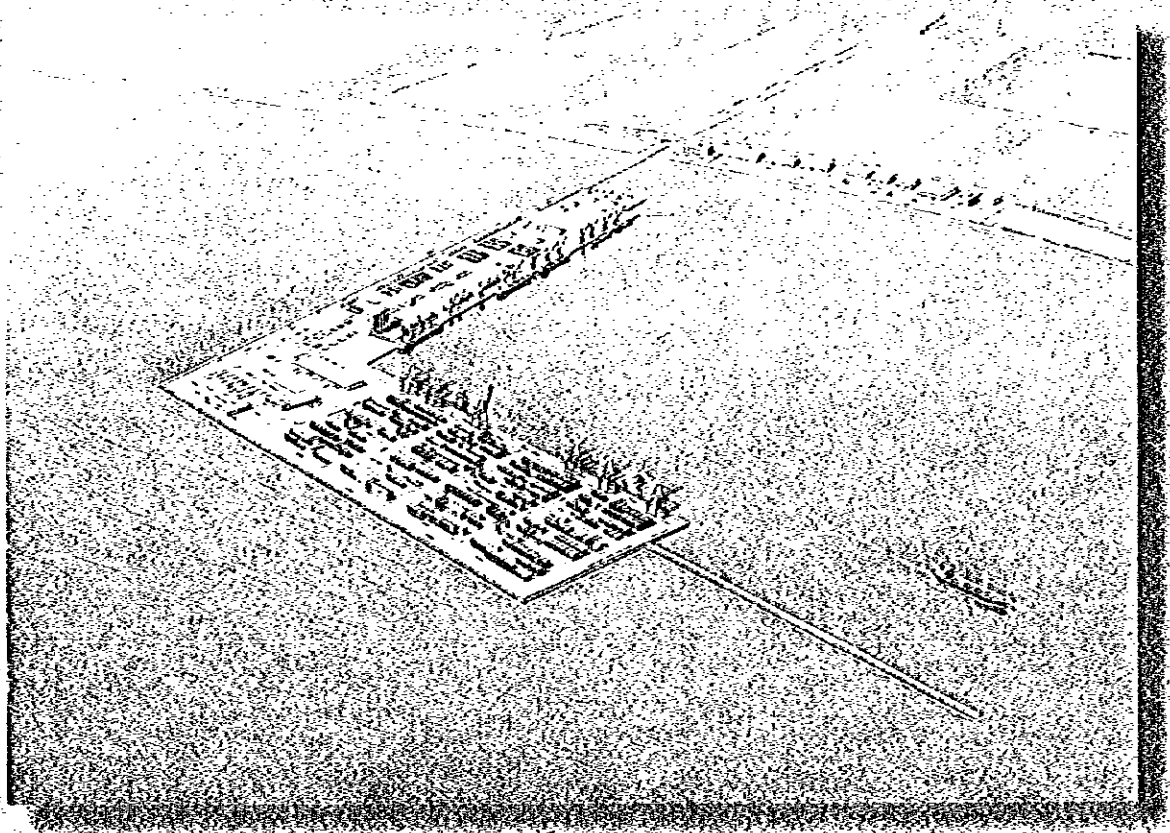


THE MASTER PLAN STUDY FOR THE PORTS DEVELOPMENT AT THE SEA OF MARMARA IN THE REPUBLIC OF TURKEY



**FINAL REPORT
(PART II)**

SEPTEMBER 1997

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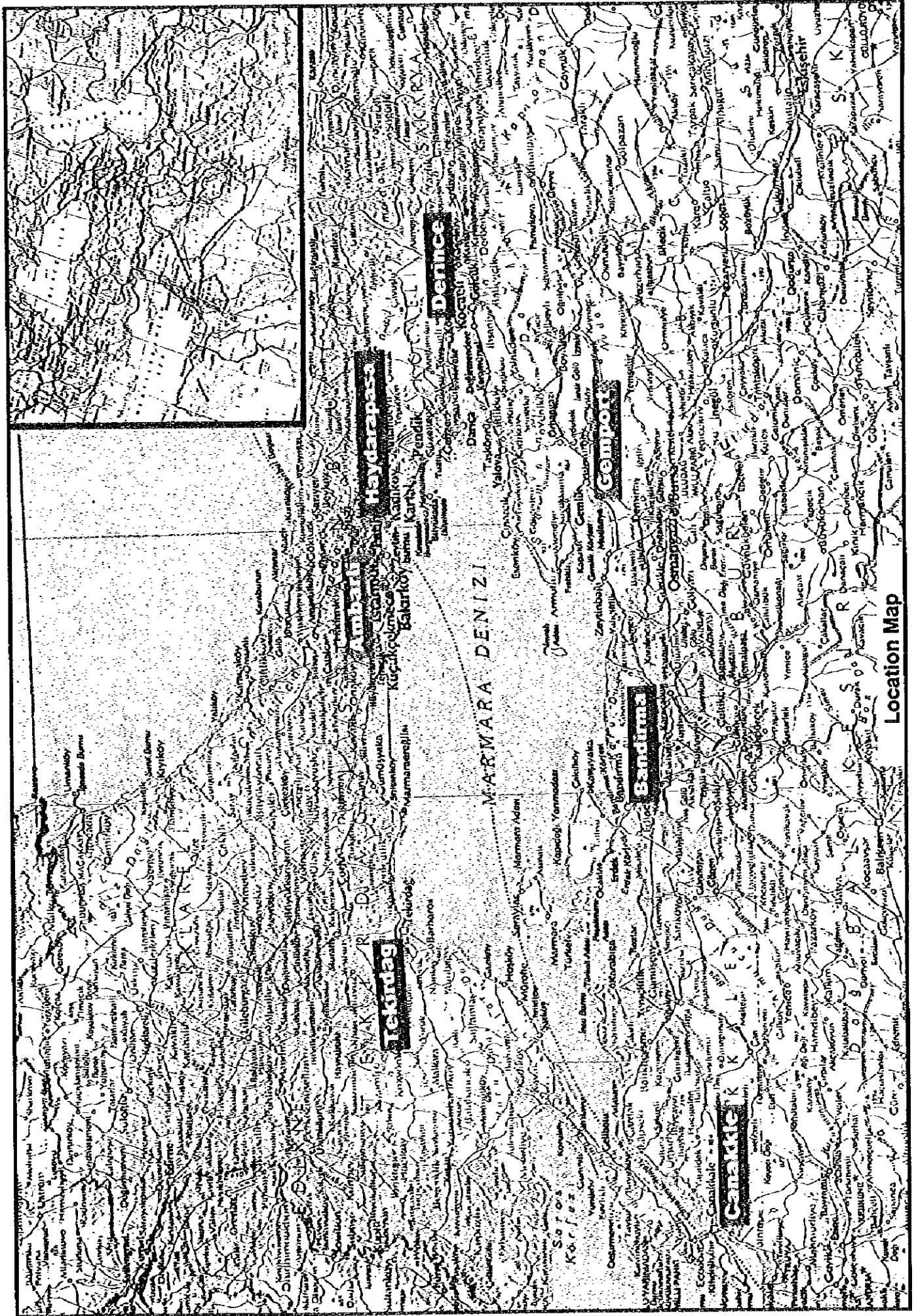


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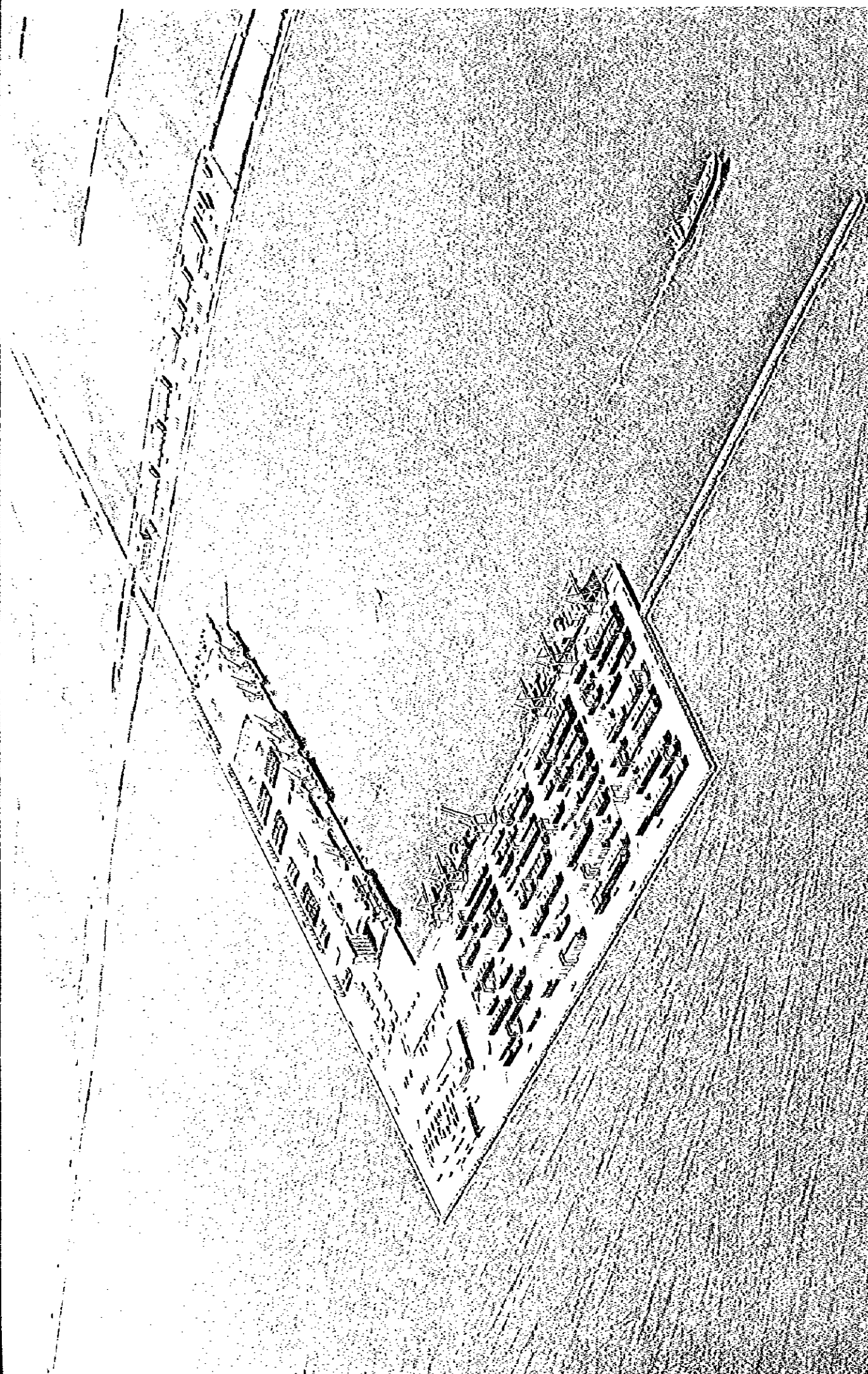
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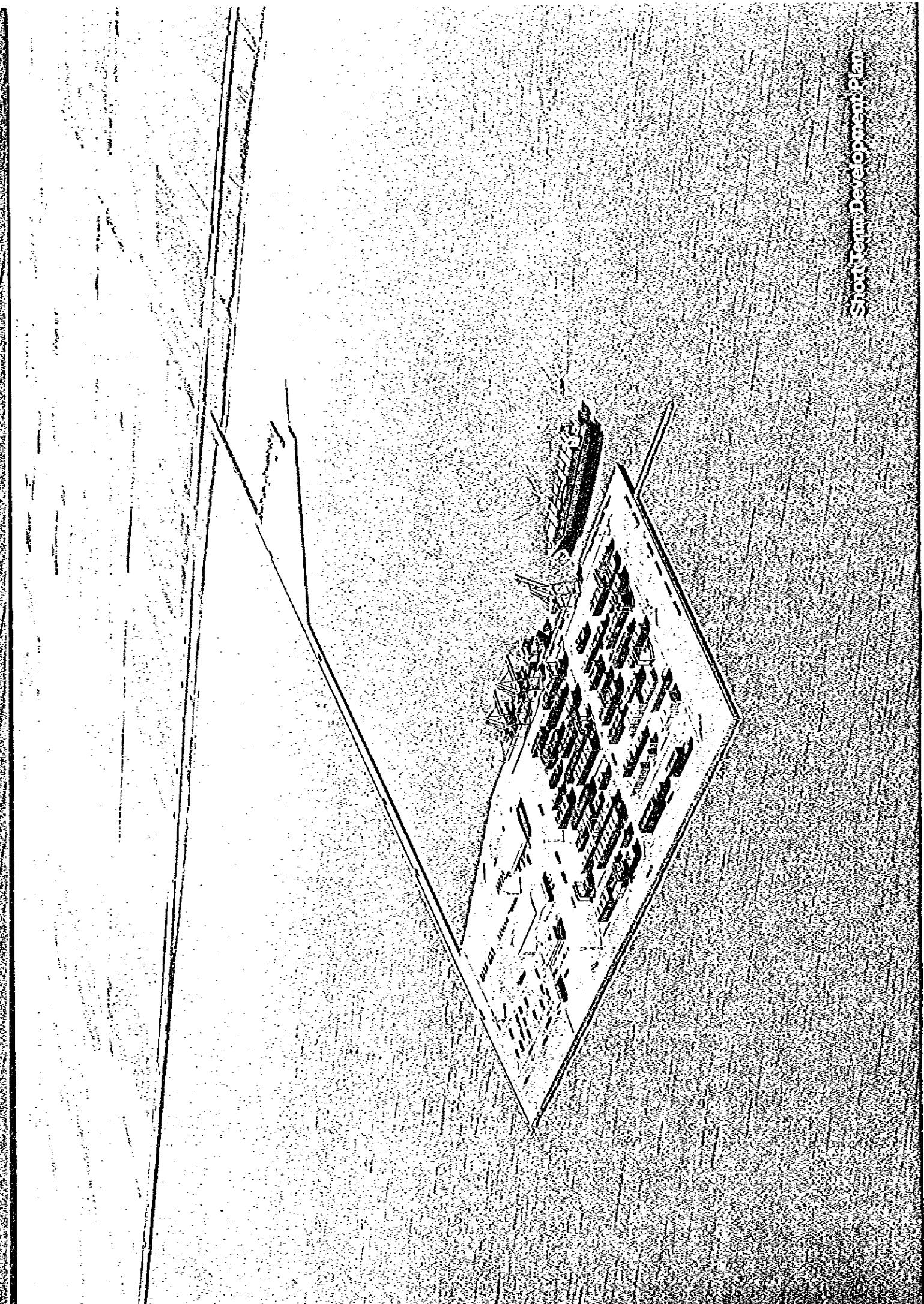
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Location Map





ABBREVIATION

CFC	Conversion Factor for Consumption
CFS	Container Freight Station
CIF	Cost, Insurance and Freight
CIS	Commonwealth of Independent States
CT	Container Terminal
CY	Container Yard
DLH	General Directorate of the Construction of Railway, Harbors and Airports
DWT	Dead Weight Tonnage
EBRD	European Bank for Reconstruction and Development
EDI	Electronic Data Interchange
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EU	European Unions
FCL	Full Container Load
FIRR	Financial Internal Rate of Return
FOB	Free on Board
FTZ	Free Trade Zone
FZ	Free Zone
GDP	Gross Domestic Products
GRT	Gross Registered Tonnage
HWL	High Water Level
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
LCL	Less than Container Load
LWL	Low Water Level
NRT	Net Registered Tonnage
OCDI	Overseas Coastal Area Development Institute of Japan
OECD	Organization for Economic Cooperation Development
OECF	Overseas Economic Cooperation Fund
RO/RO	Roll on and Roll off
SCF	Standard Conversion Factor
SIS	State Institute of Statistics
SPO	State Planning Organization
SPT	Standard Penetration Test

TCDD	Turkish State Railways
TDI	Turkish Maritime Organization
TEU	Twenty Footer Equivalent Unit
TL	Turkish Lira
TMO	Turkish Grain Board
UN	United Nation
US	United States of America
WB	World Bank

PART II DEVELOPMENT PLAN

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1 Framework for Development Plan

1.1 Domestic Economy

1.1.1 Gross Domestic Products (GDP)

The growth rate of Turkish GDP in future is estimated by SPO as shown in Table 1.1.1.

TABLE 1.1.1 Trend and Projection of Turkey GDP at 1987 Constant Price

Year	Low Case		Medium Case		High Case	
	GDP million T.L.	growth rate %	GDP million T.L.	growth rate %	GDP million T.L.	growth rate %
1987			74,721,925			
1988			76,306,292	2.1		
1989			76,498,311	0.3		
1990			83,578,465	9.3		
1991			84,352,830	0.9		
1992			89,400,745	6.0		
1993			96,590,370	8.0		
1994			91,320,722	-5.5		
1995	98,023,152		98,023,152	7.3	98,023,152	
1996	102,924,310	5.0	103,708,495	5.8	104,492,680	6.6
1997	108,070,525	5.0	109,723,588	5.8	111,389,197	6.6
1998	113,474,051	5.0	116,087,556	5.8	118,740,884	6.6
1999	119,147,754	5.0	122,820,634	5.8	126,577,782	6.6
2000	125,105,142	5.0	129,944,231	5.8	134,931,916	6.6
2001	131,360,399	5.0	138,130,717	6.3	145,186,741	7.6
2002	137,928,419	5.0	146,832,952	6.3	156,220,934	7.6
2003	144,824,840	5.0	156,083,428	6.3	168,093,725	7.6
2004	152,066,082	5.0	165,916,684	6.3	180,868,848	7.6
2005	159,669,386	5.0	176,369,435	6.3	194,614,880	7.6
2006	167,652,855	5.0	187,480,710	6.3	209,405,611	7.6
2007	176,035,498	5.0	199,291,995	6.3	225,320,438	7.6
2008	184,837,272	5.0	211,847,390	6.3	242,444,791	7.6
2009	194,079,136	5.0	225,193,776	6.3	260,870,595	7.6
2010	203,783,093	5.0	239,380,984	6.3	280,696,760	7.6
2011	213,972,248	5.0	254,461,986	6.3	302,029,714	7.6
2012	224,670,860	5.0	270,493,091	6.3	324,983,972	7.6
2013	235,904,403	5.0	287,534,155	6.3	349,682,754	7.6
2014	247,699,623	5.0	305,648,807	6.3	376,258,644	7.6
2015	260,084,604	5.0	324,904,682	6.3	404,854,300	7.6

Source: SPO Economic and social Indicators (1950-1955)

Figure 1.1.1 and Figure 1.1.2 show trend and projection of Turkey GDP at 1987 constant price and GDP growth rate.

FIGURE 1.1.1 Trend and Projection of Turkey GDP

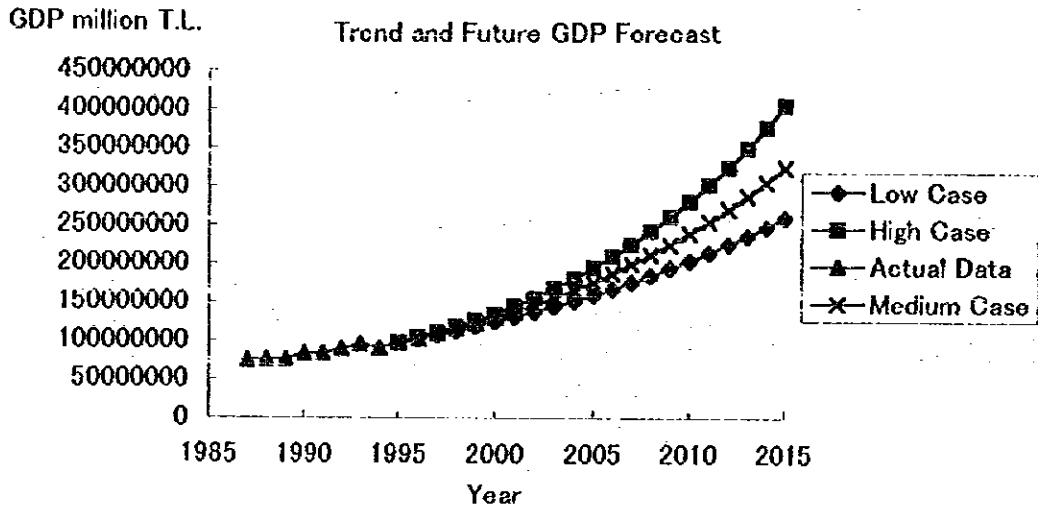
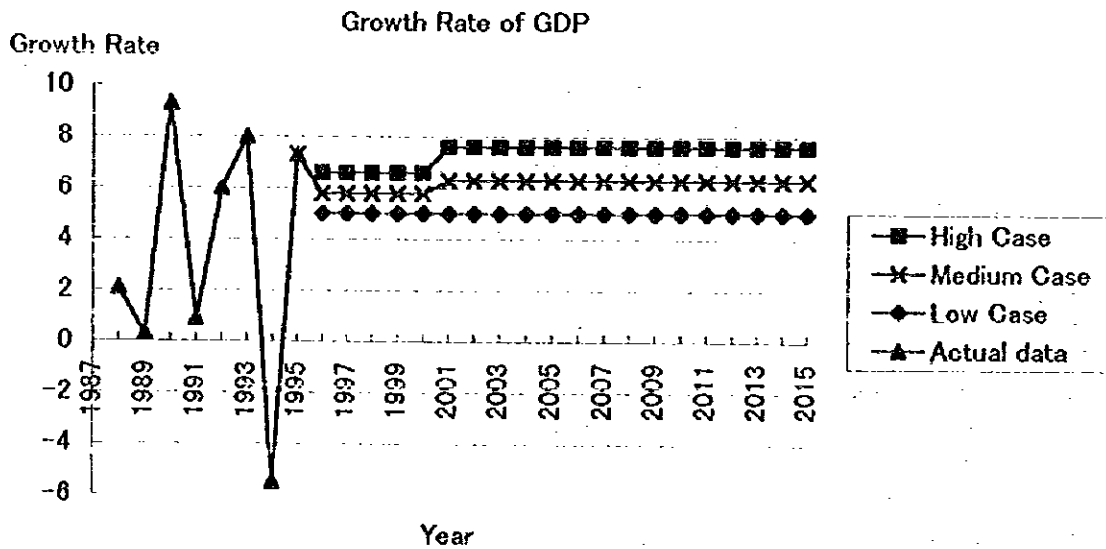


FIGURE 1.1.2 Trend and Projection of GDP Growth Rate



1.2 International Transport Environment

1.2.1 Outline of Forecasting Method

(1) Aim of the Study

Generally speaking, the demand forecast related to port development is mainly made on the basis of the socio-economic conditions of the concerned country. In this study also, these methods will be adopted. However, it is recognized that these methods alone will not result in a complete understanding of the future transport environment of the Sea of Marmara. This is because there are some important international factors described in a foregoing chapter that are not taken into account.

The aim of this chapter is to estimate following items on the assumed GDP and to guess the future situation of international maritime transportation.

- 1) prospective situation of international trade
- 2) prospective situation of maritime cargo movement
- 3) prospective situation of container throughput

Wide ranging data is necessary for this analysis. However, data covering the whole world is difficult to obtain and the reliability of this type of data is questionable. Therefore the predictions arising from the analysis should only be regarded as possible scenarios.

(2) Area Classification for Analysis

First, areas to be included in the analysis must be set. It is desirable that the area surrounding the Mediterranean Sea / the Black Sea is treated in more detail than other areas. And while as much data as possible should be gathered on a country - by - country basis, it must be recognized that data on some countries, for example Libya, are lacking.

Considering above mentioned points, following 12 areas were set. Sub-areas in parenthesis will be used as a working base.

- 1) Former USSR
- 2) Easter Europe - Black Sea (Bulgaria & Romania)
- 3) Other Eastern Europe
- 4) Western Europe - Mediterranean Sea (Greece, Italy & Spain)
- 5) Other Western Europe

- 6) Western Asia - Mediterranean Sea (Israel, Cyprus & Syria)
- 7) Turkey
- 8) Other Asia
- 9) North Africa - Mediterranean Sea (Egypt, Tunisia, Algeria & Morocco)
- 10) Other Africa
- 11) America
- 12) Oceania

(3) Working Flow

A working flow chart for the analysis is shown as Figure 1.2.1. Modeling function (which is estimated by the least square method) analysis will be used in many steps.

At first, the future GDP of each sub area will be projected.

Next, export(f.o.b.) and import(c.i.f.) values in future will be projected. These values are evaluated by the constant price at 1990, the same as GDP. The standard export function of each area has some variables, weighted sum of GDPs of export partner areas, relative export price and so on. The standard import function contains GDP of concerned area as a major variable. As for export and import of each area, it is adjusted totally by a result of a macro function of the whole world.

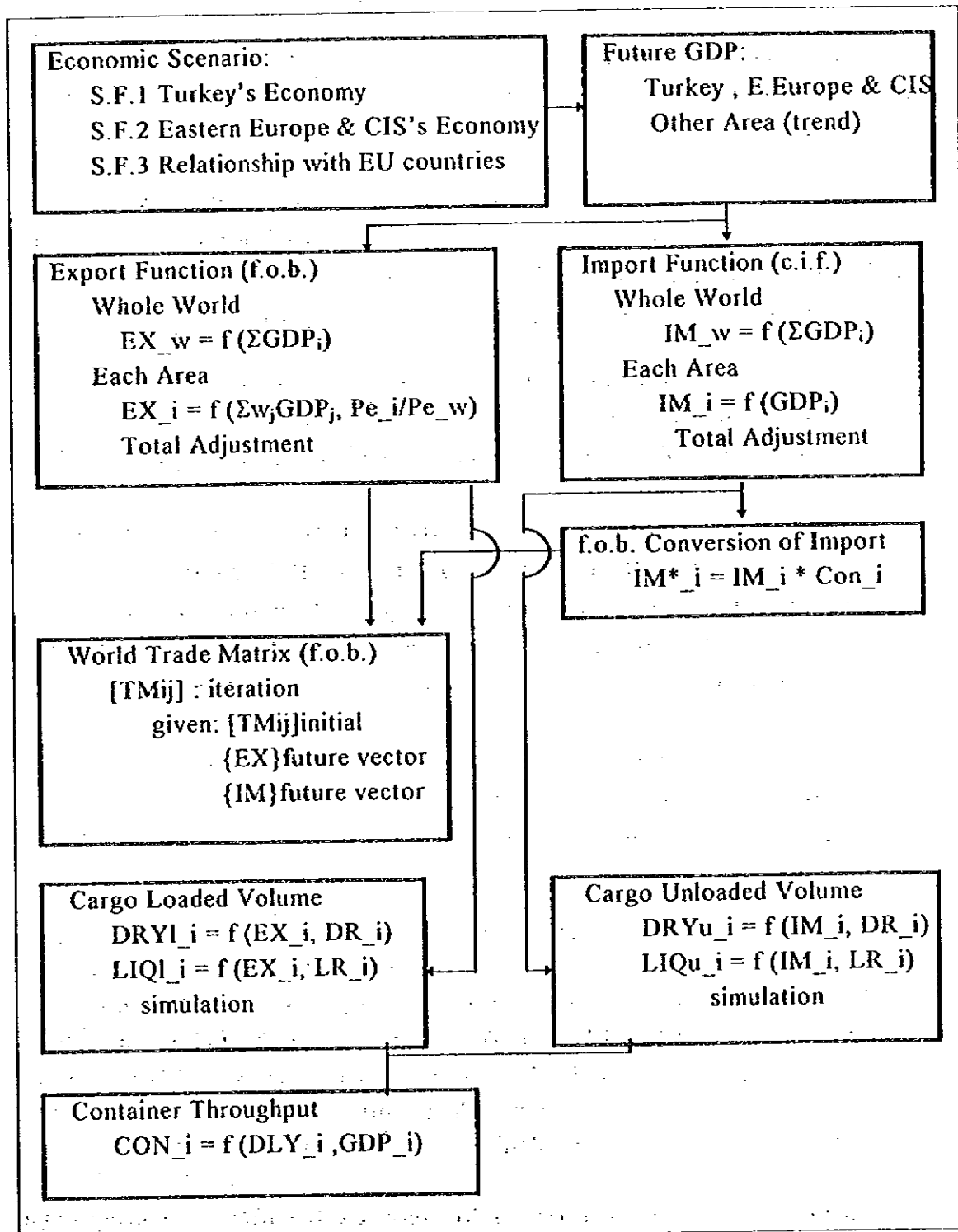
In the next step, projected export and import vectors, which are obtained in the above work, will be developed to a trade matrix. In this work, the iterative calculation will be needed for total adjustment of columns and rows, starting from actual trade matrix of known factors as an initial trade structure. Conversion from CIF of import to FOB will be needed before beginning the work. By this trade matrix, a perspective of future world trade will become clearer.

Next, loaded / unloaded maritime cargo volumes of each area will be projected by dry and liquid type. A standard function of loaded dry cargo includes a export value and a ratio of dry to total cargo as variables. The other three functions in the chart are basically similar. Future cargo volumes by dry and liquid type are projected by solving the simultaneous equation system.

Finally container throughput of each area will be projected using loaded / unloaded dry cargo volume and/or GDP as variables.

More detail of methods will be described in the top of each working step.

FIGURE 1.2.1 Flow Chart for the Forecast of the World Trade and Cargo Movement



1.2.2 GDP in 2005 and 2015 by each Area

(1) Selected Four Scenario Cases

As mentioned in chapter 1.4 three scenario cases which are explained in the form of GDP growth have been chosen to represent the future economic situation of Turkey.

In this step, it is necessary to make scenarios concerning the future economic situation of Eastern European and CIS (Commonwealth of Independent States) countries. The present situation of this region has been described in Part I. Following are relevant quotes from the EBRD (European Bank for Reconstruction and Development).

1) In Eastern Europe and Baltics, it seems that year 1993 was a bottom of economic decline and their real GDP is beginning to grow again. And its growth rates of this few years are in the level of 4 or 5% annually.

2) On the other hand, the real total GDP of CIS countries continued to decline until 1995. If the EBRD projection in 1996 would be realized and its trend would become certain, the year of 1996 become a turning point for the CIS economy. However, these are some countries remained in the situation of negative growth, Tjikistan and Ukraine.

3) As mentioned above, these countries are becoming to realize some kind of success in their transition. But it is only in a initial stage, especially in CIS. The projected GDP level in 1996 remain still 53% of 1989 in CIS and 87% in Eastern Europe.

Considering these situations, high and low growth cases are chosen for these areas. In the high case, the growth rates of the former USSR are 3% (1995-2005) and 4% (2005-2015), and those of Eastern Europe are 5% (1995-2015). And in the low case, the rate of former is 1.5% (1995-2015), and the later is 3.8%. In this connection, the GDP growth of the former USSR achieved a level of 3.7% between 1975 and 1989 when its managed economy was growing with stability. Similarly, the rates of 4.8% (1975-89) and 4.7% (1975-86) were calculated with Bulgaria and Romania.

Finally, four cases as seen Table 1.2.1 were selected after considering some combinations with three cases of Turkey and two of Eastern Europe / the former USSR.

TABLE 1.2.1 GDP Growth for 4 Cases

		High Case	Medium Case 1	Medium Case 2	Low Case
Turkey	1995-2000	6.60	5.80	5.80	5.00
	2000-2005	7.60	6.30	6.30	5.00
	2005-2015	7.60	6.30	6.30	5.00
Former USSR	1995-2005	3.00	3.00	1.50	1.50
	2005-2015	4.00	4.00	1.50	1.50
East Europe	1995-2005	5.00	5.00	3.80	3.80
	2005-2015	5.00	5.00	3.80	3.80

(2) GDP of Other Areas (Common to every Scenario)

It will be reasonable and efficient to use commonly the trends of GDP growth rate for every scenario concerning the other areas. Table 1.2.2 shows the GDP trends calculated based on the data from "World Table" (WB), "National Accounts"(OECD), "International Financial Statistics"(IMF) and "National Accounts"(UN).

TABLE 1.2.2 Trend of GDP Growth

Area	GDP Trend (%)	Term	Adjusted R-squared
(ref.) World	2.87	1975-93	0.986
(1) Greece	2.04	1975-93	0.946
(2) Italy	2.61	1975-93	0.965
(3) Spain	2.46	1975-93	0.935
(4) Israel	5.77	1975-92	0.941
(5) Cyprus	5.44	1975-92	0.831
(6) Syrian.A.R	3.28	1975-91	0.826
(7) Egypt	5.73	1975-93	0.892
(8) Tunisia	4.20	1975-93	0.981
(9) Algeria	3.19	1975-93	0.820
(10) Morocco	4.03	1975-93	0.961
(11) Other W.Europe	2.21	1975-93	0.981
(12) Other Asia	4.14	1975-93	0.984
(13) Other Africa	2.26	1975-92	0.845
(14) America	2.56	1975-93	0.977
(15) Oceania	2.78	1975-93	0.979

(3) GDP Level in Future on Assumed Growth Rate

1) GDP of the whole world

Using the above growth rates, GDPs of each area were extended toward the future. The result is shown in Table 1.2.3 and Figure 1.2.2. The two numbers below the name of each area in the Figure indicate GDP level in 2005 and 2015 compared with base year 1995 (=100).

TABLE 1.2.3 GDP Level of the Area 1975-2015
Billion US\$ at 1990 price

	World	Frm.U SSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turke y	Other Asia	Africa Med.	Other Af.	Ameri ca	Ocean ia
1975	13114	589	0	87	1089	3749	31	81	2403	66	255	4728	223
1980	15759	731	55	115	1316	4308	44	91	3022	94	335	5647	252
1985	17888	865	65	116	1413	4672	45	115	3648	121	320	6330	294
1990	21020	948	59	135	1669	5409	67	151	4611	133	380	7206	340
1991	21176	838	51	<u>131</u>	<u>1696</u>	5457	71	152	4826	135	382	7211	334
1992	21443	678	45	125	1755	5517	76	161	4991	136	<u>382</u>	7383	343
1993	21795	<u>602</u>	<u>45</u>	125	1688	<u>5495</u>	<u>78</u>	174	<u>4748</u>	<u>136</u>	<u>387</u>	<u>7632</u>	<u>357</u>
1994	22101	518	46	130	1724	5660	83	165	4910	140	397	7954	375
1995	22737	492	49	137	1777	5830	88	176	5081	143	408	8166	388
High Growth Case													
2005	30383	661	80	223	2285	7247	146	350	7594	216	513	10556	512
2015	41033	978	130	364	2937	9009	245	728	11350	330	644	13645	674
Medium Growth Case 1													
2005	30350	661	80	223	2285	7247	146	317	7594	216	513	10556	512
2015	40889	978	130	364	2937	9009	245	584	11350	330	644	13645	674
Medium Growth Case 2													
2005	30227	571	71	199	2285	7247	146	317	7594	216	513	10556	512
2015	40472	662	103	289	2937	9009	245	584	11350	330	644	13645	674
Low Case													
2005	30197	571	71	199	2285	7247	146	287	7594	216	513	10556	512
2015	40356	662	103	289	2937	9009	245	467	11350	330	644	13645	674
GROWTH RATE (% annually)													
High Growth Case													
1995-2005	2.9	3.0	5.0	5.0	2.5	2.2	5.2	7.1	4.1	4.2	2.3	2.6	2.8
1995-2015	3.0	3.5	5.0	5.0	2.5	2.2	5.3	7.3	4.1	4.2	2.3	2.6	2.8
Medium Growth Case 1													
1995-2005	2.9	3.0	5.0	5.0	2.5	2.2	5.2	6.0	4.1	4.2	2.3	2.6	2.8
1995-2015	3.0	3.5	5.0	5.0	2.5	2.2	5.3	6.2	4.1	4.2	2.3	2.6	2.8
Medium Growth Case 2													
1995-2005	2.9	1.5	3.8	3.8	2.5	2.2	5.2	6.0	4.1	4.2	2.3	2.6	2.8
1995-2015	2.9	1.5	3.8	3.8	2.5	2.2	5.3	6.2	4.1	4.2	2.3	2.6	2.8
Low Case													
1995-2005	2.9	1.5	3.8	3.8	2.5	2.2	5.2	5.0	4.1	4.2	2.3	2.6	2.8
1995-2015	2.9	1.5	3.8	3.8	2.5	2.2	5.3	5.0	4.1	4.2	2.3	2.6	2.8

Because of the nature of scenario - making in which only several options are given for a specified area, the difference between each cases concerning total GDP is very small. It grows by an average 3.0% per annum over 1995-2015, rising from a value of US\$ 22.7 billion in 1995 to 41,300 - 40,100 billion US\$ in 2015.

For reference, World Bank predicts 3.3% growth in world GDP over 1995-2004 in its "Global Economic Prospects and The Developing Countries, 1995". And as seen in Table 1.2.3, average growth of world GDP is observed at 2.9% over 1975-1993.

FIGURE 1.2.2 GDP Level in 2005 & 2015 (1995=100)

America	Other W.Europe	Other E.Europe	Former USSR	
	124 155	162 265	134 199	
			E.Euro.BS	
			163 265	
	W.Europe-Mediterranean	Turkey	Other Asia	
	129 165	180 331	149 223	
			W.Asia-Med	
			166 279	
	North Africa-Mediterranean			
	151 230			
	Other Africa		Oceania	
	126 158		131 174	

2) GDP of Turkey

It is natural that the projected GDP levels vary in accordance with the difference in growth rates.

By 2015, Turkey's GDP is forecast to reach US\$ 730 Billion (4.1 times of 1995), 580 Billion (3.3 times) or 470 Billion (2.7 times) from US\$ 176 in 1995 in each respective cases.

3) GDP of Other Areas

The GDP of the former USSR reaches US\$ 980 Billion in the high case and 660 Billion in the low case. It should be noticed that the GDP in 2015 just barely exceeds the level in 1990 even in the high case. This suggests that the recent economic decline of the former USSR was very substantial.

In the E.Europe-Black Sea region, which is assumed to grow by 5.0% in the high case and 3.8% in the low case, GDP level in 2015 becomes US\$ 100 - 130 million, an increase of 2.1 - 2.7 times that of 1995.

It is commonly held that Asia, especially East Asia, will grow rapidly toward the 21st century. But the GDP growth rate of Other Asia in Table 1.2.1 is 4.1% per annum which is not particularly high. This is because the area contains Japan which has a disproportionately large share of the area's GDP, but whose growth rate is only about 2 - 3%. The same thing seems in the area of America. The GDP level of Other Asia reaches to US\$ 11,400 Million from 5,100 Million in 1995, and its share in world rises to 27.7% from 22.3%.

On the other hand, the GDP growth rate of Other Western Europe is the lowest due to the fact that the area is comprised developed countries.

1.2.3 PROSPECTIVE Situation of International Trade

(1) Export Value and Import Value Function Estimated

1) Export value Function

For the projection of future international trade, export and import functions of each sub-area were estimated using data from "World Table" (WB), "International Financial Statistics"(IMF), "Yearbook of International Statistics"(UN) and "Yearbook of International Trade"(UN).

The estimated export function is summarized in Table 1.2.4 .

The standard type of function is log type and formulation is as follows;

$$\ln(\text{Export}) = \text{Constant} + \ln(\sum w_j \text{GDP}_j) + \ln(\text{Pe}_i / \text{Pe}_w)$$

In the function, $\sum w_j \text{GDP}_j$ means weighted summation of GDPs of exporting areas, and it expresses the import demand power of these areas. Weight is a export share in 1990. Pe_i is export price of concerned export area, and Pe_w is expert price of world average export price. This variable expresses the price competitiveness.

The variables used are in the top row of the Table. Crude oil price (P_o) is used in some functions. And dummy variable (DUM) is inputted partly. R^2 is an adjusted R-squared which shows the degree of function fitness.

The function of Turkey has a special type. Its variable to be explained is

Export value divided GDP. This is adopted to reflect Turkey's economic scenarios. Same method was tried to the function of Frm.USSR and E.Europe, but useful ones were not obtained.

TABLE 1.2.4 Coefficient of Export Value Function Estimated

	Type	C	DUM_C	GDP_world	Σ w_jGDP_j	DUM_GDP	Pc_i-P ϵ_w	Po	Po'Pc	R2'	term
World	ln(EX)	-12.843		1.655						0.968	83-93
Frm.USSR	ln(EX)	-21.629			2.210					0.902	76-86
Bulgaria	ln(EX)	-13.521			1.751		-1.258			0.897	75-88
Romania	ln(EX)	-3.906			1.014		-1.501			0.956	75-82
O.E.Europe											
Greece	ln(EX)	-19.346	-0.273		1.875		-0.605			0.948	75-92
Italy	ln(EX)	-13.783			1.684		-0.106			0.978	75-92
Spain	ln(EX)	-40.928			3.379		-0.725			0.987	75-93
O.W.Europe	ln(EX)	-12.077			1.709		-0.106			0.997	75-92
Israel	ln(EX)	-31.649			2.649		-0.714			0.977	75-92
Cyprus	ln(EX)	-14.532			1.430		-1.208			0.917	75-92
Syria											
Turkey	EX/GDP	-1.102	0.018		0.078	-0.002	-0.075			0.925	75-93
O.Asia	ln(EX)	-15.785	0.117		1.907					0.969	75-93
Egypt	ln(EX)*	-13.219	0.138		1.421	0.007				0.817	76-92
Tunisia	ln(EX)	-20.489			1.893		-0.582			0.839	75-92
Algeria	ln(EX)*	-15.954						1.674	0.084	0.975	82-92
Morocco	ln(EX)	-13.752			1.455		-0.337			0.911	75-92
O.Africa	ln(EX)	-25.720			2.417			0.936	0.430	0.937	75-91
America	ln(EX)	-6.586			1.285		-0.739			0.948	75-93
Oceania	ln(EX)	-8.923	0.051		1.292		-0.382			0.972	75-93

2) Import Value Function

The estimated import function is summarized in Table 1.2.5 .

Typical import function are following;

$$\text{Import}(t) = \text{Constant} + \text{GDP}_i(t) + \text{Import}(t-1)$$

or

$$\ln(\text{Import}(t)) = \text{Constant} + \ln(\text{GDP}_i(t)) + \ln(\text{Import}(t-1))$$

GDP_i is the GDP of concerned importing area, and it expresses the demand level of the year. t means year. Import(t-1) is import value of previous year. It is introduced for the explanation of conventional effect.

TABLE 1.2.5 Coefficient of Import Value Function Estimated

	Type	C	DUM_C	DUM2_C	GDP_world	GDP _i	DUM_GDP	IM _i	R2'	term
World	ln(IM)	-1.470			0.639			0.584	0.975	76-93
Frm.USSR	IM	-23087				0.148	-0.058		0.962	76-93
Bulgaria	IM	-35833	-6101			1.032	-0.204		0.914	80-93
Romania	IM	83				0.363	-0.147		0.912	75-92
O.E.Europe	IM*	-3461					0.021	1.026	0.919	77-90
Greece	IM	-9470	-4963			0.183		0.791	0.919	76-92
Italy	IM	-31000				0.071		0.773	0.969	76-92
Spain	IM	-67475				0.226		0.569	0.987	76-93
O.W.Europe	IM	-631471				0.268		0.420	0.982	76-92
Israel	IM	197	2786			0.125		0.658	0.898	76-92
Cyprus	IM	-110				0.147		0.904	0.931	76-91
Syria	ln(IM)*	0.400					-0.024	0.957	0.948	85-88
Turkey	IM	-10815				0.176		0.317	0.940	76-93
O.Asia	IM	-53828				0.019		1.053	0.989	76-93
Egypt	ln(IM)*	-1.190	-0.239	0.188		0.576	-0.023	0.492	0.832	77-92
Tunisia	ln(IM)	-0.082				0.464	-0.016	0.506	0.871	76-92
Algeria	ln(IM)*	2.623	0.178			0.194	-0.008	0.486	0.955	77-91
Morocco	ln(IM)	1.173	-0.498			0.359		0.452	0.801	76-92
O.Africa	ln(IM)	0.042	0.950			0.843	0.020		0.796	76-91
America	IM	-164396	-155106			0.075		0.542	0.962	76-93
Oceania	IM	-24584	-4184	6994		0.218		0.151	0.967	76-93

3) Coefficient of Turkey's Trade Function to EU

In future, if the relationship between Turkey and EU is strengthened, including full participation in EU, the coefficient of trade function might be shifted upwards.

Therefore, an attempt has been to calculate the effect of this possibility in the study. The following export and import functions are of Greece, which joined EU in 1984, to EU.

$$\text{Export to EU} = -6481 + 0.00191 * \Sigma \text{GDP(EU)} - 0.00018 * \text{DUM1} * \Sigma \text{GDP(EU)} - 1895 * \text{DUM2} \quad R2' = 0.852 \quad \text{Term; 1981-92}$$

$$\text{DUM1} = 1 \text{ for } 1981-84$$

$$\text{DUM2} = 1 \text{ for } 1988$$

$$\text{Import to EU} = -28473 + 0.52393 * \text{GDP(Gr)} - 0.02847 * \text{DUM1} * \text{GDP(Gr)} - 3500 * \text{DUM2} \quad R2' = 0.964 \quad \text{Term; 1980-92}$$

DUM1= 1 for 1981-84

DUM2= 1 for 1988

The coefficient concerning GDP changed from 0.00173 (0.00191 minus 0.00018) to 0.00191 in exports, and from 0.49546 (0.52393 minus 0.02847) to 0.52393 in imports after Greece joined the EU in 1984.

The following estimated functions are of Turkey to EU.

$$\text{Export to EU} = -14796 + 0.00327 * \Sigma \text{GDP(EU)}$$

R2' = 0.907 Term; 1975-92

$$\text{Import to EU} = -12129 + 0.15489 * \text{GDP(Tu)}$$

R2' = 0.973 Term; 1983-92

It is difficult to judge whether the change of coefficient of Greece can be solely attributed to its joining the EU or not. However, there is no information on the matter. Therefore using Greece as a model, it is roughly assumed that Turkey's coefficients would change by 10% in exports and 5.7% in imports if it were to join the EU. This method is not adopted in the low case.

(2) Result of Projection in 2005 and 2015

1) Export and Import Value Whole World.

Using export and import functions mentioned above, the future trade level of each area was projected. The assumed GDPs in future were input to the each functions. On the other hand, relative export prices in future, which is another main variable of export function, were fixed at the present level. The result are shown in Figure 1.2.3 and Table 1.2.6 for exports, and in Figure 1.2.4 and Table 1.2.7 for imports.

The total export value (f.o.b.) of the world grows at an average annual rate of 4.9 - 5.0% over 1995-2015, and reaches 10,700 - 11,000 Million US\$ at 1990 constant price in 2005 from 4,200 Million US\$ in 1995. As with GDP, the differences among each cases are very small.

The total import value (c.i.f.) grows by 4.9 - 5.1%, and the level reaches 11,500 - 11,300 Million US\$ in 2005 from 4,300 Million US\$ in 1995.

The elasticity of them to GDP growth rate is about 1.6. Therefore it is assumed that world trade will progress at a faster rate than would economic growth.

FIGURE 1.2.3 Export Level in 2005 & 2015 (1995=100)

America 144 208	Other W.Europe	152	Other E.Europe	203	Former USSR	177
		234		289	E. Euro. BS	319
						353
						533
	W. Europe-Mediterranean	151	Turkey	238	Other Asia	182
		227		503	W. Asia-Med	338
						166
						279
	North Africa-Mediterranean					
						162
						247
	Other Africa	185			Oceania	155
	345				242	

FIGURE 1.2.4 Import Level in 2005 & 2015 (1995=100)

America 124 159	Other W.Europe	126	Other E.Europe	180	Former USSR	267
		164		328	E. Euro. BS	405
						232
						395
	W. Europe-Mediterranean	151	Turkey	190	Other Asia	213
		227		366	W. Asia-Med	454
						168
						279
	North Africa-Mediterranean					
						128
						180
	Other Africa	103			Oceania	129
	125				174	

2) Export and Import Value of Turkey

Export of Turkey increase by 9.6% annually in the high case, by 8.4% in the medium case and by 8.0% in the low case. On the other hand, import grows by 7.9%, 6.7% and 5.1% respectively.

The export value in 2015 will reach US\$ 80 - 106 million while the import value will reach 92 - 155 million. (see Figure 1.2.5)

TABLE 1.2.6 Export Value of the Area 1975-2015
Billion US\$ at 1990 price

	World	Frm.U SSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turke y	Other Asia	Africa Med.	Other AF.	Ameri ca	Ocean ia
1975	1801	68	29	72	102	680	5	3	363	17	25	331	25
1980	2297	88	40	74	142	917	8	3	550	20	62	448	32
1985	2588	117	35	46	183	1084	10	13	578	16	48	454	41
1990	3437	104	19	36	234	1386	17	13	838	24	62	628	50
1991	3513	48	8	37	241	1390	16	14	892	26	60	664	58
1992	3720	51	9	35	251	1440	17	15	956	24	62	711	61
1993	3870	60	9	40	272	1484	18	17	1037	24	65	778	66
1994	3960	63	10	41	276	1514	20	16	1074	24	69	789	64
1995	4151	67	12	44	290	1586	21	17	1133	25	73	815	66
High Case													
2005	6710	118	44	90	438	2417	39	44	2069	41	136	1172	103
2015	11034	213	66	173	661	3726	64	106	3843	63	254	1703	161
Medium Case 1													
2005	6698	118	44	90	438	2414	39	40	2066	41	135	1170	103
2015	10970	212	66	172	658	3711	64	86	3828	62	253	1696	161
Medium Case 2													
2005	6653	117	42	87	435	2399	39	40	2054	41	135	1163	102
2015	10785	209	57	157	648	3654	63	84	3772	61	249	1672	159
Low Case													
2005	6639	117	41	87	434	2395	39	37	2050	41	134	1162	102
2015	10730	208	57	157	645	3637	63	80	3754	61	248	1664	158
GROWTH RATE (% annually)													
High Growth Case													
1995-2005	4.9	5.9	13.5	7.3	4.2	4.3	6.4	10.1	6.2	5.0	6.4	3.7	4.5
1995-2015	5.0	6.0	8.7	7.0	4.2	4.4	5.8	9.6	6.3	4.6	6.4	3.8	4.5
Medium Growth Case 1													
1995-2005	4.9	5.9	13.4	7.3	4.2	4.3	6.4	9.0	6.2	5.0	6.3	3.7	4.5
1995-2015	5.0	6.0	8.7	7.0	4.2	4.3	5.7	8.4	6.3	4.6	6.4	3.7	4.5
Medium Growth Case 2													
1995-2005	4.8	5.8	12.9	7.0	4.2	4.2	6.3	9.0	6.1	4.9	6.3	3.6	4.4
1995-2015	4.9	5.9	8.0	6.5	4.1	4.3	5.7	8.3	6.2	4.5	6.3	3.7	4.5
Low Case													
1995-2005	4.8	5.8	12.9	7.0	4.1	4.2	6.3	8.1	6.1	4.9	6.3	3.6	4.4
1995-2015	4.9	5.9	7.9	6.5	4.1	4.2	5.6	8.0	6.2	4.5	6.3	3.6	4.4

These results of projection will be used in Chapter 2, Part II for port demand forecasts.

As mentioned above, the trade balance of Turkey seems to be improving. However, this study employs world price, so there is no information on an actual trade balance on a nominal basis.

TABLE 1.2.7 Import Value of the Area 1975-2015
Billion US\$ at 1990 price

	World	Frm. USSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turky	Other Asia	Africa Med.	Other Af.	America	Oceania
1975	1735	71	21	51	119	659	12	12	270	27	52	398	29
1980	2281	76	25	46	166	897	15	10	390	27	67	511	35
1985	2490	113	28	43	180	985	20	17	478	29	45	614	50
1990	3567	121	22	31	289	1384	22	22	770	32	52	734	58
1991	3611	44	9	<u>37</u>	<u>311</u>	1414	25	23	862	28	55	747	57
1992	3874	43	12	41	329	1448	27	23	960	31	<u>56</u>	827	61
1993	3973	<u>38</u>	<u>11</u>	44	324	<u>1457</u>	<u>29</u>	31	<u>1052</u>	<u>34</u>	54	<u>910</u>	<u>63</u>
1994	4115	28	12	47	326	1505	31	32	1152	37	56	979	67
1995	4277	27	15	51	335	1570	34	34	1261	39	57	1033	71
High Case													
2005	6914	72	34	92	448	1976	56	72	2632	51	61	1278	91
2015	11457	110	58	168	637	2584	94	155	5738	71	72	1647	123
Medium Case 1													
2005	6901	72	34	92	448	1974	56	65	2680	51	61	1277	91
2015	11392	109	58	168	635	2576	94	125	5720	71	71	1642	123
Medium Case 2													
2005	6876	51	29	92	448	1974	56	65	2680	51	61	1277	91
2015	11338	69	44	168	635	2576	94	125	5720	71	71	1642	123
Low Case													
2005	6864	51	29	90	448	1974	56	55	2680	51	61	1277	91
2015	11293	69	44	156	635	2576	94	92	5720	71	71	1642	123
GROWTH RATE (% annually)													
High Growth Case													
1995-2005	4.9	10.3	8.8	6.1	3.0	2.3	5.3	7.7	7.8	2.5	0.8	2.2	2.6
1995-2015	5.1	7.3	7.1	6.1	3.3	2.5	5.3	7.9	7.9	3.0	1.1	2.4	2.8
Medium Growth Case 1													
1995-2005	4.9	10.3	8.8	6.1	3.0	2.3	5.3	6.6	7.8	2.5	0.8	2.1	2.6
1995-2015	5.0	7.2	7.1	6.1	3.3	2.5	5.3	6.7	7.9	3.0	1.1	2.3	2.8
Medium Growth Case 2													
1995-2005	4.9	6.6	7.2	6.1	3.0	2.3	5.3	6.6	7.8	2.5	0.8	2.1	2.6
1995-2015	5.0	4.8	5.7	6.1	3.3	2.5	5.3	6.7	7.9	3.0	1.1	2.3	2.8
Low Case													
1995-2005	4.8	6.6	7.2	5.8	3.0	2.3	5.3	4.9	7.8	2.5	0.8	2.1	2.6
1995-2015	5.0	4.8	5.7	5.7	3.3	2.5	5.3	5.1	7.9	3.0	1.1	2.3	2.8

For a reference, the effect of the coefficient change of Turkey's trade function to EU mentioned above is shown in Table 1.2.8, which was used at an intermediate stage of work. As seen in the Table, the effects were 6 - 7% in the import, and 14 - 16% in the export.

FIGURE 1.2.5 Comparison of Turkey's Trade Value

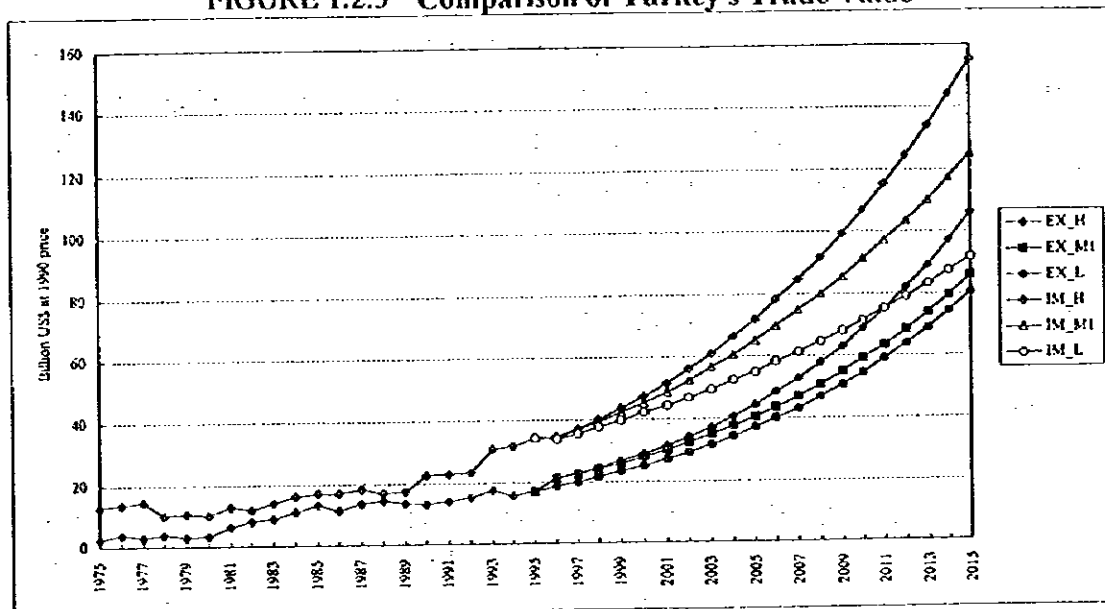


TABLE 1.2.8 Trade of Turkey to EU

Million US\$ at 1990 price

	IMPORT			EXPORT
	High	Medium	Low	
	2005			
Level	46922	41552	36637	20297
Additional	3112	2820	2553	3222
Rate	7%	7%	7%	16%
	2015			
Level	108805	85272	66193	29004
Additional	6474	5196	4159	4038
Rate	6%	6%	6%	14%

3) Export and Import Value of Other Areas

Among other areas, the trade of the Other Asia is noteworthy. Its exports grow by 6.3% over 1995-2015 in the medium case 2, while imports grow by 7.9%. Exports will

be valued at US\$ 3,800 Million and imports 5.700 Million in 2015, 3.9 times and 4.5 times the respective values of 1995.

The growth of trade of the Other W.Europe area, which comprises Turkey's major trading partners, is projected to be relatively stable. Growth rate of exports is forecast at 4.3% while that of imports is 2.5% of imports over 1995 - 2015.

The trade of the former USSR increases by 6.0% in exports and 5.7 - 7.1% in imports. The export growth rate of E.Europe-Black Sea is 7.9 - 8.7% and import rate is 5.7 - 7.1%. These rates are relatively high, but it should be noted that the trade activities of these areas are recovering after bottoming out.

(3) Result of Trade Flow Projection in 2005 and 2015

1) World Trade Flow(Trade Matrix)Projection

In this step, four cases of export and import projections on each sub-area have been obtained. If exports and imports were connected with each other on a trade flow (origin and destination) basis, it would be more useful for the study. Table 1.2.9 shows a processed world trade flow in 1990 which is originally from the trade data of "Yearbook of International Trade" (UN). One method for projection is to estimate trade functions for each cells of the matrix. However, it is unable to practice because of too much cells (20 x 20) in the matrix.

Another way adopted is a automatically one like a so called RAS method. The outline is following. There are three categories of data. They are (1)Actual trade flow structure (trade matrix in 1990 above mentioned), (2)projection of export in 2005 and 2015 corresponding to the top of column in the matrix and (3) projection of import corresponding to the top of row. Then, at first, (Step 1) vector data (2) is given to the top column of the initial matrix (1), and it is shared in according to initial structure in horizontal direction. Next, (Step 2) vector data (3) is given to the top row, and it is shared in according to tentative structure in vertical direction. Next, (Step 3) step 1 is done again under new tentative structure. And step 2 and 3 are iterated until getting convergence condition.

2) Result of Projection

At first, a trade matrix in 1995 was estimated as seen in Table 1.2.10. And the projections in future were done by each case. The results concerning the medium case 2 are shown in Table 1.2.11 for 2005 and Table 1.2.12 for 2015. The results of the other cases are in the appendix of this chapter. Furthermore, Table 1.2.12 and Table 1.2.13 shows the index number of each cell compared with 1995(=100) respectively.

In Table 1.2.13 which shows index of the medium case 2 in 2015, the import column of the Other Asia includes many large numbers. This comes from future large increase of its total import in future that has been projected with the import function. In the columns of the former USSR, E.Europe-Black Sea, the Other E.Europe and Turkey, there are seen many relatively large numbers, too.

On the other hand, as the table seen from export side (horizontal direction), the export rows of the former USSR, E.Europe-Black Sea, the Other E.Europe, Turkey and the Other Africa include large numbers.

Turkey's export level of each cases are compared in Figure 1.2.6. The adopted projection method is relatively automatic and strongly depends on the initial trade structure. It is possible that the trade between Turkey and the former USSR or E. European areas will increase more than these projections suggest.

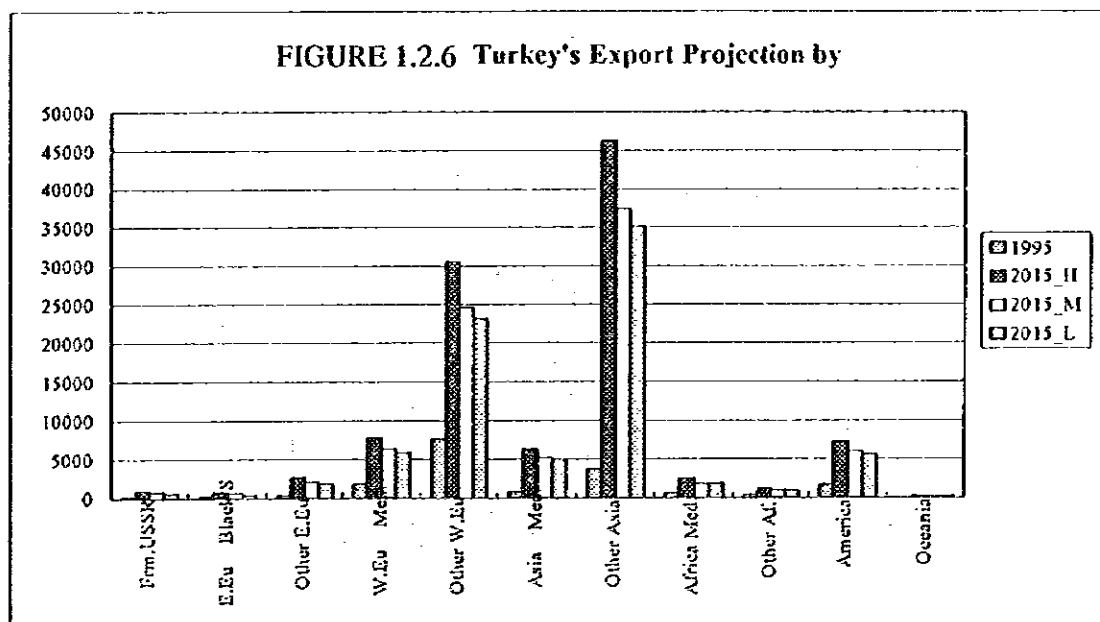


TABLE 1.2.9 Trade Matrix (f.o.b.) : 1990

Million US\$ at 1990 constant price

to->	World	Frm.USSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turkey	Other Asia	Africa Med.	Other Af.	America	Oceania
World	3438620	66242	19035	27025	277875	1386153	17818	21969	725224	268776	71288	748077	50951
Frm.USSR	104188	0	9460	4997	5696	56317	161	1239	15708	640	931	8975	64
E.Eu Black S	19215	10648	656	1610	887	2612	96	196	726	885	209	883	7
Other E.Eu	35820	7452	795	2663	1956	17837	239	433	2161	574	188	1442	80
W.Eu Med.	234135	3186	462	1987	19707	148421	1981	2131	19424	5812	4777	24607	1640
Other W.Eu	1400238	22656	3259	11491	166705	856094	9417	8164	123504	12661	34039	137981	12467
Asia Med.	30011	1898	175	269	3344	11893	467	207	5064	555	541	5422	176
Turkey	12921	533	93	199	1450	6271	398	0	2114	433	318	1081	31
Other Asia	837845	10158	2002	2008	24889	132590	1430	4690	382036	0	17537	240877	19628
Africa Med.	23680	615	103	102	5588	10554	252	348	1687	550	537	3324	20
Other Af.	75441	736	1200	596	20405	19762	223	1466	3877	866	5040	21182	88
America	627860	8388	814	1166	27224	122911	3511	2953	142206	4511	6798	295910	11468
Oceania	50100	505	109	136	1474	7162	41	142	27031	498	215	7474	5313

TABLE 1.2.10 Trade Matrix (f.o.b.) : 1995

Million US\$ at 1990 constant price

to->	World	Frm.USSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turkey	Other Asia	Africa Med.	Other Af.	America	Oceania
World	4150888	13895	12330	41137	300465	1470459	25795	31577	1109475	31477	72894	983643	57741
Frm.USSR	66699	0	3831	4471	3388	33075	157	1002	13298	391	530	6516	40
E.Eu Black S	12151	1781	487	2278	1071	2897	163	332	1357	230	567	1178	10
Other E.Eu	44259	1963	861	5491	2702	24143	485	807	4216	815	247	2413	115
W.Eu Med.	289696	693	376	3350	24848	172413	3169	3318	31664	7300	5352	35274	1939
Other W.Eu	1586352	4710	2823	18698	181069	914404	13161	12007	192929	15015	35229	182185	14121
Asia Med.	20938	396	76	117	2429	6268	120	368	4902	189	235	5668	171
Turkey	17023	126	100	367	1775	7592	803	0	3689	539	373	1618	40
Other Asia	1133339	2114	1931	3271	27458	141780	2152	6906	588876	0	18171	318402	22258
Africa Med.	25284	127	83	161	5651	10663	380	488	2497	708	557	3969	20
Other Af.	73253	127	895	805	18462	17521	257	1790	4955	813	4330	23215	83
America	815338	1757	742	1911	30072	132254	4893	4375	220573	4987	7088	393600	13086
Oceania	66357	102	105	215	1540	7448	54	203	40519	488	217	9607	5859

TABLE 1.2.11 Trade Matrix (f.o.b.) : Medium Case1 2005

Million US\$ at 1990 constant price

to->	from	World	Frm.USSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turkey	Other Asia	Africa Med.	Other Af.	America	Oceania
World		6693361	39699	29967	79200	430987	1977688	46481	64296	2522234	43010	84042	1301122	79633
Frm.USSR		118123	0	10168	8240	4990	47011	345	2145	34118	592	644	9806	63
E.Eu Black S		43585	9379	2193	8349	2761	7556	693	1250	5990	669	1428	3291	26
Other E.Eu		89838	6061	2419	12251	4744	41542	1201	2092	13095	1454	363	4396	220
W.Eu Med.		437800	1675	909	5841	36449	233682	5811	6749	77093	9889	6202	50595	2905
Other W.Eu		2413984	11472	6183	32910	257162	1241251	23417	24554	472723	20228	40913	261846	21324
Asia Med.		79376	1857	522	1139	7697	23906	2694	974	26463	1459	901	11402	363
Turkey		40479	439	200	926	3525	14778	2459	0	12962	1058	621	3334	86
Other Asia		2066169	4792	3585	5358	37030	179095	3705	13141	1342702	0	19637	425848	31276
Africa Med.		40994	296	181	252	8783	15717	677	1043	5776	1045	646	6551	29
Other Af.		135433	381	2337	1745	32858	29298	565	4508	14936	1334	6194	41102	154
America		1170384	3600	1315	2830	36898	151029	7304	7527	454666	5765	6925	475902	16623
Oceania		102675	187	154	285	1615	7602	70	313	74651	575	189	10383	6652

TABLE 1.2.12 Trade Matrix (f.o.b.) : Medium Case1 2015

Million US\$ at 1990 constant price

to->	from	World	Frm.USSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turkey	Other Asia	Africa Med.	Other Af.	America	Oceania
World		10969924	60172	50548	144521	611532	2580116	77096	123488	5383964	59925	97664	1673447	107450
Frm.USSR		212495	0	18273	15514	7317	66370	615	4458	83326	952	808	14564	99
E.Eu Black S		65814	14922	3518	14719	3287	8879	1123	2005	10867	951	1765	4147	30
Other E.Eu		172201	10928	4719	26383	8102	67080	2445	4971	36581	2612	521	7467	393
W.Eu Med.		658180	2431	1500	10133	51363	303216	9530	12924	173105	13603	7153	69036	4186
Other W.Eu		3710795	16846	9772	57727	362494	1632515	39346	47327	1075547	27860	47792	362293	31075
Asia Med.		63995	2234	393	350	5802	11436	346	1937	29886	656	305	10208	384
Turkey		85605	815	557	2056	6211	24592	5224	0	37315	1921	918	5837	159
Other Asia		3828340	6644	5096	8874	49714	222423	5779	24018	2884712	0	21660	556379	43039
Africa Med.		62364	411	281	394	12767	21268	1074	2065	12372	1449	750	9493	40
Other Af.		252848	699	4549	3826	58353	48155	1192	10906	42524	2251	9042	71070	280
America		1696427	4430	1712	4161	44124	166489	10335	12211	867046	6933	6780	551900	20305
Oceania		160859	211	177	385	1738	7692	89	466	130683	735	170	11053	7459

TABLE 1.2.13 Trade Index : Medium Case1 / 2005

1995 = 100

to->	from	World	Frm.USSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turkey	Other Asia	Africa Med.	Other Af.	America	Oceania
	World	161	286	243	193	143	134	180	204	227	137	115	132	138
	Frm.USSR	177		265	184	147	142	220	214	257	151	122	150	158
	E.Eu Black S	353	527	451	366	258	261	425	376	441	291	252	279	271
	Other E.Eu	203	309	281	223	176	172	248	259	311	178	147	182	191
	W.Eu Med.	151	242	241	174	147	136	183	203	243	135	116	143	150
	Other W.Eu	152	244	219	176	142	136	178	204	245	135	116	144	151
	Asia Med.	379	469	689	975	317	381	2246	264	540	772	384	201	212
	Turkey	238	349	289	252	199	195	306		351	196	167	206	217
	Other Asia	182	227	184	164	135	126	172	190	228		108	134	141
	Africa Med.	162	233	219	156	155	147	178	223	231	147	116	165	147
	Other Af.	185	300	261	217	178	167	220	252	302	164	143	177	186
	America	144	205	177	148	123	114	149	172	206	116	98	121	127
	Oceania	155	183	147	132	105	102	129	154	184	118	87	108	114

TABLE 1.2.14 Trade Index : Medium Case1 / 2015

1995 = 100

to->	from	World	Frm.USSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turkey	Other Asia	Africa Med.	Other Af.	America	Oceania
	World	264	433	410	351	204	175	299	391	485	190	134	170	186
	Frm.USSR	319		477	347	222	201	392	445	627	243	152	224	247
	E.Eu Black S	533	815	723	646	307	306	689	603	801	413	311	352	311
	Other E.Eu	389	557	548	480	300	278	504	616	868	320	211	309	342
	W.Eu Med.	227	351	399	302	207	176	301	389	547	186	134	196	216
	Other W.Eu	234	358	346	309	200	179	299	396	557	186	136	199	220
	Asia Med.	306	564	518	299	241	182	288	526	610	347	120	180	225
	Turkey	503	649	555	560	350	324	650		1011	356	246	361	399
	Other Asia	338	314	261	271	181	157	269	348	490		119	175	193
	Africa Med.	247	323	339	244	226	199	283	442	495	205	135	239	202
	Other Af.	345	551	508	475	316	275	463	609	858	277	209	306	339
	America	208	252	231	218	147	126	211	279	393	139	96	140	155
	Oceania	242	207	169	179	113	103	165	229	323	151	78	115	127

1.2.4 Prospective Situation of Maritime Cargo Movement

(1) Maritime Cargo Volume Function Estimated

1) Load and Unload Volume Function

In the next step, a group of maritime cargo volume function was estimated using GDP, export / import value provided by work as before. Time series data of loaded / unloaded maritime cargo by dry and liquid type is available from "Yearbook of International Statistics : Analysis of goods loaded and unloaded in international maritime transport" (UN) on each country basis. Unfortunately, the data covers only to 1990. However, as there are no other available data, it has been adopted in the study.

The estimated load and unload functions by goods type are summarized in Table 1.2.15 and Table 1.2.16 respectively. Some estimated functions contain dummy variables, which are abbreviated in Tables for the sake of simplicity.

A standard specification of load functions are following ;

for dry cargo : $DRY = \text{Constant} + \alpha * \text{Export value} + \beta * RD$

$$RD = DRY / (DRY + LIQ)$$

for liquid cargo : $LIQ = \text{Constant} + \chi * \text{Export value} + \delta * RL$

$$RL = LIQ / (DRY + LIQ)$$

At first, it was thought that each type of cargo could be is explained by its export value level only, but feasible finesses were not obtained. Instead it is necessary to solve a simultaneous equation system.

Same as load cargo, a standard specification for unload function is as follows ;

for dry cargo : $IDRY = \text{Constant} + \alpha * \text{Import value} + \beta * IRD$

$$IRD = IDRY / (IDRY + ILIQ)$$

for liquid cargo : $ILIQ = \text{Constant} + \chi * \text{Export value} + \delta * IRL$

$$IRL = ILIQ / (IDRY + ILIQ)$$

Using these systems, load / unload volumes were projected toward 2005 and 2015. However, them of Turkey are quartet from another study described in the following chapter 4. Because, the more detail analysis was made there.

TABLE 1.2.15 Coefficient of Loaded Cargo Volume Function Estimated

	DRY CARGO					LIQUID CARGO				
	C	EX	RD	R2'	Term	C	EX	RL	R2'	Term
World	380956	0.404	849236	0.952	75-87	1881690	0.326	5727280	0.953	75-90
Frm.USSR	-33500	0.242	180444	0.952	75-88	9169	0.430	74946	0.943	75-90
Bulgaria	2922	0.074		0.962	75-89	LIQ=0.13*(DRY+LIQ)				
Romania	460	0.157	4650	0.909	75-90	-3616	0.020	17695	0.977	75-90
O.E.Europe	1828	0.286	13476	0.974	75-90	LIQ=0.10*(DRY+LIQ)				
Greece	-12523	0.801	28932	0.947	75-90	-725	0.233	13521	0.938	75-90
Italy	4289	0.052	19695	0.939	75-90	-9089	0.036	49852	0.964	75-90
Spain	-94956	0.984	108188	0.977	75-90	-4066	0.190	25963	0.966	75-90
O.W.Europe	132326	0.196		0.990	75-90	-179294	0.124	681446	0.987	75-90
Israel	1777	0.252	3285	0.935	75-90	-1254		25811	0.963	75-90
Cyprus	-100	2.091	14008	0.947	75-90	-555022	51.459	600071	0.976	75-90
Syria	-1691	0.433	15737	0.961	75-90	-40764	0.545	56383	0.883	75-90
Turkey	2139	0.735	5710	0.952	76-95	LIQ=0.136*(DRY+LIQ)				
O.Asia	76093	0.357	64868	0.980	75-90	1641130	0.510	3017560	0.987	75-90
Egypt	-1102	0.351	97486	0.935	79-90	-789978	13.519	870673	0.932	78-90
Tunisia	-474	0.457	7770	0.955	80-90	-1648	0.417	10308	0.936	80-90
Algeria	1091	0.017	29196	0.933	80-90	-349654	0.376	418310	0.936	80-90
Morocco	15020	1.475		0.955	80-90	111	0.011		0.682	85-90
O.Africa	74535	1.165		0.886	75-90	-210496	1.230	563930	0.978	75-90
America	360463	0.723		0.978	75-90	118640	0.261		0.947	75-90
Oceania	43485	4.592		0.958	75-91	-4695	0.145	200763	0.978	75-90

TABLE 1.2.16 Coefficient of Unloaded Cargo Volume Function Estimated

	DRY CARGO					LIQUID CARGO				
	C	IM	IRD	R2'	Term	C	IM	IRL	R2'	Term
World	28487	0.383	1751910	0.959	75-87	1238340	0.281	4723510	0.972	75-90
Frm.USSR	-210077	0.435	258779	0.961	75-88	1755	0.044	13278	0.893	75-90
Bulgaria	-4287	0.245	20322	0.927	75-89	ILIQ=0.50*(IDRY+ILIQ)				
Romania	-9431	0.075	43410	0.969	75-90	ILIQ=0.48*(IDRY+ILIQ)				
O.E.Europe	3310	0.309		0.901	75-90	ILIQ=0.10*(IDRY+ILIQ)				
Greece	384	0.157	13585	0.982	75-90	4085		17677	0.851	75-90
Italy	47215	0.119	24282	0.904	75-90	-281114	0.277	583169	0.960	75-90
Spain	-27292	0.188	137288	0.986	75-90	28065	0.201	26890	0.949	75-90
O.W.Europe	227924	0.204	202645	0.963	75-90	-462543	0.173	1632500	0.943	75-90
Israel	3807	0.209		0.905	75-90	2067		11112	0.969	79-90
Cyprus	-2784	0.383	6190	0.941	79-90	590	0.184		0.807	79-90
Syria	-1609	0.046	13626	0.959	80-90	4750	0.044		0.983	80-90
Turkey	-15302	0.959	33281	0.980	76-95	-3806	0.996		0.956	76-95
O.Asia	-525293	0.699	1510970	0.991	75-90	82423	0.303	585604	0.947	75-90
Egypt	11351	0.633	20047	0.905	79-90	-187503	1.693	314655	0.945	78-90
Tunisia	-6910	1.708	6987	0.880	80-90	-816	0.178	8526	0.980	80-90
Algeria	-28888	0.351	42812	0.960	80-90	-251	0.049	12443	0.943	80-90
Morocco	-13723	0.231	32994	0.989	80-90	3440	0.206	528	0.970	80-90
O.Africa	168679	0.183	168679	0.935	75-90	17913	0.655	34349	0.903	75-90
America	173552	0.192		0.947	75-90	-845214	0.276	1873130	0.907	75-90
Oceania	12493	0.034	11954	0.981	82-90	-9279	0.040	53768	0.999	86-90

2) Container Throughput Volume Function

Next, functions for a projection of container throughput volume in each sub area are estimated, using a data base from Ocean Shipping LTD (except for the case of Turkey). A summary of estimated function is given in Table 1.2.17.

TABLE 1.2.17 Coefficient of Container Throughput Volume Function Estimated

	C	DUM_C	GDP	LOAD+U NLOAD	DUM_LO AD+UNL	LOAD	UNLOAD	DUM_UN LOAD	TRND	R ²	Term	DUM_TE RM
Frn. USSR	-918		0.0003			-0.0020	0.0389	-0.0230		0.754	86-94	86-90
Bulgaria	-39		0.0036						1.086	0.816	86-94	
Romania												
O.E.Europe	-347		0.0037				0.0108			0.792	85-94	
Greece	-1438		0.1238							0.986	85-95	85-92
Italy	-550		0.0026					-0.0070		0.938	85-94	
Spain	-1242		0.0050	0.0087						0.897	85-94	
O.W.Europe	-27139				0.0512	0.0386				0.924	85-94	
Israel	-386		0.0181							0.928	86-95	
Cyprus	-157		0.1344							0.861	85-94	91,92,94
Syria	-117	-52	0.0007		0.1940					0.872	85-95	
Turkey	-1571		0.0122							0.981	87-95	
O.Asia	-37950			0.0531						0.960	86-92	
All Africa(for	-12172				0.0819					0.961	86-95	
EGYPT)												
Tunisia	-103				0.0191	0.0039			1.100	0.983	86-95	
Algeria										0.841	86-95	
Morocco	-241		0.0145	38.4082						0.941	86-95	90-92
O.Africa	-8633		0.0280							0.898	87-95	
America	-29729		0.0037				0.0760			0.995	85-95	
Oceania	-2776		0.0129		0.0032					0.977	86-95	

In this step, loaded / unloaded dry cargo volume and GDP of each sub area in future are available to use as variables. However, the data on containerized cargo ratio is lacking, and it is difficult to get this type of data for all countries. The estimated coefficients without such data might overemphasize the recent trend of rapid containerization, resulting in an overestimation. So, in the study, a guideline regarding to the total container volume of the world in future was set. And the projected container volume of each sub area using function was totally adjusted with the guideline level.

(2) Result of Projection of Maritime Cargo Volume in 2005 and 2015

1) Cargo Volume of the Whole World

Using above mentioned methods, the cargo volume of each area by type was projected for the medium case 2. The result about loaded cargo are presented in Table 1.2.18, and it about unloaded cargo in Table 1.2.19 As a reference, Table 1.2.20 shows indices and growth rates.

The dry cargo of the world is projected to increases by 4.3% to 6,590 Million tons in 2015 from 2,830 Million tons (estimation) in 1995. And the liquid cargo will grow by 3.9% per annum over 1995 - 2015 to 4,300 Million tons from 1,980 Million tons.

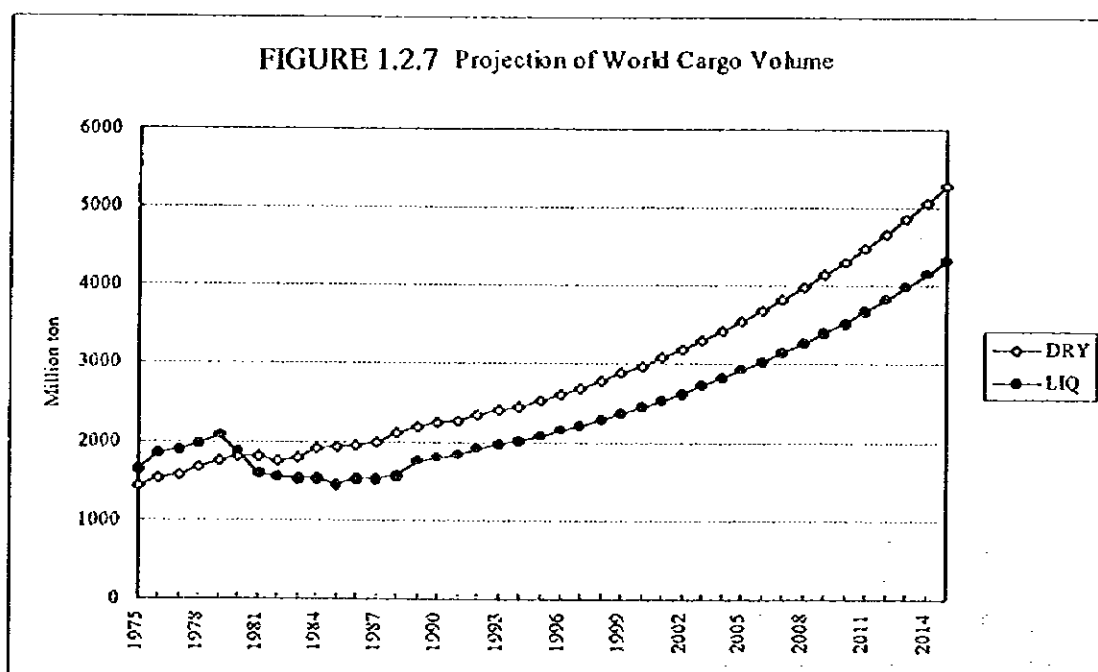


TABLE 1.2.18 Loaded Cargo Forecast : Medium case

Million Ton													
	World	Frm.US SR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turkey	Other Asia	Africa Med.	Other Af	Americ a	Oceani a
<i>DRY CARGO</i>													
1975	1431.6	46.7	7.5	31.4	43.1	250.7	4.8	3.2	201.8	24.7	103.0	536.2	178.3
1980	1820.7	54.8	6.1	30.0	73.5	302.7	9.5	5.0	265.8	28.8	124.2	717.1	203.1
1985	1937.4	40.3	8.0	31.4	74.7	364.3	9.4	7.8	303.2	36.8	126.6	699.8	235.2
1986	1944.6	40.3	8.0	33.5	77.6	367.6	10.0	8.4	301.7	39.5	127.7	685.9	244.4
1987	1980.2	40.4	10.0	29.4	63.2	366.0	10.2	8.7	326.9	39.0	130.9	713.2	242.2
1988	2108.4	41.2	9.8	27.7	74.4	368.0	10.6	13.7	368.8	34.8	141.9	759.6	255.0
1989	2195.7	46.2	9.9	25.6	78.1	392.4	10.3	12.4	388.4	32.4	142.5	789.2	268.3
1990	2247.3	44.0	8.4	26.6	79.9	399.4	10.5	12.9	401.4	31.2	147.6	811.7	273.9
1995	2832.1	52.8	8.3	27.3	121.3	467.0	12.3	17.5	540.3	33.8	171.7	1008.5	371.1
2005	4081.6	55.1	11.6	42.2	180.6	654.2	16.7	36.5	916.8	40.7	254.6	1311.3	561.4
2015	6585.0	89.6	15.4	73.5	278.5	1007.8	24.3	75.6	1734.6	56.7	437.1	1868.7	923.2
<i>LIQUID CARGO</i>													
1975	1647.0	73.0	2.5	1.0	17.8	96.7	77.5	0.6	959.8	51.3	179.4	184.1	3.4
1980	1831.0	95.0	6.1	2.0	18.1	171.8	47.1	17.2	938.7	102.8	203.7	276.7	1.7
1985	1461.8	113.8	7.8	1.6	26.2	211.5	68.4	46.9	507.4	129.5	142.2	199.4	7.1
1986	1544.8	115.4	9.4	1.8	24.5	212.9	80.2	59.4	537.6	133.4	151.3	210.8	8.2
1987	1541.2	116.8	9.4	3.5	30.0	211.4	85.4	59.1	511.3	133.9	147.7	223.8	8.9
1988	1468.4	116.4	9.5	4.4	31.6	208.1	92.2	78.5	389.0	142.0	159.9	228.0	8.8
1989	1753.7	117.1	9.9	3.1	33.9	254.4	97.1	79.8	578.1	150.7	175.9	245.8	7.9
1990	1778.4	105.4	3.5	2.8	37.9	241.9	94.6	44.1	645.1	159.5	185.8	247.7	10.1
1995	1976.6	83.2	2.4	2.7	44.0	266.4	101.1	2.8	771.6	163.6	198.4	328.0	12.4
2005	2757.5	110.1	5.7	4.1	56.7	367.2	129.4	3.1	1188.8	180.8	273.4	420.5	17.6
2015	4229.4	149.6	5.4	6.8	75.0	524.7	172.1	3.1	2102.4	189.3	417.5	557.6	26.0

TABLE 1.2.19 Unloaded Cargo Forecast : Medium case

Million Ton													
	World	Frm.US SR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turkey	Other Asia	Africa Med.	Other Af	Americ a	Oceani a
<i>DRY CARGO</i>													
1975	1424.9	29.0	15.0	19.6	98.6	415.0	9.0	7.8	481.4	23.3	46.6	249.0	26.5
1980	1881.4	48.0	31.1	23.4	132.2	538.9	8.3	9.7	679.9	39.8	56.5	289.4	22.5
1985	2026.1	69.8	29.1	15.0	120.5	556.3	14.8	16.2	784.9	50.3	53.2	289.6	22.8
1986	2065.1	72.5	29.4	15.0	123.1	575.8	16.4	19.2	792.3	50.6	50.7	294.7	21.0
1987	2162.4	75.3	29.5	16.5	117.7	568.7	17.9	21.2	892.0	49.2	50.0	298.1	21.1
1988	2284.3	77.1	27.3	16.4	136.7	616.7	17.5	20.6	934.9	49.5	56.6	305.2	20.5
1989	2373.6	79.4	28.1	15.0	138.4	617.4	15.5	23.7	999.0	51.0	59.0	320.7	21.2
1990	2395.9	78.0	27.9	16.1	143.1	624.1	14.4	28.8	1004.0	51.2	59.6	322.2	20.9
1995	2832.1	34.2	22.9	18.6	151.4	671.9	16.7	34.8	1367.5	60.0	53.4	379.4	21.2
2005	4081.6	50.9	26.3	31.2	171.0	775.7	20.9	56.6	2374.2	70.2	56.8	426.2	21.7
2015	6585.0	69.2	30.5	54.6	202.1	930.3	27.8	96.3	4506.0	88.0	61.4	496.3	22.6
<i>LIQUID CARGO</i>													
1975	1681.3	6.5	17.9	1.2	197.6	533.5	28.1	10.0	402.7	6.8	34.1	424.4	18.5
1980	1876.4	7.7	31.1	3.6	221.6	501.8	15.7	11.4	442.2	53.3	34.6	534.5	19.1
1985	1470.1	7.4	27.4	0.9	182.7	363.4	13.7	20.7	446.2	59.7	33.3	300.6	14.2
1986	1545.0	7.9	28.2	0.9	182.4	360.4	12.8	23.6	474.8	59.4	33.4	350.5	10.7
1987	1533.0	8.4	29.0	0.9	175.9	384.3	12.2	15.3	433.7	59.8	34.2	363.9	15.3
1988	1638.9	8.5	28.0	1.8	185.5	398.7	13.2	13.3	476.0	61.9	36.4	398.5	16.9
1989	1713.7	8.4	27.5	1.7	191.9	407.2	14.3	11.0	490.6	63.8	37.5	442.2	17.7
1990	1785.4	7.3	25.7	1.8	196.7	417.3	14.0	16.3	522.3	66.7	39.0	460.4	17.9
1995	1976.6	4.3	21.5	2.1	201.5	380.9	14.2	29.4	681.1	69.8	38.0	514.0	19.7
2005	2757.5	7.4	28.8	4.1	234.4	318.0	16.3	49.5	1283.9	85.3	43.6	656.6	24.6
2015	4229.4	10.3	37.4	8.0	260.4	150.1	18.1	77.3	2638.2	102.7	48.6	848.6	29.8

**TABLE 1.2.20 Volume INDEX and Growth Rate of Loaded / Unloaded Cargo
Medium Case**

	World	Frm.U SSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turkey	Other Asia	Africa Med.	Other Af.	Americ a	Oceani a
INDEX 1995 = 100													
DRY LOAD													
2005	144	104	139	154	149	140	135	208	170	121	143	130	151
2015	233	170	185	269	230	216	197	431	321	168	255	185	249
DRY UNLOAD													
2005	144	149	115	168	113	115	125	163	174	117	106	112	102
2015	233	202	133	294	133	138	166	276	330	147	115	131	107
LIQ LOAD													
2005	140	132	235	154	129	138	128	113	154	111	138	128	142
2015	214	180	223	251	170	197	170	113	272	116	210	170	210
LIQ UNLOAD													
2005	140	174	134	193	116	83	115	169	189	122	115	128	125
2015	214	240	174	375	129	39	127	263	387	147	128	165	151
GROWTH RATE (% annually)													
DRY LOAD													
1995-2005	3.7	0.4	3.4	4.4	4.1	3.4	3.1	7.6	5.4	1.9	4.0	2.7	4.2
1995-2015	4.3	2.7	3.1	5.1	4.2	3.9	3.5	7.6	6.0	2.6	4.8	3.1	4.7
DRY UNLOAD													
1995-2005	3.7	4.1	5.3	1.2	1.4	1.4	2.2	5.0	5.7	1.6	0.6	1.2	0.2
1995-2015	4.3	3.6	1.4	5.5	1.5	1.6	2.6	5.2	6.1	1.9	0.7	1.4	0.3
LIQ LOAD													
1995-2005	3.4	2.8	8.9	4.4	2.6	3.3	2.5	1.2	4.4	1.0	3.3	2.5	3.6
1995-2015	3.9	3.0	4.1	4.7	2.7	3.4	2.7	0.6	5.1	0.7	3.8	2.7	3.8
LIQ UNLOAD													
1995-2005	3.4	5.7	2.9	6.8	1.5	-1.8	1.4	5.4	6.6	2.0	1.4	2.5	2.2
1995-2015	3.9	4.5	2.8	6.8	1.3	-4.6	1.2	5.0	7.0	2.0	1.2	2.5	2.1

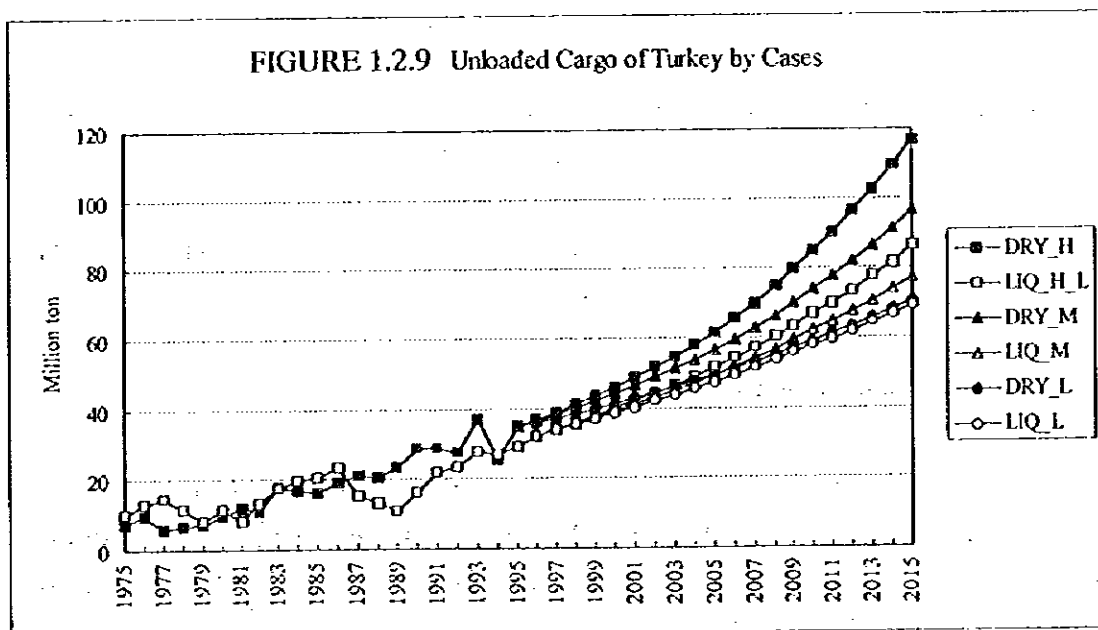
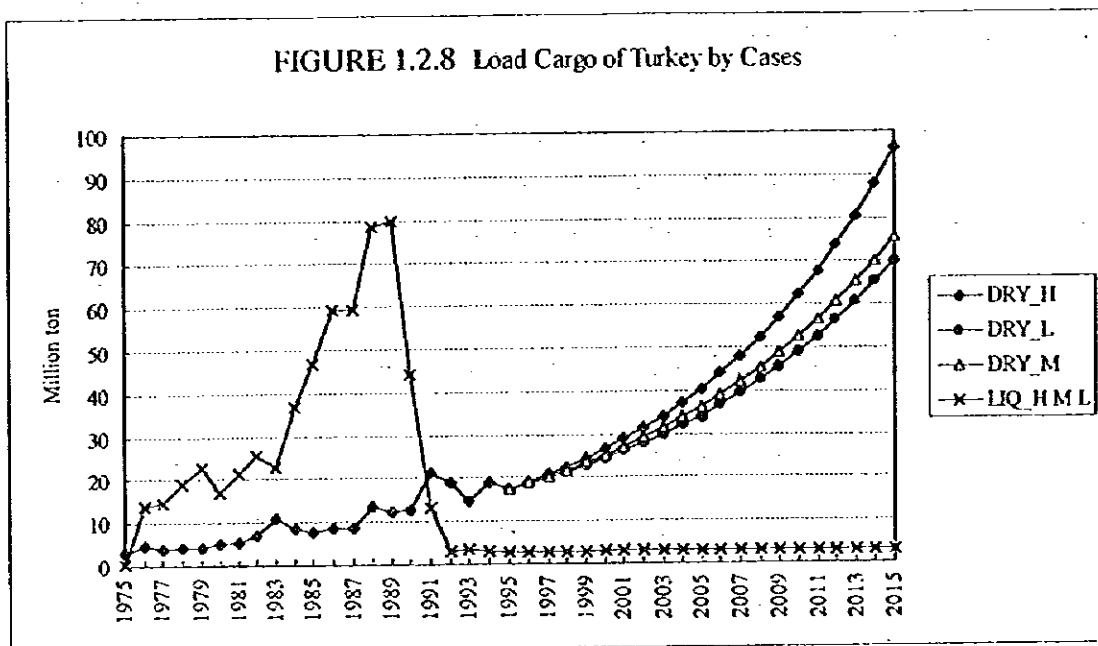
2) Cargo Volume of Turkey

Turkey's cargo volume has been estimated in Chapter 2, Part II. The compartments concerning international trade in the estimated future volume are quoted here.

On the export (load) side, dry cargo increases at an annual rate of 8.9% over 1995 - 2015 to 96.1 Million tons in the high case compared with 17.5 Million tons in 1995. Similarly, it grows by 7.6% to 75.6 Million tons in the medium case and by 7.2% to 70.3 Million tons in the low case. Liquid cargo, which mainly consists of tanker oil, is assumed to stay at the present level, 3.1 Million tons. (See Figure 1.2.8.)

About the import (unload) side, the growth rate of Turkey's unloaded cargo is projected at 6.2% in the high case, 5.0% in the medium case and 4.4% in the low case. Those volumes in 2015 are 116.8, 96.3 and 70.7 Million tons respectively. And, the liquid

which includes the clued oil here increases by 5.5%, 5.0% and 4.4% over 1995 - 2015, and reaches the level of 86.3, 77.3 and 69.0 Million tons in each respective cases. (See Figure 1.2.9)



3) Cargo Volume of the Other Area

In the other area, the cargo of the Other Asia shows the highest rate of growth, 6.0% of loaded dry, 5.1% of unloaded dry , 6.1% of loaded liquid and 7.0% of unloaded liquid. These rates seem very high, but the elasticity to its export value growth (6.3%) or that of imports (7.9%) is less than 1.0.

The unloaded liquid cargo of the Other W.Europe shows decrease in future. Moreover, its balance of loaded and unloaded seems to be peculiar. Perhaps there may be some defect in the simultaneous equation system concerning this area.

(3) Result of Projection of Container Throughput in 2005 and 2015

1) Container Throughput of the Whole world

As described already in the explanation of the container forecasting method, the world container volume in future is extended with an assumed set of increasing rates. The growth rates are following;

Growth rate of world container throughput	9.5%	(1995-2000)
	7.5%	(2001-2005)
	6.0%	(2006-2010)
	5.5%	(2011-2015)

These rates are adopted referring to " The World Container Port Market to 2010" published by the Ocean Shipping Consultants LTD, and so on.

Expanding with these rates, the container volume reaches to 560 Million TEU in 2015, about 4 times greater than the 141.6 Million TEU in 1995. (See TABLE 1.2.21)

2) Container Throughput of Turkey

The container throughput of Turkey is increasing rapidly now. It reached to 577 thousand TEU in 1995 from 70 thousand TEU in 1987. Its average annual growth rate was 30.2%. The trend was explained relatively well by GDP growth. The projections by cases are shown in Table 1.2.22.

The level of container throughput in 2015 is 8.46 Million TEU in the high case, 6.4 Million TEU in the medium case and 4.8 Million TEU. Growth rates declining toward 2015 as seen in Table 1.2.22, because the total volume of each area is adjusted by the assumed world container volume. In medium case 2 of Turkey, the average annual growth changes every five years, 21.9% over 1996-2000, 13.2% over 2001-2005, 9.2%.

TABLE 1.2.21 Projection of Container Throughput

Thousand TEU													
	World	Frm.U SSR	E.Eu Black S	Other E.Eu	W.Eu Med.	Other W.Eu	Asia Med.	Turkey	Other Asia	Africa Med.	Other AF	Ameri ca	Ocean ia
1980		186	49	82	2051	8935							1613
1985			73	100	3225	12865						15881	
1986	61210	365	76	99	3244	13407	580		22459	308	1433	17131	1950
1987	67371	440	80	123	3489	14294	644	70	25846	314	1485	18461	2024
1988	74275	464	85	150	3786	15774	712	89	29463	363	1652	19397	2227
1989	80922	486	80	148	3892	16629	799	98	33374	392	1737	20728	2392
1990	86941	532	57	146	4238	17330	961	269	37108	603	1815	21482	2325
1991	94823	659	79	131	4607	18178	951	308	42934	856	1889	21635	2510
1992	102797	565	70	113	4851	17934	1066	380	48673	931	2088	23396	2656
1993	114392	476	47	126	5179	20052	1179	510	54937	1201	2280	25466	2879
1994	127730	464	63	136	5855	21917	1219	480	62318	1523	2533	27898	3201
1995	141600	452	68	160	6125	23699	1327	577	68161	1785	2875	29999	3463
2005	320019	1439	205	599	11860	46797	3440	2877	177691	7809	7270	53282	6751
2015	559716	2186	412	1152	15979	71162	6006	6431	345749	21824	10964	68742	9110
INDEX 1995=100													
2005	226	318	300	374	194	197	259	499	261	438	253	178	195
2015	395	484	604	720	261	300	453	1115	507	1223	381	229	263
GROWTH RATE (% annually)													
1995-2005	8.5	12.3	11.6	14.1	6.8	7.0	10.0	17.4	10.1	15.9	9.7	5.9	6.9
1995-2015	7.1	8.2	9.4	10.4	4.9	5.7	7.8	12.8	8.5	13.3	6.9	4.2	5.0

TABLE 1.2.22 Projection of Turkey's Container
1000 TEU

CASE	High	Medium	Low
1987	70	70	70
1988	89	89	89
1989	98	98	98
1990	269	269	269
1991	308	308	308
1992	380	380	380
1993	510	510	510
1994	480	480	480
1995	577	577	577
2000	1682	1550	1421
2005	3379	2877	2418
2010	5573	4471	3522
2015	8461	6431	4784
GROWTH RATE (% annually)			
1996-2000	23.9	21.9	19.8
2001-2005	15.0	13.2	11.2
2006-2010	10.5	9.2	7.8
2011-2015	8.7	7.5	6.3

3) Container Throughput of the Other Area

In this projection, the areas of Africa - Mediterranean, Turkey, the Other E.Europe, E.Europe - Black Sea and the former USSR shows higher growth than the world average. Especially, the rate of Africa - Mediterranean containing Egypt, where container handling has been rapidly increasing recently, is very high.

The level of the Other Asia reaches 345.7 Million TEU, or 5 times the 1995 level.

1.2.5 Prospective Situation in mediterranean - marmara - Black Sea

(1) Container Movement in the Mediterranean Region

1) Container movement in general

Total container traffic in the Mediterranean grew to 9.9 million TEUs in 1994 from 4.7 million TEUs in 1984, showing in Table 1.2.23 and the annual growth rate from 1984 to 1994 was around 7.72%, a little lower than the world rate of 9.01%.

The trend of container movement in the Mediterranean region is analyzed by dividing the region into two area, east and west Mediterranean. Turkey is included in the east Mediterranean.

The east Mediterranean handled 4.1 million TEUs in 1994, 70% less than that handled by the west (5.8 million TEUs). However, since 1987, container movement in the east Mediterranean has been rapidly increasing with the annual growth rate of 10~20%. On the other hand, the share of the west Mediterranean has decreased from a little over 70% to a little under 60%.

2) Container movement by country

In 1994, the country handling the greatest volume of containers was Italy, followed by Spain and Egypt. France totally handled 1.5 million TEUs but most of these countries were accommodated in west France facing the North Sea.

As shown in Figure 1.2.10 Egypt handle more than 1 million TEUs, standing out

in the east Mediterranean, followed by Greece, Israel and Turkey as second top group. Egypt had handled around 180,000 TEUs/year or so until 1989 when Damietta was not fully operated. But since 1990 the traffic has remarkably increased, in 1992 Egypt ranked first in the east and third overall. The top country in the east has changed to Egypt from Israel in 1980s and Greece. Turkey has been almost fourth in the east and its share has gradually increased to 15% from 10%.

3) Container movement by port

Table 1.2.24 and Figure 1.2.11 show the top 40 ports handling containers in the Mediterranean region.

The port with the largest handling volume is Algeciras in Spain, followed by La Spezia in Italy and Barcelona in Spain.

The ports expressed in boldface on Table 1.2.24 belong to the east Mediterranean and account for half of the top 40 ports. In the east Mediterranean, Damietta, which handled no containers before 1985, is the largest port for container handling in 1994. Since 1990, cargo volume has been dramatically increasing because the port of Damietta has begun playing its function of hub-port in the east Mediterranean. This tendency affects the container handling in Piraeus(Greece), Limassol(Cyprus) and neighboring Alexandria which formerly played central roles in the Mediterranean.

Concerning ports in Turkey, Izmir is the largest port for container handling in 1994 and cargo volume has been remarkably increasing with 21.5% of annual growth rate from 1990 to 1994. However, the second largest Haydarpaşa and third the largest Mersin are nearly constant. The cargo volume of Haydarpaşa has dramatically decreased in 1994.

4) Container service network for the Mediterranean Sea

According to International Transportation Handbook '96, there are 28 container (main ship) service routes related to the Mediterranean Sea. There are 11 routes for Far East/Japan - Med., 5 routes for Far East/Japan - Europe which stop a few ports in the Mediterranean and 9 routes for North America - Europe which stop or bound for ports in the Mediterranean, and 3

route for Round the World which stop at some ports on the way.

Ports to be called by the ships of the service routes are divided into those of the east and west Mediterranean. Major calling ports in the east Mediterranean are Haifa, Alexandria, while in the west Mediterranean, Algeciras, Barcelona, Genoa, Valencia in Spain and Marseilles in France. In Turkey, Izmir and Mersin are calling ports by main ship.

5) Container Feeder routes in the East Mediterranean

According to the Containerisation International, transshipment containers handled in the Mediterranean has increased 20% from 1992 to 1994, and transshipment container volume has been over 2.4 million TEUs in 1994. The share of transshipment container in the east Mediterranean has remained 40% a little under. However, the east are highly expected growth of transshipment container and many major ocean going and feeder shipping companies have rapidly launched liner services, mainly feeder services for containers originating to/from ports at the Black Sea.

Almost of transshipment containers are reshaped in major two ports of Algeciras and Barcelona in the west Mediterranean, on the other hand, ports in the east Mediterranean are competing each other to seek a large volume of transshipment containers. The largest port handling transshipment cargo is Damietta in Egypt now, handling volume is some 500,000TEUs in 1994. Piraeus, Port Said, Lamaca, Limassol in the east and Marsaxlokk in the center are also handling considerable amount of volume, and are aiming at addition of volume. In addition, Haifa and Beirut in the east and Cagliari, GioiaTauro in the center are recently directing hub-port. Therefore, it is said that container terminals are generally in over-capacity. Because of hard competition for hub-port among ports in the east, ports cannot help reducing handling cost and it brings the operating cost down by ocean going shipper. It is also said that these situation continues for while.

Many kind of feeder services operated in the east Mediterranean are shown in Table 1.2.25. It is said that the reason why rate are comparatively satiable in spite of many feeder services, is that container cargo volume originating to/from East Mediterranean/Black Sea is growing. Average rate of feeder service in the east Mediterranean is 175~200 US\$/TEU and rate for Black Sea region, for example

Damietta in Egypt to Constanza in Rumania is 225~250 US\$/TEU, which is almost unchanging for past 12 months.

(2) Container Movement in the Marmara Region in Future

It is too difficult to obtain some reliable information about future container movement in the Marmara from a macroscopic projection in this chapter. However, daring to pick up a point on the matter, following may be able to say.

The projected container throughput of the former USSR in 2015 is 2,186 thousand TEU. If the share of the Black Sea USSR (containing Ukraine) to the total would stay in present level, which is about 20%, its volume are thought to be 440 thousand TEU. On the other hand, it of the E.Europe - Black Sea (Bulgaria and Romania) is projected to reach to 410 thousand TEU, which is concerning with Marmara Sea. And, the container throughput in Marmara region of Turkey is forested 2,600 thousand TEU in the medium case in 2015 as mentioned in following chapter. Finally, total container movement in Marmara will increase to 3,450 thousand TEU.

TABLE 1.2.23 Trend of Container Handling in the Mediterranean (Unit: thousand TEU)

Country	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984
Spain	2097	1743	2274	1916	1544	1541	1494	1464	1291	1301	1210
Italy	2565	2293	1891	1870	1807	1619	1632	1560	1539	1525	1605
France	454	444	364	458	493	489	409	408	494	519	418
Malta	428	319	292	197	136	41	55	24	17	21	20
Morocco	175	154	148	154	146	100	89	83	75	69	59
Algeria	22	17	50	48	46	29	43	37	47	50	45
Tunisia	75	65	48	44	37	37	30	7	15	22	19
West Med. Total	5816	5035	5067	4687	4209	3856	3752	3583	3478	3507	3376
Annual Growth Rate(%)	15.51	-0.63	8.11	11.36	9.15	2.77	4.72	3.02	-0.83	3.88	
Egypt	1172	990	677	519	297	195	186	179	180	176	181
Greece	691	703	645	549	480	431	361	287	249	208	186
Turkey	605	581	459	400	309	260	203	171	148	185	115
Cyprus	372	421	358	329	384	369	292	245	207	197	285
L'non	230	204	194	197	190	100	3	7	8	27	22
Isurael	687	649	464	393	363	283	269	308	274	281	283
Syria	133	120	93	83	67	55	46	54	65	85	51
B'garia	25	28	29	27	47	46	45	40	38	35	32
Albania	0	0	0	0	0	0	0	0	0	0	0
Y'lavia	*	*	10	8	8	7	7	8	5	3	4
Croatia	53	50	90	100	143	121	121	105	83	78	81
S'venia	61	60	46	62	95	90	90	67	50	47	46
Romania	41	44	58	46	29	40	40	39	38	38	38
East Med. Total	4070	3850	3123	2713	2412	1997	1663	1510	1345	1360	1324
Annual Growth Rate(%)	5.71	23.28	15.11	12.48	20.78	20.08	10.13	12.27	-1.10	2.72	
Med. Total	9886	8885	8190	7400	6621	5853	5415	5093	4823	4867	4700
Annual Growth Rate(%)	11.27	8.49	10.68	11.77	13.12	8.09	6.32	5.60	-0.90	3.55	
West Med.(%)	58.83	56.67	61.87	63.34	63.57	65.88	69.29	70.35	72.11	72.06	71.83
Turkey/East Med.(%)	14.86	15.09	14.70	14.74	12.81	13.02	12.21	11.32	11.00	13.60	8.69

Note: (*) Data not available

Source: Containerisation International Year Book

FIGURE 1.2.10 Trend of Container Handling in the East Mediterranean

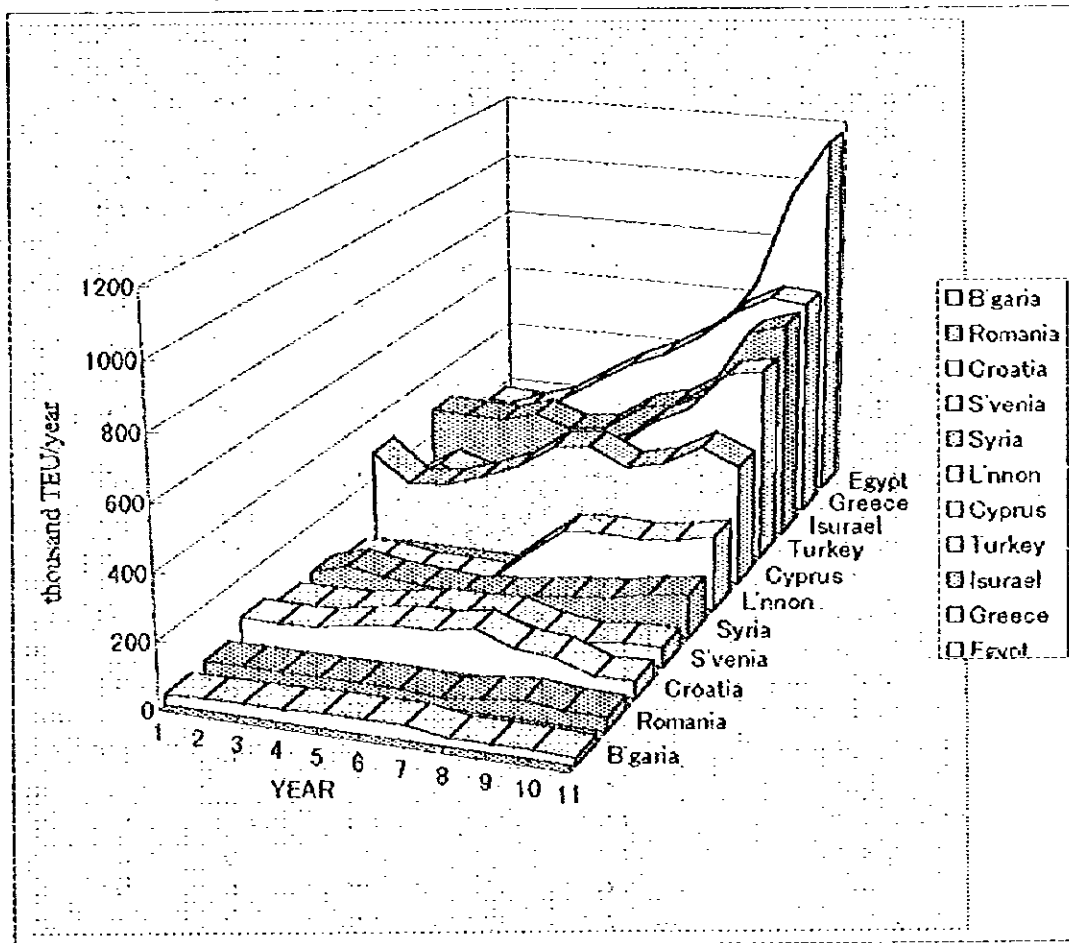


TABLE 1.2.24 Container Port Traffic in Mediterranean Region (Unit: thousand TEU)

No.	Port	1994	1993	1992	1991	1990	Country
1	Algeciras	1004	807	780	762	553	Spain
2	La Spezia	816	765	596	464	450	Italy
3	Damietta	702	561	416	252	98	Egypt
4	Barcelona	605	501	552	489	448	Spain
5	Piraeus	517	537	511	463	426	Greece
6	Genoa	512	342	338	344	310	Italy
7	Valencia	467	385	371	364	387	Spain
8	Marseilles	437	432	350	446	482	France
9	Haifa	424	405	386	323	237	Israel
10	Marsaxlokk	383	288	259	158	95	Malta
11	Leghorn	360	361	334	411	416	Italy
12	Alexandria	284	256	204	253	198	Egypt
13	Izmir	268	213	163	143	123	Turkey
14	Limassol	266	221	218	229	274	Cyprus
15	Ashdod	250	227	182	157	179	Israel
16	Beirut	230	204	81	131	0	Lebanon
17	Naples	194	181	164	154	132	Italy
18	Port Said	185	170	117	61	55	Egypt
19	Ravenna	181	171	157	150	152	Italy
20	Haydarpasa	180	233	178	146	112	Turkey
21	Thessaloniki	174	166	134	86	54	Greece
22	Casablanca	169	148	179	175	165	Morocco
23	Salemo	169	145	-	61	52	Italy
24	Trieste	146	150	134	136	142	Italy
25	Lattakia	133	120	93	83	67	Syria
26	Mersin	131	117	95	103	114	Turkey
27	Venice	115	118	107	91	90	Italy
28	Larnaca	106	192	134	95	102	Cyprus
29	Palma de Mallorca	90	60	98	116	132	Spain
30	Cadiz	73	76	74	82	79	Spain
31	Koper	60	60	46	62	95	Slovenia
32	Alicante	58	50	53	44	-	Spain
33	Rijeka	53	50	45	38	48	Croatia
34	Valletta	45	31	29	50	41	Malta
35	Savona	43	34	32	31	31	Italy
36	Constanza	41	44	45	30	28	Romania
37	Tarragona	41	41	33	27	18	Spain
38	Palermo	28	27	29	23	26	Italy
39	Varna	25	28	29	32	28	Bulgaria
40	Gemport	17	8	1	-	-	Turkey
41	Sete	17	12	13	11	11	France
42	Eilat	12	16	42	51	46	Israel
43	Derince	3	3	5	3	-	Turkey
44	Bandirma	2	2	1	2	-	Turkey
45	Samsun	2	5	4	3	1	Turkey
46	Odessa	*	19	15	30	35	Ukraine
47	Ilyichevsk	*	13	54	73	106	Ukraine
48	Famagusta	*	7	5	5	9	Cyprus

Note: 1)(*)Data not available 2)Ports in boldface are located in East Mediterranean Region

Source: Containerisation International Year Book

FIGURE 1.2.1.1 Container Port Traffic in East Mediterranean Region

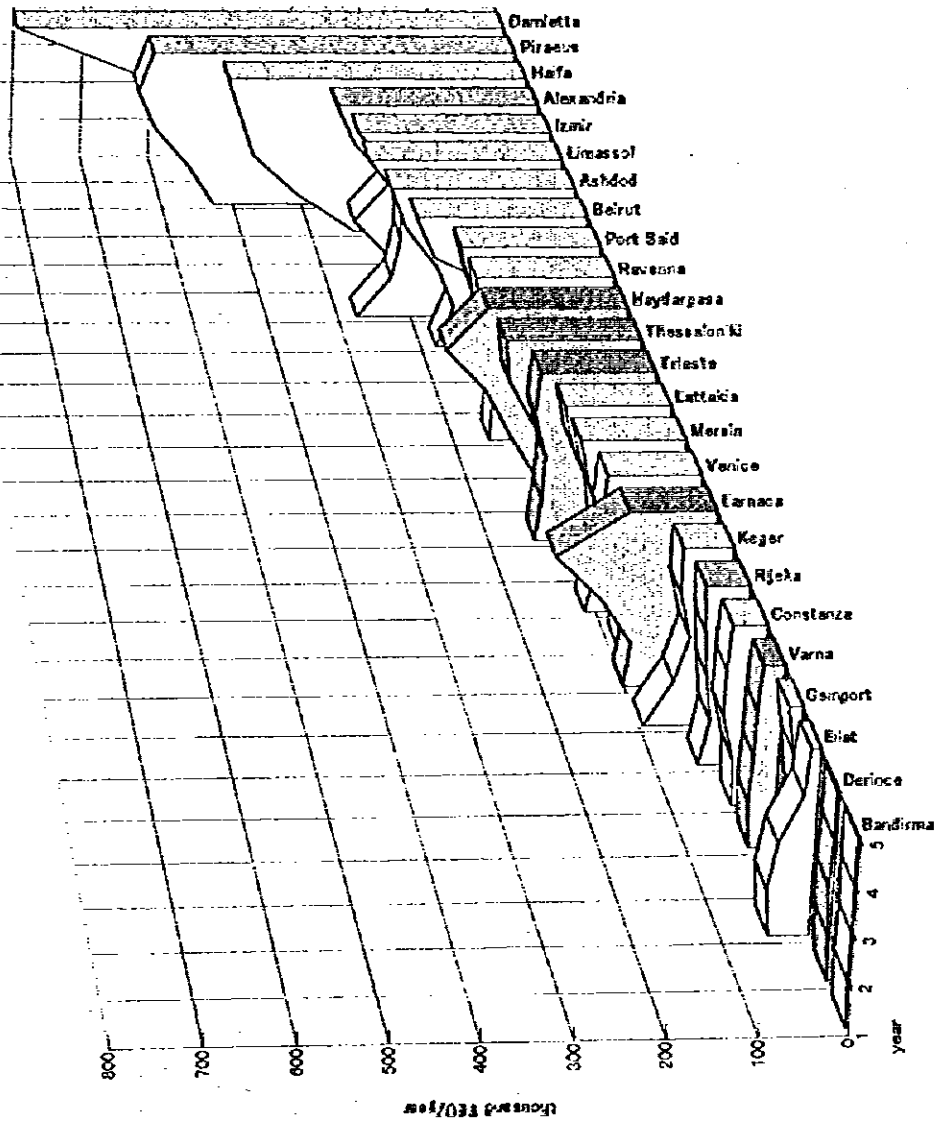


TABLE 1.2.25 PRINCIPAL INTRA-EASTERN MEDITERRANEAN FEEDER SERVICES (INCLUDING BLACK SEA), AS OF OCTOBER 1995

Feeder operator	Ports of call	Frequency		Customer if service dedicated
		Vessels deployed	No. & TEU capacity	
Blasco	Ilychevsk, Varna, Izmir, Piraeus, Salerno	20 days	1 x 250	Blasco
	Ilychevsk, Piraeus, Salerno, Marina di Carrara, Piraeus	fortnightly	2 x 640	Blasco
Camou	Damietta, Lamaca, Beirut, Mersin, Alexandria	weekly	2 x 300	
	Damietta, Port Said, Lamaca, Piraeus, Thessaloniki	weekly	2 x 300	
CMA(FAS)	Damietta, Port Said, Lamaca, Istanbul, Izmir	weekly	1 x 180	
	Damietta, Piraeus, Varna (alternate sailings), Constanza, Odessa, Piraeus	weekly	1 x 568, 1 x 602	CMA, NYK, Ellerman, DSR-Senator
	Damietta, Beirut, Mersin, Limassol	weekly	1 x 194	CMA, NYK, Ellerman, DSR-Senator
	Damietta, Istanbul, Thessaloniki, Gemlik (alternate sailings), Izmir	weekly	2 x 350	CMA, NYK, Ellerman, DSR-Senator
	Damietta, Latakia	weekly	1 x 600	CMA, NYK, Ellerman, DSR-Senator
	Piraeus, Istanbul, Varna, Istanbul, Izmir	9 days	1 x 170	
CMN	Piraeus, Ilychevsk	9 days	1 x 140	
	Alexandria, Constanza	fortnightly	1 x 150	
Fast	Port Said, Beirut, Latakia, Limassol, Alexandria	10 days	1 x 155	Comship
	Port Said, Haifa, Ashdod, Limassol, Alexandria, Mersin	10 days	1 x 158	Comship
Intermodal	Marsaxlokk, Gemlik, Thessaloniki, Izmir, Piraeus	fortnightly	1 x 155	Norasia, Maersk
	Damietta, Port Said, Piraeus, Thessaloniki	weekly	1 x 163	Nedlloyd, MOL
Maersk	Damietta, Port Said, Alexandria, Ashdod, Haifa, Mersin	weekly	1 x 148	
	Limassol, Beirut, Mersin	weekly	1 x 48	
MC-Lines	Marsaxlokk, Piraeus, Izmir	weekly	2 x 200	Maersk
	Marsaxlokk, Tunis, Palermo, Naples	weekly	1 x 300	Maersk
Med Feeder	Marsaxlokk, Heraklion, Istanbul, Thessaloniki, Piraeus	10 days	1 x 200	
	Alexandria, Limassol, Beirut, Heraklion, Constanza, Varna	weekly	1 x 75, 1 x 120	
Nedlloyd	Port Said, Limassol, Thessaloniki, Istanbul, Izmir, Heraklion, Alexandria, Damietta, Port Said	weekly	2 x 200, 1 x 90, 1 x 75	
	Limassol, Lamaca, Piraeus, Thessaloniki, Istanbul, Piraeus	10 days	1 x 400	
Norasia	Limassol, Latakia, Beirut	3 days	1 x 110	
	Marsaxlokk, Tunis, Salerno, Vado, La Spezia, Salerno	weekly	1 x 250	
PASC	Damietta, Istanbul, Izmir, La Spezia, Salerno, Izmir, Damietta, Latakia, Limassol	weekly	1 x 650, 2 x 1050	Nedlloyd
	Marsaxlokk, Piraeus, Izmir	weekly	1 x 400	Norasia
Sarlis	Marsaxlokk, Alexandria, Port Said	weekly	1 x 425	Norasia
	Alexandria, Constanza, Bourgas, Varna	21 days	1 x 240	
Zim	Piraeus, Limassol, Beirut, Latakia, Ravenna	18 days	1 x 560	
	Piraeus, Limassol, Mersin, Piraeus, Ravenna	18 days	1 x 182	
Zim	Piraeus, Beirut, Tripoli, Ravenna	17 days	1 x 223	
	Piraeus, Istanbul, Gemlik, Piraeus, Ravenna	14 days	1 x 382	
Zim	Piraeus, Thessaloniki, Alexandria, Piraeus, Ravenna	17 days	1 x 229	
	Piraeus, Thessaloniki, Izmir, Piraeus, Ravenna	14 days	1 x 217	
Zim	Haifa, Limassol, Mersin, Alexandria	5 days	1 x 150	Zim
	Haifa, Istanbul, Thessaloniki, Izmir	10 days	1 x 380	Zim
Zim	Haifa, Constanza, Odessa	weekly	1 x 350	Zim

Note: Blasco = Black Sea Shipping Co.; CMA = Compagnie Maritime d'Affretement; FAS = Feeder Associate Systems; CMN = Compagnie Meridionale de Navigation; MC = Lines comprises Mediterranean Container Lines and Metz Container Lines; PASC = Pan Arab Shipping Co.

Source: Containerisation International, November 1995

TABLE 1.2.26 TRANSHIPMENT HUBS AND FEEDER OPERATORS

Transshipment Ports	Damietta	Port Said	Haifa	Larnaca	Limassol	Piraeus	Marsaxlokk
Feeder Lines calling	Camou CMA(FAS) Intermodal MC-Lines Nedlloyd	Camou Intermodal MC-Lines	Zim	Camou MC-Lines	CMA(FAS) MC-Lines Nedlloyd Sarlis	Blasco CMA(FAS) Intermodal MC Lines Sarlis	Intermodal Maersk Med Feeder Norasia
Transshipment traffic in 1994 in TEU	493,000	140,000	40,000	82,000	95,000	101,000	343,000

Source: Containerisation International, November 1995