TRANSPORT PLANNING AUTHORITY
MINISTRY OF TRANSPORT
THE ARAB REPUBLIC OF EGYPT

No.

THE STUDY ON MULTIMODAL TRANSPORT AND LOGISTICS SYSTEM OF THE EASTERN MEDITERRANEAN REGION AND MASTER PLAN IN THE ARAB REPUBLIC OF EGYPT

FINAL REPORT

Volume 2

Main Text

AUGUST 2008

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.
KATAHIRA & ENGINEERS INTERNATIONAL

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(As of June 2007)

PREFACE

In response to the request form the Government of the Arab Republic of Egypt, the Government of Japan decided to conduct the "Study on Multimodal Transport and Logistics System of the Eastern Mediterranean Region and Master Plan in the Arab Republic of Egypt", and entrusted it to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Akihisa Kojima of Nippon Koei from November 2006 to December 2007. In addition, JICA held the support meetings headed by Professor Toshinori Nemoto of Hitotsubashi University to provide advises to the Study Team during the course of the Study in Japan.

The Study Team conducted field surveys, and conducted discussions, data analysis and project formation together with the officials concerned of the Transport Planning Authority and the Ministry of Transport as well as other officials. Upon retuning to Japan, the Study Team prepared this final report.

I hope that this report will contribute to development in the Arab Republic of Egypt, and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Arab Republic of Egypt for their close cooperation extended to the Study Team.

August 2008

Seiichi Nagatsuka
Vice President
Japan International Cooperation Agency

August 2008

Mr. Seiichi Nagatsuka
Vice President
Japan International Cooperation Agency

Letter of Transmittal

Dear Sir,

We are pleased to submit herewith the Final Report of the "Study on Multimodal Transport and Logistics System of the Eastern Mediterranean Region and Master Plan in the Arab Republic of Egypt."

The report compiles all the results of the Study and reflects the advices of the authorities concerned of the Government of Japan and your agency as well as the comments made by the counterpart organization i.e. the Transport Planning Authority, the Ministry of Transport and other authorities concerned in the Arab Republic of Egypt.

The report presents the present and future conditions of the freight logistics for export and import. It presents the overall plan for the further logistics development of all the multimodal modal and logistics system: including forwarding activities, custom clearance and procedure activities. For the newly suggested projects, more than twenty projects are proposed in addition to the projects that have been already planned by the Government of Egypt.

We wish to take this opportunity to express our sincere gratitude to your agency and the Ministry of Foreign Affairs. We also wish to express our deep gratitude to the Transport Planning Agency and the Ministry of Transport as well as other Government Agencies concerned in the Arab Republic of Egypt for the cooperation and assistance extended to us during the Study. We hope this report will contribute to the development of the Arab Republic of Egypt.

Very truly yours,

Ken Nishino
Team Leader,
Study on Multimodal Transport and Logistics System
of the Eastern Mediterranean Region and Master Plan
in the Arab Republic of Egypt

Location Map

Holistic Approach to Logistics Enhancement Not to Lose the Emerging CHANCE

- Egypt Is Rising Again
- Egypt Is Losing Occasion
- Yet It Is Not Too Late

Development of Alexandria Port

Source: Google Earth

Issues
- Lack of Container Handling Equipment
- Lack of Container Yard
- Insufficient Water Depth

- **Promotion of Strategic Sea Port Development**
- **Realization of Logistics System on Inland Transport**
- **Enhancement of Logistics Industry**
- **Establishment of Governmental Body related to Logistics**

To/From EU

ALEXANDRIA

DAMIETTA

PORT SAID (West)

PORT SAID (East)

Damanhur

Alex Agriculture Road

El-Mahalla El-Kubra

El-Mansura

Burg El Alab

El Alamain

El Arish

Bir el Abd

Construction of New Burg El Arab Direct Access Line

New Burg El Alab Industrial Area: 800ha

Cairo-Alex Desert Road

Development of New River Port

Tanta

Zagazig

Ismallia

Construction of 10th of Ramadan Direct Access Line

Source: Google Earth

Issues
- Limited Area of Container Yard
- Insufficient Length of Breakwater

Sadat City

Sadat City Industrial Area: 500ha

Construction of 6th of October Direct Access Line

Development of Logistics Center at 6th of October
(Industrial Area: 2,550ha)

6th of October

CAIRO

Helwan

10th of Ramadan

Cairo-Ismailiya Desert Road

Development of Logistics Center at 10th of Ramadan
(Industrial Area: 3,500ha)

Cairo-Suez Desert Road

Development of New Freight Link

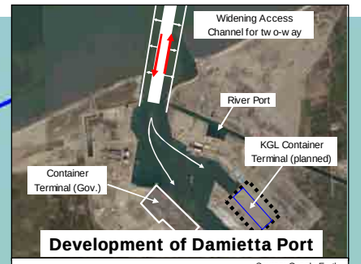
Regional Ring Road (Under Construction / Planning)

SUEZ

SOKHNA

To/From Gulf and Asian Countries

To Upper Egypt



Development of Damietta Port

Source: Google Earth

Issues
- Large Maintenance Dredging Volume
- Limited Channel Capacity

Development of Logistics Center at Port Said Port (East)

Development of Port Said Port (West)

Source: Google Earth

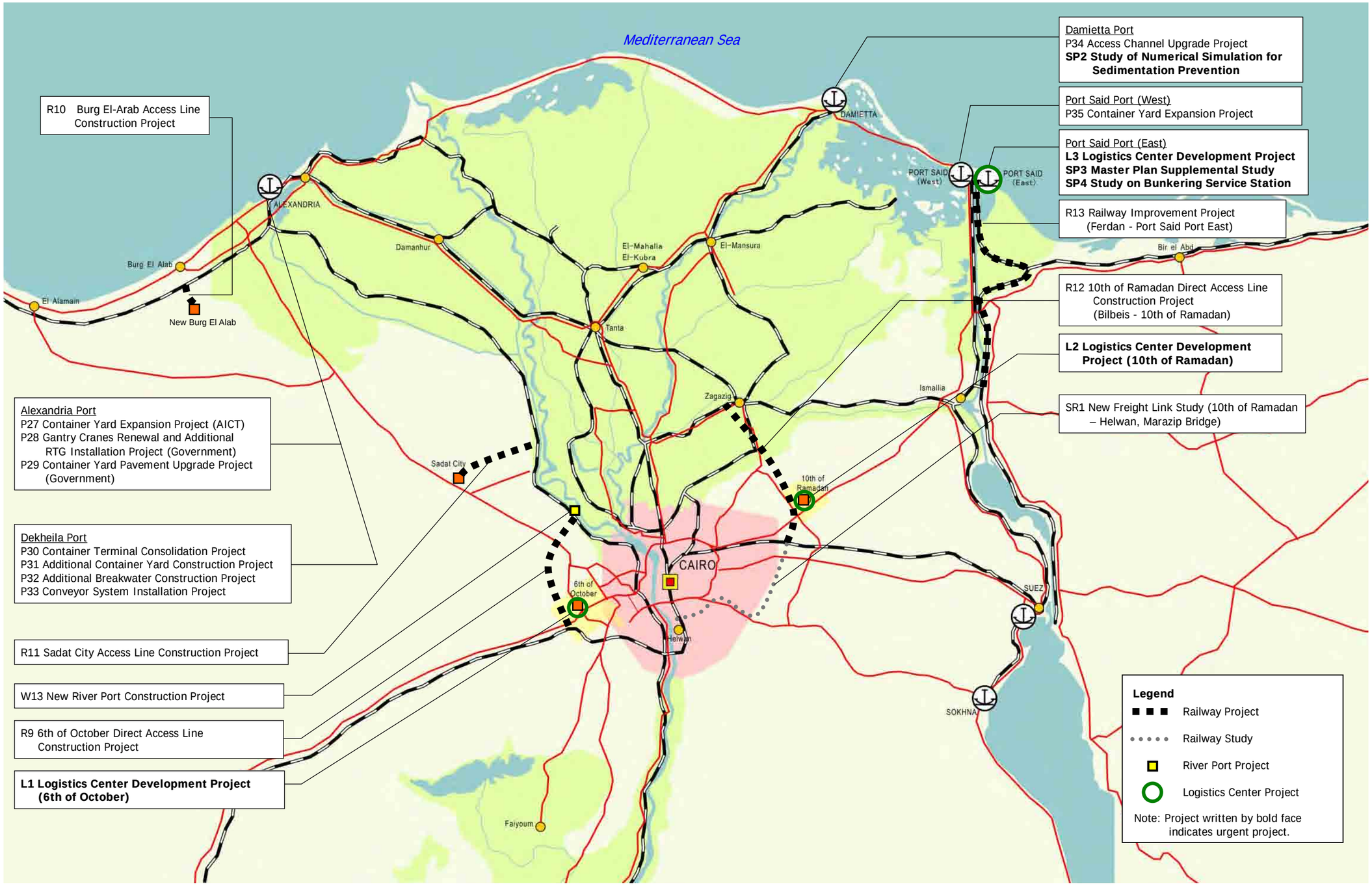
Issues
- Insufficient Water Depth
- Insufficient Area of Container Yard
- Heavy Congestion at Entry Gate

Existing Plan of Port Said Port (East)

Source: www.freefoto.com

Source: www.big-bremen.de

Necessary Programs to Develop Logistics Industry
- **Forwarding / Trucking Industry Service Enhancement**
- **Human Resource Development**
- **Legal Framework Improvement**
- **Financial Incentive**



Project Location Map

The Study on Multimodal Transport and Logistics System of the Eastern Mediterranean Region and Master Plan in the Arab Republic of Egypt

Final Report

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Abbreviations

A/N	:	Arrival Notice
AADT	:	Annual Average Daily Traffic
AASTMT	:	Arab Academy of Science Technology & Maritime Transport
ACCHC	:	Alexandria Container & Cargo Handling Company
ACTF	:	Assistance for Customs and Trade Facilitation
ADT	:	Average Daily Traffic
AEI	:	Automatic Equipment Identification
AGADIR	:	Agreement on the Establishment of a Free Trade Area between the Arab Mediterranean Countries
AIAE	:	African Institute for Applied Economics
AICT	:	Alexandria International Container Terminals
APA	:	Alexandria Port Authority
APL	:	American President Lines
APMT	:	AP Mollar Terminals
ASEAN	:	Association of Southeast Asian Nations
AVI	:	Automatic Vehicle Identification
AWB	:	Air Way Bill
B/L	:	Bill of Lading
BIMCO	:	Baltic and International Maritime Council
BOO	:	Build-Own-Operate
BOOT	:	Build-Own-Operate-Transfer
BOT	:	Build-Operate-Transfer
BRICs	:	Brazil, Russia, India and China
CAPMAS	:	Central Agency for Public Mobilization and Statistics
CBD	:	Central Business District
CFS	:	Container Freight Station
CGM	:	Compagnie Generale Maritime
CHC	:	Container Handling Charge
CKYH	:	COSCO, K Line, Yang Ming Line and Hanjin Shipping
CMA	:	Compagnie Maritime d'Affretement
COMESA	:	Common Market for East and South Africa
COSCO	:	China Ocean Shipping Company
CPI	:	Consumer Price Index
CPLP	:	Comprehensive Program of Logistics Policies
CREATS	:	Cairo Regional Area Transportation Study
CRM	:	Customer Relationship Management
CY	:	Container Yard
CY/CY	:	From container yard to container yard (one of freight system)
CY/FO	:	From container yard to the quay (one of freight system)
D/O	:	Delivery Order
D/R	:	Dock Receipt
DBFO	:	Design Build Finance Operate
DF/R	:	Draft Final Report
DP	:	Dry Port
DPA	:	Damietta Port Authority
DPW	:	Dubai Port World

DW	:	Dwell Time
DWT	:	Dead Weight Tonnage
E/D	:	Export Declaration
E/L	:	Export License
EAIS	:	Egyptian Automatic Identification System
ECA	:	Egyptian Customs Authority
ECES	:	Egyptian Center for Economic Studies
ECOM	:	Electronic Commerce Promotion Council
ECR	:	Efficient Consumer Response
EDI	:	Electronic Data Interchange
EEPC	:	Egyptian Export Promotion Center
EIFFA	:	Egyptian International Freight Forwarding Association
EMDB	:	Egyptian Maritime Data Bank
ENC	:	Electronic Navigational Chart
ENIT	:	Egyptian National Institute of Transport
ENLP	:	Egyptian National Logistics Platform
ENR	:	Egyptian National Railways
EOJ	:	Embassy of Japan
EOS	:	Electronic Order System
ERP	:	Enterprise Resource Planning
ESCAP	:	Economic and Social Development in Asia and the Pacific
EU	:	European Union
F/R	:	Final Report
FCL	:	Full Container Load
FDI	:	Foreign Direct Investment
FIATA	:	International Federation of Freight Forwarders Association
FO	:	Free Out
FTA	:	Free Trade Area
FTZ	:	Free Trade Zone
GAFI	:	General Authority for Investment and Free Zones
GARBLT	:	General Authority for Roads, Bridges and Land Transport
GATT	:	General Agreement on Tariffs and Trade
GCR	:	Greater Cairo Region
GDP	:	Gross Domestic Product
GIS	:	Geographic Information System
GOE	:	Government of Egypt
GOEIC	:	General Organization for Export and Import Control
GOPP	:	General Organization for Physical Planning
GPRS	:	General Packet Radio Service
GPS	:	Global Positioning System
GS	:	Ground Slots
GTZ	:	German Agency for Technical Cooperation
HC	:	Holding Company
HPH	:	Hutchison Port Holdings
HS	:	Harmonized Commodity Description and Coding System
I/D	:	Import Declaration
I/L	:	Import License
I/P	:	Insurance Policy
I/V	:	Invoice
IATA	:	International Air Transport Association
IC Tag	:	Integrated Circuit Tag

IC/R	:	Inception Report
ICD	:	Inland Clearance Depot
ICT	:	Information and Communication Technology
IDA	:	Industrial Development Authority
IDPA	:	Inland and Dry Ports Authority
IITL	:	Institute of International Transport & Logistics
IMC	:	Industrial Modernization Center
IMF	:	International Monetary Fund
IMMTA	:	International Multimodal Transport Association
ISO	:	International Standard Organization
IT	:	Information Technology
IT/R	:	Interim Report
ITS	:	Intelligent Transport Systems
ITT	:	Invitation to Tender
IWT	:	Inland Waterway Transport
JBIC	:	Japan Bank for International Cooperation
JETRO	:	Japan External Trade Organization
JICA	:	Japan International Cooperation Agency
JILS	:	Japan Institute of Logistics Systems
JIT	:	Just-In-Time
JNR	:	Japan National Railways
JR	:	Japan Railway
JRS	:	Japan Railway Standards
JTA	:	Japan Trucking Association
KGL	:	Kuwait Gulf Link Ports International
L/C	:	Letter of Credit
LC	:	Logistic Center
LCL	:	Less than Container Load
LNG	:	Liquefied Natural Gas
LOA	:	Length Over All
LPDPA	:	Land Ports and Dry Ports Authority
LSCI	:	Liner Shipping Connectivity Index
M/M	:	Minutes of Meeting
MCIT	:	Ministry of Communications and Information Technology
MCT	:	Medcenter Container Terminal
MEA	:	Metropolitan Expressway Authority
METI	:	Ministry of Economy, Trade and Industry Japan
MHUUC	:	Ministry of Housing Utilities and Urban Communities
MIS	:	Management Information System
MISC	:	Malaysia International Shipping Corporation
MITI	:	Ministry of International Trade and Industry
MLIT	:	Ministry of Land, Infrastructure and Transport Japan
MOE	:	Ministry of Education
MOF	:	Ministry of Finance
MOI	:	Ministry of Investment
MOT	:	Ministry of Transport
MSC	:	Mediterranean Shipping Company
MVA	:	Manufacturing Value Added
NORAD	:	Norwegian Agency for Development Cooperation

NSA	:	Norwegian Shipping Academy
NTB	:	Non Tariff Barriers
NVOCC	:	Non Vessel Operating Common Carrier
NYK	:	Nippon Yusen Kaisha
OCDI	:	Overseas Coastal Area Development Institute of Japan
OD	:	Origin-Destination
ODA	:	Official Development Assistance
OECD	:	Organization for Economic Cooperation and Development
OHSAS	:	Occupational Health and Safety Assessment System
P.S.C.C.H. Co.	:	Port Said Containers & Cargo Handling Company
P/L	:	Packing List
PAFTA	:	Pan Arab Free Trade Area
PCSU	:	Privatization Coordination Support Unit
PCU	:	Passenger Car Unit
PFI	:	Private Finance Initiative
PIL	:	Pacific International Lines
POP	:	P&O Ports
PPI	:	Port Performance Indicators
PPI	:	Private Participation in Infrastructure
PPP	:	Public Private Partnership
PQ	:	Pre-Qualification
PR/R	:	Progress Report
PSPA	:	Port Said Port Authority
PTI	:	Port Training Institute
QIZ	:	Qualifying Industrial Zones
QR	:	Quick Response
RDI	:	Radio Data Interchange
RFID	:	Radio Frequency Identification Data
RMG	:	Rail Mounted Gantry Crane
RTA	:	River Transport Authority
RTG	:	Rubber Tired Gantry Crane
S/W	:	Scope of Works
SC	:	Steering Committee
SCCT	:	Suez Canal Container Terminal
SCM	:	Supply Chain Management
SMEs	:	Small & Medium Enterprises
SOSDI	:	6th of October Storage & Distribution Co. SAE
SPDC	:	Sokhna Port Development Company
SPV	:	Special Purpose Vehicle
SUMED	:	Suez-Mediterranean Pipeline
TEU	:	Twenty Foot Equivalent Unit
THC	:	Terminal Handling Charge
TIFA	:	Egypt-USA Trade and Investment Framework Agreement
TPA	:	Transport Planning Authority
TSS	:	Technical Secondary School
UAE	:	United Arab Emirates
UASC	:	United Arab Shipping Co.
UHF	:	Ultra High Frequency
UK	:	United Kingdom
UN	:	United Nations

UNCITRAL	:	United Nations Commission on International Trade Law
UNCTAD	:	United Nations Conference on Trade and Development
UNDP	:	United Nations Development Programme
USA	:	United States of America
USAID	:	United States Agency for International Development
USD	:	United States Dollar
USTR	:	United States Trade Representative
V/C	:	Transport Volume / Capacity Ratio
VAL	:	Value-added Logistics
VAN	:	Value Added Network
VEH	:	Vehicle
VOC	:	Vehicle Operating Cost
W/B	:	Weigh Bill
WCO	:	World Customs Organization
WDI	:	World Development Indicators
WEO	:	World Economic Outlook
WG	:	Working Group
WTO	:	World Trade Organization
XML	:	Extensive Make-up Language
ZAL	:	Zona de Actividades Logísticas

Chapter 1
Introduction

Chapter 1 Introduction

1.1 Outline of the JICA Study

1.1.1 Background

In Egypt, industry and trade are the major factors determining the social and economic development of the nation, and their promotion is a focal task for the nation.

The Government of Egypt clearly sets the basic national strategy to promote its industries by strengthening trade linkages with the EU and other regions in the world, and revised a "Egypt-EU Cooperation Agreement" many times during the period 1978 ~ 2001. Egypt has replaced it with a new "Egypt-EU Partnership Agreement" in 2001 (effective in 2004), seeking more valid assurance of market access to the large EU market. This policy also targets to raise the status of the Egyptian economy in the surrounding countries in the Eastern Mediterranean region and the African region. This process reflects a deep involvement of the Egyptian economy in the international free market. Egyptian products face severe competition in quality on the international market, and the exports of the materials/products are also ruthlessly assessed in terms of price competitiveness and timely delivery in the market. Egypt also has to procure industrial materials from foreign companies wherever they are located in the world, at the best timing for the production. Therefore the total lead-time, i.e., the period of time that it takes for goods to be delivered from the time of order, should be short and a delivery should be punctual. What is more, cost is crucial determinant in selecting trade partners. In this expanding globalization process, there is now a common awareness that an international logistics system of freight is a key factor for companies to obtain a comparative advantage in international trade.

However, the existing transport development plans in Egypt have been drawn up independently by mode: maritime, road, railway, and inland waterway, resulting in insufficient intermodal connectivity and low efficiency of the system as a whole for the logistics of export/import freight. Comprehensive and intermodal solutions to optimize the logistics flows had not been built into the transport plans themselves. Furthermore, all those studies (except for inland waterways) were conducted more than ten (10) years ago, and are now so out-dated that their analytical frameworks are hardly applicable to today's dynamically developing industries. Thus, Egypt needs to urgently prepare a comprehensive logistics development plan to fulfill current logistics needs and to reflect the change in freight traffic volume taking place now and in the future.

Under this background, the Government of Egypt requested the Government of Japan to formulate a development strategy for a multimodal transport and logistics system. It includes a wide-range of fields such as transport system logistics, improvements to inter-modal facilities, and the role of public administration. This also includes highlighting potential opportunities for public-private partnerships (PPP).

In response to the request, the Government of Japan decided to carry out "The Study on Multimodal Transport and Logistics System of the Eastern Mediterranean Region in the Arab Republic of Egypt" (hereinafter referred to as "the JICA Study"), and entrusted its execution to

the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of technical cooperation programs by the Government of Japan. After conducting two preparatory studies, JICA appointed a joint venture of Nippon Koei (NK) and Katahira & Engineers International (KEI) as the JICA Study Team for the JICA Study. The JICA Study Team commenced the JICA Study in Egypt in November 2006.

1.1.2 Objectives of the JICA Study

Objectives of the JICA Study are twofold, which are:

(1) Superior Objective

To formulate a logistics development master plan in order to promote Egyptian export and import industries and foreign direct investment in Egypt, and consequently contribute to raising the standard of living of Egyptian people.

(2) Objectives

- To disseminate the concept of logistics in Egypt, and to set logistics as one of the fundamental strategies to be fulfilled in transport development policies and industrial development policies,
- To propose a master plan for multimodal transportation and logistics systems for Egypt, covering plans/projects concerned with public administration development for logistics planning, multimodal logistics system development, infrastructure development and its operation/maintenance, logistics industry promotion, legislative system, and customs clearance system, and
- To propose the order of priority for proposed plans/projects of the multimodal transport and logistics systems in consideration of their effects on export-industry promotion and foreign direct investment.

The analytical focus therefore falls on the flows of export/import freight in/around Egypt, and the JICA Study does not have a focal attention on the general domestic freight flows that are irrelevant to foreign trade.

Transport sectors that the JICA Study covers are maritime, railway, road, and inland waterway sectors, and the aviation sector and the pipe line are out of the scope of the JICA Study.

1.1.3 Study Area

The study area includes the whole of Egypt (including the Red Sea Coast and its hinterlands), and other countries around the Eastern Mediterranean Sea, for the collection of necessary maritime data only.

1.1.4 Data for Quantitative Analysis

The JICA Study is designed to prepare a logistics master plan with a focus on the export/import industries. The JICA Study Team collected all the useful data to estimate the present and future OD data, and all the demand forecast works had been conducted within a framework of the data successfully collected, such as CAPMAS, Egyptian Maritime Data

Bank (EMDB) and the reports of previously conducted studies. In spite of great efforts in creating these databases, they are not necessarily useful for the specific purpose of the JICA Study to identify the pattern of domestic flows (origins and destinations) by export/import commodity and their volumes. Most comprehensive study in this field entitled "The study on the Transportation System and the National Road Transportation Master Plan" (JICA, 1993) is too old and outdated to reflect current dynamic economic development in Egypt, and had not distinguished the export/import freights from domestic freights. Even a current study entitled "A Study on the Development of the Master Plan for Freight Organization at National Level" (TPA, 2005) focused on the domestic freight alone.

Date that the JICA Study Team utilized, are explained below:

(1) Export and import volumes by commodity type

There were two available data for the export and import volumes in Egypt: 1) Statistical Yearbook 2005, Egyptian maritime Data Bank (EMDB), and 2) a time series data (1997 – 2006) obtained from Central Agency of Public Mobilisation and Statistics (CAPMAS). The export and import volumes at each port in 2005 were only available in the data of EMDB while the time series data was only available in the data of CAPMAS. The export and import volumes of both data were not necessarily consistent with each other. Therefore, the data of EMDB was used for the base data of the current export and import volumes (2005) at each port, while the data of CAPMAS was used for the trend analysis of each commodity type.

(2) Export and import volumes by handling type

The export and import volumes at each port for the past three years were obtained in the website of Maritime Transport Sector. The data were utilized to understand the present port situation and to analyze the containerization ratio in the logistics issues.

(3) Export and import volumes by commodity type by transport mode by origin and destination in accordance with the zoning system consisted of 30 zones covering Egypt's region and 12 zones for ports and borders (total 42 zones)

Regarding railway and inland waterway, the freight movement data were obtained from Egypt National Railways (ENR) and River Transport Authority (RTA), respectively. For freight movement by truck, there was no available data that could identify the origins of exported commodities and destinations of imported commodities. However, production and consumption data by commodity type in each zone were obtained from "A Study on the Development of the Master Plan for Freight Organization at National Level (Technical Consultation Bureau, June 2005)". They were OD matrices for internal freight movement in Egypt. The obtained production data included not only volume for export but also that for domestic consumption, while the obtained consumption data included not only volume for import but also that from domestic production. Therefore, it was necessary to separate the domestic freight movement and the freight movement related to export/import.

The JICA Study Team conducted a supplementary data collection by means of interview survey in the course of the JICA Study. This supplementary survey would contribute to

clarify the features and deficiencies of current logistics systems; however, it was also apparent that answers from each manufacturing company are suffering from the deficiency in quality/accuracy because private manufacturing companies are not in favor of information disclosures.

For these reasons, the projects proposed in this master plan require further re-assessment in scale determination and its quantitative impacts of the proposed projects; however, this first study for logistics development (the JICA Study) surely identifies the necessary projects and priority of each project which is backed up by substantial analysis and discussion based on the newly acquired data and information. Further data compilation and re-assessment of the logistics patterns and volume are useful in the near future.

1.1.5 Overall Schedule of the JICA Study

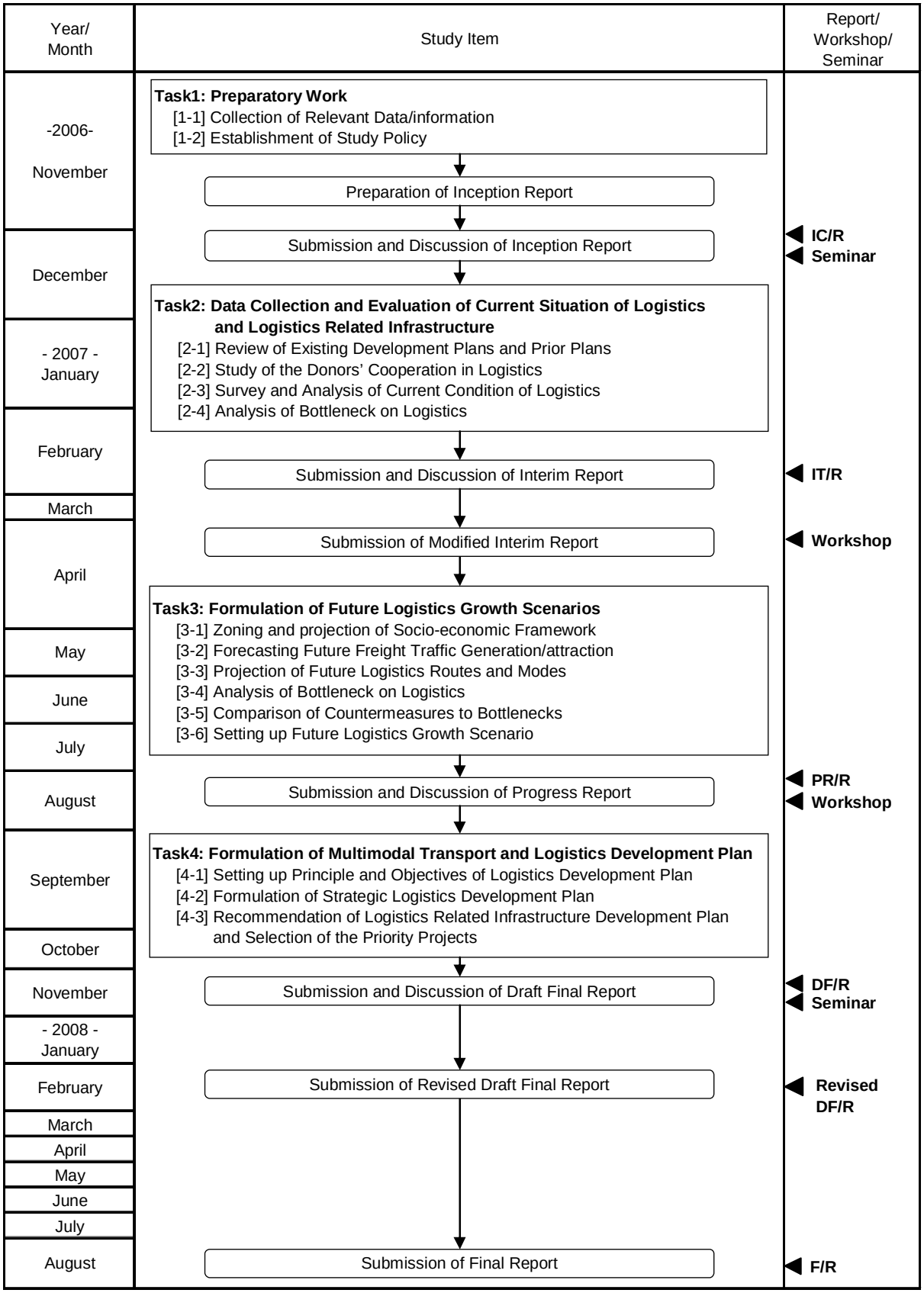
The JICA Study was commenced in the middle of November 2006. The JICA Study Team produced and submitted the Inception Report to the Transport Planning Authority (TPA), Ministry of Transport in November 2006. The JICA Study had been conducted since that time in accordance with the workflow illustrated in Figure 1.1.1.

In February 2007, the JICA Study Team produced and submitted the Interim Report, which deals with the outcome of the JICA Study from November 2006 to February 2007.

In April 2007, the JICA Study Team, additionally, submitted the Modified Interim Report, which contains the preliminary findings of the interview surveys.

On the basis of the results of the interview surveys and logistics issues, the JICA Study Team focused on the supplemental data collection and formulation of logistics development strategy. In August 2007, the JICA Study Team prepared the Progress Report, which deals with effective countermeasures to current logistics bottlenecks and the progress of the development strategy.

In November 2007, the JICA Study Team prepared the Draft Final Report, which contains the "Formulation of Multimodal Transport and Logistics Development Plan". A multimodal logistics strategy and master plan are presented with various recommendations on necessary facilities, legislation arrangement programs, human resource development plans, as well as implementation programs. In February 2008, the JICA Study Team, additionally, submitted the Revised Draft Final Report, which reflects comments from the Steering Committee.



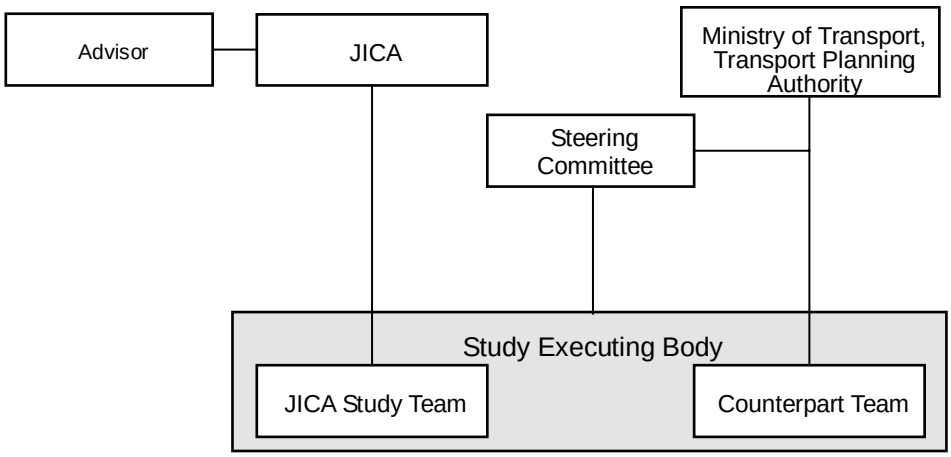
Source: JICA Study Team

Figure 1.1.1 Work Flow of the JICA Study

1.2 Organization and Participants of the JICA Study

1.2.1 Organization of the JICA Study

The JICA Study was carried out by the JICA Study Team in collaboration with the Egyptian Counterpart Team nominated by the Transport Planning Authority. The Steering Committee was set up for the entire duration of the JICA Study to discuss each report. The organization of the JICA Study is illustrated in Figure 1.2.1.



Source: JICA Study Team

Figure 1.2.1 Organization of the JICA Study

1.2.2 Participants of the JICA Study

The members of Egyptian side who participated in the JICA Study are listed below:

(1) Steering Committee

The Egyptian side has formulated a Steering Committee to supervise the JICA Study. The Steering Committee is composed of twelve (12) members from the Egyptian authorities, universities and companies chaired by the Vice Chairman, TPA as shown in Table 1.2.1. The Steering Committee meeting was held at the time of each report submission. Each discussion was compiled as “Minutes of Meeting”.

Table 1.2.1 Steering Committee Members

No	Role	Name	Position
1	Chairman	Eng. Hassan Selim	Vice Chairman, TPA
2	Member	Mr. Galal Abuel Fotouh	Chairman, Customs Authority
3	Member	Dr. Ismail Mubarak	Expert, Marine Transportation
4	Member	Prof. Dr. Mohamed Aly Ibrahim	Head of Department of International Transport and Logistics, Arab Academy
5	Member	Prof. Dr. Omar Abdel Hamid Salman	Professor of International Transportation, Faculty of Commerce, Helwan University
6	Member	Ms. Fatma Mohamed Hassan	Head of the Central Department for Technical Affairs, TPA
7	Member	Ms. Azza Ahmed Ghanem	Head of the Central Department for Economic Affairs, TPA
8	Member	Ms. Nehad Mohamed Badra	General Manager of Ports Affairs, Maritime Transport Sector
9	Member	Mr. Mohamed Hatem Ezzat	General Manager, Holding Company for Maritime and Land Transport
10	Member	Dr. Nabil Abdel Fattah Sehsah	Transport Consultant
11	Member	Mr. Unsi Fahim	Advisor, Ministry of Transport
12	Coordinator	Mr. Alaa Moustafa Kamel	Director, Technical Office, Ministry of Transport

(2) Counterpart Team

The Egyptian Counterpart Team was organized by governmental officers from fields related to logistics as shown in Table 1.2.2. Weekly meetings were held to discuss study methods and the participation in actual study works by the JICA Study Team and the Egyptian Counterpart Team. In addition, a pairing system was adopted to promote further work collaborations between the JICA Study Team and the Egyptian Counterpart Team (mainly TPA staff). A pairing system (where one member of the JICA Study Team and one counterpart always work together) was introduced from April 2007. The pairing system functioned well for executing data collection and specific task/analysis in depth, and in promoting technology transfer.

Table 1.2.2 Egyptian Counterpart Team Members

No	Name	Position
1	Eng. Hassan Selim	Vice Chairman, TPA
2	Ms. Azza Ahmed Ghanem	Director of Economic Affairs, TPA
3	Eng. Amr Foud Mahmoud Douarah	Planning General Manager, TPA
4	Eng. Samy Samouil Morkous	Chief Engineer, TPA
5	Mr. Ayman Ahmed Abd El-Tawab Rezk	Economic Affairs Expert, TPA
6	Mr. Ahmed El-Sayed Saleh Attah Allah	Statistics Affairs Expert, TPA
7	Eng. Mona Mohamed Kotb	Senior IT, TPA
8	Mr. Ali Ibrahim Mohamed	Senior IT, TPA
9	Mr. Mohamed Abdel-Sabour El-Ghandor	Senior Economist, TPA
10	Mr. Amged Abdel Alim	Senior IT, TPA
11	Eng. Abd El-Fattah Enany	Land Transport Planning General Manager, GARBLT
12	Eng. Ashraf El-Sebaei	Merchandise Transport Advisor, Commercial Dept, ENR
13	Mr. Samir Ahmed Hgameis	Maritime Transport Sector
14	Mr. Kamal Al Bandari	Maritime Transport Sector
15	General Abdel El-Rahman El-Feky	Inspection General Manager, Land Ports and Dry Ports Authority
16	Mr. Osama Mouhamed Abd El-Menieem	General Manager, GOEIC
17	Mr. M Hatem E. Abou Mostafa	General Manager, Holding Co. for Maritime & Land Transport
18	General. Adel El-Kady	Port Police Dept, Ministry of Interior

1.2.3 Japanese Side

(1) JICA

The JICA Study was supervised by the JICA Egypt Office and supported by an academic advisor and the JICA staff as shown in Table 1.2.3.

Table 1.2.3 Academic Advisor and JICA Members

No	Name	Position
1	Dr. Toshinori NEMOTO (advisor)	Professor, Graduate School, of Commerce and Management, Hitotsubashi University
2	Mr. Katsuhiko OZAWA	Resident Representative, JICA Egypt Office
3	Mr. Masakatsu KOMORI	Deputy Resident Representative, JICA Egypt Office
4	Mr. Kenshiro TANAKA	Assistant Resident Representative, JICA Egypt Office
5	Mr. Osamu TANAKA	Assistant Resident Representative, JICA Egypt Office
6	Dr. Ashraf M. El-Abd	Project Officer, JICA Egypt Office
7	Mr. Hideo MIYAMOTO (up to March 2007)	Group Director, JICA Head quarters
8	Mr. Tomiaki ITO (from April 2007)	Group Director, JICA Head quarters
9	Mr. Chikahiro MASUDA (up to October 2007)	Team Director, JICA Head quarters
10	Mr. Tomoyuki NAITO (from October 2007)	Team Director, JICA Head quarters
11	Mr. Nobuhiro KAWATANI (up to June 2007)	Project Coordinator, JICA Head quarters
12	Mr. Makoto KANAGAWA (from July 2007)	Project Coordinator, JICA Head quarters

(2) JICA Study Team

The JICA Study was conducted by the JICA Study Team, organized by JICA, which is composed of thirteen members as shown in Table 1.2.4.

Table 1.2.4 JICA Study Team Members

No	Name	Position
1	Mr. Akihisa KOJIMA (up to May 2008)	Team Leader/Intermodal Logistics Plan
2	Mr. Ken NISHINO (from June 2008)	
3	Mr. Takeharu KOBA	Demand Forecast/ Transport Plan
4	Mr. Nobuyuki IINUMA	Logistics Infrastructure Plan (Sea Transport & Port)
5	Dr. Ahmed El Hakim	Logistics Infrastructure Plan (Inland Transport)
6	Mr. Satoru NISHINO (up to March 2007)	Administration & Operation Plan (Sea Transport & Port)
7	Mr. Hiydeya SAKURAI (from April 2007)	
8	Dr. Nashreen G. Sinarimbo	Administration & Operation Plan (Inland Transport)
9	Dr. Lim Pou Soon	Forwarding Industry Plan
10	Mr. Teruo KAWAMURA	Logistics Laws & Customs
11	Dr. Asaichi MIYAKAWA	Logistics Industry Promotion/Policy
12	Dr. Hani Abdel Halim	Privatization & PPP
13	Dr. Yoji TAKAHASHI	Logistics System
14	Mr. Koichi ARAKAWA	Logistics Survey/ Demand Analysis/ Administrator

1.3 Major Events

1.3.1 Report Submission

Reports were submitted in accordance with the following schedule:

Table 1.3.1 Report Submission

No.	Report	Timing of Submission
1.	Inception Report	November 2006
2.	Interim Report	February 2007
3.	Modified Interim Report	April 2007
4.	Progress Report	August 2007
5.	Draft Final Report	November 2007
6	Revised Draft Final Report	February 2008
7.	Final Report	August 2008

1.3.2 Seminars

The JICA Study Team held the first seminar at the Egyptian National Institute of Transport (ENIT, Nasr City, Cairo) on 10 December 2006. The main purposes were as follows:

- To raise public awareness on the necessity of logistics improvement,
- To promote further communication among logistics related government offices, private companies, and the JICA Study Team, and
- To develop the opportunity to co-work on logistics improvement in Egypt.

At the beginning of the seminar, a video of a TV program was shown to explain supply chain management (SCM), identify common logistics issues (such as "time" being the crucial element in most cases), and the requirements to cope with the customers' needs. This highlights that the "just-in-time" delivery system is the most important element in SCM.

This concise and clear-cut TV program was followed by four (4) presentations: the first one providing a detailed explanation of typical logistics flow and necessary facilities/equipment, and the second one clarifying the flow and necessary procedures of modern custom clearance, which in many cases are the most serious obstacles in international logistics. Both drew attention to bottleneck issues in actual international logistics systems.

Photo of the First Seminar

Thirdly, Sokhna Port was presented as a very successful pioneering example of a logistics agency in Egypt in terms of efficiency in cargo handling. Lastly, an outline of the JICA Study was explained together with the study schedule and a request for further support and cooperation for the JICA Study Team.

The seminar was attended by approximately 100 people including governmental officers and logistics-related businessmen. The question and answer session promoted the role of Egyptian logistics in export/import and industrial development, and highlighted the weak points of the current situation in Egypt.

The second seminar was held at the time of the submission of Draft Final Report on 25 November 2007, and overall recommendations of the JICA Study were explained in detail.

1.3.3 Workshops

The first workshop was held on 3 May 2007. The compiled findings of the "Interview Survey" were presented in the workshop to the Transport Planning Authority, Ministry of Transport, Steering Committee members, and logistics-related government officials and businessmen. Afterwards, the modern trend of logistics systems was explained with emphasis on SCM and its supporting equipment and devices. Lastly, the JICA Study Team presented the "Study Approach to the Formulation of Logistics Master Plan in Egypt" based on the contents of the previous two presentations, aimed at catching up to the level of the international logistics industry so as to support an export/import industry of Egypt.

The JICA Study Team held the second workshop on 29 August 2007. Based on the contents of the Progress Report, the logistics development strategy plan was presented to logistics-related government officials, businessmen and academics (approximately 60 participants) in the workshop. In addition, the focal points of maritime and inland logistics development were explained. In the question and answer sessions, the approach of the JICA Study, location of the logistics center, and funding source were discussed between the JICA Study Team and the participants.

1.3.4 Participation of Other Seminar

In response to request from the Arab Academy for Science and Technology and Maritime Transport (AASTMT), the JICA Study Team participated in a seminar on the "Legal Aspects of Electronic Business" during 7-10 July 2007. The seminar was organized by AASTMT and Leaders Training & Consultancy, which is a Bahrain-based training and consultancy organization serving the entire Middle East region. The objectives of the seminar were to develop the use of electronic business and to understand the concept of e-commerce for logistics-related businessmen not only in Egypt but also in Middle Eastern countries. The JICA Study Team presented the following two titles:

- E-trade and International Logistics, and
- Case Studies of Radio Frequency Identification (RFID) Application for Safe and Efficient International Logistics.

The seminar was a great opportunity to share knowledge between Middle Eastern countries and Japan on logistics field.

Chapter 2

Role of Logistics in Egypt and Improvement Needs

Chapter 2 Role of Logistics in Egypt and Improvement Needs

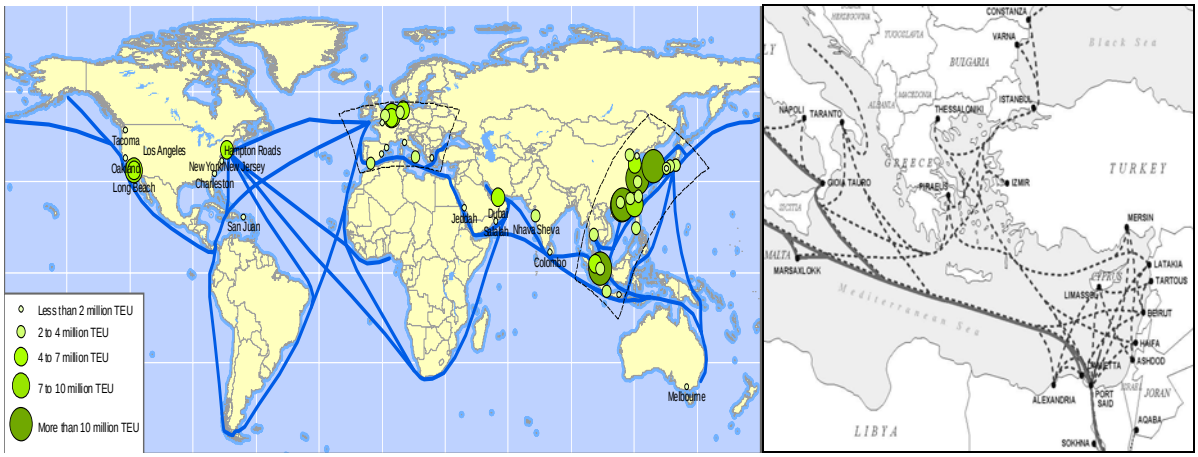
2.1 Industrial Development and Logistics

2.1.1 Global Economy and Role of Logistics

These days, we live in an era of the global economy, where the rise of technology has developed a business environment where products and services are marketed all over the world and partnerships and economic alliances are developed throughout the world. This global focus has already become essential for successful business today.

In this global economy, manufacturing companies design production flows within the framework of an international logistics network. Figure 2.1.1 shows major container flows of sea routes. Regardless of national boundaries, they try to procure any inputs in the exact quantity/volume required, at the cheapest price, and with the delivery timing they want. Any difference in actual quantity, price and delivery timing from those specified in their order causes an additional cost for the manufacturing companies, and moves them away from the profit-maximizing equilibrium point. In the worst case it results in a financial loss. In addition, any inputs need to be delivered in a condition, which is the same as the original quality without any deterioration and/or damage.

On the other hand, manufacturers are also facing the same requests from the consumers both in domestic and foreign markets. They have to deliver their products to the market, in the best quality condition, at the cheapest price and the best timing, as expected by the consumers and/or wholesalers/retailers.



Source: Rodrigue, Jean, Hofsa University of New York

Figure 2.1.1 Traffic Flows and the 50 Largest Container Ports

In any case, the shorter the lead-time is the higher the user's satisfaction is since the manufacturer can make their operation plan more punctual and flexible to reflect the sales performance. It also helps to reduce material stock volumes prior to production activities. So, shorter lead-time is an indispensable factor for manufacturers to get a new market and/or a higher market share, but if they fail to accomplish these requirements they could lose their

market.

This business model can be defined by the maxim: "Be competitive, or fade out of the market", and has become more prevalent in many countries, accompanying progress/spread of regional economic integration. Bilateral free trade agreements and trade liberalization agreements are also further accelerating the progress of globalization.

Under this economic globalization, an international/domestic logistics system together with an information network system has become essential, and improvement in its efficiency shall be explored without end. Only after continuous improvement of this global scale logistics system can Egypt develop its export industries and gain new market or larger market share in today's severely competitive business world, where the supply chain management (SCM) of the company is functioning effectively.

What is more, the consigners are always exploring new international freight routes with a keen interest to secure the shortest lead time. In responding to these needs, the Panama Canal will be widened (completion in 2014 planned) and it is sure that this project will contribute to attract the freight flows from South-east or East Asia to Europe via this canal. As for the land transportation, the Siberia railway has activated its activities of its freight transportation. At present, a share of this railway contribution is limited small: however, in a very long term, this railway route as well as the Panama Canal can have an potential impact to change its competitive status and the current patterns of freight transportation patterns.

In preparing the national logistics improvement plan for the export/import industry even if it is a conceptual plan as this JICA Study is, this kind of world-wide trends of infrastructure development for freight are well reflected in planning process not to be left behind the trend. We are now living in such a competitive world.

2.1.2 Needs for a Logistics System Improvement Strategy in Egypt

Egypt is now in the dynamic global economy, and is facing competition in terms of "price", "speed" and "quality" of the logistics service. This trend is expected to progress further, and it is expected that Egypt will be further involved in a spiral of more inter-dependent and cooperative relationships with, and of fiercer competition with, other countries.

This prospect is self-evident because the basic structure of Egyptian external trade is characterized by:

1) Major export commodities consist of goods of primary industries, and
2) Imports are characterized by intermediate goods for manufacturing industries.

The horizontal division of work is being spread around the world, the production plants for imported items are fragmented into several areas regardless of national boundaries, and each plant is functioning and synchronizing with others, all of which depend on the support of a robust international logistics network. So, an efficient logistics system is required to respond immediately to the demands of both the international and domestic markets.

Furthermore, the Government of Egypt has an export industry promotion policy as an engine for driving the national economy, targeting the EU market under the "Egypt - EU Partnership

Agreement" scheme that has become effective in 2004.

It is a basic requirement for an export promotion country to align all the policy efforts so as to have a logistics system organized to gain the wider markets and to maximize profit. Therefore, both an improvement of the international logistics system in Egypt and an establishment of industrial promotion policy are indispensable tasks.

In Egypt, the promotion of export/import industry is the top priority national policy, and the applied policy measure is to induce an influx of direct foreign investment into the industrial zones. Therefore, "improvement of the logistics system" is set on how the logistics system can be made sufficiently attractive for foreign investors to operate in Egypt and to effectively promote the export industry led by the direct foreign investors. In other words, the task of the government is to facilitate the necessary logistics infrastructures and/or systems to effectively shorten the transportation time from the port to the sites of production plants. Some of these government tasks can involve the private sector. This should also function for the benefit of domestic trade companies.

Core criteria of the logistics efficiency are:

1) Cheap,
2) Quick and punctual, and
3) No damage during transportation.

However, these vary in degree by the type of goods. Fresh agricultural products for export, for example, require special devices/packages to keep them fresh without any damage. On the other hand, in cases of agricultural products that are processed for export, such special treatment is not necessary, and the cost for transportation is low. As well as the treatment in transportation, packaging and handling measures to reduce the damages from vibration during transportation are also indispensable for preventing the losses. It is noteworthy that general consumer goods require the highest quality of services in all criteria.

A summary of preferences in logistics needs are shown in Table 2.1.1.

In addition, proper transportation modes can be specified by type of goods and a priority preference in service quality. Truck is the best for "consumer goods" and "fresh agri-products", while an inland waterway is suited for "bulk goods".

2.1.3 Current Logistics Issues in Egypt

The JICA Study Team conducted site inspections at the nodes of the logistics network. Preliminary findings cover a wide range of issues. Egyptian authorities have made every effort to smoothen the logistics flows, however, some issues are outside their responsibility and their efforts have not resulted in actual improvements.

Major issues in determining the efficiency of the total logistics system of Egypt are listed below. Those issues were identified by means of the "Interview Survey" that was conducted during the period between January and February 2007.

Table 2.1.1 Summary of Preferences in Logistics

Items	Sensitivity Degree of Preference			
	Cost	**Speed (=time)**	**Punctuality of Delivery**	**Quality (=safety)**
Agri-products 1) export as it is (fresh)	High sensitivity	High	High	High
2) for processing use	High sensitivity	Low	Medium	Low
Bulk goods (coal, cement, stones, sands, etc)	High sensitivity	Low	Medium	Low
Precious machinery/parts	Low sensitivity	High	High	High
Ordinary machinery/ manufacturing products	Medium	Medium	Medium	Medium
Consumer goods	Medium	High	High	High

Note: "High sensitivity", "Medium" and "Low sensitivity" indicate relative order of the preference compared with the "Ordinary machinery/manufacturing goods" that the shippers/receivers prefer.
Source: JICA Study Team

Issue 1: Lack of essential infrastructure and facilities

In case of Alexandria Port, its hinterland is narrow and there is insufficient land for warehouses and storage space. Besides that, neither wide bonded zones nor warehouses (i.e. zone and/or warehouse where customs clearance of the imported cargo is suspended for a temporary storage, processing, exhibition) are available near the port. The other alternative counter-measure is a dry port located away from the port and near the mega consumption area such as Cairo, but none of dry port companies even in 6th of October and 10th of Ramadan, have been authorized yet as an official dry port. These insufficient facilities include the capacity of the cargo handling at the port.

In case where the storage/cargo handling space in the ports is insufficient, cargo is transported to the inland container depot and/or distribution center. However, the facilities for transhipment in the ports are not so well connected with railway or inland waterway (Alexandria Port and Damietta Port). As this case illustrates, sufficient inter-modal facilities (such as re-loading facilities) can contribute to solving the congestion level of cargo handling in the port.

At present in Egypt, all the imported cargo is transported from the port to the production plants by individually arranged trucks, and a regular line-haul service by truck or railway is not available in Egypt. A line-haul service is defined as a regular transport service by means of truck on the assigned route on a planned time schedule between the designated origin (terminal at port) and the designated terminal near the destination (for instance, factory and terminal near the mega consumption area). The advantages of this service are the easy arrangement of transportation regardless of the volume of cargo and that punctuality of the transportation services can be also guaranteed. All of what the cargo owners/recipients have

to do is to pick-up the cargo at the terminal by a medium or small truck. Total cost of the transportation is usually lower than order-made pick-up and delivery services.

A regular line-haul service system requires a truck terminal or distribution center both at the port and the area close to the final destination. In some cases, the truck terminal and distribution center is integrated into a logistics park (including truck terminal, distribution center, inter-modal terminal, bonded warehouse, custom office etc). Lack of these distribution facilities has led to the unavailability of a regular line-haul transport service.

Issues 2: Potential economic routes to be explored

The majority share of cargo from Asian countries is re-routed in Italy, Spain and other ports of the European countries, and a small share of Asian cargo is unloaded at Sokhna Port and transported into the hinterland by land transportation services. The latter route is apparently cheaper than the route via Suez Canal and European countries, and the necessary travel time can be drastically shortened. If the final destination of the cargo is Egypt, the utilization of this route (Sokhna Port to hinterland) should be fully utilized, and the necessary infrastructure and facilities should be provided according to the volume of transportation demand.

As for the imported products from Europe, the major gate is currently Alexandria Port and transport is mainly by truck to Cairo and its adjacent areas. However, the Desert Road (Alexandria – Cairo) is expected to become congested in the future and the cargo handling capacity at Alexandria Port is physically limited in regard to the drastically increasing demand of transportation. Another new transportation mode and route should be explored. Re-activation of railway and inland waterway can be envisaged.

The potential logistics route can be proposed and explored to save logistics time and cost. For instance, Sokhna Port could offer new logistics route for the cargo from the Asian countries to the final destination in Egypt. That route is:

Logistics route (Asia ~ Sokhna Port ~ Cairo ~ 6th of October).

Cargo from Asian counties goes through Suez Canal and arrives at Alexandria Port via European seaports on the Mediterranean Sea. However, the travel distance can be shortened by going on the new route of Sokhna Port ~ (railway, truck) ~ Cairo ~ 6th of October. At the Sokhna Port, rail transportation services are available several times a day, and re-loading of cargo to the railway can be executed smoothly. In addition, time and transportation cost can also be saved for some cargo from Asian countries to the industrial estates in 10th of Ramadan.

These new routes might turn out to be more attractive for cargo to Cairo, 6th of October and 10th of Ramadan if a distribution center/truck terminal was established around Cairo, a pivotal city of the three destinations.

Distribution center (in conjunction with truck terminals) attached to each industrial center and/or industrial area, can also contribute to save logistics cost and time by assuring a more frequent trucking service between the industrial estate and the port.

A distribution center near Cairo could offer a new paradigm to improve the logistics flows into/from Cairo since a truck ban prohibits any large truck from going into the metropolitan

area in daytime (from early morning to midnight). This is a severe constraint on logistics flows, resulting in negative impacts on production/consumption activities there, making it impossible to guarantee a smooth and profit-making operation for factories in the area.

Issue 3: Lack of dual logistics routes/modes for risk reduction

A dual system is necessary as a risk reduction measure especially when the road traffic suffers from heavy traffic congestion or when the road traffic is interrupted by accident or other reasons. Though the cost might be higher and necessary time of logistics flows longer than those of the normal transportation mode, an assured availability of alternative logistics modes and routes can guarantee continuous production activities and secure reliability for users.

At present for industrial logistics, there is no guaranteed effective substitutive transportation mode for Damietta Port and Alexandria Port except road transport. Inland waterway and railway are available at both ports, but their connectivity with shipping services is not in good condition. What is worse, the railway operation is not punctual to a planned time schedule and has experienced accidents. The water depth of the canal is not sufficient for container transportation and it has lock-gate problems. Thus, neither the current railway nor inland waterway is suitable for logistics use, especially for time- and delivery punctuality-sensitive cargo at these ports.

As far as Port Said Port (West) is concerned, two transportation modes i.e. road and railway, are available. However, current railway access to the existing industrial zones is not convenient because direct access line to the industrial zones such as 10th of Ramadan and 6th of October is not available, and the frequency of freight train operation is very limited. Therefore, railway does not play a significant role to form a close transport linkage with the industrial zones around Cairo. This is a serious logistics defect for national industrial development.

Sokhna Port has facilities and the most favorable transportation conditions, with both rail and truck services.

Issue 4: Complicated procedures for export/import

This can apply to both the port and cross-boarder transportation. The issue covers customs clearance (bill of lading, invoice, packing list, insurance), quarantine etc., and the problem lies in the complicated documentation and registration requirements. Some of the documents must be written in Arabic by hand, and require a long time to prepare. So, the language problem keeps non-Arabic speaking people away from custom clearance and export/import procedure. What is worse, advanced registration (prior to the date of entry) is not allowed, resulting in a late start to the procedures process.

In addition, the shippers have to visit many officials in different offices. And in settling tariff rate disputes, a round trip between Alexandria Port and Cairo is sometimes required.

As for cross border road transportation, the same kind of registration has to be executed at both sides of the border, and the driver wastes a lot of time while the truck is not permitted to go into the neighboring country with its cargo and in some cases re-loading of the cargo is required.

As of December 2006, the Alexandria Port Authority has introduced a single window system of customs procedure making use of a computerized network system. Careful observation of the actual performance will be required since this kind of new system may not function because of the inadequate experience of the staff.

Issue 5: Lack of information network for system integration

Many port authorities are already in the process of computerizing all the customs procedures at the port, or have plans to facilitate a computer system. However, this system is not well connected with many other related offices such as quarantine, forwarders, truck companies, railway, inland waterway, shippers and/or receivers.

An information network makes all the personnel concerned aware of the actual location of cargo and allows them to take necessary actions to optimize the timing of service provision, and an insufficient network cannot accomplish this objective.

In coping with these issues, some supporting measures for small and financially vulnerable companies were explored in the JICA Study.

Issue 6: Further promotion measure for private sector participation

Some development plans for infrastructure and/or facilities have not been implemented because of difficulties in project financing and the operation capability. Sokhna Port is a pioneering case of private sector participation (strictly speaking it is a Build-Operation-Transfer scheme), and there are no other successful cases of the project financing schemes with private participation.

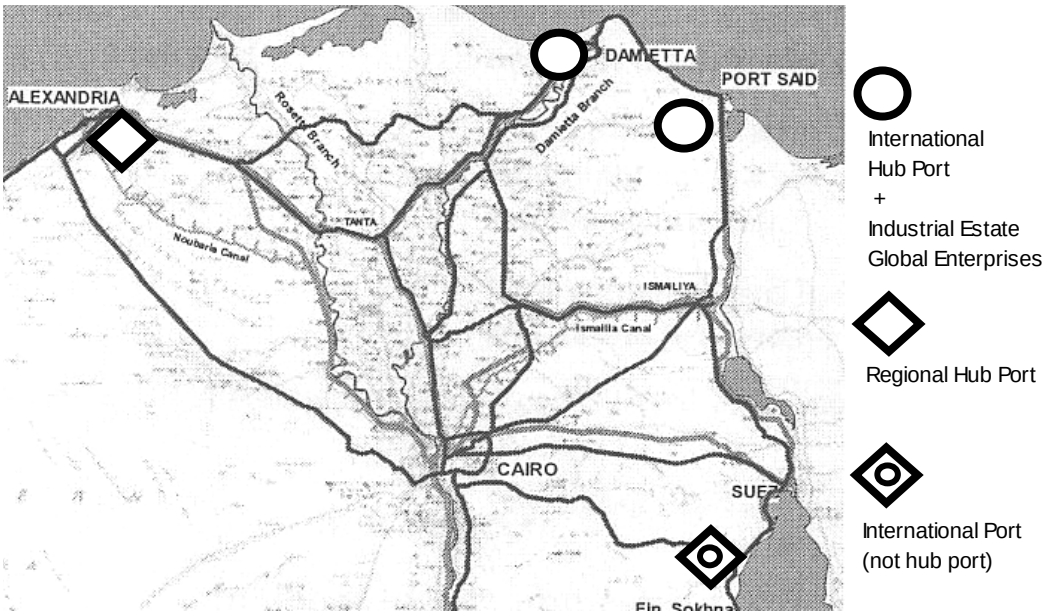
However, it is necessary to have private participation to make a breakthrough in the present slow progress of the logistics infrastructure development, and new ways of promoting this should be explored. Some new device to attract the private sector shall be explored more in the JICA Study.

Private sector participation is especially useful for the management aspects of logistics facilities, which require special operation skills, know-how and experience. It is not practical to establish new logistics facilities and management without professional personnel.

2.2 Individual Role of Ports in Egypt

Port Said Port (West and East), Damietta Port, Alexandria Port and Sokhna Port are major international ports in Egypt. Though Damietta Port and Port Said Port (West and East) have routes connecting with the Middle East and Asia, the linkage between these two ports and Cairo is not good except the road transportation because of the poor and time-consuming network of railway. Alexandria Port and Sokhna Port have closer relationships with Cairo because of good highway networks, compared with other ports. However, poor quality of railway is also true for these ports.

Taking into consideration the distance to Cairo from Damietta Port and Port Said Port, they should be developed as twin hub ports in the Mediterranean Sea Region under the condition that they would share their own compatible roles cooperatively. It is that the Government of Egypt would clearly define the individual future roles for these two ports and make the related port authorities accept the national vision (Figure 2.2.1). Alexandria could have established a strong linkage with many foreign ports in the Mediterranean Sea, and this port in a long run can be the biggest regional hub port in Egypt.



Source: JICA Study Team

Figure 2.2.1 Roles of Ports in Egypt

Although these ports have ambitious port development plans, these plans are not coordinated with each other and are sometimes incompatible. According to the port development plans, each port authority intends to develop its own port as the biggest port in Egypt without considering the role and plans of the other ports. It is necessary for the Government of Egypt to allot a suitable role to each port depending upon each port's geographical, industrial and economical role. A comprehensive plan in which each port has its own specific and advantageous role is indispensable for Egypt to be at the forefront of international competition to establish hub ports in the Mediterranean Sea Region. Disintegration of plans of the ports would lead to a misallocation of national budget over a duplicated and over-assessed function of ports. Establishment of new Port Coordination Board or a function strengthening of

existing governmental organization should have this definite role in Egyptian port development planning.

Sokhna Port can be expected to be a major gateway for cargo transportation from/to Middle East and Asian countries as well as African countries. If large trunk line ships can stop in this port, the reduction of transportation costs and travel times can be expected to improve the competitive power of Egyptian products in Asian and East African countries.

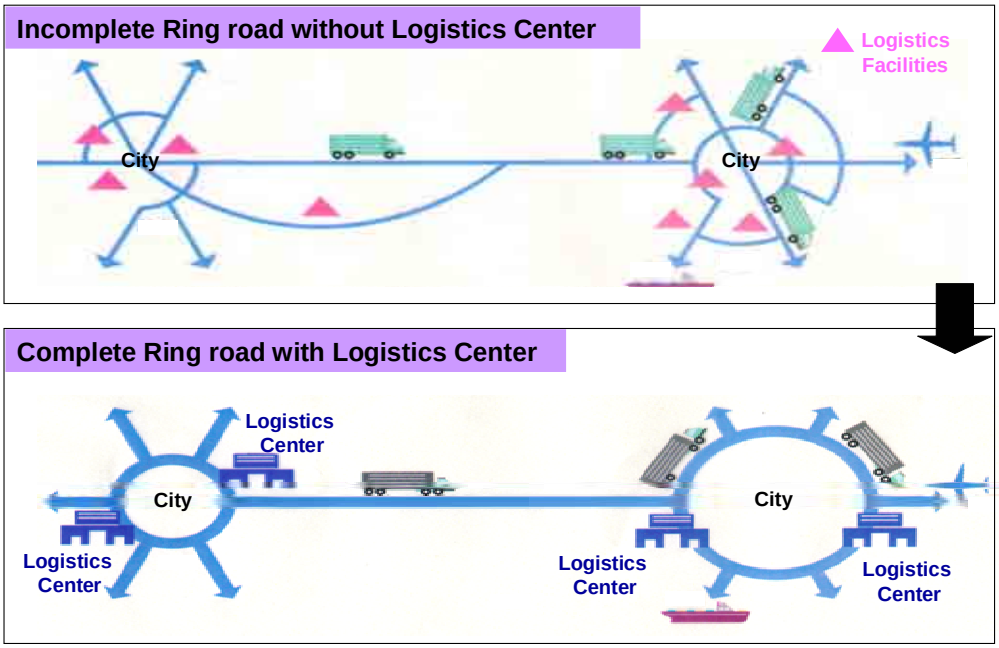
2.3 Problems of the Greater Cairo Region

Traffic congestion and environmental problems in Greater Cairo Region (GCR) is getting more serious. At the same time, because of the truck ban, the freight transportation in/around GCR has been suffering from a long waiting time and inefficient operation. This is especially true for trucks of imported consumer goods since any truck can not go into the center of GCR for delivery to wholesalers and/or retailers. Furthermore, because of the lack of parking facilities, loading/unloading activities are usually carried out on the street resulting in severe congestion, deterioration of the pedestrian environment and difficulty to access certain routes.

Usually in this case, the distribution center storage all the freights from the ports temporary, and in an off-time of truck ban, small trucks commence the delivery of temporary stored goods after sorting, labeling, and re-packing. However, this kind of logistics system is not available in Egypt.

This current situation is completely opposite to the situation that the modern logistics system seeks for, where the Just-In-Time (JIT) concept is required as the basic business model for the purpose to meet the users' request and not to miss the business chance in making the profit and to minimize the total time of delivery.

To cope with these urban problems, it is advisable to develop a Distribution Center in the outskirts of GCR. Physically the distribution center should be located at a site where pick-up/delivery trucks (between distribution center and shops in the center of GCR) as well as line-haul trucks (between distribution center and ports) can easily access to the highway and railway networks, river port and airport as shown in Figures 2.3.1.



Source: JICA Study Team

Figure 2.3.1 Role of Logistics Center

Chapter 3

Demand Forecast for Export and Import Freight

Chapter 3 Demand Forecast for Export and Import Freight

3.1 Industrial Development in Egypt

3.1.1 Strategy of Industry Development

The Ministry of Foreign Trade and Industry and the Ministry of Investment have their own policies, on the basis of their mandate, for industry and investment development. However, there does not appear to be an integrated comprehensive national policy. There is no industrial development plan with due attention to necessary logistics issues for logistics improvement. The JICA Study Team understands that the Ministry of Foreign Trade and Industry is currently preparing a national strategy for industrial development, and the JICA Study Team hope that there has been collaboration related to logistics in establishing a new industrial strategy, especially in selecting appropriate locations for industrial zones.

This section describes three items; (1) industrial development strategy, (2) export development strategy, and (3) target industrial sectors for export promotion.

(1) Industrial Development Strategy

a) Industrial Development of Egypt

Establishment of the Industrial Development Authority (IDA)

IDA was established under the Ministry of Foreign Trade and Industry in November 2005. IDA has a mandate to end long-standing obstacles to new industrial investment in Egypt. IDA is also responsible for facilitating the acquisition of land, with the necessary utilities, at feasible prices and for Greenfield projects[1].

The Industrial Development Strategy

The Ministry of Foreign Trade and Industry released a policy paper entitled "The Industrial Development Strategy" (hereinafter "the Strategy").

The Strategy emphasizes three key issues to develop the Egyptian industry, i.e. industrial production through export development and FDI attraction, industrial productivity through a set of policies/programs, and an industrial structure ranging from resource-based and low-tech activities to medium-and high-tech industries.

b) Target of Industrial Development Strategy

In order to stimulate Egyptian industry and the economy further, growth and investment targets are planned for the industrial sector (2005-2025) as shown in Table 3.3.1. Real growth rates in industrial production are planned to exceed real GDP growth rates by 0-3 % after 2009.

[1] The guarantees and exemptions of Law No. 8 Year 1997 for Greenfield projects are described below:
- A project may be wholly owned by foreigners,
- Guarantees against nationalization and expropriation of the project,
- Output of the project is not subject to price control,
- Projects are allowed to repatriate their capital and profits,
- Foreign experts salaries are exempt from income tax if their stay in Egypt is for less than one year, and
- Imported capital assets and construction materials required to establish an approved project are subject to a unified import duty rate of 5%.

Considering the creation of new job opportunities for the labor force, around 7-8 % of the real growth rate in industrial production can be assumed as a national target for the industrial sector. It could be estimated that the industrial production value would be increased in accordance with the growth rates.

Table 3.1.1 Planned Estimated Growth Rates in the Industrial Sector

Year	2005	2006	2007	2008	2009	2010	2011	2015	2020	2025
Real Growth Rate in Industrial Production (%)	3.3	4.0	5.0	5.5	6.0	6.0	7.0	8.0	9.0	9.0
Premium Over Real GDP Growth (%)	-1.7	-1.5	-1.0	-0.5	0.0	0.0	0.1	2.0	3.0	3.0
Nominal Industrial Production (billion LE)	92.0	101.0	111.0	122.0	134.0	147.0	162.0	241.0	413.0	728.0
Share of Industry in GDP (%)	17.1	16.8	16.6	16.6	16.6	16.6	16.7	17.7	19.7	22.6
Nominal Investments in the Industrial Sector (billion LE)	12.0	16.0	22.0	27.0	32.0	35.0	45.0	77.0	130.0	229.0
Industry Share in Total Investment in the Economy (%)	NA	14.0	15.9	17.4	18.9	18.9	22.3	26.9	29.5	33.8

Source: Ministry of Foreign Trade and Industry, Egypt's Industrial Development Strategy-Industry

(2) Export Development Strategy

The Strategy suggests that the objectives of targeting export are not only to increase the level of manufactured exports, but also to reinvigorate the technological structure of manufactured exports to increase the base of medium- and high-technology manufactured exports. As shown in Table 3.1.2, the Strategy is targeting the increase in the overall export proportion of the manufacturing sector in terms of the manufacturing value added (MVA) from 2005 through 2025.

Table 3.1.2 Export Target

Year	2005	2006	2007	2008	2009	2010	2011	2015	2020	2025
Manufactured export Propensity (Exports, % of MVA)	20	20	22	22	24	24	26	30	34	40
Manufactured Exports (billion LE)	18	20	24	27	32	35	42	72	140	291

Source; Ministry of Foreign Trade and Industry, Egypt's Industrial Development strategy-Industry

(3) Targeting Industrial Sectors for Export Promotion

The top three exports (excluding petroleum) of Egypt in 2005 are metal products (US$5,951 million), ordinary metals and manufactured (US$855 million), and vegetable products (US$736 million). Those three export sectors should be promoted in terms of export development and improving the knowledge-based of related technology, productivity and competitiveness with other countries. The Japan Desk of GAFI pointed out at the interview with the JICA Study Team that agro-products (in particular, fresh vegetables) and textile sectors should be promoted in terms of export and FDI attraction.

The Strategy stated that traditionally the most important industrial sectors in terms of their

value-added contribution through manufacturing are engineering and electrical machinery, food processing, chemical and pharmaceuticals, textiles and garments, building materials, furniture, paper and paperboard, and leather.

It is proposed that the medium and high tech sectors be promoted as new fields for Egyptian manufacturing industries, but it does not mean discarding existing traditional sectors. The Strategy should focus furthermore on development of target sectors along with existing sectors.

The JICA Study Team recognized that existing sectors and target sectors of exports include the following sectors respectively:

Existing Sectors:

- Engineering
- Food Processing
- Chemicals & Pharmaceuticals
- Textiles & Garments
- Building Materials
- Furniture
- Paper & paperboard
- Leather

Target Sectors:

- Engineering Machinery & Equipment
- Renewable Energy
- Labor-intensive Consumer Electronics
- Automotive Components
- Life Sciences
- Biotechnology
- Ethnic Products

3.1.2 Current Industrial Areas in Egypt

(1) Locations of Industrial Zones

a) Categories of Industrial Zone in Egypt

According to IDA of Ministry of Foreign Trade and Industry, industrial zones in Egypt are divided into 4 categories as follows;

Table 3.1.3 Category of Industrial Zones

Category	No. of Zone	Description
1. Governorate Industrial Zones,	68	The zones belong to the governorate and were located on its land. They are controlled - till now - by the governorate however, in future will be controlled by IDA. Some of those zones are established by presidential or governmental decrees, but mainly they are established by the governorate decree. All of the 68 zones are operating and have production.
2. New-Urban Communities industrial zones,	19	The zones belong to the Ministry of Housing, Utilities & Urban Communities and were controlled by it until the establishment of IDA, which became responsible for controlling them. They are located in the new urban communities in addition to the other facilities placed in some cities (housing, education, health, etc). Note that IDA was established in November 2005.
3. Public Free Zones areas,	10	These areas belong to GAFI and under their supervision and control. Lands are given through GAFI; however, IDA approval is required for establishing an industrial project.
4. Special Economic Industrial Zones ,	2	One is being developed in Suez and the other in Port Said but not yet in practice.

Source: IDA

b) Locations of Industrial Zones

Locations of industrial zones are shown in Figure 3.1.1. Major development areas for industrial zones are located along the River Nile (between Cairo and Qena Governorates), Alexandria desert road (between Cairo and Alexandria), and Cairo-Ismailia-Port Said road. The industrial zones in those areas and the major ports are mainly supported by the road network.

c) Other Industrial Zones

Heavy industry and mining zones are categorized as other industrial zones and their characteristics are summarized as follows:

- These zones are located near to the areas of natural resources,
- Established by Prime-Minister Decree,

d) Future Development of Industrial Zones

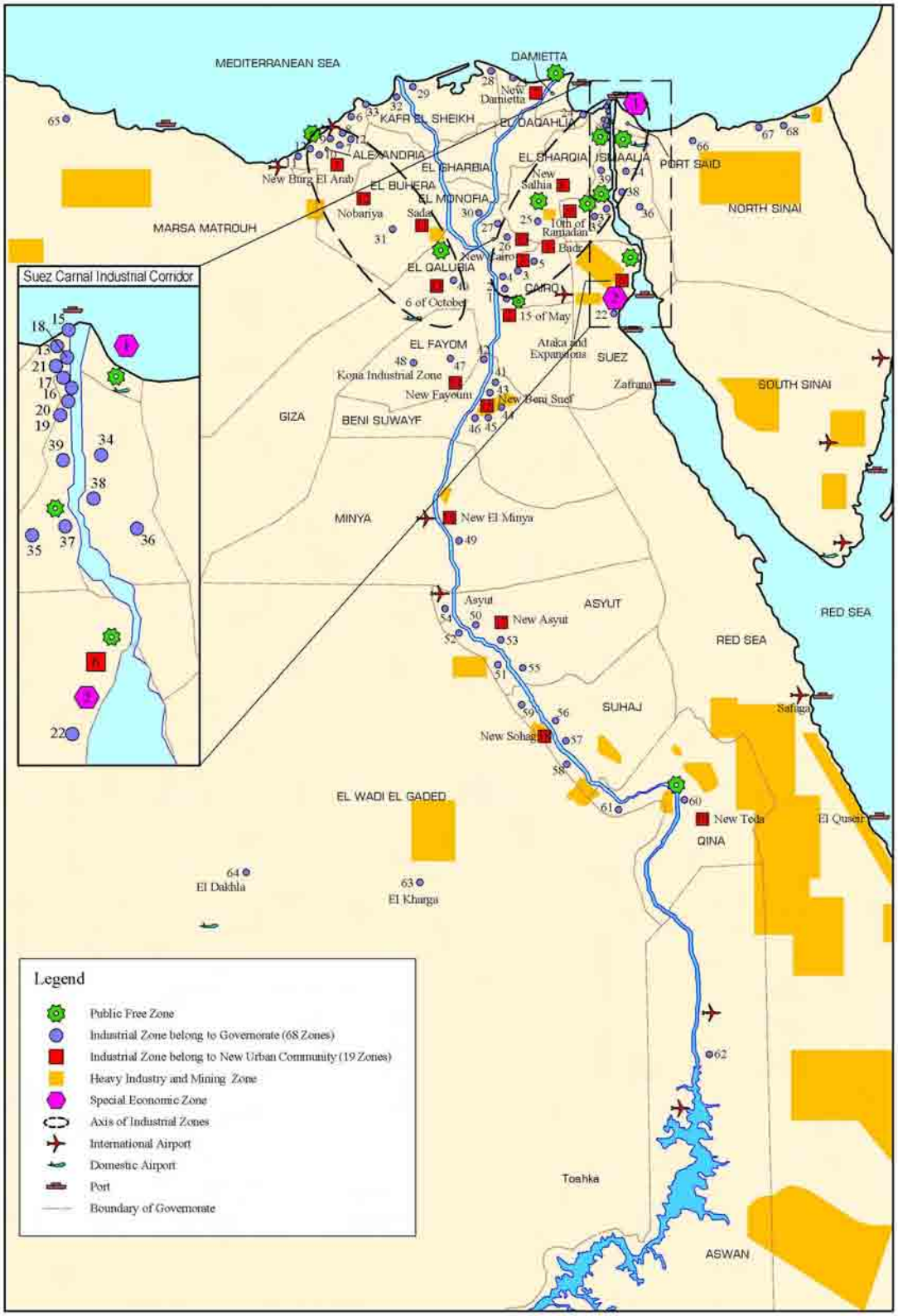
In order to forecast the future distribution of the industrial zones in Egypt, the JICA Study Team compared the areas of the major industrial zones in 2006 and 2022 as shown in Table 3.1.4 and Figure 3.1.2. The distribution of future industrial zones in the new urban communities and governorates could be clarified by taking the area used in each existing industrial zone as an indicator (See Appendix-2 for all the industrial zones of governorates and four major industrial zones in new urban communities).

According to the previous mentioned table and figure, it is clear that the highly developed industrial zones are located in the Lower Egypt region (e.g. 10th of Ramadan, 6th of October and Burg el Arab), however most of the industrial zones which are located in Upper Egypt region (e.g. Beni Suef, Asyut, Sohag governorates) are small scale, newly established or unused yet.

According to GAFI and IDA, the industrial zones in 10th of Ramadan and 6th of October have been almost saturated and El Sadat shall reach saturation soon. IDA has publicly announced new industrial development plans in 10th of Ramadan, 6th of October, Burg El Arab and El Sadat.

The Government of Egypt is targeting the development of the Upper Egypt region by establishing new industrial zones, with incentives, and improving the infrastructure in its governorates. However, the magnitude of investment and development could be furthermore increased in the Lower Egypt region due to the already settled infrastructures and facilities in addition to the highly developed industrial establishments.

From the logistics viewpoint, the JICA Study Team concluded that the focus should be on the two axes shown by dotted circles in Figure 3.1.1 that indicate the industrial zones along Alexandria Desert Road and Cairo-Ismailia-Port Said Road.



Source: Worked out by JICA Study Team based on data from IDA

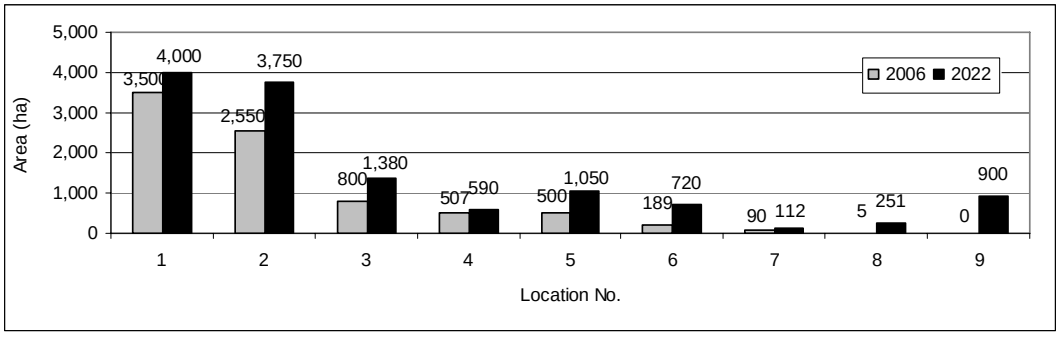
Figure 3.1.1 Industrial Zones in Egypt

Table 3.1.4 Area of Developed Industrial Zone

Unit: ha

Location No	Industrial Zone	2006	2022 (estimated)
1	10th of Ramadan, Sharkya Gov.	3,500	4,000
2	6th of October, Giza Gov	2,550	3,750
3	Burg El Arab, Alexandria Gov.	800	1,380
4	Abu Rawash & its extensions, Giza Gov.	507	590
5	El Sadat, Menofia Gov.	500	1,050
6	Industrial Zone 31/4, Beni Suef Gov.	189	720
7	Safa Bany Ghaleb, Asyut Gov.	90	112
8	Bet Dawood, West of Girga, Suhag Gov.	5	251
9	Industrial Zone 31/2, Beni Suef Gov.	0	900

Source: IDA



Source: IDA

Figure 3.1.2 Area of Developed Industrial Zones

(2) Lists of Industrial Zones

Tables 3.1.5, 3.1.6 and 3.1.7 show the names of public free zones, special economic industrial zones, industrial zones in new urban communities and industrial zones in governorates respectively. These tables were obtained from IDA. The numbers of each zone in Table 3.1.6 and Table 3.1.7 are indicated on Figure 3.1.1.

Table 3.1.5 Public Free Zones and Special Economic Industrial Zones

Industrial Zone	Governorate	Zone Name
Public Free Zones	Cairo	Nasr City
	Giza	Media Production
	Alexandria	Alexandria
	Menofia	Shebin El Kom
	Suez	Suez
	Damietta	Damietta
	Port Said	Port Said East Port
	Ismailia	Ismailia.
	Qena	Qeft
	Cairo	Badr
Special Economic Industrial Zones	Suez	Northern Suez gulf Economical Zone.
	Port Said	East Port Said Industrial Zone

Source: Industrial Map information Center, IDA, May 2007

Table 3.1.6 Industrial Zones in New Urban Communities

Governorate	No.	Communities Name
Cairo	1	Badr
	2	15th May
	3	New Cairo
	4	Al Shrouk
Alexandria	5	Burg El-Arab
Suez	6	Ataka, Ext.
Damietta	7	New Damietta
Sharkia	8	Salehiyah
	9	10th of Ramadan
Kalyoubia	10	El-Obour
Menoufia	11	El-Sadat
Behera	12	Nubariyah
Giza	13	6th October
Fayoum	14	New Fayoum
Beni Suef	15	New Beni Suef
Menia	16	New Menia
Asyut	17	New Asyout
Suhag	18	New Suhag
Teba	19	New Teeba

Source: Industrial Map information Center, IDA, May 2007

Table 3.1.7 Industrial Zones in Governorates

Governorate	No.	Industrial Zones in Governorates
Cairo	1	South of Helwan
	2	Thoura and Shak Al Thouban
	3	Al Katamia
	4	Shak Al Thouban (seized)
	5	Al Roubiki
Alexandria	6	Al Manshia Al Gadida
	7	Al Naseria
	8	Upper and lower Mirgham
	9	K.31;desert road
	10	Sepeko
	11	Al Agami; Upper Bitach
	12	Al Nahda Al Sanaia
	13	Ohm Zagheou
Port Said	14	C1 industrial zone
	15	C6 industrial zone
	16	C8 industrial zone
	17	C9 industrial zone
	18	Western north of Bourtix factory
	19	Al Houd Al Samaki; Al Rasoua
	20	C7 industrial zone
	21	C11 industrial zone
Suez	22	Light industrial zone
Dakahlia	23	Southwest of Gamasa
	24	Industries Al Asafra Cluster of small- scale
Sharkia	25	Bilibis
Kalyoubia	26	Al Shourok
	27	Al Safa Industries Zone
Kafr El-Sheikh	28	Baltiem
	29	Motobus
Menoufia	30	Mubark,its Ext
Behera	31	Al Natroun valley
	32	Al Bousily desert
	33	Edkou
Ismailia	34	East of Al Kantra
	35	First industrial zone
	36	Technology valley
	37	Second industrial zone
	38	Abo Khalifa, Ext
	39	Al Rayah -West Kantara
Giza	40	Abou Roash , Ext
Beni Suef	41	Biad Al Arab
	42	Radi Koum Abou
	43	Industrial zone 31/1
	44	Industrial zone 31/2
	45	Industrial zone 31/3
	46	Industrial zone 31/4
Fayoum	47	Koum Oushim
	48	Kouta
Menia	49	(Moutahra(east of River Nile
Asyout	50	Al Awamer, Abnoub
	51	Al Zahrabi; Abou Teig
	52	Al Safa ; Bani Ghalib
	53	Sahiel Sielim
	54	Dashlout; Dairout
	55	Al Badari
Suhag	56	Al Kaother district
	57	Al Ahaywa
	58	Biet Dawood; west of Girga
	59	West of Tahta
Qena	60	(Al Kalahien, Kaft quarter
	61	Heo
Aswan	62	Al Shalalat ; Al Elaki valley
New Valley	63	Al Kharga
	64	Mout
Matrouh	65	Matrouh road 26 km. southeast of Matrouh
North Sinai	66	Baer Al Abd
	67	Al Masaeed
	68	El-Aresh

Source: Industrial Map information Center, IDA, May 2007

(3) Establishments of Industrial Zones in Selected New Urban Communities

Table 3.1.8 shows that 10th of Ramadan, 6th of October, New Burg El-Arab and El-Obour have highly developed industrial zones and El-Obour, 6th of October, 10th of Ramadan, El-Sadat and Badr have many factories under construction. According to IDA and GAFI, the industrial zones of 10th of Ramadan, 6th of October, New Burg El-Arab and El-Obour have been saturated and El-Sadat also will be saturated soon. Many potential investors for those industrial zones are registering their names on waiting lists.

Table 3.1.8 Factories in New Urban Communities in 2006

City	Producing Factories			
	No. of Factories	Area (km^2)	Investment Capital Stock (million LE)	Annual Production (million LE)
10th of Ramadan	1,000	9.7	16,262	17,405
15th May	76	0.2	124	155
El-Sadat	263	3.8	2,785	1,029
6th of October	875	7.7	9,636	7,690
New Salehiyah	86	0.6	1,203	2,271
New Burg El-Arab	444	3,472.3	3,220	4,922
New Damietta	170	603.3	168	164
New Beni Suef	59	229.9	52	169
Badr	179	897.1	431	387
New Nubariyah	46	247.8	271	87
El-Obour	300	2,223.3	3,870	34,500
New Menia	6	13.1	5	8
New Cairo	20	169.2	47	15
Total	3,524	7,878	38,074	68,802

City	Factories Under-Construction			
	No. of Factories	Area (km^2)	Investment Capital Stock (million LE, estimated)	Annual Production (million LE, estimated)
10th of Ramadan	282	3,750.7	1,336	1,262
15th May	45	30	33	22
El-Sadat	212	2,660.1	2,757	6,902
6th of October	316	1,315.2	1,779	1,195
New Salehiyah	73	229.8	386	1,183
New Burg El-Arab	154	1,466.3	342	429
New Damietta	132	210.9	85	92
New Beni Suef	49	187	41	93
Badr	209	779.8	363	226
New Nubariyah	28	73.2	71	48
El-Obour	374	1,289.6	769	429
New Menia	25	39.6	32	19
New Cairo	2	3.6	1	1
Total	1,901	12,035.8	7,995	11,901

Source: IDA, Ministry of Foreign Trade and Industry

(4) Major Existing Industries and Their Products at Governorate Level

According to GAFI's information, each governorate has the following established major industries and products:

Table 3.1.9 Major Industry and Product by Governorate

No.	Governorate Name	Major Industry and Product
1	Menoufia & Asyout governorates	Pharmaceuticals and medical products.
2	Suhag governorate	Paint products and farm tractors.
3	El-Menia governorate	Animal fodders, concentrates, organic fertilizers and concrete pipes.
4	Beni Suef governorate	Cement plants, vegetables and fruits preservation and dehydration.
5	El-Fayoum governorate	Ceramics and sanitary wares – dehydration of field crops.
6	Alexandria governorate	Petrochemicals and tire plants.
7	Menoufia governorate	Household electrical appliances and paper products.
8	Port Said governorate	Chemical products, reinforced steel and spinning & weaving.
9	Kafr El-Sheikh governorate	Liquid gases and cylinder filling.

Source: GAFI

Products of selected industrial zones are shown in Appendix-2.

3.1.3 Future Vision of Industrial Structure

(1) Allocation of Industrial Estates

a) New Industrial Zones

One of the major mandates of IDA is to create new industrial zones in Egypt. According to the new industrial development plan of IDA, 5,000ha of industrial zones are required for the next five years including 3,000ha of new industrial zones in the cities of Burg El-Arab (800ha), 10th of Ramadan (500ha), El-Sadat (500ha) and 6th of October (1,200ha).

b) Industrial Zones in Governorates

There are 68 industrial zones in 22 governorates. Since March 2007 IDA and governorates have been studying the sites of each industrial zone to determine if there is the necessary infrastructure and public services to attract investors and promote development of each industrial zone. Currently, many of the industrial zones are not yet equipped with fundamental infrastructures such as trunk road networks, water and wastewater treatment facilities. Such circumstances with insufficient utilities would be an obstacle to attracting investors for the industrial zone.

Some of the industrial zones fully occupied but others are less utilized as shown in Appendix-2. Governorates are able to establish new industrial zones by decree but new establishments have been limited because the activities of IDA and the governorates have been concentrated on promoting the existing industrial zones.

c) Free Zones

According to the interview with GAFI officials, the Government of Egypt is no

longer interested in establishing new free zones because firstly; many investors are being attracted to the other industrial zones due to the recent economic environment reformed in Egypt, secondly; free zones would bring less benefits to Egypt than the other industrial zones due to the advantages guaranteed to investors.

d) Heavy Industry and Mining Zones

IDA is the authority responsible for developing heavy industry and mining zones.

Cement factories have been established in the heavy industry and mining zones of the North Sinai area (1 cement factory), Suez (3), Cairo (2), Alexandria (1), Asyut (1), Beni Suef (1) and Qena (1). IDA does not appear to have any future development plans for heavy industry zones, so the development impacts of heavy industry zones on the future logistics in Egypt would be limited.

e) Toshka Project

The Toshka project, which is located in the western desert of High Dam Lake, is one of the mega projects of Egypt and the final completion of this project is scheduled in 2017. The project aims at transforming a desert in the region into an arable land in order to create 2.8 million new jobs and attract 16 million people to the new towns.

The Toshka project is agriculture based and includes processing equipment. One of the major targets is to export agricultural products. The logistic system for export in terms of improvement of airports and road network was studied and reported on by TPA in 2003.

The annual agricultural production quantities transferred from Toshka are shown in Table 3.1.10.

Table 3.1.10 Annual Agricultural Production Quantities to be transported from Toshka

(Unit: thousand ton)

Year	Export	Consumption of other governorates	Total Transported
2003	385.7	272.1	657.8
2008	642.8	453.4	1,096.3
2013	964.3	680.2	1,644.5
2017	1,285.7	906.9	2,192.6

Source: "Facing the transportation demands in the development project in South the Valley, Toshka region study", Ministry of Transport, June 2003.

Estimation of quantities of agricultural production to be transported from the Toshka zone by various means of transportation is as follows:

The annual quantities of the agriculture production transported from the Toshka zone, either to the different republic governorates or to be exported assumes that 15% of the agricultural production in special crops (vegetables, tomatoes, fruits, figs) will be transported in containers by air, which represents 6.7% of the Toshka zone total production and is distributed as follows; 75% to East of Owaynat airport and 25% to Aswan airport. Export of fruits has been started even though the quantities are limited.

Exportation of fresh fruits and vegetables are planned through Aswan airport, but production and quantities for export are still only at the planning stage. Accordingly the logistics flow could not be clarified.

(2) Forecast of Production in Four Major Industrial Zones

According to the production value in the industrial zones in 2005, four major industrial zones such as 10th of Ramadan, 6th of October, Burg El Arab and El Sadat have been selected for forecasting their industrial production in 2022.

Based on the assumption that the production value per unit area will be the same by 2022 and that the new industrial zones in the four cities will be completely developed by 2022, the production in the four major industrial zones are estimated as shown in Table 3.1.13 and Figures 3.1.5.

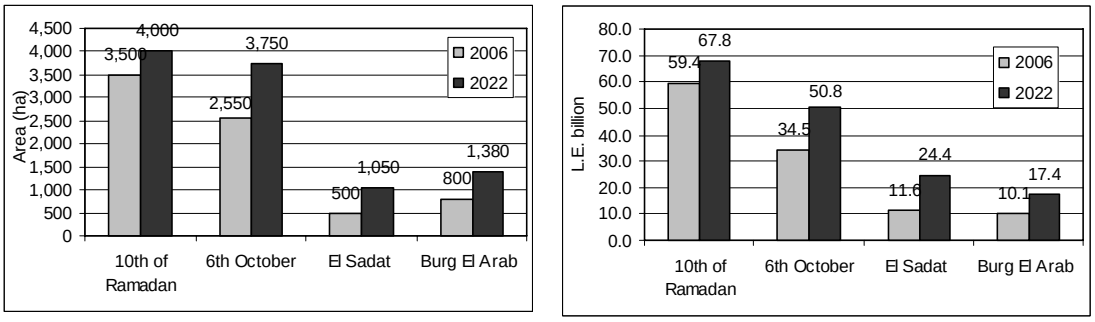
Productions of four industrial zones in 2022 are estimated to be 1.39 times more than 2005.

Table 3.1.11 Forecast of Production in the Four Major Industrial Zones

(billion LE in 2005 prices)

Industrial Zone	2005		2022	
	Area (ha)	Production	Area (ha)	Production
10th of Ramadan	3,500	59.4	4,000	67.8
6th of October	2,550	34.5	3,750	50.8
El Sadat	500	11.6	1,050	24.4
Burg El Arab	800	10.1	1,380	17.4

Source: 2005 data obtained by IDA and 2022 data estimated by JICA Study Team



Area Production

Source: 2005 data obtained by IDA and 2022 data estimated by JICA Study Team

Figure 3.1.3 Area and Production of Major Industrial Zones

3.2 Socio-economic Framework

3.2.1 Population

Population data reveals detail features such as population distribution, employment and sector structure. The Housing Census published detail information based on the Population and Housing Census 1996 and 2006 conducted by CAPMAS, which covers the whole country. The Census 2006 provides only the total figures by governorate and others are still in compilation process as of June 2007.

Total populations in each Census year are presented in Table 3.2.1. The growth rate between the years 1986-1996 was 2.07 % and that of 1996-2006 is 2.04%, showing a slightly decreasing tendency, however it is still a high rate compared with the international average rate of less than 1.6% during 1970-2000 (US Census Bureau, International Data Base, August 2006).

Table 3.2.1 Population of Egypt: Actual and Forecast

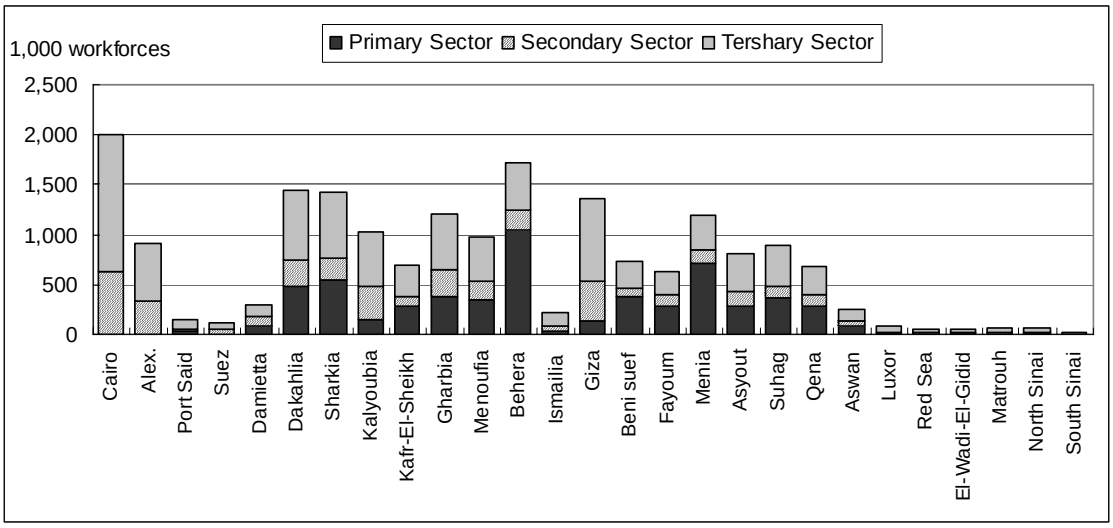
	1986 Census	1996 Census	2006 Census	2022 (Forecast)
Population (million)	48.3	59.3	72.6	90.8 (Optimistic) 86.0 (Conservative)
Average Annual Growth Rate (%)	-	2.07%	2.04%	1.41% (Optimistic) 1.07% (Conservative)

Source: 1986, 1996, and 2006 Census CAPMAS, 2022 forecast: The Fifth Five-Year Plan for Socio-Economic Development (2002-2007) & First Year, Ministry of Planning (April 2002)

The future population perspective is presented in the twenty-year development plan (Ministry of Planning, April 2002), which provides the population forecast at 2022. It assumes that population growth rate at 2022 will be at 1.0% without any clear policy and reasoning, resulting in the annual average growth rate between 2006–2022 of 1.07% (conservative) and 1.41% (optimistic) up to 2022 with a remarkable reduction of population growth tendency. No amendment of future population figures has been published yet, as of June 2007.

The two scenarios of “conservative” and “optimistic” set lower figures for population growth than actual figures since the 1986 Census. If the population growth rate is kept at the same level of 2.04% as it was in the 1990s and the early 2000s, the total population could be expected to reach at 100.3 million by 2022.

Employment distribution by governorate is shown in Figure 3.2.1 together with sector composition. It apparently shows that the densely populated areas and the economic active areas spread along the River Nile and over the Delta area. Two corridors provide large employment opportunities: a) Cairo - Alexandria Corridor, and b) Cairo – Ismailia – Port Said Corridor. Since the management of the factories answered in the Interview Survey that they had selected their present locations because there was plenty of capable labor and favored living in an urban community, these corridors are considered to be the best locations to meet their demand and preference, suggesting that this tendency will continue in the future.



Source: CAPMAS

Figure 3.2.1 Number of Employees by Governorate in 2004

3.2.2 Industrial Structure

Sectoral share of each governorate and its GDP contribution are not published in Egypt. However, employment structure data by sector in 2004 and 2005 are available at the Central Agency for Public Mobilization and Statistics (CAPMAS) website. Such data reveals which governorates are leading the Egyptian economy.

The brief analysis by the JICA Study Team reveals that the governorates located along the two economic corridors have higher contributions to GDP. These correspond with the locations of industrial estates. They are:

First: Greater Cairo Region – Alexandria corridor, and

Second: Greater Cairo Region – Ismailia – Port Said corridor.

Table 3.2.2 lists all the governorates in order of sectoral share of the secondary sector. This roughly indicates how governorates contribute to the GDP since the secondary sector has the highest and increasing productivity among the three sectors and its large share indicates a dynamic and leading engine of GDP growth as a whole as well as in the number of employees. By considering the absolute size of this contribution as well as share, it is possible to gauge the magnitude of governorate's contribution to the GDP. Agriculture is a traditionally labor absorptive sector and as it suffers from low labor productivity there can be disguised employment in the sector. The tertiary sector has a constant productivity, and thus it cannot grow rapidly in the short term. The secondary, especially manufacturing, sector alone can generate the power to accelerate economic growth.

Table 3.2.2 Employment and Sector Share by Governorate in 2005

Code	Governorate	Employees (unit: 00)				Share (unit: %)		
		Primary	Secondary	Tertiary	Total	Primary	Secondary	Tertiary
2	Alex.	6	3,232	5,900	9,138	0%	35%	65%
4	Suez	17	397	769	1,183	1%	34%	65%
8	Kalyoubia	1,486	3,352	5,382	10,220	15%	33%	53%
5	Damietta	786	956	1,258	3,000	26%	32%	42%
1	Cairo	40	6,307	13,701	20,048	0%	31%	68%
14	Giza	1,382	3,975	8,160	13,517	10%	29%	60%
10	Gharbia	3,753	2,688	5,574	12,015	31%	22%	46%
13	Ismailia	406	459	1,343	2,208	18%	21%	61%
3	Port Said	266	291	902	1,459	18%	20%	62%
20	Qena	2,742	1,291	2,765	6,798	40%	19%	41%
18	Asyout	2,805	1,519	3,750	8,074	35%	19%	46%
6	Dakahlia	4,860	2,612	6,894	14,366	34%	18%	48%
16	Fayoum	2,846	1,116	2,291	6,253	46%	18%	37%
11	Menoufia	3,536	1,715	4,452	9,703	36%	18%	46%
7	Sharkia	5,450	2,244	6,475	14,169	38%	16%	46%
23	Red Sea	28	83	444	555	5%	15%	80%
21	Aswan	882	368	1,302	2,552	35%	14%	51%
9	Kafr-El-Sheikh	2,888	977	3,044	6,909	42%	14%	44%
26	North Sinai	121	97	483	701	17%	14%	69%
27	South Sinai	21	25	138	184	11%	14%	75%
19	Suhag	3,603	1,183	4,099	8,885	41%	13%	46%
17	Menia	7,038	1,355	3,496	11,889	59%	11%	29%
12	Behera	10,455	1,884	4,880	17,219	61%	11%	28%
15	Beni suef	3,820	774	2,618	7,212	53%	11%	36%
25	Matrouh	15	68	638	721	2%	9%	88%
24	El-Wadi-El-Gidid	126	48	403	577	22%	8%	70%
22	Luxor	159	67	659	885	18%	8%	74%
	Egypt	59,722	39,182	91,462	193,182	31%	20%	47%

Note: Code is the identical number of governorate used in CAPMAS.
Source: CAPMAS on the web, June 2007

A high share of the secondary sector is apparent in Alexandria, Suez, Kalyoubia, Damietta, and Cairo, where the governorates' secondary sectors account for more than 30% of the employment of each governorate, and these are followed by Giza, Gharbia, Ismailia, and Port Said.

An employment shift from agriculture/service sector to manufacturing suggests a high potential for economic growth in the future because of the high productivity of manufacturing. Those governorates are listed in Table 3.2.3 based on the data of 2004 and 2005. They are similar to the governorates listed in Table 3.2.2, suggesting higher contribution to GDP.

Location of current and planned industrial estates is another determinant factor of future economic growth by the governorate.

Table 3.2.3 List of Governorates with Higher Growth of Manufacturing Sector

Category	Governorates	Remarks
Higher Expansion of Secondary Sector	Damietta (7%), Port Said (6%), Kalyoubia (5%), Kafr-El-Sheikh (3%),	more than 3% per year
Steady Expansion of Secondary Sector	Cairo (2%), Alexandria (1%), Dakalia (1%), Behera (1%), Giza (1%),	more than 0%

Note: Other governorates also show higher sectoral rate of secondary sector, and those are Red Sea (6%), North Sinai (1%), and South Sinai (7%). However, their economic scale by governorate is small, less than 100,000 employees as a whole. So, they are omitted from this table.

Source: Statistical Yearbook 2005, Central Agency for Public Mobilization and Statistics (CAPMAS), and CAPMAS web, June 2007.

3.2.3 Gross Domestic Product (GDP)

Formal growth rate figures of gross domestic product (GDP) are shown in Table 3.2.4. It shows that the Egyptian economy had shifted from a stage where the economy was stagnating to a more dynamic development stage after 2003/04, showing an accelerating growth rate year by year; up to 6.9% in 2005/06. This reflects an expansion in the export and manufacturing industries that has been induced by influx of foreign direct investment (FDI) and trade promotion policies supported by the Ministry of Industry, and Ministry of Investment.

Table 3.2.4 GDP: Actual Performance in the Past

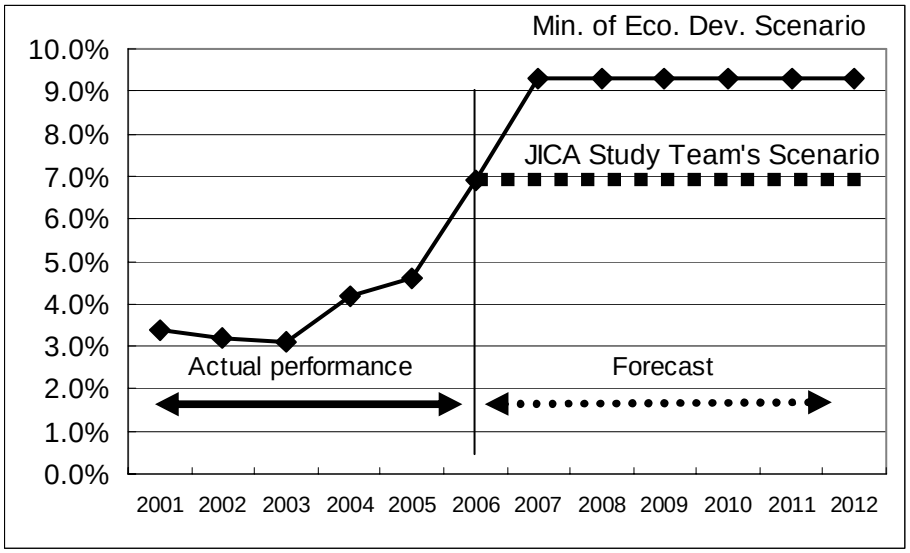
Items	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2001 -2006
Real GDP at Market Price (LE billion)	320	355	366	381	399	426	-
Real GDP Growth Rate (%)	3.4	3.2	3.1	4.2	4.6	6.9	3.5%

Source: Ministry of Planning, CAPMAS and calculation of Ministry of foreign Trade & Industry

The future GDP Growth rate was forecast by the Ministry of Economic Development (previous Ministry of Planning) in drafting the Sixth-Five years Plan for Socio-economic Development (2008-2012). This growth scenario sets an annual average growth rate of 9.3% (primary sector: 5.3%, Secondary sector: 12.5%, and Tertiary sector: 8.0% annually, in 2006 constant prices). These rates are much higher than the actual performance i.e. 3.5% during the period of 2000-2006 (2001/2002 current price) as a whole. The latest single year growth rate of 6.9% for 2005/06 indicates a higher rate than that of the average figure for the period, and shows the accelerated trend that is boosted by the manufacturing sector, mainly manufacturing exports as shown in the growth rate by sector. However, an average growth rate of 9.3% is extraordinary high compared with the previous years (4.6% and 6.9% in 2004/05, and 2005/06 respectively).

This suggests the need to set a more realistic scenario. The JICA Study Team adopts a second scenario where the growth rate is 6.9%, being same as that in 2005/06 for the whole period of 2007-2012. This allows for the trend to an accelerated growth rate; almost two times higher than average of 3.5% between 2000/01-2005/06, and about three-quarters of the planned figure in the growth scenario.

Comparison of the two scenarios is shown in Figure 3.2.2 together with the growth trend between 2000/01-2005/06.



Source: Ministry of Economic Development and JICA Study Team

Figure 3.2.2 GDP Growth Rate: Actual Performance and Two Future Scenarios

3.3 Freight Demand Forecast for Export and Import

To achieve a modern logistics system along with the development of export and import industries, it is essential to understand the international trade conditions not only in the Eastern Mediterranean Region but also in the world. In addition, it is essential to have knowledge of freight flows from origin to destination within Egypt in order to identify main freight corridors, bottlenecks and locations of required future logistics facilities in the transportation network.

Generally, international trade is discussed based on export and import values (monetary terms) as indicators representing the economic performance of a country. On the other hand, export and import volumes in terms of tons, TEU, or quantity are significant indicators for examining logistics issues.

Most of the export and import commodities are transported from/to foreign countries via Egyptian ports by sea transport. Less than 1% of the total export and import volumes in 2005, according to the CAPMAS database, were transported by air via airports or land transport via international borders. Considering the circumstances, the current export and import volumes are mainly handled at the major Egyptian ports[2]. Since the "Statistical Book 2005" issued by the Egyptian Maritime Data Bank provided sufficient and detailed data/information to analyze export and import volumes, by commodity type and by country, it was used for basic data together with the results of the interview surveys.

This section describes the results of analysis for current and future freight flows and volumes, while the method of the future freight demand forecast is described in Appendix-3.

All the OD matrices estimated in the JICA Study reaches 144 (54 + 54 + 36) cases. Appendix-3 contains some OD tables, and all OD matrices are stored in the digital form (CD-ROM) attached to the supplementary document of the JICA Study Team. That is entitled "The Demand Assignment System for Export and Import Freight Volume" and was submitted to the Transport Planning Authority for the use in the future.

Table 3.3.1 All OD Matrices Prepared in the JICA Study

Case	Transport Modes	Commodity Types	Total	Remarks
Present	3 (Truck+ Railway+ Inland Waterways)	18 Types	54	
Future (1)			54	
Future (2)	2 (Truck+ Railway)		36	Rail Development Case. Inland waterway OD is same as Future (1)

Source: JICA Study Team

[2] The major Egyptian ports include Alexandria Port, Dekheila Port, Damietta Port, Port Said Port (West), Port Said Port (East), El-Arish Port, Suez Port, Adabiya Port, Sokhna Port, Safaga Port and Nowaiba Port.

3.3.1 Current Freight Flows and Volumes between Egypt and the World

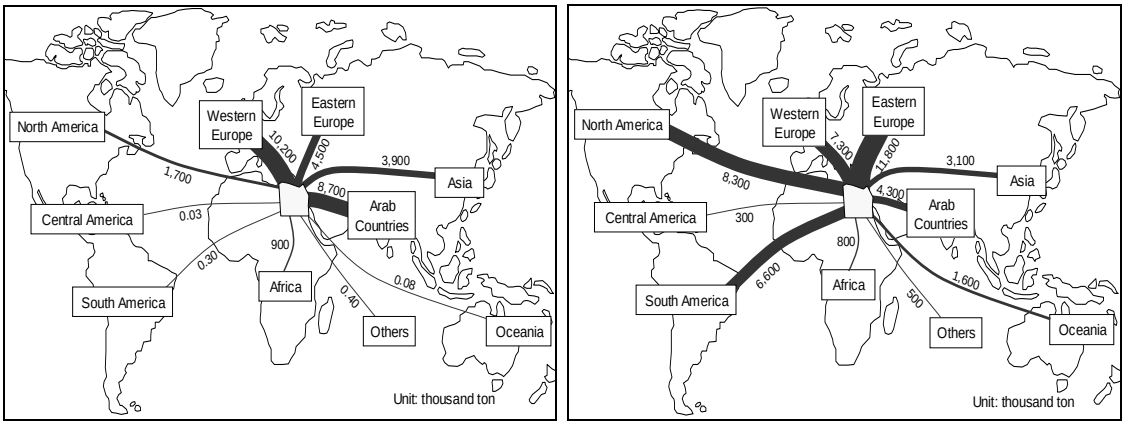
(1) Current Export and Import Flows and Volumes between Egypt and the World

By categorizing the countries into ten regions consisting of Arab Countries, Eastern Europe, Western Europe, Asia, Africa, North America, Central America, South America, Oceania and other countries in accordance with the region classification by CAPMAS shown in Appendix-3, the export and import volumes between Egypt and the regions in the world are illustrated in Figure 3.3.1. Table 3.3.2 shows the top 10 countries by export and import volumes in 2005. The export and import volumes were 31.6 million ton and 44.7 million ton in 2005, respectively.

In terms of export, Egypt was strongly related to Western Europe and Arab countries. In the region, Spain, Italy, Saudi Arabia and Syria show higher export volumes, of which the main commodities are cement, gaseous hydrocarbon and manufacturing goods. Since the United States is included in the top 10 countries for both export and import, it is an important trade partner for Egypt.

Of all regions, in terms of import, Eastern Europe shows the strongest relationship with Egypt. The main commodity is wheat. Russia, Ukraine and Turkey are identified as the main trade partners in Eastern Europe. China was ranked 14 for import and 16 for export in 2005.

Considering Figure 3.3.1 and Table 3.3.2, Egypt is mainly connected with Western Europe and Arab countries for export, while various countries and regions are the trading partners of Egypt for import. By promoting export industries, Egypt is expected to strengthen the relationship with current export countries and to explore other countries as new markets.



Export Import

Source: Worked out by JICA Study Team based on Statistical Book 2005, Egyptian Maritime Data Bank

Figure 3.3.1 Export and Import Volumes (Unit: Thousand Ton)

Table 3.3.2 List of Top 10 Countries of Export and Import Volumes in 2005

(Unit: thousand ton)

Rank	Export			Import		
	Country Name	1,000 ton	%	Country Name	1,000 ton	%
1	Spain	3,761	12	United States	6,707	15
2	Italy	3,053	10	Russia	4,617	10
3	Turkey	1,932	6	Brazil	3,641	8
4	Saudi Arabia	1,797	6	Ukraine	3,318	7
5	Syria	1,725	5	Argentina	2,906	7
6	United States	1,348	4	Italy	1,644	4
7	Sudan	1,239	4	Canada	1,540	3
8	Jordan	997	3	Australia	1,494	3
9	Yemen	897	3	Belgium	1,136	3
10	Lebanon	805	3	Turkey	1,131	3
-	Others	14,074	44	Others	16,554	37
	Total	31,627	100	Total	44,688	100

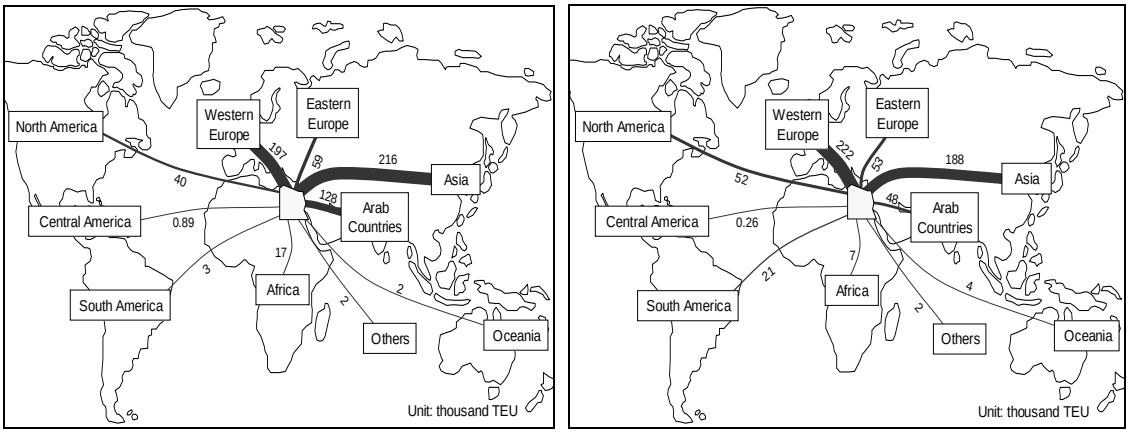
Source: Statistical Book 2005, Egyptian Maritime Data Bank

(2) Current Export and Import Container Flows and Volumes between Egypt and the World

General cargo and dry/liquid bulk cargo are generally handled at each port adjacent to production or consumption area of the hinterland. Container cargo is comparatively easy to change from the one port to another in accordance with intentions or requests of shippers or shipping companies. Container movement between Egypt and the world provides information about the allotment of containers among the Egyptian ports.

Figure 3.3.2 illustrates the export and import container volumes between Egypt and the regions. Table 3.3.3 shows the top 10 countries for export and import container volumes in 2005. Main origin and destination were Western Europe and Asia. Italy and China were the major export and import partners for container cargoes in Western Europe and Asia, respectively. The container movement between Egypt and China was more active than bulk cargoes.

Alexandria & Dekheila Ports handled 90% of the container cargoes exported/imported to/from Italy. This state can be explained by the proximity of Alexandria & Dekheila Ports to Italy and that they are calling ports for the weekly shipping service between Italy and China (using 7 vessels with a round-trip of 49 days). On the other hand, Sokhna Port handled 60% of the container cargoes exported/imported to/from China. Since Sokhna Port is the sole port with modern handling facilities in Red Sea, it is expected to handle more container cargoes from/to China and the other Asian countries.



Export Import

Note: The major Egyptian ports for container cargoes includes Alexandria Port, Dekheila Port, Damietta Port, Port Said Port (West), Port Said Port (East) and Sokhna Port.
Source: Worked out by JICA Study Team based on Statistical Book 2005, Egyptian Maritime Data Bank

Figure 3.3.2 Export and Import Container Volumes (Unit: Thousand TEU)

Table 3.3.3 List of Top 10 Countries of Export and Import Container Volumes in 2005

(Unit: TEU)

Rank	Export			Import		
	Country Name	TEU	%	Country Name	TEU	%
1	China	89,303	15	Italy	81,954	14
2	Italy	57,209	10	China	70,099	12
3	Belgium	38,529	6	Belgium	48,442	8
4	United States	36,413	6	United States	45,280	8
5	Singapore	26,713	4	Turkey	26,580	4
6	Turkey	26,512	4	Germany	23,150	4
7	United Kingdom	25,609	4	Spain	22,328	4
8	Saudi Arabia	24,274	4	India	18,312	3
9	Syria	23,595	4	South Korea	17,275	3
10	Spain	20,217	3	Brazil	15,729	3
-	Others	298,435	50	Others	230,156	38
	Total	664,675	100	Total	597,320	100

Source: Statistical Book 2005, Egyptian Maritime Data Bank

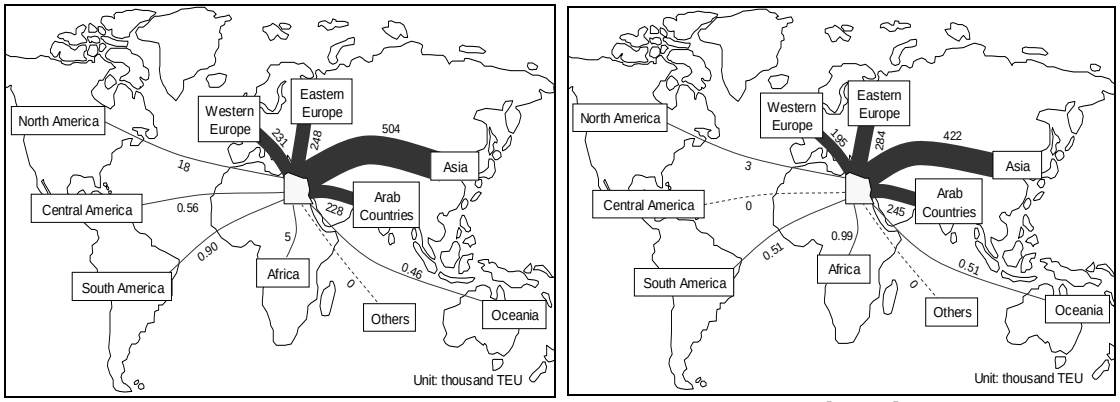
(3) Current Transhipment Container Flows and Volumes via Egyptian Ports

The geographic location of Egypt makes the transhipment containers a profitable business for terminal operators, although it has little impact to export and import industries and the national economy.

The inbound and outbound transhipment container volumes at major Egyptian ports were 2.4 million TEU in 2005, of which 97% was handled at Port Said, Port East & West and Damietta Port. As shown in Figure 3.3.3, substantial transhipment volumes are observed between Egypt and Asia. The Egyptian ports play the role and function as hub ports among Arab, European, and Asian countries. On the other hand, the Egyptian ports

handle few transhipment containers from/to North, Central & South America.

Table 3.3.4 shows the top 10 countries for transhipment container volumes in 2005. Turkey was high ranking with both inbound and outbound volumes, as were some of the Asian and European countries.



Inbound Outbound

Source: Worked out by JICA Study Team based on Statistical Book 2005, Egyptian Maritime Data Bank

Figure 3.3.3 Transhipment Container Volumes (Unit: Thousand TEU)

Table 3.3.4 List of Top 10 Countries of Transhipment Container Volumes via Egypt in 2005

(Unit: TEU)

Rank	Inbound			Outbound		
	Country Name	TEU	%	Country Name	TEU	%
1	Malaysia	133,651	11	Turkey	168,756	15
2	Turkey	118,072	10	Israel	127,524	11
3	Israel	115,484	9	Egypt	118,263	10
4	Egypt	104,125	8	China	80,346	7
5	China	85,074	7	Syria	66,360	6
6	Cyprus	70,525	6	Italy	60,278	5
7	Syria	62,457	5	Malaysia	51,954	5
8	Italy	61,163	5	France	48,609	4
9	Sri Lanka	47,007	4	Greece	41,792	4
10	Spain	38,118	3	Cyprus	37,968	3
-	Others	400,788	32	Others	349,371	30
	Total	1,236,464	100	Total	1,151,221	100

Note: Total figures of "Inbound" and "Outbound" are different in the table: however, these are the formal figures appeared in the data source below. Difference is statistical errors, and is kept as they are.

Source: Statistical Book 2005, Egyptian Maritime Data Bank

In order to classify the transhipment container movement with focus on the Mediterranean Region and Suez Canal, seven sub-regions can be classified as shown in Table 3.3.5. Based on the sub-region classification, the inbound and outbound transhipment container movements are illustrated in Figure 3.3.4.

Considering the high transhipment volumes by country in Table 3.3.4 and the strong interrelationship between Egypt and Middle East in Figure 3.3.4, the Egyptian ports (Port Said Port East & West and Damietta Port) serve transhipment containers from/to Turkey, Syria, Cyprus and Israel as a main gate to connect with Asia – Europe route.

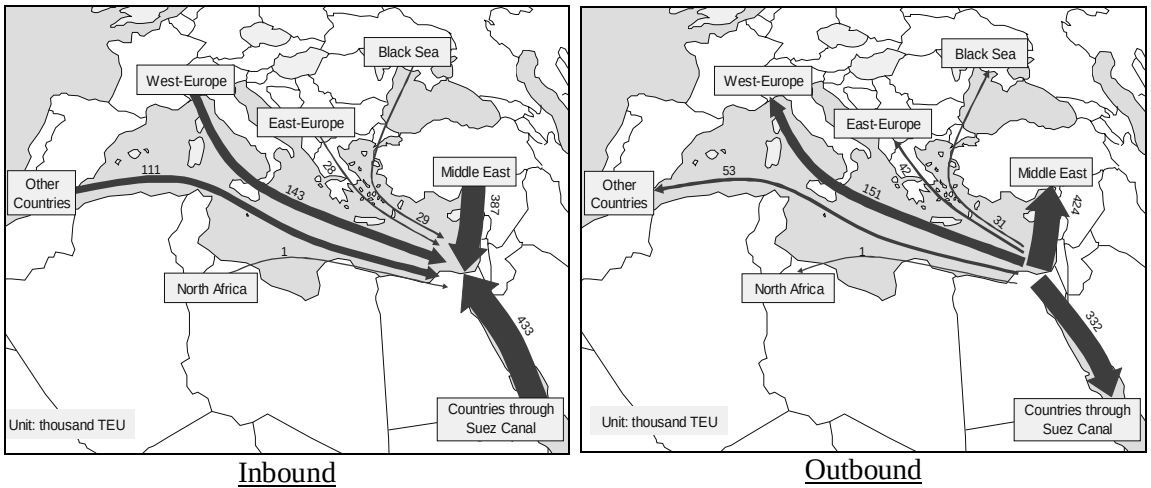
With regard to East-Europe and Black Sea sub-regions, the transhipment container volumes through the Egyptian ports are significantly low. This may be due to transhipment by other competitive ports such as Gioia Tauro Port in Italy.

The transhipment container volume through Suez Canal from south to north is higher than that from north to south. This tendency corresponds with the total cargo volumes through Suez Canal by direction in recent years.

Table 3.3.5 Sub-Region Classification

Sub-Region	Country
West-Europe	France, Italy, Spain, Malta
East-Europe	Greece, Slovenia, Croatia Bosnia & Herzegovina, Serbia, Montenegro, Albania
Black Sea	Ukraine, Romania, Bulgaria, Russia, Georgia
Middle East	Turkey, Cyprus, Syria, Lebanon, Israel
North-Africa	Algeria, Tunisia, Morocco, Libya
Countries through Suez Canal	Arab, Asian, East & South African and Oceania countries
Other Countries	Other European, North, Central & South American and West African countries

Source: JICA Study Team



Inbound Outbound

Note: Some shipping services between Egypt and West-Europe are operated through the Strait of Gibraltar.

Source: Worked out by JICA Study Team based on Statistical Book 2005, Egyptian Maritime Data Bank

Figure 3.3.4 Transhipment Container Volumes by Sub-Region

3.3.2 Current Freight Flows and Volumes in Egypt

(1) Export and Import Volumes by Handling Type

In 2005, export and import volumes at the major ports in Egypt reached 31.6 million tons and 44.7 million tons respectively. Of the total exports, 39% was exported from the Great Alexandria Port (Alexandria & El-Dekheila Port), which is the highest, followed by Damietta Port, which has a share of 27%. Regarding imports, 63% are imported at the Great Alexandria Port, which is the highest, followed by Damietta Port, which has a share of 20%.

As shown in Table 3.3.6, dry bulk is the highest for both export and import followed by general cargo. The share of container is about 15% for both export and import, which are mainly handled at Great Alexandria Port, Damietta Port, Port Said Port and Sokhna Port.

Table 3.3.6 Handled Local Cargo(*) at Egyptian Ports in 2005

(Export) (Unit: 1000 ton/year)

Port	General Cargo	Dry Bulk	Liquid Bulk	Container	Special Cargo	Total	Share
Alexandria & El-Dekheila	1,905	3,702	4,163	2,195	216	12,181	38.5%
Damietta	872	3,410	182	778	3,124	8,366	26.5%
Port Said & East Port Said	56	197	23	806	2	1,084	3.4%
Suez & Adabiya	1,059	1,757	0	30	60	2,906	9.2%
Sokhna Port	583	1,222	0	793	0	2,598	8.2%
El-Arish	1	1,482	0	0	0	1,483	4.7%
Safaga	233	1,216	6	0	29	1,484	4.7%
Nuwaiba & Others	468	999	0	0	58	1,525	4.8%
Total	5,177	13,985	4,374	4,602	3,489	31,627	100.0%
Share	16.4%	44.2%	13.8%	14.6%	11.0%	100.0%	-

(Import) (Unit: 1000 ton/year)

Port	General Cargo	Dry Bulk	Liquid Bulk	Container	Special Cargo	Total	Share
Alexandria & El-Dekheila	8,382	11,736	705	4,265	3,074	28,162	63.0%
Damietta	2,373	5,001	15	684	972	9,045	20.2%
Port Said & East Port Said	33	1,116	155	758	8	2,070	4.6%
Suez & Adabiya	1,946	93	6	25	1,078	3,148	7.0%
Sokhna Port	3	5	12	823	0	843	1.9%
El-Arish	0	8	0	0	0	8	0.0%
Safaga	67	1,107	19	0	112	1,305	2.9%
Nuwaiba & Others	97	8	0	0	2	107	0.2%
Total	12,901	19,074	912	6,555	5,246	44,688	100.0%
Share	28.9%	42.7%	2.0%	14.7%	11.7%	100.0%	-

(*) Transit Cargo is not included.
Source: Statistical Yearbook 2005, Egyptian Maritime Data Bank (EMDB)

(2) Export and Import Volumes by Commodity Type

By commodity type, the most exported commodity is cement, which has a share of 26%, followed by gaseous hydrocarbons, which has a share of 11%. For imported commodities, wheat occupied the top position (14%), closely followed by maize, which has a share of 12%. The share of other commodities (referred to as "others") is 38% for export and 41% for import.

Table 3.3.7 Top 9 Cargos(*1) at Egyptian Ports in 2005

(Unit: 1000 ton/year)

Rank	Export			Import		
	Commodity Type	Volume	Share	Commodity Type	Volume	Share
1	Cement	8,234	26.0%	Wheat	6,266	14.0%
2	Gaseous Hydrocarbons, Liquid or Compressed	3,340	10.6%	Maize	5,282	11.8%
3	Phosphates, Crude, Natural	1,794	5.7%	Other Basic Chemicals(*2)	4,680	10.5%
4	Gasoline	1,357	4.3%	Railway or Tramway Sleepers of Woods and Other Wood Roughly Squared, Half Squ	2,048	4.6%
5	Salt, Crude or Refined	1,238	3.9%	Iron ore and Concentrates	2,028	4.5%
6	Rice	1,071	3.4%	Oil-seed Fats, Oil nuts and Oil Kernels	1,722	3.9%
7	Sand for Industrial Use	973	3.1%	Gaseous Hydrocarbons, Liquid or Compressed	1,644	3.7%
8	Building and Monumental Stone, Unworked	925	2.9%	Pig iron, Spiegeleisen and Carburized Ferro-manganese	1,486	3.3%
9	Semi-finished Rolled Steel Products	560	1.8%	Animal and Vegetable Fats and Oils, and Products Derived Therefrom	1,314	2.9%
10	Others(*3)	12,135	38.4%	Others(*3)	18,218	40.8%
	Total	31,627	100.0%	Total	44,688	100.0%

(*1): Transit Cargo is not included.
(*2): Other basic chemicals include a large group of chemicals such as, e.g., plastics, fibers, resins, and dyestuffs - and the industrial chemicals.
(*3): "Other manufactured goods, which are not classified according to type" is in 3rd place for export and by 4th place for import in the Statistical Yearbook 2005, but this can't be classified as one of commodity type. Therefore, this is handled partially of "Others".
Source: Statistical Yearbook 2005, EMDB

(3) Export and Import Volumes by Commodity Type by Major Port

Table 3.3.6 shows export and import volumes by handling type at each port, while Table 3.3.7 shows only the total of export and import volumes. Export and import volumes by commodity type at each port were estimated from these tables based on the assumption that the share of each port by handling type was the same for all commodity type. To calculate this estimation, it was necessary to assume the composition of the handling types for each commodity. Table 3.3.8 shows the handling types by commodity type. Export and import volume by handling type were estimated for each commodity type from the table.

Table 3.3.8 Relation between the Handling Types and the Commodity Types in 2005

(Export)

Rank	Commodity	Volume (1000 ton/year)	Dry Bulk	Liquid Bulk	Conventional Cargo (*)
1	Cement	8,234	97%		3%
2	Gaseous Hydrocarbons, Liquid or Compressed	3,340		100%	
3	Phosphates, Crude, Natural	1,794	100%		
4	Gasoline	1,357		76%	24%
5	Salt, Crude or Refined	1,238	100%		
6	Rice	1,071	97%		3%
7	Sand for Industrial Use	973	100%		
8	Building and Monumental Stone, Un-worked	925	100%		
9	Semi-finished Rolled Steel Products	560			100%
10	Others	12,135			100%
	Total	31,627	13,986	4,374	13,267

(Import)

Rank	Commodity	Volume (1000 ton/year)	Dry Bulk	Liquid Bulk	Conventional Cargo (*)
1	Wheat, Spelt and Muslin	6,266	100%		
2	Maize	5,282	100%		
3	Other Basic Chemicals	4,680	86%		14%
4	Railway or Tramway Sleepers of Woods and Other Woods Roughly Squared, Half Squ	2,048			100%
5	Iron ore and Concentrates; except Roasted Iron Pyrites	2,028	100%		
6	Oil-seed Fats, Oil Nuts and Oil Kernels	1,722		53%	47%
7	Gaseous Hydrocarbons, Liquid or Compressed	1,644		100%	
8	Pig Iron, Spiegeleisen and Carburized Ferro-manganese	1,486	100%		
9	Animal and Vegetable Fats and Oils, and Products Derived There from	1,314			100%
10	Others	18,218			100%
	Total	44,688	19,074	912	24,702

(*) Conventional cargo consists of “General cargo”, “Container” and “Special cargo”.
Source: Estimated by JICA Study Team based on the data from EMDB.

Export and import volumes by commodity type each port were calculated as following formula, and the result is summarized in Table 3.3.9.

$$V_{pc} = \sum_{h} \left(Z_{ch} \times w_{ph} \right)$$

where, V_{pc} = Export/Import volume of commodity type *c* at port *p*,
Z_{ch} = Export/Import volume of commodity type *c* by handling type *h*, *and*
w_{ph} = Share of port *p* by handling type *h*.

Table 3.3.9 Export and Import Volumes by Major Port and Commodity Type in 2005

(Export) (Unit: 1000 ton/year)

Port	Cement	Hydro Carbons	Phosphates	Gasoline	Salt	Rice	Sand	Stone	Steel Products	Others	Total
Alexandria & El-Dekheila	2,193	3,180	475	1,089	328	285	257	245	182	3,947	12,181
Damietta	2,033	139	438	159	302	264	237	226	201	4,367	8,366
Port Said East & West	128	17	25	27	18	17	14	13	37	788	1,084
Suez & Adabiya	1,025	0	225	28	155	133	122	116	49	1,053	2,906
Sokhna Port	723	0	157	33	108	94	85	81	58	1,259	2,598
El-Arish	850	0	190	0	131	111	103	98	0	0	1,483
Safaga	701	4	156	8	108	91	85	80	11	240	1,484
Nuwaiba & others	581	0	128	13	88	76	70	66	22	481	1,526
Total	8,234	3,340	1,794	1,357	1,238	1,071	973	925	560	12,135	31,627

(Import) (Unit: 1000 ton/year)

Port	Wheat	Maize	Other Basic Chemicals	Railway Sleepers of Woods	Iron Ore	Oil Seed Fats	Hydro Carbons	Pig Iron	Animal and Vegetable fats	Others	Total
Alexandria & El-Dekheila	3,855	3,250	2,894	1,304	1,247	1,221	1,046	914	836	11,596	28,163
Damietta	1,643	1,385	1,161	334	531	147	268	390	214	2,972	9,045
Port Said East & West	366	309	256	66	119	181	53	87	43	590	2,070
Suez & Adabiya	30	26	102	253	10	106	203	7	162	2,248	3,147
Sokhna Port	2	1	23	68	1	39	55	0	44	609	842
El-Arish	3	2	2	0	1	0	0	1	0	0	9
Safaga	364	307	238	15	118	25	12	86	10	132	1,306
Nuwaiba & Others	3	2	4	8	1	3	7	1	5	72	106
Total	6,266	5,282	4,680	2,048	2,028	1,722	1,644	1,486	1,314	18,218	44,688

Source: Estimated by JICA Study Team based on the data from EMDB

(4) Export and Import Volumes by Transport Mode

Table 3.3.10 shows the transport modes used for export and import. The volume transported by railway and inland waterway is obtained by analyzing the operation data of ENR and RTA in 2005. The volume transported by trucks is calculated by deducting the volume transported by railway and inland waterway from the total volume. As seen in the same table, trucks have the dominant role and captured around 91% with the remaining 9% shared by railway and IWT.

Table 3.3.10 Export and Import Volumes by Transport Mode in 2005

(Unit: 1000 ton/year)

Mode	Export	Import	Total	Share
Railway	1,944	4,923	6,867	9.0%
Inland Waterway	46	199	245	0.3%
Truck	29,637	39,566	69,203	90.7%
Total	31,627	44,688	76,315	-

Source: Calculated by JICA Study Team based on the data from EMDB, ENR and RTA data.

(5) Freight Movement of Export and Import in Egypt

To analyze the freight movement of export and import in Egypt, Origin – Destination (OD) Matrices by commodity type and transport mode were estimated by identifying the origin and destination of exported and imported commodities in Egypt. In case of export, an origin is the starting point of a transport for export while a destination is the port where the transported commodities are exported. On the other hand, an origin of a transport for import is the port where the transported commodities are imported and a destination is the end point of the transport.

The OD matrices of railway and inland waterway were estimated form the ENR's and RTA's operation data. On the other hand, the OD matrices of truck were estimated from various sources and assumptions. Production and consumption data in "A Study on the Development of the Master Plan for Freight Organization at National Level (Technical Consultant Bureau, June 2005)" was the major source and the result of the Shipper Survey was used. To make the OD matrices of truck, the total exported volume from each origin and the total imported volume to each destination were estimated. After that, gravity model and Fratar Method[3] were applied to estimate the volumes of each OD pair. The detail process of making OD matrices are described in Appendix-3.

The followings are the estimated transport flow of major commodity types.

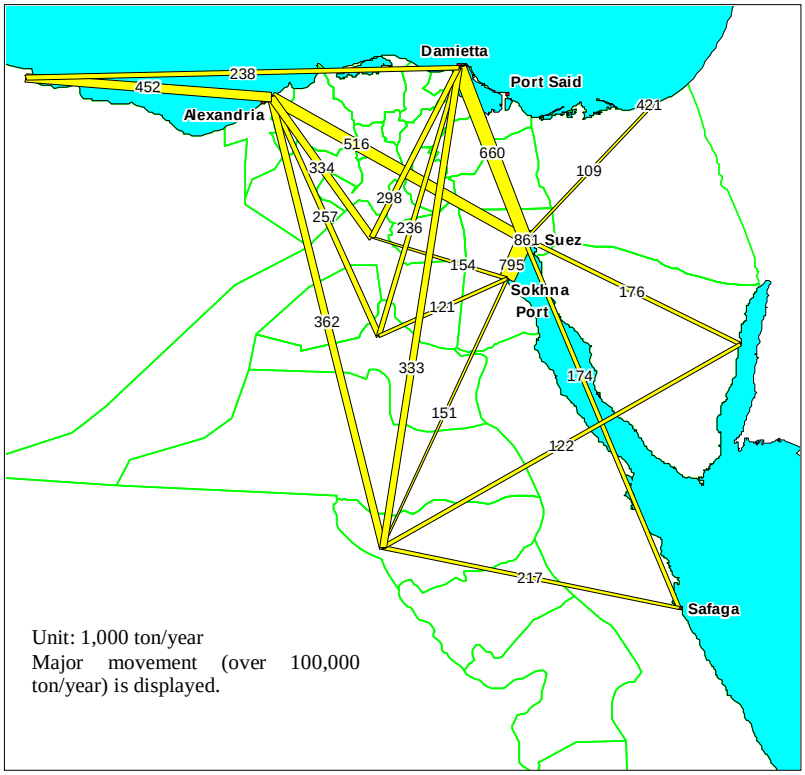
a) Cement

Cement is the prime export commodity of Egypt and 8.2 million tons of cement is exported; mostly transported by trucks. The largest volume of cement is exported from Sokhna Port followed by Suez Governorate, Damietta Port and Alexandria Port with volumes of 0.9, 0.8, 0.7, 0.5 million tons respectively. Some is generated from Asyout and others as shown in Figure 3.3.5.

b) Gaseous Hydrocarbon

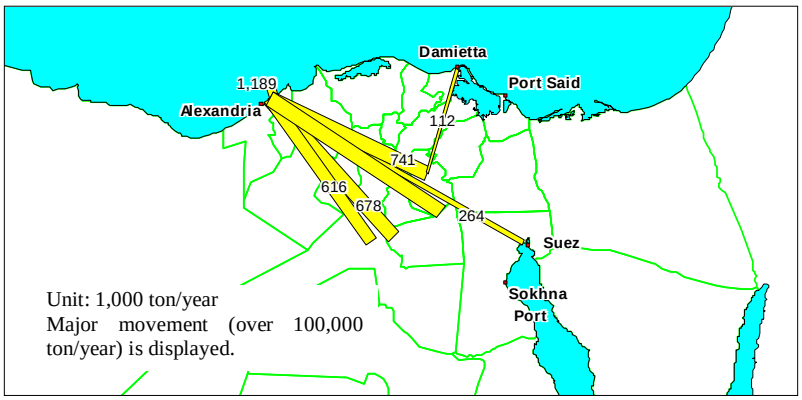
Gaseous hydrocarbon is a general term for various organic chemical compounds of carbon and hydrogen such as methane, ethylene, acetylene, etc. Export and import volumes of gaseous hydrocarbons in year 2005 were 3.3 million tons and 1.6 million tons respectively and ranked in 2nd and 7th place respectively. It can be presumed that the different kinds of gaseous hydrocarbons are transported via trucks. Most of them are exported and imported at Alexandria Port and mainly delivered to and from Cairo Governorate and surrounding industrial zones as well as Alexandria Governorate as depicted in Figure 3.3.6.

[3] This method is used to extrapolate trip distribution on the basis of growth factors for both the origin and the destination.



Source: Estimated by JICA Study Team

Figure 3.3.5 Cement Export Flow in 2005 (Truck)

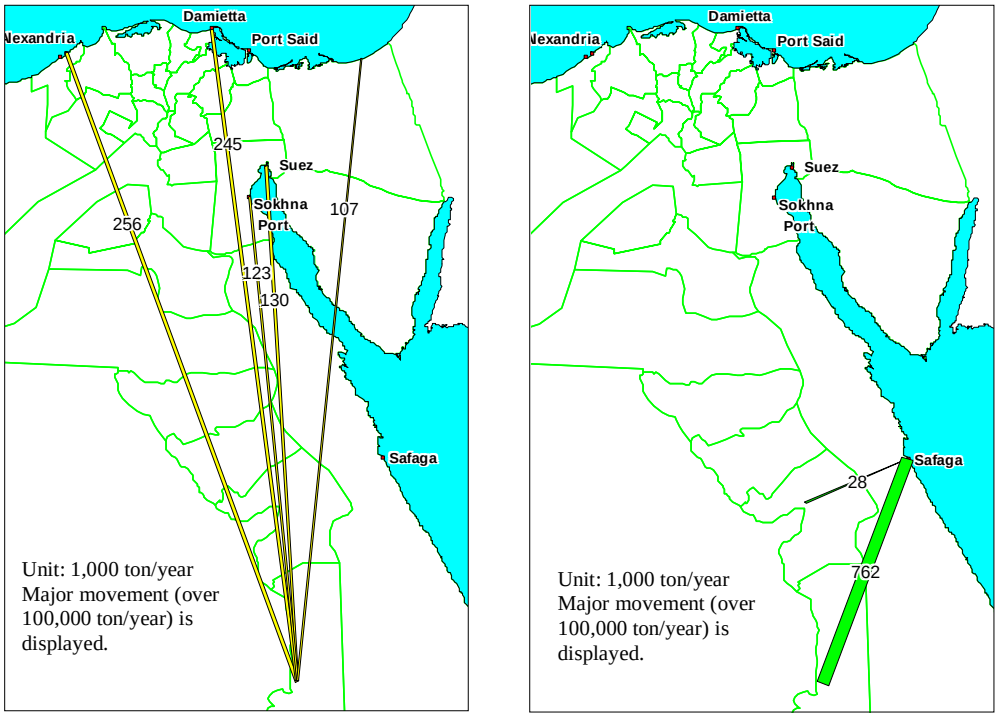


Source: Estimated by JICA Study Team

Figure 3.3.6 Gaseous Hydrocarbon Export & Import Flow in 2005 (Truck)

c) Phosphates

Egypt exports 1.8 million tons of phosphates a year. They are mainly produced in Qena Governorate and most of them are transported by railway to Safaga Port. Those volumes handled by trucks are mainly delivered to the major ports of Egypt as illustrated in Figure 3.3.7.



(Truck) **(Railway)**

Source: Estimated by JICA Study Team

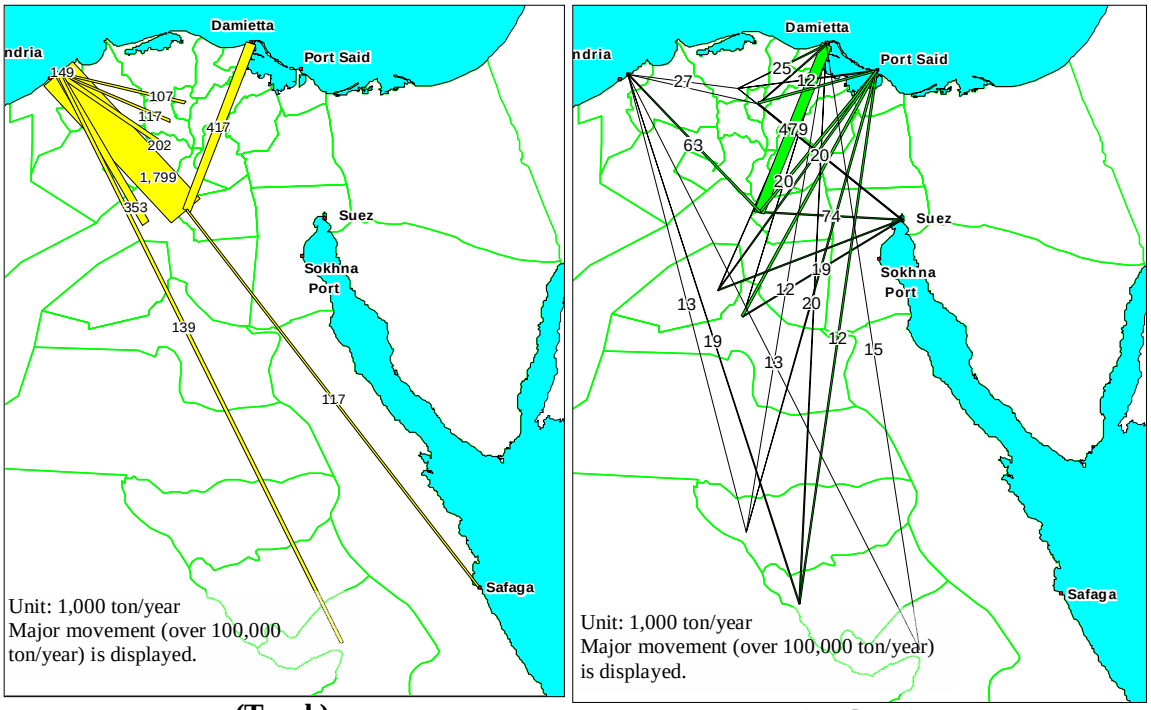
Figure 3.3.7 Phosphates Export Flow in 2005

d) Wheat

Egypt imports 6.3 million tons of wheat a year, which is the highest volume among the imported commodities. Trucks transport 5.0 million tons and the remaining 1.3 million tons is transported by railway. The major ports for the import are Alexandria Port and Damietta Port. As seen in Figure 3.3.8, wheat arriving at Damietta Port is mostly transported by railway. Wheat at the Alexandria Port on the other hand is mostly carried by trucks. For instance, 1.8 million tons of wheat is transported from Alexandria Port to Cairo Governorate by trucks and 0.5 million tons are transported from Damietta Port to Cairo Governorate by railways.

e) Maize

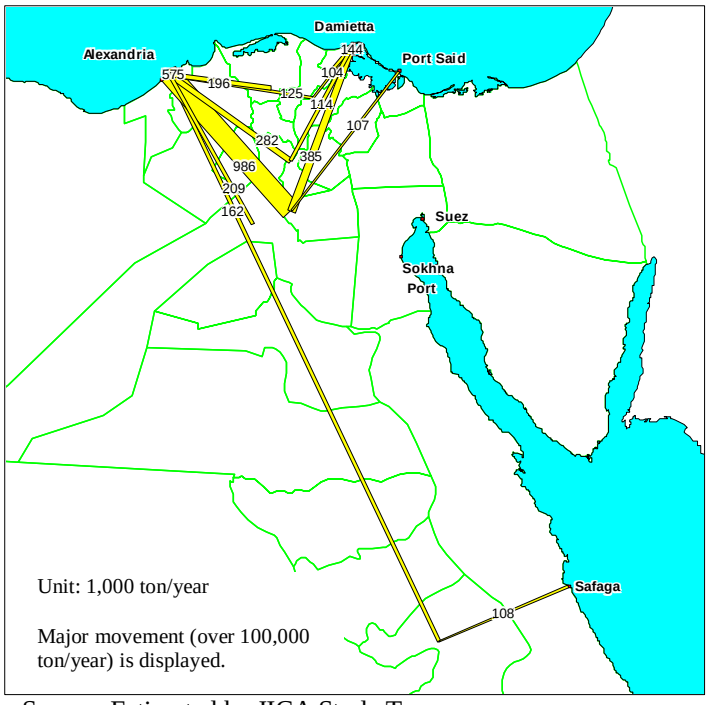
Egypt imports 5.3 million tons of maize, which is ranked in 2nd place. The major import port is Alexandria Port followed by Damietta Port. 1.0 million tons of maize is delivered to Cairo Governorate and 0.6 million tons are to Alexandria Governorate. Besides the 0.2 million tons of maize from Alexandria Port, 0.1 million tons of maize is delivered to Qena Governorate from Safaga Port.



(Truck) **(Railway)**

Source: Estimated by JICA Study Team

Figure 3.3.8 Wheat Import Flow in 2005



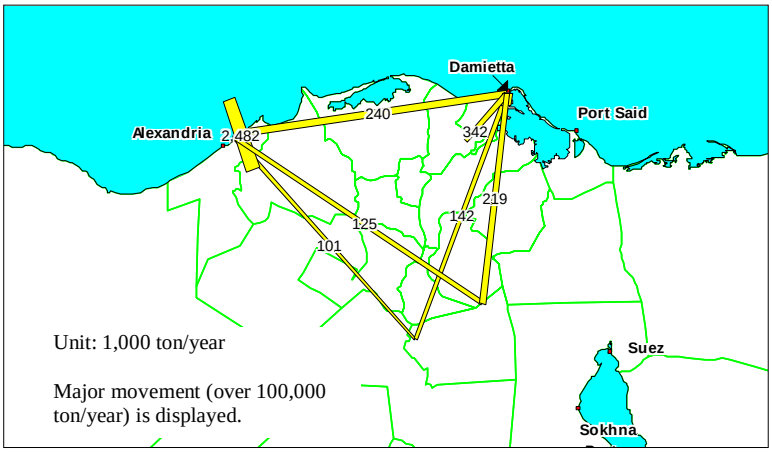
Source: Estimated by JICA Study Team

Figure 3.3.9 Maize Import Flow in 2005 (Truck)

f) Other Basic Chemicals

For the other basic chemicals, 4.7 million tons is imported into Egypt, making it the third most imported commodity category in terms of volume. Out of which, 4.6

million tons are transported by trucks, and the remaining 0.1 million ton is shipped via inland waterway. The destination of those arriving at Alexandria Port, which receives a volume of 2.5 million tons, is the Alexandria Governorate. Commodities arriving at Damietta Port, which total 0.3 million ton, are delivered to the Damietta Governorate. The industrial city of 10th of Ramadan received 0.3 million tons from Damietta Port, as shown in Figure 3.3.10.



Source: Estimated by JICA Study Team

Figure 3.3.10 Other Basic Chemicals Import Flow in 2005 (Truck)

(6) Current Traffic Volume by Transport Mode

Figure 3.3.11, 3.3.12 and 3.3.13 show the current traffic volume of export and import on the major networks of each transport mode. They were estimated by assigning of the OD matrices.

a) Truck

The traffic volume of export and import is largest on the road in the east side of Alexandria Port with 25 million tons. A volume of 17 million tons of commodities is transported on the Damanhur – Alexandria section through Cairo Alexandria Agriculture Road, and 11 million tons is transported through the length of the Cairo – Alexandria Desert Road. The traffic volumes on the Cairo – Damietta Agriculture Road and Ismailia - Port Said Road are 10 million tons and 5 million tons respectively. Along the corridor between Cairo and Upper Egypt, 11 million tons is transported by road. The traffic volume is 5 million tons on the road between Cairo and Suez.

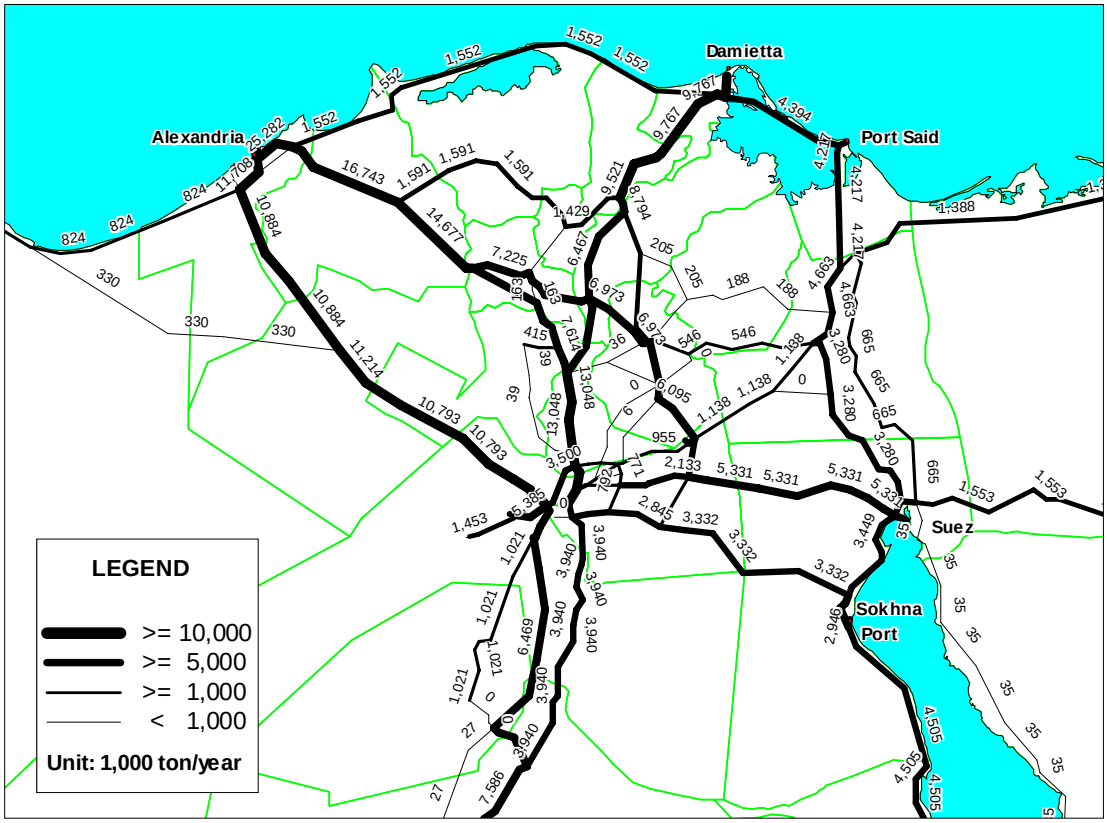
b) Railway

The railway section transporting the largest volume of export and import is around Cairo, and 4 million tons is transported annually. Focusing on directions, the traffic volume between Cairo and Alexandria is 3 million tons while between Giza Rural area and Cairo, the traffic volume is 2 million tons.

Transport between Cairo and Suez Port - Sokhna Port is made via Zagazig – Ismailia because there is no direct freight railway connection at the moment. Consequently, the transport volume between Zagazig and Ismailia is particularly large totaling 2 million tons.

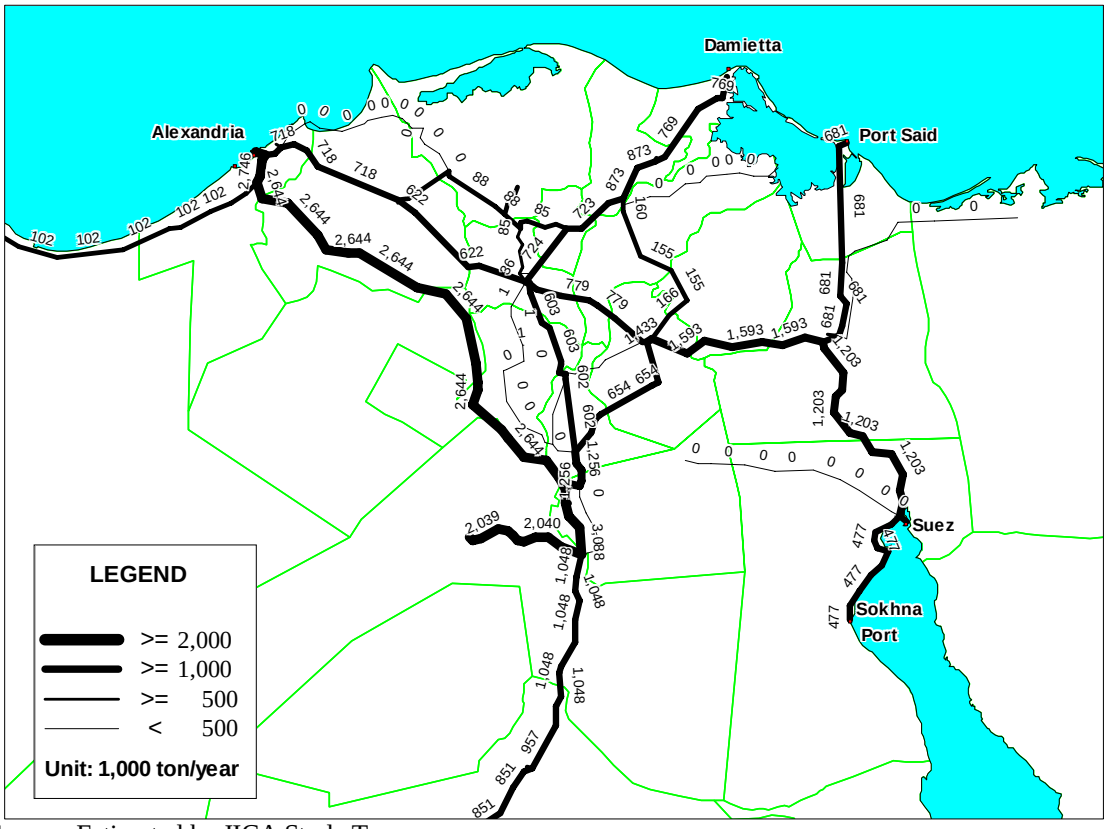
c) Inland Waterway

Transported volume by inland waterway between Alexandria Port and Cairo is less than 0.1 million ton and between Alexandria and Upper Egypt is much less. There is no transport by inland waterway through Damietta Branch at present. Completion of the on-going works by RTA is expected to activate this IWT route.



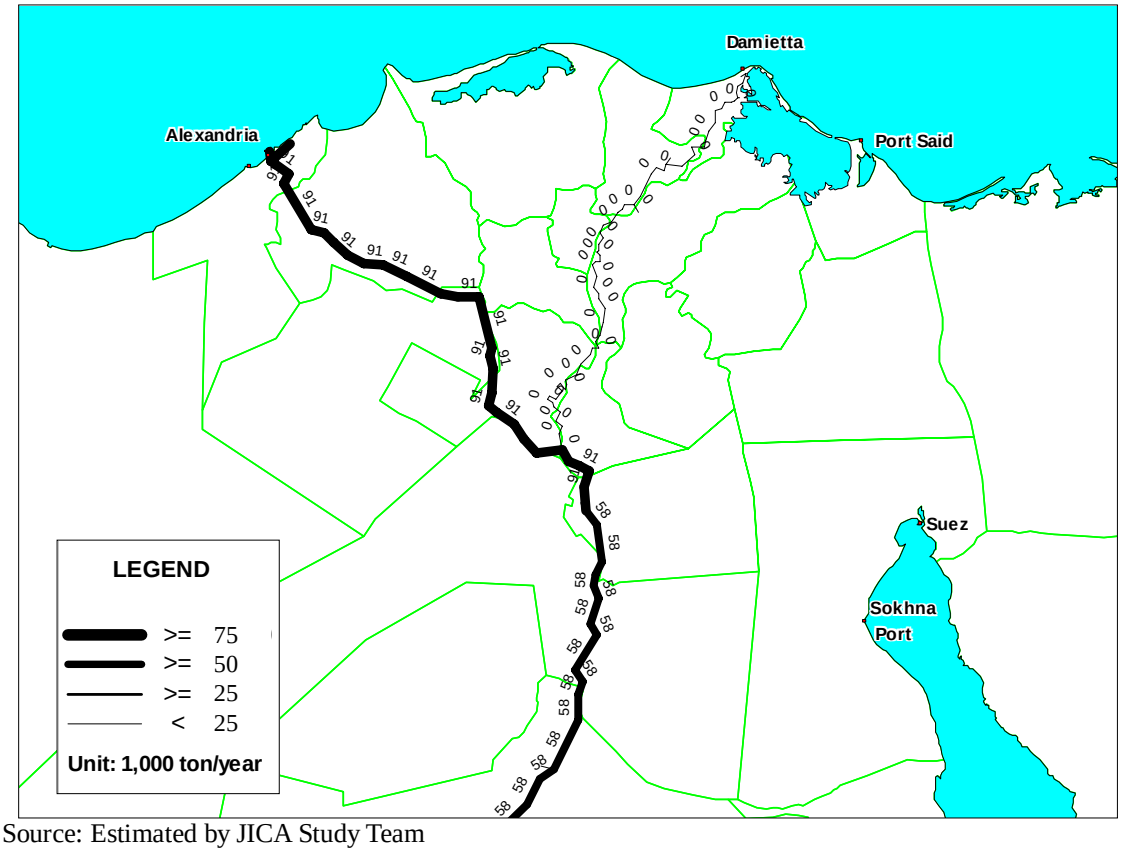
Source: Estimated by JICA Study Team

Figure 3.3.11 Current Traffic Volume by Truck



Source: Estimated by JICA Study Team

Figure 3.3.12 Current Traffic Volume by Railway



Source: Estimated by JICA Study Team

Figure 3.3.13 Current Traffic Volume by Inland Waterway

3.3.3 Future Freight Flows and Volumes for Export and Import in Egypt

(1) Export and Import Volumes in 2022 by Commodity Type

The ratios of export and import volumes in 2022 to that of 2005 were estimated using CAPMAS database. Generally, the increase in export and import volumes is proportional to the increase in GDP and population. Therefore, growth ratios of major export and import commodities were projected based on the analysis of the export and import data with GDP and population. The CAPMAS database was used for the data over the past 10 years. The future (2022) export and import volumes were calculated by multiplying the current (2005) export and import volumes by the projected growth ratios. Table 3.3.11 shows the result of the projection. The details of the projection are described in Appendix-3.

Table 3.3.11 Export and Import Volumes(*) in 2022 by Commodity Type

(Export) (Unit: 1000 ton/year)

Rank	Export Commodity	2005	Growth Rate (2022/2005)	2022
1	Cement	8,234	2.12	17,456
2	Gaseous Hydrocarbons, Liquid or Compressed	3,340	2.71	9,052
3	Phosphates, Crude, Natural	1,794	2.12	3,803
4	Gasoline	1,357	2.40	3,256
5	Salt, Crude or Refined	1,238	2.12	2,625
6	Rice	1,071	2.96	3,170
7	Sand for Industrial Use	973	2.12	2,062
8	Building and Monumental Stone, Unworked	925	2.12	1,961
9	Semi-finished Rolled Steel Products	560	4.89	2,737
10	Others	12,135	2.86	34,705
	Total	31,627	2.56	80,829

(Import) (Unit: 1000 ton/year)

Rank	Import Commodity	2005	Growth Rate (2022/2005)	2022
1	Wheat	6,266	1.38	8,647
2	Maize	5,282	1.38	7,289
3	Other Basic Chemicals	4,680	3.38	15,818
4	Railway or Tramway Sleepers of Woods and Other Wood Roughly Squared, Half Squ	2,048	2.97	6,083
5	Iron ore and Concentrates	2,028	3.11	6,307
6	Oil-seed Fats, Oil Nuts and Oil Kernels	1,722	2.47	4,253
7	Gaseous Hydrocarbons, Liquid or Compressed	1,644	2.54	4,176
8	Pig Iron, Spiegeleisen and Carburized Ferro-manganese	1,486	3.11	4,621
9	Animal and Vegetable Fats and Oils, and Products Derived Therefrom	1,314	3.05	4,008
10	Others	18,218	3.53	64,310
	Total	44,688	2.81	125,573

(*) Transit Cargo is not included.

Source: Calculated by JICA Study Team based on the data from EMDB and CAPMAS data.

(2) Cargo Volume at Major Ports

Table 3.3.12 shows the shares in cargo volume handled at the major ports in Egypt. Although the share of the volume handled in Alexandria Port accounted for over 50% until 2005, it fell to 40% in 2006. Meanwhile, the share handled in Damietta Port rose to 25%, and the share in Port Said Port and Sokhna Port also rose in 2006. It was assumed that the port shares would be the same in 2022 for the forecast of export and import volume at the major ports.

The cargo volumes at ports (2022) were estimated by multiplying the current volumes of each commodity at each port (Table 3.3.9) by the growth rate of each commodity, taking the ratios of export and import volume in 2022 to that of 2005 (Table 3.3.11) into consideration. Since there is an apparent fluctuation of handling volume at each port between 2005 and 2006, preliminary estimation of total cargo volume of each port in 2022 was adjusted by the port share in 2006, which is judged to be the most probable share in 2022 with due consideration of i) fluctuation of cargo volume in 2005-2006 and ii) various port development plans up to 2022. Table 3.3.13 shows the result for the four major ports. It was estimated that 83 million tons would be handled in Alexandria Port, which would have a share of 40%, followed by Damietta Port, which would handle 50 million tons and have a share of 25%.

The volume of cargo handled at major ports in Egypt in 2022 will reach 206 million tons, and the growth ratio of handling volume in 2022 to 2005 will be 2.7 times. Among the four major ports, Port Said Port will have the highest growth ratio (4.8 times), followed by Sokhna Port which will have a growth rate of 3.3 times. The growth ratio in Alexandria Port will be 2.1 times which is the lowest among the four major ports.

Table 3.3.12 Growth Trend of the Cargo Volume in 4 Major Ports: 2004 - 2006

(Unit: 1000 ton/year)

Major Ports	2004		2005		2006	
	Volume	Share	Volume	Share	Volume	Share
Alexandria & El-Dekheila Ports	34,902	52%	40,344	53%	23,314	40%
Damietta Port	14,396	21%	17,411	23%	14,473	25%
Port Said Port & East Port Said	3,905	6%	3,154	4%	4,433	7%
Sokhna Port	3,261	5%	3,440	4%	3,327	6%
Others	11,080	16%	11,966	16%	13,303	22%
Total	67,544	100%	76,315	100%	58,850	100%

Note: Transhipment is not included.
Source: Website of Maritime Transport Sector (www.mts.gov.eg)

Table 3.3.13 Future Growth of Local Cargo Volume by 4 Major Ports

(Unit: 1000 ton/year)

Major Ports	2005		2022		Growth Rate (2022/2005)
	Volume	Share	Volume	Share	
Alexandria & El-Dekheila Ports	40,344	53%	82,920	40%	2.1
Damietta Port	17,411	23%	50,059	25%	2.9
Port Said Port & East Port Said	3,154	4%	15,084	7%	4.8
Sokhna Port	3,440	4%	11,483	6%	3.3
Others	11,966	16%	46,856	22%	3.9
Total	76,315	100%	206,402	100%	2.7

Note: Transhipment is not included.
Source: Estimated by JICA Study Team

(3) Demand from the New Industrial Zones

The development of the new industrial zones is scheduled at various locations in Egypt. Some of them, especially the two industrial zones (6th of October and 10th of Ramadan) are so large that it is desirable to estimate the demand separately and add to the forecast. For this, the expansion rates were defined to incorporate the additional demand from the industrial zones and were calculated for the two main industrial zones. The expansion rate and the basis of the calculation are described in Appendix 3.

(4) Cargo Handling Volume by Transport Mode

The Damietta branch is scheduled to be opened in the near future, and it is expected that a part of the traffic between Damietta Port and each zone transported by truck will shift to the inland waterway.

The export and import freight between the Alexandria Port and Upper Egypt including Greater Cairo and 6th of October zones transported by the inland waterway, at present, comprises "Semi-finished rolled steel product", "Other Basic Chemicals" and "Others". The modal shares of inland waterway for these commodities are 97%, 4% and 1% respectively (Table 3.3.14). The modal shares along the Damietta Branch were assumed to be the same as those of the inland waterway between Alexandria Port and Upper Egypt. Table 3.3.15 shows the projection of traffic for export and import by inland waterway along Damietta Branch.

Table 3.3.14 Modal Share along Alexandria Port and Upper Egypt in 2005

(Unit: 1000 ton/year)

Commodity Type	Inland Waterway	Truck	Modal Share
Semi-finished Rolled Steel Product	6.9	0.2	97.2%
Other Basic Chemicals	5.1	135.8	3.6%
Others(*)	78.6	7,352.4	1.1%

(*) Others include raw aluminium, molasses and other materials.
Source: Calculated by JICA Study Team

Table 3.3.15 Adjustment of Modal Share along the Damietta Branch in 2022

(Unit: 1000 ton/year)

Commodity Type	Projection of Traffic by Truck	Modal Share of Inland Waterway	Shifted Volume to Inland Waterway
Semi-finished Rolled Steel Product	5.0	97.2%	4.9
Other Basic Chemicals	853.9	3.6%	30.7
Others	16,143.8	1.1%	177.6

Source: Calculated by JICA Study Team

Table 3.3.16 shows the estimated cargo handling volumes by transport mode. After the Damietta Branch opens, some cargo transported by inland waterway will be handled in Damietta Port, but the volume will not be large, The modal share in 2022 will be as almost the same as in 2005.

Table 3.3.16 Local Cargo Handling Volume(*) by Transport Mode in 2022 and the Modal Share

(Unit: 1000 ton/year)

Major Ports	Truck	Railway	Inland Waterway	Total
Alexandria & El-Dekheila Ports	75,190	6,940	790	82,920
Damietta Port	47,221	2,682	156	50,059
Port Said Port & East Port Said	14,167	917	0	15,084
Sokhna Port	10,701	782	0	11,483
Others	42,300	4,556	0	46,856
Total	189,579	15,877	946	206,402
Modal Share (%) in 2022	91.8%	7.7%	0.5%	100.0%
Modal Share (%) in 2005	90.7%	9.0%	0.3%	100.0%

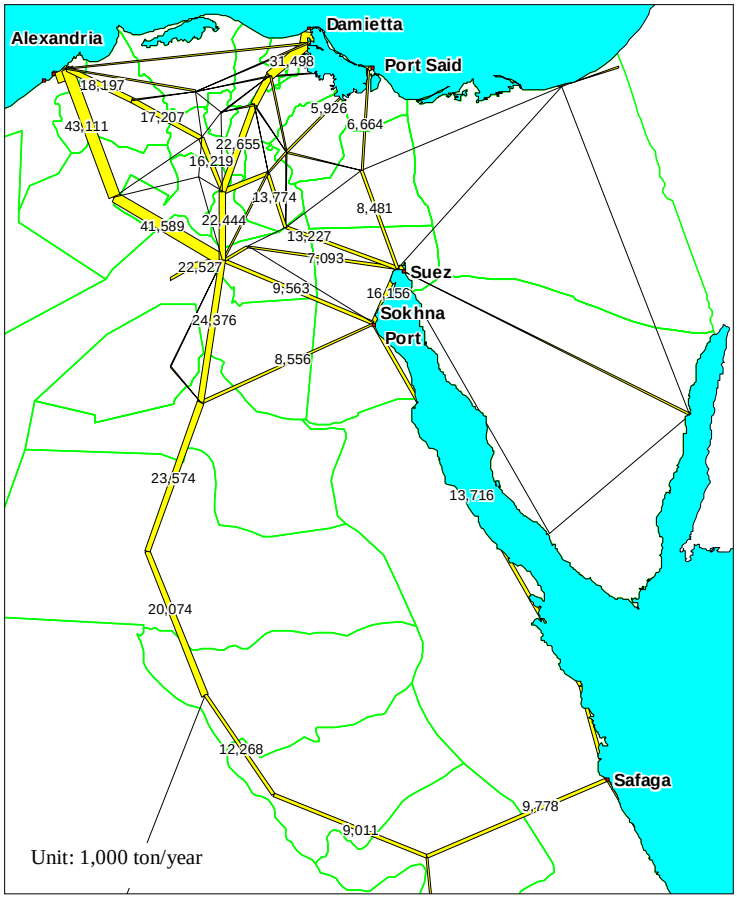
(*) Transit Cargo is not included.
Source: Estimated by JICA Study Team

(5) Future Freight Movement of Export and Import in Egypt (2022)

Cargo volumes at ports in 2022 were estimated as described above. The transport volumes from origins for export and those to destination for import were estimated from the current volumes and the growth ratios of commodities. The OD matrices in 2022 were estimated from the future volumes and current OD matrices applying the Fratar Method. Refer to Appendix-3 for the detail process of the estimation

Figure 3.3.14 shows the transport volume flow by all modes on the spider network[4] in 2022. This figure shows the section with the highest transport volume, i.e. the section that will be the most important. The largest volume will be transported between Alexandria Port and Cairo, the second largest will be between Damietta Port and Cairo, and the third will be between Cairo and Upper Egypt. Therefore, Upper Egypt – Cairo – Alexandra Port / Damietta Port will be the most important export/import corridors.

[4] A spider network is a virtual network that connects the center of each zone by a straight line.



Source: Estimated by JICA Study Team

Figure 3.3.14 Future Volume Flow on the Spider Network

(6) Future Traffic Volume by Transport Mode

Figures 3.3.15 through 3.3.17 show the future traffic volume of export/import freight on the major networks by each mode in 2022. They were estimated by assigning the future freight OD matrices to the present networks.

a) Truck

Figure 3.3.15 illustrates the forecast results of the truck traffic in 2022. It is forecasted that the section with the heaviest traffic volume of export/import freight will be the road linking Alexandria Port and the Alexandria Agricultural Road, and has a traffic volume of 51 million tons per year. The total traffic volume on Desert road and Agricultural Road between Cairo and Alexandria will amount to 55 million tons, while that on the road between Damanhur and Alexandria will amount to 32 million tons. For the corridor of Cairo - Damietta, 29 million tons will be transported on the road between Mansura and Damietta. The section between Cairo and Upper Egypt, 30 million tons will be transported in 2022.

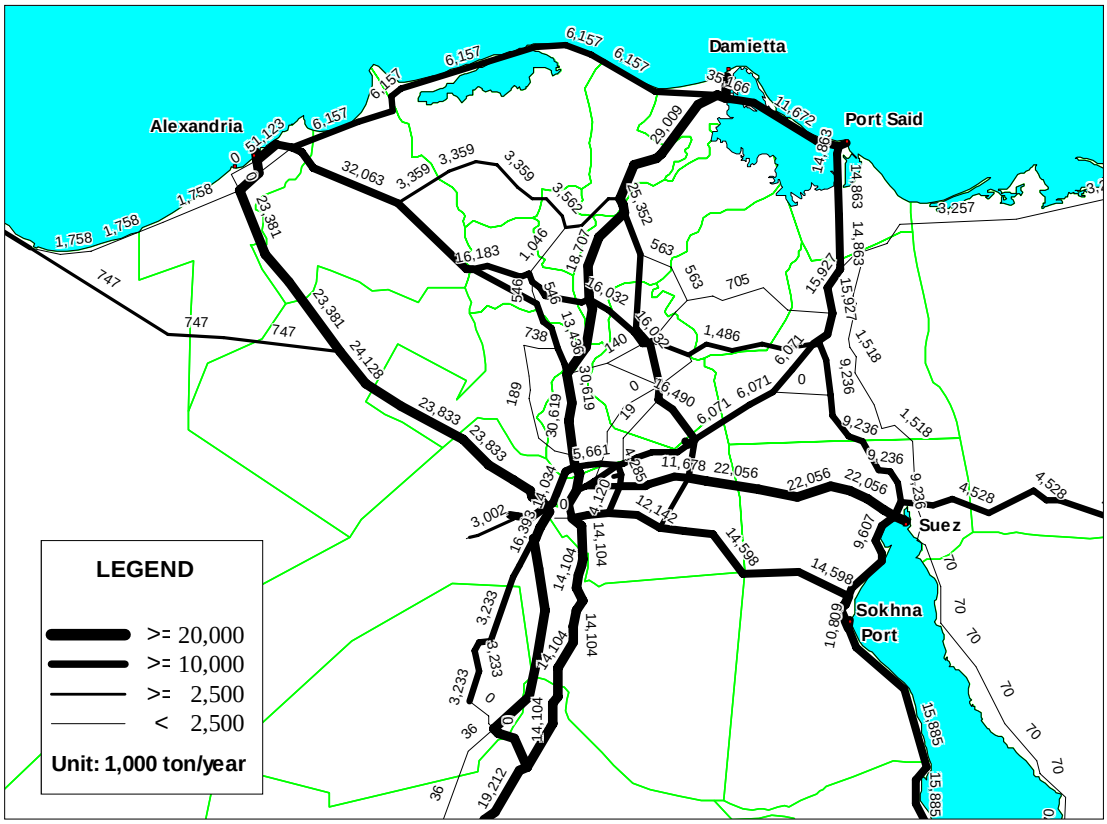
b) Railway

The results of the railway traffic projection are illustrated in Figure 3.3.16. On the rail section between the center of Cairo and the branch point in the north of Cairo, the largest export/import freight traffic volume of 11 million tons will be transported.

The second largest volume i.e. 7 million tons will be transported between Cairo and Alexandria, while 6 million tons will be transported between the rural area of Giza and Cairo. The traffic volume of other lines will be also increased, and 5 million tons will be transported between Zagazig and Ismailia.

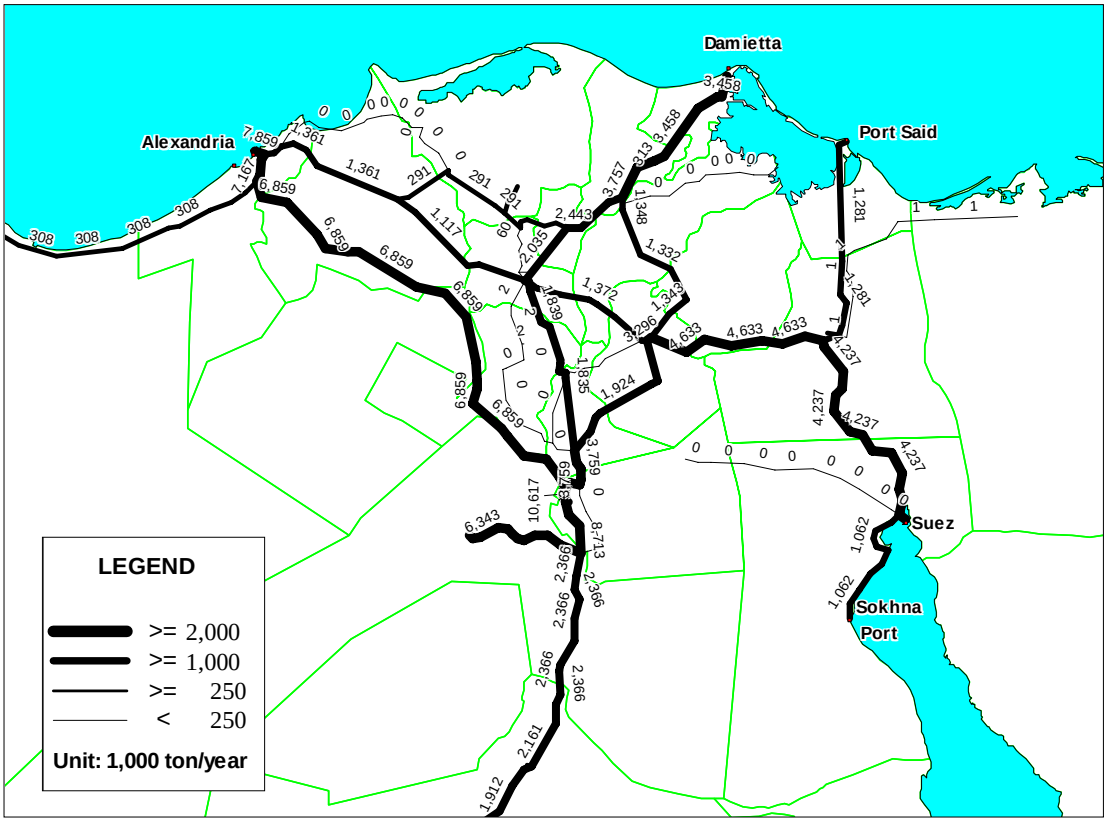
c) Inland Waterway

The volume transported by inland waterway between Alexandria Port and Cairo will be 0.3 million tons and the volume between Damietta and Cairo will be 0.2 million tons. Inland waterway services between Damietta and Cairo, it is assumed, will be commenced in 2008 or after 2008 and will a part of major freight networks, with a transport volume of 0.16 million ton per year in 2022. The result of the inland waterway traffic projection is illustrated in Figure 3.3.17.



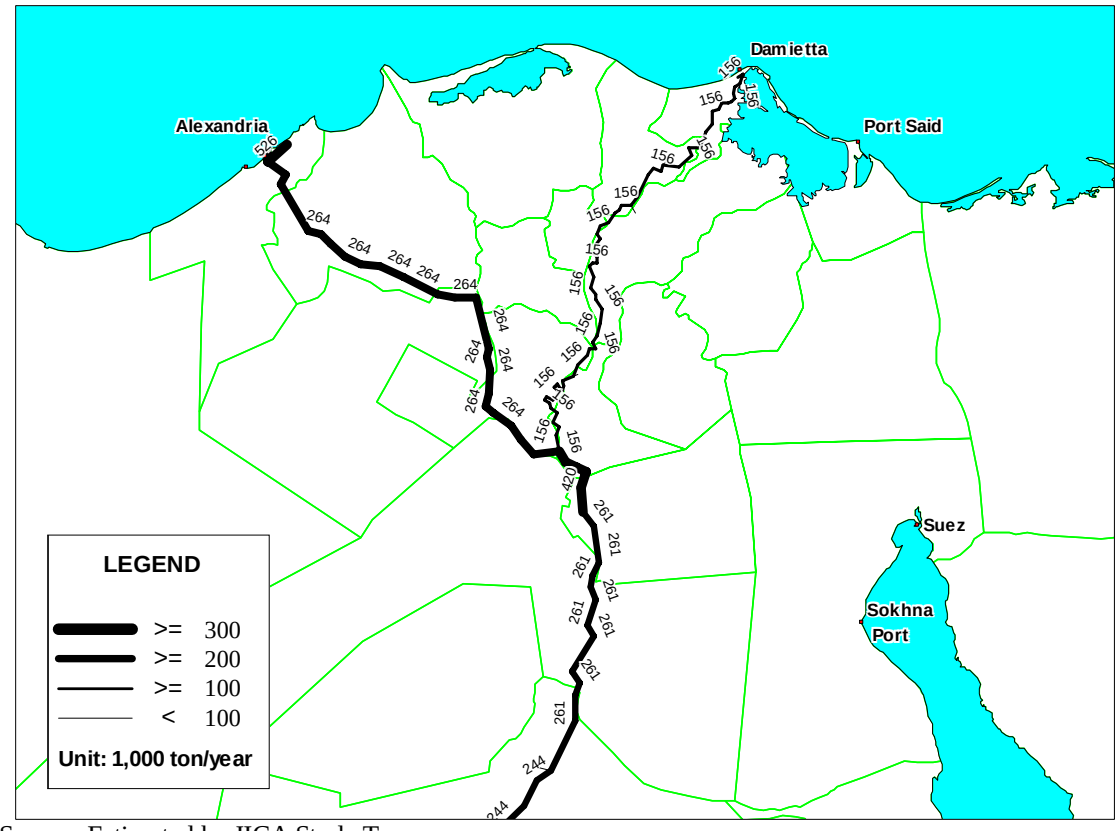
Source: Estimated by JICA Study Team

Figure 3.3.15 Future Traffic Volume by Truck in 2022



Source: Estimated by JICA Study Team

Figure 3.3.16 Future Traffic Volume by Railway in 2022



Source: Estimated by JICA Study Team

Figure 3.3.17 Future Traffic Volume by Inland Waterway in 2022

(7) Export and Import Container Volumes in 2022

The export and import volumes in 2022 were estimated at 206 million tons including dry bulk, liquid bulk and conventional cargo. The conventional cargo can handle as container cargo. The export and import container volumes were estimated with the following steps:

i) In accordance with the relation between handling type and commodity type shown in Table 3.3.8, the commodities in Table 3.3.17 were selected.

ii) The export and import conventional cargo volumes in 2022 were estimated by applying the present shares of the conventional cargo.

iii) Assuming that the containerization ratio is 60% except for "gasoline" and "railway or tramway sleepers of woods and other woods roughly squared, half squ", the export and import container volumes were estimated.

As a result, the export and import container volumes were estimated at 66 million tons. Assuming that the weight of 1 TEU is equal to 10 tons, 6.6 million TEU of containers for export and import will be handled in Egypt.

Table 3.3.17 Estimation of Export and Import Container Volumes in 2022

Commodity	(1) Volume (1000 ton/year)	(2) Share of Conventional Cargo (%)	(3) Volume of Conventional Cargo (1) x (2)	(4) Containerization Ratio	(5) Container Volume (3) x (4)
Export					
Cement	17,456	3%	524	60%	314
Gasoline	3,256	24%	781	0%	0
Rice	3,170	3%	95	60%	57
Semi-finished Rolled Steel Products	2,737	100%	2,737	60%	1,642
Others	34,705	100%	34,705	60%	20,823
Sub-Total	61,324	-	38,842	-	22,836
Import					
Other Basic Chemicals	15,818	14%	2,215	0	1,329
Railway or Tramway Sleepers of Woods and Other Woods Roughly Squared, Half Squ	6,083	100%	6,083	0%	0
Oil-seed Fats, Oil Nuts and Oil Kernels	4,253	47%	1,999	60%	1,199
Animal and Vegetable Fats and Oils, and Products Derived There from	4,008	100%	4,008	60%	2,405
Others	64,310	100%	64,310	60%	38,586
Sub-Total	94,472	-	78,614	-	43,519
Total (Export + Import)					66,355

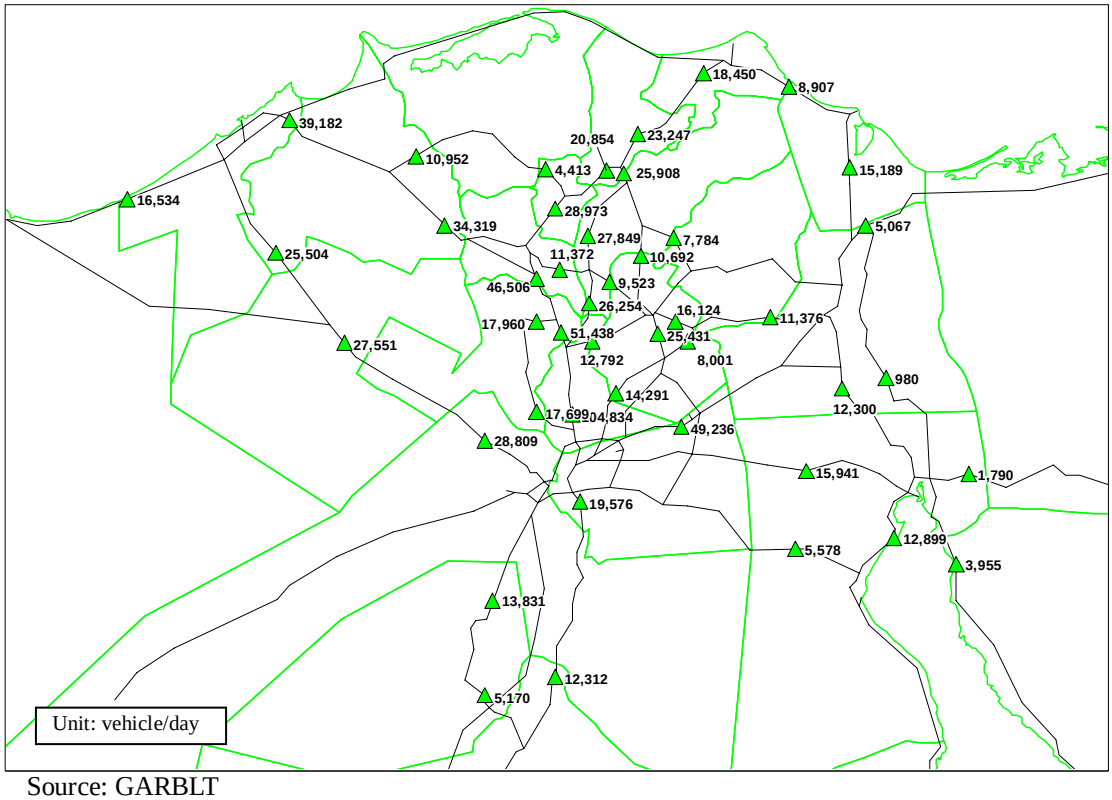
Note : The shares of conventional cargo are same as Table 3.3.8.
Source: Estimated by JICA Study Team

3.3.4 Road Capacity and Transport Demand of Major Roads in 2022

The future traffic flow was assessed in terms of road congestion on the major roads which were expected to be the important logistics corridors for export and import. For this assessment, the following roads were selected as the major components of the freight transport networks:

- Cairo - Alexandria Desert Road
- Cairo - Alexandria Agriculture Road (Damanhur - Alexandria)
- Cairo - Damietta Agriculture Road (Mansura - Damietta)
- Port Said Road (Ismailia - Port Said)
- Cairo - Suez Desert Road
- Cario - Sokhna Road

The present traffic volumes are shown in the figure below.



Source: GARBLT

Figure 3.3.18 Annual Average Daily Traffic in 2006

The future traffic volumes on these roads were estimated from the present traffic volumes and an assumed growth rate. The annual growth rate of GDP is assumed to be 6.9% in this study. Assuming the GDP elasticity of traffic volume is 0.8, the annual growth rate of traffic volume is calculated to be 5.5% (6.9 x 0.8). Using this rate, the traffic volume in 2022 was calculated to be 2.5 times that of 2005. For the evaluation of the congestion, V/C ratios (daily traffic volume/ daily road capacity) were calculated.

The following formula was applied to the calculation of the daily capacity

Qc = Qs x N/2 x 100/K x 100/D x fn x fs

Where,	Qc: Traffic capacity	(pcu/day)
	Qs: Basic traffic capacity	(= 2,000 pcu/hour)
	N: Number of Lanes	(both directions)
	K: K-factor	(=8% :Percent of the peak time traffic to the daily traffic)
	D: D-factor	(= 60 % for radial road, 55% for other road)
	fn: Area type factor	(= 0.6 for downtown, 0.75 for urban area, 0.9 for other area)
	fs: Service level factor	(= 0.8 for Expressway and trunk road, 0.9 for sub-trunk road, 1.0 for minor road)

From this formula, the capacity of the selected major roads was calculated as follows:

The values in Table 3.3.18 were applied to the variables in the formula above.

Table 3.3.18 Variables and Their Estimated Values

Section	Qs	N	K	D	fn	fs	Qc
Cairo - Alexandria Desert Road	2,000	6	8	60	0.9	0.8	90,000
Cairo - Alexandria Agriculture Road (Damanhur ・Alexandria)	2,000	6	8	60	0.75	0.8	75,000
Cairo - Damietta Agricultural Road (Mansura ・Damietta)	2,000	4	8	60	0.9	0.8	60,000
Port Said Road (Ismailia ・Port Said)	2,000	4	8	60	0.9	0.8	60,000
Cairo - Suez Desert Road	2,000	4	8	60	0.9	0.8	60,000

The result of the calculation was summarized in Table 3.3.19.

Table 3.3.19 Capacity Analysis of the Major Road

Section	Capacity [1] (pcu/day)	Daily Traffic volume		Volume/ Capacity (V/C)	Traffic volume of Export/import	
		2006 [2] (veh/day)	2022 (Upper:veh/day) (Lower:pcu/day [3])		(million ton/ year)	Equivalent traffic volume in pcu.day [4]
Cairo - Alexandria Desert Road	90,000	28,809	72,000 108,000	1.2	24	20,500
Cairo - Alexandria Agriculture Road	75,000	39,182	98,000 147,000	2.0	32	27,400
Cairo - Damietta Agricultural Road	60,000	23,257	58,100 87,200	1.5	29	24,800
Port Said Road	60,000	15,189	38,000 57,000	1.0	16	13,700
Cairo – Suez Desert Road	60,000	15,941	39,900 59,900	1.0	22	18,800
Cairo – Sokhna Road	60,000	5,578	13,900 20,900	0.4	15	12,800

1) Refer to “Capacity Calculation” described below
2) Source of traffic volume in 2006 :GARBLT, refer to Figure 3.3.18.
3) It was assumed that 50% of vehicles are large vehicle (pcu = 2.0).
4) Top: Yearly transport volume in ton
Middle: Equivalent traffic volume in pcu
Bottom: % of the equivalent traffic volume to the road capacity
The equivalent traffic volume in pcu/day was calculated as:
Export/import volume (ton/year) / 312 (operating days/year) / 15 (ton/veh) x 2.0 (pcu/veh)
Where, operating days = 6 days/week x 52 weeks/year = 312 days/year

The assessment of traffic congestion of the major roads in 2022 was summarized as follows:

Cairo – Alexandria Desert Road

The V/C (volume/capacity) ratio of this road will be 1.2 when all kinds of vehicles are taken into consideration, which indicates the possibility that congestion will occur around the morning and evening peak times in 2022.

In addition, both ends of this road are connected with the access roads to Alexandria and Cairo. These access roads are designed with less velocity and the number of lanes are less so that there will be congestion at both ends.

Cairo – Alexandria Agriculture Road (Damanhur – Alexandria)

On this road, traffic of export/import freight will amount 39% of the road capacity in 2022. The V/C ratio based on all kinds of vehicles will be 2.0, which means that congestion will probably happen all through the day in 2022.

Cairo – Damietta Agriculture Road (Mansura – Damietta)

On this road, traffic of export/import freight will amount to 41% of the road capacity in 2022. The V/C ratio will be 1.5. This V/C ratio means that congestion will probably happen all through the day in 2022.

Port Said Road (Ismailia – Port Said)

The V/C ratio based on all kinds of vehicles will be 1.0, which means that congestion will not be observed on this road in 2022.

Cairo – Suez Desert Road

The V/C ratio based on all kinds of vehicles will be 1.0, which means that congestion will not be observed on this road in 2022.

Cairo – Sokhna Road

The V/C ratio based on all kinds of vehicles will be 0.4, which indicates that the road has enough capacity in 2022.

3.3.5 Line Capacity and Transport Demand of Major Railway Lines in 2022

Table 3.3.20 lists up railway lines of the major railway freight corridors, and presents a line capacity and a freight transport demand section in 2022. Line capacity in Table 3.3.20 was assessed in the report entitled "The Master Plan Study for Egyptian National Railways" (JICA, 1996). The line capacity is dependent on many factors such as the number of locomotives and their performance, number of station and a distance between the stations, number of passenger trains required, track condition, and line facilities, so that the line capacity in Table 3.3.20 could have been improved by the railway modernization projects after 1996; however figures in the table are still useful to check new necessity of railway improvement works.

In estimating the necessary number of freight trains in 2022, the following assumptions are adopted:

Tv	=	Nw x Tw
	=	50 wagons x 20 tons/wagon = 1,000 tons/freight train
Where:	Tv:	Transport volume of one freight train (ton/freight train)
	Nw:	Number of wagons per freight train
	Tw:	Average weight of freight wagon (loaded) (ton/wagon)

Table 3.3.20 confirms that almost all the railway sections have enough line capacity to cope with the freight transport demand even in 2022 since V/C ratios (= volume/capacity) keep less than 1.0, and suggest that there is no need to conduct any big railway projects except new access line construction projects. However, three sections have to cope with excessive transport demand: first, El Maraziq – KM 48 section, secondly, Damietta Port - Kafr Bateikh section, and lastly Suez – Al Robeki section.

The transport demand of these railway sections are induced by the expected economic growth. An excessive demand on these railway sections can be coped with a simple and easy measure i.e. an installation of new stations and/or new signaling stations, resulting in a shorter distance of the block section and a higher line capacity.

As for the El Maraziq – KM 48 section, new access line between Manashy – KM 48 will greatly contribute to ease the capacity constrain and will realize more smooth and easier access to the industrial zones to/from the export/import gates and the remote markets. Newly suggested access lines are listed in Table 3.3.20, and are explained in detail in Chapter 4. Necessity of these suggested lines is set to seek for the more efficient freight flows, rather than to solve the capacity constrains.

Table 3.3.20 Line Capacity and Transport Demand of Railway by Section

Route	Section	Track	Passenger and/or Freight [1]	Line Capacity [1] (trains/day)		Transport Volume of Export/Import Freight (1,000 tons/year)		Equivalent Number of Freight Train [7] (train/day)		Volume/ Capacity	
				Pass. Train	Freight Train	2006	2022	2006	2022	2006	2022
Alexandria - Cairo/ 6th of October Industrial Zone	Port Dekheila - Qabbary	Single	F	-	24 [2]	2,746	7,167	8	20	-	0.8
	Qabbary - El Ithad	Single	F	-	24	2,644	6,859	7	19	-	0.8
	El Ithad - Manashy - Imbaba	Single	P & F	37	38	2,644	6,859	7	19	0.2	0.5
	Imbaba - El Giza - El Maraziq	Double	P & F	182	68		10,617	0	29	0.0	0.4
	(near) El Maraziq - (near) KM 48	Single	P & F	2	8	2,040	6,343	6	17	0.7	2.2
	(near) Manashy - (near) KM 48 (newly suggested access line)	Single	F	-	24 [3]	-	6,470	-	18	-	0.7
Damietta - Cairo/ 10th of Ramadan Industrial Zone	Damietta Port - Kafr Bateikh	Single	F	-	8	766	3,458	2	9	-	1.2
	Kafr Bateikh - Mansoura	Single	P & F	35	9	873	1,332	2	4	0.3	0.4
	Mansoura - Zagazig	Single	P & F	34	12	155	1,343	0	4	0.0	0.3
	Zagazig - 10th of Ramadan - Robiki (newly suggested access line)	Single	P & F	34	12 [4]	-	3,991	-	11	-	0.9
Port Said Port (West) - Cairo/10th of Ramadan	Port Said (West) - El Ismailia	Single	P & F	20	9	681	1,281	2	4	0.2	0.4
	El Ismailia - Zagazig	Double	P & F	67	32	1,593	4,633	4	13	0.1	0.4
	Zagazig - 10th of Ramadan - Robiki (newly suggested access line)	Single	P & F	34	12 [4]	-	3,991	-	11	-	0.9
Port Said Port (East) - Cairo/ 10th of Ramadan	Port Said Port (East) - El Ismailia	Single	P & F	5	2 [5]	-	n.a.	-	-	-	-
	Ismailia - Zagazig	Double	P & F	67	32	1,593	4,633	4	13	0.1	0.4
	Zagazig - 10th of Ramadan - Robiki (newly suggested access line)	Single	P & F	34	12 [4]	-	3,991	-	11	-	0.9
Sokhna Port - Cairo/ 10th of Ramadan/ 6th of October	Sokhna Port - Suez	Sinlge	F	-	17 [6]	477	1,062	1	3	-	0.2
	Suez - Nefisha	Double	P & F	18	16	1,203	4,237	3	12	0.2	0.7
	Nefisha - Zagazig	Double	P &F	67	32	1,593	4,633	4	13	0.1	0.4
	Suez - Robiki	Double	P	22	2	-	3,896	-	11	-	5.3
	Zagazig - 10th of Ramadan - Robiki (newly suggested access line)	Single	P & F	34	12 [4]	-	3,991	-	11	-	0.9
Upper Egypt - Red Sea	Qena - Safaga	Single	P & F	2	10	-	-	-	-	-	-
Upper Egypt - Cairo	El Sad El Ali - Cairo	Double	P & F	182	68	851	1,912	2	5	0.0	0.1

Note: 1) P stands for Passenger, and F stands for Freight.
2) Port Dekheila - Qabbary: its line capacity is preliminary set as same as that of Qabbary - El Ithad section.
3) (near) Manashy - KM 175 : its line capacity is preliminary set as same as that of Qabbary - El Ithad section.
4) Zagazig - 10th of Ramadan - Robiki: its line capacity is preliminary set as same as that of Mansoura - Zagazig.
5) Port Said Port (East) - El Ismailia: its line capacity is preliminary set as a quarter (6 hours/24 hours) of that of Port Said (West) - El Ismailia since Ferdan Swing Bridge (for railway) can be used for 6 hours in total per day.
6) Sokhna Port - Suez: its line capacity is preliminary set a half of line capacity of Suez - Nefisha ((18 + 16)/2 (double) = 17 (Single)).
7) It is assumed that one freight train is composed of 50 wagons (equivakent to 20 tons).
8) n.a. indicates not available.

Note: All the spellings of the ENR stations are shown as same as those in Figure 4.3.2.

Source: Master Plan Study for Egyptian National Railways (JICA, 1996), and up-date by JICA Study Team.

Alexandria - Cairo/ 6th of October Industrial Zone

At present, actual freight transportation by railway is conducted between Alexandria and Cairo, and freight transport services is not available as far as 6th of October industrial zone by railway. This is assumed kept even in 2022. As shown in Table 3.3.20, the freight transport demand will be increased up to 10.6 million tons/year on the section of Imbaba – El Giza – El Maraziq: however the V/C ratio is only 0.4 and no problem is expected in line capacity. If new access line to 6th of October industrial zone will be constructed, 6.4 million tons will be shifted from the Imbaba – El Giza – El Maraziq section to the new access line because of more efficient freight handling at a proposed logistics center there.

Damietta - Cairo/ 10th of Ramadan Industrial Zone

The V/C ratio of the Kafr Bateikh – Mansoura – Zagazig section of this export/import freight corridor will be 0.4 and 0.3 in 2022. On the contrary, the Damietta Port – Kafr Bateikh section will have an excessive demand (V/C ratio is 1.2), and this is attributable to a connectivity with the major railway line (Damietta – stations beyond EI Mansoura) at Kafr Bareikh station: however, that can be cope with easily. This single line is 15 km in length with 2 stations, and can operate 8 freight trains per day by assuming 2 hours for loading/unloading and 1 hours for a round trip. In 2022, this section requires another 2 freight trains (in total, 10 freight trains) to cope with the demand.

With new access line between Zagazig and 10th of Ramadan industrial zone (up to near Al Robeki station of the Suez – Ein Shams line) induces freight transportation demand on this line and the V/C ratio will be increased up to 0.9 in 2022.

Port Said Port (West) - Cairo/10th of Ramadan

The Port Said – El Ismailia section is a single line and have a line capacity of 29 trains per day (20 for passenger trains and 9 for freight trains), and the V/C ratio in 2022 will rise from 0.2 in 2006 to 0.4, being still far below the line capacity. The El Ismailia – Zagazig section is a double tracks and its V/C ratio in 2022 is expected only 0.4. Both sections do not have any constrain of line capacity in 2022.

Port Said Port (East) - Cairo/10th of Ramadan

In 2007, the freight transport service between Port Said Port (East) and Cairo is not available since there is no transport demand by railway. In case that this section will be used for freight transport services in 2022, the line capacity will be limited by the Ferdan Swing Bridge. However, its line capacity can be guaranteed to be 5 to 7 trains per day in total. No line capacity is expected. Since the development plan of industrial zone behind Port Said Port (East) is now underway, it is suggested that the freight transport demand of this railway line might be reviewed as the development of industrial zone will progress.

Sokhna Port - Cairo/10th of Ramadan/6th of October

New access line between Zagazig and 10th of Ramadan industrial zone (up to near Al Robeki station of the Suez – Ein Shams line) will bring a great shift of freight routes: from a route via Ismailia to a route via Suez – Al Robeki – new access line (heading toward 10th of Ramadan industrial zone). With this great shift of freight route, the line capacity of Suez – Al Robeki section will be 5.3: however, a shift in the composition of passenger train/freight train

(passenger = 12 trains, freight trains = 12 trains per day) can solve this capacity constrain for freight transportation in 2022.

Upper Egypt - Red Sea

This section is used at present only for a transport of mining resources, and the line capacity is 12 trains in total. Potential transport of reefer containers for agro-products can be attached with the present freight trains. No problem of line capacity can be expected even in 2022: however, a progress of agricultural development of this region should be observed carefully to adjust the freight transport demand on this line in the future.

Upper Egypt – Cairo

This section have a large line capacity i.e. 182 trains for passenger and 68 trains for freight trains, and no line capacity is expected on this railway line even in 2022 (the V/C = 0.1).

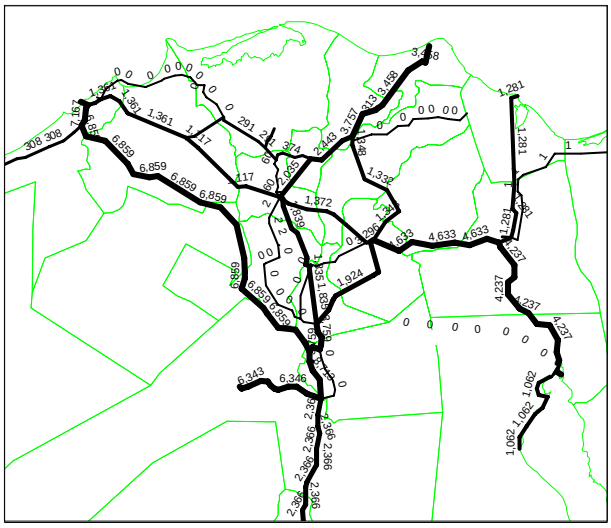
In assessing the impact of railway infrastructure development projects, the demand forecast sets five (5) cases of railway networks that are incorporated with new project suggested in Chapter 4, and are compared with the case of "do noting". In these cases, the infrastructures of roads and inland waterways that are included in the present national development plan, are set as pre-conditions. Cases are explained in Table 3.3.21, and Figure 3.3.18 show the volume flow by railway in 2022 by alternative cases.

Table 3.3.21 Alternative Cases of Railway Network

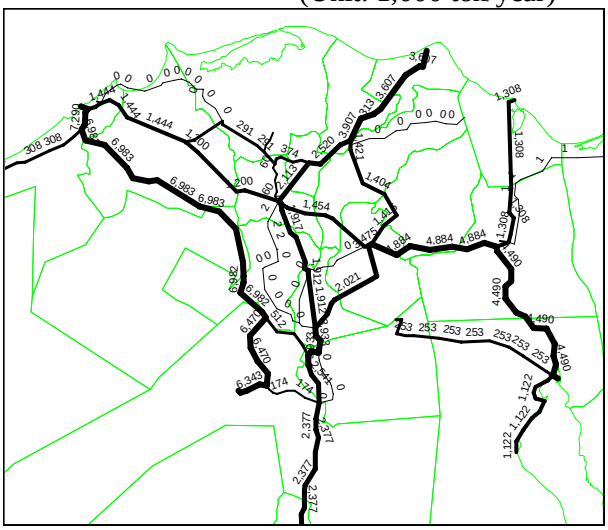
Case Name	Network Condition		
	Road	Railway	Inland Waterway
Case-0 (Do Nothing Case)	Present Network +Ring Road will be completely connected +Regional Ring Road will open	Same as Present Network	Present Network + Damietta Branch will open
Case-R1		Present Network +[R9] 6th of October Direct Access Line will open	
Case-R2		Present Network +[R12] 10th of Ramadan Direct Access Line will open	
Case-R3		Present Network +[SR1] New Freight Link (10th of Ramadan - Helwan) will open	
Case-R4		Present Network +[R12] + [SR1] will open	
Case-R5		Present Network + [R9] + [R12] + [SR1] will open	

Source: JICA Study Team

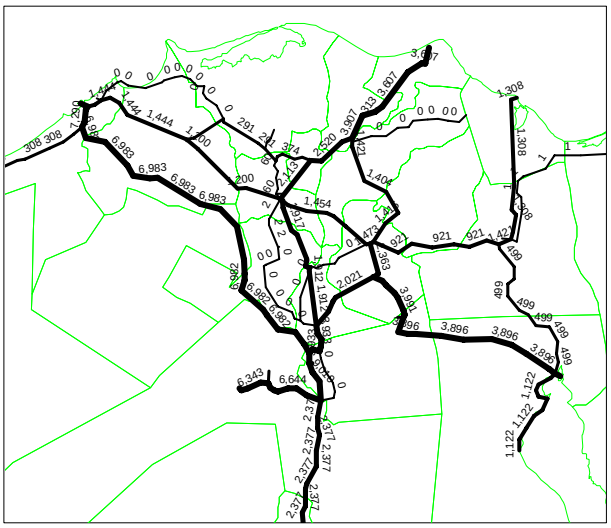
(Unit: 1,000 ton/year)



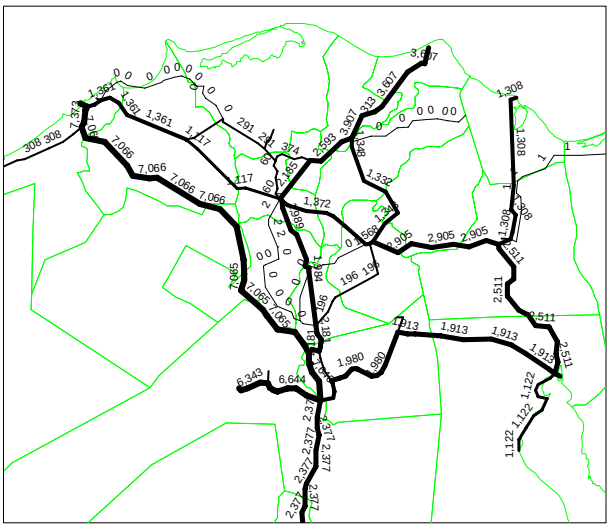
Case-0 (Present Rail Network, Same as Figure 3.3.16)



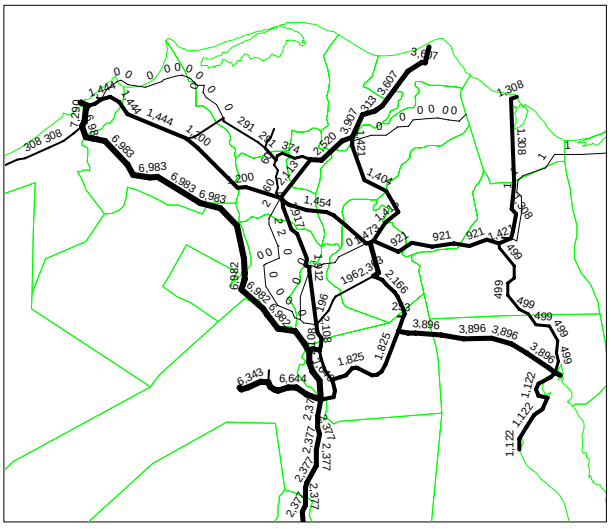
Case-R1 (+ 6th of October Direct Access Line will open)



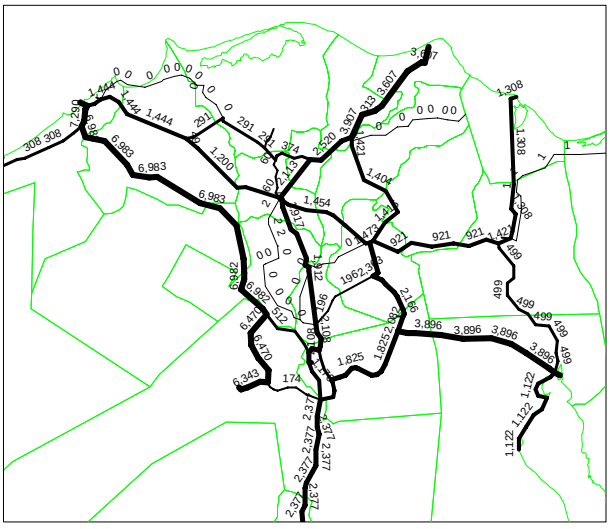
Case-R2 (+ 10th of Ramadan Line will open)



Case-R3 (+10th of Ramadan - Helwan Line will open)



Case-R4 (+10th of Ramadan Direct Access Line + 10th of Ramadan - Helwan Line will open)



Case-R5 (+all new lines will open)

Figure 3.3.18 Future Volume Flow by Railway in 2022 by Alternative Cases

Table 3.3.22 shows the total amount of transport cost in Egypt in 2022 by alternative cases. In Case-R5 (three new lines of railway ([R9] "6th of October Direct Access Line", [R12] "10th of Ramadan Direct Access Line" and [SR1] "New Freight Link between 10th of Ramadan and Helwan" will be opened), the effect of transport cost reduction is worth 102 million LE per year, the highest value of saving in transport cost in total. The distance of proposed railway line has a significant impact on the results.

On the contrary, Case R1 (In case 6th of October Direct Access Line will be opened) presents the most efficient performance of cost saving per unit (km) among five alternatives which can reach 3.32 LE per kilometer. This result shows a sharp contrast with that in terms of total cost saving (R5 is the highest one). Further, it should be noted that all cases have produces notable savings as shown in the same table.

Table 3.3.22 Total Transport Cost by Case in 2022

(Unit: Million LE/year)

Mode	Case-0	Case-R1	Case-R2	Case-R3	Case-R4	Case-R5
Truck	8,098	8,012	8,012	8,012	8,012	8,012
Railway	*864*	*867*	*880*	*877*	*873*	*848*
Inland Waterway	41	41	41	41	41	41
Total	9,003	8,920	8,933	8,930	8,926	8,901
Difference with Cost of Case-0	**-**	**83**	**70**	**73**	**77**	**102**
Length of New Line (km)	-	25	30	40	70	95
Cost Saving per km		3.32	2.33	1.83	1.10	1.07
Rank	**-**	**1**	**2**	**3**	**4**	**5**

Source: Estimated by JICA Study Team

Some explanations of how to read the traffic volume on the figure are given below. For instance, Case-R5 presents the traffic volumes of 1,308 thousand tons/year, 921 thousand tons/year, and 499 thousand tons/year for the line sections of (a) Port Said Port (West) – Suez, (b) Zagazig – Suez, and (c) Port Said Port (West) – Suez, respectively. Then, the following functions can be identified based on Case-R5 in Figure 3.3.18:

(a) + (b) = 921 thousand tons/year

(a) + (c) = 1,308 thousand tons/year

(b) + (c) = 499 thousand tons/year

Then, we arrive: (a) = 865 thousand tons/year, (b) = 56 thousand tons/year, (c) = 443 thousand tons/year.

This means that the railway traffic volume of freight for export/import between Ismailia and Zagazig is composed of (a) = 865 thousand tons/year and (b) = 56 thousand tons/year, and total volume amounts 921 (=865 + 56) thousand tons/year.

3.3.6 Inland Waterway Capacity and Transport Demand in 2022

Table 3.3.23 presents a capacity of inland waterway, transport demand of export/import freight in 2022, and the V/C ratios. Capacity of inland waterway is dependent on that of locks and its figures in Table 3.3.23 are thus the potential capacity after the repair works of locks. As of 2007, the JICA Study Team could not confirm the lock repair projects of two major corridors: Alexandria Port – Cairo and Damietta Port – Cairo, but these figures are the only one reliable data about the capacity. In this capacity analysis of inland waterway assumes the lock repair works will be completed by 2022.

Table 3.3.23 Capacity and Transport Demand of Inland Waterway in 2022

Items	Capacity of Inland Waterway		Forecast of Export/ Import Freights in 2022	V/C
	(twin-unit/ day) [1)]	('000 ton/year)[2)]	('000 ton/year)[2)]	
Alexandria Port – Cairo	32	13,920	264	0.02
Damietta Port – Cairo	13	5,655	156	0.03
Upper Egypt - Cairo[4)]	12	5,520	261	0.05

Note: 1) "The Development Study on the Inland Waterway System in the Arab Republic of Egypt", (JICA, 2003. Figures in this column were calculated based on the navigation conditions after repair works of locks, and they are thus possible and maximum figures.
2) Dead weight is assumed 1,450 ton/unit, and working days/year is assumed 300 days/year.
3) Forecast results of the JICA Study Team are based on the potential demand of modal shift from other modes with consideration of commodity features and actual economic growth performance. This approach is different from the target-oriented approach that pre-sets the targeted shares of inland waterway service (= 21% both for Alexandria Port – Cairo and Damietta Port – Cairo).
4) This estimation has been carried out assuming that the water depth is dredged to make the practical use of river transportation.

Forecast volumes of two major corridors account for small share of the potential capacity after the repair works of locks, and the V/C ratios thus appear very small. With the assumption that the locks will be improved by 2022, the V/C ratios in Table 3.3.23 are useful to advocate that the export/import freight volume of inland waterway in 2022 can be smoothly transported and does not require any further significant improvement project as for the capacity of canal and lock are concerned.

Besides these factors, there is other factor that constrains the transport capacity of inland waterway: that is river port. At present, there is no active river port for public use, and it is a most serious constrain of the inland waterway services near the Greater Cairo Region.

As for the inland waterway route of Upper Egypt – Cairo, no data of transport capacity is available: however, the width of the River Nile suggests that there is no serious capacity problem. Besides the canal and lock capacity, other apparent constrain can be a capacity of river port for freight transport, and no public river port is open to the public as of 2007.

In this capacity analysis of inland waterway, it is assumed that public port for freight will be available in and around the Greater Cairo Region by 2022.

3.3.7 Freight Handling Capacity of Logistics Center

This section presents a preliminary capacity estimation of logistics centers that are proposed in Chapter 4. In determining the freight demand capacity requires a detail OD data of the delivery trucks (by commodity) that transport the consumer products to/from the Greater Cairo Region (GCR) i.e. the traffic data inside the GCR: however, the JICA Study prepared only the OD tables of export/import freights of major export/import commodities and thus they are not sufficient for this purpose. In addition, the private sector take initiative to establish the logistics centers and their scales are in general determined by the number of participant companies (forwarders, truck transport service companies, warehouse companies etc.) based on their business plans. Land area available can also be a determinant of the scale of logistics center. The JICA Study could not go into the depth of search on the land acquisition at the potential area.

The JICA Study approaches thus the required capacity of two logistics centers around the GCR in a different way than the normal traffic demand forecast employs the computer simulation.

The JICA Study forecasts that 66 million tons of containers will be transported to/from this country in 2022, and of which about 8.0 million tons of containers will have origin/destination in the GCR. Assuming 4.0 million tons of containers are possible to enhance the logistics efficiency, 2.0 million tons of containers will be required each logistics center in 6th of October and 10th of Ramadan.

- Envisioned maximum handling capacity at logistics center in 6th of October:
  2.0 million tons per year
- Envisioned maximum handling capacity at logistics center in 10th of Ramadan:
  2.0 million tons per year

Those figures show accidentally quite similar volumes that are handled at the truck terminals in the Tokyo metropolitan area as shown in Table 3.3.24. Their actual handling volumes range from 1.7 million tons of Adachi Terminal to 2.3 million tons of Keihin Terminal.

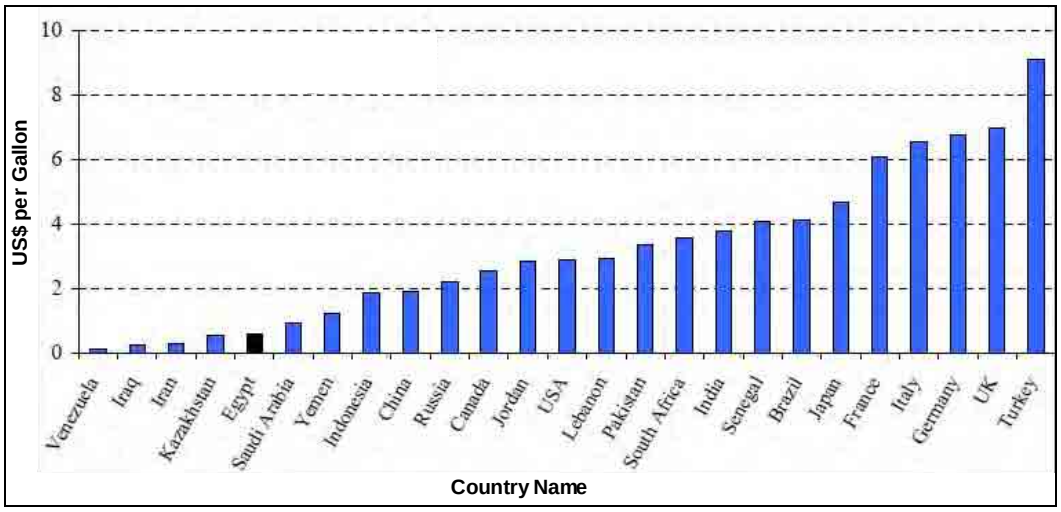
Table 3.3.24 Dimensions of Logistics Centers near Metropolitan Tokyo, Japan

Item		Keihin Terminal	Itabashi Terminal	Adachi Terminal	Kasai Terminal	Total
Land Area (sq. meter)		242,068	115,828	113,328	184,976	656,200
Truck Terminal	Number of Berth	428	320	320	460	1,528
	Platform (sq. meter)	35,326	22,200	21,000	33,858	112,384
	Handling Space (sq. meter)	64,085	35,437	29,024	48,602	177,148
	Freight Handling Capacity ('000 ton/year)	4,380	2,555	2,555	4,198	13,688
	Handling Volume/Capacity in 2007	54%	67%	66%	54%	59%
Distribution Center	Construction Area (sq. meter)	32,398	1,897	-	15,093	49,388
	Total Flow Area (sq. meter)	120,882	6,477	-	84,848	212,207
Freight Volume in 2006 ('000 ton/year)		2,358	1,715	1,687	2,262	8,022
Number of Trucks in 2006 (vehicles/day)		1,250	982	993	1,046	4,272

Note: Many of these truck terminals are composed of truck terminal and distribution center, and there is no large scale of warehouses for storage.
Source: Japan Motor Terminal Co.Ltd. (http://www.j-m-t.co.jp/index2.htm)

3.3.8 Impact of Fuel Subsidy Reduction

One of the reasons of overwhelming share of truck services is attributable to fuel price that is subsidized. Due to the considerable fuel subsidy, the government can supply the gasoline at low retail price in 2005 (Figure 3.3.19).



Source: Country Report (2006), International Monetary Fund (IMF)

Figure 3.3.19 Comparison of Retail Gasoline Price

In cases where the fuel subsidy is reduced to the international price level, the government expenditure equivalent to tax amount is expected to be shifted to other sectors[5].

In the condition of present transport cost system, transportation costs of railway and inland waterway will be equal to those of the truck when their travel distances reach 342 km and 267 km respectively. Since the distance between Cairo and major ports as shown in Table 3.3.25 is shorter than these distances, the modal shift will not happen easily under this condition.

Table 3.3.25 Distance between Cairo and Major Ports

(Unit: km)

Mode	Alexandria	Damietta	Port Said	Suez	Sokhna
Truck	220	200	200	140	140
Railway	210	220	240	170-250*	220-300*
Inland W.Way	220	250	-	-	-

(*) The distance is different depending on the degree of the newly open of the railway line.

Moreover, because the Government of Egypt is paying the subsidy of 72.6% of the diesel oil price, the transport cost for truck is cheaper than other modes now. Therefore, if it is possible to cut the subsidy, the domination of transport by trucks will fall and the modal shift to railway and inland waterway will be promoted consequently.

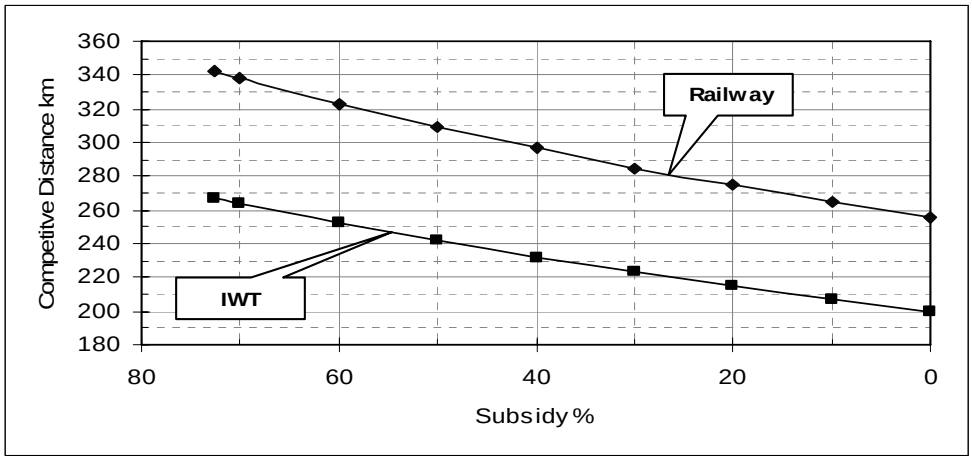
For instance, when the subsidy is reduced up to 50% of the diesel oil price, the competitive distance for railway and inland waterway falls down to 342 km and 309 km, and if the subsidy is cut completely, the break even distance falls to 267 km and 242 km. This relationship is shown in Figure 3.3.20. The estimation method for the change of break even distance is

[5] According to United Nation Environment Programme, gradual energy subsidy removal (reduction) in some countries has proceeded along with compensatory measures to support segments of society that are negatively affected.

shown in Appendix-3.

In order to reduce the transport cost of railway and inland waterway and make them competitive with road transport, it is necessary to explore other means such as reduction of handling charge for reloading between truck and other modes.

In case the handling charge is discounted to 15 LE/ton (40% off), the break even distance between truck and railway, truck and waterway are shortened to 213 km and 167 km respectively. These results imply that modal shift is possible between GCR and major ports. This scheme however is very difficult to achieve. The hope here is that as the business involving transferring of freight from one mode to another thrives, the cost will naturally decreases. Of course other creative means such as subsidy policy shall also be explored.



Source: Estimated by JICA Study Team

Figure 3.3.20 Change of Break Even Distance according to the Subsidy Reduction

In addition, if the logistic center (LC) will be opened around the Cairo and the customs clearance work of a lot of containers will be operated with LC, the feeder transport between LC and shippers will be done by trucks. In this case, handling cost between the trunk transports by each mode and feeder transport will be same, the shipper can decide the trunk transport mode in consideration of the line haul cost and transport time by each mode.