) Management of public (state) ports: Difficult to reflect the demands of the users

In general, the system that overall port administration function including facilities investment is performed by an independent port managing body enables the managing body to coordinate throughout the port and decide flexibly as the need arises. At present, it is the ports managed by the TCDD which are the most strategically important on the location and which handle the greatest cargo handling volume in Turkey. The management

and operation at TCDD ports can be characterized as follows. First, the infrastructure are owned and constructed by the Ministry of Transportation at TCDD ports. TCDD handles the cargo with the cargo handling facilities TCDD itself owns. Second, the final determination of the primary policies concerning port management including investment planning and price-setting is all undertaken by the head office located at Ankara, but not at the sites where the ports are actually operating. The present management system of the TCDD ports, besides suffering difficulties concerning rapid decision making, makes it difficult to reflect the demands of the actual users. That is because the final decision making is undertaken at a completely distant place (in addition at several different organizations; MOT and TCDD) from where the port activities take place.

5) Possibility of interconnecting PORT and regional development

At present, there are approximately 50 ports and piers managed by local governments in Turkey. All of these are rather small such as municipalities or towns. Some municipalities manage ports with their own port management division, but this does not involve large-scale development that requires integrating the development of neighboring areas. Some metropolitan municipalities along coasts which have not managed ports have not recognized the importance of ports as social infrastructure so well.

The local government's role concerning port management for efficient utilization of port should be further reviewed. As for possibilities of involvement of local authorities in port development in future, it would be suggested that role sharing between port management bodies and local authorities in the management of land and water areas in port areas including environmental conservation could be considered. Secondly in Turkey, there are some cases that it might be more efficient to develop a port with its surrounding area as a whole because of the land use restraint. Thirdly, it is possible in future that port development could be addressed as part of a wider infrastructure development in the relevant region in cooperation with local government. The on-going reformation project of local authorities system in Turkey which is scheduled in near future enables the local authority to establish plans on infrastructure development including more than two cities. The authorities of Special Provincial Administration which is a wider administration (provincial) unit will be strengthened in planning function including city areas as well as its financial allocation.

It is scheduled that management of passenger terminals which belong to TDI will be transferred to the metropolitan municipalities which the terminals located in. At present it is necessary in Turkey to begin with promoting the participation of local governments in the port management as opportunity permits.

(2) Possible bottlenecks to national economic development

Presently, comprehensive port policy is lacking, and consequently it is a reality that provision of the necessary budget and the funds for the port facility is not fulfilled smoothly, and the prospects of ensuring the facility amount that will be required in the long term is not clear. If the necessary facility amount is not ensured, then the national economic development aims will not be realized. In other words, the lagging port

development might be one of the conditions that could become a bottleneck in the national economic development as well.

(3) Subordinate position in international container transport

The container cargo potential is large, and it is expected to reach 5.4 million to 6.7 million TEUs by the year 2020. As clearly indicated in the examination of the possibility of establishment of international container hub-port in this Study, the existing feeder transport is, even taking only the ship costs into account, US\$ 100 more expensive than when a mother vessel directly calls a Turkish port. And it will be the Turkish enterprises, and finally the Turkish people who will have to pay for that. That makes 500 to 700 million US dollars worth of annual loss for the country. (At present the burden is 100 million US dollars.) In addition, the rather higher transportation costs of the feeder transport will be reflected in commodity prices, and that will also harm the international competitiveness of Turkish enterprises. The meaning in having a hub-port lies in this point. If Turkey would like to have hub-ports in her territory, promotion policy for international hub-ports should be adopted as a national policy.

(4) Increasing importance of stable inflow of natural resources and energy

Bulk cargo has been hitherto handled mainly by the private sector. However, given the growth of awareness concerning the scarcity of world resources, strategic importance of stable inflow of the key commodities such as energy and industrial materials into the state is increasing. In this sense, it should be noted that governmental role to ensure the stable inflow of the key commodities also will increase.

(5) Lack of involvement in environmental issues

Concerning the environmental aspect, it is a fact that port managing bodies solely make use of the marine area and do not bear any environmental responsibilities. Port managing bodies should shoulder more responsibility for the environment including oil combating in natural disasters and ship accidents, collection of fluid disposal from vessels and environmental monitoring, because they are enjoying the utilization of sea area, people's common assets, exclusively.

Since energy efficiency of maritime transport is much higher than trucks, further promotion of the utilization of the maritime transport in domestic cargo transfer is put as a main policy in the existing Five Year National Development Plan. The concrete promotion measures of maritime transport from the viewpoint of port, however, are not presented at all so far. Establishment of maritime transport promotion policy is required.

(6) Insufficiency of the maintenance works

Daily maintenance for port facilities is very important with respect to keeping the facilities in good condition during the calculated life period. That is because if a berth is damaged, the vessels can not come along the berth or cargo handling works can not be undertaken as expected, or if the cargo handling equipment is out of order, the port can not ensure

sufficient productivity. However, it is also a fact that the maintenance costs constitute a considerable burden for the management. For that reason, for the majority of the ports that suffer from failures to increase their earnings, it is most probably the case that they fail to take pains for sufficient maintenance. As a result of that, decreases in productivity or cargo handling occur, and possibly some of the users might stop using that port, thus, further adverse effects on their earnings might be felt. The administration or operating organization that manage the port facilities can not concern themselves only with the earnings, and leave the conditions at the site to private companies, and show no interest. They should grasp the real time information about the port, and pay due attention to the condition of the port facilities. Then, the management ledger on port facilities and cargo handling equipment should be prepared, and be renewed at least once a year, and that ledger should be kept in such a manner that anyone who takes a look at it can obtain the latest facility information.

(7) Lack of risk management

Last year, the port facility damages due to big natural disasters followed one another, such as the damage of the terminal of the Derince Port due to the Kocaeli Earthquake in August, or the damage of the breakwater of the Trabzon Port in February. The introduction of earthquake-proof or wave-proof design is a difficult issue as it required balance between safety and economy. It can be said, however, that there is a necessity of collecting the detailed data on the damages by the natural disaster in the past 30 years, and examining the design philosophy and design criteria in Turkey. In the same vein, perhaps there is need for examining whether the construction works complied with the designs, or there was any management failure related to the damage at the site. Furthermore, central government should pay more attention to the urgent restoration works of port facilities that are damaged by natural disaster.

(8) Financial problems

Public investment undertaken by the government amounts to US\$ 4500 million per year. Of that, the port budget of the government is US\$ 20 million for port development (DLH), US\$ 15 million for port operation (TCDD), and US\$ 15 million for the maritime affairs (Under-Secretariat of Maritime Affairs). These amounts are extremely small, and facility expansion in the last 10 years does not go beyond meager small-scale port facilities. The receipts from maritime trade are US\$ 200 million. Corresponding to the expansion of the amount of maritime imports and the amount of import cargo at ports, the receipts are growing.

The municipalities do not share the costs of port investments. The total amount of public investment of the municipalities is US\$ 2400 million, and there is an item of budget. The financial affairs situation of the port department of TCDD has rapidly recovered. The financial affairs situation of TDI is worsening.

(9) Movement of private capital

BOT contracts have not been developed satisfactorily. In the terms of the contracts, the

risks that are related to arbitration, accounts, cost increases, force majeure, termination of contract are all onesided imposed on the private sector unilaterally.

Among the private sector enterprises that participate in port operation, or the private ports, losses are common, and most of them barely manage to operate, with no funds to invest in new projects.

In order to promote domestic and foreign private investment, favorable tax system is prepared. However, the investments are small, and investment areas are centered at zones of population and production accumulation where market growth is expected.

Judging from the bank savings balances, and the stock market, the situation is not for increasing private financial capital loans. Among the private enterprises, those that entertain self capital are few, and the majority of these have not the financial margins to afford new investments, and have no confidence that they can raise funds.

(10) Cargo handling efficiency that falls short of world standards

Although the cargo handling efficiency at the three big container ports operated by the TCDD (Haydarpaşa, Ýzmir, and Mersin) are said to be improving, it still lags behind when compared with the major ports in the world. This is due not only to the abilities of the operators, but also to the insufficient container yard capacities, the aged cargo handling equipment, or the delays in computerization. In order to meet the increasing container demand, the port operators, in addition to getting hold of the present situation accurately, should establish the targeted cargo handling productivity on the basis of the world standard (24-25 boxes/hour/crane, in gross), and they should provide important guidance and supervision so that that aim is attained.

Also, in order to increase the cargo handling productivity, in addition to preparations such as the expansion of capacity, or renewal of the cargo handling equipment, concerning the “hard-ware” side of the issue, completion of such steps as increasing the ability of the operators, introduction of effective communications system between the control center and the operators, computerization of the cargo handling, and the like that concerns the “software” side should be pursued.

(11) Computerization that lags behind

Though the computerization of the cargo handling operations at the Haydarpaşa and Ýzmir ports is continuing, it considerably lags behind those at the major ports of the world. Introduction of computers into general operation business (Management, Personnel, Accounting, etc.) is continuing, however, introduction of computers into overall operations such as the Container Inventory Control, Container Delivering / Receiving Control System, or Loading / Unloading Operation Control System, etc. is still lagging.

Together with corresponding to the expanding container cargo, in order to achieve rapid and precise cargo handling operations, and competing with rival ports, it is indispensable to introduce computers into wide areas of operations. And also, computerization is deemed to be a strategic move in the direction of introduction of EDI system which, in the future, is

indispensable.

(12) Inefficient custom regulations and the delays in introduction of EDI

In the recent years, the advanced ports of the world continue to simplify the port administration formalities including the introduction of EDI. EDI is handling all application and permission works that were hitherto accomplished either by written or fax form, in a paper-less way, and online via computers, and is a last trump in the way to bring port efficiency to higher levels. It could be thought that the governmental organizations or the port management body in Turkey seem to lack basic awareness or information concerning the introduction of EDI, but there is also insufficiency in grasping the global trends.

Concerning the introduction of EDI; revision of the related laws and regulations, or coordination with and informing the interested parties such as the governmental organizations, users, etc. is necessary. In this regard, leadership by the central government is all the more indispensable. In addition, concerning the custom procedures, some users point out to the excessive empty container physical inspections or sample checks, and further simplification of the procedures is required.

Consequently, by means of this study, the necessity of the introduction of EDI, the present conditions in the world, the introduction procedures, etc. are explained. The government and the port administrators are strongly required to switch to user-oriented port approach that maximizes the satisfaction of the customers, by means of increasing the efficiency of cargo handling, introduction of the EDI, and simplification of customs clearance.

(13) Insufficient utilization of railway in container transport

Due to the lack of sufficient facilities and appropriate system, railway is not utilized much in container transport. Railway should play more and more important roles in land transport from the economical and environmental viewpoint. Adequate measures to promote the railway activity in container transport should be introduced.

5.2 The Roles and Functions of Ports

5.2.1 Functions of Ports

- (1) Transport function
- (2) Productive function

5.2.2 Basic Roles of Ports

- (1) Supporting socio-economic development
- (2) Surviving in the age of globalization
- (3) Supporting the regional development
- (4) Sustaining people's daily lives

- (5) Emergency commodities transfer route and emergency evacuation route in case of earthquake
- (6) Protection of the marine environment

5.2.3 Basic Roles of Ports in Each Region

(1) Ports of the Mediterranean Sea

The ports at the Mediterranean are fulfilling the task of supporting the people's lives and the industrial activities in the hinterland of the ports. Especially, these ports have to play a role in promoting the GAP region as a gateway that would connect the GAP region to abroad. Iskenderun TCDD and Mersin Port should be appointed to fulfil that task.

(2) Ports of the Aegean Sea

The ports of the Aegean Region are fulfilling the task of supporting the people's lives and the industrial activities in the hinterland of the ports. Still more, Izmir Port serves also as the intermediary base for the container cargo of the Black Sea ports of Turkey.

(3) Ports of the Marmara Sea

The ports of the Marmara Sea are fulfilling the task of supporting the people's lives and the industrial activities in hinterland of the ports.

(4) Ports of the Black Sea

The ports of the Black Sea Region are fulfilling the task of supporting the people's lives and the industrial activities in the hinterland of the ports. Particularly since the ports of the East Black Sea region have to contribute to the development of the region, port development has to be planned in line with the DOCAP development plan. Since these ports can play a role as the gateway to abroad for the regions such as the GAP region or the Eastern Anatolia that do not face sea, they are expected to contribute to the promotion of the GAP region, and the Eastern Anatolia region. That responsibility should be borne by Trabzon, Hopa and Rize Ports.

5.3. Basic Roles of Public and Private Sector

5.3.1. Ports and harbors as public assets

In general, ports and harbors are regarded as public assets which are used equally by each member of a society. Ports and harbors as public assets have dual dimensions in character; non-profitable facilities and profitable facilities. Port infrastructure such as channels, waterway, anchorage and basins are classified as non-profitable facilities. That means the above-mentioned "public assets". On the other hand, berthing facilities are profitable facilities. Focusing on the profitable character, ports, especially container terminals are sometimes considered private assets, not public assets. Moreover, as an environmentally

friendly means of transport, sea transport should be paid more attention in road-oriented infrastructure development.

5.3.2 Basic roles of the Public sector

Taking the characteristic of public assets in ports and harbors into consideration, the central government should play the following fundamental roles in nationwide port development.

- Establishment of legal framework of port activities and its coordination
- Planning comprehensive guideline for nationwide port development and its follow-up
- Securing construction and maintenance of non-profitable port infrastructure
- Proper involvement in the fulfillment of port development by private finance initiative
- Taking environmental preservation into consideration

5.3.3 Basic roles of the Private sector

Private sector is expected to play the following roles

- Provision of efficient management and operation
- Transfer of the most up-to-date techniques and know-how
- Investment in port development

5.3.4 Case study: Roles of public sector, and roles of private sector in European ports

Involvement by central governments in port development

In Germany, the Netherlands, and Belgium, the degree of national involvement is extremely low, and port management bodies are engaged in port administration and management independently in a competitive environment on a self-support basis. The ports in those countries can be termed “Landlord type of port authority”, which are making profits by leasing the self-owned land to private stevedoring and cargo-handling companies on a long term basis. Among competitive ports in the region that extends from Hamburg to Antwerp, they are vying for superiority with one another. Therefore the ports which are exposed to severe natural conditions are subsidized by their government in building breakwaters and dredging channels in large rivers in order to secure their competitiveness. On the contrary, the United Kingdom has no subsidy or financial support system by the central government for port development in principle. Port management bodies are responsible for installing navigation aids or dredging within port areas.

5.4. Framework of Basic Policies

5.4.1 Policy on Port Infrastructure Development

Based on the above, basic policy on infrastructure development shall be summarized as follows.

- 1) To formulate advanced maritime transport network in international container transport
- 2) To formulate rational international maritime transport network
- 3) To formulate rational domestic maritime transport network
- 4) To formulate safe and comfortable passenger transport network
- 5) To promote port projects to assist regional development
- 6) To sustain national/ regional economy and people's daily lives in case of emergency such as an earthquake and energy crisis

5.4.2 Policy on Port Management and Operation

First, it should be considered how to deal with surging containerization movement in Turkey. Scale merit at strategic locations should be pursued in port development to enable efficient management. Ways of administration and management by port management bodies at present shall be reexamined from the port users' viewpoint. It should be oriented to improve port services to catch up with the global standard of services by private sector participation. Full utilization of up-to-date techniques and know-how of private sector should be more considered.

Secondly, it is assumed that the number of ports which are administered and managed by the private sector will steadily increase as the privatization process progresses. It will thus become more important to strengthen the coordination function by the central government to avoid overlapped investment among ports for efficient port development. It is therefore essential to clarify urgently basic concepts on roles of public and private sector, the priority of development and effective incentives for private sector. It is also required to establish more accurate port statistics for strategic planning.

Thirdly, environment around port areas is becoming serious issue, especially in ports located in main industrial areas. The authority and responsibility of a port management body should be institutionally provided.

Table 5.4.1 Policy framework on port management and operation

-
- (1) Establishment of strategic nationwide port development guideline
 - (2) Establishment of institutional framework on port management between central government and port management bodies
 - (3) Establishment of reliable statistics system on ports and harbors as the fundamental basis for strategic planning
 - (4) Proper involvement by government for promoting port development with PFI
 - (5) Strengthening the authority and responsibility of port management bodies
-

Source: JICA Study Team for ULIMAP

Chapter 6 Strategy for Port Infrastructure Development

6.1 Container Ports in the Mediterranean Sea

6.1.1 Location and Throughput of Container Ports

Major ports including Algeciras, Gioia Tauro and Genoa Port are located in the West Mediterranean. Major ports including Haifa, Piraeus and Marsaxlokk Port are located in the East Mediterranean.

Algeciras Port handled more than 1.5 million TEUs, the largest volume in the West Mediterranean, and also the largest in the whole region. Algiers Port handled only 121 thousand TEUs, the least volume in the West Region. Big ports and rather small ports are clearly divided in the West. In the East, Haifa Port has the largest volume of 684 thousand TEUs while Kum Port handles 150 thousand TEUs. Unlike the West, big ports and rather small ports are not clearly divided. Since every port will try to do its best to become a big port in the region, severer competition will be expected in the East Region.

6.1.2 Transshipment Ratio of Major Container Ports

It is difficult to obtain data on the transshipment container volume in each port. "Containerization International July 1995" provides the transshipment container volume only for Damietta, Port Said, Limassol, Piraeus and Marsaxlokk port. The Study Team surveyed the transshipment ratio of some other ports in the region.

6.1.3 Classification of Container Port

- (1) Hub-port (1)
- (2) Hub-port (2)
- (3) Calling-port
- (4) Feeder-port

6.1.4 Container facilities of Hub-port in the Mediterranean

Ports belonging to the hub-port (1) have long container berths with adequate water depth, plenty container handling equipment and broad storage area.

6.2 Container Traffic to/ from Turkey

6.2.1 Existing Container Traffic in the Mediterranean Sea

Container vessels moving on the Mediterranean Sea are classified by maritime route such as Europe- Far East, Mediterranean- Far East, Europe- East Asia/ East Africa, Inter-European and etc. Vessels with a large capacity are applied to Europe- Far East, therefore, feeder service is necessary to deliver containers to small ports. Inter-European services include this feeder system and local maritime service.

6.2.2 Future scenario of Container Traffic

Two alternatives are supposed based on our experience and analysis of the present situation. One is a very similar in structure to the present traffic. In this case, slightly larger container ships and more frequent services will be introduced. The other is a case in which less hub-port (1) will be needed due to the successful introduction of gigantic container vessels. In this case, two more alternatives are supposed.

6.2.3 Present Situation of Container Traffic to/ from Turkey

Feeder vessels transfer most of the container to/from Turkey from/to the hub-ports such as Gioia Tauro and Damietta Port. Actually Turkey is one of the best counterpart countries of Damietta Port so far. In this section, the present situation of container traffic to/ from Turkey is analyzed by main container route.

- (1) Northern Europe
- (2) North America
- (3) West Mediterranean Region
- (4) Asia

6.3 Roles of Turkish Port in International Container Transport

6.3.1 Characteristics of Container Ports in East Med. Sea

Ship cost analysis was conducted to identify the characteristics of container ports in the East Mediterranean Sea. The Study Team selected Istanbul Port (Haydarpaşa), Izmir Port and Mersin Port representing the Turkish ports in Marmara Sea, Aegean Sea and Mediterranean Sea respectively. The Study Team also selected Port Said in Egypt, Beirut Port in Lebanon, Haifa Port in Israel, Limassol Port in Cyprus and Piraeus Port in Greece as main foreign competitors of Turkish ports.

- (1) Mother ship cost

In case vessel capacity is 6,200 TEUs, total mother ship cost is US\$ 1,342,400 in which container box charge is assumed US\$ 3/ TEU/ day. In cases vessel capacities are 5,250 TEUs, 4,700 TEUs, 4,300 TEUs and 3,500 TEUs, total mother ship costs are US\$ 1,170,600, US\$ 1,090,500, US\$ 1,008,100 and US\$ 877,600 respectively.

- (2) Characteristics of container ports in the east Mediterranean Sea

- 1) Istanbul (container ports in the Marmara Sea)

Container ports in the Marmara Sea can not be a major competitor in the East Mediterranean container transport due to the long deviation distance and feeder service distance. If a container port in the Marmara Sea can collect a certain amount of local container cargo, the port can attract large container vessels to call at the port directly.

2) Izmir Port (container ports in the Aegean Sea)

The too long feeder service distance prevents Izmir Port from being a competitor in the East Mediterranean Sea. If a container port in the Aegean Sea can collect a certain amount of local container cargo, the port can attract large container vessels to call at the port directly.

3) Mersin Port (container ports in the Mediterranean Sea)

Mersin Port (container ports in the Mediterranean Sea) can be a major competitor in the East Mediterranean container transport.

4) Port Said

Port Said can be the most powerful competitor in the East Mediterranean container transport due to the geographical advantage of deviation distance.

5) Beirut Port

Beirut Port can not be a major competitor in the East Mediterranean container transport.

6) Haifa Port

Haifa Port can be a major competitor in the East Mediterranean container transport.

7) Limassol Port

Limassol Port can not be a competitor in the East Mediterranean container transport due to the lack of local container.

8) Piraeus Port

Piraeus Port can not be a major competitor in the East Mediterranean container transport. On the other hand, deviation distance and location of Piraeus Port can qualify the port as a tough competitor in the Aegean and Black Sea container transport.

6.3.2 Competition in the East Mediterranean Sea

The Study Team conducted ship cost analysis again to identify the competitive situation in the East Mediterranean Sea.

Table 6.3.6 shows the result of other marginal local container volume.

Table 6.3.6 Marginal Local Container Volume of Mersin Port against Port Said

Vessel Capacity (TEU)	Marginal local Container Volume (TEU)
6,200	920,000
5,250	800,000
4,700	750,000
4,300	720,000
3,500	630,000

6.3.3 Competition in the Aegean Sea

Table 6.3.8 shows the Marginal local container volume of Izmir Port against Piraeus Port.

Table 6.3.8 Marginal Local Container Volume of Izmir Port against Piraeus Port

Vessel Capacity (TEU)	Marginal local Container Volume (TEU)
4,700	950,000
4,300	890,000
3,500	760,000

6.3.4 Analysis of a container port in the Marmara Sea

This means that if the volume of direct cargo demand between Rotterdam Port (North Europe) and a Port in the Marmara Sea is more than 4,160 TEUs* a week (216,000 TEUs** annually), the direct transport service would be realized. Container volume between Turkey and North Europe is assumed to be composed of approximately 30 %*** of whole containers of this country. Accordingly, that figure, 216,000 TEUs, could be converted to 720,000 TEUs.

6.3.5 Analysis of future container transfer in the Black Sea

(1) The Black Sea countries and other CIS countries

A total amount of containers in the Black Sea region in around 2010 is expected to reach approximately one million TEUs excluding the future demand of Russian district facing to the Black Sea.

(2) The Danube River

According to the forecast, traffic volume will increase again from 21 million tons in 1994 to 31 million tons.

6.3.6 Desirable Future Roles of Turkish Ports

Figure 6.3.4- Figure 6.3.6 illustrate the desirable future roles of Turkish ports in each coastal area. Figure 6.3.4 shows the role of a port in the Mediterranean Sea. Figure 6.3.5 shows the role of a port in the Aegean Sea and Figure 6.3.6 shows the role of a port in the Marmara Sea. Although related data of Mersin Port, Izmir Port and Hydarpassa Port were used in the cost analysis, these three ports were selected as typical examples in each coastal area, which provide the Study Team with materials of the cost analysis. Concrete locations of the ports which would play very important roles in the container transport should be determined taking the various aspects such as future expansion area, existing expansion plan, future land transport connection, financial situation etc. into consideration.

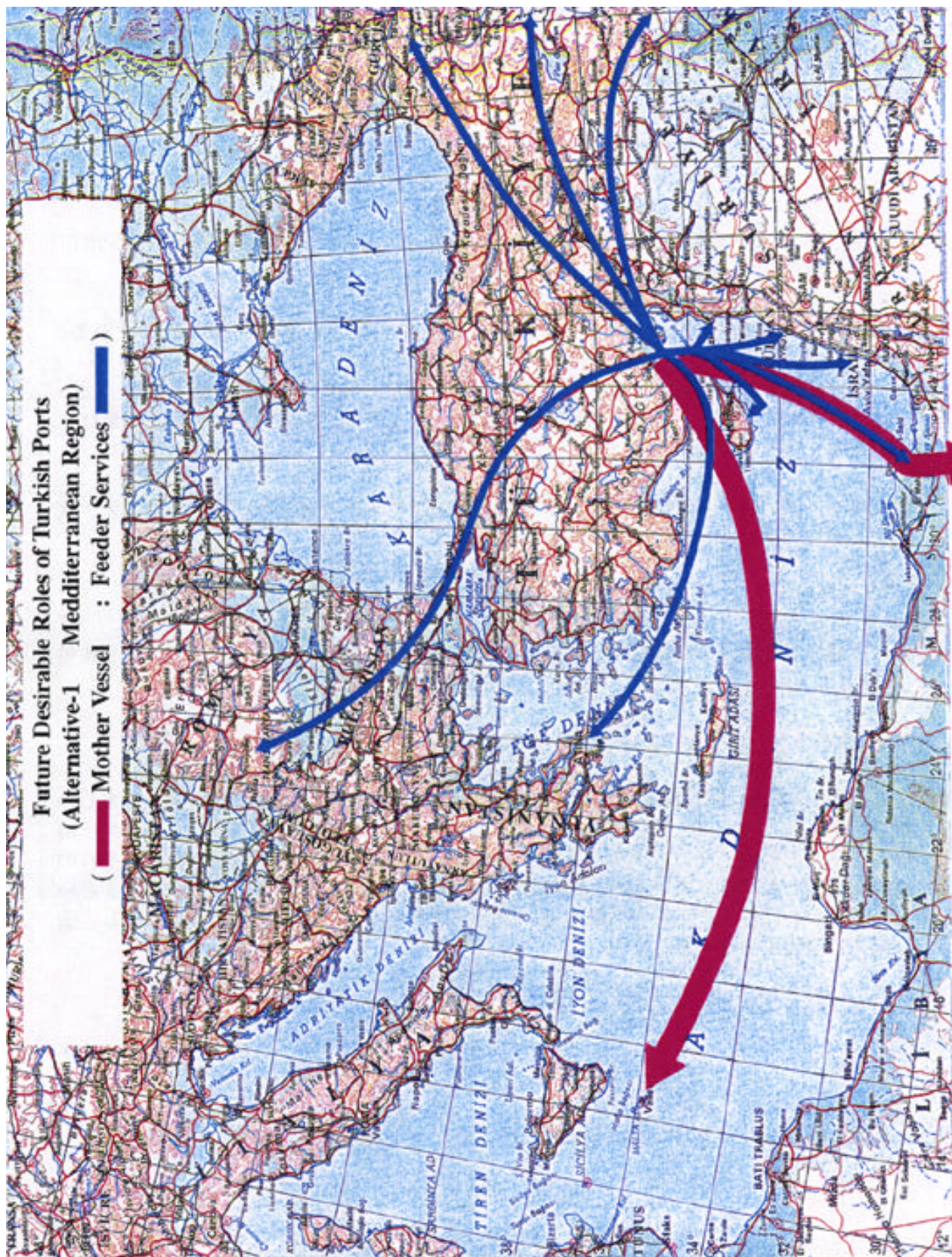


Figure 6.3.4

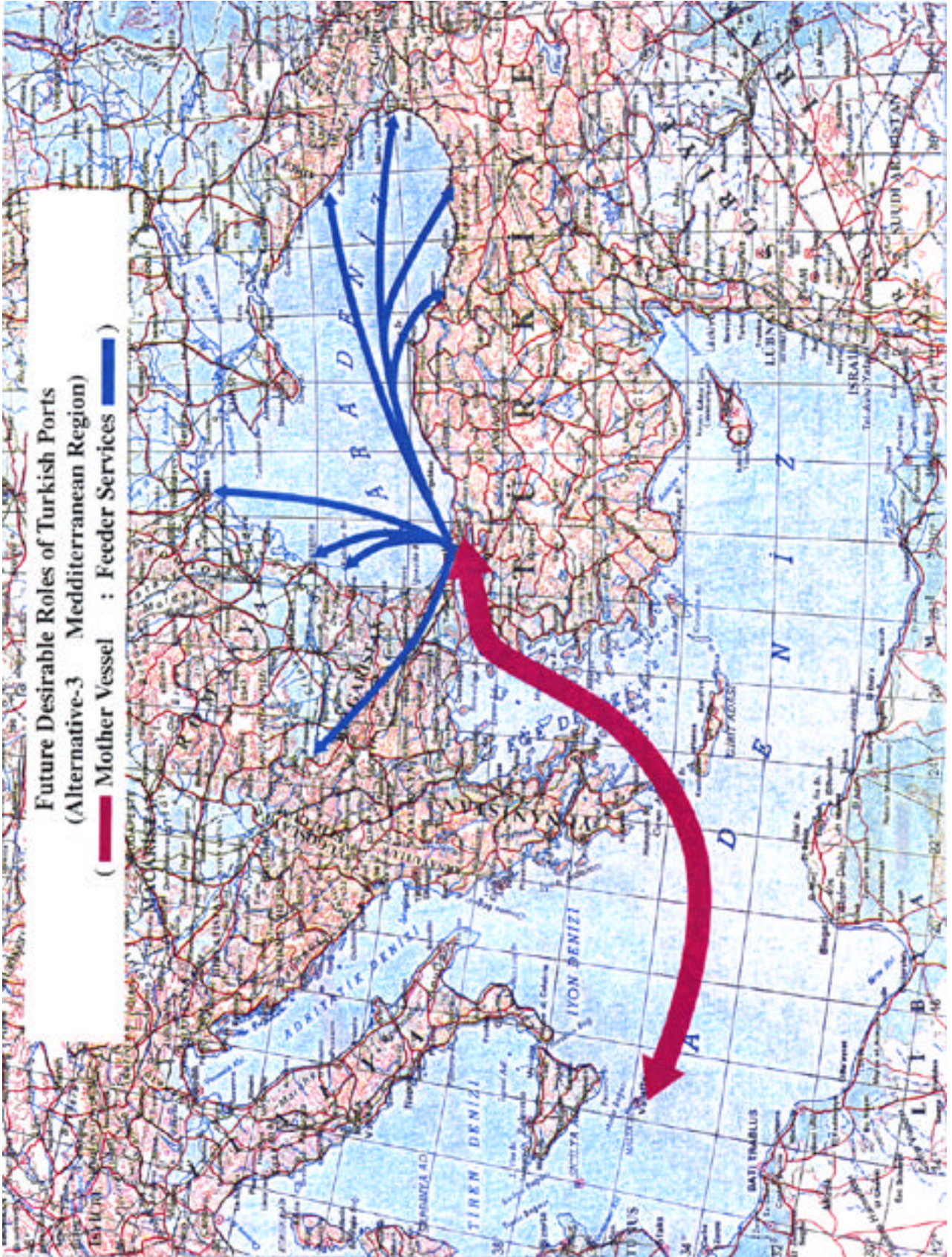


Figure 6.3.5

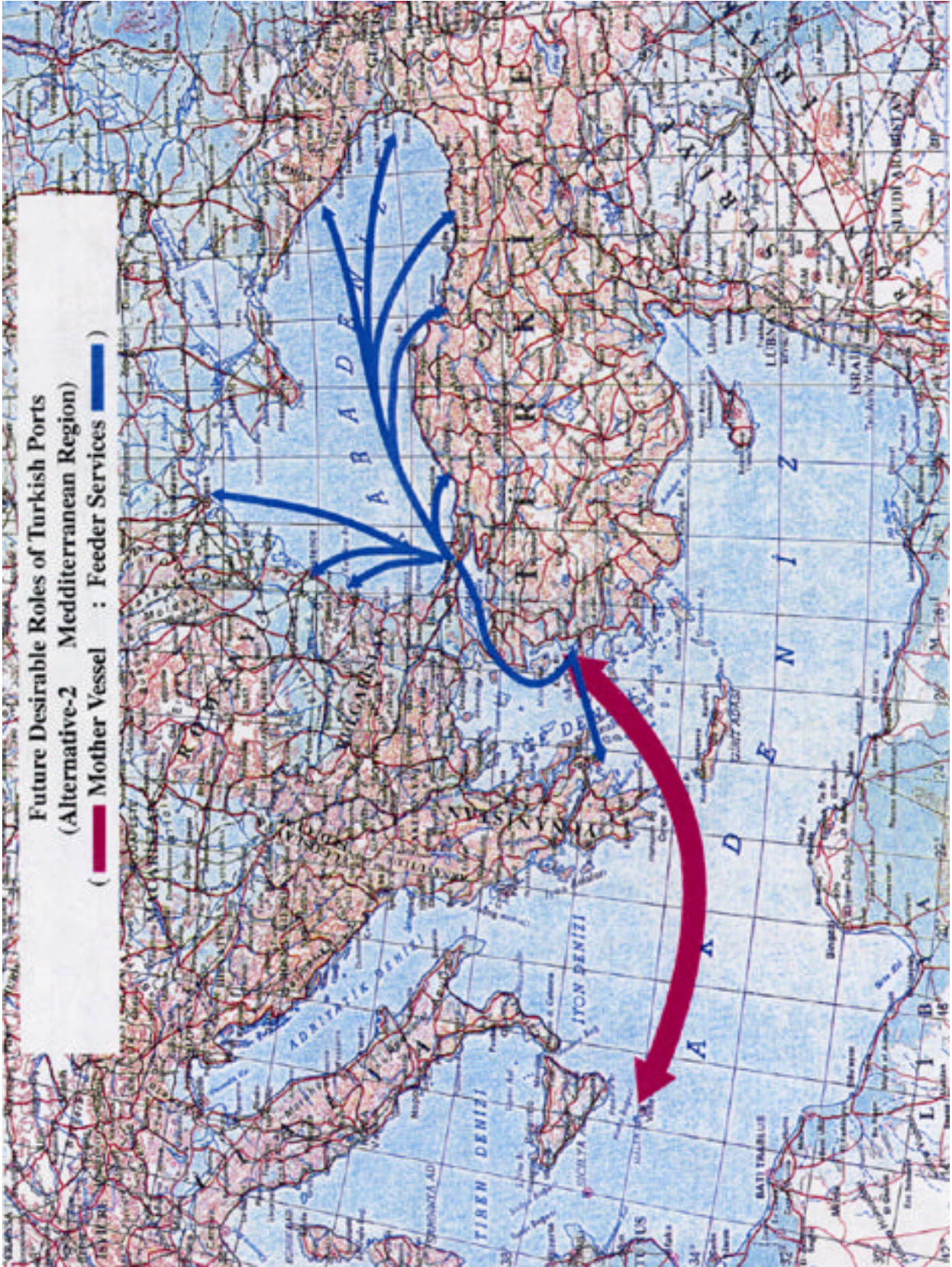


Figure 6.3.6

6.4 Port Classification

6.4.1 Background

Since no arrangement on the facility development and management direction among ports has been conducted, a wasteful use of national resources and conflict among those port-managing bodies has been witnessed. Ports are requested to carry out their functions and roles for achievement of national objective with making full use of national resources. That is why the basic idea of port classification is needed. The role of the central government needs to be identified in each class.

6.4.2 Major-port and Other-port

(1) Major-port

A Major-port is a port that has been significantly contributing to the development of national economy and international trade.

(2) Other-port

All remaining ports are classified as other-ports.

6.4.3 Roles of Central Government in Major-port

- (1) To examine the coherency of the port development plan/ project with the long term port development policy
- (2) To examine the coherency of port management and operation with the long term port development policy
- (3) To extend possible assistance to the port managing body to improve the basic port facilities and quality of port management and operation
- (4) To take the initiative in establishing a united organization for port management and operation in case of a “group port”
- (5) To collect the necessary data and information to examine the progress of the long term port development plan and to revise the plan

6.4.4 Roles of Central Government in Other-port

- (1) To extend possible assistance to the port managing body to improve the basic port facilities and quality of port management and operation
- (2) To collect the necessary data and information to examine the progress of the long term port development plan and to revise the plan

6.4.5 Ports to be classified

Table 8.2.1 in page I-8-2 to 5 shows the ports, identified by the Study Team, which will be classified.

6.4.6 Criteria

- (1) Total quantity of international cargo handled in the port
- (2) Quantity of international general cargo handled in the port
- (3) Total value of international trade conducted through the port
- (4) Total number of international passengers of the port

6.4.7 Conclusion

Consequently, the twenty-nine ports, shown in Table 6.4.1, are selected as major ports.

Table 6.4.1 Present Status of Turkish Ports

	Name of Port and Group Port	Im/Ex Cargo (1,000 Tones)	Im/Ex General Cargo (1,000 Tones)	Foreign Trade (1,000,000 USD)	Foreign Travelors (1,000 person)
(Mediterranean)					
1	Iskenderun TCDD	1,056.856	234.738	421.41	0.49
2	Iskenderun	9,932.359	4,811.994	768.63	
3	Botas	12,169.863	674.982	615.51	
4	Mersin	7,639.805	1,814.677	2,126.96	3.51
5	Tasucu	146.340	130.574	3.80	21.22
6	Anamur	96.667		0.02	1.05
7	Alanya	2.849			0.95
8	Antalya	592.412	165.738	154.98	59.56
9	Finke	0.336	0.336		0.39
(Aegean)					
10	Fethiye	63.289	5.046	5.96	8.28
11	Marmaris			2.81	74.93
12	Bodrum	7.777	7.753	0.71	95.44
13	Gulluk	1,474.663	15.290	20.85	0.12
14	Kusadası	2.666	2.666	1.40	353.27
15	Cesme	1.214	0.057	5.10	21.85
16	Izmir	2,526.562	1,533.850	6,527.94	9.56
17	Alaga	18,191.444	6,039.066	1,574.39	
18	Dikili	194.686	66.879	11.23	11.31
19	Ayvalic	2.371	0.752	28.54	3.78
20	Bozcaada	4.984	1.417		
21	Gokceada Kuzu	13.559	10.822		
(Marmara)					
22	Canakkale	2,243.739	1,698.824	152.82	18.33
23	Lapseki		0.000		
24	Gelibolu	124.224	45.407	0.27	
25	Karabiga	22.087	10.662		
26	Bandirma	2,833.657	861.719	405.07	0.51
27	Mudanya	198.690	66.593	372.60	
28	Gemlik	2,120.866	1,508.514	1,581.23	
29	Yalova				
30	Izmit	25,235.138	9,009.985	5,663.74	1.62
31	Darica				
32	Hydarpasa	6,257.125	5,851.563	6,368.12	
33	Istanbul TDI				219.01
34	Istanbul Zeyport				
35	Ambarli	5,415.506	2,337.758	1,595.83	
36	Silivri	2,156.632	530.960		
37	Tekirdag	1,446.559	692.858	932.49	15.84

(Black Sea)				
38	Sile	0.200	0.200	
39	Kefken		0.000	
40	Eregli	6,998.762	1,616.246	756.05 0.11
41	Zonguldak	98.986	87.908	33.78 0.36
42	Bartın	776.646	716.647	111.77 0.15
43	Amasura	0.200	0.200	
44	Kurucasile			
45	Inebolu	34.293	15.998	8.25
46	Ayancik	300.006	1.762	2.67
47	Sinop	9.175	6.730	2.67 0.22
48	Gerze			
49	Samsun	1,858.214	561.026	413.78 17.13
50	Unye	225.185	26.307	30.06
51	Fatsa	153.756	89.985	20.13
52	Ordu	132.511	84.996	125.68 0.01
53	Giresun	132.031	32.906	174.43 0.41
54	Vakfikebir			
55	Akcaabat			
56	Trabzon	432.124	65.415	151.45 50.92
57	Rize	209.444	18.707	96.78 0.05
58	Cayeli			
59	Pazar	14.536	6.575	
60	Hopa	143.553	2.323	73.37
TOTAL		113,694.548	41,465.411	31,343.276 990.355

6.5 Required Facilities in Long Term Perspective

6.5.1 Basic Direction of Infrastructure Development

(1) Container facilities

1) The Mediterranean Sea

Since the present container volume handled in Iskender Port is far below the existing capacity, the new container terminal should be constructed in a timely manner, watching the future progress of container volume of the port.

Mersin Port handles 242 thousand containers at the existing container terminal with three gantry cranes. Since it is certain that the container volume will exceed the existing capacity within several years, the new terminal should be constructed step by step to work in that case. Full capacity of 1.0 million TEUs of the new terminal is not necessary at the first stage of the development.

2) The Aegean Sea

Izmir Port handles 399 thousand containers at the existing container terminal with five gantry cranes so far. Since it is certain that the container volume will exceed the existing capacity within a few years, the new terminal should be constructed as soon as possible. Even if the new terminal will be completed, the shortage of capacity of 30- 40 thousand TEUs in 2010 and of 0.9- 1.2 million TEUs will be expected in a Aegean Sea region. Another new terminal with sufficient capacity should be constructed. A close investigation and study should be done as soon as possible to determine the most suitable location for the large container terminal.

3) The Marmara Sea

Since it is certain that the container volume will exceed the existing capacity within several years, new terminals should be prepared. It should be taken into consideration that too many small-scale container terminals would prevent a port in this region from becoming a calling-port. In this context, large-scale container terminals, namely Derince container terminal and Marmara Port, should be given high priority.

4) The Black Sea

Since the present container volume handled in ports in the region is far below the existing capacity, new facilities for containers should be constructed in a timely manner, watching the future progress of container volume of each port.

5) Other infrastructures

Road network is also important for container land transport. Particularly the capacities along “Southeast Anatolia Axis” and “East Anatolia Frontier Sub-Axis” should be emphasized.

(2) Facilities for general cargo except containers

Since a certain amount of general cargo will exceed the capacity of Turkish ports in 2020, new facilities for general cargo should be constructed in a timely manner, watching the future progress of cargo volume of each port.

(3) Bulk Cargo

Since a certain amount of bulk cargo will exceed the capacity of Turkish ports in 2020, new facilities for bulk cargo should be constructed in a timely manner, watching the future progress of cargo volume of each port.

6.5.2 Estimation of Required Construction Investment in Long Term

Concerning container terminal, as Turkish ports have a possibility of becoming hub ports, that is, arranged transshipment type to Mersin and mother port type to Izmir ~ Aliaga and Tekirdag ~ Istanbul ~ Izmit, required initial construction investment is calculated by assuming that hub port being settled to the Mediterranean, Aegean and Marmara region respectively until target year. Hub port type berth is constructed in hub port. Major port type berth and feeder port type berth will be constructed in hub port or respective type ports. Container cargo berth, including all container port type, will be required for five berths in the Mediterranean region, six berths in the Aegean region, seven berths in the Marmara region and two berths in the Black Sea region. The initial construction investment of container terminal in Turkey by 2020 is estimated at approximately US\$880 million. The total berth length is assumed 5,900m.

Ten general cargo berths will be required for the Mediterranean region, 28 berths for the Aegean region and 33 berths for the Marmara region. And a portion of the berths will be constructed as multi-purpose type. The initial construction investment of general cargo terminal in Turkey by 2020 is estimated at approximately US\$1,060 million. Total berth length is assumed 17,100m.

Dry bulk cargo berth will be required for one grain berth and 13 ore/coal berths in the Black Sea region and several berths in the Aegean region. The initial construction investment of dry bulk cargo terminal in Turkey by 2020 is estimated at approximately US\$410 million. Total berth length is assumed 6,000m (See Table 6.5.1).

Table 6.5.1 Tentative Calculation of Required Initial Construction Investment of Port Facilities in Long Term (2020)

Region	Container terminal			General cargo terminal*			Dry bulk terminal		
	Berth number	Berth length (m)	Rough cost (Mil. US\$)	Berth number	Berth length (m)	Rough cost (Mil. US\$)	Berth number	Berth length (m)	Rough cost (Mil. US\$)
Mediterranean	5	1,460	220	10	2,410	149	0	-	-
Aegean	6	1,790	274	28	6,750	419	6	1,800	130
Marmara	7	2,120	328	33	7,960	496	0	-	-
Black Sea	2	500	58	0	-	-	14	4,200	280
Total	20	5,870	879	71	17,120	1,064	20	6,000	410

Note) *: Except for container

Source: Prepared by JICA Study team

The amount of annual maintenance cost of new port facilities after 2020 in Turkish ports is estimated at approximately US\$54 million /year. The maintenance cost is divided into US\$17 million /year for port facilities and US\$37 million for cargo handling equipment. The results are summarized in Table 6.5.2.

Countermeasures to natural disaster, such as large scale earthquakes and wave, are shown in Table 6.5.3.

Table 6.5.2 Rough Estimation of Required Annual Maintenance Cost on New Port Facility Construction (After 2020)

New terminal	Initial construction cost until 2020 (Million US\$)	Required annual maintenance cost (Million US\$/year)		
		Port facilities	Handling equipment	Total
New container terminal	879	4.4	22.0	26.4
New general cargo terminal	1,064	9.6	10.6	20.2
New dry bulk cargo terminal	410	3.3	4.1	7.4
Total	2,353	17.3	36.7	54.0

Note: These maintenance include building, berth, storage area, breakwater, dredging and labour cost.

Source: JICA Study team

Table 6.5.3 Considered Item as Countermeasure to Natural Disaster

The Considered item as countermeasure to natural disaster
1) Examination of an aseismatic berth construction
2) Establishment of restoration policy
3) Establishment of technical standard for Turkish port facilities, including the reexamination of design seismic coefficient
4) Checking system on managing execution of construction work

6.6 Program of Infrastructure Development in Short Term (2010)

When stage plan of infrastructure development is considered, it is essential to prioritize port facilities that should be constructed in the short term (2010).

Concerning container terminal, in accordance with the policy of hub port and demand forecast in this Master Plan, the construction of a calling port of mother port type in the Aegean and Marmara region respectively will be required by the target year (2010). Two container cargo berths, including all container port type, will be required in the Mediterranean and Aegean region respectively, and three berths in the Marmara region. The initial construction investment of container terminal in Turkey until 2010 is estimated at approximately US\$360 million. The total berth length is assumed 2,200m.

Five general cargo berths will be required for the Mediterranean region, 18 berths for the Aegean region and 21 berths for the Marmara region. And a portion of the berths will be constructed as Multi-purpose type. Initial construction investment of general cargo terminal in Turkey until 2010 is estimated at approximately US\$650 million. Total length is assumed 10,000m.

Two dry bulk cargo berth will be required for the Aegean region and four berths for the Black Sea region. Initial construction investment of dry bulk cargo terminal in Turkey until 2010 is estimated at approximately US\$110 million. Total length is assumed 1,800m (See Table 6.6.1).

Table 6.6.1 Tentative Calculation of Required Initial Construction Investment of Port Facilities in Short Term (2010)

Region	Container terminal			General cargo terminal*			Dry bulk terminal		
	Berth number	Berth length (m)	Rough cost (Mil. US\$)	Berth number	Berth length (m)	Rough cost (Mil. US\$)	Berth number	Berth length (m)	Rough cost (Mil. US\$)
Mediterranean	2	580	91	5	1,200	72	0	-	-
Aegean	2	630	108	18	4,340	269	2	600	38
Marmara	3	960	162	21	5,060	312	0	-	-
Black Sea	0	-	-	0	-	-	4	1,200	75
Total	7	2,170	362	44	10,600	654	6	1,800	113

Note) *: Except for container

Source: Prepared by JICA Study team

Chapter 7 Strategy for Port Management

7.1 General

Following three chapters, seven to nine, deal with administrative, management and institutional issues including financial aspects. In general, these issues contain a lot of concrete conduct and procedures. Since these concrete conduct and procedures overlap with one another, administrative, management and institutional issues can not be divided clearly. Deepening the understanding on the three chapters, it is useful to clarify the scope of the following key words: port management, port administration and institutional framework.

7.1.1 Definition of Port Administration, Port Management and Institutional Framework

This report uses these words with the following meanings respectively.

- Port administration means to clarify ideal blueprints on nationwide or individual port development based on policies, strategies or plans by national or local governments, and lead ports and harbors to those policy goals. It also includes giving permit and approval on legal basis in the implementation process. Port administration implies the following concrete conduct and procedures.

(Port administration of central government)

- To clarify “Ports” to be managed -
- To establish the nationwide port development master plan -
- To establish the guideline for port development master plan of individual port -
- To coordinate organization concerned in formulating port development master plan of individual port -
- To approve the port development master plan submitted by Port Authority -
- To approve the development plan of coastal facilities (port facilities) based on relevant laws and regulations
- To grant port operational right to appropriate organizations in individual port -

(Port administration of each port managing body (Port Authority))

- To approve appropriate utilization of port facilities by port users -
- To coordinate relevant activities of various port users -

- Port management means to manage an individual port, making full use of port facilities, personnel and funds which include both existing and future resources. Port management implies the following concrete conduct and procedures.
 - To clarify individual port to be managed -
 - To establish a port managing body (Port Authority) in individual port-
 - To clarify the responsibilities and function of Port Authority-
 - To establish port management system including personnel education and outsourcing of human resources in Port Authority -

- To establish a port development master plan of individual port -
- Institutional Framework means the legal and organizational framework to secure port management and administration. Institutional framework implies the following concrete conduct and procedures.
 - To introduce necessary laws and regulations to clarify “Ports” to be managed -
 - To restructure the port administrative and management organization to meet the global current -
 - To restructure the port administrative organization to strengthen the coordination and cooperation function among the organization concerned in central government-
 - To introduce appropriate system to reinforce the ability of human resources in relevant organization -
 - To introduce necessary framework for effective port administration including port statistics on legal bases

7.1.2 Main Topics of Chapter 7, 8 and 9

(1) Since it is clearly observed that the matter of definition of ports is common issue of port administration, port management and institutional framework, this matter is dealt in Chapter 7 as a common issue.

(2) Since the mater of port development master plan is also common in port management and port administration, this matter is dealt in Chapter 7 as another common issue.

(3) Except these common issues, the concrete conduct and procedures of port administration can be divided into two categories. One is a matter of coordination function of central government and the other is a matter of Port Authority. Former is dealt in Chapter 9 and the latter is dealt in Chapter 7.

(4) Consequently Chapter 7 describes two common issues and other topics concerning port managing bodies.

(5) Chapter 8 focuses on financial issues.

(6) Chapter 9 deals the institutional issues and other topics concerning the coordination function of central government. Chapter 9 also describes the step-wise preparation for the nationwide port development taking various issues of administrative, management and institutional issues including financial aspects into account.

7.2. Definition of ‘PORTs’ to be managed

In order to provide firm foundation for a unified port administration system, basic concept and legal definition of ‘ports’ should be clarified. In this study, ‘Port’ is understood as: “An organic structure of a set of coastal facilities for cargo and passenger traffic to be administered, managed and operated as a unified functional unit and with a certain legal boundary which is necessary at least for port administration, management and operation”

Table 7.2.1. Concept of 'PORT' on legal basis

	Present 'port'	'PORT' to be considered
1. Characteristic	One of coastal Facility	Basic Infrastructure of the National Development
2. Use	Public use (ports occupied in coastal line as public property)	Public use (PORTs as public assets)
3. Objects	Port facilities (wharves, piers, breakwaters, superstructures)	Port facilities and the surrounding areas (land & water) for the efficient operation and management to be necessary at least
4. Management	Management of municipal ports, etc. (Law on the management of wharves)	Overall administration and management of PORT (Including price-setting, operating safety, etc.)
5. Related laws	Ports law (1341,43), Law on the management of wharves (1936), Law on the construction of ports, and the Additional law (1954, 59), Coastal Law (1990,92)	

Source: JICA Study Team for ULIMAP

7.3 Port Development Master Planning

7.3.1 Port Development Master Plan

(1) Characteristics

In this study, port development master plans are characterized as follows.

1) Port Development Master Plan should be established by each port authority on a legal basis. This plan is a guideline both for administration and management of port. It is a master plan with a long term planning period (approximately 10-15 years) that includes the use and maintenance of ports and harbors, and examination on environmental impact, as well as port development. The key concept is that port is regarded a space to be managed which includes land and facilities.

2) This plan is a masterplan, which is to be a guideline for realizing what the port should be in the future. It is different from a construction plan. It does not include specific items such as construction bodies, technical methods, and implementation schedule. This enables the port authority to deal with socio-economic changes flexibly during the long planning period. Port authority makes implementation plan in the shorter term separately for achieving the goals set out in the master plan.

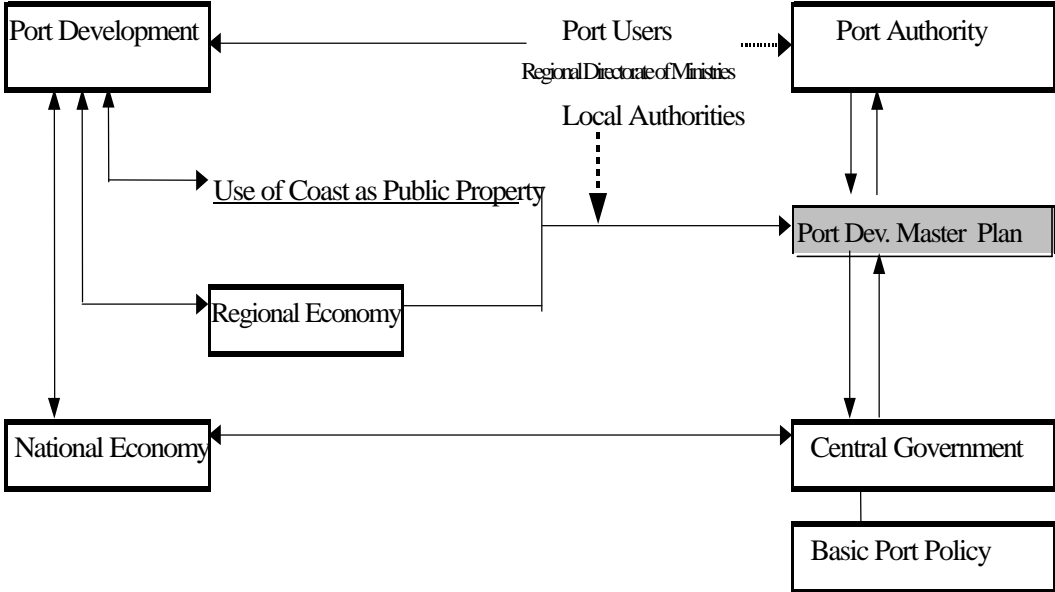
3) Port authorities at major ports should have an obligation to obtain the government's approval in case of establishing and changing the port development master plan. This is because major ports are considered to have a serious impact on the national interest. The central government also establishes the guideline for formulating the masterplan.

(2) Strategic Port Development through Port Development Master Plan

In the planning process, port development master plan is first coordinated with other land-use plans in the adjacent area on a regional basis. The central government then coordinates

and guides the masterplan on the nationwide port development. Through this dual coordination system, the government can lead each port development to well-controlled development by giving priority with definite function; such as commercial ports based on scale-merit principle for containers, or local public ports for regional demand, as well as avoiding overlapped investment in a certain area. Figure 7.3.1. shows the concept of strategic port development.

Figure 7.3.1. Concept of strategic port development



Source: JICA Study Team for ULIMAP

7.3.2. Contents of Port Development Master Plan

A port development master plan includes the scale, arrangement and land use on scheduled port facilities as well as the existing port facilities. The main items to be described in the main texts are as follows:

Table 7.3.1 Main items of Port Development Master Plan

Category	Items to be formulated
1. Basic policy	(1) Location and Function (2) Development and use of port facilities (including examination of other adjacent port function) (3) Land use of port area (4) Environmental consideration in port area (including traffic condition at port and adjacent area) (5) Securing safety in port area
2. Capacities of port	Cargo handling volume, passenger volume and other capacities at the target year
3. Scale and Arrangement of port facilities	Water facilities (Channel, Basin, etc.), Outer facilities (Breakwater, etc.), Berthing facilities, Access Transportation facilities (Roads, Rail, etc.), Cargo handling equipment, storage, Passenger facilities, if any
4.Environmental preservation in port area	
5. others	

Source: JICA Study Team for ULIMAP

7.4 Port Authority

7.4.1 Definition of Port Authority

In this study, ‘Port Authority’ is understood as follows: “A statutory body which develops, maintains ports as a unified functional unit, and secures port services for public use”.

It should be emphasized that proper port administration needs to be secured at each port. Historically speaking, port authorities were established in the U.K. or U.S. to secure public interests expected from various port activities, which originated in constraints of individual port management by private sector. Monopolized management by the private sector resulted in higher prices and lower service levels, overcapacity at some ports, and undercapacity at others in the U.S..

What is required at present in Turkey is a system to control port management by proper involvement of the central government. In such a system, each port operator is obliged to manage and operate a port based on port master plans which are authorized by the central government.

7.4.2 Function of Port Authority

The responsibilities of the ‘Port Authority’ are to be specified by legislation. Main items are as follows:

- (1) To administer overall port activities
- (2) To establish Port Development Master Plan
- (3) To compile port statistics for port development
- (4) To implement construction and maintenance works for port facilities (including projects by the central government.)

- (5) To maintain port area and port facilities in good operating condition
 - 1) This includes controlling the use of land and water areas of port by restricting disorderly use. This authority is exercised in case additional legal measures are taken by the local government concerned.
 - 2) Port facilities are managed by port-facilities register (including cases in which the central government does the maintenance work on port infrastructure).
- (6) To maintain and improve environmental conditions of the port
This authority is exercised in case additional legal measures are taken by the local government concerned.
- (7) To ensure the adequate provision of port services
Port authority does not always mean providing operational activities by itself.
- (8) To prepare port tariff and collect fees and charges from port users
- (9) To conduct surveys for port promotion

7.4.3 Recommended Classification of Port Authority

It is recommended to establish statutory bodies as port authorities by granting them public status. These authorities should be categorized based on the present status of each port management body for the time being in order to facilitate a smooth switchover. Port authorities categories might be classified as follows: Turkish Port Authority (TPA), Local Port Authority (LPA), and Private Port Authority (PPA). Details are as shown in the following table.

Table 7-4-1 Classification of Port Authority

Present Port Management Bodies	New Category of Port Authority
TCDD (port department)	TCDD As Turkish Port Authority (TPA)
Municipality Government (port division)	Municipality Government, State Economic Enterprise (non-privatized) As Local Port Authority (LPA)
State Economic Enterprise (non-privatized) (port division)	
State Economic Enterprise (privatized) (port division)	State Economic Enterprise (privatized), TDI. Inc.Co. Private operating companies As Private Port Authority (PPA)
TDI. Inc.Co. (department of ports)	
Private operating companies(Privatized TDI ports)	
Private operating companies (private ports)	

Source: JICA Study Team for ULIMAP

In general, one port is administered by one port authority. In the area which is designated as a ‘Group port’, the status for port authority are granted to a representative organization, if one exists. Otherwise, representative organization should be established as a port authority. The representative organization coordinates with each member port in formulating a port development master plan as a unified port authority. The central government can give advice or recommendation to the port authority.

7.4.4 Responsibilities of Port Authority

Each statutory body as port authority takes responsibilities as described in the section 7.4.3. There is no difference in function among the categories basically, but some responsibilities such as controlling the use of land and water areas of port, and environmental conservation in port are exercised in case the competent authorities entrust the port authority with these matters.

7.4.5 Port Management for ‘competitive edge’ at state ports

(1) Background

At present, it is the ports managed by the TCDD that are strategically most important and which handle the greatest volume of cargoes. The government should consider measures to create internationally competitive ports, so-called hub ports, which can handle large volumes of container cargoes and offer a high level of services.

(2) Strategy to Create Competitive Ports

Overall port administration by an independent port authority promotes efficient and flexible management.

1) Port facilities management should be done by one port authority. It should be considered, if necessary, that the facilities of TCDD ports are integrately managed by TCDD as a port authority, including port infrastructure as well as superstructure by transferring authorities from the Ministry of Transport. This will allow the port authority to allocate finances flexibly in a comprehensive port development scheme.

2) Especially at the ports designated as the ‘competitive ports’, it is required to strengthen the port administration and management function at the site where the ports are actually operating, by giving port managers an administrative freehand for efficient management. Necessary authorities/responsibilities should be transferred to port managers from headquarters. Meanwhile, headquarters should focus on overall administration policy such as privatization and training.

3) It should be considered to open up opportunities for talented employees beyond the middle management class including outsourcing. It should be required to recruit talented personnel including outsourcing.

4) In order to raise handling productivity, it is one of alternatives to begin with partly adoption of operation by private sectors to encourage competition between TCDD operation and private operation.

Chapter 8 Strategy for Port Investment and Finance

8.1 Present Situation and Evaluation on Public Port Investment

Current Financing scheme for port development and maintenance is as follows; Construction of port sub-structure at public ports is undertaken by the national budget of maritime port while maintenance for these structures is undertaken by respective port management bodies at their own expense. Super-structures and cargo handling facilities are procured by port management bodies and/or private operating companies.

Maritime port investment was more than US\$ 30 million in the beginning of the 1990's but decreased to US\$ 20 million in 1998. The share in maritime transportation investment was nearly 40% but less than 0.5% of government investment.

Maritime port investment amount is extremely small compared to road investment of 30% share of government investment. This amount is insufficient to meet the foreseeable demand. The authorities should endeavor to increase the amount.

Local administrations have not invested in ports in recent years although that they provide budgetary items concerning pier and berth.

Treasury receipts from foreign maritime trade is 6 % of the government revenue and reached annual receipts of US\$ 2 billion. 85% of trade volume and 46% of trade value has passed through ports. In this sense, the authorities should give a priority to port investment.

TCDD has been rapidly improving its financial performance of the port account. The operating ratio and the working ratio have entered satisfactory ranges. One of reasons is that an investment of US\$ 144 million has enabled the port to increase capacity and operating efficiency, which has been generated a rough operating profit of US\$ 468 million during 1990-1998.

TDI's financial performance has worsened, and operating ratio and working ratio are of the 80% level compared to high performance at the beginning of the 1990s.

8.2 Present Situation and Evaluation on Private Port Investment

Private investment has increased since the promotion of private participation and privatization of the state owned organizations began in the 1980s, and now accounts for more than 70% of the gross fixed investment. **Existing capacity** in private ports represents more than 50% of the national port capacity. Port operation at TDI ports has been transferred to the private sector and BOT projects have been conducted.

However, due to a lack of financial and legal incentives, private companies are finding it difficult to generate expected profits.

BOT bidding procedure and **construction procedure** are well provided and port projects

have been carefully carried out taking an overall settlement into consideration. The projects have also been carefully scheduled with regard to landfill.

BOT agreement has some articles that make contractors hesitant to enter the bidding because of unclearness and unfairness, this may preclude international finance. The authorities should reconsider articles concerning arbitration, account, cost increase, force majeure and termination.

BOT scheme should be reexamined by the authorities from the viewpoint of risk sharing. And the agreement should incorporate a coordination mechanism, which includes legal and economic procedures to allocate risks reasonably when risks happen. Generally risk sharing is formed on the basis of culture, tradition, and experience of each country. Therefore consultation with financial advisers and lawyers is important to improve skills on BOT scheme.

Transfer contract of operation right has some articles, which would result in a financial burden for contractors. The authorities should reconsider articles concerning repair cost of natural disaster and assignment of authorization.

One of the **private operating companies** is suffering from inefficient performance that will not be rapidly improved. Since privatization, operating ratios of both TDI and contracting companies have become worse. The authorities should survey the reasons and reflect its results in the agreement and in the administrative policies.

One of the **private port managing companies** is facing a financial difficulty. They cannot be able to invest in new projects.

Government investment incentive scheme is well provided to domestic and foreign investors, but an amount enjoyed by companies declined.

A tax incentive is not available for small companies when they invest in new equipment.

The outstanding amount of domestic deposit was a low ratio of 20% of GDP, amounting to US\$ 40 billion in 1998. **The trading volume at stock market**, on the other hand, was 35% of GDP, amounting to US\$ 70 billion, however small member of the market is giving enterprises a barrier for equity finance.

There is a shortage of funds in domestic banks and in the stock market. Therefore private sectors intend to enter the port business or renew port facilities, find it difficult to raise funds.

Foreign direct investment inflow into Turkey reached US\$ 807 million in 1998, but which ranks the country 55th among developing countries in terms of receiving amount in spite that the country was ranked 22nd in the first of the 1990s. Therefore the government is concerned about the decline and has increased promotional efforts.

8.3 Required Investment Amount for Port Investment up to 2020

See Table 8.3.5

Required investment includes both improvement of existing facilities and construction of new facilities. The calculation is made by region on a basis of cargo forecast volume, existing port capacity and unit cost arranged from cost estimation of standard facilities. Required amount up to 2020 is estimated US\$ 646.4 million for TCDD ports, US\$ 195.4 million for other public ports and US\$ 637.2 million for private ports. Required gross amount for all ports sums up US\$ 1,479 million up to 2020.

See Table 8.3.6

A private investment during 2000-2010 is expected only contracted BOT projects. This is equivalent to 0.5 and 0.7, which means that only 50% of required private in sub-structure is expected up to 2010 and that 70% of required private investment in super-structure is expected up to 2010. Private investment during 2010-2020 may be expected, but a clear view on attracting private investors in ports has not appeared so far. Therefore, 0.3 and 0.7 are assumed with expectation that enthusiasm will increase in the future. The shortage of private investment is US\$ 140 million up to 2010 and is US\$ 281 million up to 2020.

See Table 8.3.7

Measures to counter shortage of private investment are studied in case studies; In case-1, investment in other public ports will be increased by US\$ 281 million to cover the shortage of investment in private ports. In case-2, investment in TCDD ports will be increased by US\$ 281 million to cover the shortage of investment of private ports.

Evaluation of case studies is made from the viewpoint of receipts of TCDD port account that directly contribute to increase the government revenue and that have a potential to be used as a loan for private sector. Therefore, the government must improve its financial performance as soon as possible. Meanwhile private sectors are finding it difficult to raise funds. On the other hand, receipts of cargo handling at other public ports and/or private ports dose not have a direct route of contributing to the government revenue.

See Table 8.3.11

The annual rough profit in 2020 is US\$ 252 million/year in the Present Status of Quota and Case-1, while US\$ 288 million/year in Case-2. Receipts during 20 years of 2001-2020 is US\$ 3,706 million with an investment of US\$ 289.1 million by DLH and of US\$ 357.2 million by TCDD in Case-1, while US\$ 4,045 million with an investment of US\$ 478.0 million and of US\$ 449.6 million in Case-2. Investment performance of Case-2 is slightly lower than that of Case-1, but amount of receipts of Case-2 is larger than that of Case-1.

8.4 Proposed Strategic Financial Scheme for Port Investment

Proposed strategic financial schemes is comprise of two parts; a scheme for an efficient financial operation of TCDD port account and a scheme for encouraging private sectors who are expected to enter the port or port-related business.

For an efficient financial operation of TCDD port account, authorities should start to consider a matter that the port account should be separately operated from the railway account on the following conditions;

1) The port account should continue to increase Treasury receipts. The annual amount transferred to Treasury would be 50% of the annual rough operating profit. A transferred amount to Treasury during the 20 years from 2001-2020 totals US\$ 2,022 million in Case-2.

It is expected that the Government will take necessary measures to utilize this transferred amount mainly for the rationalization of the TCDD railways and the as compensation for the loss of the TCDD railways.

2) The port account should be efficiently operated to raise investment effectiveness. The port account should be allowed to invest in both sub-structure and super-structure in order to realize effective investment by short-term construction and improvement. Thus budget amount of the maritime port investment for TCDD ports should be transferred to the port account. Annual amount for self-operation would be 40% of the annual rough operating profit, which will allow investment in both sub-structure and super-structure in TCDD ports. Self-operation amount during the 20 years totals US\$ 1,618 million in Case-2.

3) The port account should function like a public fund to support private sectors because TCDD is unable to handle all of the increasing cargo. On the other hand private sectors will be wanting lenders in order to cope with the increasing cargo in their ports because of shortage of private credits. Therefore this account is expected to function as a public fund. Both Treasury and Transport Ministry will operate this account from a viewpoint of encouraging the private sector. TCDD will act as a secretariat of the account. The annual amount of this function would be 10% of the annual rough profit. This amount during 20 years from 2001-2020 totals US\$ 404 million in Case-2, which compensates a large portion of the shortage of private financing resources.

4) It should be noted that this TCDD fund is not utilized as a subsidy, but as a loan which will bear interest on a commercial basis.

For encouraging private sectors, the authorities should begin to reconsider the following points on BOT scheme, transfer of operation right, the support function for private sectors and the tax system.

1) In a BOT contract, the authorities should start to reexamine articles on arbitration, account, cost increase, force majeure and termination from the viewpoint of risk sharing. Details are explained in “8.2.1. BOT scheme.” In order to make an attractive BOT scheme, the authorities should have opportunities to consult with financial advisers and lawyers to improve and develop skills on BOT financial scheme.

2) In an agreement of transfer of operation rights, the authorities should reexamine articles on repair cost of natural disaster and assignment of authorization because some private operating companies may be faced with financial difficulties according to financial statements. Details are explained in “8.2.2 Port Operation at Privatized Port.”

- 3) Investment by private capitals is inactive as explained in “8.2.4 Private Capitals.” A public function should be established, which provides private sectors with a direct loan and/or a guarantee to a loan from private banks. This function will be in the TCDD port account as described above. This public function will compensate a large portion of the shortage of private financing resources.
- 4) A tax system has a function to provide enterprises with financing resources as exemption. Because those enterprises who are in the port businesses or those which intend to enter the port business are small, they are not eligible for incentive scheme. In this sense, a tax system of prepaid stock dividends and special depreciation is a powerful tool to encourage private investment and should be considered to compensate the shortage of private funds.

Table 8.3.5 Required Gross Investment Amount

TCDD ports	(Million US\$)					
	up to 2010			up to 2020		
	Total	Sub	Super	Total	Sub	Super
Construction	239.8	135.4	104.4	524.0	260.6	263.4
Improvement	38.3	8.9	29.4	122.4	28.6	93.9
Total	278.1	144.3	133.8	646.4	289.1	357.2

Other public ports	(Million US\$)					
	up to 2010			up to 2020		
	Total	Sub	Super	Total	Sub	Super
Construction	85.1	66.2	18.9	153.7	109.3	44.3
Improvement	13.6	2.8	10.8	41.8	8.6	33.1
Total	98.7	69.0	29.7	195.4	118.0	77.5

Private Ports	(Million US\$)					
	up to 2010			up to 2020		
	Total	Sub	Super	Total	Sub	Super
Construction	282.1	198.0	84.2	491.4	297.4	194.0
Improvement	46.1	10.0	36.1	145.8	31.8	114.1
Total	328.2	208.0	120.2	637.2	329.2	308.0

All Ports	(Million US\$)					
	up to 2010			up to 2020		
	Total	Sub	Super	Total	Sub	Super
Construction	607.0	399.6	207.4	1,169.0	667.3	501.7
Improvement	98.0	21.8	76.3	310.0	69.0	241.1
Total	705.0	421.3	283.7	1,479.0	736.3	742.7

Table 8.3.6 Private Participation Ratio

Ratio	2000 - 2010		2011 - 2020	
	Sub	Super	Sub	Super
	0.5	0.7	0.3	0.7

Note

1) During 2000-2010, private investment is only BOT projects of Derince Port and Filyos Port. This is equivalent to 0.5 and 0.7

2) During 2010-2020, private investment may be expected. This is equivalent to 0.3 and 0.7.

Table 8.3.7 Required Gross Investment Amount by Organizations

on the Present Status of Quota

	up to 2010				up to 2020			
	Total	TCDD ports	Others	Private	Total	TCDD ports	Others	Private
DLH	213.3	144.3	69.0		407.1	289.1	118.0	
TCDD	133.8	133.8			357.2	357.2		
Private Sector	357.9		29.7	328.2	714.7		77.5	637.2
Total	705.0	278.1	98.7	328.2	1479.0	646.4	195.4	637.2

Case-1 Other public ports handle the remaining cargo on the sea

The remaining cargo on the sea requires an investment of US\$ 281 million, which are scheduled to handle at private ports but now placed on the sea because of shortage of private investment.

	up to 2010				up to 2020			
	Total	TCDD ports	Others	Private	Total	TCDD ports	Others	Private
DLH	317.3	144.3	173.0		595.9	289.1	306.8	
TCDD	133.8	133.8			357.2	357.2		
Private Sector	253.9		65.8	188.2	525.9		169.9	356.0
Total	705.0	278.1	238.7	188.2	1479.0	646.4	476.6	356.0

Case-2 TCDD ports handle the remaining cargo on the sea

The remaining cargo on the sea requires an investment of US\$ 281 million, which are scheduled to handle at private ports but now placed on the sea because of shortage of private investment.

	up to 2010				up to 2020			
	Total	TCDD ports	Others	Private	Total	TCDD ports	Others	Private
DLH	317.3	248.3	69.0		595.9	478.0	118.0	
TCDD	169.8	169.8			449.6	449.6		
Private Sector	217.8		29.7	188.2	433.4		77.5	356.0
Total	705.0	418.2	98.7	188.2	1479.0	927.6	195.4	356.0

Table 8.3.11 TCDD ports Profit and Investment**on the Present Status of Quota**

		1998	2000-2010	2010	2011-2020	2020	Total 2000-2020	Remark
Investment								
DLH	(Million US\$)		144.3		144.8		289.1	
TCDD	(Million US\$)		133.8		223.5		357.2	
Port capacity	(Thousand tons)	44,258		59,401		83,995		Note 1)
Rogh profit	(Million US\$/year)	133		178		252		Note 2)
Rogh profit	(Million US\$)		1,555		2,151		3,706	

Case-1 Other public ports handle the remaining cargo on the sea

		1998	2000-2010	2010	2011-2020	2020	Total 2000-2020	Remark
Investment								
DLH	(Million US\$)		144.3		144.8		289.1	
TCDD	(Million US\$)		133.8		223.5		357.2	
Port capacity	(Thousand tons)	44,258		59,401		83,995		Note 1)
Rogh profit	(Million US\$/year)	133		178		252		Note 2)
Rogh profit	(Million US\$)		1,555		2,151		3,706	

Case-2 TCDD ports handle the remaining cargo on the sea

		1998	2000-2010	2010	2011-2020	2020	Total 2000-2020	Remark
Investment								
DLH	(Million US\$)		248.3		229.6		478.0	
TCDD	(Million US\$)		169.8		279.8		449.6	
Port capacity	(Thousand tons)	44,258		64,756		95,920		Note 1)
Rough profit	(Million US\$/year)	133		194		288		Note 2)
Rogh profit	(Million US\$)		1,635		2,410		4,045	

Note

1)For calculation of port capacity, 1TEU is equal to 10 tons.

2)Rough profit ratio is set at US\$ 3 per ton according to TCDD ports financial performance.

Chapter 9. Strategy for Institutional Framework

9.1 General

Ports and harbors are essential for the growth of the national economy, as well as the nuclei of regional development. Port development by the private sector also should be guided by this basic principle.

In Turkey, as economic growth is expected to increase cargo handling demand as well as in increase private sector participation in port development, it is required for the government to achieve overall administration on nationwide port development in future. In order to facilitate planning and coordination function by the central government, individual ports should be administered by statutory bodies entitled at the first step. Because the number of ports are numerous along the long coastline in Turkey, and condition vastly differ by region. Each port authority has an obligation to administer, and manage properly in line with the actual condition such as the existence of neighboring ports and the distance from the city center. The central government establishes institutional framework for the basics of the port administration. In addition, government coordinates and leads each port authority to the policy goals.

9.2 Policy Framework to be required

Chapter 7 analyzed the relationship among port administration, port management and institutional framework and identified a lot of conduct and procedures. Almost of all those conduct and procedures related to institutional framework should be borne by central government and can be categorized into the following four policies.

(1) Policy on coordination by port master planning

This policy contains the following issues.

- To establish the nationwide port development master plan -
- To establish the guideline for port development master plan of individual port -
- To coordinate organization concerned in formulating port development master plan of individual port -
- To approve the port development master plan submitted by Port Authority -
- To approve the development plan of coastal facilities (port facilities) based on relevant laws and regulations
- To grant port operational right to appropriate organizations in individual port -

(2) Policy on organization

This policy contains the following issues.

- To restructure the port administrative and management organization to meet the global current -
- To restructure the port administrative organization to strengthen the coordination and cooperation function among the organization concerned in central government-

(3) Policy on sub-framework for port management

- To introduce appropriate system to reinforce the ability of human resources in relevant organization -
- To introduce necessary framework for effective port administration including port statistics on legal bases

(4) Policy on step-wise preparation for nationwide port development

9.3 Proposed Coordination System by Port Master Planning

9.3.1 Basic framework

(1) Establishment of Guideline for Port Development Master Plan

The central government formulates a guideline for port development master plans which are established by each port authority, and the planning criteria including items to be established, and items to be considered. Those standards for masterplans are based on the basic policy for nationwide port development.

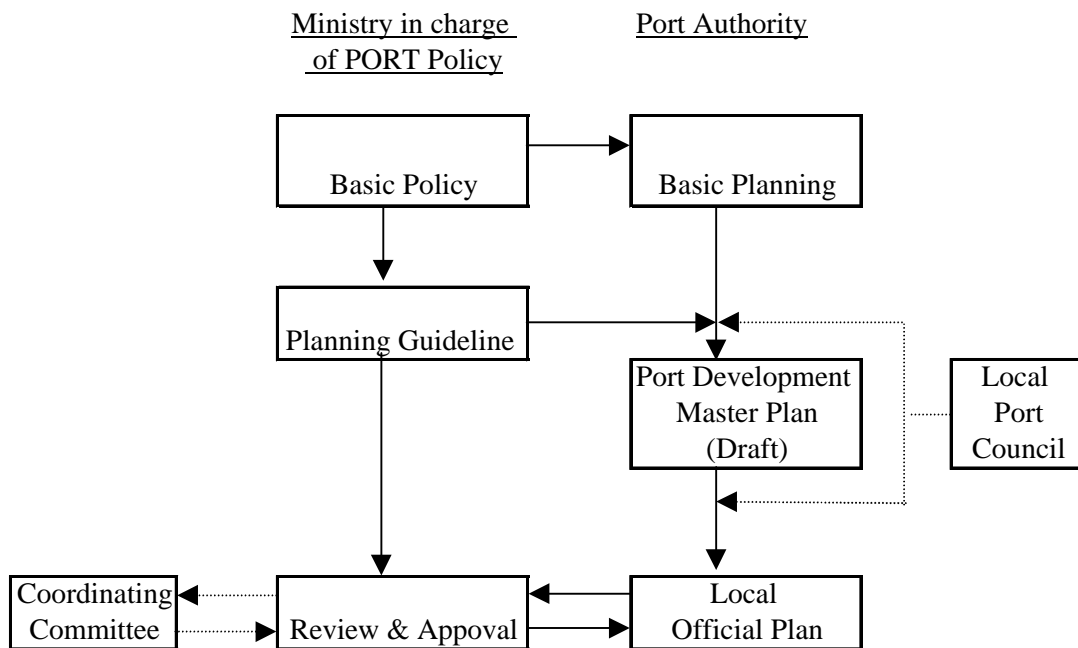
(2) Establishment of ‘Port Planning Coordinating Committee’

The government tentatively establishes a ‘port planning coordinating committee’ which consists of staffs from the port-related ministries concerned. The committee coordinates among the ministries concerned on matters from port masterplans to the construction plans. Apart from this committee, the government establishes a task force meeting to examine the integration of port and harbor administration in the Prime Ministry.

9.3.2 Procedures for coordination

The government reviews the port development master plan submitted by a port authority, based on the guideline which follows the basic policy, and gives approval. In case of changing the plan, it is also necessary for port authority to get approval from the central government. After obtaining the approval, port authority makes construction plan, deciding the development priorities based on the government’s basic policy and the approved master plan. Following figure shows the flow of coordination procedure. Based on the submitted construction plans, the government formulates nationwide port development plan that includes investment by private sector, taking into consideration development priorities by the criteria of ports.

Figure 9.3.1 Procedures for port planning and Implementation



Source: JICA Study Team for ULIMAP

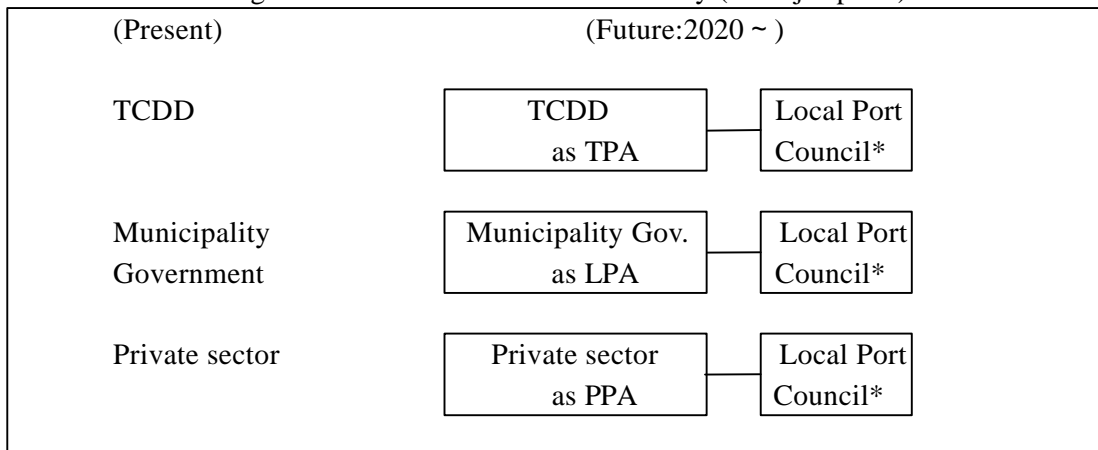
9.4 Organization of Port Authority

9.4.1 Establishment of 'Local Port Council'

Port authorities at major ports designated by the government, should have a tentatively named 'Local Port Council' to consult and obtain comments and recommendations on establishing or changing port development master plan. This is because the development of major ports are considered to have significant impact on the national interest.

A Local Port Council is an advisory group which consists of two sectional meetings for administration, and management & operation. Staffs from the competent local government (province or metropolitan municipality), the branch office of port related ministries are appointed as the members of the administrative meeting. The management & operation meeting consists of port customers such as shippers and consignees, vocational chambers, port operators and persons of learning and experience. Following figures show key concepts of recommended port authority in Turkey.

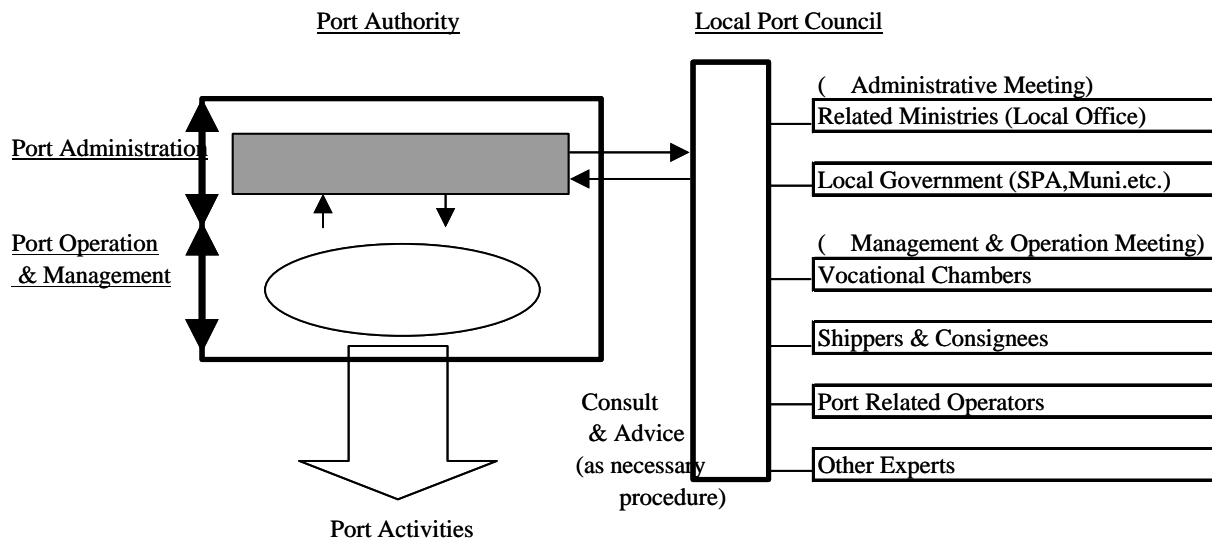
Figure 9.4.1 Structure of Port Authority (at major ports)



*Local Port Council is established in the category of major ports under legislation.

Source: JICA Study Team for ULIMAP

Figure 9.4.2 Organization of Port Authority



Source: JICA Study Team for ULIMAP

9.4.2 Relationship between Port Authority and Government

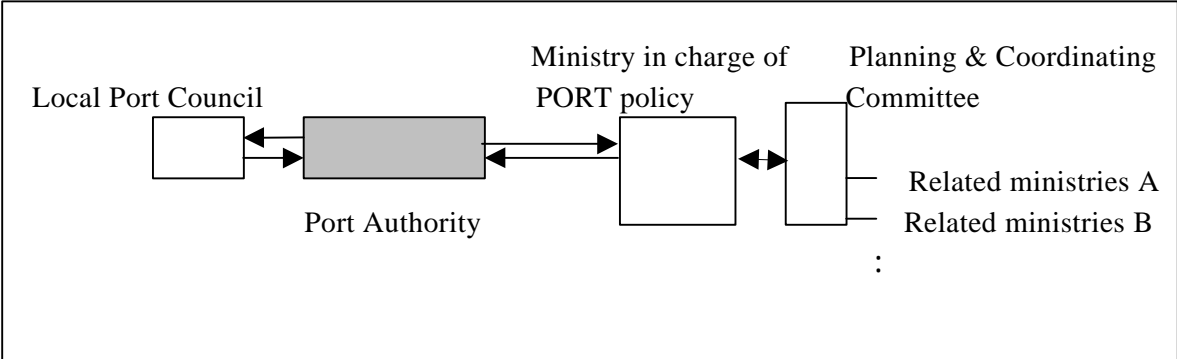
In the new framework, the main ministry which has the greatest responsibility for promoting the national port development should be clarified. Until now, the responsibilities on port development have been cut into pieces functionally among the competent ministries. This is one of the reasons why a total coordination function is lacking in the present system.

Following figure shows a relationship between port authorities and government. Under the

new concept, for regional matters, local port authorities are to take necessary procedures with the ministries concerned through a local port council. Meanwhile, at the national level port authorities contact the competent ministry to submit the port development master plan. The contact ministry establishes a coordinating committee, which consists of port-related ministries concerned.

Financial involvement by the central government in the new scheme will be basically the same as in the present framework for the time being. This is because it is necessary at present to establish a framework as soon as possible for port development with the participation of private sector in future. The difference is that the government establishes port development priorities financially by introducing port priority policy.

Figure 9.4.3 Relationship between port authorities and government



Source: JICA Study Team for ULIMAP

9.4.3 Characteristics of Proposed Port Authority in Turkey

- (1) Autonomous port administration
Granting port authority status to port management bodies establishes a foundation for an autonomous port administration system. Especially for major ports that have great influence on the national development, coordination function by the central government is strengthened through the approval of the port development master plans and so on.
- (2) Flexible port management
The system should reflect the comments or recommendations by the local port council to ensure that the port management bodies function in an efficient and customer-oriented manner.
- (3) Financial Independence
Pursuit of financial independence depends on the development policy of each port. The central government assigns financial priority based on the classification of ports (main ports /local ports etc.). At present, most port authorities in Turkey are not financially independent. (But some exceptional cases are found among port authorities that belong to Private Port Authorities.)

(4) Port development in liaison with regional development

Local governments (provinces or municipalities) can be involved in local port councils which are to be established at major ports preferably by laws to promote integrated land use between port area and the adjacent area, as well as effective use of the port area including environmental conservation. Necessary coordination would be done flexibly at the port authority. The competent government can entrust the statutory bodies with necessary authorities such as management of environment of port areas, if necessary.

9.5 Establishment of Sub-framework for Port Management

9.5.1 Strengthening Port Statistics System

Port statistics are very important as a tool for nationwide port development. It is essential to make full use of port statistics for recognizing present situation on port activities nationwide in establishing basic policy. The port statistics here are understood as the data related to port administration, management and operation such as cargo handling volume by port, and by handling shape. Especially cargo handling data are required in details in examining designing port facilities, procuring handling equipment and yard arrangement etc.

(1) Present Situation

Basic port statistics in Turkey have three categories by data sources: the Prime Ministry Undersecretariat Maritime Affairs (PMUMA), customs, and port management bodies. Unfortunately, there are many inconsistencies among the different data sources.

Firstly, the number of ports in port statistics by PMUMA is not consistent with the total number of ports. Because harbor master offices which keeps statistics are established only at major ports. In addition, the cargo handling volume is not consistent between PMUMA and port management bodies. The data of PMUMA are compiled based on the application for port entry procedure by captains. Meanwhile, the data of port management bodies are the cargo handling volume which are treated at the site.

Secondly, the category of conventional cargo is different between PMUMA and each port management body. Even worse, this holds true among each port management body. The fact is that each port management body compile necessary port data for its own use. One of the reasons is that there is no legislation requiring that port management bodies compile data in a standardized manner.

(2) Recommendation

- Authorization of Port statistics by port authority

At present in Turkey, the most systematic and consistent data are port statistics by PMUMA. The cargo handling data, however, is insufficient from the viewpoint of port development and promotion because the data source originally comes from inspection reports for port entry application. Another data source with regard to cargo handling

volume should be secured to supplement PMUMA data. In that sense, port statistics by port management bodies should be paid more attention. At least, port statistics of major ports which have significant impact on the national interest should be periodically reported to the central government under the law.

- Unified category of statistics

As for the statistics of PMUMA, it has been examined to adjust their coding system into global standards. Statistical categories should be unified among each port management body on the national basis. Related guidelines in EU or international organizations also should be examined as they must be compatible in future. Unified criteria on port statistics cargo enable comparison of the port data among all ports regardless of type of port management bodies, which is a powerful tool for nationwide port development policy making.

- Nationwide Physical Distribution Survey

Fundamental data on nationwide container cargo flows is useful for the examination of nationwide port development strategies. Periodical OD (Origin-Destination) survey for container cargoes is a supplementary means to grasp the cargo handling volume.

9.5.2 Management of Port facilities by Register

In many ports, port facilities management by register is not always being done in an integrated fashion by the port management body. Because port infrastructure is constructed and maintained by the government, while superstructure is constructed by the port management body. Management of port facilities including data collection should be implemented integrately by the port authority exclusively. In this way, it would become clear when port facilities need to be renewed.

9.5.3 Personnel Education System

(1) Present situation

Specialization on functional basis in the present port administration system works well in solving immediate problems. Because each expert in the related field can tackle subjects intensively. However, port administration involves dealing with a number of fields simultaneously in an effective manner.

Secondly, it is important for the staffs in charge of port development and administration to deepen their understanding of container transportation which will become prevalent even in Turkey from now on. Basic concepts such as punctual time management, door-to-door transportation and intermodal transportation should be considered in the construction of port facilities and port management and operation.

(3) Recommendation

- Personnel Changes among Port-related Ministries

Personnel changes among port-related ministries should be considered to increase communication and information sharing. It should be noted that bureaucracy in the government would inevitably hinder effective port management and operation.

- Establishment of 'Port and Harbor Council'

Persons of learning and experience in the field of ports and harbors should be utilized in the process of policy making. Fortunately, there are many talented people with wide experience in container transportation and port management around the business world in Turkey. A system to draw on their opinions should be established urgently. 'Port and Harbor Council' which consists of experts on port construction, port management and operation, and other experienced persons concerned, should be established in the government to give comments and recommendations when necessary.

9.6 Step-wise Preparation for the Nationwide Port Development

In order to realize strategies for nationwide port development, we tentatively propose the following steps. Considering the necessity to deal with changes of external environment, it is better to start the new institutional framework as soon as possible, and strengthen the system by adopting mitigating policies.

(1) Preparatory Stage: (~ 2002)

- The main ministry responsible for nationwide port development is decided.
- The competent ministry prepares draft framework of basic policy for nationwide port development plan.
- Port Planning Coordinating Committee should be established in the competent ministry for comprehensive overall administration on Ports and Harbors as an urgent measure for unifying port administration.
- Task Force on Effective Administration on Nationwide Port Development is established in Prime Ministry for restructuring authorities and organizations. The members are appointed by the ministers concerned under the legislation. This task force also discusses the draft framework on the basic policy making.
- Possibility of separating port account from rail account is discussed between MOT and TCDD.
- Personnel Changes among the port-related ministries are examined.

(2) Policy-Making Stage: (2003 ~ 2005)

- The competent ministry formulates specific policies in each field of the basic policy, based on the discussion in the Task Force. The competent ministry also establishes related laws and regulations on the specific policies.
- The competent ministry establishes guideline for port development master plan which

is to be made by port authority, based on the basic policy.

- Task Force establishes restructuring policy on overall port administration system such as the matters including allocation of authority among the relevant ministries concerned.
- Necessary revision of related laws and regulations on port administration is implemented as proposed:
 - 1) Definition of 'PORT' to be managed
 - 2) Introduction of 'PORT AUTHORITY'
 - 3) Introduction of Port Development Master Plan & coordinating system
 - 4) Reexamination in present related laws such as laws on establishment of local governments (Province, Metropolitan municipality, and Municipality), laws on land use, etc.
- Financial framework and allocation scheme are discussed among the ministries concerned, based on the progress of the meeting on TCDD account.
- New system to draw on experts' opinions in the administration is examined.
- The competent ministry establishes Task Force Team on formulating unified port statistics criteria in cooperation with PMUMA.

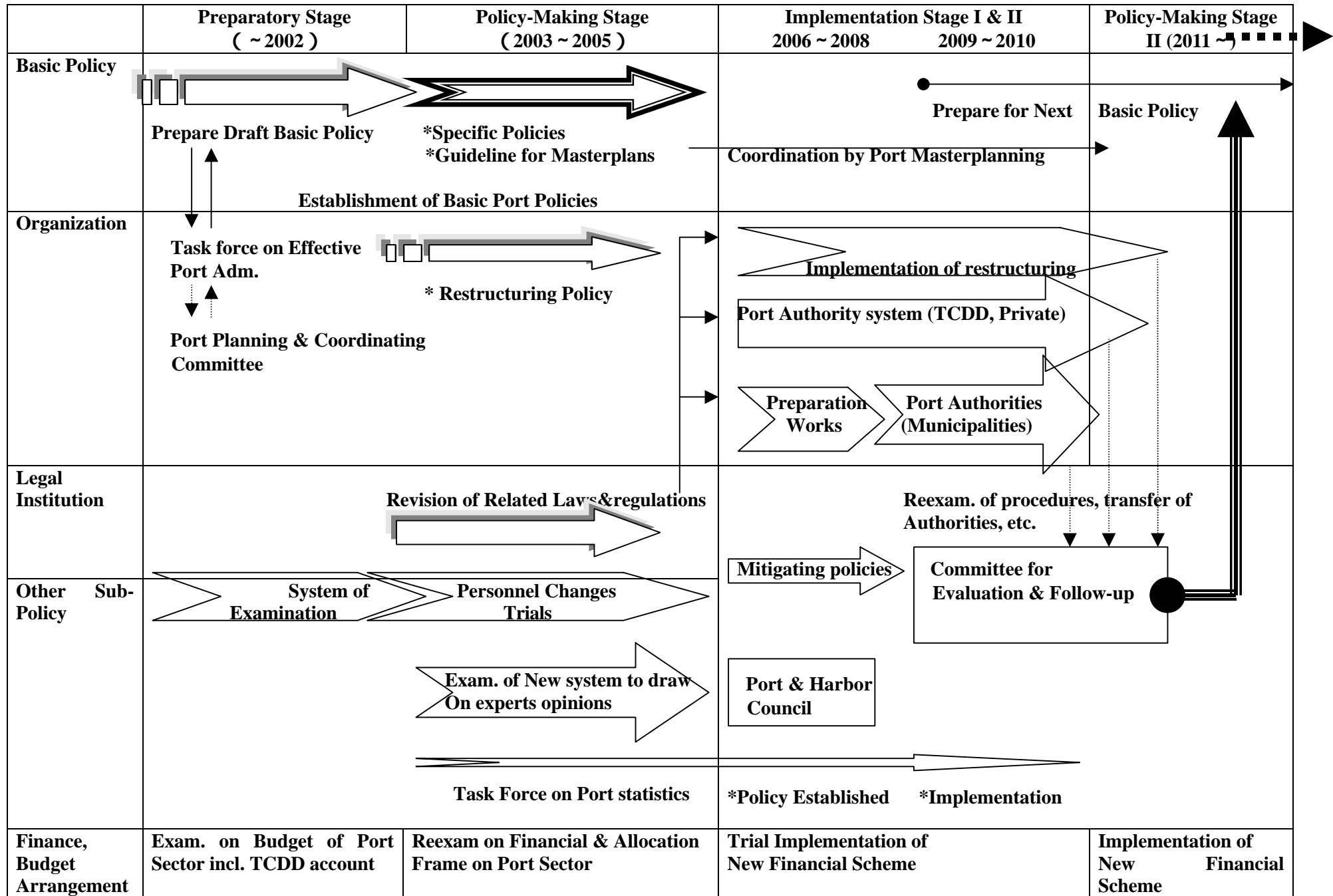
(3) Implementation Stage I: (2006 ~ 2008)

- The 1st restructuring of organization is implemented for integrating the port administration.
- Port Authority system is introduced for TCDD ports and Private ports.
- Preparatory works for introduction of port authority into local municipality governments are implemented such as personnel, job assignment, and staff training.
- Coordinating system through establishing port development master plan by each port authority is partly executed. (Period for trials and errors)
- Preparation of various sub-systems for mitigating drastic impacts are done by the ministries concerned.
- New financial scheme is implemented on trial base.
- Port and Harbor Council is established in the competent ministry.
- Task Force Team on formulating unified port statistics criteria establishes port statistics policy.

(4) Implementation Stage II: (2009 ~ 2010)

- The competent ministry prepares for next term port development basic policy.
- The 2nd restructuring of organization is implemented as the final stage.
- Port Authority system is introduced for local municipalities ports.
- Coordinating system through establishing port development master plan by each port authority is implemented.
- "Evaluation Committee for newly introduced system" is established by the ministries concerned to evaluate and take countermeasures as follow-up. This PLAN-DO-SEE process is repeated to realize the nationwide port development.
- New financial scheme is implemented.
- Port statistics system based on unified criteria are prepared by port authorities.

Figure 9.6.1 Procedure for the Realization of ULIMAP



Chapter 10 Strategy for Port Operation

10.1. Importance of Establishment of Basic Concept

10.1.1 General

In examining the strategy for port operation, effective use of existing facilities is getting more and more important owing to a lack of public funds. High cargo handling productivity should be realized in order to provide users with high quality services without further investment in facilities in the terminal. It is also necessary for port operators to enhance their productivity by introducing appropriate cargo handling system and facilities. In addition, introduction of EDI (Electronic Data Interchange) and simplification of custom clearance are also considered as a chain of efficiency of port operation.

In Turkey, generally, cargo handling productivity is not so high compared with many other major ports in the world. From the above-mentioned views, the details of the strategy shall be summarized as follows. In this chapter, the discussion shall be concentrated on port operations at TCDD ports, which comprise the major ports in Turkey.

- 1) Establishment of Basic Concept for Efficient Port Operation**
- 2) Improvement of Container Handling Operation**
- 3) Improvement of Conventional Cargo Handling Operation**
- 4) Improvement of Dry Bulk Cargo Handling Operation**
- 5) Introduction of EDI (Electronic Data Interchange) System**

10.1.2 Establishment of Basic Concept for Efficient Port Operation

In order to improve cargo handling efficiency, it is necessary for Turkish Ports to consider carefully the following basic concepts.

- (1) Effective Use of Existing Facilities**
- (2) Concept of Land-lord Port Type**
- (3) Encouragement of Competition**
- (4) Satisfaction of Customers (User-oriented Port)**
- (5) Monitoring the Performance of Operators**
- (6) Incentive for Good Performance**
- (7) Introduction of Payment based on Ability**

10.2 Improvement of Container Handling Operation

10.2.1 Evaluation of Present Container Handling Productivity

(1) Productivity of Container handling at Major Ports in Turkey

According to information reported from certain ports, the productivity of cargo handling is 22-25 TEU per hour at specific TCDD ports by using gantry cranes and 18-19 TEU per

hour by mobile cranes at some private ports. These figures are not bad. However, according to cargo volume-berthing time analysis based on TCDD statistics (Limani Aylık İstatistik Cetveli, 1998), the container handling productivity (gross time) can be assumed 10.11-10.17 box/hour/crane (about 15 TEU/h/c).

Taking into consideration “non-working time” for stevedoring preparation, various procedures & departure preparation (usually 2-3 hours), the productivity will increase to about 12-13 box/hour/crane (gross time). It can be assumed that net time productivity is approximately 15-17 box/hour/crane (about 30% up). Although the productivity may be improving little by little, it is still low compared with many other ports in the world.

Table 10.2.1 Productivity of Container handling at 3 Major Ports based on Cargo Volume-Berthing Time Analysis (1998)

Item	Hayderpasa	Izmir	Mersin
Cargo volume (TEU)	322,596	398,619	241,865
Cargo volume (box)	221,881	281,001	161,385
Total berthing time (hour)	21,812	27,628	15,949
Productivity (/)(TEU/hour/crane)	14.78	14.42	15.16
* Gross productivity(/) (Box/hour/crane)	10.17	10.17	10.11
* Revised Gross productivity (Box/hour/crane)	11.93	11.75	12.63
* Net productivity (Box/hour/crane)	15.50	15.27	16.41

Source : TCDD

* Note

“Gross productivity” includes idling time. “Net productivity” doesn’t includes idling time (break time, crane movement & hutch cover operation, etc).

(2) Comparison of Container Handling Productivity

Table 10.2.2 Productivity of Container Handling at 3 Major Container Ports (1998)

Item	Hayderpasa	Izmir	Mersin
Length (m)	* 650	1,050	980
Berth number	4	5	4
Maximum depth (m)	-12	-13	-10 ~ -14
Quay gantry crane	4 (40t)	5 (40t)	3 (40t)
Transfer crane	9	9	11
Holding capacity (TEU)	8,800	11,072	8,474
Container yard (m2)	179,040	211,017	266,130
TEU (1998)	322,596	398,619	241,865
/ (TEU/m)	496	379	246
/ (TEU/berth)	80,649	79,723	60,466
/ (TEU/crane/year)	80,649	79,723	80,621
/ (Times year)	36.65	36.00	28.54

* The figure doesn’t include the container terminal (250m) with ship cranes.

Table 10.2.3 Result of Comparison with Other Major Ports

Description	Unit	Turkish 3 Major Ports (1998)	Other Major Ports (1997)
Container handling productivity	TEU/m	246-496	773-1,919
Quay crane operational productivity	TEU/crane/year	79,723-80,649	88,888-150,000
Container turnover in storage	Times year	28.54-36.65	39.18-344.37

Table 10.2.2 summarizes productivity of container handling at Turkish major ports (1998). The Table 10.2.3 compares productivity of major Turkish container ports (Hayderpasa, Izmir & Mersin) and other major ports in the world.

Container handling productivity of all Turkish ports (246-496TEU/m) is less than that of major ports. This means there is room for receiving more cargoes. In terms of quay crane operational productivity, Izmir (99,654) compares favorably while Hayderpasa (36.65) & Izmir (36.00) demonstrate high productivity in container turnover in storage.

(3) Reasons for Low Performance

Following reasons for low productivity of container cargo handling at TCDD ports are identified. First of all, the “non-competition” environment (monopolistic structure) can be pointed out. In addition, the following reasons can be seen from the physical point of view.

Lack of capacity causes traffic congestion in the port and reduces the efficiency of container handling. Containers unloaded from ship must wait for the arrival of tractors.

Infrastructure of the port is in poor condition and this has a negative impact on the vehicle and equipment.

In specific ports, pavement of container terminal is deteriorated, preventing smooth transportation of container traffic.

Cargo handling equipment is quite old and often requires maintenance, which leads to reduced productivity.

Number of spare parts for the container handling equipment is insufficient.

Since tugs and pilots services are operated by TCDD and TDI respectively, insufficient linkage in the works of these services causes delay in the vessel schedule.

10.2.2 Establishment of Targeted Productivity

The following Table 10.2.4 shows container handling productivity in neighboring major ports. The average container handling productivity in neighboring competitive ports such as Algeciras & Gioia Tauro account for 23-26 box/hr.

Table 10.2.4 Container Handling Productivity in Neighboring Major Ports

Port	Container traffic	Container handling productivity (Gross Time)
*Algeciras (Spain)	1,825,614 TEUs (1998)	Av. 25 Box/hr (Ships operation) Av. 27 Box/hr (Yard operation)
* Gioia Tauro (Italy)	2,125,640 TEUs (1998)	Av. 26 Box/hr (Ships operation)
* Marsaxlokk(Malta)	720,000 TEUs (1998)	Av. 23 Box/hr (Ships operation)
* Damietta (Egypt)	610,000 TEUs (1997)	Av. 14.3 Box/hr (Ships operation) (337,494 box ÷ 23,593hr = 14.3)
* Port Said (Egypt)	312, 454 TEUs (1997)	Av. 16.4 Box/hr (Ships operation) (312,454 box ÷ 19,009hr = 16.4)
* Alexandria (Egypt)	188,000 TEUs (1997)	Av. 16.9 Box/hr (Ships operation) (133,031 box ÷ 7,890hr = 16.9)
* El Dekheila (Egypt)	151,622 TEUs (1997)	Av. 18.6 Box/hr (Ships operation) (112,446 box ÷ 6,032hr = 18.6)

Source : * Study on Master Plan & Rehabilitation Scheme of the Great Alexandria Port (OCDI, November 1999)

** Study on the Port Development Plan in the Syrian Arab Republic (OCDI, August 1996)

Generally speaking, current world trends indicate that the targeted productivity of container handling should be 24-25 boxes/hour per crane. It is required to achieve the targeted productivity of container loading/unloading operation to handle the future container traffic in the existing facilities. This target means that a crane operator has to finish one cycle of movement within 2 minutes and 30 seconds.

Although efficiency of container loading/unloading operation depends on the skill or technique of a crane operator, the productivity of marshalling yard is also very important for quick and smooth operation.

10.2.3 Effective Measures for Container Handling Operation

In order to achieve the targeted productivity, following measures shall be promoted from the practical point of view.

(1) For Unloading Operation

- 1) In case of unloading, a crane operator has to know in advance the location of containers to be lifted in a hold or on deck.
- 2) An operator of quayside crane should not stop a spreader to find a container to be lifted.
- 3)The operator has to put a spreader on a container exactly and should not hit a spreader or container against other containers.
- 4) A crane operator should move a spreader at the appropriate and constant speed to

prevent the sway of containers.

- 5) Drivers of yard tractors should cooperate with a crane operator to minimize delay at the interface between a quayside crane and stacking area to achieve the targeted productivity.
- 6) Three trailers usually work for one quayside crane. 3 drivers make up a team and they transfer containers in turn from quayside to stacking area or vice versa. If a trailer needs more than 7.5 minutes (2.5 minutes × 3) to return to quayside, it is necessary to increase the trailers of one team.

(2) For Other Operations

- 1) In case of loading operation, before arrival of a vessel, it is necessary to get together and stack containers to be loaded in accordance with the stowage bay plan of vessels.
- 2) In case of delivering containers to consignees, it is required to retrieve nominated containers from stack quickly.
- 3) Information system in the following chapter should be adopted for precise and efficient operation.

(3) Importance of Roles of Signalman

In order to achieve the targeted productivity, signalman's role to support a crane operator is also very important for quick and smooth operation. A signalman on shore must instruct a tractor/trailer driver properly to adjust the halt position so that an operator of quayside crane/RTG can load containers onto tractor/trailers smoothly. To give proper signals to crane operators, a crane operator needs to work as a signalman in turn while he is not operating a quayside gantry crane.

(4) Minimizing the Breakdown Time of Container Handling Equipment

To achieve the targeted productivity, it is essential to minimize the breakdown time of container handling equipment. Competent personnel should be appointed as a yard operator. To minimize the breakdown time of quayside gantry crane or RTG, backup spreaders must be procured. It is also advisable to conduct preventive maintenance at a regular interval

(5) Establishment of Targeted Time for Tractor Flow (Round Time)

Advanced container terminals in the world have targeted productivity for tractor flow in order to satisfy customer's demands. It is called "round time" (dwelling time of tractor). Round time is different by operation types such as transfer crane type and straddle carrier type. The most popular target is within 30 minutes for tractors from gate-in to gate-out. It is advisable for TCDD ports to establish appropriate targeted time (desirably, within 30 minutes) based on accurate understanding of the current situation.

10.2.4 Introduction of Advanced Technology

To improve the efficiency of container handling operation, it is essential to exchange information and communicate effectively between crane operators and the supervisor at the control center. In Turkish container ports (Hayderpasa, Izmir), “walkies talkies” are being favored for communication between their offices and crane operators. However, most of operations are covered by man-power communication. The following 4 systems for transmitting information are currently used at container terminals. The following Table indicates the particularities of each system.

Table 10.2.5 Particularities of Advanced System

Item	Ways of Utilization	Particularities
(1) Walkie Talkies	One way communication from control center to crane operators	Relatively old system The system is fitted for small-scale CT
(2) Mobile Radio Terminal on Vehicle System	Two way communication between control center & crane operators	Exchange of real-time information The system will widely introduced.
(3) PHS	Two way communication between control center & crane operators	The system is fitted for small-scale CT. Small investment
(4) GPS	Installed on vehicles to detect the locations	Detecting & indication of exact location of handling equipment. The system makes it possible to give appropriate instruction to operators.

10.2.5 Introduction of Computer Systems

(1) Documentation

1) Current Situation

Currently computers in TCDD ports are used only for specific administrative activities such as accounting, statistics & personnel. Computers are not yet connected with outside users. In Hayderpasa port, some specific activities (control of location of containers, container yard plan & personnel information) are disposed by computer. Therefore, TCDD does not make full use of the potential of computer systems.

If a computer system is introduced for other wider fields, for example, documentation, berth assignment, accounting, administration work and personnel management as well as statistics, the documentation will be streamlined and the required time for port users to

finish necessary procedures will be shortened. Consequently, the dwelling time of cargoes will be shortened and capacity of the port will increase.

2) Importance of Computerization

Computerization will make it unnecessary to get access to the same information on other documents and possible to use repeatedly the information once fed into computers. It is also expected that compiling statistics concerning port activities will become easier.

Therefore at first, TCDD should introduce the computer system concerning documentation inside the PMB (Port Management Body), and as a next step, it is necessary to upgrade functions and expand the areas covered by the computer system. Consequently, the computer system will become an open system in which the parties concerned can participate. The following measures shall be considered to enhance container handling productivity.

To promote a computer system concerning documentation inside the PMB at first.

To upgrade functions and expand area covered by the computer system as a next step.

To introduce computer system such as container inventory system, delivering/receiving control system and loading/unloading control system.

To exchange information and communicate effectively between crane operators and the supervisor at the control center in the container terminal by introducing advanced technology.

To implement EDI system

(2) Container Inventory Control

1) Inventory control of containers stored in CY is the most important task in container terminal operation. It is essential to grasp the location and kind of containers stored in CY to operate a container terminal efficiently.

2) In Hayderpasa port, most of container inventory control is still conducted by “inventory cards” although the container throughput amounts to 322,596 TEU (1998).

3) Gate offices, yard control center and container handling equipment should be linked with each other to exchange information effectively and assure the accuracy of information on containers. The above information is entered into the terminal computer at the gatehouse and transmitted to the control center in real time. The yard control center instructs operators of container handling equipment to pick up/stack the designated containers.

(3) Container Delivering/Receiving Control System

1) Gate offices of container terminal play important roles in receiving/delivering containers from/to shippers/consignees. Delivering containers is one of the most important functions of a container terminal. Gate is the boundary separating the limit of responsibilities between shippers/consignees and the container terminal.

- 2) In receiving an export container, it is important to decide its optimum location in CY based on the container's information for efficient operation.
- 3) In delivering an import container, it is important to instruct the tractor/trailer driver to go to the location of the containers quickly and to inform the operator of container handling equipment of the tractor/trailer's arrival.
- 4) It is possible to grasp the storing location and exact information on container by inputting and renewing it into a terminal computer in real time after verifying the driver's documents and the container.

(4) Loading/Unloading Operation Control System

- 1) It is important to prepare an operation plan so that one crane does not interfere with the operation of another crane. In loading export containers, it is very important to load containers based on the yard planning system by weight, port of discharge and container size for stability and safe navigation of vessels.
- 2) Necessary information on containers should be obtained from shipping lines or agents as early as possible. Obtaining the information in advance enables a terminal operator to prepare the working schedule indicating the order of unloading/loading containers and to minimize the operation time.
- 3) After loading containers, the terminal operator prepares the stowage bay plan, which indicates the result of the operation, and passes it to the captain or shipping agent. Making the stowage bay plan is an important task of a terminal operator. In advanced container terminals, the operation section makes stowage plans with a computer system. In Turkey, port users (shipping agents) usually must make bay plan at their own costs, which is completely against the concept of "user-oriented" port.

10.2.6 Proper Use & Maintenance of Cargo Handling Equipment

(1) Replacement of Old Cargo Handling Equipment

As mentioned before, generally, cargo handling equipment of Turkish ports is rather old. The use of old and insufficient cargo handling equipment leads to inefficient cargo operation. Therefore, it is imperative for Turkish ports to replace old handling equipment. It is noted that the use of old equipment causes not only inefficient operation but may also result in fatal accidents for workers.

(2) Importance of Continuous Maintenance

So as to maintain the handling machines in a good condition anytime, it is essential to inspect them at fixed intervals such as 1, 6 and 12 months. It is one of the most important jobs in managing a container terminal to prevent breakdowns during the ship's

loading/unloading operations.

(3) Preparation of Spare Parts

In order to maintain each piece of handling equipment in good condition, it is necessary to keep a proper stock of such a wide range of spare parts and supply them as necessary. However, as it is difficult to do so by hand, making use of computer becomes essential.

10.2.7 Enrichment of Training System

Introduction of sophisticated computer system will be essential to improve port operation in Turkey. Appropriate training to master computer shall be provided to all staff at TCDD ports. Enrichment of the training programs for each staff will improve overall service level for port users.

10.3 Improvement of Conventional Cargo Handling Operation

10.3.1 Evaluation of Present Conventional Cargo Handling Productivity

Table 10.3.1 Standard Productivity of Conventional Cargo handling at TCDD Ports

Package style	Kinds of cargo	Major handling style	Productivity (ton/hour)
Bag (grain)	Sugar	Shore crane with hook & sling	16.6 t/h
	Rice		16.6 t/h
Bag (chemical)	Fertilizer	Shore crane with hook & sling	19.3 t/h
	Sulfur		9.9 t/h
	Cement		19.9 t/h
Box	Olive oil	Shore crane with hook & wire	12 t/h
	Citrus fruits		12 t/h
	Frozen meat & fish		13 t/h
Palettes	Chemicals	Shore crane with hook & pallet sling	15.9 t/h
	Citrus fruits		15.3t/h
Bale	Paper	Shore crane with hook & sling	20.6 t/h
Barrel	Small barrel	Shore crane with hook & special sling	18.6 t/h
	Olive oil & wine		18.6 t/h
Roll	Paper roll	Shore crane with hook & rope sling	20.6 t/h
	Kraft paper		37.3 t/h
	Steel bar	Ship gear with hook wire	23.3 t/h
Bundle	Sawn timber	Shore crane or mobile crane	31.3 t/h
	Plank timber		28.6 t/h
	Steel coil	Shore crane with hook & coil sling	49.9 t/h

Source : TCDD Note : Standard tonnage ÷ 7.5 hours (1shift)

Table 10.3.1 shows the standard productivity for conventional cargo established by TCDD. The average productivity ranges from 19.50-26.82 ton/hour excluding that of private companies. Generally, the productivity is not so high. Some reasons for the low productivity can be pointed out : the waiting time for custom clearance, many direct loading & unloading, unavailability of truck/forklift and old handling equipment, etc. Such waiting time makes operational efficiency relatively low. It is necessary for Turkish ports to take effective measures in order to improve their productivity.

10.3.2 Establishment of Targeted Productivity

It is essential for Turkish ports to establish a targeted productivity for conventional cargo operation in order to promote efficient operation. The productivity depends upon various conditions such as operator's skill, climate, facilities, equipment etc. In addition, the overall productivity depends not only on the productivity (1) of transfer from vessel to quayside but also on the productivity (2) of transfer from quayside to storage area (open yards or warehouse/sheds).

The following Table shows the examples of targeted productivity from vessel to quayside. It is possible to raise the productivity by approximately 20-25 % in 2010 and 45-50% in 2020 by using effective measures mentioned later.

Concerning the unloading operation, the targeted productivity from wharf to warehouse by cargoes (bagged cargo, steel products, timber, paper products & etc) shall be established. Once establishing the target, all kinds of effective measures shall be considered to achieve the target.

Table 10.3.2 Examples of Targeted Productivity of Conventional Cargo at TCDD Ports

Package style	Kinds of cargo	Present Standard Productivity (ton/hour)	Future Productivity (ton/hour)	
			2010 (20-25%up)	2020 (45-50%up)
Bag (grain)	Sugar, Rice	16.6	20	25
Bag (chemical)	Fertilizer, Cement	19.3	24	28
Box	Olive oil, Fruit	12	15	18
Roll	Paper roll	20.6	25	30
Bundle	Sawn timber	31.3	39	46
	Plank timber	28.6	35	42
	Steel coil	49.9	62	75

Prepared by OCDI

10.3.3 Effective Measures at Conventional Handling Operation

(1) Private Sector Participation in Conventional Cargo Operation

In order to increase the productivity, it is essential for Turkish ports to utilize know-how,

technology and experiences of the private sector. Conventional cargo operation is the most suitable field for private sector participation owing to its labor-intensive nature. The participation of the private sector in specific berths of TCDD ports shall be allowed on certain conditions in the future. The competition between the public sector (TCDD) and private sector will be useful to increase the productivity and eventually boost the economy.

(2) Establishment of Comprehensive Terminal Operators for Conventional Terminals

This is very common at conventional terminals in advanced European ports. The conventional terminals are divided into some portions and they are allocated to the terminal operators. Each terminal should have the appropriate size for conventional cargo handling and have open storage yards and warehouses for exclusive use. In addition, a terminal operator can preferentially use a berth in front of its storage area. It is essential to establish comprehensive terminal operators, which conduct everything from cargo handling operation to warehousing in order to secure more efficient operations.

(3) Avoiding Direct Loading/Delivery

In case of conventional cargoes, loading/unloading operations are generally performed with shore cranes or ship's cranes. In Mersin port, 90% of conventional cargoes are directly loaded on trucks or unloaded from trucks. Although this method reduces cargo damage during operation, productivity is lower than when landing on the quay. Landing cargoes on small platforms of trucks/trailers makes the cycle time longer. The throughput of cargoes depends on the arrival of trucks and the turn-around on the apron. It is advised that this method should be adopted only for handling specific cargoes, such as hazardous cargoes, frozen cargoes, perishable cargoes and special heavy cargoes.

(4) Utilization of General Cargo Forklifts & Warehouse

So far, general cargo forklifts and warehouse are not utilized positively in conventional berths. This is mainly owing to shortage of space in storage areas. However, as mentioned in (3), it is essential to promote non-direct loading & delivery operation to secure quick turnover and increase the productivity. In order to do so, TCDD should utilize forklifts on the wharves as much as possible and transfer cargoes quickly from wharves to storage area (open yards or warehouse/sheds).

(5) Promotion of Pallet System

It is necessary to use pallets for landing cargoes on the quay so those forklifts could pick up, carry and sort the landed cargoes and store them in the sheds/warehouse behind the quay. In addition, palletized cargoes are also very easy for handling in vessels by using forklifts. Therefore, bagged cargo such as fertilizer and sugar and cartons must be palletized as much as possible to increase the throughput.

(6) Securing Sufficient & New Cargo Handling Equipment

Cargo damage is likely to happen during the loading/unloading operation rather than the sea transportation. The lack of adequate cargo handling equipment (rope, wire slings, spreaders & attachment for forklifts) is a main factor. In addition, the condition of open yard is also a contributing factor.

Furthermore, handling equipment for general cargo is very old compared with container handling equipment. The use of old and insufficient cargo handling equipment leads to inefficient cargo operation. That old handling equipment should be replaced by the newest types as early as possible. This will be helpful to increase the overall productivity.

10.4 Improvement of Dry Bulk Cargo Handling Operation

10.4.1 Evaluation of Present Dry Bulk Cargo Handling Productivity

According to the data (Limani Aylik Istatistik Cetveli in 1998) provided by TCDD, average productivity for dry bulk ranges from 33 ton/hour (Mersin) to 65 ton/hour (Bandirma) by using grab bucket type and 126 ton/hour (Izmir) and 169.55ton/hour (Mersin) by using pneumatic unloader. Although TCDD has 2 pneumatic unloaders (160t/h) and 10 (50t/h) at 3 TCDD ports, the discharging capacity is not so high.

It can't be said that productivity of dry bulk handling is high. Generally, productivity for dry bulk mainly hinges upon the quality of the cargo handling equipment. Therefore, the reasons for low productivity are mainly due to the old handling equipment and its low capacity. In the future, it is expected that specific Turkish ports need dry bulk terminals with longer length and deeper depth (e.g. length 300m & depth -15m). In order to raise the productivity and meet the increasing demand for dry bulk cargo, it is advisable for ports to introduce advanced handling equipment.

10.4.2 Examples of European Countries & Japan

(1) Types of Dry Bulk Handling Equipment

Generally, there are 3 types for dry bulk handling (grab bucket type, pneumatic type & continuous type). The following Table 10.4.1 shows a comparison of each type.

In European countries, most bulk terminals for iron ore and coal adopt unloading machines (grab type). The main reason is that the maintenance cost is cheaper than that of continuous type. Pneumatic unloader is the most popular for grain terminals. However, most ports are considering converting to mechanical types due to its bad energy-efficiency.

Different from European countries, continuous unloader is favored over the grab unloader in Japan, which has many special ports. Continuous unloader has its advantages in efficiency, energy-saving and environmental friendliness (See Table 10.4.2).

Table 10.4.1 Comparison of Each Type

Description	Grab Bucket Type	Pneumatic Type	Continuous Type (Mechanical)
Bottom-cleaning	×		× ~
Energy-efficiency		×	
Multi-purpose		×	×
Dust-discharging	×		

* (Excellent), (Middle), × (Poor)

Table 10.4.2 General Preference for Dry Bulk Handling Equipment in European Countries & Japan

Item	Kinds of Dry Bulk	Handling Equipment
Most European Countries	Iron ore & coal	Grab unloader
	Grain	Pneumatic unloader
Japan	Iron ore & coal	Continuous unloader
	Grain	Continuous unloader & Pneumatic unloader

10.4.3 Introduction of Advanced Handling Equipment

The productivity will be improved rapidly (see Table 10.4.3) by employing the newest handling machines with high capacity such as pneumatic type (300-400 t/h) and mechanical type (400-800 t/h) at TCDD ports. It is desirable for TCDD dry bulk ports to introduce the newest machines in order to meet increasing demands for dry bulk cargo by 2020.

Table 10.4.3 Improvement of Dry Bulk Handling Productivity

Port	Kinds of cargo	Present Productivity(1998) (ton/hour)	Future productivity (2020) (ton/hour)
Mersin	Grain & Ore	33.07	300-400
Bandirma	Ore	65.10	400-800
Izmir	Grain	48.21	300-400

10.4.4 Necessity of Appropriate Private Sector Participation for Dry Bulk Handling

In both European countries and Japan, dry bulk cargo is mainly handled by the private sector due to the nature of that business. It is advisable for TCDD ports to introduce gradually the private sector into dry bulk handling to increase its productivity and meet the increasing demands. In order to do so, appropriate deregulation is required. For example, it is one idea that specific terminals at TCDD ports are exclusively rent to specific private sector with sound business mind on certain conditions. TCDD will be able to get certain rents from the private sector and avoid further investment for the equipment (land-lord port type).

10.5 Introduction of EDI (Electronic Data Interchange) System

10.5.1 General

It is essential for Turkey to consider the introduction of a more advanced information system in the future. Advanced ports such as Singapore and Rotterdam in the world are not only developing port information network systems but also promoting terminal automation. Recently major overseas ports have been implementing EDI to control entry/departure to and from a port without paper work and long procedures. In major overseas ports, EDI for necessary procedure for arrival/departure vessels has been introduced, and “Paperless Procedure” and “One Stop Service” has been implemented.

To increase international competitiveness and provide user-oriented services, it is necessary for Turkey to promote the implementation of EDI, which would simplify and improve efficiency of port and harbor administration. It is advisable for Turkish Ports to learn from the examples of major competitive ports in advanced countries.

10.5.2 Purposes of EDI

(1) Definition of EDI

EDI represents ;

- | |
|--|
| <ol style="list-style-type: none">1) Interchange of standardized data for trading through computer2) Used by different organizations3) Based on a widely agreed design |
|--|

EDI system in port procedure makes it possible to apply for various procedures and exchange information quickly and accurately by linking the network to government agencies & outside users.

For example, when the vessel enters the port, the shipping agencies must submit a lot of applications and declarations to relevant government organizations (custom office, harbor master, quarantine, immigration, port management body, etc). If EDI system is implemented, users can submit these applications and receive permissions through computer network.

(2) Merits of EDI

EDI makes it possible to solve various issues brought by change of conditions in international distribution, to implement information exchange regarding trade, clerical procedures & settlement and to exchange business data and information between government organizations and port users.

The merits of EDI can be summarized as follows ;

- | |
|---|
| <ol style="list-style-type: none">1) To enable port users to complete almost all procedures by submitting electronic application to only one authority2) To minimize paper flow resulting in elimination of errors in communication and faster response3) To share same data among different organizations & to retrieve necessary data quickly |
|---|

- 4) To increase efficiency of documentation procedure through simplification and electronization of administrative procedure
- 5) To improve the level of service for users by reducing total costs & minimizing entry/departure time
- 6) To strengthen international competitiveness of ports

10.5.3 Example of Singapore

(1) Outline of Advanced System

Singapore is the largest container port, handling 15 million TEUs in 1998. Approximately 80 % of them are transshipment containers. In the port, automation of terminal is indispensable due to efficient handling of increasing containers and shortage of workers. Singapore has the most advanced EDI system in the world. To meet the changing needs of customers, the applications are continuously enhanced with state-of-the-art technologies and move user-friendly tools. "TRADENET", "PORTNET", and "MAINS" are some of the EDI systems that help shipping lines & forwarders transact business conveniently and expeditiously with the port and to tranship their containers in the fastest possible way. The EDI system is based on UN/EDIFACT (world standard) as business protocol message.

(2) TRADENET (For Trade & Custom Clearance)

In Singapore, both "TRADE NET" (application for trade & custom clearance) and "PORTNET" (application for port management body) were introduced from 1989. While TRADE NET is managed by TDB (Trade Development Board), PORTNET is managed by PSA. TRADE NET provides various kinds of services related to trade such as import/export declaration, access to trade statistics database, etc.

Today, more than 95 % of import/export custom declarations are disposed through TRADENET. As a result of introduction of Trade Net, disposal time for documentation of trade procedures has been shortened from 1-4days to 15 minutes.

(3) PORTNET (For Port Management Body)

"PORTNET", established in 1989, is a 24-hour on-line electronic data communications system between PSA (port management body) and its customers. PORTNET is now connected with approximately more than 1,400 users (shipping agencies, consignees, forwarders, truck companies, etc.). In addition, "PORTNET" also can provide easy access service to "TRADENET".

(4) MAINS

In addition, "MAINS"(The Maritime Information System), which integrates both systems (TRADENET & PORTNET) came into use from the end of 1992 in order to eliminate duplication of data input among different organizations. MAINS enables PSA to share information with other agencies and port users to exchange both information.

10.5.4 Gradual Procedure for Introducing EDI System in Turkey

(1) Introduction of Computer System for Documentation

Although the ultimate goal of computerization is EDI, it takes a long time to enact or amend relevant laws and regulations and to establish consensus and cooperation among concerned parties to implement EDI. Therefore at first, PMB (TCDD & TDI) should introduce the computer system concerning documentation inside the PMB, and as a next step, it is necessary to upgrade functions and expand the areas covered by the computer system. Consequently, the computer system will become an open system in which the parties concerned can participate.

(2) Promotion of One-Stop Service System (Single-Window Service System)

After introduction of computer system for documentation & many other fields, the relevant government agencies and PMB should promote the “one-stop service system” in every international port.

The system makes it possible for port users to complete almost all procedures by submitting application to “only one” authority. If this system is introduced, cumbersome procedures of bringing documents from one department to another for port users can be eliminated. It is very rational for the government and PMB to proceed to EDI system after the introduction of single-window service. The combination between EDI system and one-stop service system makes overall procedures more reliable and easier without consuming time & money consuming and many kinds of papers.

(3) Government Strong Leadership for Promoting EDI

The central government is expected to show strong leadership in introducing EDI system as follows ;

- 1) The government shall work to establish consensus and cooperation among concerned parties.
- 2) At that time, the government shall listen to the views of port users and users associations as much as possible.
- 3) At the same time, the government shall cooperate with related world organizations in order to establish EDI system based on world standard.
- 4) Based on the domestic and world based-consensus, the government shall enact or amend relevant laws and regulations.
- 5) In addition, it takes a lot of money to implement EDI network. Related business associations may be required to share a part of the costs.

However, the government should not hesitate to invest in information technology. Without appropriate & quick information investment by both public and private sector, there is a danger that Turkish ports will be further and further behind neighboring rival ports.

(4) Implementation of EDI System based on International Standard

At first, it is necessary for Turkish ports to introduce EDI system at every container port. However, it is necessary for the government to implement EDI by using “widely accepted common terms” (protocol). Without a widely agreed rules and standards, EDI system can’t work well. In this respect, the following 2 factors shall be carefully considered.

1) Business Protocol Standard

EDI is to standardize the formats to be used. If users don’t comply with “the common terms” agreed on among parties concerned and “the formats” needed for output were different from terminal to terminal in the work, EDI would never work effectively. Therefore, “a single standardized format” (EDI standard = Business Protocol Standard) must be used in common by all participants all over the world.

2) Other Standards

In addition, other important matters (ways of data transmission, business operation & contract terms) must be standardized.

In this respect, the standardization is classified into the following 4 sectors of contracts.

- | |
|--|
| <ul style="list-style-type: none">(a) Communication Protocol (on how to transmit data)(b) Business Protocol (on how to express data)(c) Business Manual Protocol (on business operation)(d) Basic Business Protocol (on contract terms) |
|--|

Today, standardization of EDIFACT (Electronic Data Interchange for Administration, Commerce & Transport) has been studied among many nations all over the world under the guidance of the United Nations. Today, “UN/EDIFACT” is thought to be the world standard of business protocol message. More and more advanced ports in the world have introduced “UN/EDIFACT” as the most reliable world standard.

10.5.5 Simplification of Customs Clearance

(1) Many competitive ports in the world have been making efforts to simplify cumbersome custom procedures in order to be “user-oriented” ports. These efforts include simplifying physical inspection, minimizing the number of documents, unification of necessary application forms and introduction of EDI system. “

(2) In Turkey, container box is regarded not as a “container” but as a “cargo”. Therefore, even “empty containers” are subject to custom clearance (physical inspection), in which containers are regarded as “imported commodities” and taxed. This is one of the reasons for the long waiting time of containers in the port. In order to reduce the waiting time of containers and to secure smooth operation in the port, physical inspection against empty containers should be limited to the necessary and minimum scope.

(3) Some port users complain about high ratio of sampling checks. To speed up custom

clearance, the ratio of sample check should be limited to approximately 5%. At first, customs officers should select and inspect only one container physically regardless of the volume of consignment. If they do not find contraband in this container, they should end the physical inspection.

(4) Some port users complain that the custom law and legislation have not been changed in accordance with the European Custom regulations even after joining the “Custom Union”. The government would execute the New Custom Law (gazette No.23866) after 5th, February 2000 in order to try to introduce European standards for simplifying of customs procedures. In addition, the government has an idea to introduce EDI system to customs documentation in the future. Although the details are not clear, careful attention shall be paid to the directions.

Chapter 11 Environmental Consideration

11.1 Environmental Issues around Ports

11.1.1 Administrative aspects

One of the most important activities concerning the environment is the periodical monitoring of water quality, air quality, noise level and other necessary items. In Turkey, this kind of monitoring is conducted by the Ministries concerned, their local branches and Municipalities. A port managing body has nothing to do with the periodical environmental monitoring even in the port area except the case in which the port managing body is conducting the construction works and relevant laws and regulations oblige the port managing body to monitor the environmental qualities.

11.1.2 Environmental Qualities around Ports

(1) Water quality

Many environmental reports suggest environmental seriousness of the following areas.

- 1) The Bay of Iskenderun
- 2) The Bay of Izmir
- 3) The Bay of Candarli
- 4) The Bay of Izmit
- 5) The Bay of Gemlic
- 6) The Bay of Golden Horn

(2) Air quality

As air quality monitoring in port area is conducted by other organizations, port managing bodies do not have enough data for analysis on air qualities.

(3) Noise level

As noise level monitoring in port area is conducted by other organizations, port managing bodies do not have enough data for analysis on noise levels.
the case of petroleum transport, and improper disposal of ballast and bilge waters.

11.1.3 Review of an Existing Report of Environmental Impact Assessment

The Study Team reviewed an existing report of Environmental Impact Assessment on a new terminal project. This EIA report deals with various matters to be tackled during the construction works and operation.

11.1.4 Transport System Depending Mainly on Road Traffic

The share of road traffic in domestic cargo movement has been increasing constantly in the term of the present Five-year Development Plan

11.2 Recommendation

- (1) To take necessary measures for preventing destruction and pollution of maritime environment
- (2) To provide port managing body with the authority to monitor the environmental quality and implement environmental projects
- (3) To establish comprehensive oil-combating system involving the relevant public and private sectors
- (4) To do environmental consideration in port development not only on the port facilities and activities but also on related economic activities in the hinterland
- (5) To establish domestic maritime transport promotion policy

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and Recommendation

1. Strategy for Port Infrastructure Development

(1) Classified port development system

Since a major-port has a significant effect on the national interest. The government has to pay special attention to the development and maintenance of the function of the port, even if the port is constructed and managed by a private sector. The government should bear the following roles.

- (1) To examine the coherency of the port development plan/ project with the long term port development policy
- (2) To examine the coherency of port management and operation with the long term port development policy
- (3) To extend possible assistance to the port managing body to improve the basic port facilities and quality of port management and operation
- (4) To take the initiative in establishing a united organization for port management and operation in case of a “group port”
- (5) To collect the necessary data and information to examine the progress of the long term port development plan and to revise the plan

Twenty-nine (29) ports are selected as major ports.

Mediterranean:	1) Iskenderun TCDD,	2) Iskenderun,	3) Botas
	4) Mersin,	5) Antalya,	
Aegean	: 6) Marmaris,	7) Bodurum,	8) Gulluk,
	9) Kusadasi,	10) Izmir,	11) Aliaga,
Marmara	: 12) Canakkale,	13) Bandirma,	14) Mudanya,
	15) Gemlik,	16) Izmit,	17) Hydarpassa,
	18) Istanbul TDI,	19) Ambarli,	20) Silivri,
	21) Tekirdag,		
Black Sea	: 22) Eregli,	23) Bartin,	24) Samsun,
	25) Ordu,	26) Giresun,	27) Trabzon,
	28) Rize,	29) Hopa	

(2) Container facilities

1) The Mediterranean Sea

Since the present container volume handled in Iskenderun Port is far below the existing capacity, the new container terminal should be constructed in a timely manner, watching

the future progress of container volume of the port.

Mersin Port handles 242 thousand containers at the existing container terminal with three gantry cranes. Since it is certain that the container volume will exceed the existing capacity within several years, the new terminal should be constructed step by step to work in that case. Full capacity of 1.0 million TEUs of the new terminal is not necessary at the first stage of the development.

2) The Aegean Sea

Izmir Port handles 399 thousand containers at the existing container terminal with three gantry cranes so far. Since it is certain that the container volume will exceed the existing capacity within a few years, the new terminal should be constructed as soon as possible. Even if the new terminal will be completed, the shortage of capacity of 30- 40 thousand TEUs in 2010 and of 0.9- 1.2 million TEUs will be expected in a Aegean Sea region. Another new terminal with sufficient capacity should be constructed. A close investigation and study should be done as soon as possible to determine the most suitable location for the large container terminal.

3) The Marmara Sea

Since it is certain that the container volume will exceed the existing capacity within several years, new terminals should be prepared. It should be taken into consideration that too many small-scale container terminals would prevent a port in this region from becoming a calling-port. In this context, large-scale container terminals, namely Derince container terminal and Marmara Port, should be given high priority.

4) The Black Sea

Since the present container volume handled in ports in the region is far below the existing capacity, new facilities for containers should be constructed in a timely manner, watching the future progress of container volume of each port.

(3) Long term development

The initial construction investment of container terminal in Turkey by 2020 is estimated at approximately US\$880 million. The total berth length is assumed 5,900m.

(4) Short term development

When stage plan of infrastructure development is considered, it is essential to prioritize port facilities that should be constructed in the short term (2010).

Concerning container terminal, in accordance with the policy of hub port and demand forecast in this Master Plan, the construction of a calling port of mother port type in the Aegean and Marmara region respectively will be required by the target year (2010). Two

container cargo berths, including all container port type, will be required in the Mediterranean and Aegean region respectively, and three berths in the Marmara region. The initial construction investment of container terminal in Turkey until 2010 is estimated at approximately US\$360 million. The total berth length is assumed 2,200m.

Five general cargo berths will be required for the Mediterranean region, 18 berths for the Aegean region and 21 berths for the Marmara region. And a portion of the berths will be constructed as Multi-purpose type. Initial construction investment of general cargo terminal in Turkey until 2010 is estimated at approximately US\$650 million. Total length is assumed 10,000m.

2. Strategy for Port Management

In general, ports and harbors function as public assets. Coastal lines are limited for public use by Turkish laws. First of all, every port management body including private sector should be granted a certain status as a public statutory body for port administration. In addition, it is required that the central government should coordinate or guide port management bodies as autonomous bodies. To secure port development in Turkey, we recommend a nationwide port administration system as following section. It would be a basis to support port development by private sector in future.

(1) Definition of ‘PORTs’ to be managed

In order to provide a firm foundation for a unified port administration system, basic concept and legal definition of ‘ports’ should be clarified. In this study, ‘Port’ is understood as:

“An organic structure of a set of coastal facilities for cargo and passenger traffic to be administered, managed and operated as a unified functional unit and with a certain legal boundary which is necessary at least for port administration, management and operation”

(2) Port development master plan

Port Development Master Plan should be established by each port authority on a legal basis. This plan is a guideline both for administration and management of port. It is a master plan with a long term planning period (approximately 10-15 years) that includes the use and maintenance of ports and harbors, and examination on environmental impact, as well as port development. The key concept is that port is regarded a space to be managed which includes land and facilities.

(3) Establishment of port managing bodies (Port Authorities)

‘Port Authority’ is understood as follows: “A statutory body which develops, maintains ports as a unified functional unit, and secures port services for public use”. What is required at present in Turkey is a system to control port management by proper involvement of the central government. In such a system, each port operator is obliged to manage and operate a port based on port master plans which are authorized by the central

government.

3. Strategy for Port Investment Finance

(1) For an efficient financial operation of TCDD port account, authorities should start to consider a matter that the port account should be separately operated from the railway account on the following conditions;

- 1) The port account should continue to increase Treasury receipts. The annual amount transferred to Treasury would be 50% of the annual rough operating profit. A transferred amount to Treasury for 20 years of 2001-2020 sums up US\$ 1.689 million in Case-2.
- 2) The port account should be efficiently operated to raise investment effectiveness. The port account should be allowed to invest in both sub-structure and super-structure in order to realize effective investment by short-term construction and improvement. Thus budget amount of the maritime port investment for TCDD ports should be transferred to the port account. Annual amount for self-operation would be 40% of the annual rough operating profit, which will allow investment in both sub-structure and super-structure in TCDD ports. A self-operation amount sums up US\$ 1,351 million in Case-2.
- 3) The port account should function like a public fund to support private sectors because that TCDD is unable to handle all of the increasing cargo. On the other hand private sectors will be waiting lenders in order to cope with the increasing cargo in their ports because of shortage of private credits. Therefore this account is expected to function as a public fund. Both Treasury and Transport Ministry will operate this account from a viewpoint of encouraging the private sectors. TCDD will transact as a secretariat of the account. The annual amount of this function would be 10% of the annual rough profit, which will be loaned to private sectors. This amount for 20 years of 2001-2020 sums up US\$ 337 million in Case-2, which compensates 80% of the shortage of private financing resources.

(2) For encouraging private sectors, the authorities should begin to reconsider the following points on BOT scheme, transfer of operation right, a support function for private sectors and a tax system.

Refer to II - 8.2.1

- 1) On an agreement of BOT contract, the authorities should start to reexamine articles on arbitration, account, cost increase, force majeure and termination from a viewpoint of risk sharing. Details are explained in “8.2.1. BOT scheme.” In order to make an attractive BOT scheme, the authorities should have opportunities to consult with financial advisers and lawyers to improve and develop skills on BOT financial scheme.

Refer to II - 8.2.2

- 2) On an agreement of transfer of operation right, the authorities should reexamine articles on repair cost of natural disaster and assignment of authorization because some private operating companies may be faced with financial difficulties according to financial

statements. Details are explained in “8.2.2 Port Operation at Privatized Port.”

Refer to II – 8.4

3) Investment by private capitals is inactive as explained in “8.2.4 Private Capitals.” A public function should be established, which provides private sectors with a direct loan and/or a guarantee to a loan from private banks. This function will be in the TCDD port account as described above. This public function will compensate large portion of the shortage of private financing resources.

Refer to 4.2.4 (3)

4) A tax system has a function to provide enterprises with financing resources as exemption. Because those enterprises in the port businesses or the enterprise intend to enter the port business are small, they are not eligible for incentive scheme. In this sense, a tax system of prepaid stock dividends and special depreciation is a powerful tool to encourage private investment and should be considered to compensate the shortage of private funds.

4. Strategy for Institutional Framework

(1) Coordination system by port master planning

The government reviews the port development master plan submitted by a port authority, based on the guideline which follows the basic policy, and gives approval. In case of changing the plan, it is also necessary for the port authority to obtain approval from the central government. After obtaining approval, port authority makes construction plan, deciding the development priorities based on the government’s basic policy and the approved master plan.

(2) Organization

Port authorities at major ports designated by the government must have a ‘Local Port Council’ with which to consult and obtain comments and recommendations on establishing or changing port development master plan. This is because the development of major ports is considered to have a significant impact on the national interest.

In the new framework, the main ministry which has the greatest responsibility for promoting the national port development should be clarified. Until now, the responsibilities on port development have been cut into pieces functionally among the competent ministries. This is one of the reasons why a total coordination function is lacking in the present system.

(3) Position of Port statistics by port authority

At present in Turkey, the most systematic and consistent data are port statistics by PMUMA. The cargo handling data, however, is insufficient from the viewpoint of port development and promotion because the data source originally comes from inspection reports for port entry application. Another data source with regard to cargo handling volume should be secured to supplement PMUMA data. In that sense, port statistics by

port management bodies should be paid more attention. At least, port statistics of major ports which have significant impact on the national interest should be reported to the central government periodically on the legal basis.

(4) Unified category of statistics

As for the statistics of PMUMA, it has been examined to adjust their coding system into global standard. Statistical criteria such as the category of items should be unified among each port management body on the national basis. Related guidelines in EU or international organizations also should be examined as they must be compatible in future. Unified criteria on port statistics cargo enable comparison of the port data among all ports regardless of type of port management bodies on the national level, which is a powerful tool for nationwide port development policy making.

(5) Nationwide Physical Distribution Survey

Fundamental data on nationwide container cargo flows is useful for the examination of nationwide port development and promotion. Periodical OD (Origin-Destination) survey for container cargoes is available as one of supplementary measures in addition to grasping the cargo handling volume by port authorities.

(6) Personnel Changes among Port-related Ministries

Personnel changes among port-related ministries should be considered to increase communication and information sharing. It should be noted that bureaucracy in the government will inevitably hinder effective port management and operation.

(7) Establishment of ‘Port and Harbor Council’

Persons of learning and experience in the field of ports and harbors should be utilized in the process of policy making. Fortunately, there are many talented people with wide experience in container transportation and port management around the business world in Turkey. A system to draw on their opinions should be established urgently. ‘Port and Harbor Council’ which consists of experts on port construction, port management and operation, and other experienced persons concerned, should be established in the government to give comments and recommendations to the government’s request for advice.

5. Strategy for Port Operation

(1) Introduction of Advanced Technology

To improve the efficiency of container handling operation, it is essential to exchange information and communicate effectively between crane operators and the supervisor at the control center. In Turkish container ports (Hayderpasa, Izmir), “walkies talkies” are being favored for communication between their offices and crane operators. However, most of operations are covered by man-power communication. The following 4 systems for transmitting information are currently used at container terminals. The following Table indicates the particularities of each system.

(2) Importance of Computerization

Computerization will make it unnecessary to get access to the same information on other documents and possible to use repeatedly the information once fed into computers. It is also expected that compiling statistics concerning port activities will become easier.

Therefore at first, TCDD should introduce the computer system concerning documentation inside the PMB (Port Management Body), and as a next step, it is necessary to upgrade functions and expand the areas covered by the computer system. Consequently, the computer system will become an open system in which the parties concerned can participate.

(3) Proper Use & Maintenance of Cargo Handling Equipment

- 1) Replacement of Old Cargo Handling Equipment
- 2) Importance of Continuous Maintenance
- 3) Preparation of Spare Parts

(4) Enrichment of Training System

Introduction of sophisticated computer system will be essential to improve port operation in Turkey. Appropriate training to master computer shall be provided to all staff at TCDD ports. Enrichment of the training programs for each staff will improve overall service level for port users.

(5) Introduction of EDI (Electronic Data Interchange) System

To increase international competitiveness and provide user-oriented services, it is necessary for Turkey to promote the implementation of EDI, which would simplify and improve efficiency of port and harbor administration. It is advisable for Turkish Ports to learn from the examples of major competitive ports in advanced countries.

6. Environmental Consideration

- (1) To take necessary measures for preventing destruction and pollution of maritime environment
- (2) To provide port managing body with the authority to monitor the environmental quality and implement environmental projects
- (3) To establish comprehensive oil-combating system involving the relevant public and private sectors
- (4) To do environmental consideration in port development not only on the port facilities and activities but also on related economic activities in the hinterland
- (5) To establish domestic maritime transport promotion policy

7. Recommendation

[Policy on Port Infrastructure Development]

- (1) To formulate advanced maritime transport network in international container transport (The Mediterranean, Aegean and Marmara Sea)
 - a. To establish internationally competitive container ports
 - b. To invest the public and private resources intensely and effectively in port development based on future demand
 - c. To improve cargo handling capacity)
 - c-1 To improve existing capacity (maintenance works for existing facilities and equipment)
 - c-2 To introduce overall computerized system covering management and container operation
 - c-3 To introduce EDI system in long term
- (2) To formulate rational international maritime transport network
 - 1) Other international general cargo
 - a. To invest the public and private resources effectively in port development based on future demand
 - b. To improve cargo handling capacity by means of strengthening the maintenance works for existing facilities and equipment
 - 2) International bulk cargo transport
 - a. To increase governmental involvement to secure stable inflow of energy and natural resources for future possible scarcity of world natural resources
 - b. To invest the public and private resources effectively in port development based on future demand
 - c. To improve cargo handling capacity by means of strengthening the maintenance works for existing facilities and equipment
 - d. To establish comprehensive oil-combating system involving the relevant public and private sectors
- (3) To formulate rational domestic maritime transport network
 - a. To establish maritime transport promotion policy
 - b. To maintain and improve existing facilities
- (4) To formulate safe and comfortable passenger transport network
 - a. To upgrade international maritime passenger facilities to promote tourism
 - b. To maintain and improve existing maritime passenger facilities

- (5) To promote port projects to assist regional development
 - a. To establish local container ports to assist regional development in long term (The Med. and Black Sea)
 - b. To maintain and improve existing maritime passenger facilities
 - c. To maintain and improve existing facilities for cargo transport
- (6) To sustain national/ regional economy and people's daily lives in case of emergency such as earthquake, energy crisis
 - a. To improve anti-earthquake capacity of facilities to be selected
 - b. To increase governmental involvement to secure stable inflow of energy and natural resources for future possible scarcity of world natural resources
- (7) Common framework of infrastructure development
 - a. To establish the Nationwide Port Development Master Plan to coordinate and guide port development projects implemented by various organization
 - b. To introduce classified port development system to invest the public and private resources intensely and effectively in port infrastructure development
 - c. To introduce a new investment system based on the port development master plan of each selected port
 - d. To strengthen functions of access railway and road network connecting ports and their hinterland
 - e. Particularly, to introduce adequate measures to promote the railway activity in container transport

[Policy on port administration, management and operation]

(1) Improvement of port management

1) Framework of port management

- a. To introduce "Port Law" to clarify a basic concept and legal definition of "Port"
- b. To establish port development master plan of each port
- c. To identify roles and functions of port managing bodies
- d. To introduce Port Authority system in long term

2) Efficiency of port management

- a. To transfer more authority/ responsibility to each port manager port from the headquarters of TCDD
- b. To introduce a new personnel system including promotion of talented employees and outsourcing
- c. To introduce competitiveness into container stevedoring in TCDD container terminal to raise handling productivity

(2) Port investment and finance

- a. To reconsider existing BOT contract from the view point of risk sharing for encouraging private sector investment
- b. To reconsider existing article on repair cost of natural disaster of privatization contract of TDI port.
- c. To raise public fund to provide private sectors with a direct loan and/ or a guarantee to a loan from private banks
- d. To provide private companies, which are managing port related business, with exemption tax system
- e. To consider a matter that port account of TCDD should be separately operated from the railway account.
- f. To accelerate port investment both in infrastructure and superstructure

(3) Institutional framework

1) Basic framework

- a. To establish guideline for port development master plan of each port
- b. To establish an appropriate organization to coordinate among the ministries concerned on matters from port master plan to construction plan
- c. To strengthen coordinating function of central government
- d. To establish an appropriate organization in each port to collect various opinions and suggestions of relevant parties concerning port management and development

2) Sub-framework for port administration and management

- a. To strength port statistics system
 - a-1 To introduce port statistics done by each port managing body
 - a-2 To introduce periodical report of port statistics to government from major port managing bodies on legal basis
 - a-3 To introduce unified category of statistics
- b. To introduce registered system of port facilities
- c. To introduce personnel change system among port-related ministries

(4) Port operation

- a. To increase cargo handling productivity, especially in container handling by employing various effective measures
- b. To promote appropriate private sector participation gradually in cargo handling operation
- c. To introduce advanced communication system between crane operators and control center
- d. To promote computerized operation systems such as container inventory control, container delivering/receiving control and loading & unloading operation control
- e. To implement EDI system gradually based on world standard
- f. To enrich training programs of computer system appropriately

(5) Environmental consideration

- a. To take necessary measures for preventing destruction and pollution of maritime environment
- b. To provide port managing body with the authority to monitor the environmental quality and implement environmental projects
- c. To establish comprehensive oil-combating system involving the relevant public and private sectors
- d. To do environmental consideration in port development not only on the port facilities and activities but also on related economic activities in the hinterland
- e. To establish domestic maritime transport promotion policy