NO.

ANNEX III WORLD TRADE AND INTERNATIONAL SHIPPING
FINAL

THE STUDY ON
THE EFFECTIVE MANAGEMENT SYSTEM
OF THE SUEZ CANAL
IN THE ARAB REPUBLIC
OF EGYPT

AUGUST 2001

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The following foreign exchange rates are applied in this study:

US$1.00=LE(Egyptian Pound)3.50=JP¥109.00

US$1.30= SDR1.00

as of August, 2000

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
SUEZ CANAL AUTHORITY (SCA)

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AUGUST   2001

THE OVERSEAS COASTAL AREA DEVELOPMENT INSTITUTE OF JAPAN (OCDI)

MITSUBISHI RESEARCH INSTITUTE, INC. (MRI)

PREFACE

In response to a request from the Government of the Arab Republic of Egypt, the Government of Japan decided to conduct a study on the Effective Management System of the Suez Canal in the Arab Republic of Egypt and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA dispatched a study team to Egypt three times between August 2000 and June 2001, which was headed by Mr. Hidehiko Kuroda and was composed of members from the Overseas Coastal Area Development Institute of Japan (OCDI) and Mitsubishi Research Institute, Inc. (MRI).

The team held discussions with the officials concerned of the Government of the Arab Republic of Egypt and Suez Canal Authority (SCA) and conducted field surveys at the study area. Upon returning to Japan, the study team conducted further studies and prepared this final report.

I hope that this report will contribute to this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of SCA and other authorities concerned for their close cooperation extended to the study team.

August 2001

Kunihiko Saito
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

August 2001

Mr. Kunihiko Saito
President
Japan International Cooperation Agency

Dear Mr. Saito:

It is my great pleasure to submit herewith the Final Report of the Study on the Effective Management System of the Suez Canal in the Arab Republic of Egypt.

The study team of the Overseas Coastal Area Development Institute of Japan (OCDI) and Mitsubishi Research Institute, Inc. (MRI) conducted surveys in Egypt over the period between August 2000 and June 2001 as per the contract with the Japan International Cooperation Agency.

The study team compiled this report, which proposes the Effective Management System of the Suez Canal including the transit forecast model and the tariff setting system, through close consultations with officials of the Suez Canal Authority (SCA).

On behalf of the study team, I would like to express my heartfelt appreciation to SCA and other authorities concerned of the Government of the Arab Republic of Egypt for their diligent cooperation and assistance and for the heartfelt hospitality, which they extended to the study team.

I am also greatly indebted to your Agency, the Ministry of Foreign Affairs, the Ministry of Land, Infrastructure and Transport and the Embassy of Japan in Egypt for valuable suggestions and assistance through this study.

Yours faithfully,

Hidehiko Kuroda
Team Leader
The Study on the Effective Management System
of the Suez Canal in the Arab Republic of Egypt

ABBREVIATION LIST

APA	Alexandria Port Authority
BAF	Banker Adjusting Factor
BIMCO	Baltic and International Maritime Council
BOT	Build, Operate and Transfer
C/B	Charter Base
CBE	Central Bank of Egypt
CEU	Car Equivalent Unit
CFS	Container Freight Station
CHS	Container Handling Surcharge
CIF	Cost, Insurance and Freight
CRF	Capital Recovery Factor
CY	Container Yard
DEM/DES	Demurrage/Dispatch
DO	Diesel Oil
DPA	Damietta Port Authority
DST	Double Stack Train
DWT	Dead Weight Tonnage
ECSA	European Community Ship-owners' Association
EDI	Electronic Data Interchange
EMDB	Egyptian Maritime Data Bank
ENR	Egyptian National Railway
ETA	Estimated Time of Arrival
FAK	Freight All Kinds
FCL	Full Container Load Cargo
FIRR	Financial Internal Rate of Return
FO	Fuel Oil
FOB	Free on Board
GDP	Gross Domestic Product
GARE	Government of Arab Republic of Egypt
GOJ	Government of Japan
GT	Gross Tonnage
H/B	Hire Base
ICS	International Chamber of Shipping
INSROP	International Northern Sea Route Program
INTERCARGO	International Association of Dry Cargo Ship-owners
INTERTANKO	International Association of Independent Tanker Owners
JAMRI	Japan Maritime Research Institute
JICA	Japan International Cooperation Agency
JP¥	Japanese Yen
LB	Land Bridge
LCL	Less than Container Load Cargo
LE	Egyptian Pound
LNG	Liquefied Natural Gas

LOA	Length Overall
LOOP	Louisiana Offshore Oil Port
LPG	Liquefied Petroleum Gas
LUP	Laying-Up Point
MOMT	Ministry of Maritime Transport
MRI	Mitsubishi Research Institute, Inc.
MSL	Maersk-Sealand
MT	Metric Ton
N/P	Net Proceeds
NPV	Net Present Value
NWA	New World Alliance
OCDI	Overseas Coastal Area Development Institute of Japan
O-D	Origin and Destination
OSRA	Ocean Shipping Reform Act
PAE	Petroleum Authority of Egypt
PCC	Pure Car Carrier
P/L	Profit/Loss
PSPA	Port Said Port Authority
QGC	Quay-side Gantry Crane
RGT	Rubber-Tired Gantry
S/C	Service Contract
SCA	Suez Canal Authority
SCCT	Suez Canal Container Terminal
SCGT	Suez Canal Gross Tonnage
SCNT	Suez Canal Net Tonnage
SCVTMS	The Suez Canal Vessel Traffic Management System
SDR	Special Drawing Right
SSA	Stevedoring Services of America
SUMED	Arab Petroleum Pipelines Co.
S/W	Scope of Work
TEU	Twenty-foot Equivalent Unit
ULCC	Ultra Large Crude Carrier
US$	US Dollar
VLCC	Very Large Crude Carrier
WSF	World Scale Flat
WSR	World Scale Rate

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1.1.1   World Outlook

After widespread expectation that the world economy was settling into a comfortable pattern of annual growth rates in the 3% to 4% range in an environment of the longest non-recessionary period, global growth slowed in 1998, particularly in Asia. The "Tiger" economies had their claws dulled and Japan went into a tailspin with industrial output declining and businesses collapsing. Things improved in 1999 and 2000, but Japan continues to sputter along and rapid growth is not continuing elsewhere with the slowdown in the United States.

Globalization had been heralded as the great unifier of the world's economies and equalizer of opportunities. Reputably it would generate wealth, free trade and democratic tendencies. The World Bank and the IMF heralded the concept of sustainable growth as the key, but at the same time prescribed medicines that virtually ran counter to this philosophy. Growth does not always equate with a reduction in poverty and democracy. The adverse impact of the financial crisis was felt most in the developing world. Neither Latin America nor Africa has been able to translate very strong GDP growth into sustained per capita income growth. Distribution of wealth remained as skewed as ever.

The financial upheaval of 1998 was replaced with the geo-political storm of 2000 and the resurgence of OPEC as a relatively unified force. The enthusiasm for globalization overlooked the non-economic factors that so often rear their ugly heads and cause the economic vehicle to falter and sometimes veer off the road. Did anyone factor in that religious hatred, regional rivalries, and Balkan nationalism could possibly impact the financial markets? No. Is the clash between economic growth of the global economy and the geo-political forces relevant? Perhaps the answer is yes, given the rising price of oil and the declining stock markets.

Global trade remains vulnerable to issues beyond the wealth seeking aspirations of globalization and the mutual dependence of national economies.

Table 1.1.1 World Outlook Summary

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	1995-1999	2000-2005	1995-2005
REAL GDP (PERCENT CHANGE)													
WORLD (PPP WEIGHTS)	3.8	3.7	1.7	3.2	4.6	4.2	4.1	4.1	4.1	4.1	3.4	4.1	3.8
WORLD (1990 BASE)	3.5	3.5	2.1	2.9	4.1	3.8	3.5	3.6	3.5	3.5	3.2	3.6	3.4
DEVELOPED COUNTRIES	3.1	3.2	2.4	2.7	3.7	3.3	3.0	2.9	2.8	2.8	3.0	3.0	3.0
UNITED STATES	3.6	4.2	4.3	4.2	4.9	3.6	3.4	3.6	3.5	3.4	4.2	3.5	3.9
CANADA	1.5	4.4	3.3	4.5	4.5	3.3	3.0	2.8	2.6	2.8	3.6	2.9	3.3
JAPAN	5.2	1.6	-2.5	0.3	1.9	3.1	2.7	2.2	1.9	1.9	1.2	2.4	1.8
WESTERN EUROPE	1.9	2.8	2.8	2.1	3.3	3.1	2.7	2.6	2.6	2.5	2.6	2.7	2.6
GERMANY	1.3	2.3	2.5	1.3	2.8	3.1	2.6	2.5	2.4	2.2	2.0	2.5	2.3
FRANCE	1.1	1.9	3.2	2.9	3.5	3.3	2.6	2.5	2.4	2.4	2.5	2.6	2.6
ITALY	1.1	1.8	1.5	1.4	2.8	2.8	2.4	2.4	2.3	2.2	1.7	2.4	2.1
UNITED KINGDOM	2.6	3.5	2.6	2.1	2.9	2.7	2.5	2.8	2.7	2.7	2.7	2.7	2.7
AFRICA, EXCL. SOUTH AFRICA	5.3	4.2	4.0	3.2	4.3	5.0	5.6	5.7	5.8	5.6	4.2	5.6	4.9
LATIN AMERICA, EXCL. MEXICO	3.2	4.9	0.9	-0.7	3.6	4.3	4.4	4.3	4.5	4.4	2.4	4.4	3.4
MIDDLE EAST, EXCL. TURKEY	4.6	1.0	-0.9	2.6	5.9	4.4	4.0	4.5	4.3	4.2	2.6	4.3	3.4
OTHER ASIA	8.9	4.8	5.6	5.7	5.9	6.5	6.7	6.8	7.0	7.0	5.8	6.8	6.3
PACIFIC BASIN	6.6	4.9	-5.0	5.9	6.7	5.7	5.9	5.7	5.5	5.7	3.7	5.7	4.7
CHINA	9.8	8.5	7.8	7.1	7.7	7.6	7.6	7.7	7.7	7.7	8.2	7.6	7.9
MEXICO	5.2	6.8	4.9	3.7	5.6	4.4	4.9	5.1	5.4	5.6	5.2	5.1	5.2
EASTERN EUROPE	3.5	2.8	2.1	2.5	3.8	4.3	4.6	4.7	4.7	4.8	2.9	4.6	3.8
FORMER SOVIET UNION	-3.3	0.8	-3.2	2.9	4.7	3.8	4.0	4.9	4.9	4.9	0.3	4.5	2.4
CONSUMER PRICE INDEXES (PERCENT CHANGE)													
DEVELOPED COUNTRIES, EXCL. TURKEY	2.2	2.0	1.4	1.4	2.1	1.9	1.9	2.1	2.1	2.1	1.8	2.0	1.9
UNITED STATES	2.9	2.3	1.6	2.2	3.3	2.2	2.3	2.5	2.6	2.6	2.5	2.4	2.4
CANADA	1.6	1.6	1.0	1.7	2.3	2.1	2.0	1.9	1.9	2.0	1.6	2.0	1.8
JAPAN	0.1	1.7	0.6	-0.3	-0.6	0.7	1.1	1.2	1.2	1.0	0.3	1.0	0.7
WESTERN EUROPE, EXCL. TURKEY	2.4	1.9	1.6	1.2	2.1	2.0	1.9	1.9	2.0	2.0	1.8	2.0	1.9
GERMANY	1.4	1.9	0.9	0.6	1.6	1.7	1.8	1.9	1.9	1.9	1.3	1.9	1.6
FRANCE	2.0	1.2	0.7	0.6	1.3	1.4	1.8	1.9	1.9	1.9	1.2	1.8	1.5
ITALY	3.9	1.7	1.8	1.6	2.0	1.8	1.9	2.1	2.1	2.0	2.2	2.0	2.1
UNITED KINGDOM	2.4	3.1	3.4	1.6	3.0	2.6	1.6	1.9	2.3	2.4	2.7	2.2	2.4
UNEMPLOYMENT RATE (PERCENT OF LABOR FORCE)													
DEVELOPED COUNTRIES	8.6	8.4	8.2	7.9	7.5	7.3	7.1	6.9	6.7	6.6	8.1	6.9	7.5 (a)
UNITED STATES	5.4	4.9	4.5	4.2	4.1	4.2	4.3	4.4	4.3	4.4	4.6	4.3	4.5 (a)
CANADA	9.6	9.1	8.3	7.6	6.5	6.2	6.1	6.0	6.0	5.9	8.2	6.0	7.1 (a)
JAPAN	3.4	3.4	4.1	4.7	4.8	4.4	4.0	3.7	3.5	3.3	4.1	3.8	3.9 (a)
WESTERN EUROPE	10.4	10.1	9.6	9.0	8.2	7.7	7.3	6.9	6.6	6.3	9.5	7.0	8.2 (a)
GERMANY	10.3	11.2	11.0	10.6	9.9	9.2	8.4	7.5	6.7	5.8	10.6	7.5	9.1 (a)
FRANCE	12.4	12.4	11.8	11.1	9.8	9.1	8.7	8.3	8.0	7.7	11.5	8.4	9.9 (a)
ITALY	11.7	11.7	11.8	11.5	10.7	10.3	9.7	9.3	9.1	9.1	11.5	9.5	10.5 (a)
UNITED KINGDOM	7.2	5.5	4.7	4.3	3.9	3.9	3.9	4.0	4.0	4.0	5.1	4.0	4.5 (a)
CRUDE OIL PRICE													
AVE. CRUDE PRICE ($/BARREL) (b)	20.37	19.27	13.07	18.14	25.64	24.04	23.74	24.14	23.84	24.06			
PERCENT CHANGE	18.4	-5.4	-32.1	38.7	41.4	-6.2	-1.2	1.7	-1.2	0.9	8.3	-1.3	3.4
SHORT-TERM INTEREST RATE													
LONDON INTERBANK RATE (3-MONTH)	5.5	5.8	5.6	5.4	6.7	7.3	6.8	6.4	6.3	6.3	5.8	6.6	6.2 (a)
UNITED STATES (3-MONTH CD)	5.4	5.6	5.5	5.3	6.6	7.0	6.5	6.1	6.1	6.1	5.7	6.4	6.0 (a)
JAPAN (3-MONTH CD)	0.6	0.6	0.7	0.2	0.3	1.3	2.9	3.1	3.2	3.2	0.5	2.7	1.6 (a)
GERMANY (3-MONTH FIBOR)	3.3	3.3	3.5	3.0	4.4	4.6	4.2	4.2	4.2	4.2	3.5	4.3	3.9 (a)
FRANCE (3-MONTH PIBOR)	3.9	3.5	3.6	3.0	4.4	4.6	4.2	4.2	4.2	4.2	3.7	4.3	4.0 (a)
UNITED KINGDOM (3-M INTERBANK)	6.0	6.8	7.3	5.4	6.5	6.2	5.8	5.3	5.3	5.3	6.4	5.5	6.0 (a)
EXCHANGE RATE (LOCAL CURRENCY/U.S. DOLLAR, AVERAGE)													
EURO	0.769	0.887	0.900	0.939	1.034	0.945	0.890	0.870	0.850	0.840	7.1	-4.1	1.4
DEUTSCHE MARK	1.50	1.73	1.76	1.84	2.03	1.85	1.74	1.70	1.66	1.64	7.3	-4.2	1.4
JAPANESE YEN	108.8	121.0	130.9	113.9	106.2	105.7	105.1	104.7	104.3	102.4	2.5	-0.7	0.9
POUND STERLING	0.641	0.610	0.603	0.618	0.649	0.627	0.623	0.621	0.620	0.619	0.5	-1.0	-0.2
CANADIAN DOLLAR	1.36	1.38	1.48	1.49	1.46	1.43	1.41	1.39	1.37	1.35	1.2	-1.5	-0.2
WORLD TRADE (PERCENT CHANGE)													
VOLUME (EXPORTS), TOTAL	5.2	9.6	3.5	5.5	9.5	7.2	6.6	6.6	6.7	6.7	6.6	6.8	6.7
PRIMARY COMMODITIES	5.1	6.2	0.9	1.7	8.1	6.1	6.1	5.9	5.6	5.6	4.4	5.9	5.1
FUEL AND ENERGY	6.5	4.1	0.4	4.9	8.2	5.6	5.4	5.5	4.5	5.4	4.8	5.3	5.0
MANUFACTURED GOODS	5.0	10.8	4.2	6.1	9.9	7.5	6.8	6.9	7.0	7.0	7.2	7.0	7.1
PRICES (EXPORT DEFLATOR, DOLLAR)	-0.4	-6.0	-4.2	-2.6	-2.0	4.4	3.6	1.8	1.8	1.4	-3.1	2.6	-0.3
PRIMARY COMMODITIES	-2.1	-6.2	-4.9	-4.0	-2.8	6.5	4.6	2.5	2.3	1.8	-4.0	3.5	-0.3
FUEL AND ENERGY	5.3	-0.9	-11.2	6.3	6.4	1.3	3.1	2.2	2.8	1.9	0.9	2.3	1.6
MANUFACTURED GOODS	-0.8	-6.6	-3.3	-3.3	-2.8	4.5	3.5	1.7	1.6	1.3	-3.4	2.5	-0.5
CURRENT ACCOUNT BALANCES (US$ BILLION)													
UNITED STATES	-123	-141	-217	-331	-443	-467	-484	-478	-473	-474	-251	-475	-363 (a)
JAPAN	66	94	121	106	119	120	108	89	78	74	101	94	97 (a)
WESTERN EUROPE	121	157	113	58	59	72	78	83	90	96	102	84	93 (a)
REST OF WORLD	-82	-78	-46	4	35	13	16	17	11	8	-34	13	-10 (a)

(a) AVERAGES CALCULATED OVER 10 YEAR PERIOD
(b) AVERAGE OF DUBAI, U.K. BRENT, AND ALASKAN NORTHERN SLOPE SPOT CRUDE PRICES. SOURCE OF HISTORICAL DATA : (I.F.S)

Source) WEFA, Inc. for JICA Study Team

1.1.2 European Union

Euro zone growth strengthened marginally. Government consumption and fixed investment grew strongly, as did both exports and imports. Germany and Italy, which were two of the weakest economies in the Euro zone in 1999, strengthened further in 2000.In 2001, we expect the Euro zone economy to grow by 3.2%.

Domestic demand will continue to be the key driver of growth in 2000, with consumer demand rebounding strongly. The recovery of the export sector will add balance to economic growth. Export orders in the Euro zone countries have been boosted by the continued strength of the US economy, the weak euro, solid UK growth, and an upturn in emerging markets. The leading indicators support our view that growth will strengthen, with both business confidence and order books remaining very upbeat. Consumers will remain confident as the Euro zone labor market continues to improve and real disposable incomes rise. Domestic demand overall will benefit from low interest rates and a less restrictive fiscal policy stance.

It is clear that the recovery in economic growth is now firmly established. A buoyant service sector and rapid growth in the housing market suggest that the current upswing still has someway to go.

1.1.3 North America

In the United States, substantial signs of slowing appeared in 2000. For example, employment growth slowed, the unemployment rate rose, and retail sales declined for two months in a row. Higher interest rates, including long-term corporate rates, stock market losses, and a strong dollar began to cool the economy.

Investment remained strong through 2000 but moderated as interest rates continued to increase. Expected reductions in interest rates should dampen the decline in investment in 2001.

Exports are expected to accelerate, while imports remain strong. Consumer inflation of 3.3% in 2000, mostly boosted by energy prices, reduced real wage growth.

Real economic expansion was expected to be 4.9% in 2000 but fall to 3.6% in 2001.

The greatest risk to the US economy is likely to come from increased inflation, a stock market slump, lower productivity gains, and slow reductions in interest rates. WEFA rates the possibility of lower growth—about 2.5% in 2001 and 2002 as strong.

The Canadian economy grew strongly in early of 2000 but has slowed subsequently. WEFA's forecast for Canadian growth in 2001 is 3.3%.

There has been a steady erosion of Canada's output gap and a tightening of its labor market in recent years. If growth continues at its recent pace, there is a danger the economy could

overshoot its productive potential, leading to rising inflation. High oil prices pose yet another risk to inflation. Should they remain persistently high, they could feed into inflation expectations that, in turn, would drive up wages and prices. In either case, higher inflation would result in the Bank of Canada not reducing interest rates, which could interrupt continued growth.

1.1.4 Asia

(1) Japan

The private sector set the pace of growth in 2001. Gross Domestic Product rose 1.9% in 2000 and is forecast to grow 3.1% in 2001, unless the downturn in North America accelerates and reduces Japanese exports.

The yen was at about 105 yen per US dollar in 2000 but may weaken early in 2001 before recovering. The yen is expected to strengthen to about 105 for 2001 and 2002, which may make trouble for the Japanese economy. A much stronger yen would reduce profits from exports and lower business investment.

Though non-performing loans remain a continuing risk, it is not growing as a problem for the overall Japanese economy. The greatest risk now facing the Japanese economy is the still dormant Japanese consumer and a potential failure to pursue reform.

There is some upside risk with real GDP rising about 4% in 2001 if reforms are pursued actively.

(2) Other Asia

Viewed as a whole, Asia continues on the growth path that began with its recovery from the Asian crisis of 1997–1998. Despite the well-known problems of the financial sector, which were expected to restrain lending and growth, most of the countries are rebounding with strong domestic demand. In addition, the depreciation of the currencies in 1998 provided the benefits of improved competitiveness and increased exports, further contributing to demand. A sure sign that the crisis has been largely relegated to the past is that many were beginning to express concern over the possibility of overheating and inflation, though such worries are premature in light of the slowdown in technology in the United States.

The problems that remain are no longer considered serious impediments to growth. Bad loans in the banking sector and other financial excesses are gradually being re-solved, through bankruptcy and re-capitalization (the latter often by public expenditure). Although this restructuring is proceeding slowly, and consequently provides the market with periodic bouts of pessimism, the economies have managed to obtain necessary capital investment and financing.

Many of the Asian countries have been growing quickly and will do so in the near future.

Hong Kong and South Korea have bounced back from their recessions of 1998 and are posting real growth. Taiwan, which took less of a hit during the crisis, achieved near 7% growth. India, Malaysia, and Singapore have had satisfactory performance in the 6% to 7% range.

On the other hand, China's performance is somewhat disappointing. Although a growth rate of over 7% would be stunning for most countries, China's vast resources give it the potential to grow in the 8% to 10% range. Since it was little affected by the Asian crisis, this underperformance arises strictly from domestic causes, notably the large share of the economy owned or controlled by the state.

Other countries are clearly lagging. Indonesia, the Philippines, and Thailand are all below 5% growth for the foreseeable future. This is not unusual for the Philippines; historically, it has averaged a growth rate of 5% and this trend is expected to continue. But Thailand and Indonesia grew in the 7% to 8% range prior to the Asian crisis. Though some of this high growth could have been due to excessive liquidity arising from capital inflows, these two countries are now well below their potential.

Table 1.1.2 Real GDP growth rates in Asia

	1997	1998	1999	2000	2001
China	8.5	7.8	7.1	7.7	7.5
Hong Kong	5.0	-5.1	2.9	7.8	4.6
India (FY Apr – Mar)	5.1	5.7	6.0	6.4	7.0
Indonesia	4.9	-13.4	0.2	3.4	4.5
Malaysia	7.5	-7.5	4.9	6.5	6.3
The Philippines	5.2	-0.5	3.3	4.1	4.7
Singapore	8.0	1.5	4.9	6.3	6.2
South Korea	5.0	-6.7	10.7	8.2	6.0
Taiwan	6.8	4.8	5.3	7.7	6.7
Thailand	-1.7	-10.2	4.2	4.2	4.4

Source) WEFA forecast for JICA Study Team

For those countries that have succeeded, one of the factors in their favor has been strong foreign demand for their exports, especially by the US and the European Union (EU). Consequently many of the slower-growing countries are pinning their hopes on Japan.

The potential for high-risk, low-probability events is largely unchanged. Indonesia and the Philippines continue to suffer low-level violence that poses little threat to the central government, but could make its rule in outlying areas problematic. And the possibility of a devaluation of the Chinese Yuan, which would make the other Asian countries relatively less competitive, appears unlikely

1.1.5 Australia

The Australian economy slowed from the robust growth experienced in 1999 and 2000.

The declines in the unemployment rate since 1998 will continue.

WEFA forecasts that real GDP grew by 3.4% in 2000 and will grow 3.6% in 2001. These are still healthy growth rates, but are considerably below growth rates of 5.0% and 4.4% recorded in 1998 and 1999, respectively. Consumption has slowed, as well, with interest rate hikes in 2000.

Although exports were forecast to increase by 5.2% in 2000, compared to import growth of 3.6%, imports remained higher. This gap is forecast to narrow slowly over the next several years, and the current account deficit-to-GDP ratio will improve slowly

1.1.6 Latin America

The Mexican economy grew by about 5.6% during 2000 and is forecast to slow down to 4.4% growth in 2001, due to the slowdown of the US economy.

Meanwhile, the Brazilian economy continues to recover from 1999's devaluation of the domestic currency and high interest rates. The Brazilian economy is expected to show a strong growth during 2000 and 2001 growing by 3.7% and 4.0%.

The Colombian economy was expected to recover during 2000 growing by 3.2% to achieve a full economic recovery during the year 2001 growing by 4.1%.

Argentina is also facing a very difficult path out of the recession created by the Asian, Russian and Brazilian crisis.

The outlook for the Argentine economy is positive. The Argentine economy grew by almost 2.7% in 2000 and it is expected to grow by 4.2% in 2001.

The risks associated with our Latin American forecast continue to be related with the "second generation reforms," those associated with changes to the political system and its institutions. These changes are more urgent in some countries than others and could be delayed if economic growth is high. However, for those countries in a growth slump, the reforms are ever more important to continue on the road of modernization and sustained strong growth.

1.1.7 East Europe

(1) Russia

Russian economic developments were favorable in 2000. Growth accelerated and helped improve the fiscal situation. In the first half of 2000, inflation was substantially lower than in the corresponding period of 1999. Despite an anticipated mild slowdown, growth will remain robust in the remainder of 2001. Inflation is likely to continue to decelerate.

Much of the export growth was due to the rise in energy prices.

In 2000, real GDP likely rose about 5%. As the impact of the ruble's devaluation fades, growth will slow to a still positive 4% in 2001.

The main external risk would be a substantial drop in energy prices.

(2)   Other Eastern Europe

The economic upturn in the European Union is good news for the economies of Eastern Europe, especially since the key driver of growth is domestic demand.

With the euro expected to strengthen modestly over the next couple of years, Eastern European exports should gain competitiveness in the EU, especially as the positive inflationary differential between East European countries and the EU will continue to narrow. The recent trade agreement with Hungary increasing tariff-free access will be extended to other countries in the region.

Growth in the region will continue to be stimulated by further inflows of foreign direct investment, although the competition for attracting investment is rising as further structural reforms are taking place across the region. Hungary had been particularly successful at attracting foreign investors in the past, but the flows appear to have slowed significantly in 2000, while this has not been the case for the region as a whole.

Domestic demand has been boosted by robust investment growth, stimulated by strong inflows of foreign investment (except in Hungary).

Inflation rates across the region have continued to be affected by the strength of oil prices, which have yet to subside.

1.1.8 Middle East and Africa

High oil prices improved real economic activity, pushing the Gulf economies to grow by about 7% in 2000. They are forecast to grow about 4% in 2001. In the medium-term, real oil prices are expected to fall mildly from their current level. The Saudis and Kuwaitis, both of whom have large reserves, do not want to stimulate investment in oil-conserving technologies.

Nevertheless, the expected OPEC average oil price of US$25 in 2000 is still higher than the 1999 average of US$17.50 a barrel. If the price expectation for 2001 is realized, Saudi Arabia and the rest of the Gulf oil exporters will see a continuation of increased oil revenues, which in 2000 were about 60% higher than in 1999, which itself was 34% above 1998 levels.

Despite high oil prices, monetary discipline will keep money supply under control and inflation tame. For most of the Gulf countries, increased government spending on infrastructure, education, and healthcare, which will benefit the non-oil sector and provide

added momentum to economic growth.

Given the low consumer inflation in the region, the cash windfall will give a strong boost to consumption. Furthermore, the unexpected additional revenue will help most countries achieve lower-than-anticipated budget deficits, and even budget surpluses in some countries.

In Israel, the new government's policies shifted the economy toward accelerated growth of in 2000 but will be hurt by unrest in 2001. For the year 2000, the inflation rate was stabilized at 2%. In Jordan, the economy is gradually recovering from the 1998 slowdown and is expected to grow by about 4% over the forecast horizon. This is partially based on the assumption that Jordan will continue to enjoy increased trade opportunities with the West Bank, and Gaza, Iraq, and the EU. The remittances of Jordanian workers in the Gulf will increase as growth in the Gulf economies improves.

Improved oil prices and a rebound in the tourism industry pushed real GDP growth in Egypt to 6% in 2000.

Both Libya and Algeria benefit from the recent increase in oil prices. Growth in Algeria will average around 6% for 2000 and 2001. In Tunisia, increased exports and improved tourism revenues will be the driving forces behind the 6% real growth in 2000. The drought constrained Morocco's less diversified economy to only 3.5% real growth in 2000.

Our growth forecast is based on high oil prices from an eventual rebound in demand in East Asia and continued positive growth in industrialized countries. If the global recovery falters, or if OPEC's production quotas collapse completely, the revenues from oil, other commodities, and tourism will be depressed. In this case, most African and Middle Eastern countries will sink into a recession. For Iran and Nigeria, this deteriorating environment could pose difficult social and political challenges. Alternatively, if oil prices are higher than expected, oil-exporting nations in the Middle East and Africa will register better economic conditions in the next few years.

1.2 Trade of Key Commodities

1.2.1 Liquid Cargo

(1) Crude Oil and Petroleum Products

The diagram below clearly demonstrates the instability of the oil market in recent short-term. After declining by more than 24% between March and April in 2000, the OPEC average rose by more than 34% in less than two months. This volatility clearly reflects the conflicting forces that are influencing supply and demand. On the demand side, strong economic growth in the US and Asia is keeping the demand for oil strong. There is also a significant amount of speculative demand in the oil market.

The suppliers are not interested in taking advantage of this strong demand for short-term gains because it would be to their detriment in the long run. Oil prices that are too high will choke global economic growth and reduce the demand for oil in the long run. It will also encourage more investment and larger production capacity outside of OPEC, which is against the interests of major producers. Some OPEC producers that are close allies of the US are also under political pressure to increase output.
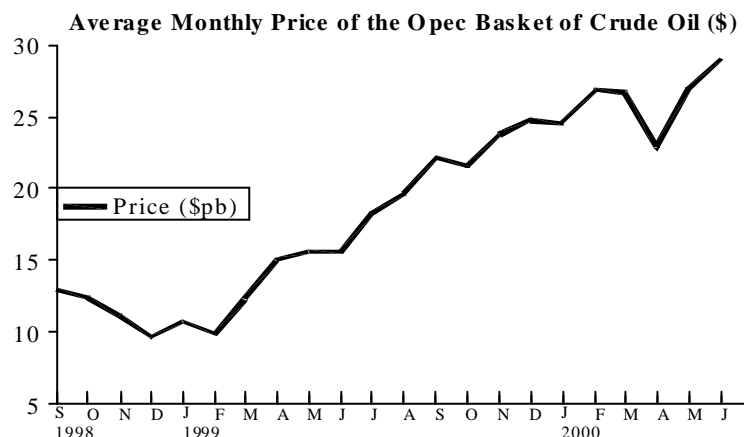
Figure 1.2.1 Average Monthly Price of the OPEC Banker Crude Oil

OPEC is experimenting with new cooperative strategies to stabilize the market. This plan, called Automatic Output Adjustment, allowed the OPEC president to raise or cut OPEC output by up to 500,000 bpd if the price of oil remains outside of the $22–$28 per barrel range for more than 20 days.

As shown in the diagram below, we expect the price of the OPEC basket to remain within the $22–$28 per barrel range over the 2000–2005 period. While in the past disarray within OPEC and high non-OPEC production have pushed the price to as low as $9 p/b, we believe the repetition of such scenarios is less likely in the near future for several reasons. First of all, as described above, OPEC has introduced new mechanisms to increase its flexibility and reduce output quickly if there is an excess supply. Second, it appears that

the political conflicts among Middle Eastern members of OPEC are diminishing. Relations between Iran and its Arab neighbors are improving, and within the Arab members of OPEC, the isolation of Iraq is gradually coming to an end.

(US Dollars per Barrel)
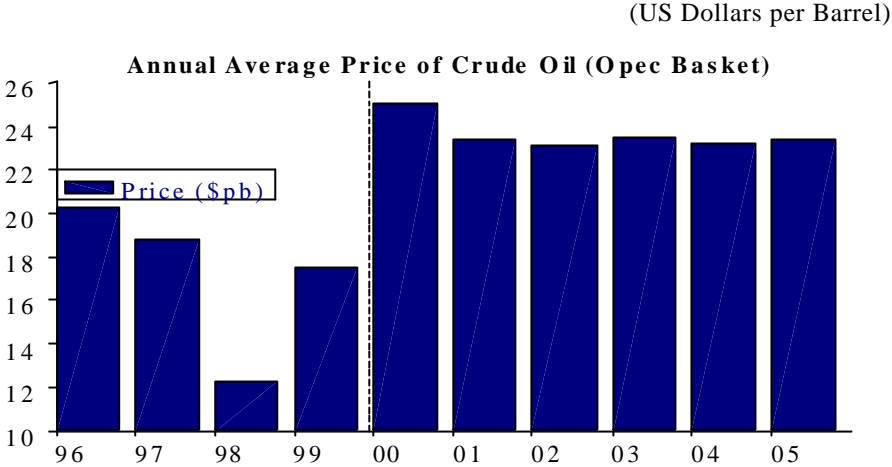
Figure 1.2.2 Annual Average Price of Crude Oil

Another important development is that we are witnessing more cooperation between OPEC and non-OPEC oil producers. In 1999, Mexico was supportive of OPEC policy and went along with OPEC members and cut back a portion of its output. Furthermore, even if OPEC members and non-OPEC producers decide to increase output, the excess capacity is limited. Currently, Saudi Arabia has spare capacity of two mbpd, while the rest of OPEC has only one mbpd of excess capacity. In some countries, like Venezuela, the capacity is gradually declining, and there are no indications of sizable investment in crude oil production. Independent investors have not increased their capacity in recent years either. The sharp fluctuations in the price of oil in recent years have discouraged them from making new investments, and their low investment rate is in part a result of OPEC's strategy. Major OPEC producers, such as Saudi Arabia, are opposed to high oil prices because higher prices will encourage investment and increase capacity.

OPEC reacted to the sharp increase in prices by raising the production quotas and preventing the OPEC basket price from rising above $30 per barrel.

If oil prices remain in the $20–$30 range for the next few years, the adverse effect on the global economy will be minimal, and the world economy will even benefit from increased demand by oil-exporting countries. Most OPEC members who were suffering from severe recessions in 1998 are now experiencing an economic recovery, which will boost their imports of consumer and capital goods from industrial nations. We anticipate a large growth in import expenditures in OPEC countries in the 2000–2001 period. The countries that might suffer from current oil price increases, even if prices remain in the $22–$28 range, are the middle- and low-income developing countries whose industries are not as competitive. Countries like India, Turkey, Brazil, and Argentina are prime examples of this category. The trade balance of these countries will come under stress in 2000.

The recovery of European and Asian economies has increased the world demand for oil. So far, the real price of oil after adjustment for inflation is still very low when compared to 1981. As long as prices remain below $30 per barrel, they will not choke the current global economic growth, and their only consequence will be a mild inflation in the energy sector. However, if for any reason prices rise to above $30 p/b and remain at that level for more than six months, then we can expect a reduction in economic growth for major oil importing economies along with cost-push inflation.

(Thousands of Metric Tonnes)
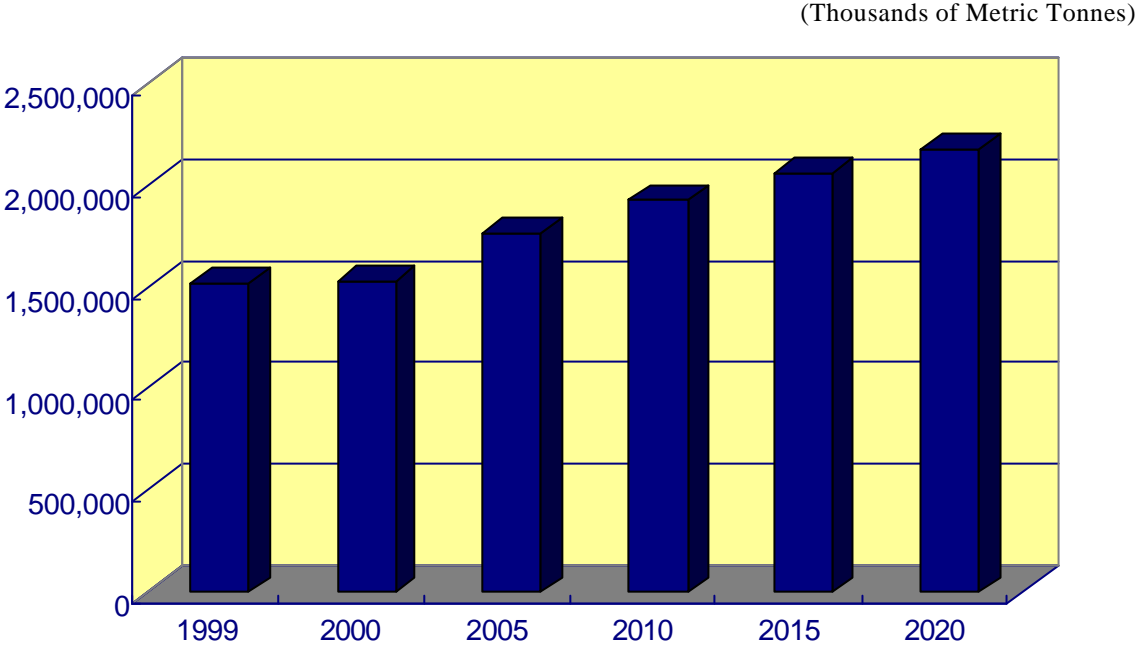
Source) WEFA, Inc. for JICA Study Team

Figure 1.2.3 World Total Crude Oil Trade Forecast

Table 1.2.1 World Total Crude and Oil Products Export Forecast by Country/Region

(Thousands of Metric Tonnes)

	1999	2000	2005	2010	2015	2020
Argentina	7,166	7,240	8,921	10,905	12,226	13,553
Australia	10,290	10,518	10,354	9,838	8,600	7,652
Austria	12	11	11	10	9	8
Belgium	307	298	296	280	269	257
Baltics	199	197	152	127	102	87
Brazil	271	267	265	283	269	269
Canada	3,675	3,650	2,863	2,791	2,235	1,861
China	16,702	16,957	21,098	20,501	18,267	15,303
Chile	4	5	8	12	17	26
Colombia	18,715	18,664	23,391	24,798	24,322	23,528
Caribbean Basin	5,038	4,992	5,171	4,703	2,474	1,759
CIS Southeast	807	824	1,038	904	562	261
CIS West	9	9	11	7	5	4
Czech Republic	30	31	33	34	35	34
Denmark	988	983	721	475	385	314
Egypt	18,012	18,001	18,690	15,111	11,137	10,627
United Arab Emirates	126,613	129,510	148,487	95,796	65,895	61,310
Finland	17	16	16	14	13	12
France	278	270	280	275	260	241
Germany	675	686	750	779	803	825
Greece	1,013	1,014	1,015	773	531	526
Hong Kong	2	2	2	1	1	1
Hungary	52	54	65	78	90	99
India	67	66	84	92	99	106
Ireland	16	16	16	16	14	13
Indonesia	69,647	71,343	104,350	156,545	220,046	272,427
Israel	124	124	224	125	124	26
Italy	395	400	402	383	369	352
Japan	722	732	669	597	535	478
South Korea	895	910	968	894	766	659
Malaysia	19,893	20,405	25,570	39,523	47,463	51,746
Mexico	95,640	95,459	133,398	205,385	258,871	295,381
Netherlands	878	889	922	889	899	916
Norway	56,141	55,838	58,271	58,073	55,111	42,512
New Zealand	1,682	1,735	1,467	1,328	1,142	933
Other Central America	1,310	1,302	1,631	1,951	2,120	2,270
Other East Coast of S. America	344	352	422	419	410	383
Other Indian Subcontinent	78	78	83	90	90	90
Other Mediterranean Region	15,682	15,594	13,859	11,148	8,918	7,026
Other North Africa	100,249	99,482	119,252	135,520	152,586	170,301
Other Persian Gulf	274,034	277,052	296,216	281,090	262,040	256,156
Other Southern Africa	31,780	31,682	37,439	37,970	35,565	27,524
Other West Coast of S. America	10,401	10,511	12,748	14,821	14,553	12,840
Other Region	52,767	52,996	28,061	24,011	21,777	299
Peru	2,058	2,047	2,220	2,335	2,030	1,791
Portugal	83	80	90	80	72	64
Philippines	118	118	137	154	159	169
Pakistan	204	213	256	236	220	218
Poland	62	61	89	93	116	171
Romania	20	20	22	24	25	26
Russia	36,841	37,431	46,806	45,502	44,676	40,635
South Africa	243	237	278	237	174	144
Singapore	1,114	1,142	1,292	1,452	1,466	1,326
Saudi Arabia	235,043	237,165	263,809	271,149	281,753	294,163
Spain	793	789	881	796	736	676
Sweden	95	91	90	86	83	80
Thailand	507	518	690	755	760	726
Turkey	139	139	140	196	197	196
Taiwan	1,614	1,659	1,400	1,188	1,062	962
United Kingdom	30,005	29,931	19,821	16,059	13,278	10,726
United States	22,176	21,998	22,967	22,381	21,242	19,898
Vietnam	12,029	12,338	17,514	24,134	30,319	34,702
Venezuela	113,527	113,409	154,989	187,113	192,491	211,590
Western Africa	117,882	117,830	149,751	192,330	238,034	275,564

Source）WEFA, Inc. for JICA Study Team

(2) Chemicals

Large amounts of new capacity for ethylene, propylene, and polyethylene (PE) are expected around the globe during the next few years. Planned capacity additions for polypropylene (PP), PVC, and polystyrene (PS), though significant, will be less aggressive. Petrochemical producers are expecting that markets will be tight enough to absorb this new capacity.

Major consolidation moves are redrawing the petrochemical industry's competitive landscape worldwide. These moves have given birth to new rankings and competitive positions across most commodity petrochemicals.

A less conventional approach has also been adopted by the industry in the last few years to minimize the risks of overcapacity and the cost of building new plants. One popular form of such practices is the "condo cracker," which enables two or more companies to jointly own a new plant. Another form of alliance is the "virtual cracker," which allows an ethylene consumer to purchase capacity on a long-term basis at formula cost for an up-front capital charge. There is also the "time-share cracker" concept, in which a company purchases capacity from another for an agreed-upon period of time for a cost similar to that of investing in a comparable de-bottlenecking or new capacity project.

(Thousands of Metric Tonnes)
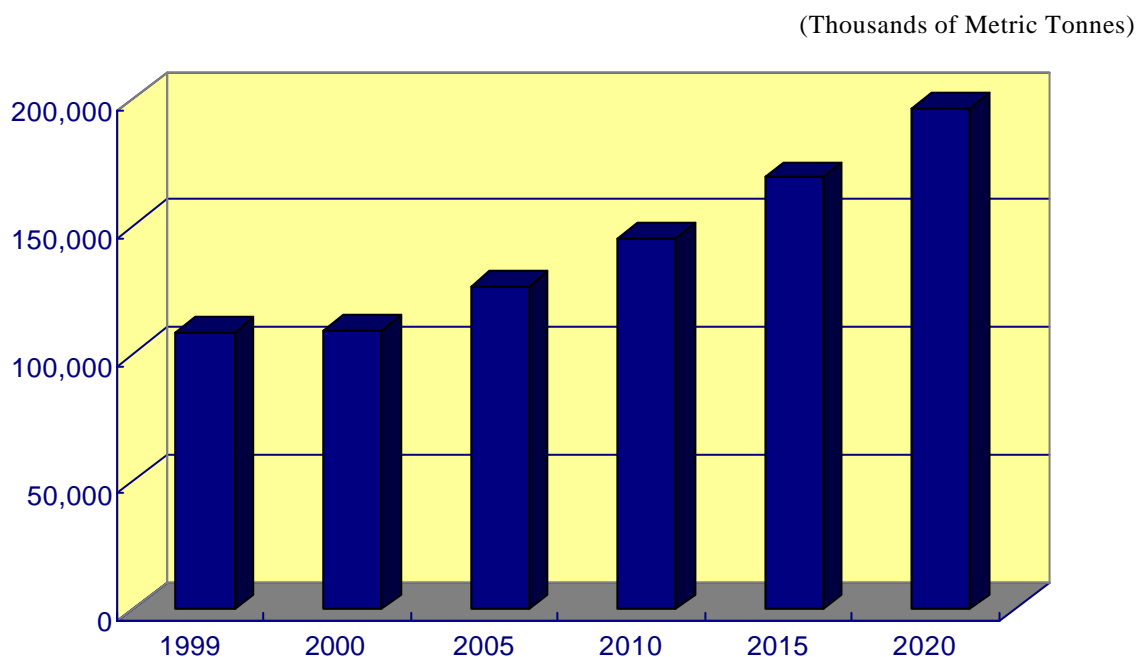
Source) WEFA, Inc. for JICA Study Team

Figure 1.2.4 Suez Chemicals Trade Forecast

Table 1.2.2 World Total Chemicals Export Forecast by Country/Region

(Thousands of Metric Tonnes)

	1999	2000	2005	2010	2015	2020
Argentina	159	160	193	238	313	427
Australia	784	775	773	845	929	1,032
Austria	175	172	180	188	200	215
Belgium	2,075	2,004	1,936	2,018	2,217	2,425
Baltics	38	42	46	54	65	74
Bulgaria	160	164	189	250	319	373
Brazil	2,284	2,317	2,539	2,763	3,274	3,697
Canada	3,016	3,036	3,231	3,593	4,043	4,476
China	5,385	5,532	8,053	10,233	11,794	13,264
Chile	443	476	749	1,246	2,155	3,747
Colombia	177	228	421	548	722	982
Caribbean Basin	2,551	2,666	2,788	2,715	2,639	2,567
CIS Southeast	31	37	49	61	72	80
CIS West	1,167	1,449	1,691	1,757	1,847	2,077
Denmark	95	93	90	90	90	87
Egypt	173	178	199	212	210	195
United Arab Emirates	698	684	711	509	306	247
Finland	663	650	609	463	465	472
France	1,771	1,736	1,711	1,776	1,856	1,920
Germany	5,930	5,745	5,596	5,941	6,529	7,147
Greece	111	111	109	102	91	83
Hong Kong	41	42	54	65	74	82
Hungary	138	151	185	261	358	467
India	585	618	881	1,138	1,578	2,058
Ireland	288	292	345	382	381	387
Indonesia	2,703	2,545	3,834	6,017	9,478	13,787
Israel	1,880	1,966	2,468	2,779	3,216	3,819
Italy	1,237	1,204	1,167	1,193	1,228	1,277
Japan	9,634	9,299	9,132	9,040	9,221	9,833
South Korea	7,125	6,960	8,055	9,371	10,476	11,619
Kenya	84	119	281	660	880	1,142
Malaysia	753	783	1,052	1,484	2,339	3,475
Mexico	1,464	1,646	3,162	4,410	6,195	8,113
Netherlands	8,388	8,172	7,536	7,583	8,224	8,937
Norway	851	810	801	834	888	938
New Zealand	32	33	32	37	44	49
Other Central America	19	21	30	38	45	54
Other East Coast of S. America	13	16	23	29	36	44
Other Indian Subcontinent	34	38	46	53	59	71
Other Mediterranean Region	366	366	373	350	296	253
Other North Africa	3,821	4,019	5,254	6,491	7,622	8,710
Other Persian Gulf	823	825	869	881	793	814
Other West Coast of S. America	25	25	40	53	64	78
Other Region	4,556	4,545	5,527	5,972	6,495	6,548
Peru	176	211	322	437	586	716
Portugal	207	202	199	212	239	286
Philippines	76	79	108	148	196	261
Poland	254	282	396	499	647	817
Romania	543	692	832	892	995	1,117
Russia	1,777	1,891	2,412	3,025	3,947	4,801
South Africa	1,069	1,089	1,395	1,478	1,457	1,431
Singapore	1,969	2,045	2,622	3,334	3,939	4,704
Saudi Arabia	2,641	2,634	2,886	3,123	3,458	4,065
Spain	1,911	1,914	2,220	2,614	2,938	3,289
Sweden	388	366	355	373	402	436
Switzerland	306	300	307	315	325	342
Thailand	573	589	793	1,025	1,236	1,363
Turkey	416	426	527	641	808	1,067
Taiwan	1,098	1,098	1,131	1,267	1,488	1,704
United Kingdom	2,121	2,111	2,136	2,220	2,314	2,504
United States	18,696	19,204	22,671	26,297	30,348	34,785
Vietnam	32	33	51	75	111	154
Venezuela	942	1,090	2,132	2,642	3,254	3,916
Western Africa	181	192	224	296	384	491

Source) WEFA, Inc. for JICA Study Team

1.2.2 Bulk Cargo

(1) Cereals

International trade in agricultural commodities, including cereals, is expanding along with the overall expansion of trade. There are, however some areas of concern that must be noted. Large global supplies of cereals and oilseeds exist, and prices, though improving, are projected to remain relatively low for the short term. Cost of production is going up as a direct result of the increase in oil prices. Notwithstanding this, there is the potential for global agriculture to expand and flourish in the next ten years.

With China joining the WTO, this market will open up to international trade which will have an impact on cereals shipments as the market becomes more open to international pricing structures. Another factor is the continuing growth in the world population, particularly in regions that are dependent upon cereals imports.

Commodity prices for cereals are expected to remain weak, but with a recovery beyond 2002 after having reached their lowest levels in the current year. Corn prices are expected to reach a trough by the end of 2000 with slow growth thereafter, supported by gradually reducing stocks, rising demand and expanded trade. Soya bean prices on the other hand are expected to remain weak for a number of years due to on-going area expansion that has led, and will continue to lead to global surpluses.
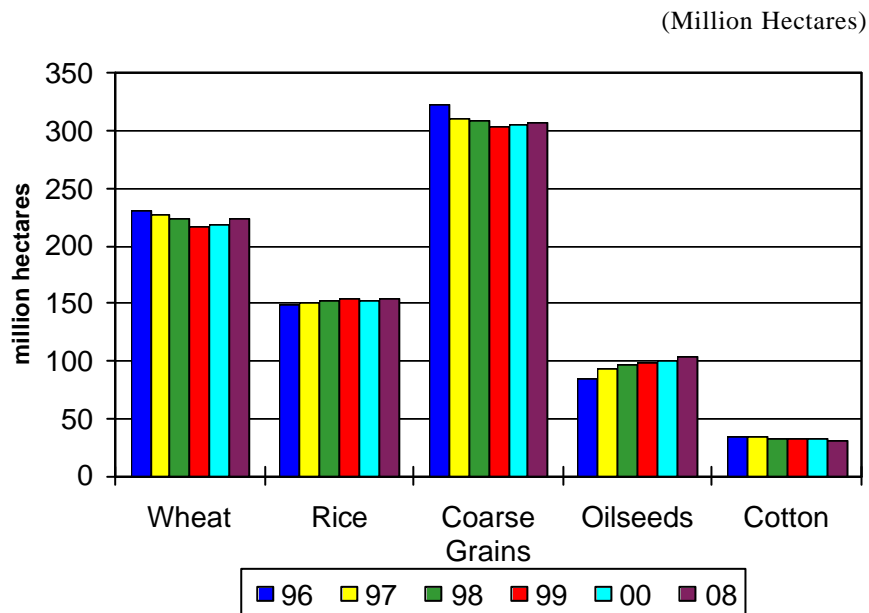
(Million Hectares)

Source) WEFA, Inc. for JICA Study Team

Figure 1.2.5 World Agricultural Crop Area Harvest Forecast

Table 1.2.3 Major Food Crop Area Harvested by Country/Region

	Area Harvested			Change from 1999/00	
	1999/00	2000/01	2008/09	2000/01	2008/09
	(million hectares)				
Africa	95.55	96.30	101.79	0.75	6.24
Argentina	19.02	18.82	20.48	-0.20	1.46
Australia	18.28	18.04	18.17	-0.24	-0.11
Brazil	31.57	32.05	34.11	0.48	2.54
Canada	23.86	24.35	24.58	0.49	0.72
China	108.63	108.18	107.62	-0.45	-1.01
Eastern Europe	25.28	26.73	27.29	1.45	2.01
European Union	41.16	40.67	40.61	-0.49	-0.55
Former Soviet Union	79.64	79.00	76.24	-0.64	-3.40
India	122.80	123.09	123.63	0.29	0.83
Japan	2.12	2.09	2.14	-0.03	0.02
Middle East	29.23	31.22	32.18	1.99	2.95
Mexico	11.91	11.61	11.67	-0.30	-0.24
Other Asia/Oceania	60.86	60.91	61.85	0.05	0.99
Other Latin America	11.29	11.32	11.78	0.03	0.49
Other Western Europe	0.55	0.55	0.55	0.00	0.00
Rapidly Developing Asia	18.14	18.08	18.33	-0.06	0.19
Thailand	11.45	11.17	11.07	-0.28	-0.38
United States	93.43	95.03	96.78	1.60	3.35
World	804.77	809.21	820.87	4.44	16.10

Source) WEFA, Inc. for JICA Study Team

Rice production has increased dramatically, particularly in Asia, which has resulted in significantly reduced import demand, with export growth coming from China, Vietnam and Thailand. Export growth of wheat can also be expected from the European Union and Eastern Europe and to a lesser extent from the United States. Coarse grain production has also increased, notably in the Former Soviet Union and the Middle East, as well as in Australia. As dietary habits change in China, most of the coarse grain consumption will be for livestock feed.

(Thousands of Metric Tonnes)
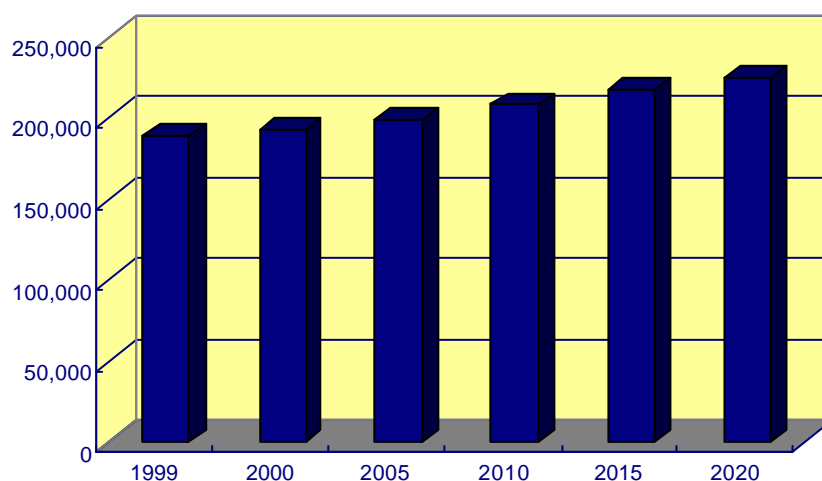
Source) WEFA, Inc. for JICA Study Team

Figure 1.2.6 World Cereals Trade Forecast

Table 1.2.4 World Total Cereals Export Forecast by Country/Region

(Thousands of Metric Tonnes)

	1999	2000	2005	2010	2015	2020
Argentina	15,744	15,992	18,134	21,434	25,487	30,589
Australia	39,644	39,698	39,657	42,011	45,924	47,926
Austria	317	305	272	249	229	203
Baltics	427	413	304	270	249	214
Belgium	9	10	9	10	11	11
Brazil	227	230	242	266	256	249
Bulgaria	12	12	12	13	12	12
Canada	13,296	13,261	11,333	10,352	9,360	8,336
Caribbean Basin	7,338	7,620	10,031	11,275	12,597	12,108
Chile	64	68	87	118	190	422
CIS Southeast	114	126	132	132	117	114
CIS West	60	65	84	90	88	70
Colombia	337	374	404	344	274	229
Denmark	502	465	358	305	254	205
Egypt	366	381	421	407	350	313
Finland	23	23	23	13	8	8
France	294	291	242	209	186	162
Germany	11,450	11,484	8,982	8,041	7,318	6,449
Greece	2,628	2,543	1,942	1,747	1,707	1,637
Hong Kong	61	60	57	47	34	23
India	1,753	1,824	1,859	2,069	2,243	2,325
Indonesia	1,002	1,128	1,679	2,012	2,224	2,506
Ireland	167	166	178	162	139	102
Israel	577	530	729	791	998	2,167
Japan	279	271	217	194	176	156
Kenya	299	278	239	213	193	174
Netherlands	26	29	40	42	55	74
New Zealand	224	239	337	475	626	754
Norway	160	142	122	113	105	98
Other East Africa	31	32	24	23	20	17
Other East Coast of S. America	37	37	55	55	56	72
Other Indian Subcontinent	20	21	21	16	11	6
Other Mediterranean Region	502	543	714	794	848	849
Other North Africa	2	3	3	4	4	4
Other Persian Gulf	283	293	282	248	192	133
Other Southern Africa	6	6	7	7	4	1
Other West Coast of S. America	25	28	32	32	32	32
Pakistan	24	23	28	32	32	33
Peru	163	176	237	218	192	139
Philippines	9	9	10	10	9	8
Poland	10	10	9	11	11	11
Romania	1,162	1,321	1,378	1,277	1,105	940
Russia	16	17	17	18	17	16
Saudi Arabia	1,363	1,549	1,712	1,649	1,485	1,374
Slovak Republic	663	673	795	759	660	557
South Africa	8	8	11	12	12	11
Sweden	427	444	497	553	555	535
Switzerland	662	610	487	452	419	394
Thailand	3,661	3,910	5,483	6,218	6,658	7,473
Turkey	2,552	2,623	2,872	3,465	3,871	4,196
United Arab Emirates	2	2	2	2	2	2
United Kingdom	2,777	2,854	2,603	2,528	2,395	2,334
United States	75,378	76,992	81,194	83,533	83,736	83,135
Venezuela	1,992	2,125	2,900	3,079	3,748	5,142

Source) WEFA, Inc. for JICA Study Team

(2)   Fabricated Metal

Fabricated metal production and trade is closely tied to the international economic developments and directly related to GDP growth. With higher energy prices and rising consumer debt, purchases of automobiles are declining which in turn directly affects demand for steel. Current inventories of steel are high leading to a decline in volumes shipped in the near term. Other than the motor vehicles industry, the remaining sectors that are large consumers of steel and finished products are expected to weaken less, with growth at a slower pace than experienced during the last few years.

Fabricated metals, non-electrical machinery and electrical machinery were all beneficiaries of the strong industrial investment during the last decade. This is projected to continue at a lower rate than experienced between 1992 and 1998 (12.8% p.a. on average).

Due to the fact what fabricated metal demand derives from consumer and industrial purchases, difficult times by the customers of fabricated metal producers will also lead to difficult times by the fabricated metal producers themselves. The demand growth for steel and other metals is likely to be moderate because the so-called "low-tech" industries will be in a slow expansion phase. Additionally the motor vehicle sector will see a lower growth over the period.

As construction activities pick up in developing economies, demand for fabricated metal products will also increase. This should see an increase in shipments from the Former Soviet Union, Eastern Europe and the European Union.

Table 1.2.5 Global Steel Production Forecast

MILLION TONNES	1993	1994	1995	1996	1997	1998	1999	YTD % Change	2000	2001	2002	2003	2004
EUROPE...	188.0	199.0	205.1	193.5	210.4	207.4	198.5	6.9	216.6	209.7	211.1	212.1	212.7
EU-15	144.2	151.7	155.8	146.6	159.9	159.9	155.0	7.0	164.6	159.2	160.3	161.3	162.1
AUSTRIA	4.1	4.4	5.0	4.4	5.2	5.3	5.2	9.6	---	---	---	---	---
BEL-LUX	13.5	14.4	14.2	13.3	13.3	13.9	13.6	7.2	---	---	---	---	---
FRANCE	17.1	18.0	18.1	17.6	19.8	20.1	20.2	4.8	---	---	---	---	---
GERMANY /1	37.6	40.8	42.1	39.8	45.0	44.0	42.1	12.9	---	---	---	---	---
ITALY	25.7	26.2	27.8	23.9	25.8	25.8	25.0	8.8	---	---	---	---	---
NETHERLANDS	6.0	6.2	6.4	6.3	6.6	6.4	6.1	-0.9	---	---	---	---	---
SPAIN	13.0	13.4	13.8	12.2	13.7	14.8	14.6	9.3	---	---	---	---	---
SWEDEN	4.6	5.0	5.0	4.9	5.1	5.2	5.1	4.1	---	---	---	---	---
UK	16.6	17.3	17.6	18.0	18.5	17.3	16.6	-5.6	---	---	---	---	---
OTHER EU	5.9	6.0	5.9	6.1	6.8	7.1	6.6	4.3	---	---	---	---	---
TURKEY	11.5	12.6	13.2	13.6	14.5	14.1	14.4	1.9	14.4	14.3	14.4	14.5	14.5
OTHER EUROPE	32.3	34.6	36.1	33.3	36.1	33.4	29.1	53.6	37.5	36.1	36.3	36.3	36.1
NORTH AMERICA...	103.2	105.2	109.6	110.3	114.1	114.6	113.6	5.9	121.0	117.5	120.6	122.6	125.0
CANADA	14.4	13.9	14.4	14.7	15.6	15.9	16.3	5.9	16.8	16.4	16.9	17.1	17.4
UNITED STATES	88.8	91.3	95.2	95.5	98.5	98.7	97.3	16.4	104.1	101.0	103.7	105.5	107.5
OTHER ADVANCED...	117.1	116.0	119.7	116.0	122.4	110.8	110.0	13.6	124.0	122.5	123.1	123.3	123.3
AUST/N.ZEA	8.7	9.2	9.3	9.2	9.6	9.7	8.9	-3.4	8.7	8.6	8.7	8.7	8.8
JAPAN	99.6	98.3	101.6	98.8	104.5	93.5	94.2	16.2	108.3	106.9	107.4	107.5	107.5
SOUTH AFRICA	8.7	8.5	8.7	8.0	8.3	7.5	6.9	1.7	7.0	7.0	7.0	7.0	7.0
DEVELOPED REGIONS...	408.3	420.2	434.4	419.8	446.9	432.7	422.1	10.0	461.6	449.6	454.7	457.9	461.0
LATIN AMERICA...	43.7	46.0	47.8	50.0	52.4	51.6	50.9	12.3	55.7	54.2	54.8	55.2	55.5
BRAZIL	25.2	25.7	25.1	25.2	26.2	25.8	25.0	10.6	26.6	26.0	26.1	26.2	26.3
MEXICO	9.2	10.3	12.1	13.2	14.2	14.2	15.3	8.5	16.5	16.1	16.5	16.8	17.0
OTHER	9.3	10.0	10.5	11.6	12.0	11.7	10.6	22.1	12.6	12.2	12.2	12.2	12.2
DEVELOPING ASIA...	165.4	168.2	177.9	189.2	204.0	203.8	214.8	5.6	226.1	224.9	227.4	229.7	231.6
CHINA	89.5	92.6	95.4	101.2	108.9	114.1	123.3	3.3	126.8	126.8	128.7	130.3	131.8
INDIA	18.2	19.3	22.0	23.8	24.4	23.5	24.3	10.8	26.6	26.2	26.4	26.5	26.7
SOUTH KOREA	33.0	33.7	36.8	38.9	42.6	39.9	41.0	7.3	44.0	43.5	43.9	44.2	44.3
OTHER	24.7	22.6	23.8	25.3	28.1	26.3	26.1	11.1	28.8	28.4	28.5	28.6	28.8
AFRICA-MIDDLE EAST...	12.1	12.6	13.1	13.8	14.5	13.5	12.5	7.1	13.3	13.1	13.2	13.3	13.3
AFRICA	5.3	4.8	4.9	4.7	4.6	4.8	4.7	5.3	---	---	---	---	---
MIDDLE EAST	6.9	7.8	8.1	9.2	9.9	9.1	9.8	7.9	---	---	---	---	---
FORMER USSR...	98.1	78.3	79.1	77.2	81.0	74.4	83.9	19.1	98.2	95.6	96.7	97.4	97.8
RUSSIA	58.3	48.8	51.6	49.3	48.5	43.8	49.8	19.9	58.3	56.6	57.3	57.7	57.9
UKRAINE	32.6	24.1	22.3	22.3	25.6	24.4	27.0	16.7	31.3	30.5	30.9	31.1	31.3
OTHER CIS + BALTICS	7.2	5.4	5.2	5.6	6.9	6.2	7.1	23.0	8.7	8.4	8.5	8.6	8.6
DEVELOPING REGIONS...	319.3	305.1	317.9	330.2	351.9	343.3	362.1	10.2	393.3	387.9	392.2	395.5	398.1
TOTAL WORLD...	727.6	725.2	752.2	750.0	798.9	776.1	784.2	10.1	854.9	837.4	846.9	853.4	859.1
% CHANGE	1.1	-0.3	3.7	-0.3	6.5	-2.9	1.1		9.0	-2.0	1.1	0.8	0.7

Historical Source: International Iron And Steel Institute; Forecast Source: WEFA; (1) Incl. E. Germany Beginning in 1991; (2) Excl. E. Germany Beginning in 1991.
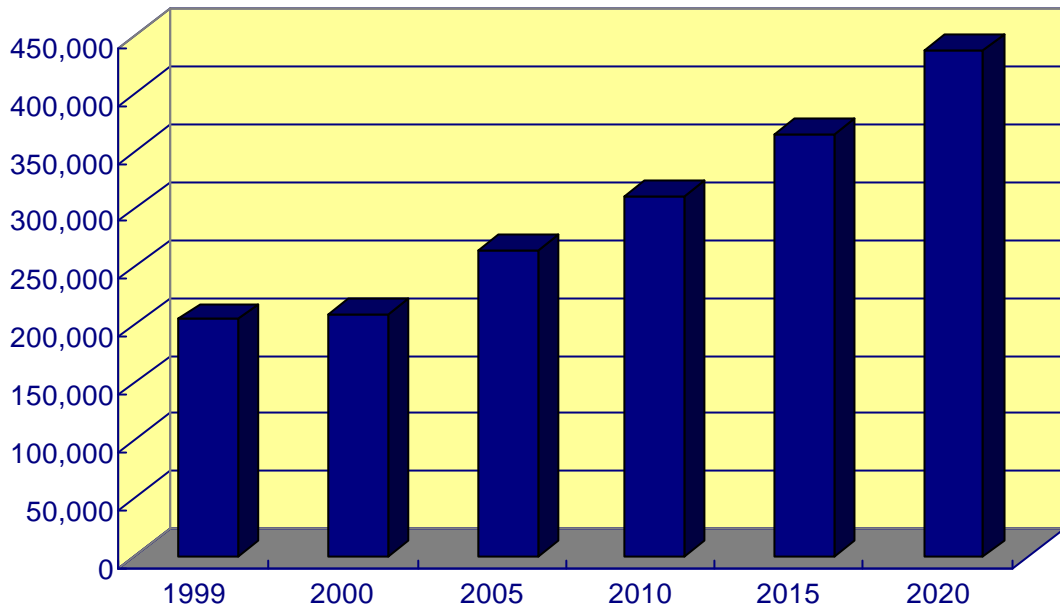
Source) WEFA, Inc. for JICA Study Team

Figure 1.2.7 World Fabricated Metal Trade Forecast

Table 1.2.6 World Fabricated Metals Export Forecast by Country/Region

(Thousands of Metric Tonnes)

	1999	2000	2005	2010	2015	2020
Argentina	1,034	1,062	1,312	1,642	2,142	3,103
Australia	3,647	3,609	3,853	4,448	5,280	6,309
Austria	903	904	999	1,119	1,275	1,460
Belgium	4,035	3,790	3,835	4,406	5,213	6,121
Baltics	580	631	746	863	1,016	1,211
Bulgaria	185	199	300	387	502	693
Brazil	17,478	18,447	24,388	30,401	37,987	47,426
Canada	757	752	826	1,004	1,198	1,377
China	9,726	9,988	15,489	19,739	25,240	32,780
Chile	119	125	227	323	462	709
Colombia	149	167	295	355	434	556
Caribbean Basin	998	1,020	1,085	1,039	959	903
CIS Southeast	2,328	2,567	4,028	4,899	5,935	6,801
CIS West	9,013	10,269	12,714	13,865	15,068	16,491
Czech Republic	419	428	428	452	480	493
Denmark	161	151	146	155	163	161
Egypt	312	324	418	464	478	479
United Arab Emirates	51	49	70	46	32	32
Finland	998	990	963	1,003	1,066	1,131
France	5,023	4,999	5,100	5,510	6,246	7,091
Germany	8,323	8,146	8,729	9,668	10,760	12,614
Greece	677	670	700	723	682	652
Hong Kong	40	39	38	42	49	60
Hungary	206	217	283	374	478	623
India	2,454	2,608	3,972	5,101	6,577	8,877
Ireland	245	233	251	270	286	292
Indonesia	2,106	1,914	2,890	3,873	5,323	8,193
Israel	19	19	28	36	47	61
Italy	3,801	3,741	3,803	4,222	4,711	5,201
Japan	25,388	24,254	25,787	27,599	28,036	30,279
South Korea	16,001	15,874	20,231	25,519	30,744	35,670
Malaysia	2,323	2,452	3,579	4,344	5,831	9,144
Mexico	1,548	1,706	3,699	5,189	7,241	11,001
Netherlands	2,941	2,876	3,055	3,647	4,441	5,454
Norway	648	606	636	739	849	943
New Zealand	551	562	543	586	632	684
Other Central America	41	44	68	86	107	149
Other Mediterranean Region	1,742	1,839	2,168	2,011	1,544	1,086
Other North Africa	797	818	1,029	1,309	1,550	1,853
Other Persian Gulf	362	372	385	396	381	354
Other Southern Africa	330	350	473	544	621	712
Other Western Europe	68	68	79	92	103	116
Other West Coast of S. America	9	8	13	17	20	23
Other Region	1,263	1,300	1,455	1,554	1,651	1,676
Peru	13	15	25	29	34	39
Portugal	143	143	169	203	246	316
Philippines	144	154	260	362	513	738
Poland	1,554	1,665	2,569	3,241	4,145	5,572
Romania	2,593	3,013	4,150	4,735	5,445	6,268
Russia	34,870	36,987	48,190	54,761	62,941	74,569
South Africa	8,665	8,782	12,371	13,475	13,676	14,357
Singapore	385	409	652	851	1,045	1,191
Saudi Arabia	51	51	59	69	80	89
Slovak Republic	156	171	175	182	191	196
Spain	3,475	3,465	4,212	5,451	6,609	7,750
Sweden	1,779	1,635	1,708	2,003	2,372	2,790
Switzerland	331	314	338	375	413	461
Thailand	694	720	1,006	1,213	1,464	1,795
Turkey	5,031	5,110	6,060	6,997	8,608	12,259
Taiwan	6,611	6,652	6,797	7,854	9,536	12,168
United Kingdom	4,499	4,672	5,060	6,129	7,416	9,202
United States	1,365	1,432	1,888	2,299	2,838	3,581
Vietnam	10	10	17	21	29	46
Venezuela	2,842	3,146	8,014	10,838	13,485	16,583

Source) WEFA, Inc. for JICA Study Team

(3) Coal and Coke

The sea-borne trade in coal and cokes after years of decline reverted to growth in 1974. By 1973 the volume was down to around 21 million metric tonnes but in the decades since then two oil crises and a distinct move away from further nuclear development in many countries has made coal a significant contributor to the primary global energy demand.   In many countries, notably the United States and China, coal today has a dominant role in electricity generation. By 1999 the global sea borne trade had grown from the low of 21 million metric tonnes in 1973 to 316 million metric tonnes.

The graph below shows the historical evolution of coal volumes in millions of metric tonnes and prices of coal delivered to European power stations in both nominal US$/tonne-of-coal-equivalent ($/tce) and 1999US$/tonne-of-coal-equivalent ($/tce).

Million tonnes (Mt), US dollars per tonne of coal equivalent ($/tce)
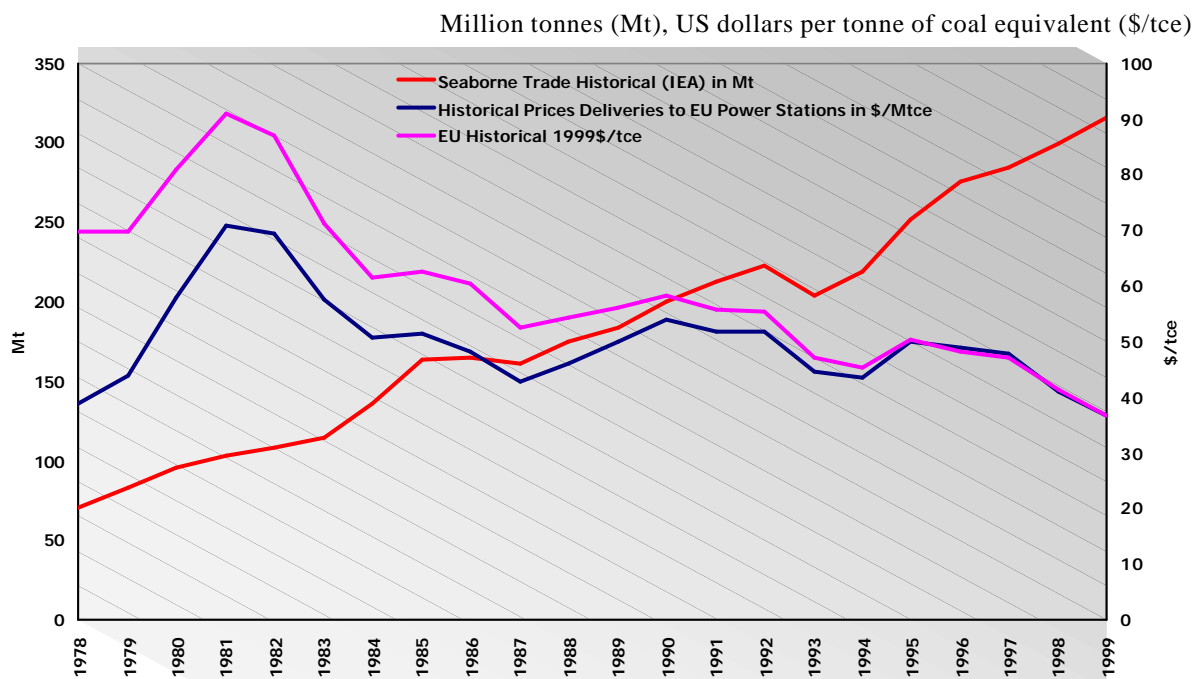
Source) WEFA Energy Group, International Energy Agency (IEA), JICA Study Team

Figure 1.2.8 Historic Volumes and Prices of Coal

The table below details the forecast imported volumes to the principal importing regions to 2020 in Millions of tonnes of coal equivalent (Mtce).

Table 1.2.7 World Sea-Borne Steam and Metallurgical Coal Imports

(millions of tonnes of coal equivalent (Mtce))

	1990	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020
Scandinavia	14.4	12.2	8.0	12.6	14.6	13.4	13.7	13.3	11.3	10.2	8.5	6.8
N.W. Europe	34.6	43.2	52.9	48.2	50.7	51.0	53.3	52.0	51.9	58.2	56.1	59.1
British Isles	8.6	14.6	11.8	17.4	18.9	19.1	19.6	20.5	21.5	21.6	17.8	15.7
S.W. Europe	19.6	21.9	27.2	31.9	32.8	32.7	32.7	31.4	30.8	31.6	29.9	30.4
Eastern Europe	1.3	0.5	0.8	0.9	1.0	1.2	1.5	1.6	1.7	3.1	6.9	8.4
East Med.& Africa	7.6	14.0	12.3	15.3	17.0	17.5	17.6	18.6	20.1	22.9	25.8	26.3
Japan	34.3	62.1	61.5	66.0	70.0	75.0	77.8	78.2	79.8	89.3	96.1	106.1
South Korea	9.5	30.3	34.1	34.5	35.5	39.0	41.0	43.9	46.5	49.6	54.8	59.7
Taiwan	10.6	21.6	26.6	25.0	25.5	25.7	26.0	26.2	26.0	28.3	30.2	32.5
Other Asia	11.6	20.9	21.6	26.6	29.9	37.3	44.3	49.2	51.9	67.2	91.5	118.3
Latin America	2.3	10.2	6.7	10.5	12.2	12.1	12.4	12.4	12.7	15.6	19.8	24.2
North America	1.5	7.3	7.3	7.4	7.8	8.6	9.9	9.6	10.1	11.2	15.5	15.6
World	**156**	**259**	**271**	**296**	**316**	**333**	**350**	**357**	**364**	**409**	**453**	**503**
W.Europe	78.4	93.7	100.6	113.0	119.6	119	122	121	121	129	121	121
Far East	66.0	135	144	152	161	177	189	198	204	234	273	317
Americas	3.8	17.5	14.0	17.9	20.0	20.7	22.3	22.0	22.8	26.8	35.3	39.8
Others	7.7	12.7	12.4	13.3	15.4	15.9	16.1	16.2	16.6	18.6	24.4	25.9
World Coal Total	156	259	271	296	316	333	350	357	364	409	453	503
Metallurgical Tonnes	5.7	11.3	11.7	12.3	12.9	13.7	14.3	15.0	15.9	19.5	25.5	35.7

Source) WEFA Energy Group for JICA Study Team

The above table shows how the steady historical growth is forecast to continue out to 2020. Careful examination of the numbers and the figures reveal that the bulk of the growth is coming from the Asia-Pacific region and in the latter stages from what may be considered the next generation of Asian tiger economies. This becomes more immediately apparent when the demand is consolidated into regions as follows.
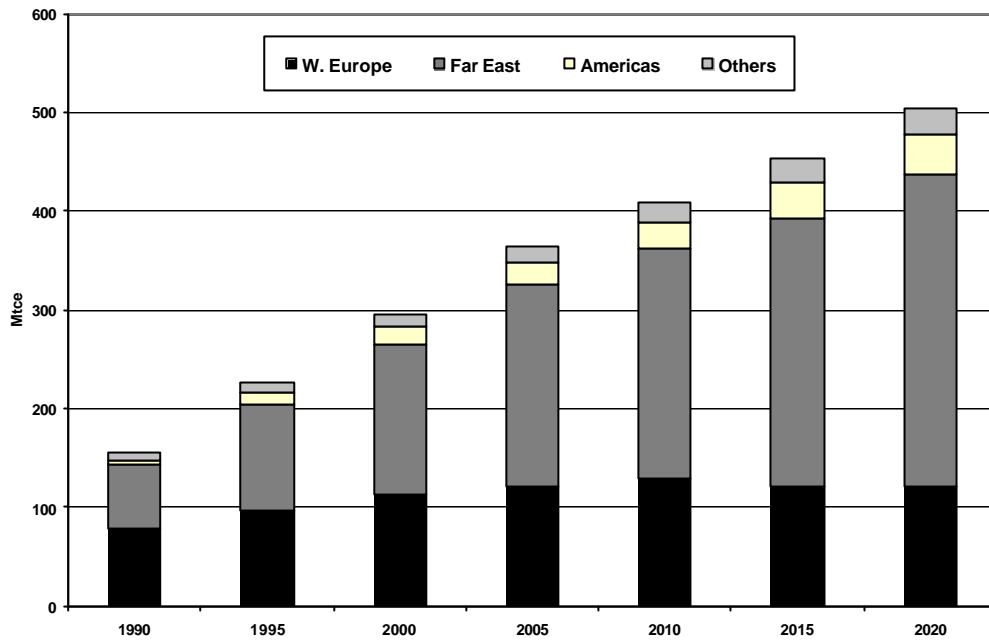
Source) WEFA Energy Group for JICA Study Team

Figure 1.2.9 World Sea-Borne Coal Imports

Over the forecast period the demand from China and the Indian subcontinent is forecast to grow by some 60 million tonnes of coal equivalent, which is almost comparable to the increase for the Asian "big three." It is clear that India in particular has a demand that would support this growth but as always whether the infrastructure and financing of projects can be put in place must be questioned. The Indian Government also has a habit of increasing import duty on coal every time imported coal looks as if it could take an impression. Currently the import duty into India stands at 35%.

In Europe the major growth areas in the short-term are Germany, Spain and the UK. In Germany plans to advance the closure of mines will require some additional imports, as it will in Spain. While German subsidies are intended to be withdrawn by 2005, with 26 million tonnes of coal production at a cost of around $200/tonne and over 35,000 employed in the industry it cannot suddenly stop. WEFA assumes that the run down will take much longer. In the UK new ownership of the major coal generating plant will change the utilization of this plant increasing the demand for coal at the expense of gas. Beyond 2010 despite increases in demand from France the fall in traditional coal burning economies will hold the level of demand steady.

The table below details WEFA's forecast of how the producing regions will meet the demand over the forecast period. Supply volume in expressed in millions of tonnes (Mt) and standard calorific values have been used in each region to convert the quantity to million tonnes of coal equivalent (Mtce) to match the demand.

Table 1.2.8 Sea-borne Steam Coal Exports

(Million metric tonnes)

	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020
Australia	87	94	100	108	114	118	121	144	169	195
Canada	5	5	5	6	6	6	7	7	8	10
S. Africa	67	72	78	80	84	85	86	94	94	94
USA: ECoast	8	10	11	11	12	12	12	13	14	15
WCoast (Rockies)	3	3	3	4	4	4	4	4	5	16
Alaska	0	0	0	0	0	0	0	0	0	4
PRB	0	0	0	0	0	0	0	0	0	0
Colombia	30	35	39	39	41	41	42	49	59	71
Venezuela	8	9	10	10	11	10	11	12	14	16
Indonesia - Bituminous	16	17	18	18	19	19	19	20	20	20
Indonesia- Sub-bituminous	37	39	42	48	52	55	57	61	69	70
China	32	33	35	37	39	41	42	47	55	55
Russia	12	14	15	15	15	15	14	15	15	15
Poland	13	14	14	14	14	14	13	14	10	10
Total	**317**	**346**	**369**	**389**	**410**	**419**	**428**	**480**	**532**	**589**

Source) WEFA Energy Group for JICA Study Team

From the growth in exports detailed above WEFA is predicting an increase of around 270 Mt in total trade with approximately 40% of this coming from Australia. The other main contributors to this increase are Colombia (15%), Indonesia (14%) and South Africa, China and the United States each of who contribute around 10%.

Over the medium-term we have made assumptions regarding the running down of indigenous production in Europe. It is possible that both the German and the Spanish coal industries could decline slower than currently planned despite pressure from the EU in regard to the continued subsidies given to the industries. It is also possible that at the same time the UK industry runs down more slowly than forecast as a result of the coal plants in the UK preferring to secure a greater level of local supplies for their coal requirements. Should this happen then up to ten million tonnes could be thrown back onto the Atlantic market with the consequential effect on coal prices.

There is a risk that continued high oil prices could slow down the switching to gas given that the price of gas in most contracts has a significant level of oil-related indexing.

Demand for imports of metallurgical coal (both blended coals for coke production and PCI coals) is projected to grow from the 174 million tonne level in 1999 to 200 million tonnes per year in 2005. This growth is at a rate averaging 2.3% per year, with PCI growth rates of approximately 5.5% percent per year. Demand for coke oven blended coals will grow at a rate of 1.2% per year increasing from 154 Million tonnes in 1999 to 166 million tonnes per year by 2005.

Table 1.2.9 Forecast Demand for Imported Metallurgical Coal

(Million Metric Tonnes)

Region/Area	1998	1999	2000	2001	2005
North Asia	97.7	96.5	96	95	97
Other Asia	10.9	10.8	12	15	19
E.C. –12	42.6	39.7	47	46	46
Other Europe	16.4	15.9	17	17	17
Mid. East/ Africa	9.3	8.8	10	10	11
America/Pacific	20.8	20.3	21	24	26
Total	**197.6**	**192**	**203**	**206**	**216**
Sea-borne trade	**176.7**	**174**	**185**	**191**	**202**

Source）WEFA Inc., World Coal Institute for JICA Study Team

The sea-borne metallurgical coal export market, and in particular the hard coking coal market, is dominated by Australia, which in 1999 supplied almost 53 percent of the total world seaborne trade in this commodity category. To maintain its market share Australian exporters will have to remain cost and quality competitive versus Canadian and US exporters, which limits the prices that can be negotiated in the market place. However 1999 and 2000 contract prices were low enough that it forced mine closures in Canada and a reduction in US export volumes.

Table 1.2.10 Metallurgical Coal Export Forecast

(Million Metric Tonnes)

	1998	1999	2000	2001	2005
Australia	84	92	98	104	118
Canada	28	29	27	25	25
USA	43	29	28	28	25
China	5	5	7	8	10
Poland	7	6	7	7	6
South Africa	5	2	4	5	6
Indonesia	5	6	6	6	6
Venezuela	3	3	4	4	4
Other	17.6	20	22	21	16
Total	**197.6**	**192**	**203**	**206**	**216**
Sea-borne trade	**176.7**	**174**	**185**	**191**	**202**

Source）WEFA, Inc., World Coal Institute for JICA Study Team

Metallurgical coal exports from Australia are expected to increase from 98 million tonnes in 1999 to 118 million tonnes by 2005 and the plans exist to expand production and shipping capacity to reach such a level of exports. Longer term the industry has the resource base to increase supply capacity further to 130 million tonnes per year by 2010. No significant expansions are anticipated for Canada and the USA during this period, because both countries have excess export capacity. Additional metallurgical coal will become available from China. Poland, which is scaling back production to reduce the previous level of subsidies, is planning to maintain its current level of exports. Russian exports are primarily by land, with their sales made to neighboring eastern European countries, while seaborne exports to the Far East suffer from high cost of land transport to the Russian ports in Asia, which is inhibiting increased exports. The strong steel market in 1999 and 2000 absorbed the available low cost sea-borne supply capacity, which in 2000 resulted in low export stocks in Australia. The situation has been exacerbated by technical problems at some Australian underground mines.

(Million Metric Tonnes)
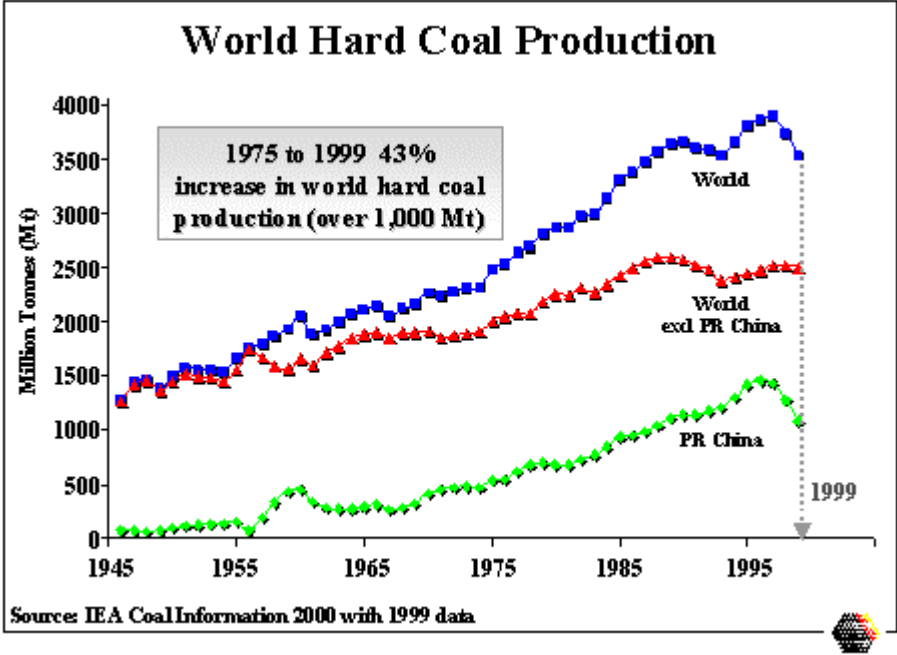
Source) International Energy Administration's Coal Information 2000

Figure 1.2.10 World Hard Coal Production, 1975 to 1999

(4)   Ores

Production and shipments of ores are, as with fabricated metals and steel, closely related to the overall economic growth of the world economies. The broad "Ores" category under study includes iron ore, other metallic ores, alumina, bauxite, and phosphate rock.

The commodities in the ores category are mostly used as intermediate inputs to manufacturing processes that in turn produce end products for consumers or industrial customers. In the recent past, the growth in ore shipments has come from increases in production of fabricated metals and steel from imported ores. Therefore the production of ores for export has grown significantly. Factors influencing sea-borne shipments of ore include the newer technologies used in manufacturing. Notable developments of production technology have occurred for steel making and in the production of other metals.

For example, the proportion of world steel output produced by electric arc furnaces has grown substantially over the last 20 years. This is projected to continue to increase over the forecast period as newer technologies allow manufacturers to enter new markets and reduce production costs. The implications for ores are significant. The electric arc furnaces use significant amounts of scrap metals as input feedstock instead of pig iron. The shift to electric arc furnaces increases the use of directly reduced iron ore, as a consequence of which the structure of the industry is changing. Both Brazil and Australia have become major producers of directly reduced iron ore pellets, thereby creating an imbalance in the location of steel producing facilities and ore production areas. This has been further accentuated by the decline of the European ore production and the growth of the Asian steel industry. As a result, the supply of regional iron ore is insufficient to meet demand that in turn will lead to increasing international, long distance traffic movement by large bulk carriers. Over 95% of all iron ore is shipped by sea, and sea-borne trade in iron ore is forecast to increase over the forecast period.

With the world steel industry consuming around 99% of exported iron ore, ore production remains an industry totally dependent on underlying steel production. Asian metal manufacturing companies have grown to such an extent that they are now the largest producers of crude steel, but less than a quarter of world iron ore production is carried out in the region. The primary source of ore is Australia, which unfortunately will not benefit the Suez Canal. Similarly, with the growth of Brazilian production, it is unlikely that a significant proportion of that will use the Suez Canal. However, Indian iron ore destined for the Mediterranean and Northern Europe will be a user of the Canal.

Similarly, bauxite and alumina shipments have grown only as demand for growth in aluminum and derivative product manufacturing has increased.
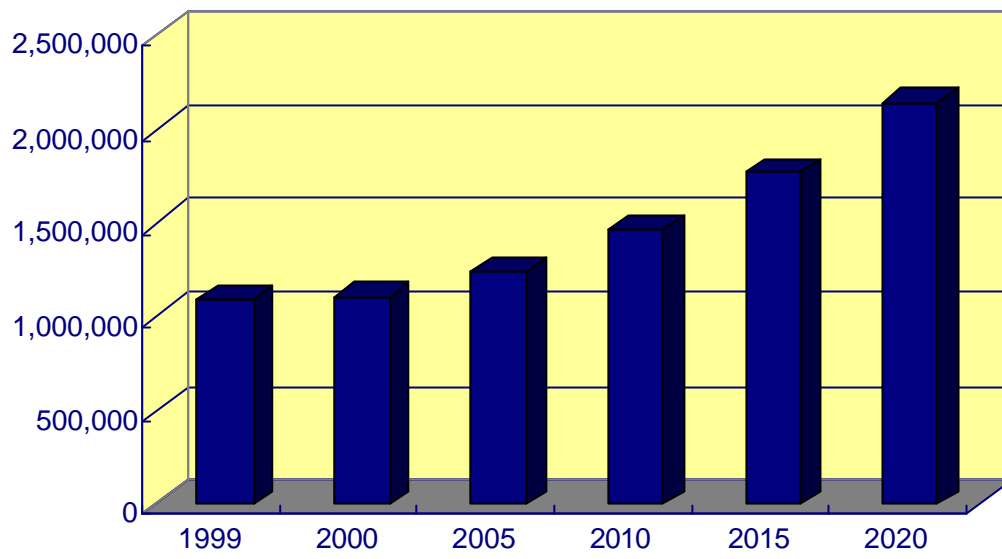
Figure 1.2.11 World Total Ores Trade Forecast

Table 1.2.11 World Total Ores Export Forecast by Country/Region

(Thousands of Metric Tonnes)

	1999	2000	2005	2010	2015	2020
Argentina	438	454	587	760	969	1,243
Australia	161,839	156,171	159,598	181,106	210,521	243,546
Austria	14	14	20	20	26	26
Belgium	84	69	58	58	60	65
Bulgaria	6	7	8	11	14	16
Brazil	210,794	219,593	263,207	318,291	394,844	490,545
Canada	527,962	530,007	510,978	526,694	562,946	599,322
China	1,965	2,131	3,560	5,005	5,674	6,258
Chile	15,563	17,693	31,696	61,215	97,273	153,213
Colombia	13	17	33	50	69	93
Caribbean Basin	9,503	10,977	14,314	17,450	21,900	24,967
CIS Southeast	630	819	1,525	2,431	3,402	4,218
CIS West	161	223	281	334	417	506
Egypt	12	12	18	18	24	30
United Arab Emirates	43	41	56	43	32	30
Finland	33	33	34	35	39	43
France	110	109	103	108	120	131
Germany	108	106	108	114	126	140
Greece	244	240	265	294	315	343
Hungary	8	10	15	27	39	57
India	36,654	39,861	60,004	87,184	123,702	170,498
Ireland	1,150	1,122	1,492	1,852	2,155	2,411
Indonesia	10,037	8,869	13,694	22,345	36,644	58,953
Italy	209	205	195	205	221	236
Japan	142	135	125	128	133	136
South Korea	29	27	30	33	35	36
Malaysia	462	497	681	1,004	1,361	1,830
Mexico	339	373	588	825	1,143	1,434
Netherlands	130	127	125	127	140	148
Norway	584	481	625	658	691	699
New Zealand	2,092	2,161	1,744	2,008	2,273	2,394
Other Central America	183	212	350	528	651	807
Other East Coast of S. America	3,935	4,555	8,253	13,181	17,473	22,412
Other Mediterranean Region	138	148	167	189	224	255
Other North Africa	764	859	1,265	1,688	2,154	2,724
Other Persian Gulf	810	873	999	1,049	1,118	1,174
Other Southern Africa	169	201	325	413	516	642
Other West Coast of S. America	484	501	862	1,290	1,585	1,986
Other Region	7,952	8,873	11,631	14,351	17,549	21,498
Peru	7,318	7,970	11,200	14,445	17,393	20,169
Portugal	125	120	132	157	178	195
Philippines	7,356	7,926	12,631	21,383	31,189	42,247
Pakistan	147	183	257	324	413	540
Poland	40	42	59	79	103	129
Russia	1,754	1,990	2,878	3,609	4,408	5,560
South Africa	28,247	29,022	39,944	45,071	46,424	50,866
Saudi Arabia	84	94	109	127	151	180
Spain	271	280	343	382	394	413
Sweden	6,403	5,915	5,876	6,537	6,965	7,500
Thailand	21	24	36	47	55	64
Turkey	231	251	329	416	544	698
Taiwan	21	21	19	19	20	21
United Kingdom	14	14	14	14	15	16
United States	3,422	3,484	3,762	4,009	4,294	4,650
Vietnam	258	281	463	861	1,209	1,596
Venezuela	8,854	10,745	21,291	28,994	37,848	48,816
Western Africa	29,949	34,852	50,718	77,136	108,476	149,891

Source) WEFA, Inc. for JICA Study Team

(5) Fertilizer

WEFA has raised its estimate of nutrient consumption in the past year in response to the growing acreage of agricultural production worldwide. The large trading economy of the United States remains a net importer of nitrogen and potash and this will not change over the forecast period. In fact the strong U.S. dollar will foster greater import demand. The U.S. is also an exporter of potash, primarily to Asia (from south Florida), however these shipments are carried via the Panama Canal.

Continued economic growth around the world, strong Asian economies and improved economic performance in Europe are positive factors pushing demand for agricultural commodities higher, and consequently also increasing the demand for fertilizers.

World potash capacity is relatively stable in terms of supply at about 40 million metric tones and therefore any change in demand must be met out of stocks of substitution if the increase is beyond production capability. However there has been a significant expansion of production of mono ammonium phosphate and DAP in recent years, particularly in Asia, India, China and Australia. Both China and India have plans to further increase production, primarily for the growing U.S. markets. This will certainly benefit the Suez Canal.

(Millions of Metric Tons)
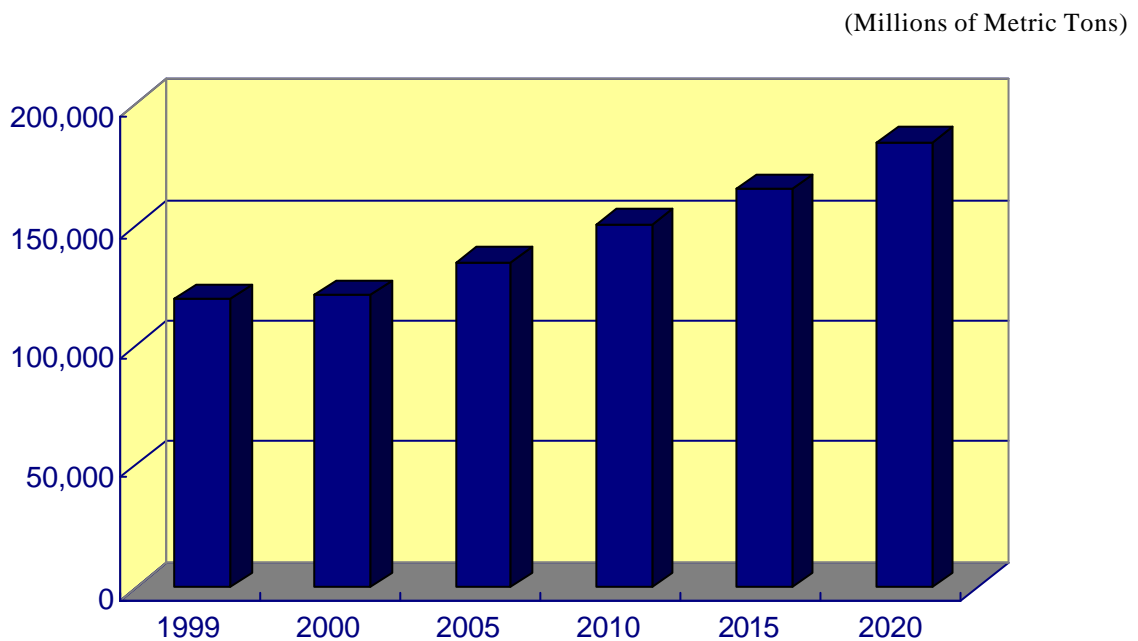
Source) WEFA, Inc. for JICA Study Team

Figure 1.2.12 World Total Fertilizer Trade Forecast

Table 1.2.12 World Total Fertilizer Export Forecast by Country/Region

(Thousands of Metric Tonnes)

	1999	2000	2005	2010	2015	2020
Argentina	6	7	8	11	16	23
Australia	94	93	91	91	92	92
Austria	108	97	95	97	102	108
Belgium	2,881	2,738	2,542	2,607	2,819	3,095
Baltics	199	221	247	284	320	342
Bulgaria	275	280	318	422	527	577
Brazil	152	160	191	227	266	294
Canada	9,113	9,062	8,748	8,959	9,202	9,430
China	3,218	3,232	4,021	4,587	5,098	5,730
Chile	609	625	940	1,452	2,218	3,609
Colombia	75	85	170	179	190	220
Caribbean Basin	580	590	644	630	607	603
CIS Southeast	82	89	127	172	208	220
CIS West	1,357	1,550	1,781	1,789	1,824	1,880
Denmark	238	222	188	178	178	182
Egypt	551	559	613	620	679	685
United Arab Emirates	66	68	97	78	64	69
Finland	446	425	387	386	396	399
France	555	542	496	499	516	540
Germany	4,474	4,249	3,953	3,999	4,183	4,383
Greece	324	320	309	300	292	282
Hungary	33	34	42	52	56	64
India	37	38	54	71	88	108
Ireland	295	290	306	323	342	361
Indonesia	2,152	2,029	3,334	5,441	9,060	14,941
Israel	5,706	5,928	7,703	8,542	9,173	10,160
Italy	351	336	338	353	380	414
Japan	941	922	928	944	974	1,035
South Korea	1,295	1,263	1,370	1,484	1,534	1,483
Malaysia	810	835	1,101	1,657	2,384	2,491
Mexico	623	672	1,075	1,561	2,438	4,038
Netherlands	2,900	2,745	2,671	2,786	3,007	3,272
Norway	955	862	886	986	1,090	1,161
New Zealand	26	28	22	22	23	23
Other Central America	89	99	135	166	225	327
Other East Coast of S. America	10	10	17	19	20	20
Other Indian Subcontinent	176	181	193	204	218	231
Other Mediterranean Region	5,813	5,748	6,043	5,958	5,434	4,870
Other North Africa	20,512	20,464	22,710	25,014	27,377	29,644
Other Persian Gulf	2,105	2,128	2,221	2,252	2,233	2,203
Other Southern Africa	20	22	27	28	30	31
Other Region	1,053	1,067	1,097	1,092	1,128	1,102
Peru	66	66	71	76	81	84
Portugal	54	54	57	63	72	86
Philippines	425	453	722	1,174	1,926	3,073
Poland	739	766	813	876	942	986
Romania	607	727	907	978	991	1,015
Russia	22,870	24,038	27,037	29,800	31,041	32,209
South Africa	1,888	1,876	2,122	2,072	1,989	1,869
Singapore	152	162	215	251	242	222
Saudi Arabia	539	542	561	586	615	639
Slovak Republic	13	14	13	13	13	13
Spain	604	615	723	766	804	848
Sweden	80	73	65	67	72	76
Switzerland	26	26	25	26	27	30
Thailand	49	53	73	85	86	91
Turkey	81	81	107	141	195	288
Taiwan	127	124	107	107	112	118
United Kingdom	287	294	284	293	303	325
United States	17,370	17,848	19,728	21,883	23,701	25,628
Vietnam	16	16	26	41	66	103
Venezuela	255	303	888	1,642	2,237	2,786
Western Africa	2,464	2,446	2,715	3,041	3,297	3,604

Source) WEFA, Inc. for JICA Study Team

Table 1.2.13 Selected Agricultural Commodities and Nonferrous Metals

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Wheat										
US$ per bu	5.48	4.16	3.29	2.92	2.93	3.22	3.44	3.81	3.64	3.65
% change	18.26	-24.05	-21.03	-11.09	0.17	10.00	6.84	10.76	-4.40	0.14
Corn										
US$ per bu	3.82	2.67	2.23	1.92	1.85	1.74	1.88	2.03	2.31	2.50
% change	41.98	-30.14	-16.51	-14.09	-3.78	-5.82	7.76	8.00	14.07	8.12
Soybeans										
US$ per bu	7.44	7.52	5.96	4.55	4.61	4.16	4.09	4.25	4.51	4.93
% change	24.44	1.19	-20.77	-23.60	1.32	-9.71	-1.74	3.91	6.20	9.24
Rice										
US$ per cwt	19.64	20.45	18.46	15.37	10.71	9.98	12.09	13.78	15.47	15.56
% change	18.69	4.12	-9.73	-16.74	-30.35	-6.83	21.12	13.98	12.26	0.56
Cotton										
cts per lb	76.99	69.26	68.56	53.44	52.03	50.37	53.70	57.41	61.61	64.51
% change	-17.16	-10.04	-1.01	-22.06	-2.64	-3.19	6.62	6.90	7.31	4.71
Copper										
cts per lb	104.09	103.27	75.03	71.34	80.68	85.73	90.35	94.24	99.04	101.87
% change	-20.93	-0.78	-27.35	-4.91	13.09	6.26	5.4	4.3	5.1	2.85
Nickel										
US$ per lb	3.13	3.14	2.10	2.73	4.46	4.27	3.99	3.75	3.83	3.92
% change	-16.66	0.37	-33.17	29.85	63.57	-4.26	-6.58	-6.08	2.36	2.31
Lead										
cts per lb	35.10	28.29	23.96	22.78	20.71	22.43	23.12	23.45	23.84	24.39
% change	19.82	-19.40	-15.31	-4.92	-9.10	8.29	3.11	1.44	1.63	1.63
Aluminum										
cts per lb	68.30	72.54	61.57	61.74	73.6	77.74	81.24	83.03	84.92	86.82
% change	-15.80	6.22	-15.12	0.27	19.22	5.62	4.51	2.20	2.28	2.24
Zinc										
cts per lb	46.50	59.70	46.45	48.80	52.83	54.60	56.10	57.59	59.20	60.96
% change	-0.70	28.38	-22.19	5.06	8.26	3.34	2.75	2.66	2.79	2.98

Source) WEFA, Inc. for JICA Study Team

The above table of selected agricultural and nonferrous metals commodities summarizes the forecast for prices and annual changes in those prices. The prices are measured as traded commodity values in US dollars or cents per common traded unit of volume. The volatility in commodity prices is demonstrated by the wide range of annual percent changes exhibited over the last five years of history. This volatility affects trade annual trade flow volume measured more in value terms than in tonnage terms as the demand for these goods does not change tremendously with changes in internationally traded prices.

1.2.3 Other Cargo

(1) Automobile

The sale of automobiles and light trucks is closely related to disposable income available to the consumer. This in turn is linked with interest rates and price elastic ties for other products. The current situation of rising interest rates, increasing fuel costs and already extended consumer borrowing all point to a reduction in expenditure on vehicles, although one does not expect this to be overly dramatic.

Globally there is an oversupply of unwanted late year models, mostly trucks and higher priced vehicles. Inventory levels are reaching five year highs. The overall forecast indicates a reduction in sales over the 2001 through 2002 period. Thereafter, as the various economies improve sales will again pick up. WEFA expect that car production will shift to the newer economies over time and that both the United States and Europe will see increasing import penetration over the longer term.

(Millions of Metric Tons)
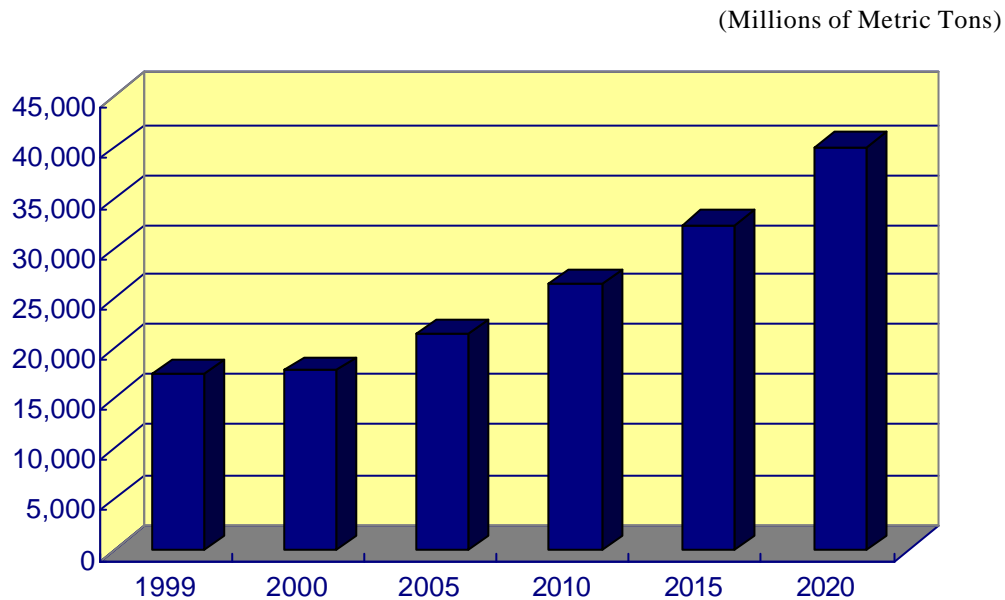
Source) WEFA, Inc. for JICA Study Team

Figure 1.2.13 World Total Automobiles Trade Forecast

Table 1.2.14 World Total Automobiles Export Forecast by Country/Region
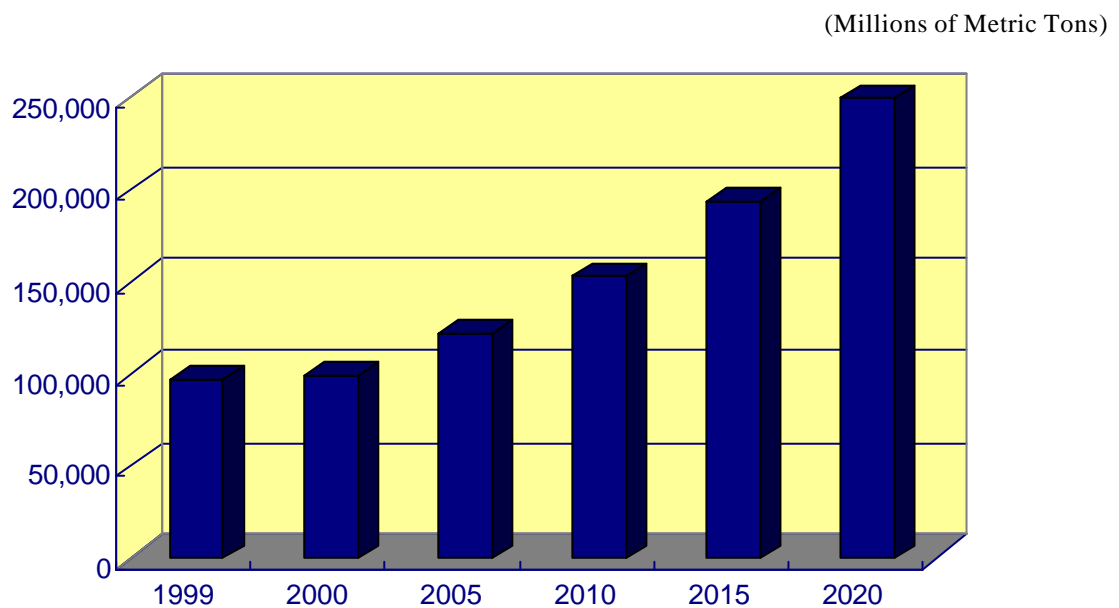
(Thousands of Metric Tonnes)

	1999	2000	2005	2010	2015	2020
Argentina	51	52	69	94	126	173
Australia	88	91	98	125	163	215
Austria	77	78	92	115	136	165
Belgium	679	688	793	963	1,169	1,449
Brazil	307	351	527	738	957	1,245
Canada	285	299	347	453	616	827
Chile	8	10	16	26	38	55
China	24	24	40	55	70	91
CIS West	13	17	22	27	32	38
Colombia	2	2	4	5	6	9
Czech Republic	20	21	20	20	19	18
Denmark	10	10	12	14	16	20
Finland	35	36	47	65	86	115
France	829	848	937	1,102	1,322	1,581
Germany	3,043	3,078	3,677	4,659	5,920	7,719
Greece	4	3	4	4	4	4
Hong Kong	2	2	2	3	3	4
Hungary	11	12	15	22	27	33
India	37	42	71	116	156	225
Indonesia	16	15	23	35	50	73
Ireland	4	4	5	7	8	9
Italy	380	385	450	548	655	786
Japan	6,169	6,234	7,098	7,978	9,092	10,242
Malaysia	25	27	37	57	77	110
Mexico	118	126	198	277	381	525
Netherlands	219	227	265	326	395	477
Norway	9	9	10	14	18	24
Other Central America	2	4	7	11	16	24
Other Mediterranean Region	12	13	16	17	16	15
Other North Africa	1	1	2	3	3	5
Other Persian Gulf	14	18	26	38	50	65
Other Region	72	74	120	160	198	236
Other West Coast of S. America	2	2	4	5	5	5
Philippines	4	4	8	12	16	22
Poland	18	22	35	51	69	97
Portugal	82	83	95	122	153	198
Romania	3	3	5	5	6	8
Russia	58	64	92	137	189	253
Singapore	21	24	31	45	60	83
South Africa	38	39	58	70	80	99
South Korea	1,313	1,316	1,650	2,078	2,519	3,101
Spain	883	889	1,033	1,327	1,655	2,133
Sweden	457	434	502	672	887	1,176
Switzerland	47	47	48	50	52	54
Taiwan	29	31	37	45	56	75
Thailand	69	74	110	138	154	170
Turkey	59	62	83	118	165	244
United Arab Emirates	5	5	8	5	4	4
United Kingdom	798	855	1,044	1,350	1,687	2,181
United States	1,061	1,172	1,610	2,186	2,802	3,659
Venezuela	4	5	13	20	27	38

Source）WEFA, Inc. for JICA Study Team

(2)   Other Cargo

The other cargo commodity category most of that will be General Cargo has been in a long decline as containerization of world trade has progressed. Despite this long-term shift in commodities from general cargo ships to container vessels, general cargo remains an important category in ocean shipping. The global trade in construction and project cargoes shipped increases the tonnage of general cargo so that world tonnage continues to grow moderately over time. With the significant advances in container penetration into markets traditionally carried by general cargo vessels, the commodities that will mostly remain for general cargo shipping are not as readily handled by container vessels. As an example of a typical remaining general cargo commodity, one can examine petroleum drilling and exploration equipment. These shipments are frequently of size and handling characteristics that prevent being easily carried aboard container vessels. With the recent increase in real oil prices, it is likely that the trade in the shipments of petroleum drilling and exploration equipment commodities will be strong.

The continued strength of the general cargo markets has lead to construction of new multi-purpose ships intended for carrying general cargo commodities as well as containers.

(Millions of Metric Tons)

Source) WEFA, Inc. for JICA Study Team

Figure 1.2.14 World Total Other Cargo Trade Forecast

Table 1.2.15 World Total Other Cargo Export Forecast by Country/Region

(Thousands of Metric Tonnes)

	1999	2000	2005	2010	2015	2020
Argentina	632	668	866	1,165	1,577	2,201
Australia	2,906	2,807	2,687	2,991	3,439	3,967
Austria	414	415	475	557	669	807
Baltics	34	38	45	55	67	81
Belgium	2,136	2,133	2,332	2,693	3,180	3,766
Brazil	4,390	4,693	5,890	7,380	9,246	11,576
Bulgaria	48	49	60	82	110	139
Canada	7,619	7,658	7,642	8,240	9,168	10,139
Caribbean Basin	921	986	1,188	1,316	1,457	1,613
Chile	1,093	1,191	1,935	3,071	4,767	7,541
China	4,126	4,305	6,390	8,402	10,479	13,080
CIS Southeast	96	108	163	206	256	298
CIS West	494	592	710	773	839	920
Colombia	364	434	775	1,009	1,310	1,725
Denmark	398	396	426	472	512	522
Egypt	107	111	142	176	188	175
Finland	530	527	555	612	685	768
France	2,912	2,949	3,141	3,650	4,340	5,131
Germany	5,246	5,234	5,900	7,148	8,784	11,020
Greece	519	508	545	616	669	739
Hong Kong	181	187	220	268	337	424
Hungary	205	226	305	515	761	1,054
India	930	1,009	1,526	2,245	3,206	4,497
Indonesia	9,102	8,385	11,096	16,061	25,274	39,959
Ireland	254	254	302	355	404	439
Israel	270	291	366	436	536	670
Italy	2,362	2,364	2,564	2,971	3,510	4,116
Japan	8,762	8,758	9,804	11,022	12,308	13,385
Kenya	37	44	83	173	242	334
Malaysia	2,054	2,200	3,140	4,619	6,683	9,619
Mexico	1,321	1,416	2,385	2,924	4,039	5,434
Netherlands	1,859	1,857	1,966	2,231	2,615	3,109
New Zealand	554	597	594	718	826	925
Norway	486	462	493	579	685	808
Other Central America	135	150	246	362	524	736
Other East Africa	23	25	30	34	38	42
Other East Coast of S. America	64	71	116	173	228	290
Other Indian Subcontinent	94	106	149	204	276	365
Other Mediterranean Region	492	506	546	542	508	463
Other North Africa	784	827	1,050	1,296	1,539	1,814
Other Persian Gulf	228	241	323	450	549	653
Other Region	2,251	2,457	3,505	4,532	5,163	5,889
Pakistan	223	286	431	588	799	1,099
Peru	124	135	187	236	283	330
Philippines	412	452	730	1,183	1,822	2,667
Poland	256	284	415	579	818	1,208
Portugal	340	330	353	412	493	607
Romania	543	644	776	892	1,069	1,279
Russia	2,067	2,196	2,847	3,520	4,455	5,672
Saudi Arabia	332	343	440	547	673	813
Singapore	416	444	618	842	1,084	1,406
South Africa	1,173	1,200	1,622	1,785	1,821	1,933
South Korea	3,436	3,455	4,352	5,522	6,761	8,419
Spain	2,578	2,568	2,917	3,575	4,366	5,411
Sweden	1,254	1,181	1,284	1,572	1,932	2,377
Switzerland	214	211	231	254	282	316
Taiwan	2,045	2,102	2,381	2,981	3,893	5,297
Thailand	1,057	1,126	1,560	1,989	2,400	2,891
Turkey	897	924	1,131	1,419	1,822	2,561
United Arab Emirates	144	147	200	143	102	104
United Kingdom	2,174	2,277	2,571	3,098	3,702	4,539
United States	9,262	9,762	12,200	15,105	18,771	23,507
Venezuela	752	879	1,882	2,707	3,490	4,449
Vietnam	73	80	124	180	268	410
Western Africa	317	357	498	742	1,040	1,432

Source) WEFA, Inc. for JICA Study Team