TRANSPORT PLANNING AUTHORITY
MINISTRY OF TRANSPORT
THE ARAB REPUBLIC OF EGYPT

No.

MiNTS – MISR NATIONAL TRANSPORT STUDY

THE COMPREHENSIVE STUDY ON THE MASTER PLAN FOR NATIONWIDE TRANSPORT SYSTEM IN THE ARAB REPUBLIC OF EGYPT

FINAL REPORT

TECHNICAL REPORT 3

INLAND WATERWAY TRANSPORT SECTOR

March 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS CO., LTD.
ALMEC CORPORATION
KATAHIRA & ENGINEERS INTERNATIONAL

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APPENDIX

CHAPTER 1: INTRODUCTION

1.1. BACKGROUND

The Japan International Cooperation Agency (JICA) and the Transport Planning Authority of the Ministry of Transport are cooperating in the conduct of the *Comprehensive Study on The Master Plan for Nationwide Transport System in the Arab Republic of Egypt* (MiNTS – Misr National Transport Study), based upon agreements finalized during July, 2009[1]. Oriental Consultants Company Limited, headquartered in Tokyo, Japan, is the designated lead consultant for the study. Associated firms are Almec Corporation, Japan and Katahira & Engineers International, Japan. Technical efforts in Egypt were initiated during December, 2009.

1.2. THE MiNTS FRAMEWORK

1.2.1. Study Scope and Objectives

MiNTS is comprehensive in nature, that is, approaches have been designed to mitigate transport problems and contribute to the sustainable development of the nation. Investigative efforts extend over the entirety of the Republic (Figure 1.2.1), with a particular focus being major corridors of movement for both persons and cargo. All major modes of transport are addressed including road, rail, maritime, inland waterways, civil aviation and pipelines. However, the practical master planning focus falls upon those modes falling under the jurisdiction of the Ministry of Transport; that is, the road, rail, maritime and inland waterway sectors.

Five key milestones form the foundation upon which planning efforts are based:

- Establish a nationwide, multi-modal database whose validity rests on a series of focused transport surveys and data collection exercises;
- Formulate overall strategies and policies for development of the nationwide transport fabric;
- Develop an integrated, multi-modal transport master plan with years 2017, 2022 and 2027 being short, medium and ultimate planning horizons, respectively;
- Identification, within the master plan framework, of high-priority projects; and,

[1] *Scope of Work - Comprehensive Study on The Master Plan for Nationwide Transport System in the Arab Republic of Egypt*, as mutually agreed upon between the Japan International Cooperation Agency and the Ministry of Transport, Government of Egypt, July 16, 2009.

- Implementation of an effective and productive technology transfer program with Egyptian counterparts.

Source: JICA Study Team

Figure 1.2.1 MiNTS Study Area

The transport strategy embedded within MiNTS must concurrently contribute to an efficient economic structure, strengthen linkages within Egypt as well as with neighboring countries, and provide a base for market-oriented transport activity. Economic expansion and social transformations within Egypt are well underway; continuing improvements in productivity and well-being are expected. As economic growth continues, changes in transport activities and behavior will follow suit. Thus, the foci of transport planning must gradually shift from alleviation of present deficiencies to realization of a transport system founded upon sustainable evolution and integrated, mutually supportive transport solutions. This strategy is particularly valid given the almost 20-year planning horizon adopted by MiNTS.

1.2.2. A Consultative Planning Process

The final structure of MiNTS, and the successful reception thereof, can only be achieved as a direct result of cooperative efforts and close liaison between the Study Team and local experts. Considerable efforts have been expended in gathering information, reviewing previous studies and holding numerous discussions to enhance knowledge of, and sensitivity to, local transport conditions, norms and practices.

The Study Team, housed in the offices of the Transport Planning Authority, Ministry of Transport, is being strongly assisted by its designated counterparts the Special Working Group, Coordination Committee and Steering Committee. Thus, continuous and productive technical liaison is being maintained with a number

of organizations including the Ministry of Transport and various entities thereof (Office of the Minister, Transport Planning Authority, Egypt National Railways, General Authority for Roads, Bridges and Land Transport, General Authority for River Transport, Maritime Transport Sector); the Ministry of Housing, Utilities and Urban Communities; Ministry of Civil Aviation; Ministry of Agriculture and Land Reclamation; Ministry of Trade and Industry; Ministry of Industrial Development; Ministry of Interior; Ministry of Local Development; Ministry of Finance; State Ministry of Foreign Affairs, Sector of International Cooperation; Ministry of the Environment; CAPMAS (Central Agency for Public Mobilization and Statistics); as well as various Governorates and entities thereof. Close coordination has also been effected with Universities and various departments within those learned institutions.

Likewise, effective consultations are programmed with various international agencies, funding institutions, donors, and consultant groups in order to obtain an overview of previous, current, and likely future activities and/or involvement in Egypt.

1.2.3. Sustainability and Human Resources Development

The components of the Master Plan diversify beyond the traditional "hardware" concepts associated with infrastructure provision. Additional key elements of the process consist of "software" aspects, that is, available technology, international standards, and modal integration needs (cargo/passenger terminals, logistics chains, transfer points) as well as "humanware" needs. In the latter case, this represents the cultivation of human resources via the designation of training and education programs as well as other requirements for developing expertise. In other words, "sustainability", or the notion that the planning process must allow Egyptian stakeholders to participate in visualizing and shaping their own future. This is of substantial importance in terms of ownership building if MiNTS is to be adopted and used by the people and their elected officials both during, and following, the conduct of MiNTS.

1.3. REPORTING STRUCTURE

The *Final Report* consists of three elements: *The Master Plan* report, *Technical Reports* and *Appendix Reports*.

- *The Master Plan* report is seen as the main document whose intent is to present, in a synoptic sense, main findings of the MiNTS investigations;
- *Technical Reports* represent a series of sector-specific reports which document the technical underpinning of *The Master Plan* document (Table 1.3.1), and,
- *Appendix Reports* represent task-specific or activity-specific documents and other data summaries, some of which have been developed in response to client group requests.

Table 1.3.1 Technical Reporting Structure

Report Number	Subject
1	Road Sector
2	Rail Sector
3	Inland Waterway Transport Sector
4	Maritime Sector
5	Civil Aviation and Pipeline Sectors
6	Demand Simulation and Scenario Testing
7	Organizational and Functional Aspects of the Transport Sector
8	Private Sector Participation
9	Environmental Considerations
10	The MiNTS Vision, Policies and Strategies
11	Transport Survey Findings
12	Project Prioritization
13	Counterpart Training Program

Source: JICA Study Team

CHAPTER 2: INLAND WATER TRANSPORT

2.1. BACKGROUND

It is well known that the Nile River has played an important role in the formation and prosperity of Egypt, as represented by the saying that "Egypt is the gift of the Nile" in the writing of an ancient Greek historian in the 5th century BC[2]. A story implies that at the time of an ancient Egyptian Pharaoh Djser in the 27th century BC, stone materials were already being transported on the Nile from Aswan region to the present Sakkara near Cairo by traditional sailing boats for construction of his "Step Pyramid", which might be one of the oldest historical records of "Inland Waterway Transport" in Egypt. With development of Egypt, manmade canals were more recently built, originally for irrigation purposes along the Nile and its branches around the Delta area. After that, the canals started to be used as waterways for river transportation. It was major mass transportation until the affluence of automobile era, since most people and cities of Egypt are lying on oases along the waterfront area.

In the latter half of 1970's, Nubaria Canal connected to a large seaport, Alexandria after completion of its construction project. At the same time, with the need for a well organized administration for the river transportation by the Government, the River Transport Authority (RTA), which was formerly the "General Authority of Internal Water Affairs" established in the 1950's was formed under the Ministry of Transport (MOT) in 1979 by President Decree No. 474. RTA is generally responsible for planning, operation, maintenance, improvement, finance, project implementation and legal affairs including permits in relation to river navigation, transportation and their infrastructure. Under the RTA administration, most portions of IWT activities are actually held on major routes only within courses 1,500 km long composed of the Nile mainstream (Cairo/ Aswan) and Nubaria and Beheria Canals (Cairo/ Alexandria), although available waterways are totally 3,100km in Egypt.

The following two referable studies were generally carried out in terms of IWT in Egypt. The reports pointed out that share of cargo traffic of IWT has decreased against other transport modes and suggested to provide some measures for securing certain traffic.

In the 6th five year plan 2007 – 2012 of the Egyptian Government[3], the Government is putting emphasis on IWT development and promotion to share some of the current cargo traffic with other modes as one transport strategy. In this connection, it is therefore required to suggest effective and feasible recommendations to match the transport strategy of the Government.

[2] *Herodotus: "The Histories", (440BC)*

[3] *Ministry of Economic Development: "The Sixth Five Year Plan 2007-2012", Chapter 5 Sector Development, 5/5, the Government of Egypt, (2003)*

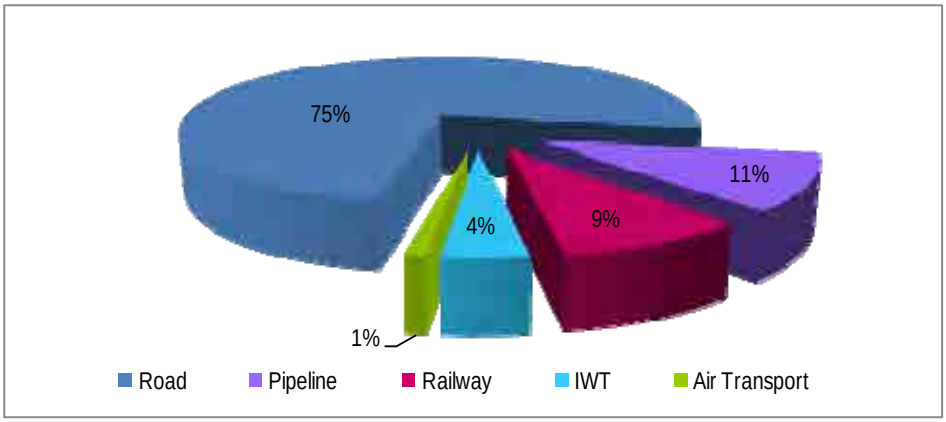
It is noted here that because of disparate functions including operation as well as being the mother organization, this study only focuses major inland waterways operational especially along the River Nile, although the Suez Canal is also categorized as a sort of inland waterway of Egypt.

2.2. PRESENT SITUATION

2.2.1. Volume of Traffic

1) Cargo

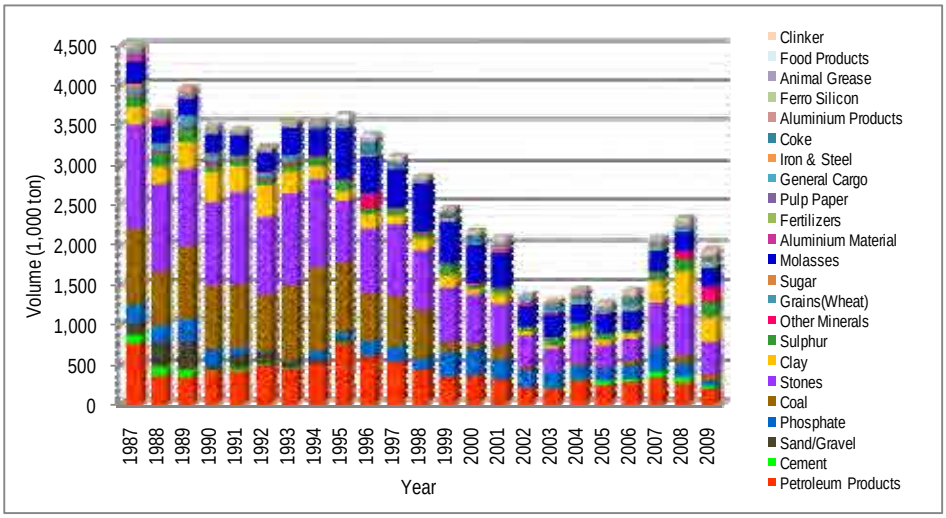
Inland Waterway Transport (IWT) is traditional transportation operated since ancient the Egyptian dynastic period, which is commonly advantageous to mass transportation. According to the current mode split of cargo transport in Egypt as shown in Figure 2.2.1, the share of IWT is only about 4% of the total cargo traffic, although most people, cities, industrial and economic zones are located along the Nile. This was caused by modal shift based on rapidly growing motorization and in lower competitiveness in the aspects of speed, cost and accessibility.



Source: Institution for transport Policy Studies in Japan, Transportation Outlook in Egypt, 2006

Figure 2.2.1 Modal Split of Cargo Transport in Egypt (Ton-Km Base)

Figure 2.2.2 presents a trend of cargo traffic by commodities from 1987 to 2009, based on the statistical data as attached in Table 2.2.1.



Source: RTA

Figure 2.2.2 Trend of Cargo Traffic by Commodities (1987 – 2009)

Firstly, the figure highlights the reduction of cargo traffic. In 1987, the traffic was 4.5 million tons and that is the maximum volume for the past twenty years. After 1987, the first peak is met in 1995 when the traffic came back to 3.5 million tons from the first bottom around 1991-1992.

Table 2.2.1 Statistical Data of Cargo Traffic by Each Commodity (1987-2009)

Unit: 1,000 ton

ID	Commodity	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Petroleum Products	754.0	359.1	347.0	423.0	415.2	490.0	444.0	509.0	755.0	589.9	529.2	433.2	344.9	364.1	292.3	192.9	177.2	276.8	224.1	266.7	322.9	251.4	178.7
2	Cement	108.0	113.4	92.1	14.0	36.0	17.0	13.3	4.4	15.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	12.9	14.3	55.2	31.6	88.1	95.1	34.7
3	Sand/Gravel	138.3	300.2	348.0	38.0	160.2	143.2	77.0	51.0	38.0	20.2	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
4	Phosphate	245.0	191.3	262.0	208.0	83.0	12.2	14.0	91.2	74.0	179.2	186.0	136.1	298.9	323.8	271.3	233.3	212.9	188.2	179.2	182.5	297.3	161.3	61.2
5	Coal	949.0	689.0	907.0	803.0	805.0	713.4	941.1	1,054.0	882.0	592.6	631.2	611.1	128.8	72.0	169.8	38.3	5.2	26.3	7.7	66.8	23.4	103.0	108.5
6	Stones	1,296.0	1,089.0	997.0	1,032.0	1,146.0	963.1	1,141.2	1,110.1	770.0	810.9	902.8	730.1	681.8	612.7	527.5	382.6	281.5	321.2	267.4	260.5	542.3	635.8	389.4
7	Clay	235.0	234.2	325.2	394.2	341.0	386.3	290.2	165.0	125.0	178.0	111.8	163.2	152.3	65.8	118.4	56.7	45.3	86.5	67.2	71.5	270.3	406.6	299.1
8	Sulphur	132.3	159.0	157.1	84.0	77.4	88.3	82.2	104.0	125.0	68.1	69.5	65.6	139.6	43.3	70.8	53.9	92.0	95.6	84.4	31.9	109.2	151.9	212.8
9	Other Minerals	15.2	17.4	19.0	37.4	7.0	29.0	23.2	13.4	28.0	166.2	2.0	20.2	8.3	18.2	11.3	1.0	0.0	0.0	0.0	0.0	0.0	93.2	181.5
10	Grains(Wheat)	80.0	105.0	151.1	79.0	19.0	46.0	83.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
11	Sugar	55.0	2.1	1.4	23.3	18.0	15.4	7.4	4.0	7.0	10.2	13.0	2.8	0.0	9.3	0.6	0.3	2.2	0.0	1.5	0.0	0.0	0.0	0.4
12	Molasses	269.0	215.0	213.1	231.0	246.0	237.0	331.0	329.4	615.0	471.2	495.6	583.1	520.3	471.9	412.4	273.0	275.0	234.9	227.4	250.7	254.8	258.5	226.9
13	Aluminium Material	98.0	83.0	36.0	5.1	10.0	15.3	5.2	5.0	5.0	5.0	10.0	5.1	9.4	10.6	54.3	52.8	29.6	11.0	12.6	7.4	0.0	0.0	0.0
14	Fertilizers	13.0	13.4	13.4	8.2	8.0	3.3	6.3	5.0	0.4	0.6	2.2	1.0	0.0	0.0	0.0	0.0	0.2	0.6	9.9	8.1	7.0	3.6	16.7
15	Pulp Paper	12.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	General Cargo	19.0	12.0	20.4	40.0	18.0	16.2	18.0	39.0	46.0	21.2	19.5	34.9	24.9	24.1	14.2	40.4	46.4	50.6	43.8	48.1	31.5	30.9	34.5
17	Iron & Steel	1.0	4.0	9.3	11.0	0.4	0.0	17.4	3.0	6.0	1.5	1.1	0.7	19.0	0.6	11.6	1.6	0.5	9.2	7.3	15.0	13.2	3.4	32.7
18	Coke	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	161.6	55.3	9.6	70.6	94.8	43.4	11.1	66.3	49.3	12.4	103.0	53.9	33.7	50.6
19	Aluminium Products	54.0	44.0	48.0	29.3	35.4	29.0	31.3	44.0	53.0	48.1	31.4	48.7	40.7	23.8	57.0	29.9	31.6	46.1	45.8	32.6	43.3	34.3	32.9
20	Ferro Silicon	14.2	8.0	7.0	13.0	2.0	15.0	9.0	1.0	0.0	0.0	0.0	0.0	0.0	20.0	5.9	0.0	3.7	14.5	12.4	32.7	16.3	53.0	40.0
21	Animal Grease	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	Food Products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.0	35.3	31.6	3.3	4.0	6.5	25.0	6.1	0.4	3.8	11.0	11.1	13.0	10.4	2.9
23	Clinker	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.6
	Total	4,488.0	3,649.1	3,954.1	3,473.5	3,427.6	3,219.7	3,534.8	3,532.5	3,627.0	3,362.8	3,094.6	2,848.7	2,443.5	2,161.5	2,085.8	1,373.9	1,282.8	1,428.9	1,269.3	1,420.1	2,086.6	2,325.8	1,919.1

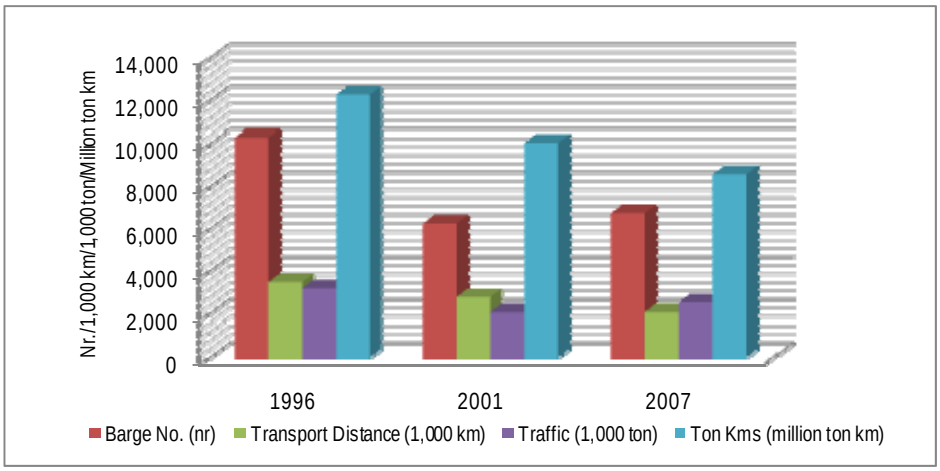
Sorce: RTA

The trend from 1995 to 2003 shows a rapid decline down to 1.3 million tons as the bottom in the twenty years. After that, the traffic seems to have pulled back again up to 2 million tons from 2007 to the present. However, the recent traffic average moved in the range of 2 million tons, the traffic is still less than a half of the golden age at 1987. Secondly, the annual figure describes a shifting of composition of cargo traffic by commodities. As found in the figure for twenty years, the stable major commodity proportionally weighted is *Stones*. The following are respectively *Petroleum Products*, *Molasses* and *Clay*. There are some commodities that are not constant and particularly accounted for the traffic, such as *Cement*, *Phosphate*, *Sulphur*, *Minerals* and *Coke*. Other commodities like *Grain, Sugar, Aluminum Material, Fertilizer, Pulp Paper, Iron & Steel, Aluminum Products, Ferro Silicon, Animal Grease, Food Products and Clinker* are minor as subsidiary, temporary and/or limited within specific regional trade. It should be noted that the traffic of *Sand/Gravel and Coal* suddenly decreased in 1999 and both have been categorized as minor commodities after 2002. In addition, although *General Cargo* has constituted the traffic since 1987, the volume of the traffic was only 1 – 4 % of the total in a year and it is also grouped into minor commodity the same as the above mentioned. Thirdly, the data illustrated also suggests a correlation with historical economic policy enforcement and/or socio-economic events, domestic and international, relating to Egypt. It can be speculated that the highest upsurge illustrated in 1987 might be reverberated by the remnant effect of the Open-Door Policy implemented by President Sadat in 1974, even though it was a turning point of the decline of the Egyptian economy from 1986 to 1990. For the period 1991-1993, the Government of Egypt (GOP) initiated the Economic Reform and Structural Adjustment Programme (ERSAP) with support of World Bank, IMF, ADB and other donors. Africa Development Bank Group (AfDB) reported in 2000 that most of the programme goals and targets were largely achieved and socio-economic conditions improved considerably during and after the implementation[4]. It is reasonable to suppose that this effort contributed to raising the fallen traffic volume in 1995 as the first peak. Focusing on the trend of the traffic between 1995 and 2000, it rapidly fell to the range of 1.5 Million ton. This trend does not match the inverted uptrend of GDP for the period[5] even though macroeconomic balance in Egypt was restored in good condition until the end of 1990's. It is possible to mention that this degradation probably resulted from other factors, such as the privatization that had been facilitated in/after ERSAP, which eventually produced a more competitive market and demarcated a bipolarization between local enterprises that were profitable and those that were not. After 2000, as the economic situation became stagnant, due to deterioration of the Palestine issue, decreasing tourist arrivals affected by the September 11 attacks, shrinkage of foreign currency income by the decline of crude oil prices, and aggravation of an unemployment rate, the traffic bottomed around 2004 when the Nazif regime was just established. Based on a challenge to economic structural reforms that have been enforced by the regime, the results of the challenge gradually appear to have produced good results, backed up by the current GDP indicators. Unlike the trend between 1995 and 2000, the traffic trend after 2004 fits the one of the GDP.

Figure 2.2.3 shows a trend of IWT major cargo traffic parameters in 1996, 2001 and 2007 (refer to data attached in APPENDIX-1). As seen in the figure, the total number of barges decreased by approximately 4,000 in 2001 and 2007. Also, transportation distance diminished through the years. Traffic volume shows the same V-shape trend as shown in Figure 2.2.2. Traffic on ton-km base is correlative to the trend of the transportation distance and it has shrunk about 4,000 million ton-km compared between 1996 and 2007, which is similar to the trends of transportation distance and traffic volume that generally decreased in recent years. With the reduction of barge numbers, this implies a significant situation surrounding IWT as well as lowering the capacity of transportation.

[4] *Operations Evaluation Department: " Project Performance Evaluation Report (PRER) on Egypt Economic Reform and Structural Adjustment Programme (ERSP)", Africa Development Bank (AfDB) Group, pp. 1-3 (2000)*

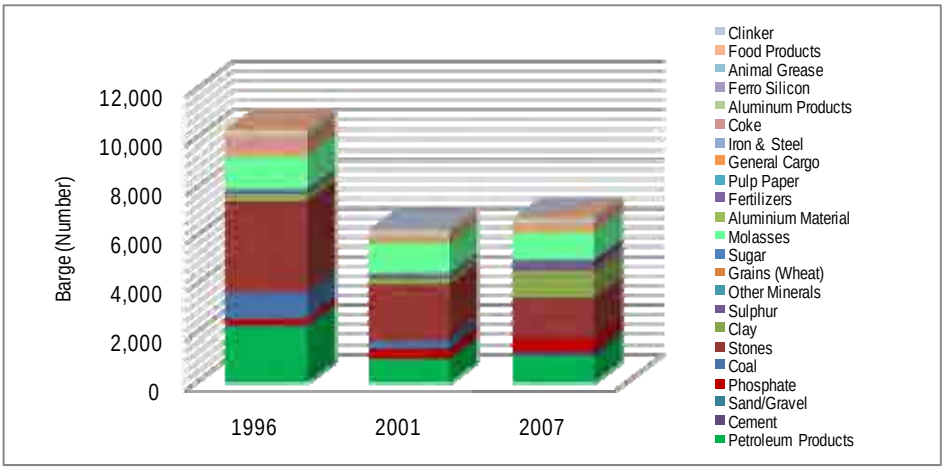
[5] *UNSD Data, United Nation Statistic Division,< http://unstats.un.org/unsd/databases.htm>, (2010-6)*



Data Source: 2003 JICA Report for 1995 and 2001, and RTA for 2007

Figure 2.2.3 Trend of Major Cargo Traffic Parameters of IWT

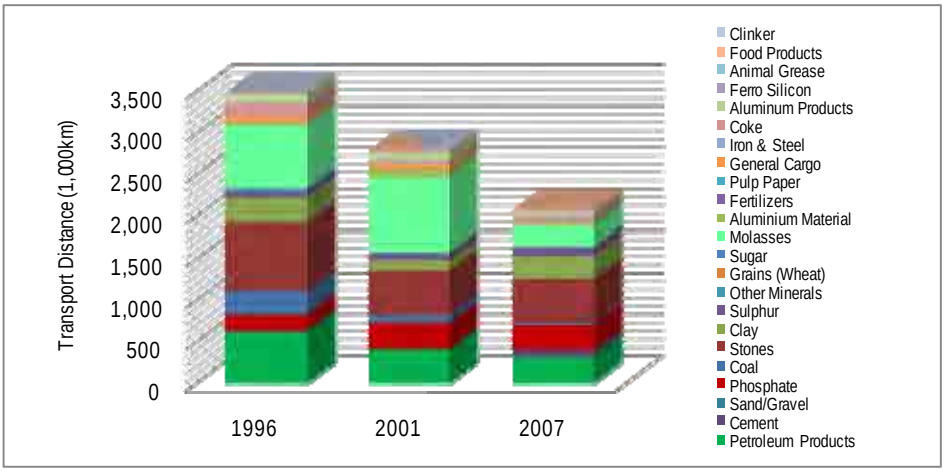
Figure 2.2.4 presents a trend of barge numbers by commodities (refer to APPENDIX-1). As seen in the figure concurrently with Figure 2.2.2, major commodities in the trend consisted of Stones, Petroleum Products and Molasses. Both the barge numbers of Stones and Petroleum Products were in a trend of decrease against 1996. For other major commodities, barge numbers of Clay increased with the same trend as its traffic volume, contrary to the two commodities aforementioned, that of Molasses flattened without particular change even though its traffic volume largely decreased between 1996 and 2007. It is observed that the dominant reason of the total reduction was shrinkage of the barge numbers of Stones and Petroleum Products by more than 50 % of the values in 1996 and reduction of the composition of Coal in the trend.



Data Source: 2003 JICA Report for 1995 and 2001, and RTA for 2007

Figure 2.2.4 Trend of Barge Numbers by Commodities

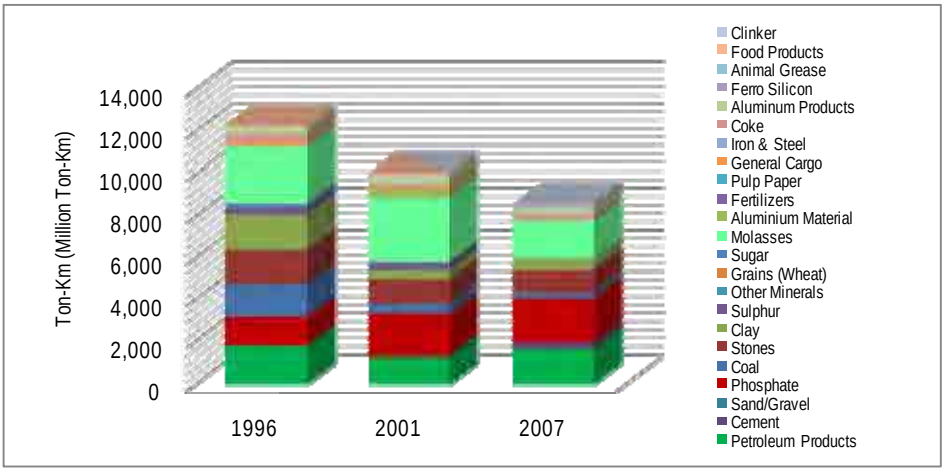
In connection to transportation distance, as shown in Figure 2.2.5 (refer to APPENDIX-1), Stones, Petroleum Products and Molasses were also major commodities to form the trend. Commonly all the commodities lowered their distances in the trend. Especially, in the reduction, Petroleum Products and Molasses indicate more than 50 -60 % reduction of the distance up to 2007. It is not certain whether those tendencies were casual or not. However, there is a possible reason to explain the situation that the two commodities were sensitive to international markets and their movement, and they directly influenced transport activities of the commodities. Moreover, it is noted that Phosphate was upon a tendency toward increasing its distance, even though the traffic volumes were decreased rather than significantly grown.



Data Source: 2003 JICA Report for 1995 and 2001, and RTA for 2007

Figure 2.2.5 Trend of Transport Distance by Commodities

Figure 2.2.6 introduces a trend of cargo traffic on ton-km base by each commodity in 1996, 2001 and 2007 (refer to APPENDIX-1). The total traffic volumes on a ton-km base lowered as found in the figure, because of decreasing either traffic, barge numbers or transportation distance as previously mentioned. In major commodities, Stones and Petroleum Products maintained the same range of the traffic. Coal and Clay were in a trend of decrease. But the traffic of Phosphate was only amplified gradually in the trend resultant from increasing transportation distance.



Data Source: 2003 JICA Report for 1995 and 2001, and RTA for 2007

Figure 2.2.6 Trend of Cargo Traffic of IWT by Commodities (Ton-Km Base)

The next statistical data examined is of Origin/Destination (OD) pattern for cargo transport, surveyed and compiled by RTA. Before review of the data, Figure 2.2.7 introduces a location map of major inland waterways and river ports in Egypt for geographical familiarization. As given in the figure, there are available four inland waterways, such as the Nile Mainstream from Aswan to Cairo, Beheiry and Nubaria Canals from Cairo to Alexandria, Damietta Branch from Cairo to Damietta, and Ismailia Canal from Cairo. Along the Nile Mainstream, there are 16 ports in Upper Egypt, 3 ports in Middle Egypt and 7 ports in Greater Cairo and those 26 ports on the Nile mainstream are about 75 % in the total of the major ports. The Beheiry and Nubaria Canals have 3 ports each. On Damietta Branch and Ismailia Canal, there is only one port each. Although these ports are not all of the river ports, the shown ports are actually operating as major ports along the waterways. Additionally, one river port located on the upper stream of Lake Nasser in Sudan is

also remarked particularly in the location map due to having a considerable commercial transaction in IWT with some ports in Egyptian territory.

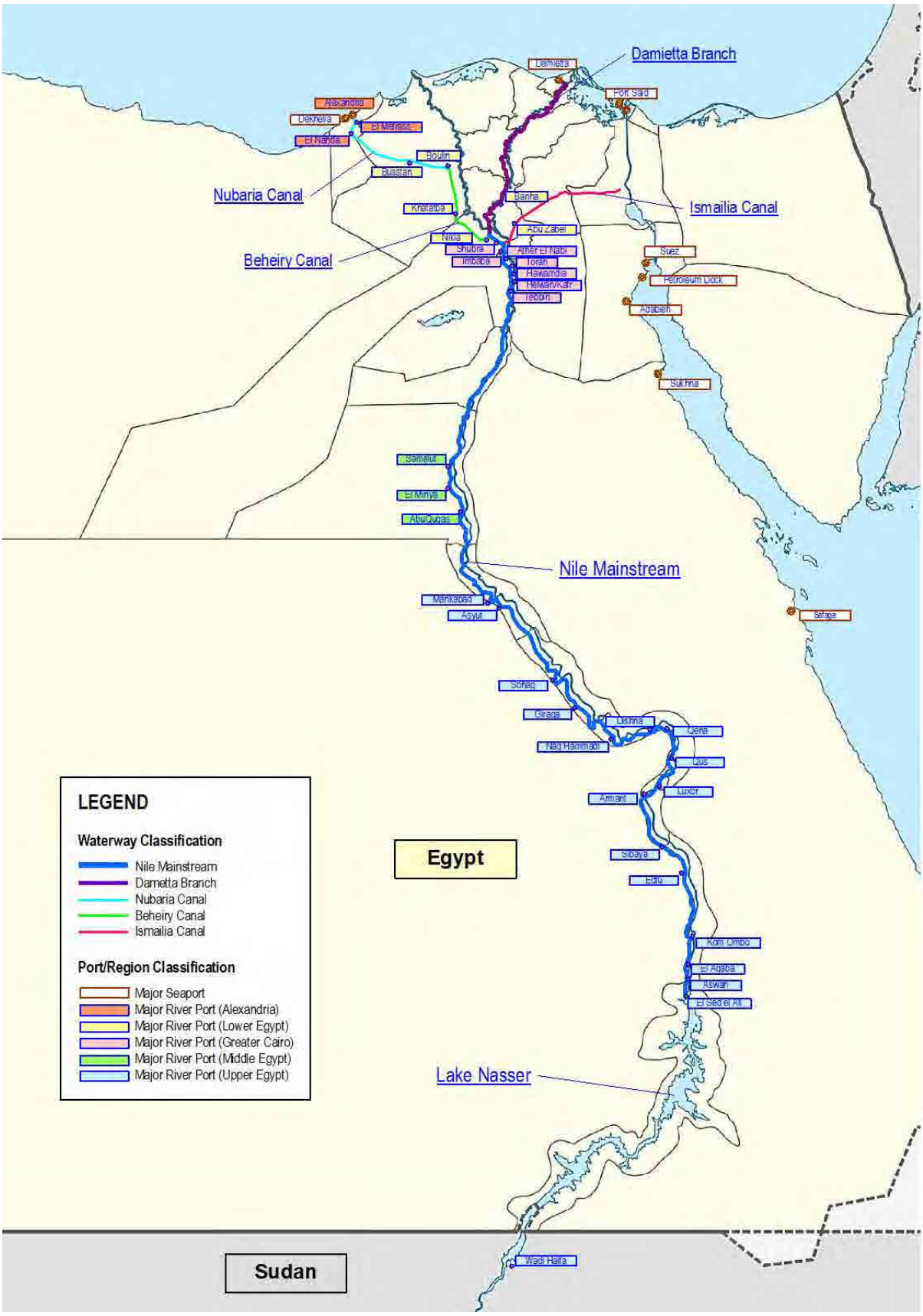
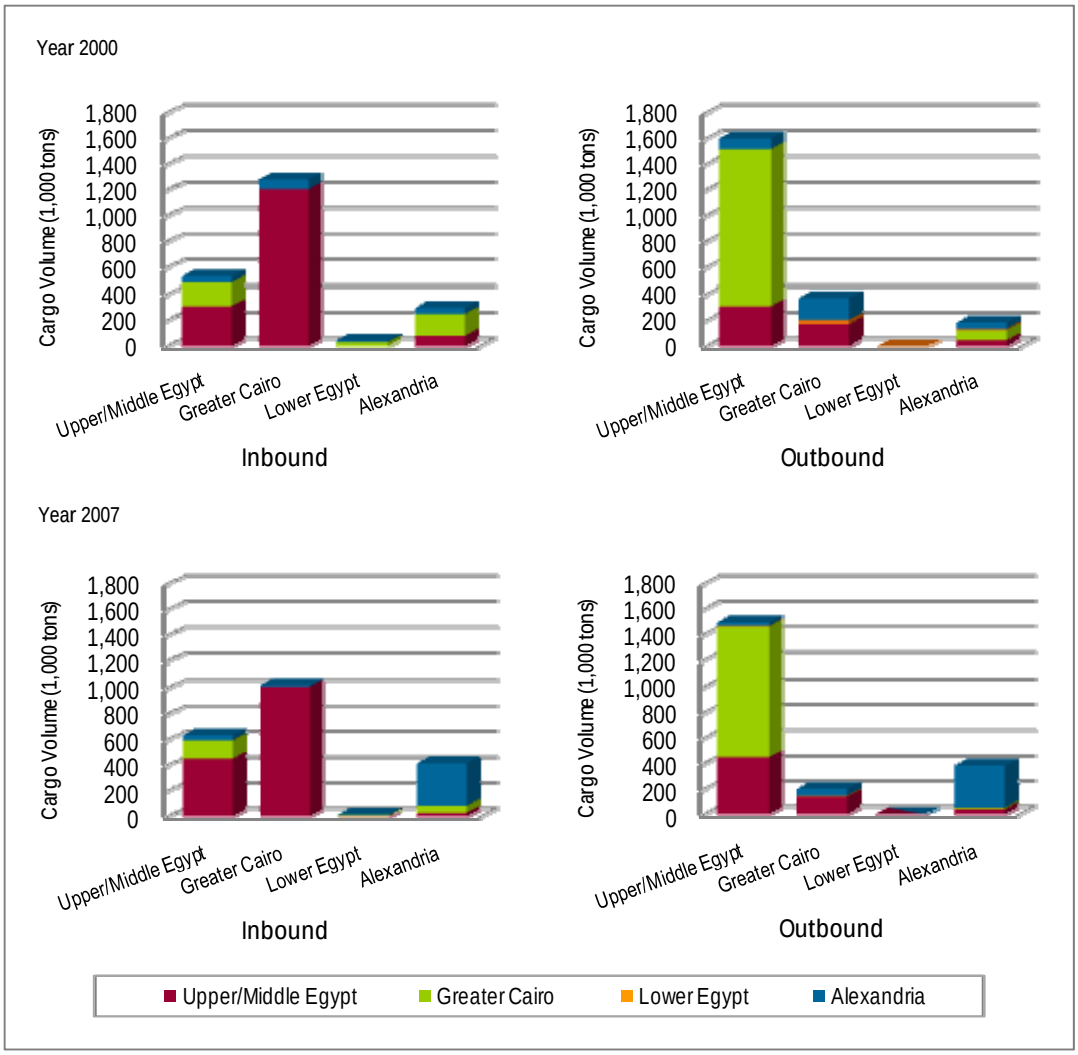


Figure 2.2.7 Location Map of Major inland Waterways and River Ports in Egypt

Based on the latest OD matrix tables of IWT in 2007 as referred to in APPENDIX-2, the characteristics of cargo traffic are summarized as follows. Figure 2.2.8 presents Inbound/Outbound Cargo traffic for Inter/Intra-Regions in 2000 and 2007.



Data Source: 2003 JICA Report for 1995 and 2001, and RTA for 2007

Figure 2.2.8 Inbound/Outbound Cargo Traffic for Inter/Intra-Regions in 2000 and 2007

As shown in the figure, outbound cargo is dominant against the inbound for Upper/Middle Egypt, which has more than 70 % share of the total volumes. In the outbound cargo, almost 60-70% of the outbound cargo was transported to Greater Cairo. The rest of the cargoes mostly moved within the same regions, which had a small increment in 2007. In case of Greater Cairo, contrary to Upper/Middle Egypt, inbound cargo is dominant in the movement as seen. The majority of the inbound cargo originated from Upper/Middle Egypt and the share in the cargo from Alexandria was insignificant. In terms of outbound cargo from Greater Cairo, the outbound cargo was less than 400,000 tons in both years, which was comprised of two destinations such as Upper/Middle Egypt and Greater Alexandria. For Lower Egypt, as found in the figure, its cargo volumes and shares in the total are quite small. Unlike Upper/Middle Egypt and Greater Cairo regions, Alexandria region does not have a conspicuous difference in its volume between inbound and outbound cargoes. As presented in the figure, this region has two remarkable changes in its composition formed and volumes themselves between both years. The flows of Inbound/outbound cargoes in 2000 appeared most likely from/to Upper/Middle Egypt and Greater Cairo, and within the same region. However,

the majority of the cargoes moved within the same region in 2007 and the volumes of the inbound/outbound cargoes multiplied by 2-3 times over the volumes in 2000.

Figure 2.2.9 describes a simplified cargo traffic flow of IWT in 2000 and 2007 by using the same base OD data in APPENDIX-2. This figure more clearly introduces a cargo flow pattern among the regions and a diversity of the traffic flow between both years. The following characteristics of the traffic flow are briefly observed:

- Upper/Middle Egypt dominates outbound cargo mainly to Greater Cairo and tends to shift intra-regional traffic within the same region
- Greater Cairo has an excess of inbound cargo unlike Upper/Middle Egypt, but its share is inclined to decrease gradually
- Lower Egypt has minimal cargo traffic, compared to other regions.
- Alexandria holds a certain share in the whole cargo traffic movement, but is comparatively minor
- Majority of cargoes flow between Upper/Middle Egypt and Greater Cairo and within Upper/Middle Egypt
- Bipolarization in the cargo traffic movement is to be preliminarily recognized at two inter/intra-regional blocs assumed between Upper/Middle Egypt and Cairo and within Alexandria

Moreover, the above observations can present a possibility that IWT does not attribute significant contribution to import/export conditions for national economics.

As a review from a different angle about the OD data, APPENDIX-3 shows OD traffic diagrams in 2007 by commodity, in order to comprehend individual characteristics for each port.

In Figure APX3-1, a diagram for all commodities generally profiles typical patterns in cargo traffic movement within Upper Egypt and Alexandria, between Upper Egypt and Middle Egypt/Greater Cairo/Alexandria, Middle Cairo and Greater Cairo, Greater Cairo and Alexandria. In Upper Egypt, Wadi Halfa port actually belongs to the territory of Sudan, but seems to be considered to be in the same economic bloc as the Upper Egypt region. The figure quantitatively shows some dominant cargo traffic movements between Samalut (Middle Egypt) and Tebbin (Greater Cairo), Alexandria and El Metrass (Lower Egypt), Sibaya (Upper Egypt) and Shubra (Greater Cairo), and El Sed el Ali (Upper Egypt) and Wadi Halfa (Sudan), which have about 1,200,000 tons that was equivalent to 57 % of the total cargo traffic volume in 2007. From this diagram, it can be found that major ports which handled larger cargoes more than 100,000 tons are El Sed el Ali, Whadi Halfa, Edfu, Sibaya and Asyut in Upper Egypt, region Samalut in Middle Egypt region, Tebbin, Hawamdia and Shubra in Greater Cairo region, and El Metrass and Alexandria in Alexandria region.

The diagram shown in Figure APX3-2 is for Petroleum Products. Main traffic networks are from Tebbin and Hawamdia/Asyut to most Upper Egyptian ports. The network from El Sed el Ali to Wadi Halfa is not negligible in the cargo traffic. The combined volume of the said networks is estimated to be more than 300,000 tons equivalent to 88 % of the total of the commodity. It is simple to say that Tebbin, Asyut, Hawamdia and Alexandria are regional base ports of the Petroleum Products, because their hinterlands have branch control stations of oil pipelines and/or oil refineries. It is assumed from the above that IWT has a role of transportation to supply Upper Egypt with the Petroleum Products.

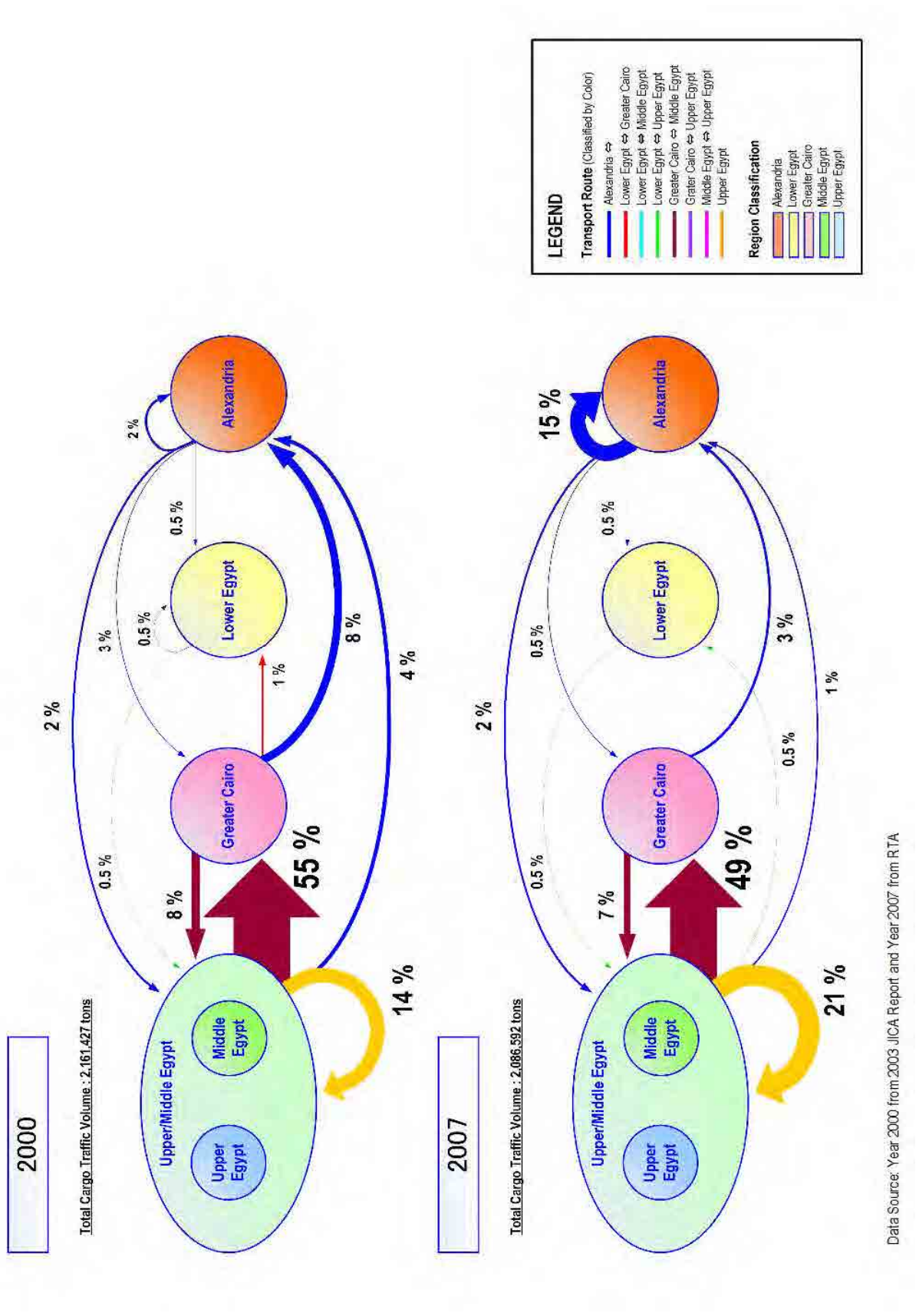


Figure 2.2.9 Comparison of Inter/Intra-Regional Cargo Traffic of IWT (2001/2007)

Figures APX3-3 and -4 show two diagrams for Cement and Phosphate. As seen in the figure, Cement did not have any share in Egypt and only had a transport network between El Sed el Ali and Wadi Halfa, with approximate 90,000 tons traffic volume a year, most likely because it was produced in the Aswan area. Phosphate mainly originated from Sibaya to Mankabad and Shubra, which had annually 300,000 tons traffic volume. For the Cement transport El Sed el Ali – Wadi Halfa route, it is possible to speculate that Wadi Halfa does not have enough accessible main roads from the main regional capital, especially for mass transportation. With regard to Phospahte, an illustrative map of industrial activities in Egypt[6] gives a reason why Sibaya supplies the commodity, which is that Sibaya and its environs handles an industry based on Phosphate used for food, agriculture, manufacturing or such.

Figures APX3-5 and -6 indicate two diagrams for Coal and Stones. Coal has only a route from Alexandria to Edfu having about 23,000 tons traffic volume a year. Although the volume is minimal, it is presumed that this was traded with foreign countries or produced from a part of the Sinai Peninsula. Stones have three inter-regional networks: Greater Cairo – Lower Egypt, Greater Cairo – Middle Egypt and Middle Egypt – Upper Egypt and an intra-regional network in Upper Egypt. Especially, approximately 470,000 tons of Stones were carried upon a network from Samalut to Tebbin, equivalent to 87 % of the total traffic volume of the commodity. The Coal was used probably for factories and/or power industries around Edfu area. As also referred to footnote 5, the Stones, particularly represented by Limestone, have been produced along the Nile Mainstream in the range between Sohag to Cairo and around Aswan. This Limestone is widely used as a raw material for steel, construction, chemicals, agriculture, foods, pharmaceuticals, pollution control, water treatment and the like. By this inter-connection, there are some industrial areas that are related in the hinterlands of the destination ports of the commodity.

Figures APX3-7 and -8 present two OD diagrams for Clay and Sulphur. Clay is carried from Aswan to Tebbin, El Metrass and Alexandria, and from Alexandria to El Metrass and its volume was about 200,000 tons a year. This Clay is commonly used for applied chemicals, construction, agricultural industries etc. and it is duly expected that its destinations probably have those related industrial areas. Sulphur had two networks: Armant – Hawamdia and Alexandria – El Metris with about 170,000 tons a year. Approximately 60 % of the total was of the route between Alexandria – El Metrass and the rest was from between Armant to Hawamdia. As referenced in the information of footnote 5, it is confirmed that there is a Sulpjur industry in Alexandria region and this cargo flow is reasonably understandable. In case of Hawamdia, it can easily connect to many industrial areas and those areas probably have some demand for sulfuric acid to be generated from Sulphur as an important raw material in chemical or other concerned industries.

Figures APX3-9 and -10 show two OD diagrams for Molasses and Fertilizer. As seen in the diagram for Molasses, all outbound ports are located in Upper Egypt such as Edfu, Qus, Dishna or such. The destinations are Hawamdia in Greater Cairo region and Alexandria in Alexandria region. The majority of the Molasses was delivered to Hawamida and its volume was more than 180,000 tons a year equivalent to 95 % of the total of the commodity. The remaining 5 % was carried to Alexandria. Those were likely to be used in the food processing industry mainly for local consumption etc. In the case of Fertilizer, it has only flows between El Sed el Ali and Wadi Halfa and its volume was just 7,000 tons a year. The same as the other commodities carried from El Sed el Ali, it is also observed that this network is important transportation for Wadi Halfa.

6 *Industrial Development Authority: "Industrial Zones Guide", the Government of Egypt, (2009)*

Figures APX3-11 and -12 display two OD diagrams for General Cargo and Iron & Steel. For General Cargo, the flow was mainly concentrated between Upper Egypt and Greater Cairo, but there were some minor cargo movements within Upper Egypt, between Upper and Middle Egypt, Upper and Lower Egypt, and Greater Cairo to Alexandria. The total traffic volume was only 31,000 tons a year and the major flows centered on Upper Egypt were more than 95 % of the total. In the cargo traffic volumes, the route from El Sed el Ali to Wadi Halfa accounted for more than 80 %. Iron & Steel had four typical cargo flows observed: within Upper Egypt, between Upper Egypt and greater Cairo, Middle and Lower Egypt, and Alexandria and Greater Cairo/Lower Egypt. The traffic volume was quite small, about 13,000 tons a year. The combined volume that originated from Alexandria and was shipped to Ather El Nabi in Greater Cairo region and Nikla in Lower Egypt region was dominant over the others with more than 90% of the total of the commodity. The "Industrial Zone Guide" as referenced in footnote 5, shows that some Iron & Steel industries are near both ports. Iron & Steel also has cargo traffic movements between Hawamdia and Nag Hammadi/Qus/Armant. However, the weight of the volume combined was insignificant.

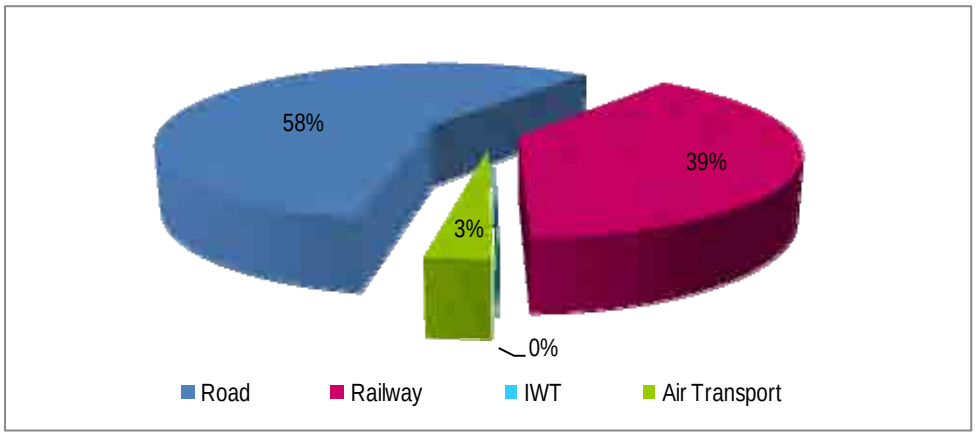
Figures APX3-13 and -14 illustrate two OD diagrams for Coke and Aluminum Products. As seen in the figure, Coke had two cargo flow networks from Tebbin to Alexandria and from Alexandria to Edfu. The majority of the cargo traffic flow was from Tebbin to Alexandria at approximately 53,000 tons a year equivalent to 99 % of the total of the commodity. Coke is generally used in iron mills as a fuel for blast furnaces and/or in the manufacturing industry as a raw material. As referred to in the "Industrial Zones Guide" in footnote 5, there is no particular Iron & Steel Industry in the vicinity of Alexandria. It is possible to assume that Coke was used in the manufacturing industry around Alexandria or otherwise exported to other countries. The figure shows another diagram for Aluminum Products. It shows a simple cargo flow pattern from Nag Hammadi to Hawamdia/Shubra as well as El Sed el Ali to Wadi Halfa. The volume of about 40,000 tons, which is equivalent to more than 90 % of the total of the commodity was handled in the route from Nag Hammadi to Hawamdia/Shubra. The cargo volume from El Sed el Ali to Wadi Halfa was just 2,500 tons a year. A stipulation can be given to elucidate a reason for the cargo traffic flows, because it is well known that there is an aluminum smelter in Nagi Hammadi and the products are transported to Greater Cairo economic bloc.

Figures APX3-15 and -16 provide two OD diagrams for Ferro Silicon and Food Products. Ferro Silicon was only transported from Alexandria to Edfu, which had approximately 16,000 tons a year. Originally, this Ferro Silicon was commonly used in a process of melting of steel and cast-iron. According to Minerals Years Book[7], one Egyptian company produces and distributes Ferro Silicon in domestic and international markets and has its Aswan plant at Edfu where the location is advantageous to the source of electricity and the availability of pure quartz utilized for the production. It is natural that Ferro Silicon is carried from Edfu to Alexandria for its export. However, the statistics provided by RTA inverted the route as seen in the diagram. One possible reason is that quartzite as a raw material of Ferro Silicon carried from Alexandria due to excessive demand was counted in the statistic. Food Products designated in another diagram only had a cargo link from El Sed el Ali and Wadi Halfa with 13,000 tons cargo traffic volume a year. The same as other commodities to Wadi Halfa, it seems that the network is for an important commodity supporting the local economic bloc in the area.

[7] *Harold R. Newman: "Minerals Yearbook 2004", United States Geological Survey (USGS), volume III, Area Reports—International, Egypt, pp.14.2, < http://minerals.usgs.gov/minerals/pubs/myb.html> (2010-6)*

2) Passengers

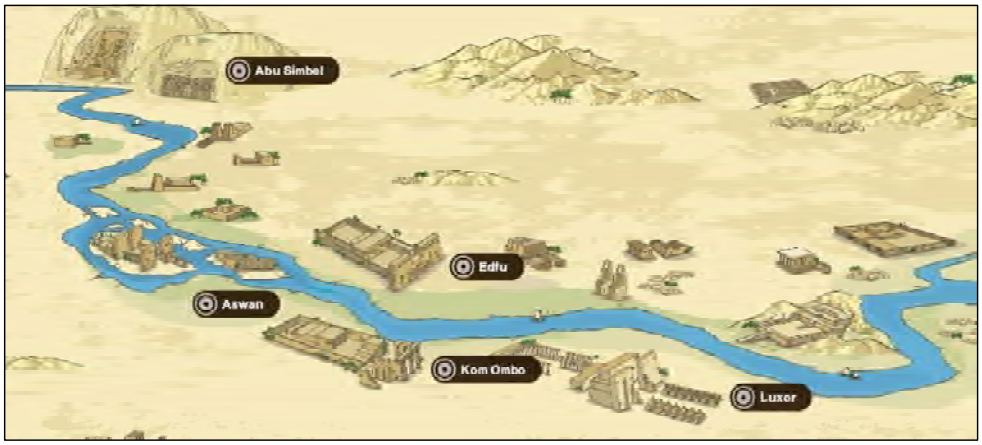
Based on the available mode split of passenger transport in Egypt as shown in Figure 2.2.10, IWT statistically has no weight in the split. In fact, it is confirmed that there are many passenger boats around Cairo and tourist cruise boats mainly operated between Luxor and Aswan.



Source: Institution for transport Policy Studies in Japan, Transportation Outlook in Egypt, 2006

Figure 2.2.10 Modal Split of Passenger Transport in Egypt (Ton-Km Base)

It appears though site observation that particular local people within the area need to use the passenger transport in Greater Cairo and its operation is like a ferryboat across the Nile, which is shorter than other operations. Therefore, this transportation has a low possibility to have share in WTI or to contribute to a change of the modal split in the nationwide transport movement. In the case of transportation between Luxor and Aswan called "Nile Cruses", these have an important role in the tourism industry, especially for the Upper Egypt region including Abu Simbel. The operation is undertaken by more than 300 tourist cruising boats registered by the relevant private companies and those boats have luxurious rooms and facilities good for the 4-7 day trips for sight-seeing of the historical Egyptian monuments and temples along the Nile as found in Figure 2.2.11.



Source: Egyptian Tourism Authority <http://www.egypt.travel/index.php?nav1=nilecruise>

Figure 2.2.11 Main Route Map of Nile Cruises in the Upper Egypt Region

Although the Egyptian Tourism Authority (ETA) has not officially disclosed statistical data for the cruising passengers, it is likely that the majority of tourists that visited the Upper Egypt take the cruise as a part of their trip options. However, this transportation is also intra-regional like that of Greater Cairo. Likewise, its

share in IWT and interconnection to other transport modes are not significant from the aspect of the nationwide transport system.

2.2.2. Infrastructure

Egyptian inland waterways are mainly comprised of the Nile Mainstream, Bheiry/Nubaria Canals, Damietta Branch and Islmailia Canal that are classified as the first class waterways. Other than the said waterways, there are some canals/branches in the waterway network classified as the second/third waterways. This subsection generally introduces the inland waterways, bridges, major river ports and navigation aids with the latest information updated in comparison with the previous similar study reports[8/9].

1) Inland Waterways

Inland Waterways (IWs) in Egypt consist of the River Nile and they have three classifications in view of navigability in the waterways. Figure 2.2.12 presents a general map of the inland waterway network in the Nile Valley and Delta areas. As shown in the figure, the waterways have three classifications, such as the first, second and third class waterways. The first class waterways, as indicated in blue lines, include Nasser Lake and Aswan/Cairo on the Nile Mainstream, Nubaria/Beheiry Canals, Damietta Branch, Ismailia Canal and Rosseta Branch. There are three second class waterways, as highlighted in red lines, El Khandal/El Sharki Canal, Tanta Navigation Canal and Port Said/El Matareya. The third class waterways, as implied in yellow lines, are severally formed by the El Mahmoudia Canal, El Bagouria Canal, Bahr Shibeen, Damietta Bra./Shebin River, El Mansoria/El Tawfike Canals and Damietta/El Matareya in the Nile Delta area, and Ibrahimia Canal and Bahr Youssef in the Nile Valley area.

Table 2.2.2 presents the conditions upon which the waterway classifications are specified by RTA. As seen in the table, it has requirements for air clearance, width and depth in the waterway and draft of fleet. The above requirements are currently stipulated by RTA. However, they might be changed or modified in case of upgrading of the relevant structures and/or modernization of fleet dimensions or style in transportation to be efficient

Table 2.2.2 CONDITIONS FOR WATERWAY CLASSIFICATION

Item\Category		Waterway Classfication				Remark
		1st Class		2nd Class	3rd Class	
		Group A	Group B			
Air Clearance		> 13 m	> 6 m	> 3.5 m	> 3.5 m	On the lowest water level under
Width	Navigable cross section	> 35 m or		> 12 m	> 8 m	
	Navigable each one lane	> 12 m		-	-	In two nabigable lanes
Max. Draft		1.8 m		1.5 m	1.0 m	
Min. Water Depth		2.5 m		1.8 m	1.25 m	

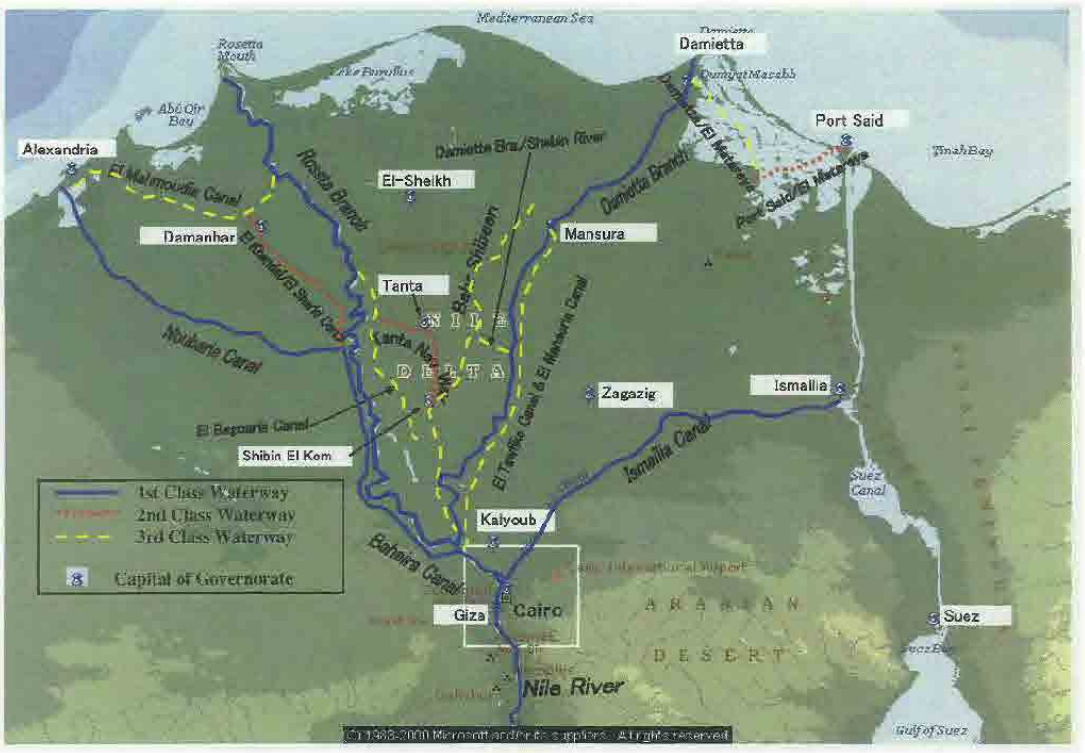
Note: Group A is comprised of the Nile Main Streams (Aswan-Cairo) and its two branches (Damietta and Rosetta Branches)
Group B includes Beheiry/Nubaria and Ismailia Canals

Source: 2003 JICA Study Report

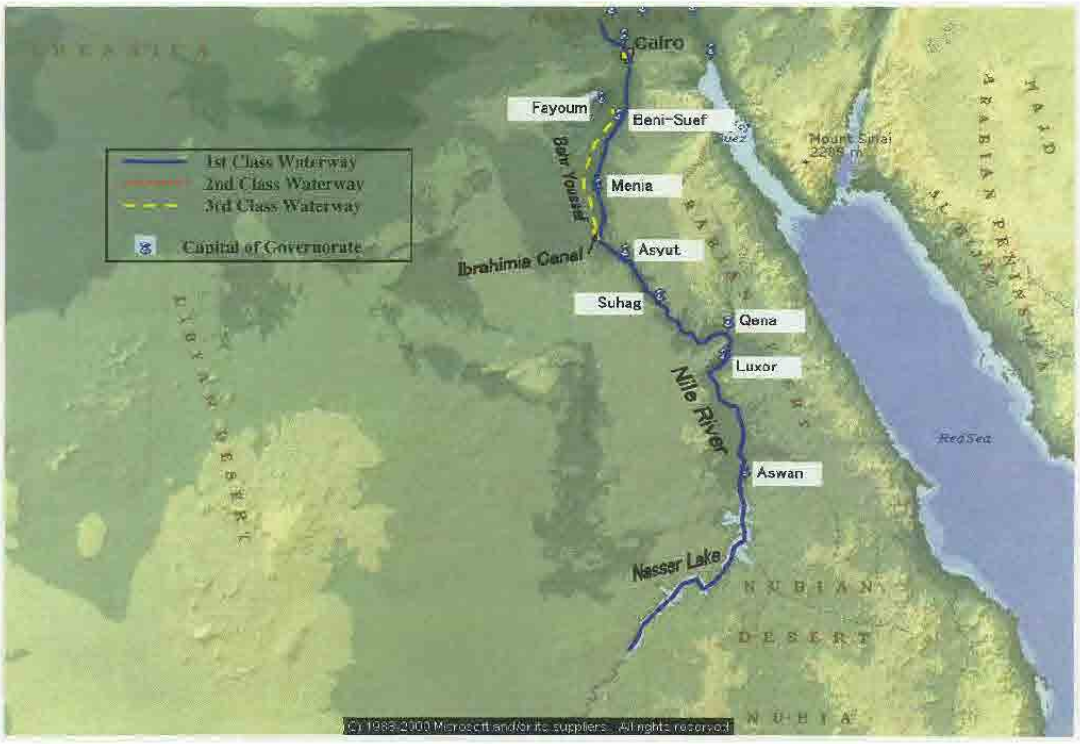
[8] *The Overseas Coastal Area Development Institute in Japan (OCDI) and Pacific Consultants International (PCI): "Final Report on The Development Study on Inland Waterway System in The Arab Republic of Egypt", Japan International Cooperation Agency (JICA) & River Transport Authority (RTA), (2003)*

[9] *Nippon Koei Co., Ltd and Katahira & Engineers International: "Final Report on The study on Multimodal Transport and Logistic System of The Eastern Mediterranean Region and Master plan in The Arab Republic of Egypt", Japan International Cooperation Agency (JICA) & transport Planning Authority (TPA) under Ministry of Transport, (2008)*

Table 2.2.3 exhibits a summary of inland waterways Figure 2.2.14 shows location of locks on IWs. As found in the table and figure, all waterways have parting points where there are some riparian/canal structures most likely locks with barrages and the entrance/end of waterways.



Nile Delta Area



Nile Valley Area

Source: 2003 JICA Study Report

Figure 2.2.12 GENERAL LOCATION MAP OF INLAND WATERWAY NETWORK

Table 2.2.3 SUMMARY OF INLAND WATERWAYS

Area	Classification 1st	Classification 2nd	Classification 3rd	Name of Waterway	Stretch From	Stretch To	Lock Section	Lock Total	Lock Total	Lock Total	Bridge Section	Bridge Total	Bridge Total	Bridge Total	Length (km) Section	1st Class	1st Class	1st Class	2nd Class	2nd Class	2nd Class	3rd Class	3rd Class	3rd Class	Total	Total
Nile Valley	✔			Nasser Lake	Aswan High Dam	Halfa Valley (Sudan)			3	9			24	59	350	350	1,330	1,330						369	1,330	1,699
				Aswan/Cairo	Aswan	Esna Lock	1	3			2	24			169	980										
					Esna Lock	Nag Hammadi Lock	1				5				190											
					Nag Hammadi Lock	Asyut Lock	1				2				187											
					Asyut Lock	Delta Barrage					15				434											
			✔	Ibrahimia Canal	Asyut	Dairut	1	2	6		14	17	35		-	-						80	369		369	
					Dairut	Mallawi	1				3				-											
				Bahr Youssef	Dairut	El Ebaid Barrage Lock	2	4			7	18			-	-						289				
					El Ebaid Barrage Lock	Sakola Lock	1				5				-											
					Sakola Lock	Mzora Lock	1				3				-											
					Mzora Lock	El Rahun					3				-											
Nile Delta	✔			Beheriy Canal	Entrance Lock	Khatatba Lock	1	2	21	27	4	6	83	104	42	84	815	815			121				815	936
					Khatatba Lock	El Nubaria (Boulin)	1				2				42											
				Nubaria Canal	El Nubaria (Boulin)	Busstan Lock	1	5			5	21			29	121										
					Busstan Lock	Janakless Lock	1				4				34											
					Janakless Lock	El Nahda Lock	1				5				39											
					El Nahda Lock	End Lock	2				7				20											
				Damietta Branch	Delta Barrage Lock	Zefta Barrage Lock	1	3			7	16			89	241										
					Zefta Barrage Lock	Damietta Lock	1				5				134											
					Damietta Lock	Damietta Port	1				4				18											
				Ismailia Canal	Entrance Lock	Seriakos Lock	4	8			9	34			13	128										
					Seriakos Lock	El Nonir Lock	1				3				15											
					El Nonir Lock	El Salheya Lock	1				7				47											
					El Salheya Lock	Ismailia Lock	1				15				52											
					Ismailia Lock	End Lock	1								1											
				Rosseta Branch	Delta Barrage	El Gate Dam Lock	1	3				6			120	241										
					El Gate Dam Lock	Adfina Lock	1				6				83											
					Adfina Lock	Mediterranean Sea	1								38											
		✔		El Khandal/El Sharki Canal	Boulin	Entrance of El Kandal Canal	1	3	6		2	10	21		-				56	121					121	
					Entrance of El Kandal Canal	Dmanhur	1				3				-											
					Dmanhur	End of El Kandal Canal	1				5				-											
				Tanta Navigation Canal	Tanta entrance Lock	El Btnotiya Lock	1	3			7	10			-				37							
					El Btnotiya Lock	El Dlgmon Lock	1				3				-											
					El Dlgmon Lock	End of Tanta navigation Canal	1								-											
				Port Said/El Matareya	Port Said	El Matareya					1	1			-				28							
Total										36				163				2,145			121			369		2,635

Source: RTA

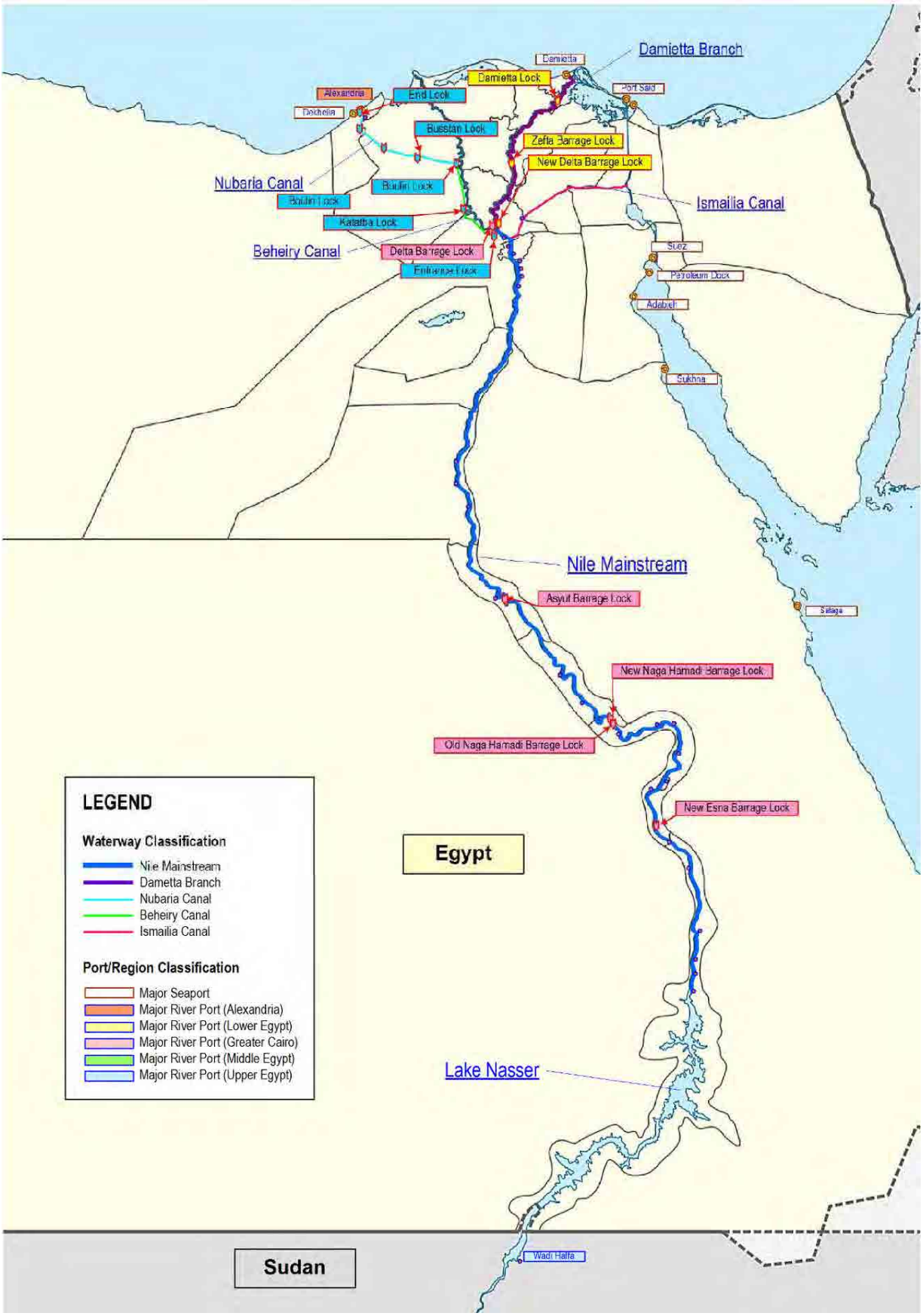
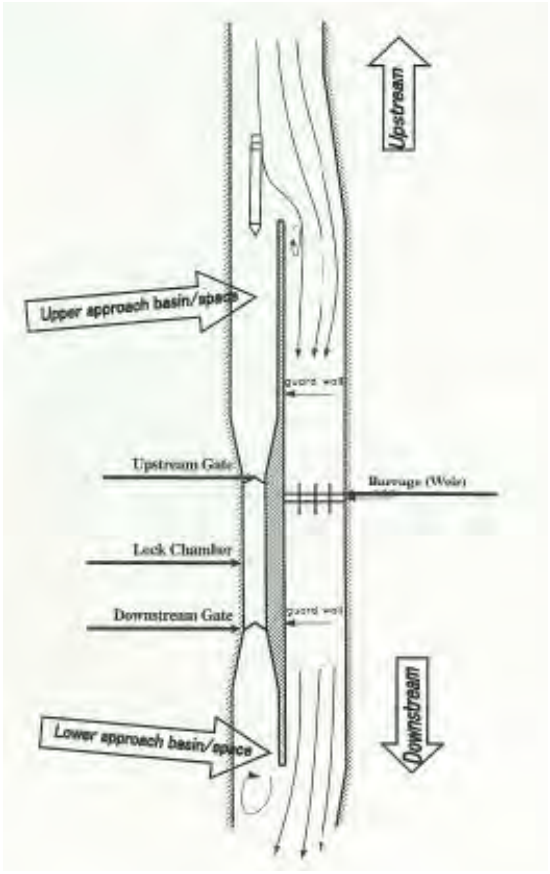


Figure 2.2.13 LOCATION OF LOCKS ON IWS

In the Nile Valley area, there are two 1st class waterways, which are totally 1,330 km long with 3 locks and 24 bridges and two 3rd class waterways in aggregate 369 km long including 6 locks and 35 bridges. The major waterways among them are Nasser Lake and Aswan/Cairo classified as 1st class and navigable for the existing barges or other standard vessels/boats, which support IWT operation.

In the Nile Delta area, there are two categories including 1st class waterways having 815 km total length with 21 locks and 80 bridges, consisting of Beheiry/Nubaria Canal, Damietta Branch, Ismailia Canal and Rosseta Branch, and 2nd class waterways with a total length of 121 km with 6 locks and 21 bridges. Considering navigability actually operative, these 1st class waterways are important routes connected between some gateways of the sea and Greater Cairo area by IWT. It is noted that Rosseta Branch is not being used for navigation purposes as of the present, even though it is classified as a 1st class waterway, because of no interconnection to the seaport and core manufacturing factories that rely on the IWT. As mentioned above, it is apparent from the view of navigability that Nasser Lake, Cairo/Aswan, Beheiry/Nubaria Canals, Damietta Branch and Ismailia Canal are main waterways in IWT operation.

The abovementioned waterways have existing facilities such as barrages, locks or such. Historically, the barrages along the waterways were originally constructed for irrigation control and water supply purposes and the locks were accessorily provided at the same time in order to prevent blocking of navigability by the barrages. In this back ground, the Ministry of Water Resources and Irrigation (MWRI) has controlled the water level of the waterways in Egypt and IWT is utilizing the waterways for transportation. The details of administrative organizations are to be mentioned in another section. A typical layout barrage/weir and lock are show in Figure 2.2.15.



Source: 2003 JICA Study Report

Figure 2.2.14 Typical Layout of Barrage/Weir and Lock

As described in the figure, the passable way is only limited through the lock because of blocking of water flow by the barrage/weir, which controls the water elevation. The following is a basic process at the lock operation: The downstream gate is closed until the water level comes up to the same elevation as the upstream by natural and mechanical means. After the fleet comes into the lock, the upstream gate is closed and the water inside lock starts to drain by the same means. When the water level is the same as that of the downstream, the downstream gate is opened and the fleet can successfully pass the lock. Going upstream is just the reverse.

Based on the above general information, the following is an explanation of the present situation of the major waterways, including the existing facilities, that were obtained through field observations (refer to APPENDIX-4):

Cairo/Aswan IW (Nile Mainstream)

APX4-1 and -2 (refer to APPENDIX-4) present summary of the existing situation of Cairo/Aswan Inland Waterway (IW). This IW begins at the Delta Barrage at the north end and Aswan Dam at the south end. According to RTA, the minimum navigable width is 21 m under the existing Imbaba Railway Bridge and average depth is 2.5 m annually. This IW is basically enough to operate current navigation without significant bottlenecks, due to the sufficient navigable width and depth. Along this IW, there are two new barrages at Naga Hamadi and Esna constructed with additional other facilities such as an earth dam and hydro generated power plant for supplying regional power to maximize diversified utilization of water resources .This IW is already equipped with navigation aids and is physically available for night navigation but some of the aids were missing or stolen. Also some studies under foreign technical assistance have been carried out in order to improve navigability of the IW. For instance, RTA is implementing installation of

a River Information System (RIS) as an ODA loan project with technical assistance funded by the Government of Austria (this RIS is introduced in another section later). Aside from the above dominance of the IW, this IW has a weak point at Grater Cairo area where the existing Imbaba Railway and El Tahrir Bridges have only 4.5 m vertical clearance and hamper their navigability when barges are fully loaded. In addition, some congestion of vessel passage at New Esna Lock are seasonally observed particularly in January, based on information obtained from RTA. These may become issues in the future, including the security of Navigation Aids and RIS.

Alexandria/Cairo IW (Beheriy and Nubaria Canals)

APX4-3, -4 and -5 (refer to APPENDIX-4) describe a summary of the present situation of Alexandria/Cairo IW composed of Beheriy and Nubaria Canals. The Beheiry Canal stretches between the Entrance lock laid near Delta Barrage lock on the Nile Mainstream and Boulin area at the end of the Canal. As reported in the 2003 JICA Report, the minimum navigable width is 25 m under the existing bridges and average depth is approximately 2 m targeted in ordinal maintenance dredging carried out by MWRI and/or RTA, depending on the necessity. This IW is therefore navigable for the existing barge system and already provides navigation aids possible to operate night navigation. However, the end of the Canal has a right-angled connection to the next Nubaria Canal and some damage to the existing bulkheads are confirmed at the site. This alignment would give further difficulty in fleet maneuvering especially to large-sized barges and therefore needs improvement so as not to be a bottleneck.

Nubaria Canal sections run between Boulin Lock and End Locks at Alexandria Port. The minimum navigable width is 16 m under the existing bridges and average depth is 1.5 m based on the actual measurements by several barge operators through the site hearing. Although the 2003 JICA Study Report designated some bottlenecks in the IW, such as sunken units, unused water resources, other various obstructions, sedimentation and the like, it is most likely that RTA has removed the bottlenecks by implementation of navigation upgrading projects based on the site hearing from several cargo service operators. In principle, the Canal was thereby navigable for the existing barges at the completion of the said projects. However, some sedimentation issues remain in this Canal as of the present according to RTA and the said service operators. This issue necessitates speed reduction on barge operators and becomes a bottleneck in the IW.

Therefore, this IW has restrictions on the navigability for the existing barge system even though the Canal provides navigation aids for night navigation, i.e. shallow water depths that affects navigation constantly arise due to sedimentation and/or flow control. Additionally, another serious bottleneck is found at the end of the Canal, where the 2003 JICA Study proposed an improvement of a small maritime lock. RTA is now tackling this issue for improvement by either extension of the lock to avoid disturbance of vessel passage at the lock or changing the existing bridge to a movable one.

Damietta/Cairo IW (Damietta Branch)

APX4-6 and -7 (refer to APPENDIX-4) show a summary of the existing situation of Damietta/Cairo IW. This IW is a branch of the Nile River, called the Damietta Branch, and stretches from the New Delta Barrage located 3 km downstream of the parting point of the Nile Mainstream to Damietta Port through its connection canal. According to RTA and the 2003 JICA Study Report, the minimum navigable width is 20 m and average depth is 2.5 m annually. Although the minimum navigable width under the existing bridge at the New Delta Barrage is 12 m, this IW is generally adequate to operate current navigation without significant bottlenecks due to sufficient navigable width and depth, and water flow as a branch of the Nile River. But some weak points are observed regarding navigability such as the existence of some floating weeds and movable bridges, longer navigation distance compared with Alexandria-Cairo IW and the like. This IW is

currently preparing to equip navigation aids to be able to operate night navigation. Some existing bridges exist along this IW might affect navigation of large-sized barges. However, as mentioned in the 2003 JICA Study Report, those bridges are to be demolished depending on coordination among the relevant governmental sectors.

Ismailia/Cairo IW (Ismailia Canal)

APX4-8, -9 and -10 (refer to APPEDIX-4) present a summary of the existing situation of Ismailia/Cairo Inland Waterway (IW). This IW starts from the Nile Mainstream at the center of Cairo and flows to the Suez Canal at Ismailia City. According to RTA and the 2003 JICA Study Report, the minimum navigable width is about 10 m under the existing small bridges and average depth is 1.5-2.0 m annually. This IW is difficult to navigate because of the following aspects, i.e. many bridges and narrow width. In fact, this IW seldom has barge transport and many such bottlenecks exist in the IW. Also, in such situation, some of the locks certainly require cleaning, maintenance and/or rehabilitation to commence navigational operation. Around the center of Ismailia City, it is apparent that this IW becomes narrower and shallower, and is not navigable by barges. This IW does not have navigation aids and is not physically suitable for night navigation. According to RTA, there was a study to divert this IW for removal this bottleneck especially along Ismailia City. However, in view of the investment, such development could not be cost-effective upon evaluation. Consequently, it is disclosed from the facts that this IW is not navigable so far.

2) Bridges

Table 2.2.4 shows a summary of the existing bridges across the four inland waterways. This is based on an inventory list of bridges provided by RTA (refer to APPENDIX-5).

Aswan-Cairo IW has totally 27 bridges composed of 24 for roads and 3 for railways. Most of the bridges on the IW have more than 100 m of length. The majority of the bridges are made of concrete except for the railway bridges. Substructure of the bridges has minimally 21 meters width, which satisfies the requirements of the IW classification. However, this IW has 6 bridges which have less vertical clearance than specified in the classification requirements.

Alex-Cairo IW has totally 28 bridges composed of 2 for pedestrians, 23 for roads, 2 for railways and 1 for a combination of the railway & road. Most of the bridges on the IW average 50-70 m in length. The majority of the road bridges are made of concrete, the rest of the bridges for pedestrians and railways are of steel.

Table 2.2.4 Summary of Existing Bridges across the IWs

Unit: Number

Bridge for \ IW		Aswan-Cairo		Alex-Cairo		Damietta-Cairo		Ismailia-Cairo		Total	
Pedestrian	Fixed			1	2			11	21	12	23
	Movable			1				10		11	
Road	Fixed	22	24	22	23	8	15	24	35	76	97
	Movable	2		1		7		11		21	
Railway	Fixed	1	3	2	2		3		3	3	11
	Movable	2				3		3		8	
Road & Railway	Fixed				1		1				2
	Movable			1		1				2	
Total			27		28		19		59		133
Bridge less than required Air Clearance		6		8		8		3		25	

Source: RTA

The combined road & railway bridge is also made of concrete and is located at the end lock connected with Alexandria Port. Minimum span under the bridges is 16 meters and this satisfies the classification requirements. This IW has 8 bridges which have less vertical clearance compared with the requirements.

Damietta-Cairo IW has totally 19 bridges composed of 15 for roads, 3 for railways and 1 combined for railways & road. Most of the bridges on the IW are more than 100 m in length.

This IW is actually longer than the Alex-Cairo IW, but has just 19 bridges installed. Fixed bridges lie around rural towns and movable bridges exist in the center of towns and/or cities. Pedestrian and railway bridges are made of steel the as same as the other IWs. Minimum span under the bridges is 12 meters and this satisfies the classification requirements. This IW has also 8 bridges which have less vertical clearance compared with the requirements.

Ismailia-Cairo IW has totally 59 bridges composed of 21 for pedestrians, 35 for roads, and 3 for railways. Most of the bridges on the IW have more than 40-50 m length, except for a narrower portion in the center of Ismailia City. There are only 59 bridges in the 128 km long waterway and the average is 1 bridge per 2 km. Unlike other IW, this IW has 21 pedestrian bridges, which indicates the existence of regional communities along the IW. Fixed bridges are made of concrete and movable bridges are of steel the same as the other IWs. Also, pedestrian and railway bridges are made of steel the same as the other IWs. Minimum span under the bridges is 8.5 meters, which does not satisfy the classification requirements. This IW has also 3 bridges which have less vertical clearance compared with the requirements.

3) Major River Ports

Table 2.2.5 shows the list of major river ports including some technical information. In the table, El Hadid and El Solb (Iron & Steel) port has already been demolished based on recent information from RTA. From the information given, major river ports in Egypt become accordingly 43 ports under jurisdiction of RTA.

As seen in the table, the majority of the ports are private and there are 42 in total. The remaining port is public under management of RTA. Particularly, the private ports have been used mostly by factories, plants and other industrial companies, which require transporting some raw materials in their services. On the other hand, the public port named Ather El Nabi Port, which is located beside the RTA Building, is being used by local forwarders and communities.

Table 2.2.5 Major River Ports in Egypt

No.	Port Name	Distance from Aswan Dam (km)	Quay Dimension			Equipment	Storing Capacity (ton)	Owner	Remark
			Number (m)	Length (m)	Structure Type				
1	El Hadid and El Solb (Iron & Steel)	-	-	-	-	-	-	-	Demolished
2	Abu Zaabal Fertilizers	9	1	60	Concrete	1- Loader 1- Belt conveyors	15,000	Abu Zaabal Mines	
3	Kima	10.5	1	111	Concrete	1- Crane (20 ton)	2,000	Kima Company	
4	El Nasrr Phosphate (Tanash)	10.5	1	50	Concrete	1- Belt conveyor	2,000	El Nasrr Phosphate Co.	
5	El Gizera	12	1	160	Concrete	1- Crane 1- Loader	3,000	El Nasrr Phosphate Co.	
6	El Shima	13	1	100	Concrete	2- Cranes	1,000	El Masraya	
フ	El Nasrab	15	1	150	Concrete	1- Belt conveyor	1,500	El Nasrr Phosphate Co.	
8	ElAkaba	20	1	100	Concrete	1- Transpotation gutter	2,000	El Nasrr Calories Co.	
9	ElAkaba	22	1	150	Concrete	1- Crane 1- Loader	3,000	High Dam Civil Enterprises Co.	
10	El Biyara	41	3	500	Stone	-	15,000	Public sector	
11	Edfu Sugar	106	1	600	Stone	1- Fixed crane	2,000	Public sector	
12	El Morada	106	1	148	Concrete	1- Dredging machine	180	El Nasrr Phosphate Co.	
13	Firocilicon Factory	115	1	50	Concrete	2- Cranes (10 ton)	500	El Masraya Company for Iron Ingot	
14	El Sibaaya	143	1	103	Concrete	1- Belt conveyors 1- Loader	30,000	Private	
15	Armant Sugar	203	4	60	Soil	2- Fixed cranes	30,000	Sugar Co.	
16	Koss Sugar	257	1	200	Stone	1- Freight terminal 2- Cranes	50,000	Sugar Co.	
17	Dishna Sugar	314	1	154	Concrete	2- Cranes	10,000	Sugar Co.	
18	Nagaa Hammady Sugar	340	1	786	Concrete	2- Cranes	50,000	Sugar Co.	
19	River Aluminum	347	2	207 143	Concrete	1- Crane bridge 2- Dredgingers	60,000	Aluminum Factory	
20	El Balina	391	2	20	Stone	1- Ferry (45 ton)	10,000	Private	
21	Gerga Sugar	394	2 buoys	-	Soil	2- Cranes	500	Sugar Co.	
22	Asyut Calories Station	553	1	200	Concrete	2- Suction pumps 1- Crane (8 ton)	35,000	Public Sector	
23	Petrol Port	553	1	150	Concrete	1- Pumping pipes & Cistanks 1- Loading terminal	Warehouse	Egypt Petrol Co.	
24	Asyut Cement in Menkbad Petrol	446	1	150	Concrete	1- vehicle elevator 2- Cranes and 4- Pumps	20,000	Asyut Cement Co.	
25	Asyut Cement in Menkbad Cement	556	1	450	Concrete	1- Crane, 1- Packing unit 4- Transportation gutters	60,000	Asyut Cement Co.	
26	Fertilizer Factory in Menkbad	556	1	150	Concrete	2- Cranes	50,000	Financial and Industrial Co.	
27	El Nil Cotton Ginning Co.	702	1	60	Soil	1- Crane	7,000	Nefertiti Co.	
28	Bany Khaled in Samllot	705	2	12.5	Concrete	1- Belt conveyor	10,000	Iron and Steel Co.	
29	Limestone in El Tebbin	925	1	200	Concrete	3- Overhead cranes (16 ton) 1- Land crane (16 ton)	70,000	Iron and Steel Co.	
30	El Tebbin El Nahree	925	4	877	Concrete	4- Cranes	17,750	River Nile Transport Co.	
31	Coke Factory in El Tebbin	927	2	250 150	Steel	4- Gantry cranes	125,000	El Nasser Coke Industry Co.	
32	El Kawmiya Cement	930	1	70	Concrete	1- Cement loading machine	7,000	El Kawmiya Cement Co.	
33	Cement Packing on Nile	935	4 outside 2 inside	4.10 2.30	Concrete	1- Crane, 2- Packing machines 4- Belt conveyors	9,000	Portland Cement Co.	
34	Samloot Cement Receive	935	1	30	Concrete	1- Immovable crane	7,000	Portland Cement Co.	
35	Sugar Factory in El Hawmdiay	940	6		2- Soil 1- Concrete	1- Immovable crane	1,0000	Sugar Co.	
36	Equipments Factories	940	1	60	Concrete	1- Belt conveyor	-7,000	Sugar Co.	
37	El Masara	940	1	110	Concrete	1- Bridge crane 1- Movable crane	4,000	Egypt Aluminum Co.	
38	Tora	945	1	100	Concrete	1- Cement tankers 1- Belt conveyor	5,000	Tora Cement Co.	
39	Athar El Nabi	953	1	1000	Concrete	1- Crane	200,000	RTA	
40	Ambaba Tankers	960	1	90	Concrete	2- Sanction machines	60,000	Tankers Co.	
41	Sauulft	986	1	100	Soil	1- Crane	40,000	Abu Zabal Fertilizers	
42	Phospgate (Ismailia canal)	938+23	1	115	Concrete	1- Suction drilling machine 1- Belt conveyor	60,000	Abu Zabal Fertiliers	
43	El Nahda (El Noubaria canal)	1035+102	1	100	Concrete	1- Crane	80,000	Being privatized	
44	El Metras (El Noubaria canal)	1036+118	2	12	Concrete	1- Bridge crane 1- Wheel movable crane	5,000	Iron and Steel Co.	

Source: 2003 JICA Report and RTA

Although this port is under management of RTA, there is difficulty in the actual operation and management due to legal issues between the existing users and the Government. In fact, the issues affected the Cairo New Container Terminal Project to be implemented by RTA.

Additionally, among the private ports, it is observed that there are some deteriorated and/or unused ports which should be demolished under supervision by RTA.

4) Navigation Aids

For navigable IWs, such as Aswan-Cairo, Alexandria-Cairo and Damietta-Cairo IWs, RTA is gradually installing navigation aids, which include navigational buoys, signs and beacons. According to RTA, the status of the actual installation is the following:

- Installation completed in Aswan-Cairo IW
- Installation completed in Alexandria-Cairo IW
- Installation to be started in Damietta-Cairo IW

For example, as shown in the following photograph, navigational beacons are alternately installed at both banks of Alexandria-Cairo IW, which equip solar power cell units with batteries.

Currently, it is informally reported that some and/or some parts of navigation aids installed are missing along Aswan-Cairo IW. The extent of the damage is not certain or disclosed. However, this event affects installation and implementation of River Information Services (RIS) as explained in the next section.

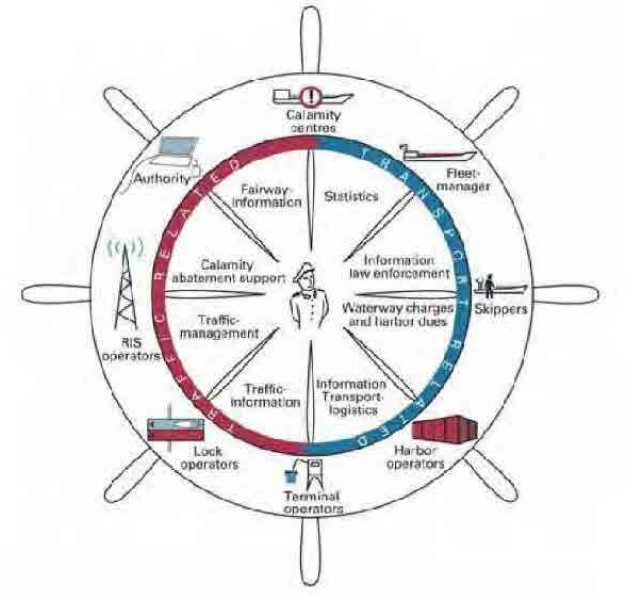
5) River Information Services (RIS)

An advanced information and communication technologies that enables not only to expand an opportunity for inland waterway transport but also to provide safety and efficiency for all the users on the waterway. The system has a role as an interface connected between public and private parties participating in inland waterway transport. It is expected that RIS will possibly facilitate preferable organization and management of IWT. The system could be available in the future for use in the commercial process.

An RIS guideline is already released as a PIANC recommendation[10] and internationally organized. RIS has been widely introduced, especially in several European countries, and it brings the following innovations to navigation operation in inland waterways:

- Electronic navigational charts and its display information System to visualize navigational waterways and ship positioning information
- A sort of standard for electronic navigational charts and waterway networks
- Electronic ship reporting systems for information collection and distribution on navigation
- Vessel tracking and tracing technologies such as Automatic Identification System (AIS) for automatic reporting of the position of ships and other safety relevant data
- Radar systems for navigation and traffic monitoring
- Route and voyage planning applications

The new information technology provided by RIS will aid in providing fairway information service, traffic information service, traffic management, calamity abatement service, transport logistics information, law enforcement information, statistics, waterway charge and port due and so on as presented in Figure 2.2.16.



Source: via-donna 2005

Figure 2.2.15 General Structures of River Information Services (RIS)

RTA has implemented an ODA project for installation of River Information Services (RIS) which is funded by the Government of Austria. This project is particularly for Aswan-Cairo IW where most of the vessels are actually operating on IWs in Egypt.

[10] *PIANC: Guideline and Recommendations for River Information Services, RIS GUIDELINES 2004 , (2004)*

2.2.3. Fleet

Table 2.2.6 shows a list of navigation registrations and licenses. As found in the table, inspected and licensed fleets in 2007/2008 are smaller than those in 2006/2007. It seems that those fleets are concentrated on Cairo-Aswan, Cairo-Alex and Cairo Damietta. It is observed that only tourist boats increased their numbers in the registrations and permits given against a decrease in the numbers for other fleets.

Table 2.2.6 List of Navigation Registrations and Licenses

Category	Nr. of Inspected Vessels		Nr. of Licensed Vessels		Number of Permits	
	2006/2007	2007/2008	2006/2007	2007/2008	2006/2007	2007/2008
Tourism	463	163	8	68	635	1001
Cairo	472	271	330	112	22	41
Aswan	369	266	239	165	-	48
Damietta	219	151	118	141	-	-
Government	243	154	200	16	15	41
Port Said	832	182	664	165	-	-
Total	2598	1187	1559	667	672	1131

Source: RTA

Table 2.2.7 presents list of cargo transport units operating on the Nile. Share of public sectors including River Transport Company (National Nile Company for River Transportation), Sugar Company and Nile Valley Authority is about 65 %. The remaining 35 % is in the private sectors.

Table 2.2.7 List of Cargo Transport Units Operating on the Nile by Owner

Company Name	Nr.of Unit	Tonnage (ton)		Length (m)		Width (m)	
		Max.	Min.	Max.	Min.	Max.	Min.
Watanya	30	750	330	90	45	9.1	7.5
Sugar company	104	425	175	45	35	7.8	7.16
Private sector	71	850	165	60	11	10	6.7
Government sector	1	400	232	51	35	7.5	7
Nile Valley Authority	15	870	170	100	33	10	6.7
River Transport Co.	74	920	175	97.5	34	7.5	6
Business sector	4	530	385	53.14	40	10	7.6

Source: RTA

Table 2.2.8 describes the number of units by fleet type and their basic dimensions. It is apparent that the number of passenger boats is bigger than the one of cargo fleets and the share of the private sector fleets is totally bigger than the one of the public sectors.

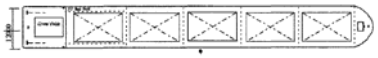
Table 2.2.8 Number of Units by Fleet Type and Basic Dimensions

Units Type	Nr. of Unit	Load Capacity (ton)		Engine Capacity (HP)		Draft (m)	
		Max.	Min.	Max.	Min.	Max.	Min.
Tourist	360	5556	72	2328	90	2.64	0.94
Passengers	306	99	2	350	35	0.8	0.4
Cargo	311	920	165	460	40	1.6	0.6
Public picnic	188	80	2	135	25	1	0.4
Private picnic	1231	272	1.2	535	55	1.6	0.4
Tugboat	73	-	-	230	177	1	0.9
Ferry	77	246	15	535	135	1.14	0.8
Light Transport	43	24.15	15	127	40	1.5	0.8

Source: RTA

The 2003 JICA Study Report suggested a new large-sized barge system for bulk and container cargo transport as presented in Table 2.2.9, in order to facilitate competitiveness to other transport modes and to introduce environmental advantage for mitigating greenhouse gas etc. Along the line of the proposal, a private sector entity, Nile Cargo, has provided two 100 meter long large-sized barges for bulk and container transport use as designated in Figure 2.2.16.

Table 2.2.9 Recommended New Large-sized Barge System in the 2003 JICA Study Report

Cargo Type		Container		Dry Bulk
Drawing				
Barge Type		Self-propelled	Self-propelled	Self-propelled
		Non-coastal	Coastal	Non-coastal
Length	m	100	100	100
Beam	m	12	12	12
Depth	m	2.3	3.8	2.3
Draft	m	1.6	1.6	1.6
Air Draft	m	4.35	4.35	-
Dead Weight	ton	1,430	1,260	1,450
Nr. of Container	TEU	96	96	-
Main Engine	Hp	600	600	600
Complement	person	6	6	6
Speed	knt	7	7	7
Ttal Price	1000LE	2,190	2,869	2,083
Price.Unit	1000LE/TEU	22.8	29.9	-
	1000LE/DW	-	-	1.44

Source: 2003 JICA Study Report

Source: Nile Cargo

Figure 2.2.16 100 m Large-sized Barge System newly provided by Private Service Provider (Nile Cargo)

2.2.4. Cargo Handling

1) Cargoes

The commodities handled at each river port are shown in APPENDICES-2 and -3, which cover 23 kinds of commodities, such as Petroleum Products, Cement, Sand/Gravel, Phosphate, Coal, Stones, Clay, Sulphur, Other Minerals, Grain(wheat), Sugar, Molasses, Aluminum Material, Fertilizers, Pulp Paper, General Cargo, Iron & Steel, Coke, Aluminum Products, Ferro Silicon, Animal Grease, Food Products and Clinker. Inbound commodities are mostly raw materials for the factories and outbound commodities are raw materials and industrial products.

2) Cargo Handling Methods

Table 2.2.5 in Section 2.2.2, shows that each river port has necessary cargo handling equipment and productivity fit for the actual operation, depending on commodity handled in the ports. Liquid bulk cargoes utilize pipe and pumping systems. Bulk and break bulk cargoes use rail mounted cranes, fixed cranes, loaders and movable cranes. Some large ports connected to factories introduce belt conveyor systems. All ports have their own cargo handling equipment which is owned by each operator.

At the sea gateways such as Alexandria Port, the cargo handling generally uses ship cranes equipped on bulk carrier vessels berthed at the quay. When cargoes need to be unloaded or loaded from the vessel, the barges stay beside the vessel in the port basin area or rarely berth at the quay and use the loading/unloading equipment at the seaport.

2.2.5. Navigation

1) Lock Capacity

The longest operational cycle time at the locks is the dominant factor to determine the capacity of the IWs. The operational cycle time of a lock mainly depends on the time needed for water-filling and discharging into/from the lock chamber. Based on an examination in the 2003 JICA Study, the estimated capacities of the locks are shown in Table 2.2.10. As seen in the table, the lock capacities of Cairo-Alexandria and Cairo/Damietta IWs are respectively 32 and 36 twin units per day.

Table 2.2.10 Capacities of Locks

IW	Cairo/Alex IW	Cairo/Damietta
Longest Cycle Time	0.75 hrs	0.67 hrs
Lock Capacity	32 twin-units per day	36 twin-units per day

Note: Cycletime includes open/close times of gates, water-filling/discharging time and enter/leave times of twin-units assumed with 12 meters beam as a new-type barges

Source: 2003 JICA Study Report

2) Inland Waterway Capacity

Cairo-Alexandria IW has a restriction, especially in Nubaria Canal, on barge traffic. When barges are moving in opposite directions, one barge should slow-down and stop to allow the other to navigate at a reduced speed. This is called a "Semi-Two-Way Operation". Likewise, Cairo-Damietta IW has a similar restriction on barge traffic. Table 2.2.11 suggests the capacities of each IW estimated in the said Study.

Table 2.2.11 Capacities of IWs

IW	Cairo/Alex IW	Cairo/Damietta
Operation Type	Semi-Two-Way	Semi/Full-Two-Way
IW Capacity	210 units per day	160 units per day

Source: 2003 JICA Study Report

3) Obstacles to Navigation

In the 2003 JICA Study Report, some obstacles to navigation in the IWs were listed, especially in Nubaria Canal, such as sunken units, unused water sources, various other obstacles or such. Based on the recommendation to secure navigability, RTA conducted the removal of such obstacles to navigation for the Cairo-Alexandria and Cairo-Damietta IWs. It is assumed that the present IWs are free from such obstacles based on the lack of complaints from IW users.

4) Other Navigational Conditions

According to RTA information, the Government of Netherlands has assisted in making navigation charts. However, the coverage is not certain and it seems that the charts have not been released to the public users. The charts that covered all available IWs have basic important information regarding navigation for IW users, and so should be provided to IW users by RTA with periodic updating.

As mentioned in Section 2.2.2, navigation aids such as buoys and light beacons have been provided and upgraded as well as RIS installation to some parts of IWs. Kilometer marks are not clearly confirmed along each IW.

2.2.6. Institution and Administration

1) Establishment of RTA

As mentioned in the 2003 JICA Study Report, RTA was established in 1979 by Presidential Decree No. 474 "The Establishment of River Transport Authority". RTA is under the umbrella of Ministry of Transport. RTA aims at developing the national economy by upgrading the efficiency of river transport facilities through the Nile River and its navigational channels, based on proper technical and economic basis.

The following are within the jurisdiction of RTA as stipulated under the Presidential Decree:

a) Executing the provisions of laws promulgated with regard to organizing domestic navigation

b) Developing comprehensive planning for river transport facilities and all the industrial works related thereto in order to fulfill the requirements of development in all aspects, besides preparing the necessary programs and projects as well as the supervision after the execution

c) Clearing and improving the domestic navigation canals and canal locks, and the maintenance thereof in such a way as to achieve the optimum utilization

d) Supervising all river transport projects to ensure the proper executions thereof as well as their conformity to the conditions and technical specifications

e) Determining the navigation lines, canal locks and public berths, and developing the rules of their utilization

f) Determining the fees for using the industrial facilities established by the Authority

g) Dividing the navigational waterways into cargo and passenger transport lines, and running them according to the rules and regulations stipulated in navigation laws

The board of directors manages RTA, controls issues and suggests the general policy so that RTA functions well. The board has the right of taking any necessary actions for realizing the RTA aims.

In 2008, the Presidential Decree No. 474/1979 was amended as referred to in the following laws (refer to APPENDIX-6) and regulations related to RTA and IWT except for those listed in Table 2.2.12. By the amendment, it is generally emphasized that RTA is required to consult with and to obtain approvals from the Ministry of Defense (MOD) and its mother organization, the Ministry of Transport (MOT) prior to implementation of some activities or if the appointees of the board of the directors are to be changed.

Table 2.2.12 Laws and Regulations Relevant to IWT

Law/Regulation	Ref. No.	Summary
	#10/1956	The Inland Nvigation
	#130/1975	Berth and Organizing berthing at the Internal Water
	#01/1973	Tourist and Hotel Institution
	#48/1982	Protecting River Nile and Its Waterway from Pollution
	#12/1984	Irrigation and Draining
	#04/1994	Environmental Protection
Presidential Decree	#290/1969	The Transfer of Responsibilities of Regulations departments to the Local Administration Organization
	#474/1979	Establishment of the River Transport Authority
	#117/2008	Amendment of #474/1979
Prime Minister Decree	#2272/1971	Authorizing governor witresponsibilities of Ministry of Transport
	#294/1999	Protecting River Nile clean
Minister Decree	#8921/1956	Licensing of Units and their Safety and Validity Condtions and Specifying Shipping Lines
	#8922/1956	Organizing Units Traffic and Using in the Internal Water and the Condtions for Working on It
	#9040/1957	The Licensing Condtions for Public Ferries Traffic and Organizing the Tender Regulations
	#189/1962	Condtions of Licensing for Private Berth and Organizing Berthing at Private Berths and the Temporally Berthing including the Fees
	#08/1983	Protecting River Nile and Its Waterways from Pollution
	#15/1983	Licensing of Engine Ships and their Safety and Validity Conditions and Organizing Ships Traffic in Internal Water
	#126/1986	Bridges Construction over the Waterways
	#282/1998	Navigation Licenses in the Internal Water

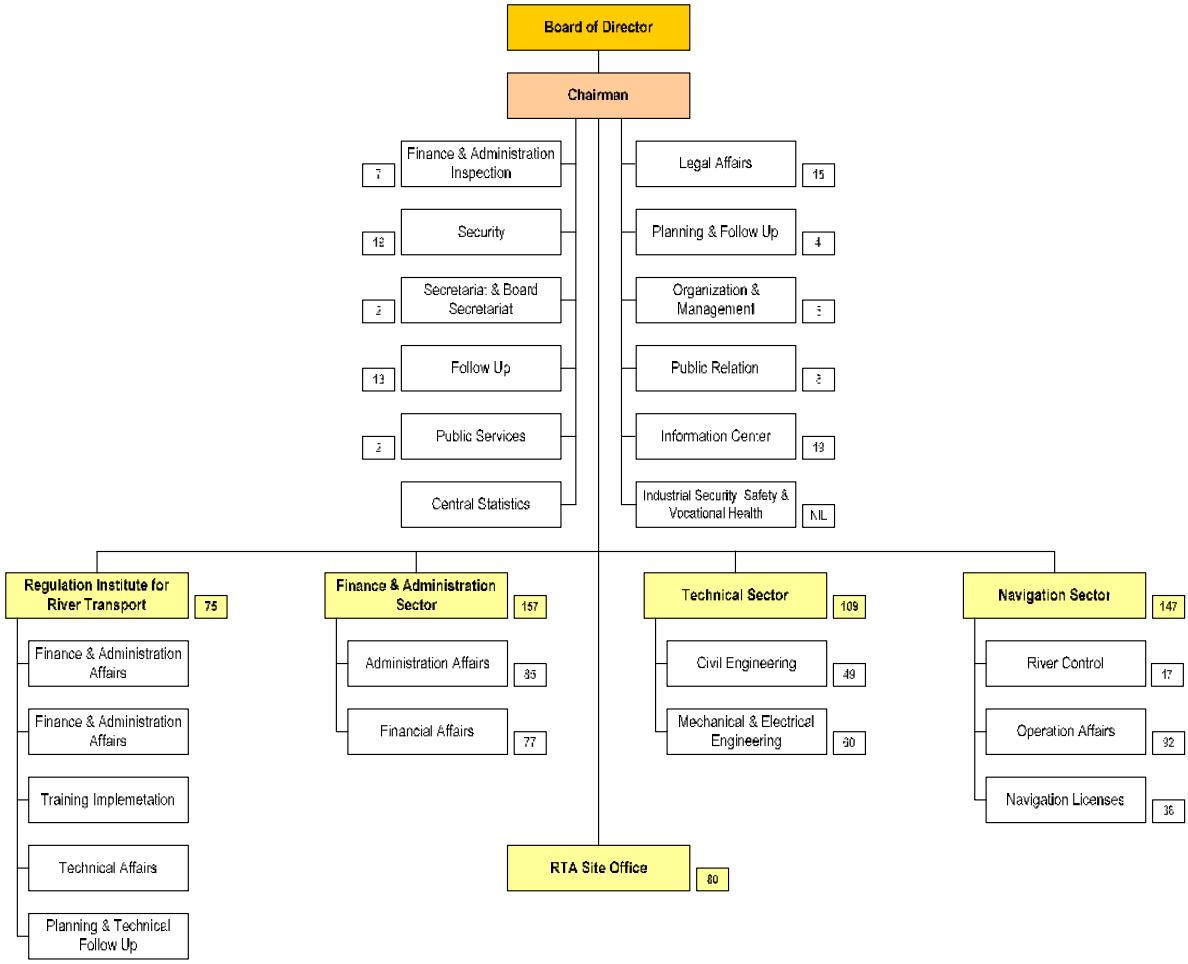
Source: 2003 JICA Study Report and RTA

As mentioned in the above, licensing is one of the revenue sources of RTA, which has the following renewal process: every 6 years for inspection of newer barges, very 4 years for inspection of older barges, every 2 years for an under water survey and every 2 years for licensing (also refer to APPENDIX-7)

2) Organizational Framework

Based on information from RTA, its organizational framework, roles and functions of each department and section have not been significantly changed since the 2003 JICA Study. Figure 2.2.17 presents the RTA organization chart in (2007). As shown in the figure, there are a lot of direct departments and sections under the Chairman with some probably overlapping in roles and functions and some departments or sections are lacking to provide planning and policy, business promotion and whatever else is necessary to succeed in strategic IWT promotion.

Table 2.2.13 and Table 2.2.14 respectively display numbers of RTA Employees by work categories and positions/degrees. As found in both tables, total number of RTA staff seems to be the same compared with the number in the 2003 JICA Study Report. Apparently, it has a trend that the proportion of the employees related to Engineering is respectively bigger than other categories. Also it should be noted that the employees of statistics are much smaller and there are no employees related to planning, business promotion and environment.



Source: RTA

Figure 2.2.17 RTA Organization Chart (2007)

Table 2.2.13 Number of RTA Employees by Work Categories (2009)

No.	Category	Nr.of Employees
1	Senior management posts	11
2	Engineering jobs	53
3	Engineering Jobs help	110
4	Administrative Development Jobs	24
5	Statistics Jobs	2
6	Information Jobs	2
7	Finance and Accounting Jobs	34
8	Legal Jobs	8
9	Office functions	193
10	The functions of art and architecture	5
11	workshops and machinery Jobs	37
12	Function of the movement and transport	90
13	Support Services Jobs	35
14	Security Jobs	1
Total		605

Source: RTA

Table 2.2.14 Number of RTA Employees by Position/Degree (2009)

No.	Position/Degree	Nr.of Employees	
		Permanent	Temporary
1	Excellent	1	
2	High	2	
3	General Manager	8	
4	Senior specialists	22	
5	Large professional	6	
6	Senior writer	7	
7	First class	181	9
8	Second class	138	3
9	Third class	121	81
10	The fourth degree	76	67
11	The fifth degree	16	1
12	The sixth grade	27	36
Total		605	197

3) Working Condition & Training Practice

As mentioned in the 2003 JICA Study Report, working hours are from 8:00 to 15:00 Saturday to Tuesday and from 8:00 to 15:15 on Wednesday. Regular holidays are on Thursday and Friday. Other working conditions mentioned in the report are unchanged according to information from RTA.

Table 2.2.15 describes number of training sessions, fees and revenue gained through training conducted by RTA and Table 2.2.16 shows internal training programs and the number of trainees in RTA. As seen in Table 2.2.15, RTA conducts several trainings externally, especially for crews for barges, boats and other ships and the training fees become a source of RTA revenue. Not only external trainings, RTA has internal

training programs as designated in Table 2.2.16. RTA staff have some opportunities to have trainings for the purpose of promotion or to increase their skills.

In addition to the above, the Government of the Netherlands is now providing technical assistance to RTA as a Netherlands Initiative for Capacity development in Higher Education (NICHE) from 2011 till 2014.

Table 2.2.15 Number of training sessions, Fees & Revenue gained by RTA Training (2009)

Semester		First Quarterly			Second Quarterly			Total			Fee Exemption	
Course Title	fee	Course	Trainee	Revenue	Course	Trainee	Revenue	Course	Trainee	Revenue	Check	Fee free
Mariner	200	5	210	42,000	1	52	10,400	6	262	62,400	1,000	
Professional Mariner	100	5	176	17,600	1	37	3,700	6	213	21,900		One Trainee
Master Mariner	100	3	127	12,600	2	41	4,100	5	188	16,700		
Senior Master Mariner	150	1	26	3,900	1	18	2,700	2	44	6,600		
Deputy Ship Captin	200		16	3,200	1	12	2,400	1	28	5,600		
Tourist Ship Captin	250				1	30	7,500	1	30	7,500		
Mechanic Engineer	200	5	195	39,000	1	27	6,400	6	222	44,400		
Mechanic	75	3	90	6,675	1	22	1,650	4	112	8,325		
Senior Mechanic	100	1	32	3,200	2	18	1,800	3	50	6,000		
Electrician Engineer	200	2	38	7,600				2	38	7,600		
Electrician	75	2	53	3,975	1	23	1,725	3	76	5,700		
Senior Electrician	100	1	18	1,900	1	9	900	2	28	2,600		
Simulators	350	4	147	51,450	4	112	39,200	8	259	90,550	2,450	One Trainee
Radar	350											
Occupational Safety and Health	100	4	145	14,500	3	104	10,400	7	249	24,900	800	
No. of Courses		36			20			56				
No. of Trainees			1,274			505			1,779			
Revenues				204,600			91,875			299,475		
Cheque			16									
Fee Free			2									

Source: RTA

Table 2.2.16 Internal Training Programs and Number of Trainees (2008/2009)

Program Name	Nr. of Course	Nr. of Traninees		Cost
		Male	Female	(LE)
I. SPECIALIZED TRAINING				
Succeeded Training				18,534
Crises mangment	5	4	1	500
Role of the manager in the Shadow of modern Variables	2		2	500
Time mangment	1		1	100
Team structure	1	1		100
Comprehensive quality	1	1		100
Total	10	6	4	19,834
II. EXTERNAL TRAINING				
Computer	58	27	31	9,850
English Language	11	5	6	6,485
Diesel Engines Malfunction detector	1	1		210
First Aids	2	2		400
Fire Prevention	8	8		800
Vocational Safety and Health	4	3	1	800
Total	84	46	38	18,545
III. INTERNAL TRAINING				
Computer	3	21	30	1,880
New Employees	1	25	10	936
Preparing and Writing Reports Skills	1	21	8	1,000
Contstructive Projects mangments	1	16	6	1,000
	6	83	54	4,816

Source: RTA

4) Sailing Rules on Inland Waterways

The sailing rules in Inland Waterways were established in the Ministerial Decree No. 15/1983, No. 282/1998, No. 9040/1957, and Annex of No. 8922/1956 as stated in the 2003 JICA Study Report. There seem to have been major changes and modifications. Particularly, the concerned rules are extracted as below:

a) Restriction on speed

- Within the Nile River 15 km/hour
- Within the Delta Area 08 km/hour
- Speed Boats 40 km/hour

b) Sailing Hours

The period of sailing without night visual devices which are approved by the authority, is limited from sunrise to sunset.

5) Financial Situation and Budget

In financial year 2009/2010, RTA recorded about 14 million LE as expenditures and 8.2 million LE from incomes excluding investments. These figures show an unbalanced situation lacking 6 million LE in deficit financing and RTA therefore needs budget allocation from the Government. Also, it is noted that the expenditures more than tripled comparing to those figures stated in 2003 JICA Study Report but incomes only doubled.

RTA revenue is mainly from ship and crew registrations, the licensing fees and the training courses for the crews. Presently, RTA is not imposing fees for lock use or for using the navigable channels. However, it is planned that RTA will impose such fees after navigability can be guaranteed by RTA.

2.2.7. Service Providers

Currently, there are two major cargo transport service providers in Egyptian IWT. The one is “Nile Cargo” (National River Transport Company sometime called Wataneya) under Citadel Financial Consultation Group, which is a leading private company for river transport services. The company is undertaking its own technical and economic investigations and studies to accomplish “door to door” logistics services with interconnection among sea, river and land modes. The company owns around 30 units of 30-60 meter long standard barges and would additionally provide 62 new units of 100 meter long large-sized barges the same as recommended in the 2003 JICA Study Report. Two large-sized barges have already been launched and now operate on the Nile, according to information by the company. The advantage to the company is to have greater flexibility and mobility with its own investment supported by the mother company as well as other associated companies under the mother company for accomplishment of logistics interconnection to other transport modes. Cargo transport services of the company are mainly bulk raw materials and products, and also container cargoes but these are not constantly transported so far.

Another company is “The National Nile Company for River transportation” associated with the Ministry of Defense (MOD). Cargo services of the company are mostly for the government sectors and the state owned companies related to mineral, industrial, chemical, petroleum, food & agricultural raw materials and products. Additionally, it seems that the National Sugar Company or other authorities exclusively operate their cargo transport services between their own ports.

In the case of passenger transport, especially the Nile mainstream has a lot of tourist boats, ferries and small private power/sailing boats. Tourist boats and ferry passenger transport services are organized business operations mainly run by small-medium scaled companies and other boats registered are mostly privately owned.

2.2.8. Maintenance & Safety

RTA is undertaking ordinal maintenance to IWT infrastructures such as waterways, locks, navigation aids and other related groups of bodies. RTA is constantly implementing maintenance dredging of approximate 7 million cubic meters per year totally costing 150-200 million LE. The average annual dredging volume is composed of 3 million cubic meters from Cairo-Aswan IW, 2.4 million cubic meters from Nubaria Canal (Cairo-Alexandria IW), 0.1 million cubic meters from Beheiry Canal (Cairo-Alexandria IW) and 1.5 million cubic meters from Cairo-Damietta IW. It seems the constantly incurred cost of dredging becomes a constraint for the annual budget of RTA. The actual dredging activities are carried out every alternate year for the said IWs depending on site conditions after hydrographic surveys. Regular maintenance of the locks is also executed every 5 years with an average cost of 6 million LE per lock. Maintenance of navigation aids and other infrastructure is taken upon necessity arisen from periodical investigations by RTA.

As a safety measure, RTA installed navigation aids including buoys, light beacons and RIS. However, there are some accidents reported as described in Table 2.2.17. As seen in the table, the accidents in river transport happened in Cairo-Aswan IW and are of passenger boats. This situation may imply congestion in some peak traffic on the IW.

Table 2.2.17 Accident Reports on IWs (2008/2009)

No.	Unit	Date	Location	Description	Consequence
1	Borevage	8-May-08	Luxor	Collision with Bridge	Damage
2	Tobaz	8-Jul-08	Cairo	Collision with Bridge	Damage
3	Arabia	9-Jul-08	Cairo	Fire	No information
4	Astra	9-Aug-08	Luxor	Fire	Full Combustion
5	Shahd & Paid no 225 Egypt	10-Sep-08	Cairo	Units Collision	Damage
6	Gandolla - Montaser 1	28-Oct-08	Luxor	Units Collision	Damage
7	Lady Christina	12-Jun-08	Esna	Fire	Damage
8	King Toot 1 - Glory	28-Dec-08	Luxor	Units Collision	Damage
9	Ogeny bel Aibok	24-Jan-09	Nasser Lake	No informaiton	No Damage
10	Launch Control 30 meters	17-Feb-09	Cairo	Fire	Damage
11	Royal Tregency	16-Mar-09	Edfo	Collision with Bridge	Damage
12	Anny	4-May-09	Aswan	Fire	Damage
13	Radamis 1 , Nile Pioneer 1	5-Sep-09	Luxor	Units Collision	Damage

Source: RTA

2.2.9. Interconnection to Other Transport Modes

Egyptian IWs currently are interconnected to the sea gateway especially for bulk raw materials. However, the cargo handling is old-fashioned style and inefficient. Interconnection to land transport modes is not well organized except for the one between private river ports exclusively used by the associated factories located beside the ports.

2.2.10. Environmental Concerns

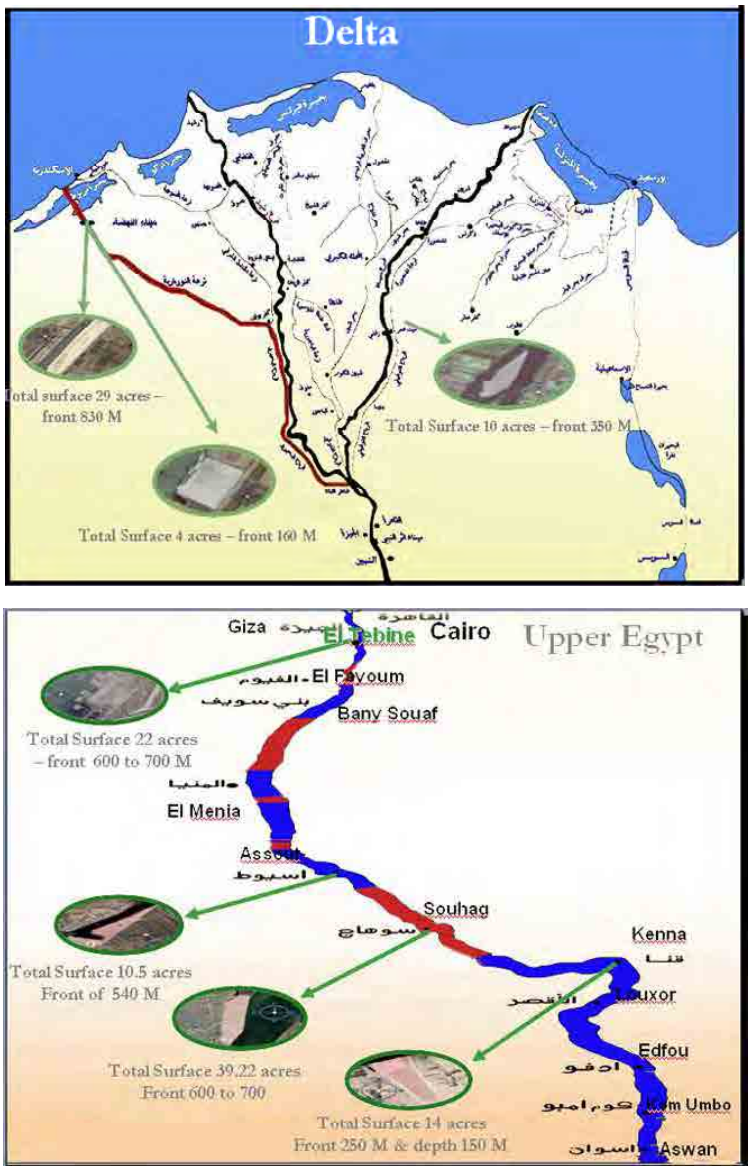
As listed in Table 2.2.12, there are some laws and regulations relevant to environmental concerns. The Nile and its stretches, including canals, are precious water resources contributing to developing the country, especially for agriculture, industries, transportation and other items related to economic and human

activities. In such background, environmental issues and concerns have been carefully taken into consideration even within IWT industries.

So it is further necessary for the IWT that RTA should be involved in discussions for the environmental concerns with other governmental sectors, stakeholders and regional communities.

2.2.11. Public Private Partnership (PPP)

RTA has undertaken facilitation of Public Private Partnership (PPP) since 2007. Especially, RTA plans PPP for developing 7 new river port terminals for such as El Nahada, El Nahada port extension and Meat Ghamr river ports in the Delta area, and Sohang, Assyut, Tebinn, Quena river ports in middle/upper Egypt areas as presented in Figure 2.2.18. According to information from RTA, the bids for concerned parties were not successful at the beginning and the parties are undertaking Due Diligence for investment. PPP is a new challenge for IWT as well as RTA. Therefore, it is essential to undertake suitable PPP formulation considering the present situations and surrounding business environment without failure in their bidding process.



Source: RTA and MOF

Figure 2.2.18 Location Map of PPP for River Port Development

2.2.12. Committed Projects

Based on the development plans already committed to, RTA currently has some projects. Table 2.2.18 gives a list of the committed projects indicating the main scope of work, period and financial information with the project cost, and Figure 2.2.19 shows their location map (refer to APPENDIX-8). As found in the table, as committed projects, there are three projects are being implemented by RTA, which are at the present all on-going and categorized as regular infrastructure improvements, such as dredging, new lock construction, installation/upgrading of navigation aids and the like. Additionally, River Information Services (RIS) newly introduced is also under installation between Cairo/Aswan IW on the Nile mainstream as a modernized IT infrastructure. These areas of the projects cover all the main IWs: Alexandria/Cairo, Damietta/Cairo and Cairo/Aswan IWs. Also, the said three are self-financed projects of the Government of Egypt, but the rest are loan projects being financed with foreign funds from the Government of Austria that is also providing technical assistance.

Table 2.2.18 Committed Projects in IWT

Project	Project Type	Implementing Agency	Scope of Work	Project Period	Finance		Estimated Cost (Million L.E.)
					Type	by	
Nubaria & Beheiry Canals Development	Infrastructure	RTA	- Protection of the existing bridges along the both Canals - Identifying locations of alluvial deposits and bridge collapse - cleaning and rehabilitation for securing design river bed levels - Renewal, modernization and maintenance of locks regularly - Construction of extension to Small Briny Lock - Construction of a new lock at 100km on Nubaria Canal	2007-2012	Self-financed	Egypt	715
Development of CAI - Aswan Waterway	Infrastructure	RTA	- Development and Improvement of navigation route - Removal of any navigational bottlenecks for protection river unitsand cargo & Passenger transports - Specifying navigational route by buoys and adding signs with night lights - Producing navigational maps thru regular cadastral survey	2007-2012	Self-financed	Egypt	102
Development of Damietta Branch Navigation Route	Infrastructure	RTA	- Removal of any navigational bottlenecks thru regular cadastral survey for connection to Damietta Port a) Preparation of training room at Regional Institute b) Establishment of emulators to train river transport crews on stevedoring at Regional Institute c) Periodical locks maintenance d) Provision of navigational guides and aids with solar energy	2007-2012	Self-financed	Egypt	51
Establishment of Central Control & Surveillance Network (River Infromation Ssytem)	IT Infurastructure	RTA/GOA	- Establishment of central control and surveillance network for navigation - Provision of service to different river units to minimization of congestion at locks a) Establishment of IT network infrastructures b) Establishment of International Computer Surveillance Network	2007-2012	lent	Austlia	0.5

Note: GOA means the Government of Austlia

Source: RTA

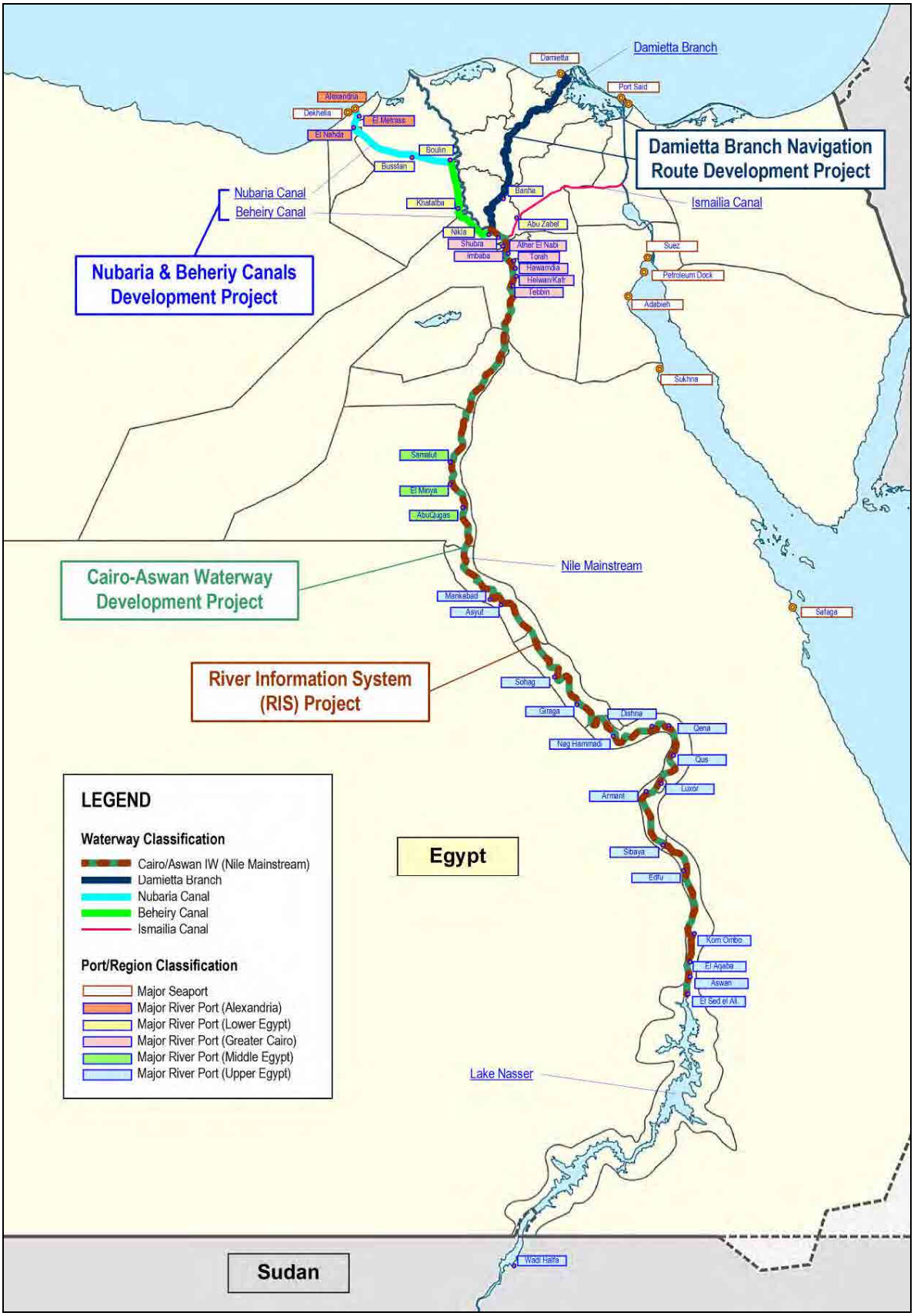


Figure 2.2.19 Location Map of Committed Projects for IWT

2.3. REVIEW OF SECTOR STRATEGY REGARDING THE NATIONAL DEVELOPMENT PLAN

2.3.1. Introduction

In Egyptian transport sectors, Inland Waterway Transport (IWT) has come under jurisdiction of the River Transport Authority (RTA) formed under the Ministry of Transport (MOT) in 1979 by President Decree No. 474. RTA, with involvement of local consultants, concerned academies and public & private sectors has initiated some technical/administrative studies to improve IWT, their operation & management and RTA itself. Also, there were some similar studies regarding IWT by Official Development Assistance (ODA) of such countries as the Netherlands, Japan, Austria and the like. Although most of the studies focused on particular items, the Japan International Cooperation Agency (JICA) carried out a development study for IWT in 2003[11] in order to analyze underlying issues from technical, operational, and administrative aspects and to suggest a comprehensive IWT master plan and could finally be a baseline for the updated IWT policy making of RTA. RTA has successively implemented some development projects as recommended based on the baseline policy originated from that master plan.

By the efforts of RTA as well as some exterior factors such as the economy upturn and activation of the markets that resulted from reformation of government bodies and facilitation of privatization enforced under the Nazif regime, IWT cargoes returned to 2 million tons in 2007 from the bottom of 1.2 million tons around 2003 and 2005. However, the volume of 2007 still remained half of that in the middle of the 1980's and now has a hard trail to return back to such prosperous age, because of less than flexible and timely adjustments and actions that have been taken to respond to the drastic changes in the surrounding economic climate and market movements, and the appearance of more competitive modernized efficient modes of transportation with importance placed especially on speed and cost.

In such situation, RTA holds some exercises to further improve and promote the current IWT by implementing some successive projects and concurrently referring to the baseline policy in the master plan aforementioned. In the following sections, Development vision and plans, and committed projects of IWT are to be discussed. Additionally, after the said sections, a discussion is made in terms of key issues and sector barriers of IWT based on examination of the progress in implementing the master plan and field findings that were generally observed.

2.3.2. Development Vision

1) Basic Vision in 2020

RTA has continuously implemented some development plans and projects based on the master plan as previously mentioned in the foregoing section. As the conceptual development plan, roles of IWT in 2020 are discussed in the plan in consideration of three aspects, such as national land structure, basic characteristics of each transport mode and relation between navigational and irrigational uses. The major roles of IWT concluded as the development vision are summarized in the following four points:

[11] *The Overseas Coastal Area Development Institute in Japan (OCDI) and Pacific Consultants International (PCI): "Final Report on The Development Study on Inland Waterway System in The Arab Republic of Egypt", Japan International Cooperation Agency (JICA) & River Transport Authority (RTA), (2003)*

- Establishment of an economical and energy efficient transport system to cope with increasing demand for cargo transport among major seaports, Greater Cairo (GCR) and inland industrial areas
- Establishment of a reliable and safe mass transport system all year around
- Establishment of a transport system attractive to private barge operators
- Easing of environmental problems

For the above four roles of IWT, further explications are given as below:

Establishment of an economical and energy efficient transport system to cope with increasing demand for cargo transport among major seaports, Greater Cairo (GCR) and inland industrial areas

As the first step, it is important to establish an economical and energy-efficient transport system to respond to competitive market demand. This can indirectly recognize minimization of time cost in the system. The energy-efficient system is advantageous for reduction of CO_2 emissions and other air pollution as well. Strategic actions to aim at the cost-efficiency can be listed in the following:

To focus on routes between major seaports and GCR as paramount IWT axes:

It is apparent that the IWT sector needs a strategic view to forming larger inland transport axes from principal routes in Egypt, which consist of “Alexandria/Cairo”, “Damietta/Cairo” and “Port Said/Cairo”. In fact, the majority of the cargoes are concentrated in the said three axes in view of cargo volume at each seaport, so that the three axes should be firstly prioritized in the development plan.

To target specific commodities:

IWT is disadvantageous for speed, handling and distribution, but can commercially transport goods. In such case, it should maximize its major advantage of cost saving to be competitive. For this purpose, IWT should specify particular commodities considering cargo characteristics as well as advantage/disadvantage of IWT.

To enlarge size of barges and to improve IW infrastructure:

One effective measure to save transport cost is given by increasing the size of the transported loads, which means enlargement of barge size.

Establishment of a reliable and safe mass transport system all year around

“Mass Transport” between seaports and GCR has an important role in several industries in Egypt. It is required to be safe and reliable transportation that is “regular service all year around” for its users such as producers, factories and transporters. The following strategies to secure safe and reliable systems are provided:

To improve IW infrastructure to secure safe and smooth navigation:

The current IWT is not a reliable mode of transport, because IW facilities and bottlenecks obstruct smooth and safe navigation of barges and IWs have been frequently/sometimes not passable resulting from lack of maintenance of related facilities, e.g. locks, canals, bridges and irrigation facilities. It is therefore required to resolve such bottlenecks with consideration of the future barge system. Properly scheduled appropriate maintenance programs for such facilities are necessary to minimize the waiting periods in barge transport operation.

To establish flexible system of adapting to seasonal fluctuations in water depth:

IWs are utilizing the River Nile that is used for other important purposes such as irrigation control. Therefore, coordinated and harmonized use of the water resources is necessary. Especially, irrigation use has higher priority than IW use, in order to control water flows and elevations which affect huge areas in the Nile delta. Therefore, a new barge system is required to maintain sufficient navigability of the system itself such as using shallow draft type barges during lower water level periods. Simultaneously, it is essential that RTA collects and announces such water-depth conditions to the relevant operators and organizations in co-operation with the Ministry of Water Resources and Irrigation (MWRI).

Establishment of a transport system attractive to private barge operators

Two strategies for attracting customers to the transport system are briefly summarized in the following:

To improve IWT operational and managerial systems:

IWT requires more promoting that is attractive to its customers with their cargoes. In spite of possible equipment already provided for night time operation in most Egyptian transport systems, IWT operation is still limited to only the 10 hours during the day time from sunrise to sunset. In order to maintain the same condition as other transport systems to be competitive, an environment for possible night time operation is essential to IWT.

To clarify roles of other governmental organizations:

Roles and responsibilities of the relevant parties such as the Ministry of Transport (MOT), RTA and private sector entities are important to be clarified. Especially, those of MOT are essential and significant to facilitate promotion of IWT for increasing its modal share with appropriate coordination with other transport sectors.

Easing of environmental problems

Currently, it is considered that environmental concerns should be settled in any development. Especially, reducing transport cost, reduction of traffic volume, economization of fuel consumption and mitigation of CO_2 emissions have been required in transport sectors. They somehow conflict at first glance, however, they should be optimally harmonized as has been widely discussed such as in major international conferences. For such situation, strategies to address the environmental concerns need to be implemented in the long-term and comprehensive views. It is expected that more promotion of IWT could result from moderation of such environmental concerns.

In regard to the above stated vision, it is observed that some circumstances that have changed might be considered in a review of the vision and that this would suggest adjustments of the current trends and conditions. However, to date, the above vision, to be activated by 2020 is principally the backbone of IWT development to be implemented by RTA.

2) Short-term Policies in The Sixth Five Year Plan (2007-2012)

In addition to the Basic Vision in 2020 of the Egyptian Government, RTA has short-term policies related to IWT in the 6th five year plan[12], which are summarized below:

- Developing and increasing the efficiency of water canals to increase the available capacities for river transportation, and effectuating its role in cargo transport
- Establishing river ports suitable for usage for cargo transport and tourism purposes

It is recognized that the above policies are basically derived from the Basic Vision in 2020, but consider current circumstances surrounding IWT.

2.3.3. Development Plan

1) Master Plan in 2020

In order to achieve the said four roles of IWT as the development vision suggests, the master plan for 2020 was made based on identification of the improvement measures to the existing problems held in IWT. Table 2.3.1 provides the particular problems for master plan making.

Table 2.3.1 Indentified Particular Problems of IWT

Particular Problem	Main Reason
Declination of modal share of IWT	*Decrease of IWT cargo volume unlike other land transport sectors
Insufficient accessibility to major seaports	*Rehabilitation project on going, no improvement and physical access by IWs
Hindrance from efficient transport & transport cost saving	*Limited operational time of current barge system (only day time)
Shortcoming to participate in transport of containers	*No public river port facilities for accommodation of containers in GCR region *No commission to container barge operation between seaports and GCR
Untimely actions and less role sharing between public and private sectors	*Lack of coordination within the relevant governmental organizations *Insufficient framework for timely responses to needs and demands from IWT market
Few participations and investment by private sector in IWT market	*Hesitance for investment to new larger-size barge building in recession of IWT market *Physical constraint in IW infrastructures for investment new larger-size barges

Source: 2003 JICA Study Report

Based on identification of the particular problems of IWT aforementioned, basic strategies of the master plan are presented as described in Table 2.3.2.

To formulate the master plan, the following prerequisite conditions are to be considered:

Prioritized IWs: (corresponding to Strategy No. 1) in major first class waterways in the Nile Delta area, two IWs are connected to major seaports: Alexandria/Cairo IW (Beheriy/Nubaria Canals) and Damietta/Cairo (Damietta Branch). These are major water-bone transport axes in Egypt for connection between the

[12] *Ministry of Economic Development: "The Sixth Five Year Plan 2007-2012", Chapter 5 Sector Development, 5/5, the Government of Egypt, (2003)*

seaports and GCR and have adequate capacity to be utilized for mass-transport of specific cargoes. Additionally, although there are other IW to major seaports between Port Said-Ismailia/Cairo (Ismailia Canal) and cargo volume of Port Said is forecast to increase, the route is apparently less competitive compared to other transport modes and is disadvantageous of investment by reasons of uncertain traffic demand and necessity of passing through the Suez Canal. Expecting supplemental functions of Alexandria/Cairo IW, a new connection canal at Bolin is also to be prioritized.

Table 2.3.2 Basic Strategies in Master Plan of IWT

1	To avoid excessive investment in improvement of IW facilities (prioritization of IWs)	
2	To target specific commodities as cargo to be transported by barge	
3	To improve related infrastructures by public sector	
	3.1	To strengthen accessibility to seaports: *- To improve IW facilities* *- To establish night navigation system*
	3.2	To develop new connection of IW
	3.3	To develop public river port in GCR
4	To enlarge barge size to maximum extent within physical conditions of improved IW facilities *- To increase loading capacity* *- To enable barges navigation in open sea area between El Dekheila and Alexandria Ports*	
5	To improve management and operation of IWT	
	5.1	To provide government programs to support IWT
	5.2	To improve managerial and operational system of RTA

Source: 2003 JICA Study Report

Water Supply to IWs in the Nile Delta: Present seasonal water fluctuation patterns should be unchanged in 2020.

Policies of the Egyptian Government: efforts for environmental preservation and energy conservation should be undertaken by the Egyptian Government by adopting necessary policies to improve the present conditions.

Key development plans are suggested in the master plan for implementation of the base strategies as previously presented. The development plans are comprised of infrastructures and managerial & operational systems of the IWT.

IWT Infrastructure Improvements: (corresponding to Basic Strategy Nos. 2,3 & 4) improvements of IWT infrastructures are targeted in four categories such as Alexandria/Cairo IW, Damietta/Cairo IW, river ports and barge systems as summarized in Table 2.3.3.

Alexandria/Cairo IW has four development plans: three for infrastructure and one for facility operational improvements. The infrastructural improvements include extension of the existing Alexandria small lock to prevent blockage under the existing railway and road bridges, dredging and navigation aids for constantly ensuring navigable conditions in the IW, and a new connection canal at Boulin to provide a new bypass route in the IW through Rosetta Branch. The facility operational improvement is to reduce unnecessary waiting time at every lock by implementation of 24 hour operation.

Damietta/Cairo IW requires only facility operational improvement. There appear to be minimal bottlenecks in navigation unlike Alexandria/Cairo IW, except for removal of some obsolete bridges which could be physically implemented at any time depending only on governmental arrangements. The facility operational improvement as mentioned is the only significant action that needs to be taken so far.

For river ports, one infrastructural improvement that is suggested is to construct new container and general cargo terminals in the vicinity of GCR. It is proposed to make a core major port to be operated by the public sector at its beginning until it can offer a concession to the private sector(s) for facilitating a full-scale river port operation model.

Table 2.3.3 Summary of Development Plans (IWT Infrastructure Improvements)

Corresponded Basic Strategy	Category	Proposed Plan	Purpose	Component	Estimated Cost (Mil. L.E.)
2/3	Alexandria/Cairo IW	Extension of existing Alexandria lock (small Lock)	To circumvent smaller air clearance under the existing Alexandria Port railway & road bridge	Civil works, M&E equipment, Engineering services etc.	77
		Dredging & navigation aids along Alexandria/Cairo IW	To successively secure navigable conditions	Dredging & bank protection, Navigation Aids, Engineering services etc.	50
		New connection canal at Bolin	To provide a bypass route via Rosetta Branch for support to Alex/Cairo IW	New canal & dredging along Rosetta Branch, M&E equipment, Engineering services etc.	90
		24 hours operation of locks	To reduce time constraint upon navigation	Non (administrative arrangement)	-
	Damietta/Cairo IW	24 hours operation of locks	To reduce time constraint upon navigation	Non (administrative arrangement)	-
	River Port	Cairo river port development	To handle possible common general/container cargoes expected near GCR in defining role and function between public and private ports	Container & General Cargo Terminals, Cargo handling equipment, Engineering services etc.	192
2/4	Barge system	Larger-size new barge system	To take advantage in mass transport to other sectors with fitting to physical dimensions of the relevant existing infrastructures	Non (private investment expected)	-

Source: 2003 JICA Study Report

In addition to such mentioned improvements, new larger-size barges are to be introduced to take advantage of the mass-transport of containers and bulk cargoes through promoting investment of the private sector(s). This forms a part of the plan to establish an advantage in the competitive market for the IWT sector.

IWT Managerial and Operational Improvements: (corresponding to Basic Strategy No. 5) improvements of IWT managerial and operational systems are targeted at three categories such as inducement measures for IWT, role-sharing between the public and private sectors, and management & repair for IW infrastructures as summarized in Table 2.3.4.

Table 2.3.4 Summary of Development Plans (IWT Managerial & Operational Improvements)

Corresponded Basic Strategy	Category	Proposed Plan	Purpose	Component	Estimated Cost (Mil. L.E.)
5	Inducement Measure	Establishment of soft-loan program	To provide a preferential treatment to private sectors in IWT promotion for such as investment to new barge system	"IWT Promotion Fund"	-
		Governmental program to tackle environmental issues	To lower environmental impact and social cost as less accident with highlighting IWT their advantages	Regulation control to automobiles, environmental tax etc.	-
	Role-sharing	Review of responsibility of public sector	To properly coordinate IWT concerns among relevant sectors	"IWT Committee" composed of RTA, MOT, MWRI, National Water Research Center (NWRC), Nile Research Institute (NRI) and Ministry of Tourism	-
		Enhancement of market principal	To privatize governmental IWT company, and assist making and foster competitive market and its environment	Preferential treatment among three land transport sectors, efficient administration on license issuance etc	-
		Strengthening IWT business	To act any IWT business concerns by associative parties	"IWT association" to handle issues of IWT operators, marketing of IWT, appealing to the Government, lobbing for IWT promotion, PR activity of IWT etc.	-
	Management & Repair	Reinforcement of RTA technical division & personnel	To assure proper level of public services and higher level of transport system	Deployment of skilled and experienced engineers	-
		Execution plan for maintenance & repair	To ordinarily keep good conditions for navigational activities	Maintenance & Repair Program in consideration of seasonal patterns and/or experiential records	-
		Close coordination with MWRI	To effectively harmonize in maintenance & repair issues	Close periodical coordination meetings	-
		Share of RTA role	To efficiently carry out necessary duties in properly demarcated role of individual sections	Information share of technical/administrative knowledge	-
		Training for technical personnel	To increase trained/skilled personnel, maintain technical level, and secure maneuverability in daily duties	Training program for maintenance & repair works	-

Source: 2003 JICA Study Report

Inducement measures for IWT have two development plans and both are institutional programs. One is establishment of a soft-loan program for assisting IWT private sector participators in their investment by a preferential treatment of the Government sectors, e.g. “IWT Promotion Fund” which is a lower interest loan frame beneficial to private investment. Another is tackling of environmental issues for mitigating environmental impacts and lowering social cost as fewer accidents can be expected through control by the Government, in which the IWT sector is more advantageous than road transport on these issues.

Role-sharing between the public and private sectors has three development plans: review of the responsibilities of the public sector, enhancement of market principals, and strengthening of the IWT business. The first plan must create a coordination system among the relevant Governmental sectors, such as MOT, RTA, MWRI, National Water Research Center (NWRC), Nile Research Institute (NRI) and Ministry of Tourism. This is because the IWT sector is operating its business on the River Nile, its Branches and connected canals originated from the Nile, and the operations are not executed by the sector directly related to the operation alone. The second is to privatize the governmental company that has almost monopolized their transport business market and to facilitate a competitive IWT market environment. A component of this plan is to facilitate preferential treatment among three land transport sectors, and efficient administration on license issuance for transportation, stevedoring, warehousing and such. This effort is expected to produce a favorable environment for participation in IWT business as well.

The Management & Repair category has 5 development plans as provided, which contain reinforcement of the RTA technical division & personnel, execution plan for maintenance & repair, close coordination with

MWRI, share of RTA roles and training for technical personnel. The reinforcing of the RTA technical division and personnel is required to timely and sufficiently perform RTA technical services with skilled/experienced engineers or equivalent and maintaining such services at a good level is eventually connected to enhance an attractive market environment and to further call possible private sectors to become involved in IWT business. The next plan is to maintain good navigable conditions including waterways, locks, banks, navigation aids and other related facilities and to provide comprehensive maintenance and repair programs taking seasonal patterns and/or past records into account. This is also an important plan to produce a stable navigable environment for private operators as well as to give them reassurance in their operation. The third plan is closely related to the review of responsibility of the public sector in role-sharing. It is emphasized that IWT operation can't be implemented without any coordination and cooperation firstly with MWRI. For example, it is definitely essential to have close coordination with them during maintenance or repair works, because MWRI has to know what kind of operations are on-going at any moment that would affect water flow control in the Nile. The forth plan is to have necessary duties in appropriately demarcated roles for individual sections in RTA and to share information obtained for effective use in formulating the next action(s) to be taken immediately. This means a sort of organizational program for reformation of RTA. Finally, the fifth plan for the training program is for increasing trained/skilled personnel, securing technical level & services, and providing technical flexibility and mobility in case of emergency and the like.

2) Quantitative Target Plans in The Sixth Five Year Plan (2007-2012)

The 6th five year plan also states quantitative target plans in terms of IWT and proposes some IWT infrastructural improvements. Table 2.3.5 shows the Summary of Quantitative Target Plans in The Plan. As shown in the table, the plans listed are all based upon the Vision for 2020 as well as the Policies in The Plan. In this plan, it is observed that some were on-going before establishment of the master plan and some were branched from the similar proposals in the master plan. It is possible to say that there were unexpected delays, difficulties, political considerations and/or technical/budgetary obstacles. Turning to the table, it describes two plans highlighted for Cairo/Aswan IW and the new Damietta port connection. These are additionally included plans branched from the original or for consideration of the current situation that has changed since the master plan was created.

Table 2.3.5 Summary of Quantitative Target Plans in The 6th Five Year Plan

Corresponded Basic Strategy	Category	Proposed Plan	Purpose	Component	Estimated Cost (Mil. L.E.)
2/3	Alexandria/Cairo IW	Developing & purifying IW including building necessary new locks	To successively secure navigable conditions	Dredging, Construction of new locks etc.	N/A
		Upgrading navigation line to support night operation		Rehabilitation/provision of navigation aids	N/A
	Cairo/Aswan IW	Upgrading IW and providing maintenance to navigation towers	To successively secure navigable conditions	Dredging, maintenance of relevant facilities etc.	N/A
		Upgrading navigation line to support night operation		Rehabilitation/provision of navigation aids	N/A
	Damietta/Cairo IW	Completing cleaning and maintenance of Damietta Branch	To successively secure navigable conditions	Cleaning, Maintenance of facilities etc.	N/A
		Upgrading navigation way in Damietta Port with connection to other navigation ways lying on the Governorates		Dredging, maintenance of relevant facilities etc.	N/A
		Upgrading navigation line to support night operation		Rehabilitation/provision of navigation aids	N/A
	River Port	Establishing new river ports to serve South Valley projects	To handle possible container cargoes equipped with loading/unloading cranes	Container terminal, Cargo handling equipment etc.	N/A

Source: MOP

2.4. KEY ISSUES, CONSTRAINTS AND OPPORTUNITIES

1) General

This section comprehensively discusses key issues, constraints and opportunities from three angles of view. Firs, the "Preliminary Assessment for Achievement of Development Plan" is highlighted by contrasting between target plans and the actual achievements observed. Secondly, the "Barrier Analysis on Technical, Regulatory and Administrative Aspects" mentions some barriers observed in Egyptian IWT. Thirdly, the "Particular Concerns" summarizes further concerns through field observations or site works.

2) Preliminary Assessment for Achievement of Development Plans

The development plans were established aiming at improvement/removal of the indentified particular problems as previously summarized in Table 2.4.1 and promotion of IWT. RTA has made efforts in implementing some projects to achieve the targets. In such situation, an assessment for achievements of the development plans is preliminarily discussed as follows.

IW Infrastructural Improvements: the plans are composed of four categories, such as Alexandria/Cairo IW, Damietta/Cairo IW, Cairo/Aswan IW, River Ports, and Barge Systems. Table 2.4.1 summarizes the status of the plans.

Table 2.4.1 Summary of Assessment for IW Infrastructural Improvements

Category		Proposed Plan	Status	Achievement	Key Note/Issue
Alexandria/Cairo IW	Master Plan 2020	Extension of existing Alexandria lock (small Lock)	Implemented/suspended	-	Design changed required due to discrepancy of soil conditions
		Dredging & navigation aids along Alexandria/Cairo IW	Completed	Navigability secured at day and night times	Maintenance
		New connection canal at Bolin	Cancelled	-	low return for the investment estimated by RTA
		24 hours operation of locks	Principally enforced	Possible 24 hour operation if any	working rule, compensation
	5 Yrs Plan	Developing & purifying IW including building necessary new locks	On-going	-	Maintenance
		Upgrading navigation line to support night operation	Completed	Navigability secured at day and night times	Maintenance
Damietta/Cairo IW	Master Plan 2020	24 hours operation of locks	Principally enforced	Possible 24 hour operation if any	Maintenance
	5 Yrs Plan	Completing cleaning and maintenance of Damietta Branch	Completed	Navigability secured	Maintenance
		Upgrading navigation way in Damietta Port with connection to other navigation ways lying on the Governorates	Completed	Navigability secured	Maintenance
		Upgrading navigation line to support night operation	Completed	Navigability secured at day and night times	Maintenance
Cairo/Aswan IW	5 Yrs Plan	Upgrading IW and providing maintenance to navigation towers	On-going	-	On gping RIS included
		Upgrading navigation line to support night operation	Completed	Navigability secured at day and night times	Maintenance
River Port	Master Plan 2020	Cairo river port development	Suspended/cancelled	-	Land issue arisen with local residences
	5 Yrs Plan	Establishing new river ports to serve South Valley projects	On-going	-	Re-bidding for concession
Barge System	Master Plan 2020	Larger-size new barge system	On-going	-	Some private sectors tackled

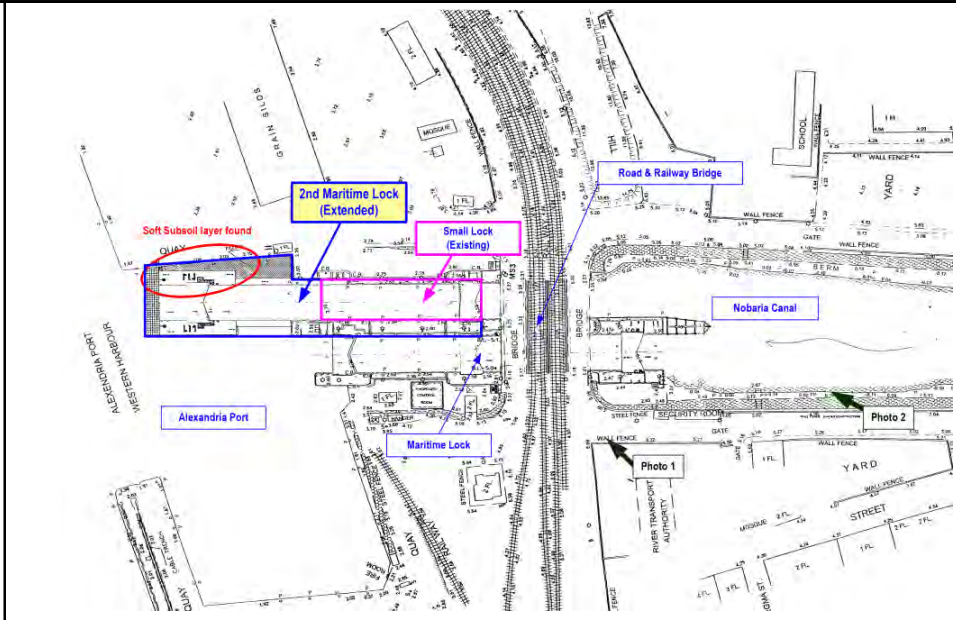
Source: JICA Study Team

In the 15 plans as listed, 8 plans have been completed and achieved their goals, 4 plans are on-going in efforts by their target years, 2 plans are cancelled and 1 plan is suspended. In general, it can be observed that the major IWs could most likely be navigated at day/night times with necessary navigation aids by implementing the relevant projects by RTA. The "new connection canal at Bolin" was cancelled based on a cost effective analysis by RTA. The on-going plans were all established after the master plan for 2020 in the

6th Five Year Plan and their completion is targeted by 2012. The emphasis is on the following two plans because they seem to have problems/issues:

"Extension of Existing Alexandria Lock (Small Lock)" was to originally extend the existing lock to extend the length of the lock for accommodation of larger-sized barges adjacent to the existing road and railway bridge located inside Alexandria as referred to in Table 2.4.2.

Table 2.4.2 General Plan and Panoramic Photographs of Existing Alexandria Lock (Small Lock)

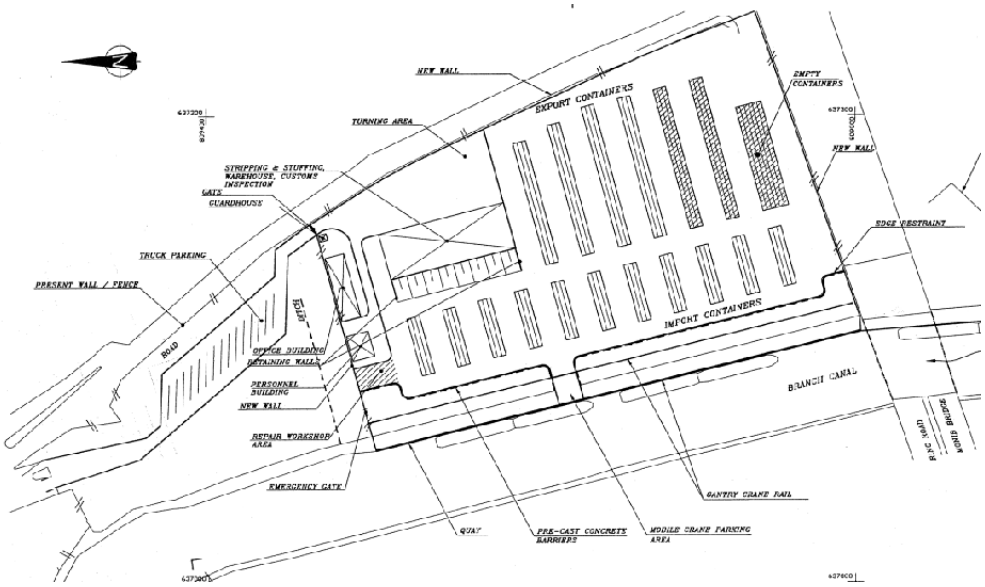
Facility Name	Small Lock
Location	End of Nubaria Canal at connection to Alexandria Port
Description	Originally scoped to extend the length of the lock for accommodation of possible large-sized barge
Alternative	Diversion to other location on the line, raising the existing bridge to secure enough air clearance with consideration of large-scaled fleet dimension in the future
General plan	
Panoramic Photographs	 

This is being resolved and to be resumed by design/scope change. The existing Maritime Lock is passable and so far it is not a problem in the navigational environment. However this is an important point to interconnect with the seaport gateway, so that the revised plan should well consider future expandable capacity with close consultation with the relevant public sectors including the seaport, road and railway sectors.

"Cairo River Port Development" was expected to develop new container and general cargo terminals (3 berths each) at the existing Ather El Nabi Port as seen in Table 2.4.3. After the 2003 JICA Study, RTA had prepared to materialize the plan with execution of a detailed design and tender preparation. However, the

targeted land had a conflict of interest between RTA and the habitants and users inside the port area in terms of vacation, which became a political issue. Finally, this difficulty caused a suspension and brought the plan into cancellation. Although RTA at the present is looking for an alternative area for the new port, it seems that its movement is being held up by uncertain demand, floating cargo volumes and changeable commodity markets.

Table 2.4.3 General Plan and Panoramic Photographs of Cairo River Port Development

Facility Name	Cairo River Port
Location	Ather El Nabi Port, Cairo
Description	Originally scoped to respectively develop 3-berth new container and genral cargo terminals
Alternative	Diversion to other location on the line, raising the existing bridge to secure enough air clearance with consideration of large-scaled fleet dimension in the future
General plan	
Satelite Photograph	

Overlooking the assessment, critical situations do not generally exist so far in view of achievement of the development plans. However, it should not be forgotten that IWT has disadvantages, especially for its infrastructures' compared with the road and railway sectors, i.e. no flexibility in its route choice, existence of constraints in threatening water depth by daily water level fluctuation and/or uncertain sedimentation on the riverbed, no substitution of fleets due to special dimensions or such, and always needs good conditions for its proper operation. Taking the above into account, the following should be implemented:

- Completion of the revised “Small Lock” extension plan considering the future capacity required in order to make smooth interconnection to the seaport gateway, and other on-going plans to maintain good condition so that they are always navigable

- Alternative development of new modernized core river ports instead of the proposed Cairo River Port to be competitive for intermodality in harmony with the nationwide transport strategy

- Facilitation of technical assistance incentives for large sized barges for private sector entities

- Assurance of all good infrastructural conditions that allow navigation at any time

-

IW Operational & Administrative Improvements: the plans are composed of four categories, such as inducement measures, role-sharing, management, and repair. Table 2.4.4 summarizes the status of the plans.

Table 2.4.4 Summary of Assessment for IW Operational & Administrative Improvements

Category		Proposed Plan	Status	Achievement
Inducement Measure	Master Plan 2020	Establishment of soft-loan program such as "IWT Promotion Fund" for promotion of IWT private sector	Not completed	-
		Governmental program to tackle environmental issues for lowering environmental impact	Not completed	-
Role-sharing		Review of responsibility of public sector, espablishing e.g. "IWT Committee" composed of the relevnat public sectors	Not completed	-
		Enhancement of market principal for liberalization in nomopolized governmental company	Completed	Privatization of the governmental company
		Strengthening IWT business, e.g. "IWT association" to handle issues of IWT concerns, lobbing for IWT promotion etc	Not completed	-
Management & Repair		Reinforcement of RTA technical division & personnel	Not completed	-
		Execution plan for maintenance & repair,Maintenance & Repair Program in consideration of seasonal patterns and/or experiential records	On-going	-
		Close coordination with MWRI	On-going	-
		Share of RTA role,Information share of technical/administrative knowledge	Not completed	-
		Training for technical personnel	On-going	-

Source: JICA Study Team

As found in the table, only 1 plan has been completed and achieved its goal, 3 plans are visibly being tackled as on-going to achieve the aims, and 6 plans are immobile without particular trials. Progress of the Operational & Administrative Improvements seems to be stagnant unlike the other Improvements. Although there might be many hindrances to challenge implementation of such improvements, their materialization is

strongly desired to produce more effective and efficient reformation of the IWT sector. The following are once emphasized to further undertake the improvements:

- Establishment of a Soft-loan program such as an "IWT Promotion Fund"
- Governmental Program to tackle environmental issues
- Review of the public sector's responsibility in establishing an "IW Committee" among the relevant public sector entities
- Strengthening of IW business, forming an "IWT Association" by joint effort of the public, private and academic sectors
- Reinforcement of RTA technical capacity with certain numerical targets
- Facilitating comprehensive maintenance & repair programs with technical and financial flexibility incorporating seasonal patterns and/or past records
- Further undertaking coordination closely and constantly with MWRI, especially for the concerns of IWT
- Producing more actual field exercises to practice skills obtained for trained staff with proper deployment

3) Barrier Analysis of Technical, Regulatory and Administrative Aspects

IWT has several barriers in view of technical, regulatory and administrative aspects. In order to identify and to envisage latent IWT barriers, barrier analysis of IWT is summarized with classified key items such as parameters, barriers, effects, causes and scope as shown in Table 2.4.5 and Table 2.4.6. The following are key points of each aspect:

Technical Aspects:

Navigability: a significant barrier is uncertain navigability. Major causes are restricted clearance under bridges, number of barrages and locks, too few and non-functioning navigation aids, frequent sedimentation, waterway alignment, weeds, lack of budget, lack of flexible mobility and resources and so on. The effects from these problems are time consuming and increase the risk to navigation in Cairo-Aswan, Cairo-Alex and Cairo-Damietta IWs. Organizations involved to eliminate the barriers are mainly to be RTA, MWRI, GARBLT, ENR, Local Governments etc.

Interconnection: a significant barrier is lack of guaranteed spaces at the river side and its hinterlands. Major causes are lack of budget, lack of recourse, lack of clear strategy and lack of opportunity. Effects are restriction of river transportation and increasing risk and increasing cost for bank protection in all IWs. Organizations involved to eliminate the barriers are mainly to be MOT, RTA, private sectors etc.

Modernization: significant barriers lack of traffic/transport management and lack of vessel control. Major causes are lack of budget, lack of recourse, and lack of specific regulations. Effects are increasing risk and cost to navigation lack of traffic/transport management, non-functioning and inadequate RIS installed, old-fashioned vessels, and unclear standards for vessel design and inspection regulated in all IWs. Organizations involved to eliminate the barriers are mainly to be RTA, private sector entities etc.

Regulatory & Administrative Aspects:

Institution: significant barriers are lack of a firm concept for river use and lack of IW promotion. Major causes are limited authorization, jurisdiction and responsibilities to allow timely response to IWT industries and market, and lack of updating of laws, rules, and regulations. Effects are suspension of IWT promotion and river transportation in all IWs. Organizations involved to eliminate the barriers are mainly to be MOT and RTA.

Sustainable Finance: significant barriers are lack of a foresighted strategy, along with the distanced relation to IWT industries, inadequate internal and external coordination in RTA, non-standardized unformatted information, unbalanced financial situation, no navigation charts, uncertain maintenance program, diversion into other transport modes of IWT users, unequal opportunities for investment etc. Major causes are no master plan updates, and lack of administrative management, lack of systematic information control and lack of coordination with other sectors, lack of IWT promotion, funds and lack of attractive incentives to possible IWT users etc. Effects are inordinate development, increasing risk and cost, decreasing value, lowering flexibility, inadequate income generated, non-competitive transport market, reduced business opportunities related to IWT, decreasing number of service providers , investors departing etc. Organizations involved to settle the barriers are mainly to be RTA, MOT, private sector entities etc.

Water Management: a significant barrier is the unbalanced and uncontrolled utilization of the waterways and their hinterlands. Major cause is lack of coordination and lack of harmonization among the relevant parties. Effects are creation of more fatal and modifiable complications upon water use. Organizations involved to eliminate the barriers are mainly to be RTA, MOT, MWRI, local Governments, private sector entities etc.

Table 2.4.5 IWT Barrier Analysis 1 of 2 (Technical Aspect)

Aspect	Category	Parameter	Barrier Analysis				
			Barrier	Objected IW	Effects	Causes	Scope
Technical	Navigability	Fairway	Abandoned structures & facilities under the existing bridges	Aswan-Cairo	Time consuming and risk increasing	Lack of budget/different independent working	GARBLT/ENR/RTA
			Frequent sedimentation	Alex-Cairo	Time consuming, and risk and cost increasing	Lack of mobility, monitoring, program and budget & resource	RTA/MWRI
			Sharp angle fairway course toward Nubaria Canal	Alex-Cairo	Time consuming and risk increasing	Utilization of the existing irrigational waterway	RTA/MWRI
			Propagation of waterweed	Damietta-Cairo/ Ismailia-Cairo	Time consuming, and risk and cost increasing	Seldom use for navigation, lock of budget	RTA/MWRI
			Partially narrow width	Damietta-Cairo	Time consuming and risk increasing	Seldom use for navigation and lack of budget	RTA
			Divergent fairways (meanders)	Damietta-Cairo	Time consuming and risk increasing	Given natural condition	Egypt
			Narrow width and shallow depth (Ismailia City)	Ismailia-Cairo	Non navigability	Development Plan of Ismailia City	RTA/Local Government
		Lock	Congestion of passenger boats at Esna Lock (seasonal)	Aswan-Cairo	Time consuming and cost generating	Operation frequency increasing and no time table controlled	MWRI
			Many locks on navigation (5 locks only for 120 km waterway)	Alex-Cairo	Time consuming	Utilization of the existing irrigational waterway	MWRI
			Long waiting time for lock passage	All	Time consuming and cost increasing	Manual operation, operational restriction and no technical improvement	RTA
			Lock operation under different jurisdiction (Damietta Lock)	Damietta-Cairo	Time consuming and inconvenient operation	Different independent working authority	MWRI
			Malfunction of the existing locks (Ismailia and End Locks)	Ismailia-Cairo	Non navigability	Retained in development of Ismailia City	RTA/Local Government
		Barrage	Many barrages on navigation (5 barrages only for 120 km waterway)	Alex-Cairo	Time consuming	Utilization of the existing irrigational waterway	MWRI
			Earthfill dam for water resource control (Damietta Dam)	Damietta-Cairo	Time consuming	Different independent working authority	MWRI
		Bridge	Small air clearance under the existing bridges	All	Time consuming, difficulty of navigation and risk increasing	Already constructed before utilization as navigational waterways, lack of coordination and communication, different independent working authority	GARBLT/ENR/ Local Government/RTA
			Movable bridges	All	Time consuming, inconvenient navigation and risk increasing	Already constructed before utilization as navigational waterways, lack of coordination and communication, different independent working authority	GARBLT/ENR/ Local Government/RTA
		Navigation Aids	No navigation aids (partially)	Aswan-Cairo	Safety risk at night navigation	Lack of budget and resource	RTA
			No navigation aids (totally)	Damietta-Cairo/Ismailia-Cairo	Safety risk at night navigation	Lack of budget and resource	RTA
			No navigation guidance	All	Risk increasing	Lack of program, budget and resource	RTA
	Interconnection	Port	Abandoned ports	All	Restriction for new river exploitation and cost increasing	Lack of budget and resource as well as administrative guidance by authority	Private Sectors/RTA
			No bank protection	All	Risk and cost increasing	Lack of budget and resource as well as administrative guidance by authority	RTA/Private sectors
			No public ports and loading/unloading terminals	All	Non-planed river exploitation without public benefit	Lack of river exploitation strategy	RTA/MOT
	Modernization	RIS	No traffic and transport management by information sharing	Aswan-Cairo (partially) Other all IWs	Non control of authority and risk increasing	Lack of budget and resource	RTA
		Vessel	Aged vessels	All	Risk and cost increasing and no competitive standard	Lack of budget for new investment and maintenance, and control by authority	Private Sectors/RTA
			Small capacity vessels	All	Cost increasing and time consuming	Limit of loading capacity to maintain small draft and height and lack of investment budget	RTA/Private Sectors
			No standards for vessel design and inspection	All	Risk and cost increasing and no competitive standard	No regulation specified by authority	RTA/Private Sectors

Source: JICA Study Team

Table 2.4.6 IWT Barrier Analysis 2 of 2 (Regulatory & Administrative Aspects)

Aspect	Category	Parameter	Barrier Analysis				
			Barrier	Objected IW	Effects	Causes	Scope
Regulatory & Administrative	Institution	Laws, Rules & Guidelines	Lack of concept and action for river exploitation and commercial promotion relative to IWT	All	Suspension of IWT promotion	Less authorization, no updating and strengthening of new RTA roles & jurisdictions timely required from IWT market	RTA/MOT
			Outmoded laws and/or regulations not internationally standardized for IW classification, navigation, fleet, licensing, berth, port etc.	All	Non competitive market to other traffic modes and old-fashioned systems limited within the existing players	No updating the relevant laws and regulations to consider timely needs of IWT market and other related environment	RTA/MOT
			River sides development under jurisdiction of other government sectors	All	Opportunity decreasing and restriction creating for river exploitation	No jurisdiction given for river sides to RTA	RTA/MOT
	Sustainable Finance	Policy	Lack of clear strategy and plan for IWT development and promotion	All	Inordinate development and cost increasing	No master plan periodically updated in consideration of essential and critical issue and/or concern	RTA
		Administration	Endistanced relation between RTA and markets related to IWT	All	Less cognition of trends and needs of IWT and related possible other markets to be interconnected	No divisions formed in RTA related to commercial and logistics activities	RTA
			Lack of internal/external coordination in RTA	All	Mobility lowering and opportunity losing on decision making	No divisions formed in RTA related to internal/external coordination matters	RTA
			Negligence to existing infrastructure, projects completed and program and operation of RTA	All	Value decreasing and mobility lowering	No division formed in RTA related to technical, economical and financial assessment and evaluation in appropriate timing	RTA
			Indigested information and knowledge for/among technical, administrative and regulatory aspects	All	Time consuming on services and increasing ignorance for own information and knowledge updated	No usable, uniformed and systematic IT database and its network system	RTA
			Segregated responsibility from RTA for environment, safety and security concerns	All	Risk and cost increasing	No divisions formed in RTA related to environment and safety & security on navigation	RTA
			Lack of human resource development and management without IT database	All	Dispersed human resources and efficiency lowering	No division formed in RTA related to human resource development and management	RTA
		Financial Capacity	Subsidy and allocated budget systems	All	No income generated organization without certain financial assessment	Given systems for the governmental body	RTA/Government
		Technical Affairs	Uncertain maintenance and repair program upon constant monitoring	All	Time, cost and inconvenience increasing	No systematic program developed with certain record data accumulated	RTA
			No navigation chart on IWT	All	Risk increasing and non competitive market without navigable assurance internationally standardized	No systematic program developed with certain record data accumulated	RTA
		Interconnection	No ports well connected to other transport modes	All	Non competitive market without interconnection	Lack of comprehensive inter modal transport strategy with consideration of regional development	RTA/MOT/Other relevant Ministries and Authorities
			Distance between regional & rural development and river transport & exploitation	All	Probable new market decreasing and public participation losing	No coordination and involvement into River Exploitation	RTA/MOT/Other relevant Ministries and Authorities
		Market	Diversion into other transportation	All	Time and cost increasing comparatively with becoming non competitive market	Rapid and flexible transformation of road transport	RTA/MOT/Private Sectors
			Unchanged market advantageous for the existing service provider(s)	All	Service providers decreasing and becoming more non competitive market conditions	No superheated market conditions and no promotion of IWT	RTA/MOT/Private Sectors
		Investment	Unequal opportunity upon private investment to IWT capital	All	Investment losing and negligence for IWT investment	Lack of fund and attract incentive	RTA/MOT/Private Sectors
	Water Management	Coordination	Unbalanced and uncontrolled exploitation related to water utilization	All	Creating more barriers fatal or modifiable	No harmonization among the relevant government sectors for using water utilization	RTA/MOT/MWRI/Other relevant Ministries and Authorities
	Skill & Knowledge	Training	Disconnection of trained skills with actual tasks and duties	All	Skill & knowledge lowering and malfunction of organization	No practical program implementation developed and produced	RTA
		Specialty	Stagnated skills and knowledge	All	Skill & knowledge lowering and malfunction of organization	Lack of environment to require specialized skills and knowledge	RTA
		Database	Straggled information and knowledge	All	Mobility lowering and opportunity losing on decision making	No IT database sharing developed without uniformed and systematic formation	RTA
	Resource Injection & Allocation	Encouragement	Discouragement to own expertise	All	Capacity and quality decreasing	Lack of intent for human and knowledge developments to encourage own expertise	RTA/MOT
		Resource Importation	Stagnated skills and knowledge	All	Skill & knowledge lowering and capable manpower decreasing	Lack of environment to require specialized skills and knowledge	RTA/MOT
	Employment Opportunity	Work sharing	Unbalanced and uncertain tasks and duties given	All	Time and cost increasing, and service and quality lowering	Lack of monitoring and management by organization	RTA/MOT
		Public Participation	Distance between regional & rural development and IWT industries	All	Probable new employment opportunity decreasing and public interest losing	No coordination, involvement with IWT industries and producing new IWT industries	RTA/MOT/Other relevant Ministries and Authorities

Source: JICA Study Team

Skill & Knowledge: significant barriers are irrelevancy of trained skills with actual tasks and duties, stagnated skills, and lack of information & knowledge. Major causes are lack of practical program implementation, lack of requirement for staff to acquire specialized skills and knowledge, and lack of an IT database. Effects are lowering the levels of skill and knowledge, malfunction of the organization, lowering flexibility and opportunity loss on decision making in RTA. Organizations involved to eliminate the barriers are mainly to be RTA, other specialized third parties etc.

Resource Injection & Allocation: significant barriers are the discouragement of RTA staff and stagnated skills & knowledge. Major causes are lack of intent for human and knowledge development for encouragement to own staff, and lack of requirement for workers to acquire specialized skills and

knowledge. Effects are a reduction in capacity and quality. Organizations involved to eliminate the barriers are mainly to be RTA, MOT, other specialized third parties etc.

Employment Opportunity: significant barriers are the unbalanced and uncertain tasks and duties assigned in the RTA organization, and the distance between regional & rural development and IWT industries. Major causes are lack of monitoring, lack of management, lack of coordination, and lack of involvement with IWT industries. Effects are time & cost increase, lowering quality, decrease in new employment opportunities, and public interest in IWT decreasing. Organizations involved to eliminate the barriers are mainly to be RTA, MOT, Local Governments etc.

4) Particular Concerns

As realized, all the issues, constraints and concerns are closely connected among themselves. Aside from the assessment of achievements and the barrier analysis previously mentioned, the following concerns are highlighted and also provide opportunities to be changed into solutions for IWT reform and promotion:

Weak RTA initiative to lead Egyptian IWT sector with strategic involvement of MOT, other public, private and academic sectors:

RTA actively carries out its own roles as the executive agency of IWT. However, one observation is that there is only a weak initiative for strategic involvement of the public, private and academic sectors, to comprehensively promote the IWT sector.

The assessment is that there is inadequate achievement of the relevant targets and goals specified in the Vision of the IWT sector in implementing project and program management by RTA:

Concretely and numerically, periodic assessments are required to confirm whether the targets and goals are being achieved or not. But the trial seems not to work well and the achievement itself is not defined clearly. This is one reason that they are unable to offer clear encouragement to the concerned staff and parties involved.

There is no updating of the master plan for IWT development to reflect harmonization with the current environment surrounding the IWT or along the line of the nationwide transport strategy :

Since JICA proposed the master plan for IWT in 2003, the plan has not been updated even though some modifications have been incorporated into the sector strategy as mentioned in The 6th Five Year Plan. The updating is vital so as not to overlook the direction and basic policy of the IWT sector.

Lack of reorganization, including dissolution, integration, re-arrangement and management of the 43 river ports:

According to the official announcement of RTA, there are at least 43 river ports in the IWs of Egypt. But, it is observed that some of them are in the same place, just beside each other, and that they are not used or it is not known exactly where they exist. Also the names of ports do not clearly corresponded to those on cargo statistics given by RTA , which creates confusion to the concerned.

There is uncertainty in the timely maintenance and repair program and it lacks certain deployment of engineers and skilled and experienced staff:

The maintenance and repair projects are established but the program have never been seen in black and white. Also, there is no reliable program in place to incorporate seasonal patterns and/or past records in the program to facilitate adequate deployment of skilled and experienced engineers.

Shortcoming of the regional core public ports to collect cargoes and to promote the rural economy with public involvement:

There are some intentions within RTA to have public ports along the current IWs. The idea is somehow understandable in the financial aspect. However, there still appear many areas in which the public sectors could transfer control that would maximize public benefits such as improving regional economic development by involving the local sectors.

Non uniformity in the efforts to establish technical/operational/administrative information databases and sharing them through interconnection among key sectors in RTA:

It is essential to collect necessary information vertically and horizontally. Especially, implementing a strategy or policy, reviewing the present conditions and issues etc. that require such database define the current situations.

Shortage of strategic recognition, evaluation and monitoring of the actual IWT capacities currently held in the infrastructural, operational and administrative aspects:

Separately, some information is available that describes a part of the IWT capacity but no integrated information currently exists. The information should be comprised of an inventory of the existing infrastructures and transport methodology, and other operational & administrative capacities, which can be efficiently utilized for “IWT promotion and marketing”.

Segregation of rural economic development with involvement of the IWT, especially in view of the tourism and/or agricultural industries:

It has difficulty to harmonize IWT with the tourism industry at this moment, because the tourism industry is under the jurisdiction of the Egyptian Tourism Authority. However, just as the RTA is already harmonized with MWRI regarding IWT operation, this can be accomplished through intra-governmental bodies. It is assumed that RTA will require that it gain control of passenger piers constructed in the ungoverned and developing new passage terminals or ports along the River Nile around Luxsor and/or Aswan areas. It is not only for control purposes but also for possible contribution to the rural economic development by involvement in the tourism and/or agricultural industries.

Weakness in the interconnection between the seaports and land transport sectors focusing on intermodal transport:

The current IWT seems to be functionally isolated between the seaport and inland transport sectors which have no active interrelationships. To make the intermodal transport effective and efficient, this isolation should be rectified. The problem is that the public sector entities expect a lot of concessions from the private sectors but they never compromise regarding what the public sectors want unless it is beneficial to them in their own market environment. So, it is necessary for the public sector to provide involvement opportunities to the private sectors interested in IWT, such as seaports and inland freight companies, dry port operators, industrial companies etc., who may have unknown potential and capacity to further contribute to IWT promotion.

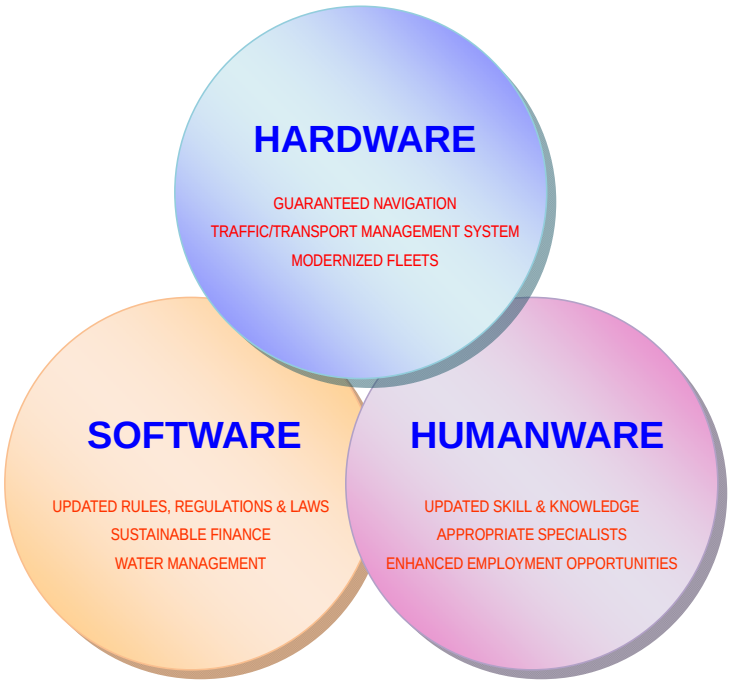
2.5. RECOMMENDATIONS

2.5.1. General

This section provides recommendations based on the examination of the present situation, identification of key issues, constraints and opportunities. The recommendations are comprised of a "Conceptual Framework" which is a conceptual framework including action plans to establish effective candidate projects in the future, the "Proposed IWT Candidate Projects by 2027" which lists several candidate projects categorized in consideration of the conceptual framework as well as the future traffic volume forecast for 2027, and "Further Discussions" which suggests potential and possibilities toward future paths and approaches for IWT reform and promotion.

2.5.2. Conceptual Framework

Finding key issues and constraints consequently gives opportunities for solutions. The path needs a conceptual framework to form the basis for action plans to be firmly established. Based on the issues, constraints and opportunities aforementioned, it is recognized that a conceptual framework requires three aspects, such as HARDWARE, SOFTWARE and HUMANWARE and each aspect should have key action plans. Figure 2.5.1 introduces an ideal diagram of the conceptual framework. As seen in the figure, the framework associates each factor with the other so as to support each accomplishment and essential activity.



Source: JICA Study Team

Figure 2.5.1 Conceptual Framework for IWT Reform and Promotion

The following are explications of action plans for each aspect in the framework:

HARDWARE

Guaranteeing Navigability: it is physically essential that navigability is certainly secured and assured by RTA for all IWT users including provision of all necessary information and the physical environment for

navigation e.g. navigation charts, traffic information and so on. To enhance navigability at guaranteed level, there are still improvements required for IW infrastructures for such as waterways, locks, navigation aids and river ports.

Modernizing Fleets: an advantage of IWT is mass transportation to other transport modes and fleet modernization is necessary for enhancement of cargo share and efficient transport through the IW. Although this action is actually taken by private sectors depending on market trend and economic situation, RTA is required to be involved in establishing the initiative for its facilitation.

Providing Traffic/Transport Management Systems: the traffic management system is an important component to reduce time consumed and risk involved in navigation. The system must ensure not only close communication between RTA and all IWT users but also timely collection of necessary information by RTA. The hardware of the system must be able to be utilized by traffic management, and coverage should be expanded to include ports, logistics centers, factories and such, which can be efficient logistics services to help become competitive and facilitate sharing roles with other transport modes.

SOFTWARE

Updating All Relevant Rules, Regulations and Laws: rules, regulations and laws are the backbone of IWT and their updating is a guarantee for success in IWT reform and promotion. Those updates should cover technical, administrative and regulatory affairs in relation to IWT and the RTA. They have to be timely revised, amended and reformed to benefit IWT, its users and surrounding local communities by enforcement of public services.

Sourcing Sustainable Finance: sustainable finance is essential to make a success of IWT operation, reformation and promotion. Lack of cost-consciousness creates unbalanced finances even in public services and discouragement to relevant staff involved. For providing an environment of easy and safe accessibility and fair opportunities to all IW users, certain revenues should be reasonably collected, which would create a healthier financial situation and allow RTA to become a financially independent organization. This obviously requires restructuring of the organization and changing of outlook for individual staff. Finance sustainability will come from creating a well-organized initiative, attractive strategy policy and planning of RTA.

Coordinating Water Management: water management is needed by the water uses and the people in the surrounding areas and hinterlands adjacent to the waterfront. IWT does not need locks and barrages but MWRI needs them for irrigation purposes. RTA should secure and produce waterfront space and hinterlands for river exploitation and interconnection to other transport modes. In fact, many stakeholders relevant to the water use and hinterlands require coordination with interference by the Government initiative to prevent inordinate exploitation and development. RTA should be one of the entities to begin the Government initiative with MOT.

HUMANWARE

Upgrading Skill & Knowledge: individual capacities are the foundation of an organization and form its quality barometer. Not only the organization but also the individuals are essential to maintain professional

consciousness and to produce better results from work. Also database management is a tool for organization and individual staff which connects with the quality of services.

Injecting & Allocating Appropriate Specialists: enhancement of internal renovation for upgrading skill and knowledge has limitations and difficulties to introduce new concepts, views, ideas, technology etc. and to advise the proper way to improve the direction of an organization sometimes is unwelcome. Also injecting and allocating appropriate specialists are required to upgrade and maintain skill and knowledge of individual staff.

Enhancing Employment Opportunities: it is generally difficult for individual staff to know the work that others are involved in and the workload is sometimes unbalanced among them without sharing. Some work may need advice from experienced senior staff and its sharing is important. Moreover, there are a lot of regional and rural communities from whom IWT needs understanding and corporation with IWT development and improvement around the IW and IWT industries, so IWT should therefore provide employment opportunities for harmonization.

2.5.3. Proposed IWT Candidate Projects by 2027

The Study Team conducted an OD demand forecast for cargo traffic volume in 2027 by using a Nationwide Transport Model (NaTM) established by the Study Team. The forecast also provided IWT cargo traffic volume in 2027 as shown in APPENDIX-9. Based on the conceptual framework in consideration of the traffic volume forecast in 2027, the Study Team proposed IWT candidate Projects by 2027 as designated in Table 2.5.1 and Figure 2.5.2. Each Project is explicated as follows (titled head ID number corresponds to project ID):

1) Hardware Projects

IWP1: Detailed Waterway Assessment & Improvement Project (MCA/Project ID: SW-6)

Purpose: guaranteeing navigability
Estimated Cost & Duration: approx. 70 million LE / 4 years

It is recognized that RTA has made efforts for securing safe navigability in all IWs. Especially dredging is one of the most costly projects and has been constantly undertaken for all IWs. However, continuous complaints have arisen from private sectors. In addition, clear authorized navigation information must be disclosed for all IW users. In such situation, RTA, as the authority of IWT, is required to timely release "guaranteed IW navigation information" to all the IW users, which should include the latest navigation charts comprised of depth and width of fairways, location of buoys, light beacons, locks, obstructions etc., current speed, seasonal variations of water level and river bed features, and whatever else is necessary for safe navigation. In order to implement the above, this Project is proposed for implementation, which consists of but is not limited to:

- Conducting of hydrographic surveys for all IWs on a monthly basis to characterize the mechanism of sedimentation and seasonal variations of river bed features
- Monitoring of water flows and levels on a monthly basis to characterize seasonal variations
- Investigation of the locations and present conditions of all locks, bridges, buoys and beacon lights, ports, obstacles, other facilities, structures or such in all IWs
- Provision of "IW navigation charts" for all IWs incorporating all the above information and others required

- Provision of effective dredging plan for each IW and any other spur structures to control sedimentation with numerical simulation

According to the latest information given, RTA is conducting the dredging projects in cooperation with MWRI and some EU assistance to conduct safety training the navigation and dredging processes.

IWP2: Procurement of Survey Equipment and Special Boats (MCA/Project ID: SW-6)

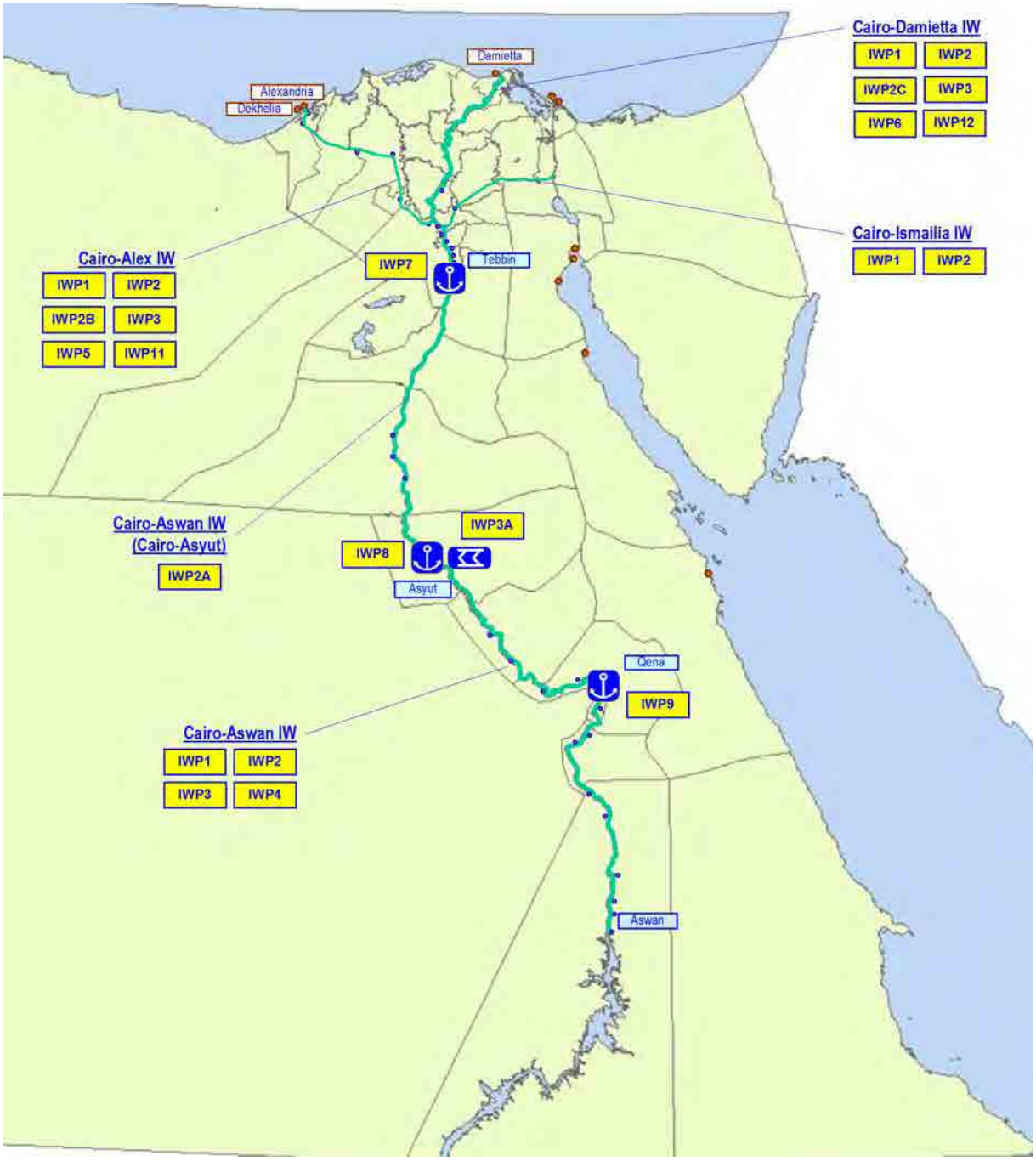
Purpose: guaranteeing navigability
Estimated Cost & Duration: approx. 175 million LE / 2 years

In principle, RTA must quickly gather the actual field situation, and should also control any operation, action, arrangement, business and safety concerns which may be disturbed with interference to legal affairs under the RTA jurisdiction. Especially, RTA should have the capacity to conduct its own hydrographic survey and patrol activities as the IWT authority. In order to tackle the above situation, this Project is proposed for implementation, which consists of but is not limited to:

Table 2.5.1 Proposed IWT Projects by 2027

Project ID / IWP	Scope	Target IW: Cairo-Aswan	Cairo-Alex	Cairo-Damietta	Cairo-Ismailia	Classification		Project ID for Multi Criteria Analysis to cross-sector evaluation, ranking	Fund: Public	PPP	Private	Category: Program	Study	Design/Engineering	Construction/Procurement	Other	Name	Site/Subject	Background/Necessity	Dimension/Specification	Priority	Estimated Cost (million L.E.)		Duration (yr)
1	Hardware	✔	✔	✔	✔	Navigavility	Waterway	SW-6	○				✔	✔			Detailed Waterway Assessment & Improvement	All IWs	No full scaled technical assessment has been discussed on sedimentation process for IW navigation and measures taken are in a spiral of huge costs and works generated.	Monitoring yearly river bed sedimentation, water level, lock operation, navigation and so on, simulating and analyzing the cause & effect and trend, and execute alternative studies with finding most suitable and reasonable measures to be taken	High	3,960	70	4
2									○					✔	✔		Procurement of Survey Equipment & Special Boats	All IWs	RTA does not have any movable waterborne equipment for patrol, survey, investigation, site visit or such and is resultantly lack of direct information to be quickly settled	Provision of 8x search and rescue boats in max.30 knt speed and 5xsurvey boats with full survey instruments, which would be allocated to each regional core portflock along the IWs	High		175	2
2A		✔						IW-4	○						✔		Urgent Dredging	Cairo-Asyut	Upon filed visit and hearing to the relevant parties including private sectors, this portion of IW has sedimentation which disturbs safe navigability and urgent dredging are therefore required in cosideration to the results of IW assessment and improvement project	Dredging and desposal of approx.16 million cu.m sedimentation (min. safe width 40 m x dredging depth 2 m x 200 km of IW)	High-Midium		650	3
2B			✔					IW-5	○						✔			Cairo-Alex		Dredging & desposal of approx.12.2 million cu.m sedimentation (min. safe width 40 m x dredging depth 1.5 m x 203 km of IW)	High-Midium		500	3
2C				✔				IW-6	○						✔			Cairo-Damietta		Dredging & desposal of approx.14.5 million cu.m sedimentation (min. safe width 40 m x dredging depth 1.5 m x 203 km of IW)	High-Midium		600	3
3		✔	✔	✔			Lock/Barrage/Bridge	IW-3	○			✔	✔				Lock Operation Improvement	All Locks	Concurrently with installation of navigation aids to all IWs, night operation of all major locks are to be required for accommodation of 2027 IWT NaTM traffic demand forecast	Investigation of the present conditions, operations, maintenance activities etc. and making improvement program with financial evaluation upon the operations including training, lecture, seminar necessary to be ready for night operation	High		10	2
3A		✔							○					✔	✔		Lock Expansion	Asyut Barrage Lock	Upon estimate of lock capacity at Asyut Barrage Lock, this lock is not able to locally accommodate 2027 IWT traffic forecast by NaTM. The lock is consequently required to have its expansion.	Construction of expansion parallel to the existing lock (applox. 170 m long) including necessary buildings, equipment and other misellaneous accessories and works	Medium		280	4
4		✔					Navigation Buoys, Beacon, Sign etc	SW-6	○					✔	✔		Navigation Aids Improvement & Upgrading	Asyut-Aswan	Considering future night operation for accommodation of 2027 NaTM IWT traffic demand forecast, the installation is to be required between Asyut and Aswan where no navigation aids have been placed	Installation of buoys every 2 km and of beacon & sign every 1 km with certain protective measures for missing	High		40	2
5			✔						○					✔	✔			Cairo-Alex	Considering future night operation for accommodation of 2027 NaTM IWT traffic demand forecast, the installation is to be required to all around along the IW	Installation of buoys every 2 km with certain protective measures for missing	High		15	2
6				✔					○					✔	✔			Cairo-Damietta		Installation of buoys of beacon & sign every 1 km with certain protective measures for missing	High		15	2
7				✔			River Port	IW-1	○	△			✔	✔	✔		New River Port Development	South Cairo (Tebbin)	Upon 2027 IWT NaTM traffic demand forecast, this region is expected to develop a certain scaled river port with future interconnection anticipated competitiveness to land transport sectors	Construction of 2x115 m berths (1-container & 1-general cargo), yard, buildings and procurement of minimum loading/unloading equipment etc. including consultancy services	Medium		310	4
8				✔				IW-2	○	△			✔	✔	✔			Asyut	Upon 2027 IWT NaTM traffic demand forecast, this region is expected to develop a medium-scaled river port to support development and economy of the middle Egypt as a core mass transport base to be competitive	Construction of 3x115 m berths (2-container & 1-general cargo), yard, buildings and procurement of minimum loading/unloading equipment etc. including consultancy services	Medium		540	5
9				✔					○	△			✔	✔	✔			Quena	Upon 2027 IWT NaTM traffic demand forecast, this region is expected to develop a medium-scaled river port to support development and economy of the upper Egypt as a core mass transport base to be competitive	Construction of 4x115 m berths (2-container & 2-general cargo), yard, buildings and procurement of minimum loading/unloading equipment etc. including consultancy services	Medium-Low		630	6
10		✔	✔	✔		Modernization	Fleet	SW-6			○		✔				Modernized Fleet	All related	Fleet modernization contributed to maximization of higher traffic capacity of lock and IW and its updated information is to induce investment of fleet by private sectors	Updating advanced technology and latest trend of IW navigation fleet with suitable application to Egyptian IWT.	Medium		10	1
11		✔					RIS		○		△		✔	✔	✔		RIS Network Formation	Cairo-Alex	To implement night navigation required for accommodation of 2027 IWT NaTM traffic demand forecast, the two IWs need to equip the system well-linked with the already installed in Cairo-Aswan IW	Installation of RIS and network formation with necessary trading including consultancy services	High		55	2
12			✔						○		△		✔	✔	✔			Cairo-Damietta			High		60	2
13	Software	✔				Institution/Organization	Laws, Rules & Guidelines	SW-6	○				✔				IWT Reformation	IWT	Organization and institution of IWT are the backbone of themselves but they are probably old-fashioned without flexible and timely modification, renewal and establishment, corresponding to surrounded industrial and business activities as well as other transport sectors	Implementation n of study to assess Egyptian IWT industries, business, concerned sectors, operations, management and other matters related, and to suggest necessary legal reformation plan of IWT in terms of organization with involvement to the relevant government sectors, which would be a basis of change in laws, rules and guideline	High	180	35	3
14						Sustainable Finance	Policy		○				✔				Updating IWT Master Planning		JICA Master Plan made in 2003 which is a basis of Vision 2020 of IWT is to get previous plan without incorporation of the latest challenges in Egyptian IWT	Implementation of master plan study reflecting the latest issues and challenges with harmonization to comprehensive transport movement and other related sectors in Egypt, which would be a basis of new National Transport Vision	High		40	2
15							Administration		○			✔	✔				RTA Restructuring	RTA	Through observation of RTA operation, RTA seems to have lack of organization mobility and sectionalized close body with uncertain sections, divisions, departments etc. and most staff does not know well operation of their group	Implementation of study to carefully assess RTA organization and administrative operation and propose comprehensive reformation plan of the body itself with administrative rationalization in operation and organization including monitoring and post evaluation	High		25	5
16							Financial Capacity		○			✔	✔				Revenue Improvement	RTA	No sufficient income is not generated to all the operation activities of RTA without financial plan projected, due to budget allocation and subsidies from the Government	Implementation of study to assess financial situation and revenue system of RTA and propose reconstruction of proper revenue system which RTA body can operate with having financial self efficiency including monitoring and post evaluation	Medium		20	2
17							Market Investment		○ ○	△ △		✔ ✔	✔ ✔				IWT Promotion	IWT	IWT promotion suggested in JICA master plan has not been taken effectively in difficulty due to lack of definite awakening of advantage and disadvantage with their strategic measure and overcoming sales promotion should have been led by RTA and MOT on time with involvement of the relevant IWT industries and possible private sectors intended to utilize IWT	Implementation of study to assess strengths and weakness of IWT concurrently with undertaking practical actions to minimize the weakness by RTA and MOT involving private sectors and other academic bodies and propose sales promotion and business plans of IWT with consideration of establishment of IWT fund which can easily drawn possible private sectors in IWT industries including monitoring and post evaluation	Medium		25	5
18						Interagency Coordination	Water Management Interconnection		○ ○	△ △		✔ ✔			✔ ✔		Water Management & Interconnection Enhancement	All related	IWT has many challenges to enhance its opportunities for the related agencies and sectors but issues exist beyond the agencies and sectors and then need to have proper coordination continuous with strong initiative upon the implementation by RTA and MOT	Execution periodically and timely of interagency coordination among stakeholders from public and private sectors by RTA and MOT initiatives for which IWT development and operation would be beneficial and effective with harmonization to the other sectors including monitoring and post evaluation	Medium-Low		20	10
19						Technology	Navigation Management Database Structuring		○ ○			✔ ✔					IT Database & Information Sharing System Formation	RTA	RTA does not have systematic database formation for the both administrative and technical knowledge and can not quickly utilize such kind of information due to complicated format and paper information without effective and useful IT introduction be basically shared at any time to all the staff related for effective quality service and task undertaking	Formation of IT introduction for all information accumulated and establishment for timely data collection system from the related branches and other sectors in/out of RTA with modernized IT infrastructure including monitoring and post evaluation	High		15	5
20	Humanware	✔				Skill&Knowledge	Training Specialty	HW-5 with NICHE/RIRT program	○ ○				✔ ✔			✔ ✔	Capacity Assessment & Building	RTA	Even though RTA is conducting training to his staff every year but the effectiveness has not been properly evaluated as integrated skill and knowledge of organization of RTA without practical opportunities to utilize such experience	Execution of capacity assessment for all the staff including RTA management and organization and of capacity building for efficient resource development to each staff and RTA himself including monitoring and post evaluation	High	90	20	5
21							Database Utilization		○				✔				Strengthening IT Knowledge Utilization	RTA	Mobility for taking actions and information held seem low and old-fashioned due to insufficient database structure	Formation of utilizing database system stored in advanced IT infrastructure for enhancement mobility and intelligence of each staff and RTA himself including monitoring and post evaluation	High		15	3
22						Resource Injection&Allocation	Encouragement		○				✔			✔	Personnel Exchange & Detachment	RTA	Human resource management and development for RTA staff are not sufficient and resource drain might consequently happen in such situation	Implementation of resource exchange periodically within RTA or sometime out of RTA and detachment of personnel to the related advanced public and private sectors in/out of the homecountry including monitoring and post evaluation	Medium		15	5
23							Resource Importation		○				✔			✔	Specialist/Expert Detachment	All related	New view and action are lacking in RTA for its reformation and restructuring	Incorporation of specialist/expert who assists reformation and restructuring of RTA from third party view including monitoring and post evaluation	High		20	5
24						Employment Opportunities	Work Sharing		○				✔				Working Environment Improvement	RTA	Task management and capacity maximization is required upon efficient public services of RTA	Strengthening management skill of administrative position and facilitation of the practice including monitoring and post evaluation	High		15	5
25							Public Participation		○				✔				Public Involvement Formation	All related	Distance or estrangement may have been made between IWT and communities but any exploitation can not be done without understanding and cooperation by them	Implementation of public participation structure in any aspects to carry out the related IWT activities with awareness program including monitoring and post evaluation	medium		5	3

Source: JICA Study Team



Source: JICA Study Team

Figure 2.5.2 Location Map of IWT Candidate Projects by 2027 (Hardware)

- Procurement of 5 survey boats with full advanced survey instruments, which should be allocated to core ports or locks along Cairo-Aswan, Cairo-Alex, Cairo-Damietta IWs
- Procurement of 8 search and rescue boats with a maximum 30 knot speed, which should be allocated to core ports or locks along Cairo-Aswan, Cairo-Alex, Cairo-Damietta IWs
- Provision of training for surveys and boat operation and maintenance

IWP2A, 2B & 2C: Urgent Dredging Project (MCA/Project ID: IW-4, -5 and -6)

Purpose: guaranteeing navigability
Estimated Cost: approx. 650 million (Cairo-Asyut), 500 million (Cairo-Alex), 600 million (Cairo-Damietta) LE
Estimated Duration: approx. 3 years

The above projects should be required in consideration of the results of IWP1 Project. The scope assumed is to include dredging works for each IW at critical and significant portions or z whole fairway through and through, construction of spur structures to control sedimentation if necessary, and conducting pre and post hydrographic surveys using the procured survey boats and instruments as may be required. The following are roughly estimated dimensions for dredging works:

- Cairo-Aswan (Asyut) IW: dredge and dispose sedimentation, approx. 16 million cubic meters (minimum safe width 40 m x dredging depth 2 m x 200 kilometers long)

- Cairo-Alex IW: dredge and dispose sedimentation, approx. 12.2 million cubic meters (minimum safe width 40 m x dredging depth 1.5 m x 203 kilometers long)

- Cairo-Damietta IW: dredge and dispose sedimentation, approx. 14.5 million cubic meters (minimum safe width 40 m x dredging depth 1.5 m x 203 kilometers long)

According to the latest information given, RTA is conducting the dredging projects in cooperation with MWRI and some EU assistance to conduct safety training regarding navigation and dredging processes.

IWP3: Lock Operation Improvement Project (MCA/Project ID: IW-3)

Purpose: guaranteeing navigability
Estimated Cost & Duration: approx. 10 million LE / 2 years

This Project is required based on the IW capacity assessment (refer to APPENDIX-10) to prepare for commencement of 24 hour operation which includes enhancement of the capacity of the existing lock facilities as well as maintenance matters. The scopes assumed are the following but not limited to:

- Investigation of the present conditions, operations, and maintenance activities of all the locks

- Establishment of improvement program with financial evaluation for all the operations, including training, lectures, seminars etc.

WP3A: Lock Expansion Project (MCA/Project ID: IW-3)

Purpose: guaranteeing navigability
Estimated Cost & Duration: approx. 10 million LE / 2 years

This Project is also required based on the IW capacity assessment (refer to APPENDIX-10) to accommodate, without traffic congestion, the future traffic forecast in 2027 between Cairo-Aswan IW. The Project proposes to install additional locks of the same size as the existing lock and in parallel with the existing lock at the Asyut Barrage Lock. Coordination with MWRI is absolutely essential due to ownership and jurisdiction deferent.

IWP4, 5 & 6: Navigation Aids improvement & Upgrading Project (MCA/Project ID: SW-6)

Purpose:	guaranteeing navigability
Estimated Cost:	approx. 40 million (Aswan-Asyut), 15 million (Cairo-Alex), 15 million (Cairo-Damietta) LE
Estimated Duration:	approx. 2 years

These Projects are required to completely install all the necessary navigation aids for all IWs, with which all vessels will be able to navigate at night time. It is known that RTA already installed these aids in some of the areas but there are not enough to implement night navigation and also to produce safe navigation. The following are the scopes assumed:

- Asut-Aswan IW: installation of navigation buoys every 2 km and a beacon and sign every 1 km with certain prevention measures
- Cairo-Alex IW: installation of navigation buoys every 2 km with certain prevention measures
- Cairo-Damietta IW: installation of navigation buoys every 2 km with certain prevention measures

According to the latest information given, the installation of navigation aids was not successful, due to damage and misuse by fish boats or such. RTA is presently shifting provision onto RIS.

IWP7, 8 & 9: New Port Development Project (MCA/Project ID: IW-1 and -2)

Purpose: guaranteeing navigability (interconnection)
Estimated Cost: approx. 310 million (South Cairo), 540 million (Asyut), 630 million (Quena) LE
Estimated Duration: approx. 4 years (South Cairo), 5 years (Asyut), 6 years (Quena) These Projects are required based on the future cargo traffic volumes forecast for 2027 by NaTM (refer to APPENDIX-9). Especially, the river ports between Cairo-Aswan are competitive transport modes for connection between the region to the Delta, and from the region to the sea gateways in view of nationwide cargo traffic movement. The proposed ports are to be located in Tebbin, Asyut, and Quena particularly to utilize the land spaces secured for the PPP program in the IWT sector (refer to Section 2.2.11). Basic dimensions of each port are determined as referred to in APPENDIX-11. The following are the scopes of work but are not limited to:

- South Cairo (Tebbin): construction of 2 berths each 115 meters long (1 for containers and 1 for general cargo is assumed), a yard, buildings, and procurement of minimum loading/unloading equipment etc. with consultancy services
- New Asyut Port: construction of 3 berths each 115 meters long (2 for containers and 1 for general cargo is assumed), a yard, buildings, and procurement of minimum loading/unloading equipment etc. with consultancy services
- New Quena Port: construction of 4 berths each 115 meters long (2 for containers and 2 for general cargo is assumed), a yard, buildings, and procurement of minimum loading/unloading equipment etc. with consultancy services

These Projects have contractually many alternative options, in case of application of PPP schemes. For example, all base infrastructures could be procured by RTA and other necessary infrastructures,

equipment and all operations and management could be the responsibility of the private sector(s), or all procurements, operations and management could be from the beginning undertaken by the private sector(s), which is depending on the type of PPP contract and its conditions. Past PPP schemes have normally been successful if the scheme was implemented by the first example case as mentioned.

Other than the above, it is understood that RTA is planning to develop some of the river ports, especially within the Delta area. Those ports are for very specific use by specific public/private sectors, which already have the advantage to be able to interconnect to the landside productive factories and/or industries. As analyzed, although the river ports within the Delta area are not competitive against other traffic modes, they are strongly advantageous when special purposes exist in the use of these ports. It is therefore suggested that such ports within the Delta should be fully invested and constructed by the public/private sectors that would solely profit from the ports. In other words, it can be mentioned that the river ports between Cairo and Aswan IW still need some type of government interposition due to their higher public nature, but the river ports within the Delta are already of a commercial nature for each stakeholder.

According to the latest information given, RTA does not plan to construct any infrastructures for new ports or to proceed with the second example case aforementioned in a PPP scheme for Asyut, Sohang, Quena Port (middle/upper Egypt) or Meetghamr port (Delta area).

IWP10: Modernized Fleet Information Upgrading Project (MCA/Project ID: SW-6)

Purpose: modernizing fleets
Estimated Cost & Duration: approx. 10 million LE / 1 year

This Project is to collect and upgrade the latest necessary information about IWT fleet industries and their modernization and to introduce them to private sectors for their investment such as a 100 m large-sized barge building etc. This also will probably be the basis of securing IWT funds and for facilitation of private sector participation in IWT industries. The Project scope is the following but is not limited to:

Upgrading to the advanced technology and latest trends of IW navigation so that IWT funding may be established as an effort toward IWT promotion

IWP11 & 12 : RIS Network Formation Project (MCA/Project ID: SW-6)

Purpose: guaranteeing navigability, providing traffic & transport management
Estimated Cost & Duration: approx. 55 million (Cairo-Alex), 60 million (Cairo-Damietta) LE / 2 years

This Project is required based on the IWT capacity assessment as referred to in APPENDIX-10. RIS is a quite useful and important tool to control traffic, to gather necessary information, to make a strategy and measures for issues, etc., and to further control transport management.

Based on the capacity assessment, the function is a prerequisite and essential. This system must include a comprehensive network for all IWs without any excluded areas. The following is the scope of work but is not limited to:

- Cairo-Alex IW: installation pf RIS and network formation with necessary training including consultancy services
- Cairo-Damietta IW: installation of RIS and network formation with necessary training including consultancy services

- According to the latest information given, RTA is currently installing the RIS for both the Cairo-Alex and Cairo-Damietta IWs.

2) Software Projects

IWP13: IWT Reformation Project (MCA/Project ID: SW-6)

Purpose: updating all relevant rules, regulations and laws, all action plans related
Estimated Cost & Duration: approx. 35 million LE / 3 years

This Project is essentially to conduct updating of the rules, regulations and laws for IWT reformation and is connected to all the action plans. The present rules, regulations and laws might become out dated without flexible and timely modification, renewal and re-establishment. The Project is to implement a study to assess Egyptian IWT industries, businesses, concerned sectors, operations, management and other related matters, and to suggest a necessary legal reformation plan for the IWT in terms of organization with involvement of the relevant government sectors, which would be the basis for change in the rules, regulations, and laws.

IWP14: Updating IWT Master Planning Project (MCA/Project ID: SW-6)

Purpose: scoping IWT perspective for securing sustainable finance
Estimated Cost & Duration: approx. 40 million LE / 2 years

This Project is to update the master plan for IWT for 2027 and over the intervening years and for updating the rules, regulations and laws for IWT reformation as they are connected to all the action plans. The JICA Master Plan made in 2003 that is the basis of Vision 2020 for IWT is an older plan that does not incorporate the latest challenges in Egyptian IWT. This Project is to implement a master plan study reflecting the latest issues and challenges in order to harmonize comprehensive transport movement with other related sectors in Egypt, which would be the basis of a new National Transport Vision.

IWP15: RTA Restructuring Project (MCA/Project ID: SW-6)

Purpose: scoping RTA perspective for securing sustainable finance
Estimated Cost & Duration: approx. 25 million LE / 5 years

This Project is to enhance the function and quality of organization. Through observation of RTA operations, RTA seems to have a lack of organizational flexibility and it has a sectionalized organizational structure with uncertain sections, divisions, departments etc. and most staff do not well know the operation of their group. The Project is to implement a study to carefully assess RTA organization and administrative operation and propose a comprehensive reformation plan the organization itself with administrative rationalization in operation and organization including monitoring and post evaluation.

IWP16: Revenue Improvement Project (MCA/Project ID: SW-6)

Purpose: sourcing sustainable finance
Estimated Cost & Duration: approx. 20 million LE / 2 years

This Project is to establish an appropriate revenue system for RTA. The income currently being generated is not sufficient to cover all the operation activities of RTA and must rely on budget allocations and

subsidies from the Government. This Project is to implement a study, including monitoring and post evaluation, to assess the financial situation and revenue systems of RTA and to propose a proper revenue system, with which the RTA can operate with financial self sufficiency.

IWP17: IWT Promotion Project (MCA/Project ID: SW-6)

Purpose: sourcing sustainable finance
Estimated Cost & Duration: approx. 25 million LE / 5 years

This Project is to enhance IWT promotion. IWT promotion, as suggested in the JICA master plan, has not been undertaken effectively due to lack of definite recognition of the advantages and disadvantages along with their strategic measures, and methods of overcoming the disadvantages. Sales promotion should have been led by RTA and MOT in a timely manner with involvement of the relevant IWT industries and possible private sector entities that are intending to utilize IWT. This Project, including monitoring and post evaluation, is to implement a study to assess the strengths and weakness of IWT concurrently with RTA and MOT undertaking practical actions to minimize the weaknesses through involving private sector entities and academic bodies and they should propose sales promotion and business plans for WT with consideration of establishment of an IWT fund, possibly created by private sector entities in IWT industries, which can easily be drawn from .

IWP18: Water Management & Interconnection Enhancement Project (MCA/Project ID: SW-6)

Purpose: coordinating water management
Estimated Cost & Duration: approx. 20 million LE / 10 years

This Project, including monitoring and post evaluation, is to create and produce opportunities for water management and interconnection with the relevant parties. IWT has many challenges to enhance its opportunities for the related agencies and sectors but issues exist beyond the agencies and sectors and they need to have proper and continuous coordination with strong initiative upon the implementation by RTA and MOT. This Project is to periodically and timely implement interagency coordination among stakeholders from the public and private sectors by RTA and MOT initiative for which IWT development and operation would be beneficial and effective with harmonization with the other sectors.

IWP19: IT Database & Information Sharing System Formation Project (MCA/Project ID: SW-6)

Purpose: utilization of accumulated information for securing sustainable finance
Estimate Cost & Duration: approx. 15 million LE / 5 years

This Project, including monitoring and post evaluation, is to establish a systematic database and information sharing systems. RTA does not have a systematic database for administrative and technical knowledge and can not quickly utilize such kind of information due to the complicated format and paper and ink information storage system without effective and useful IT introduction that could be basically shared at any time with all the related staff for effective quality service and task undertaking. This Project is to create an IT database system for all information accumulated for timely data collection from the related branches and other sectors in/out of RTA with modernized IT infrastructure.

3) Humanware Projects

IWP20: Capacity Assessment & Building Project (MCA/Project ID: HW-5)

Purpose: upgrading skill & knowledge

Estimated Cost & Duration: approx. 20 million LE / 5 years

This Project, including monitoring and post evaluation, is to upgrade the capacities of RTA staff. Even though RTA is conducting training to its staff every year, the effectiveness has not been properly evaluated as integrated skill and knowledge of the organization of RTA and there are no practical opportunities to utilize such experience.

This Project is to implement capacity assessment for all the staff including RTA management and the organization itself and for capacity building for efficient resource development to each staff and RTA itself.

IWP21: Strengthening IT Knowledge Utilization Project (MCA/Project ID: HW-5)

Purpose: upgrading skill & knowledge
Estimated Cost & Duration: approx. 15 million LE / 3 years

This Project, including monitoring and post evaluation, is to strengthen IT knowledge utilization of RTA staff. Flexibility and mobility for taking actions and information held seems to be low and old-fashioned due to insufficient database structure. This Project is to create a database system stored in advanced IT infrastructure for enhancement of mobility and intelligence of each staff and RTA itself.

IWP22: Personnel Exchange & Detachment Project (MCA/Project ID: HW-5)

Purpose: injecting and allocating appropriate specialists
Estimated Cost & Duration: approx. 15 million LE / 5 years

This Project, including monitoring and post evaluation, is to produce well-functioning human resource management in RTA. Human resource management and development for RTA staff are not sufficient and a resource drain might consequently happen in such situation. This Project is to implement resource exchange periodically within RTA or sometimes outside of RTA and detachment of personnel to the related advanced public and private sectors in/out of the home country.

IWP23: Specialist/Expert Detachment Project (MCA/Project ID: HW-5)

Purpose: injecting and allocating appropriate specialists
Estimated Cost & Duration: approx. 20 million LE / 5 years

This Project, including monitoring and post evaluation, is to inject outside specialists and experts in terms of the IWT field concerns into the RTA organization. New views and actions are lacking in RTA for its reformation and restructuring. This Project is to incorporate specialists/experts who will assist the reformation and restructuring of RTA from a third party view.

IWP24: Working Environment Improvement Project (MCA/Project ID: HW-5)

Purpose: enhancing employment opportunities
Estimated Cost & Duration: approx. 15 million LE / 5 years

This Project, including monitoring and post evaluation, is to introduce a work sharing concept into the RTA organization. Task management and capacity maximization is required for the efficient public services of RTA. This Project is to strengthen the management skill of administrative positions and facilitation of the best practices.

IWP24: Working Environment Improvement Project (MCA/Project ID: HW-5)

Purpose: enhancing employment opportunities
Estimated Cost & Duration: approx. 15 million LE / 5 years

This Project, including monitoring and post evaluation, is to introduce work-sharing and a work management concept into the RTA organization. Task management and capacity maximization is required for the efficient public services of RTA. This Project is to strengthen the management skill of administrative positions and facilitation of the best practices.

IWP25: Public Involvement Formation Project (MCA/Project ID: HW-5)

Purpose: enhancing employment opportunities
Estimated Cost & Duration: approx. 5 million LE / 3 years

This Project, including monitoring and post evaluation, is to open a gateway in IWT and to facilitate public involvement. Distance or estrangement may have occurred between IWT and the communities but it will be very difficult to expand the usage of the IWT without the understanding and cooperation of the surrounding communities. This Project is to implement a public participation structure in all aspects of IWT to carry out the related IWT activities along with an awareness program.

2.5.4. Further Discussions

1) IWT Potential and Advantages

Generally, IWT has a lot of advantages supported by several reasons. One European IWT initiative, the "European Action Programme for Inland Waterway Transport" (NAIADES) emphasizes “10 reasons to choose inland navigation” [13] as shown in Table 2.5.2.

[13] *“10 Reasons to Choose Inland Navigation”, NAIADES, <http://www.naiades.info/page.php?id=713&path=80>*

Table 2.5.2 "10 Reasons to Choose Inland Navigation" (NAIADES)

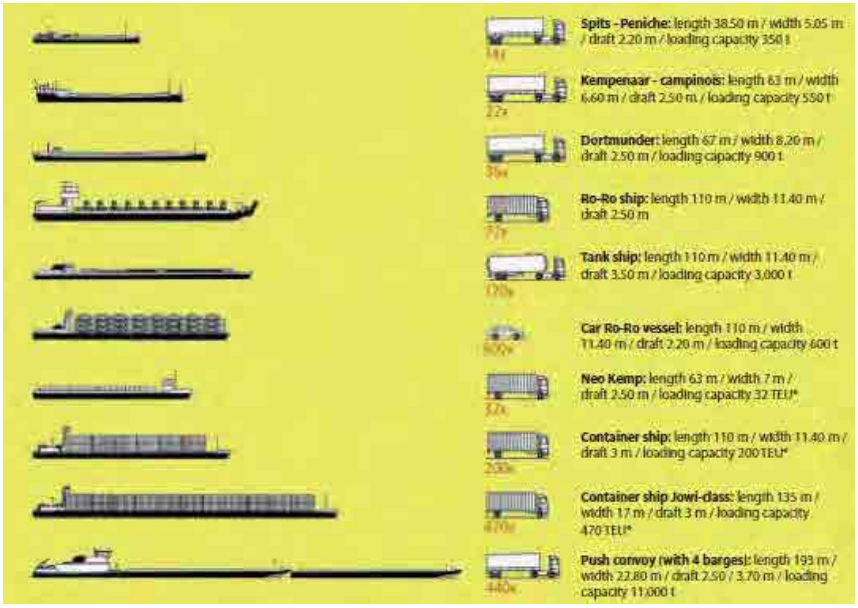
Reason	Description	
Safety		*Inland navigation has an exemplary safety record. There is a very low probability of accidents, and should an accident happen, the costs of that accident are low in economic and human terms. Barges lead the way in safe transport, especially for dangerous cargoes, with extremely high standards of inspection, training and licensing.*
Environmental costs		*All studies carried out to quantify environmental costs ultimately show the same result: Inland waterway transport is the most environmentally friendly mode of transport. Shipping more goods on water will help to reduce greenhouse gases and traffic congestion.*
Time reliability		*Every year congestion on the roads increases. This in turn increases costs and journey times, making Europe's economy less and less competitive. Inland waterways are the alternative that bypasses clogged transport routes and reliably gets freight to its end point on time.*
Infrastructure costs		*Shifting the transport of goods to waterways reduces the amount of money needed for investments in transport infrastructure. With comparably low investments transport volumes on waterways can be significantly increased. Inland waterways also have comparably low maintenance costs.*
Carrying capacity		*Inland vessels offer an enormous carrying capacity per transport unit. One motorized cargo vessel with a load of 2,000 tons carries as much cargo as 50 railway cars at 40 tons each or 80 trucks at 25 tons each. Combined with comparably low transport costs, inland vessels show an excellent cost-benefit-ratio.*
Intermodal networking		*Europe's network of inland waterways link ports, towns and cities with centers of commerce and industry providing clear opportunities for cost-effective solutions in corporate supply chains. Inland waterways form the backbone of a truly intermodal network.*
Free capacity		*Inland waterways still offer a large amount of available capacity. For instance, currently only approximately 15% of the Danube's total capacity is being utilized for inland navigation. As other modes of transport increasingly suffer from congestion, capacity problems and delays which affect mobility and economic competitiveness, inland waterway transport is an obvious choice to play a more prominent role in logistics chains.*
Abnormal loads		*Due to their size and loading capacity, inland vessels are especially suitable for transporting goods with unusual sizes and weights. Transformers, turbines, silos, boilers, aircraft sections, locomotives, helicopters etc. can often only reach their destination by ship due to limitations in road and rail transport (e.g. low bridges, narrow roads and roundabouts).*
Tailor-made transportation		*There is almost no type of cargo which cannot be transported on inland waterways. Shipping companies offer a wide range of vessels types such as dry cargo vessels, liquid cargo vessels, container vessels and Roll on/Roll off-vessels which suit any need of freight forwarders. Tailor-made logistics concepts ensure that goods are transported to the right place at the right time.*
Efficient information & communications technology		*High-performance information and communications technology is a prerequisite for effective logistics chain management. River Information Services (RIS) provide the basis for customized services for forwarders integrating inland navigation in their supply chain. RIS links freight data to traffic data, enabling authorized users in the logistics chain to track the cargo in real time.*

Source Cited: NAIADES

The reasons listed in the table are all advantages of IWT compared with other transport modes. Efforts in Europe for IWT promotion and its strengthening are advanced and based on an accumulation of experience. Some experience and practices can be applied to Egypt. In Egyptian IWT, it is observed that such mentioned advantages have not been clearly placed on the table for discussion. Because the situation is still in the initial stage Egyptian IWT has to settle some issues and constraints prior to looking for its various advantages. However, an emphasis is given to Egyptian IWT potential which has numerous advantages the same as those listed in the table, all which depend on continuous efforts toward the future transport reformation in Egypt.

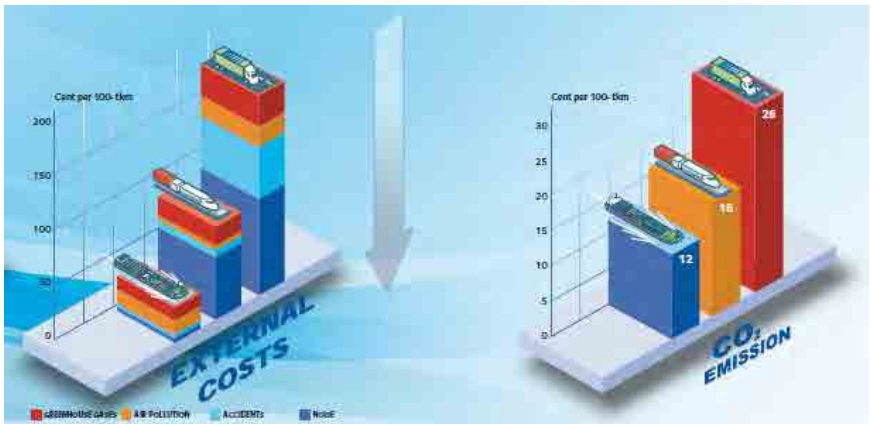
As of the present, it is apparent that Egyptian IWT has the advantages of "carrying capacity" and "Environmental Cost" referred to in Figure 2.5.3 and Figure 2.5.4. As found in both figures, the "carrying

capacity" of barges is hugely greater than the one of vehicle loading capacity at the range between 14 and 600 times, and total external costs (emissions, air pollution, accidents, noise etc) is about 5 times lower than road transport. An approach to be considered in the mid/long-term strategic planning is how the remaining 8 items listed (such as "safety", "time reliability", "infrastructure cost", "intermodal networking", "free capacity", "abnormal loads", "tailor-made transportation" and "efficient information & communications technology") become advantages of Egyptian IWT.



Source: Inland Navigation Europe (INE)

Figure 2.5.3 Comparison of Loading Capacity (IWT Fleets vs Vehicles)



Source: PLANCO 2007

Figure 2.5.4 Advantageous Environmental Costs of IWT

2) Expected IWT Role in Organized Intermodallity with Advanced Information Technology

If IWT reaches a certain advanced stage that has no major issues, constraints or barriers and other transport modes encounter similar progressive stages, an organized intermodality would be required in efficient transport management. Figure 2.5.5 illustrates the "Future Logistics Chain" in transport management in connection with IWT. As implied in the figure, long haul cargo shipping is taken through IWT and rail and clean vehicles transport cargoes the last mile. In such concept, sharing relevant information is essential at any time and any where among different transport modes such as roads,

railways, IWT and seaports, factories, city ports, and transport traffic control centers as well. IWT would be a probable actor to play an important role in the intermodal transport. The concept may expand transport and bring about the creation of additional warehouses to cut cost and emissions in the future sustainable economic development. Figure 2.5.6 presents an example of interconnection between IWT and railway transport in Germany. As shown in the figure, such intermodal transport has become a common transport network in some advanced European counties.

Source: Inland Navigation Europe (INE)

Figure 2.5.5 Future Logistics Supply Chain

Source: EC, Energy and Transport DG

Figure 2.5.6 Example of Interconnection between IWT and Railway Transport

3) Privatization

With the existing budget constraints and increasing insufficiency of government services, the option of "privatization" comes up for facilitation of its reform process. Many arguments from supporting and opposing sides have been raised as to whether it is a suitable way or not. In the Egyptian Government, no exception seems to be given in such movement due to the same reasons commonly accumulated. It is well

known that there are some successful cases in the Egyptian Government, such as the oil & gas, airport, power and water supply sectors, which are the same sectors that have been successful in other countries. Duly, the question comes to RTA as well, because RTA is also being involved in budget constraints with the Government as well as its deficit financing, and reduction of public service. Some types of privatization are as follows:

- Share issue privatization (SIP): selling shares on the stock market
- Asset sale privatization: selling an entire or organization (or part of it) to a strategic investor
- Voucher privatization: distributing shares of ownership to all citizens, usually for free or at a low value
- Privatization from below: Start-up of a new private business in formerly socialist countries

Generally, the advantages of privatization are sound finance, profitable business structure, efficient service, higher flexibility, accountability, stable employment and so on. At the first discussion of this issue, finance stability was the most important as seen in successful cases. So, from this aspect, it is not recommendable for RTA to proceed with implementing the privatization at this moment in consideration of its financial strength and incomplete role and its projects that are in progress. It is therefore suggested in Section 2.5.3 that creating a suitable and stable organizational structure in view of finance, role and function should be the first thing to be done. However, the Government budget constraints will continue to be a problem for RTA. Preparation of such a stable organizational structure is always required. A different avenue to proceed to the privatization of RTA is given in terms of enhancing intermodality. It might be an option in the privatization that all transport sectors are to be under the umbrella of a holding company with the purpose of facilitating intermodal transport.