

MiNTS – MISR NATIONAL TRANSPORT STUDY

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

FINAL REPORT

SUMMARY

March 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

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

EID
JR
12-065

**TRANSPORT PLANNING AUTHORITY
MINISTRY OF TRANSPORT
THE ARAB REPUBLIC OF EGYPT**

MiNTS – MISR NATIONAL TRANSPORT STUDY

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

FINAL REPORT

SUMMARY

March 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

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

USD1.00 = EGP5.96

USD1.00 = JPY77.91

(Exchange rate of January 2012)

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Item	Page
S.1	ROLE OF THIS REPORT 1
S.2	THE PLANNING PILLARS 3
S.3	SOCIO-ECONOMIC EVOLUTION 5
S.4	SECTOR PERFORMANCE 7
S.4.1	The Hardware Element 7
S.4.2	The Software Element 8
S.4.3	The Humanware Element 9
S.5	TESTING FUTURE SCENARIOS 10
S.6	CORRIDOR FORMATION 12
S.7	HARDWARE INITIATIVES 15
S.8	HUMANWARE INITIATIVES 16
S.9	SOFTWARE INITIATIVES 17
S.10	PROJECT PRIORITIZATION 19
S.10.1	Methodology 19
S.10.2	Attribution of Weights 20
S.10.3	Highest Priority Initiatives 21
S.10.4	The Ranked Structure 23
S.10.5	Implementation Logic 25
S.11	FISCAL CONSIDERATIONS 28
S.12	STAGING THE PLAN 32
S.13	RECOMMENDED FEASIBILITY AND FOLLOW-ON STUDIES 37
S.13.1	Egypt Transport Center 37
S.13.2	Intermodal Transport Corridor 37
S.13.3	Road Maintenance and Road Safety Initiatives 38
S.13.4	Mediterranean Corridor 39
Annex 1	Project Listing (Intermodal Transport Corridor) 41
Annex 2	Project Listing (Cairo - Damietta/ Port Said Corridor) 43
Annex 3	Project Listing (Cairo - Alexandria Corridor and Cairo - Suez Corridor) 44
Annex 4	Project Listing (Inland Delta and Suez Canal Development Corridor) 45
Annex 5	Project Listing (Mediterranean Corridor and Sinai Corridor) 47
Annex 6	Project Listing (Red Sea Corridor) 48
Annex 7	Project Listing (Upper Egypt Corridor) 49
Annex 8	Project Listing (East - West Corridor) 51

LIST OF TABLES

Item		Page
Table S. 3.1	National Population Growth	5
Table S. 3.2	MiNTS Gross Domestic Product (GDP) Forecasts	6
Table S. 3.3	Total Volume of Major Commodities.....	6
Table S. 3.4	National Employment Growth	6
Table S. 4.1	Annual Modal Share for Egyptian Freight Movement.....	7
Table S. 4.2	Year 2010 Passenger Modal Split.....	7
Table S. 5.1	Overview of Transport Scenarios	10
Table S. 5.2	Scenario Comparison.....	11
Table S. 7.1	MiNTS Hardware Initiatives.....	15
Table S. 8.1	MiNTS Humanware Initiatives.....	16
Table S. 9.1	MiNTS Software Initiatives.....	17
Table S.10.1	The MiNTS Indicators	19
Table S.10.2	Final Multi-criteria Analysis Weighting System.....	21
Table S. 10.3	Implementation Logic for the Short and Medium Term Planning Horizon.....	25
Table S. 11.1	Historic National Transport Investment.....	30
Table S. 11.2	Government Investment on Transport Infrastructure: Sixth 5-Year Plan	31
Table S. 12.1	Initiative Staging – Short Term Planning Period (Present to Year 2017)	32
Table S. 12.2	Initiative Staging – Mid-Term Planning Period (Year 2018 through Year 2022).....	32
Table S. 12.3	Initiative Staging – Long Term Planning Period (Year 2023 through Year 2027).....	32

LIST OF FIGURES

Item	Page
Figure S.1.1 The National Transport Network	2
Figure S.2.1 Context of the Planning Pillars.....	3
Figure S.2.2 Transport Strategy Building Blocks.....	4
Figure S.5.1 Scenario Performance Indicators	10
Figure S.6.1 Defining the Transport Corridors.....	12
Figure S.6.2 Year 2027 MiNTS Transport Corridors.....	13
Figure S.6.3 Concept of Intermodal Transport Corridor	14
Figure S.10.1 Consolidated Implementation Logic.....	26
Figure S.10.2 Implementation Logic: Intermodal Transport Corridor.....	26
Figure S.11.1 Contractual Structure of the Project.....	29
Figure S.12.1 Locations of Initiatives – Short Term Planning Period (Present to Year 2017)	33
Figure S.12.2 Locations of Initiatives – Mid-Term Planning Period (Year 2018 through Year 2022)	34
Figure S.12.3 Locations of Initiatives – Long Term Planning Period (Year 2023 through Year 2027)	35
Figure S.13.1 ITC Projects Grouping	37
Figure S.13.2 Mediterranean Corridor Projects Grouping.....	39

LIST OF ABBREVIATIONS

BOT	Build, Operate and Transfer
CAD	Central Authority for Development
CREATS	Cairo Regional Area Transportation Study
EIU	Economic Intelligence Unit
ENR	Egyptian National Railways
EU	European Union
EWC	East-West Corridor
GARBLT	General Authority for Roads, Bridges and Land Transport
GDP	Gross Domestic Product
GIS	Geographical Information System
GOE	Government of Egypt
GOPP	General Organization for Physical Planning
HW	Humanware
ICT	Information Communication Technology
II	Implementation Indicators
ITC	Intermodal Transport Corridor
IWT	Inland Water Transport
JICA	Japan International Cooperation Agency
L	Logistics
MCA	Multi-Criteria Analysis
MEDA	Mediterranean-European Development Agreement
MEDA-MOS	Mediterranean Motorways of the Seas
MINTS	Misr National Transport Study
MOF	Ministry of Finance
MHUUD	Ministry of Housing, Utilities and Urban Development
MOP	Ministry of Petroleum
MOT	Ministry of Transport
NICHE	Netherlands Initiative for Capacity development in Higher Education
OI	Operational Indicators
OVI	Objectively Verifiable Indicators
PI	Performance Indicators
PPP	Public Private Partnership
PT	Sea Port
RD	Road
RIRT	Regional Institute for River Transport
RTA	River Transport Authority
RW	Railway
SP	Service Provider
SSI	System Sustainability Indicators

SW	Software
TPA	Transport Planning Authority
VAL	Value Added Logistics

SUMMARY

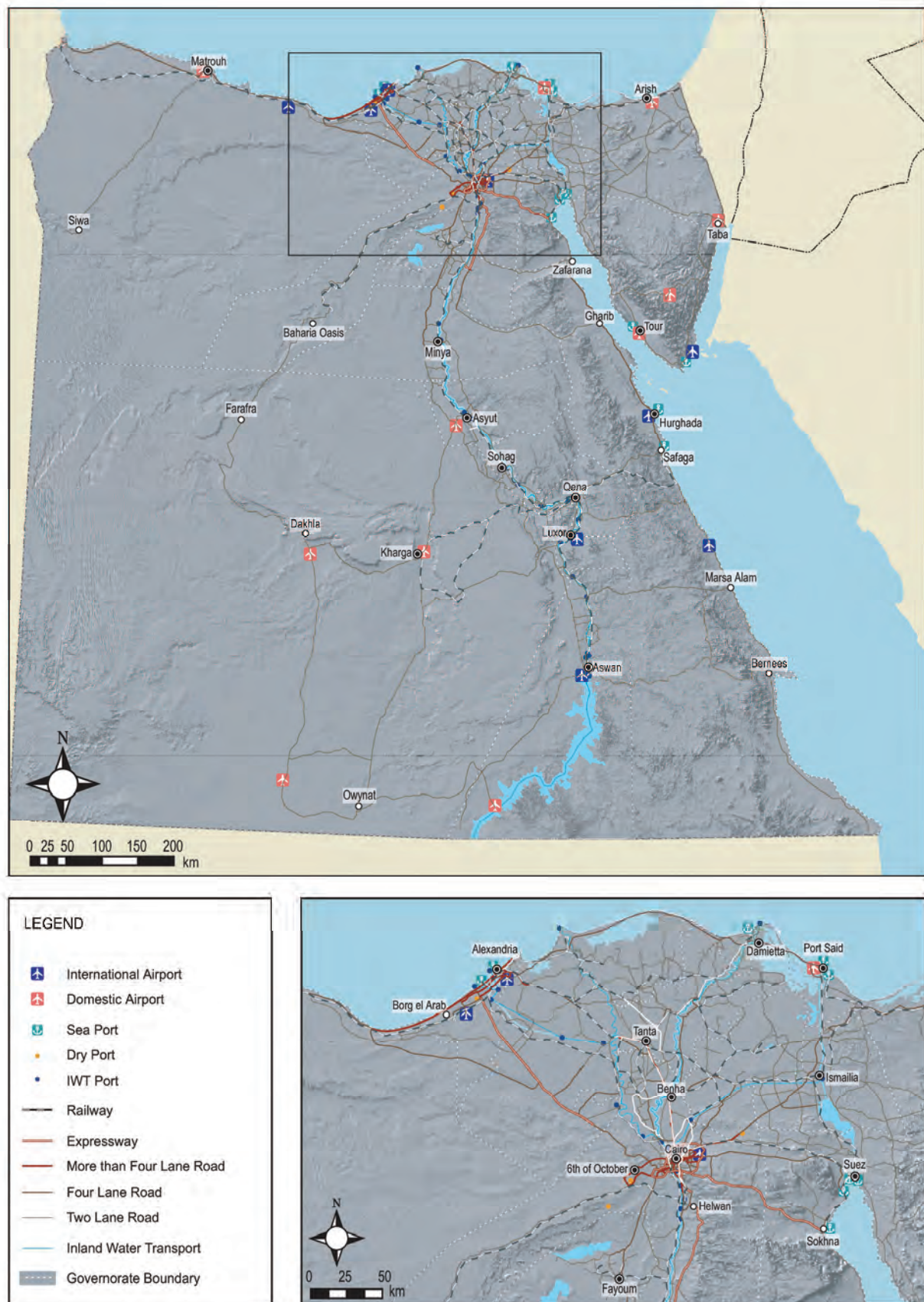
The Japan International Cooperation Agency (JICA) and the Transport Planning Authority of the Egyptian Ministry of Transport are cooperating in the conduct of the *Comprehensive Study on The Master Plan for Nationwide Transport System in the Arab Republic of Egypt* (MiNTS – Misr National Transport Study). Oriental Consultants Company Limited, headquartered in Tokyo, Japan, is the lead consultant for the study. Associated firms are Almec Corporation, Japan and Katahira & Engineers International, Japan.

S.1 ROLE OF THIS REPORT

A basic premise of all investigations is that the MiNTS shall be comprehensive in nature, that is, adopt approaches designed to mitigate transport problems and contribute to the sustainable development of the nation. All major modes of transport are to be addressed including road, rail, maritime, inland waterway, air and pipeline. However, the practical master planning focus will be those modes falling under the jurisdiction of the Ministry of Transport; that is, the road, rail, maritime and inland waterway sectors (Figure S.1.1). The planning horizon of MiNTS extends, via five-year components, to year 2027. **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, the Ministry of Transport and other 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 structure of the *Final Report* is consistent with essential formats and tenets voiced in the June, 2011 *Inception Report 2*, as well as subsequent guidance received from the client group. The *Final Report* consists of three elements: *The Master Plan* report, *Technical Reports* and *Appendix Reports*.

- *The Master Plan* report, consisting of the main text and a separate summary, is seen as the main document whose intent is to present main findings of the MiNTS investigations. *The Master Plan* report is, at the request of the client group, a relatively synoptic document;
- *Technical Reports* are a series of 13 sector or task-specific reports which detail the technical underpinning of *The Master Plan* document; and,
- *Appendix Reports* represent task-specific or activity-specific documents and other data summaries, most of which have been developed in response to requests of the Transport Planning Authority or other members of the client group.



Source: JICA Study Team

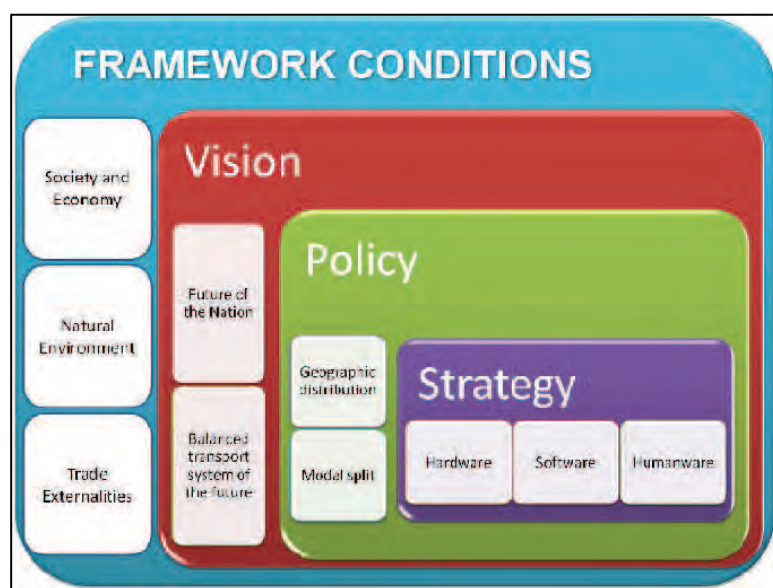
Figure S. 1.1 The National Transport Network

S.2 THE PLANNING PILLARS

The analytical framework of MiNTS embraces two avenues of investigation. These are:

- A “bottom up” sector-specific element. This includes all modes within the MiNTS mandate, that is, the rail, road, inland waterway, maritime, pipeline and civil aviation sectors. The bottom up review focuses on mode-specific investigations of performance, operations and plans/projects promulgated by individual organizations and/or providers of transport services.
- A “top-down” element focused on the broader national, specifically Ministry of Transport, mandate. In other words, the overall perception as to how a balanced functioning of the road, rail, maritime and inland waterway modes is to be achieved within key demand corridors. Considerable consultation was undertaken to ensure broad consensus with the client group in terms of the Egyptian vision for transport.

The “top down” planning cornerstones involve, sequentially, a vision, a policy, and a strategy (Figure S.2.1), to be followed by the plans and projects derived within the framework of the Master Plan (an action plan). Each component, that is, vision, policy and strategy, is based on a cascading and mutually reinforcing chain of activities. These evolve within a broader set of (non-transport) framework conditions reflective of a variety of conditions to include, for example, environment, society and similar indicators.



Source: JICA Study Team

Figure S.2.1 Context of the Planning Pillars

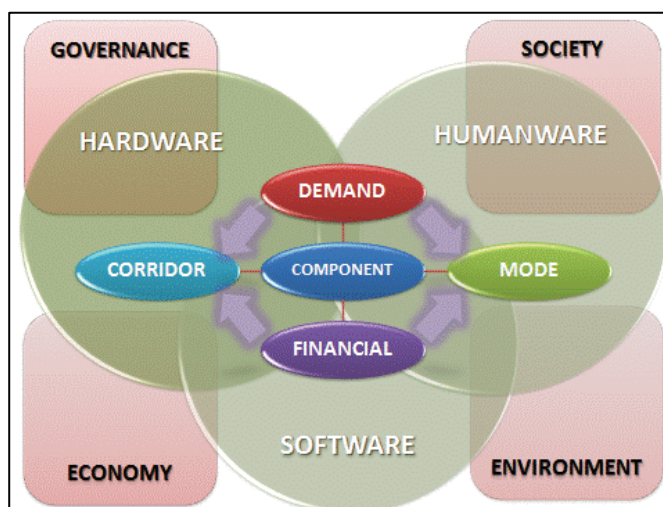
- **“Vision”** in a practical sense represents an ideal in a distant future formulated in limited, but key, ideas and concepts. The transport vision is therefore the “final transport system”, an image that must be translated into achievable policies. The vision could be summed up in different key aspirations to establish tomorrow’s transportation system.

The vision remains the essential and unchangeable component in the MiNTS transport philosophy and is intended to summarize the multidimensional key principles that will define Egypt in the future. This vision is oriented, on the one hand, towards a better distribution of the population via the creation of new industrial and economic areas in different parts of the country to reduce the unacceptable pressure on the Cairo Metropolitan Region and Nile River catchment. On the other hand, a modal shift to reduce the dominance of road transport is seen as essential.

- **“Policy”** encompasses, in a broader sense, actions needed to achieve aspirations contained within the vision. The **“strategy”** follows the policy and represents the planning of governmental

initiatives to carry out the policy. The strategy is thus the art of managing and coordinating concrete actions to achieve stated objectives, typically, in case of MiNTS, within a series of defined corridors.

A first obligation of the MiNTS approach is that it promotes good governance, balances the needs of society with those of the economy while it finally considers the long-term implications on the environment. The proposed new transport plan therefore can only be validated if and when it complies with the conditions and specifications of its four fundamental building blocks – governance, society, environment and economy. Within that context, the new strategy should not only consider the creation of new infrastructure, but should on the contrary shift its focus from infrastructure building to transport system management and efficiency, by encouraging **software (technology) and humanware (human resources)** projects to improve and optimize the utilization of existing capacity. New **hardware (infrastructure)** should be carefully considered in the new transport strategy and should prioritize projects that directly relate to strengthening at least one but preferably more than one of the four building blocks. But the new transport strategy cannot remain at the generic level and needs to be specific as it is the only direct link between visionary goals, policy objectives and Master Plan initiatives. It therefore needs to be realistic and requires confirmation at four principal levels, namely the level of response to (present and future) demand, allocation of demand linked within strategic corridors, modal use within those corridors and the availability of (public and/or private) financial resources (Figure S.2.2).



Source: JICA Study Team

Figure S.2.2 Transport Strategy Building Blocks

The MiNTS Vision for Transport

- The intrinsic linking of transport with the form and extent of the national developmental fabric, thus catalyzing a dynamic interaction between transport and Egypt's social as well as economic evolution, while concurrently cementing the Republic's important role in the international arena, both regional and beyond.
- Effective planning, in concert with the shaping of developmental patterns which influence the location, scale, density, design and mix of land uses, thus enhancing the travel experience and creating safer as well as more convenient mobility opportunities.
- Defining 21st Century sustainable and environmentally friendly transport solutions that, for all of Egypt's citizens, seek to improve the quality, enhance the accessibility, and foster the affordability of systems and services needed over the next two decades and beyond.
- The development of an integrated and multi-modal transport concept within the broader context of national evolution while retaining sensitivity towards local norms, expectations and modal requirements inherent to the movement of persons and goods.

S.3 SOCIO-ECONOMIC EVOLUTION

The population of Egypt has been steadily increasing over the past two decades at a pace slightly in excess of two percent per year, reaching an estimated 78.4 million persons in year 2010. Underlying reductions in future unit growth are seen as being achievable when coupled with intensified incentive and education programs. Still, population is expected to increase by almost 30 million persons over the MiNTS planning horizon (Table S.3.1)

Table S. 3.1 National Population Growth

Year	Population (million)	Annual Growth Rate (%)
2010	78.4	2.03
2017	89.7	1.90
2022	98.3	1.81
2027	107.3	1.73

Source: JICA Study Team in consultation with Steering Committee

This forecast of 107.3 million persons is in close agreement with the recent release of the *Egypt Vision 2052* document which places the year 2027 national population in vicinity of 108 million persons¹. The *Vision* document envisages a shift in the population growth of the Cairo Delta agglomeration to the Western Desert, New Valley, Sinai and Red Sea Regions. These spatial strategies have been considered in the formation of the MiNTS demographic allocations.

The impact of the January, 2011 revolution has exerted considerable impact on future **economic growth**. The Economic Intelligence Unit (EIU), IMF Report during the June Group 8 Summit, and the Ministry of Finance Economic Recovery Program suggest that GDP expansion will reduce from forecast pre-revolutionary levels, particularly so in the near-term future. While longer-term expansion is seen as again reaching pre-revolution rates of growth, near term economic activity is forecast as being more sluggish, in particular the initial year following the Revolution when expected real GDP growth is in vicinity of one percent per annum (Table S.3.2). The average annual compounded rate of growth over the planning horizon (years 2010 to 2027) is consequently expected to average some 5.3 percent. The implications in absolute terms is a year 2027 GDP of 2,644 billion LE (in constant year 2009 monetary terms). As previously, the Cairo Region remains a strong contributor towards national GDP, particularly within the tertiary (services) sector.

The adjusted **commodity volume** (defined as productions plus imports or consumption plus exports) is expected to increase from 1.51 million daily tonnes in year 2010 to 3.32 million daily tonnes in year 2027. In relative terms, imports and exports, despite reduced near-term demand, exhibit considerable greater long-term growth potential (Table S.3.3).

¹ *Egypt Vision 2052*, prepared by the GOPP, Ministry of Housing, Utilities and Urban Communities, 2011 (with updates).

Table S. 3.2 MiNTS Gross Domestic Product (GDP) Forecasts

(Average annual change in percent, constant value)

Forecast	2011	2012	2013	2014- 2017	2018- 2022	2023- 2027
Pre-revolution	6.0	7.0	7.0	7.0	6.5	6.5
Post-revolution	1.2	3.2	4.0	5.0	6.0	6.5

Source: JICA Study Team in consultation with Steering Committee. Data reflect Ministry of Finance, World Bank, EIU and IMF information.

Table S. 3.3 Total Volume of Major Commodities

Unit: Tonnes per day

Year	Production	Imports	Exports	Consumption
2010	1,333,930	175,962	84,339	1,425,554
2027	2,615,378	706,517	259,927	3,061,968

Source: JICA Study Team

Employment is expected to increase in future; this was considered within the MiNTS socio-economic framework by utilizing several processes: (a) a consultative process with stakeholders; (b) stratified approach to primary, secondary and tertiary employment; (c) sensitivity to national income (GDP); and, (d) national production and consumption relationship. In 2010, the employment across the primary, secondary and tertiary sectors was 22.4 million persons. Year 2027 employment is expected to reach 34.2 million persons. The largest relative increase (year 2027 ratio to year 2010) is seen in the tertiary sector (Table S.3.4).

Table S. 3.4 National Employment Growth

Year	Employment by Sector (Million Persons)		
	Primary	Secondary	Tertiary
2010	6.63	4.69	11.04
2017	7.11	5.40	14.28
2022	7.43	5.94	16.94
2027	7.74	6.51	19.91

Source: JICA Study Team in consultation with Steering Committee. Both employment and GDP are prepared in three categories of primary, secondary and tertiary. In generic terms, primary refers to employment on the land such as farming whilst secondary is associated with the manufacturing sector. Tertiary is the service sector including the public sector.

S.4 SECTOR PERFORMANCE

While much has been achieved in the transport sector, considerable work remains to be done.

S.4.1 The Hardware Element

- The growing dominance of road cargo transport is leading to stagnation in the other transport sectors (Table S.4.1). It obliges river and rail modes to focus present activities using old infrastructure and rolling stock/fleets that have exceeded their practical service life, therewith limiting operating costs and increasing revenues. This compared to investing in new equipment and infrastructure. Maintenance of existing assets suffers from a variety of ills.

Table S. 4.1 Annual Modal Share for Egyptian Freight Movement

Year	Cargo Volume (000 tonne)				Modal Share (%)			
	Road	Railway	IWT	Total	Road	Railway	IWT	Total
1979	73,700	5,000	4,300	83,000	88.7	6.1	5.2	100.0
1992	165,495	9,642	3,214	178,351	92.8	5.4	1.8	100.0
2000	242,000	11,812	2,161	256,000	94.5	4.6	0.8	100.0
2010	433,361	4,042	2,226	439,630	98.6	0.9	0.5	100.0

Source: JICA Study Team based on (a) 1979 and 1992 data from The Study on the Transportation System and the National Road Transportation Master Plan (1993), JICA (b) 2000 data from Development Study on the Inland Waterway System in the Arab Republic of Egypt, (2003), JICA; and (c) 2010 information from MiNTS data surveys. Excludes pipeline transport (115 million tonnes in year 2010). Excludes IWT (inland water transport) cross-river ferries.

- The largest part of passenger volume can be attributed to road transport (Table S.4.2). As a direct consequence, main roads are confronted with more congestion, increasing delays and environmental degradation. Rail transport is under-utilized and is beginning to suffer from the lack of consideration as a serious transport alternative. This relative neglect has hindered modernization and a lack of investments underpins the gradual deterioration of the competitive strength as compared to road transport.

Table S.4.2 Year 2010 Passenger Modal Split

Mode	Submode	Persons		Person Kilometers	
		Daily Total (000)	Percent of Total	Daily Total (Million)	Percent of Total
Road	Car	856.2	24.9	202.7	33.8
	Shared Taxi	1,367.8	39.8	192.7	32.2
	Bus	948.1	27.6	163.5	27.3
	Total	3,172.1	92.3	558.9	93.3
Railway		262.9	7.7	40.3	6.7
Total		3,512.8	100.0	613.8	100.0

Source: MiNTS data surveys. Rail includes estimate for non-paying passengers. Air passengers are not included.

- Road infrastructure receives the highest investment priority but the utilization of this valuable asset is weak due to less-than-optimum management (and policing) as well as poor transport equipment (outdated and badly maintained) and abysmal safety practices. Motorists frequently lack the capacity to maintain their vehicles or modernize their operations (logistics, intermodality, loading/usage practices), which leads to highly unsafe and inefficient traffic conditions. Shippers prefer using road transport in spite of congestion and safety concerns because the mode offers higher flexibility and lower prices.
- Operational efficiency and available capacity of railway transport is low, which leads to continued and possibly irreversible structural deterioration of the sector due to high maintenance and operating costs. Container shipments are, at present, not a priority for the rail sector due to a lack of infrastructure both for handling and transporting of this growing cargo potential. Controlled tariffs do not increase sector competitiveness and operational sustainability but only consolidate the downwards trend. To be competitive, the sector is in urgent need of adequate infrastructure, new equipment, but most of all a new operational and management philosophy.
- Commercial inland waterway transport is very modest because of impediments in river infrastructure (locks, bridges, fairway) and operational inconsistencies. River vessels are over-aged and not adapted for modern cargo transport. The fleet requires urgent refurbishment and in many cases needs to be replaced if the sector is ever to increase its role in the Egyptian transport system. River ports and other infrastructures are, in a modern sense, seldom available and lack equipment as well as professionalism to efficiently accommodate cargo, in particular containers.

S.4.2 The Software Element

- Lack of modernization of the transport sector has led to low performance and poor capacity utilization. Some one-half of trucks, for example, travel empty suggesting considerable logistics shortfalls.
- The IWT and railway sectors are limited in their capacity to capture cargo because of a wide range of hindrances, although not always generated by the sector itself. Externalities related to market access, administrative practices, lack of intermodal systems, regulatory frameworks and inability to operate in a competitive market all encourage shippers to use predominately road transport for their cargoes.
- A sustainable regulatory framework for the transport sector as a whole requires adapting the present legislation to the needs of modern transport, with a predominant aim to facilitate market-responsive, customer-oriented operations and private sector involvement.
- Commercial utilization of the river and railways is predominantly for low value bulk cargoes transported in smaller quantities to and from dedicated destinations. Cargo consolidation is hindered not only by the lack of available infrastructure and equipment, but also by the absence of management and operational know-how. The lack of sustainable prospects to capture new and alternative traffic further reduces the willingness to invest in innovation and modernization and to attract new operators to expand markets.
- Integration of river and railway transport into the Egyptian transport system (multi-modal dimension) is therefore very low to non-existent. On the contrary, river and railway transport are

confronted with unfair competition by road transport that benefits from rules and subsidy mechanisms interfering in free market principles and allowing market prices that do not reflect true operating costs.

- Technological innovation is a driving force in modern logistics and defines the competitiveness of the transport system and of logistics and transport services. There is a pressing need for the introducing of modern technology and logistics strategies into the Egyptian transport market.

S.4.3 The Humanware Element

- The sector suffers from a severe shortage of qualified staff.
- There is a lack of training programs and human resource development, in particular related to the introduction (and maintenance) of modern technologies in the sector.
- Qualified personnel, and a unified data system (ideally computerized and/or GIS friendly) encompassing all transport modes, are both lacking. This is seen as an urgent prerequisite for efficient transport planning.
- Coordination between Ministries and organizations is complex and time consuming. Approaches to transport planning, implementation and operations are currently fragmented among a myriad of organizations, entities and Ministries with little evidence of efficient, market-responsive overview guidance or control.
- Human resource responsibilities for transport activities are fragmented.

S.5 TESTING FUTURE SCENARIOS

Table S. 5.1 Overview of Transport Scenarios

Scenario	Reference	Fuel Cost Policy ⁽¹⁾	Modal Focus
A	Minimal Additional Infrastructure	Current	Road
B	Do Nothing	Current	Road
C-1	Maximum Infrastructure	Market Price	Non Road
C-2	Reduced Infrastructure	Less than Market Price but higher than Existing Price	Non Road -Passenger Road-Cargo
C-3	Revenue Generation ⁽²⁾	Market Price plus "at the pump" tax	Maximum Non Road

Source: JICA Study Team

- (1) Fuel price expressed in constant year 2010 terms. Increase percentages are approximate for presentation and discussion purposes. One hundred percent increase in fuel prices approximates removal of all fuel subsidy. More than 100 percent increase in fuel price includes additional "at the pump" tax approximately equal to 20 percent of per liter cost. In scenario C2, the overall fuel price increase approximates to the removal of the fuel subsidy on commercial transport only.
- (2) Revenue generated via imposition of "at the pump" per-liter tax.

A stepwise approach to defining a preferred future transport scenario (i.e. demand assessment) was adopted using the capabilities of the MiNTS computerized national transport model and underlying MiNTS geodatabase. Five scenarios were prepared which balance various elements of the vision with infrastructure-centric approaches. These include a minimal scenario, a scenario without any additional infrastructure and three scenarios with different levels of infrastructure and policy combinations including TGV- Shinkansen-class rail (Table S.5.1). Historically the road sector has been the dominant mode of transport and will continue to play a significant role in the future. However in recent time the road sector has been so to the detriment of all competing modes.

The identified scenarios were subjected to analytical simulation and examined from several approaches including road network use, environmental considerations, affordability and economic efficiency. The preferred scenario,

or Scenario D, was refined on review of the analysis and following discussions with stakeholders. In case of economic efficiency, the preferred scenario yields significant benefits and achieves a good economic return (Figure S.5.1). Scenario D represents a hybrid of Scenario C-1 and C-2 with high speed rail (250 km/hr max. speed technology) and with an additional focus on intermodal and logistics centers.

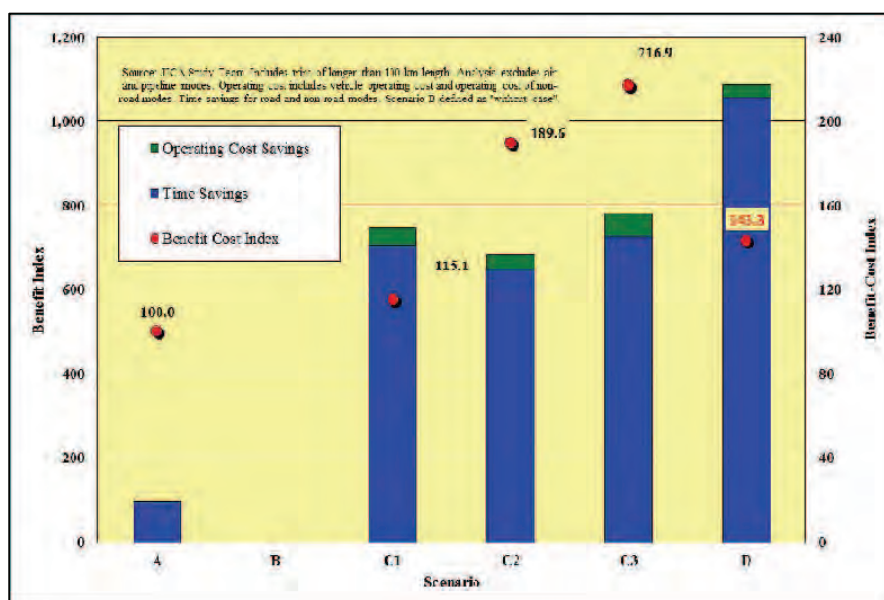


Figure S.5.1 Scenario Performance Indicators

Continued future diversification and expansion of the Egyptian economy is expected. This, in turn, will catalyze direct impacts upon transportation. By the end of the MiNTS planning horizon, the preferred scenario is expected to experience an increase in the modal share of non-road cargo transport from 3.8 percent to 9.8 percent in terms of tonne kilometers. This transformation is achieved with a balanced growth between the competing non road modes. In the case of passenger transport the rail sector (in terms of passenger kilometers) is expected to increase from 6.6 percent to 25.5 percent following the introduction of high speed rail. (Table S.5.2).

Table S.5.2 Scenario Comparison

The modal shift is implemented as a result of a twofold strategy; that is, additional infrastructure in the non-road sector coupled with the gradual introduction of a market fuel price mechanism. There is no recommendation included in the Master Plan for the introduction of an “at the pump tax” or environmental tax although this philosophy was carefully examined as one scenario that achieves even a stronger modal shift to the non-road sector.

Characteristic	Year		Growth Factor
	2010	2027	
Population (000)	78.359	107.281	1.4
GDP (Constant 2009 billion LE)	1,092	2,642	2.4
GDP per Capita (Constant 2009 billion LE)	13,930	24,630	1.8
Total Daily Tonne - Km (Mil)	213	641	3.0
Daily Non-road Tonne - Km (Mil)	8	62	7.8
Daily Non-road Mode Split (Tonne-Km basis)	3.8%	9.8%	2.6
Long Distance Person-Km (Mil)	611	1,059	1.7
Long Distance Rail Person Km (Mil)	40	270	6.8
Long Distance Rail Person Km (Mode Split)	6.6%	25.5%	3.8

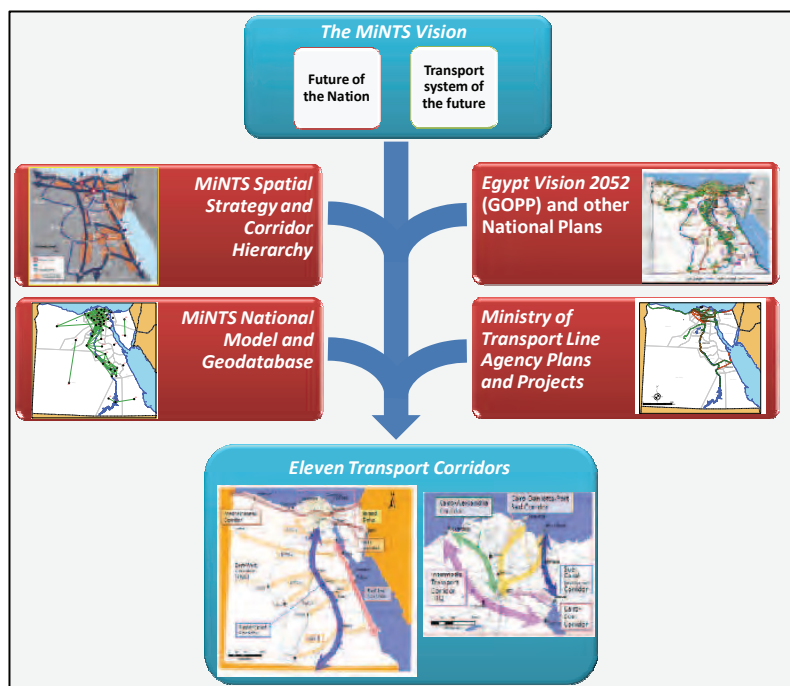
Source: JICA Study Team.

S.6 CORRIDOR FORMATION

The preferred transport scenario represents the underlying consideration that guides the formation of transport corridors and, ultimately, evolution of the Master Plan. The formation of the corridors was finalized in close consultation with representatives of the Steering Committee and Ministry of Transport. Broader inputs were obtained via the conduct of a public workshop and seminar. The schematic activity flow is noted in Figure S.6.1.

The underlying rationale is formed by the MiNTS vision, that is, a balanced transport system with a dynamic linkage to the national developmental fabric.

Important contributors are the MiNTS spatial structure, which encompasses the entire country-wide transport network. This is defined with a view to interconnecting key urban centers and/or economic activity concentrations; that is, a hierarchy of connections between national centers, regional centers and gateway (i.e. international) centers. These may also be seen as agglomerations of various activities, and thus regarded as transport nodes which either generate or attract freight and passenger demands, serve as important



Source: JICA Study Team

Figure S.6.1 Defining the Transport Corridors

distribution centers for hinterland activities or provide international linkages. A variety of developmental plans espoused by various Ministries and entities was considered to include, among others, the GOPP, Ministry of Agriculture, Ministry of Industry and Ministry of Tourism. The current (2007/08 - 2012/13) and pending (2012/13 - 2017/18) national Five-year Plans were scrutinized, as were on-going transformation efforts such as the *ENR Strategic 10 Year Plan* as well as NICHE/RIRT efforts in the inland waterway sector. Detailed consultations were carried out at various junctures of the process within the Ministry of Transport, including all line agencies, to ensure that on-going and planned projects are integrated with the corridor formation process. The MiNTS national transport model, and correlated geodatabase, were used to quantify the various relationships in that future transport demand is directly derived from parameters associated with the future socio-economic framework.

The resultant eleven corridors (Figure S.6.2) are expected to predominately, but not exclusively, contain grouped components of (hardware) projects. The most significant corridors are:

- The Mediterranean Corridor linking Libya with Palestine via Marsa Matrouh, El Alamein, Greater Cairo (Northern segment of Cairo Outer Ring Road), Ismailia, and the Suez Canal-North Sinai Area.

- The Intermodal Transport Corridor (ITC) linking the 6th of October Value Added Center with both the Alexandria-area seaports and Sokhna port. The corridor is expected to focus on the logistics of efficient freight flow.
- The Red Sea Corridor parallels the Red Sea/Gulf of Suez between approximately Zafarana and Bernees, with a potential for strengthening the current linkage with Sudan. Key intermediate points are Gharib, Hurghada and Safaga.
- The Upper Egypt Corridor paralleling the Nile River between Greater Cairo and Aswan, with a potential extension to create a new gateway to Sudan (Khartoum).

Four additional corridors service east-west axes within Central and Upper Egypt. These connect Siwa and Gharib; Farafra/Dakhla and Safaga (via Asyut); Kharga and Safaga (via Luxor/Quena), as well as Owynat and Bernees (via Aswan).

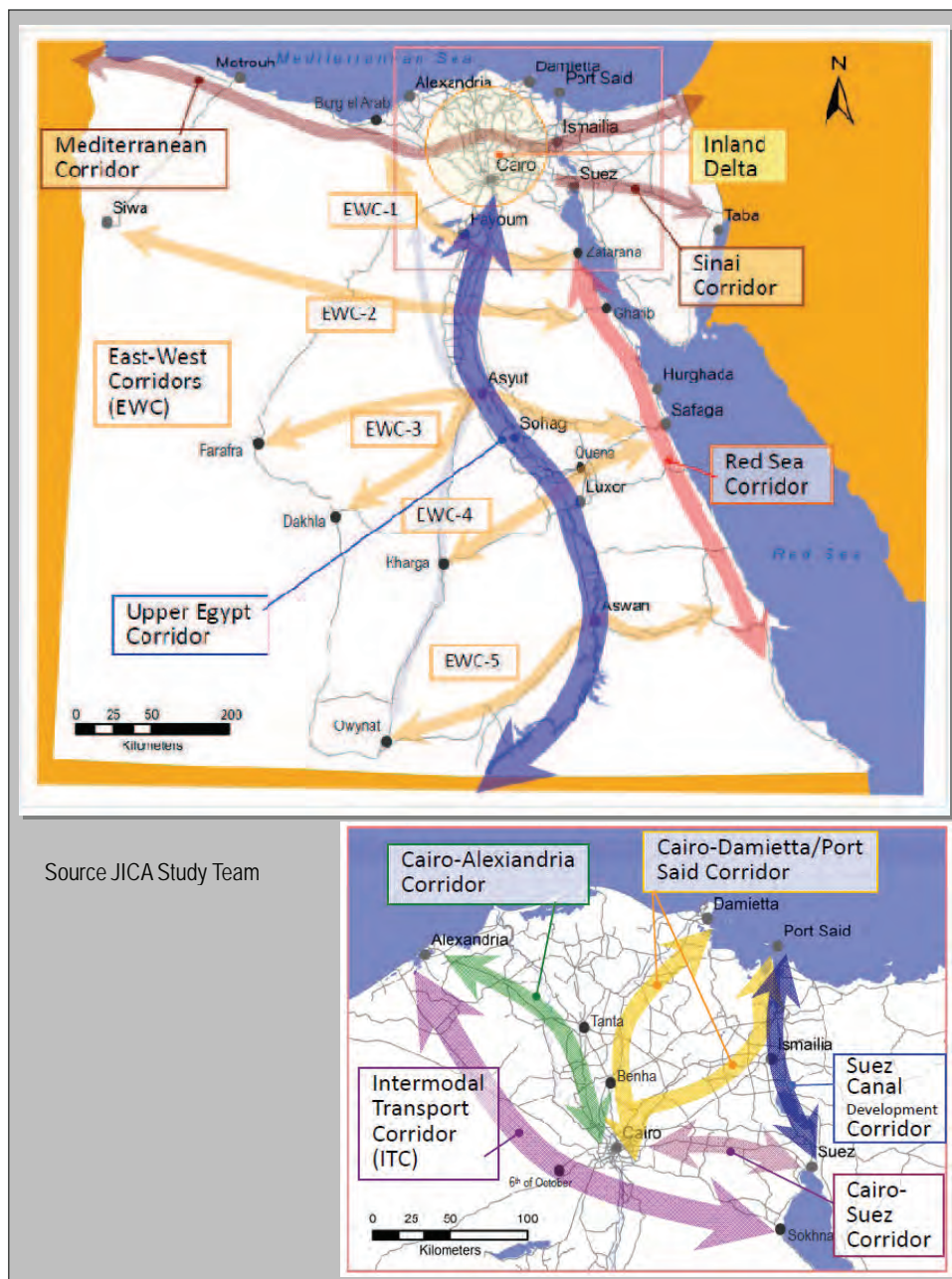
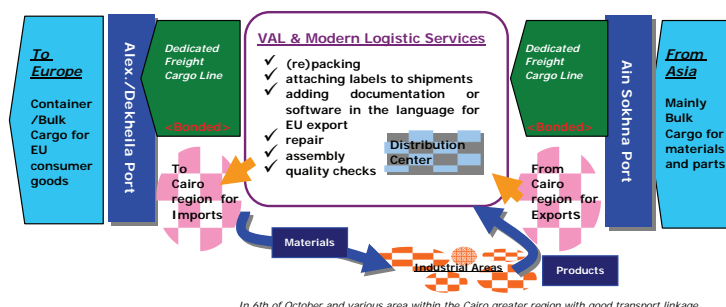
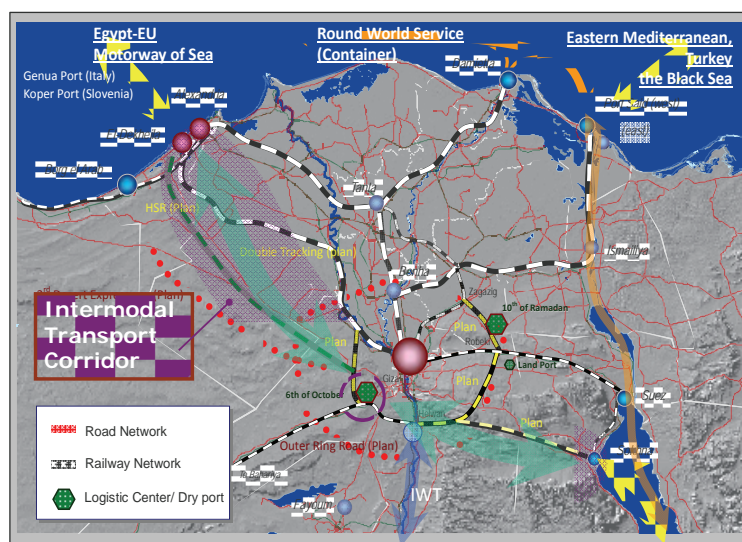


Figure S.6.2 Year 2027 MiNTS Transport Corridors

An important corridor for sustainable freight transport is the proposed Intermodal Transport Corridor, linking the 6th of October Value Added Center with both the Alexandria-area seaports and Sokhna port. The ITC is seen as also directly linking with the EU "motorway of the sea" connecting Alexandria, Genoa and Koper ports (Figure S.6.3).

The ITC will focus in the first instance on container traffic between Egypt and Europe, with destination/origin in Egypt or transiting Egypt. But the corridor will also and gradually concentrate on traffic from Asia, in particular China, destined for the European markets where the Egyptian transport sector will provide in-country value added services. The added value of the ITC corridor is the provision of contract logistics services, a segment of the transport sector at present hardly or not available in Egypt. Along the ITC, specialized logistics service providers will offer cost-efficient and customer-tailored logistics solutions for products originating from Asia and destined for the European markets that meet the specific needs of European clients.

It is emphasized that Port Said and the Damietta Ports will continue to play their important roles for round world container shipping service and windows for trading to Eastern Mediterranean, Turkey and the Black Sea.



Source: JICA Study Team

Figure S.6.3 Concept of Intermodal Transport Corridor

S.7 HARDWARE INITIATIVES

The Study Team identified 92 hardware projects within the eleven MiNTS corridors (Table S.7.1). These are detailed via a series of **eight annexes to this summary**. In addition, two nationwide projects encompass upgrading of passenger intermodal and freight logistics centers were identified. These are:

- Project P-1, encompassing enhanced/new passenger intermodal facilities at approximately 50 locations throughout Egypt; and,
- Project L-2, nationwide logistics center as well as enhanced railway intermodal connection and facilities, layout/arrangement, warehouse and station office at Cairo-Damietta (Mansura, Damietta), Cairo-Ismailia-Port Said (Tel el Kebir, Port Said).

Table S. 7.1 MiNTS Hardware Initiatives

Sector or Activity Precinct	Facility or System	Initiative
Road	Expressway	15 projects includes a) new construction (3), b) widening/improvement (2) and c) upgrade arterial to expressway (10)
	Arterial Road	33 projects including a) new construction (19) and b) widening (14)
	Main Grade Separations	Two bridges and one tunnel
Railway	High Speed Railway	Alexandria – Cairo and Cairo – Aswan
	New Railway Link and Double/Triple Tracking	Eight new railway links and five double/triple tracking projects
	Others	Includes improvement of track, signal and station for cargo
Inland Waterway Transport	Ports	Port enhancement/development in Upper Egypt and Cairo region
	Waterway	Improvement via dredging to enhance safety and navigability; also prevent sedimentation build-up in major fairways.
	Locks	Lock expansion and improvement of operation to enhance capacity
Maritime	Container/multi-purpose Terminals	New construction at Alexandria and Dekheila ports; development of port terminal management
	Channel and Basin	Countermeasure for sedimentation in Damietta Port
Logistics	6 October Value Added Logistics (VAL) Center and nationwide logistics center development	
Passenger Terminal	Inter-modal passenger terminals, nationwide	

Source: JICA Study Team

S.8 HUMANWARE INITIATIVES

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 (technology) aspects 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.

The formulation of a focused and precise approach to humanware is, within the Egyptian context, complex and fraught with political as well as social implications. However, this has not prevented MiNTS from addressing such sensitive topics. The nominated humanware initiatives are noted in Table S.8.1. The formation of such a base, and the recognition of ripple-on implications, is vitally necessary to ensure that any recommended course of action represents an achievable solution. Further, in light of the MiNTS mandate, the focus of the humanware action plan is the Ministry of Transport; obviously, and as intimated in Chapter 7 of *The Master Plan* report (main text), identified issues, opportunities, problems and potential solutions also would apply within a broader national context.

Table S. 8.1 MiNTS Humanware Initiatives

Project	Name	Intent
HW-1	A new role for the Ministry of Transport	Strengthening MOT's responsibility across all transport modes to achieve integrated multimodal transport system and logistics. Achieve enhance coordination mechanism with other key Ministries.
HW-2	Modern road traffic management and control systems	Proposes a wider responsibility for GARBLT across all road sub sectors. Training targets GARBLT officers who have current or future responsibilities in traffic management, safety control, operations as well as Intelligent Transportation Systems.
HW-3	Road Management and Maintenance	Targets GARBLT officers with responsibility for managing and maintaining road assets. Improved road network management training ensures best performance and value-for-money are obtained from the road network, while concurrently offering quality facilities to road users.
HW-4	The ENR Transformation Program	This project targets an extension of current support to ENR officers capacity development for proper operation and marketing for passenger and freight transport.
HW-5	The RTA Transformation Program	This project targets support to RTA officers capacity development, especially RTA management and operation capacities and strengthening of marketing and logistics knowledge and skill, including utilization of database. Support for, and extension of, on-going NICHE/RIRT program.

Source: JICA Study Team

S.9 SOFTWARE INITIATIVES

Infrastructure is not the only hardware component that requires attention and needs to be complemented by a program of modernizing equipment and operations. Technological innovation is a driving force in modern logistics and defines the competitiveness of the transport system and of logistics and transport services. The linking of the hardware, software and humanware elements of the action plan includes one of the (largely) missing elements within the Egyptian transport system. That is, a modern logistics system reliant on intermodal transport. One important corridor for sustainable freight transport is, as noted previously, the establishment of the Intermodal Transport Corridor, linking the 6th of October Value Added Center with both the Alexandria-area seaports and Sokhna port. Along the ITC, specialized logistics service providers will offer cost-efficient and customer-tailored logistics solutions for products originating from Asia (in particular China) and destined for the European markets that meet the specific needs of European clients. Potential services can include, among others, managing components for final assembly; kitting and customizing products for different European markets; managing warehouses including return logistics (in particular for consumer goods); management and supply of time-critical spare parts; or management of the entire end-to-end supply chain.

The software aspects of the ITC are included in the noted project as a sector initiative. In addition, MiNTS has proposed a series of project-specific initiatives for implementation (Table S.9.1). The Egypt Transport Center is seen as a flagship proposal in this regard. The Center, having previously been endorsed by the Steering Committee, actually represents a hybrid between software and hardware initiatives in that its intended tasks are manifold and comprehensive.

Table S. 9.1 MiNTS Software Initiatives

Project	Name	Intent
SW-1	Egypt Transport Center	Maintain and enhance MiNTS national transport model; maintain and expand MiNTS national geodatabase; carry out Ministry-wide transport studies and reviews; create "smart systems" for on-going data monitoring; support humanware development; road safety initiatives and similar tasks. Focus can address both national (MiNTS) and urban matters. In the latter case, this could include re-activating the recent CREATS (Cairo Regional Area Transport Study) computerized transport model/database and monitoring of urban transport systems to include, for example, performance of the expanding Cairo metro network. Other urban areas can progressively be integrated with such procedures, with Alexandria being a likely "next in queue" candidate.
SW-2	Dedicated transport fund	Explore opportunities for establishing a dedicated transport fund to supplement Ministry of Transport financial resources beyond national budget allocations. Intended use for capital and maintenance outlays.
SW-3	Enhanced road capacity and design	Move toward developing a uniform code via <i>Egyptian Highway Capacity Manual</i> , <i>Road Design Manual</i> and <i>Manual on Uniform Traffic Control Devices</i> . Develop state-of-art standards designed to maximize capacity, operations and safety. Linked to SW-4.
SW-4	Road safety initiative	Nationwide focus on 3 E's: Engineering, Education and Enforcement. Likely role of Egypt Transport Center. Intend is to establish a cross-agency single national entity responsible for road safety.

Project	Name	Intent
SW-5	Railroad safety initiative	Modern, automated technology to be applied at railroad at-grade crossings to enhance safety. Continuation and expansion of on-going program set to expire year 2017. Closely allied with hardware improvements as overall railroad safety enhancement initiative.
SW-6	Railroad systems and control	Modern technologies for signaling and communications.
SW-7	IWT navigation and control	Modern technology for inland waterway transport to include navigation management, database structuring, river information systems, and navigation aids improvement/upgrading.

Source: JICA Study Team

S.10 PROJECT PRIORITIZATION

S.10.1 Methodology

MiNTS evaluates the candidate projects and programs by means of a multi-criteria analysis (MCA) using an algorithm-based rank-weighting calculation methodology, incorporating also arguments generally excluded in traditional (numerical) evaluation methods. The key features of the proposed evaluation method are:

- The use of *objectively verifiable indicators* (OVI) to guarantee an evaluation that reduces the risk of data manipulation thanks to the potential to verify the validity of the variables;
- The *allocation of weights* to evaluation criteria based upon a range of variables considered realistic and in line with socio-economic and political policy priorities that guarantees that those projects considered most "important" are given a suitable and equitable evaluation; and,
- *Sensitivity testing* of the different alternatives to assess the level to which any particular alternative contributes to the achievement of specific objectives and to identify the true boundaries that projects contribute to improving current situation.

The proposed projects and programs are divided between hardware (further stratified by corridor in which the infrastructure investment is proposed), software, and humanware projects. One group of investments focuses the creation of an Intermodal Transport Corridor to create in the long-term a new economic sector where modern value added logistics services are affiliated with high value economic activities already under development (Design City and Smart Village). The range of investments in software and humanware has also its particular focus with the establishment of the Egyptian Transport Center, to be equipped with state-of-the-art software and benefiting of the necessary expertise to develop, maintain and use the proposed software.

The objectively verifiable indicators used in the multi-criteria evaluation are summarized in Table S.10.1 and include operational indicators that are an appreciative value of investment priority based upon numeric values of operations; performance indicators that are strategic qualitative assessments of the effects of the projects; implementation

Table S. 10.1 The MiNTS Indicators

OI - Operational indicators	
OI - 1	Person Demand / Freight Demand
OI - 2	Supply Utilization
OI - 3	Cargo Transport Facilitation
OI - 4	Relation to priority corridor
PI - Performance indicators	
PI - 1	System improvement
PI - 2	Enhanced Market Mechanisms
PI - 3	Knowledge Based Management
PI - 4	ICT development / improvement
PI - 5	Equipment modernization
II - Implementation indicators	
II - 1	Improved Governance (public sector)
II - 2	Regulatory Framework
II - 3	Stakeholder Involvement
II - 4	Private sector involvement
II - 5	Development Cost
SSI - System Sustainability indicators	
SSI - 1	Environmental Impact
SSI - 2	Transport Safety
SSI - 3	Job creation
SSI - 4	Gateway Center Connectivity
SSI - 5	Regional Center Connectivity

Source: JICA Study Team

indicators that evaluate on the basis of its complexity and maturity the overall potential that a recommended project can be realized; and the system sustainability indicators that are based upon environmental impact and safety or the generation of socio-economic benefits.

The OVI parameters, factors and weightings attached thereto were reviewed in detail with members of the Steering Committee as well as during a December, 2011 workshop with representatives of the Ministry of Transport. The exchange of information was most helpful and beneficial. Complete consensus on factors and weightings was achieved. Conclusions of the consensus building process are part and parcel of the MiNTS MCA and project prioritization process.

Considering the resultant priority list is the result of a computer-based process, findings are subsequently integrated into a "relational matrix" in which the priority projects are linked together and implementation adjusted according to their logical correlation. While the various projects and programs have sequential and determined implementation logic from the project ranked first to the one ranked last in the MCA-based priority list, the relational framework assesses the practical logic of the implementation sequence and could therefore impose a different sequence of implementation.

The use of the OVI acknowledges the strategic objectives of the transport policy and ensures compliance between OVI and strategic objectives. An important step of the consensus building process was mutual agreement as to strategies, reflective of both Ministry of Transport and MiNTS aspirations, that should serve to identify the baseline condition. The jointly adopted strategies are:

- Integrated and harmonized transport modes;
- Increase of non-road freight services;
- Promoting private sector participation;
- Secure and safety of transport modes;
- Good Ministry of Transport governance of an integrated transport system;
- International Gateway strengthening;
- Integrated passenger transport services;
- Toll road network provision;
- Development of human resources;
- Connection to the *Egypt Vision 2052* New Development Zones;
- Modern transport techniques; and
- Minimize negative environmental impacts.

The priority and urgency of the recommended projects is defined by their concrete contribution to resolving identified problems in the Egyptian transport sector. The weighting system of the MCA has been tested to ensure that consistency has been achieved. The different tests proved satisfactory and demonstrated that the model is functioning correctly and criteria are well balanced and appropriate to allow the MCA evaluation of the proposed projects and programs.

S.10.2 Attribution of Weights

The final attribution of weights is consistent with the government policy of increasing sector efficiency, stimulate private sector participation, and improve sector governance (stakeholder involvement,

facilitation and improved market mechanisms), while environmental issues or actual demand are less relevant when deciding on particular investments. The weights finally used to assess the priority of the proposed projects are summarized in Table S.10.2

S.10.3 Highest Priority Initiatives

The MCA evaluation was made with the hardware, software, and humanware projects combined to ensure that the implementation priority is consistent with the government objectives of modernizing the Egyptian transport sector and is not limited to just creating new (additional) infrastructure.

Table S. 10.2 Final Multi-criteria Analysis Weighting System

Category	Sub-category	Step-2					Step-3					Sensitivity-1			Sensitivity-2			Sensitivity-3			Sensitivity-4		
		Nos. Cat	Nos. SubC	Weight in Category	Weight in Sub-category	Weight	Nos. Cat	Nos. SubC	Weight in Category	Weight in Sub-category	Weight	Weight in Category	Weight in Sub-category	Weight	Weight in Category	Weight in Sub-category	Weight	Weight in Category	Weight in Sub-category	Weight	Weight in Category	Weight in Sub-category	Weight
Operational (OI)	Person Demand / Freight Demand	4	4	0.25	0.25	0.06	4	4	0.20	0.24	0.05	0.55	0.24	0.13	0.15	0.24	0.04	0.15	0.24	0.04	0.15	0.24	0.04
	Supply Utilization	4	4	0.25	0.25	0.06	4	4	0.20	0.27	0.06	0.55	0.27	0.15	0.15	0.27	0.04	0.15	0.27	0.04	0.15	0.27	0.04
	Cargo Transport Facilitation	4	4	0.25	0.25	0.06	4	4	0.20	0.31	0.06	0.55	0.31	0.17	0.15	0.31	0.05	0.15	0.31	0.05	0.15	0.31	0.05
	Relation to priority corridor	4	4	0.25	0.25	0.06	4	4	0.20	0.19	0.04	0.55	0.19	0.10	0.15	0.19	0.03	0.15	0.19	0.03	0.15	0.19	0.03
Performance (PI)	System improvement	4	5	0.25	0.20	0.05	4	5	0.31	0.26	0.08	0.15	0.26	0.04	0.55	0.26	0.14	0.15	0.26	0.04	0.15	0.26	0.04
	Enhanced Market Mechanisms	4	5	0.25	0.20	0.05	4	5	0.31	0.20	0.06	0.15	0.20	0.03	0.55	0.20	0.11	0.15	0.20	0.03	0.15	0.20	0.03
	Knowledge Based Management	4	5	0.25	0.20	0.05	4	5	0.31	0.17	0.05	0.15	0.17	0.03	0.55	0.17	0.09	0.15	0.17	0.03	0.15	0.17	0.03
	ICT development / improvement	4	5	0.25	0.20	0.05	4	5	0.31	0.19	0.06	0.15	0.19	0.03	0.55	0.19	0.11	0.15	0.19	0.03	0.15	0.19	0.03
	Equipment modernization	4	5	0.25	0.20	0.05	4	5	0.31	0.18	0.06	0.15	0.18	0.03	0.55	0.18	0.10	0.15	0.18	0.03	0.15	0.18	0.03
Implementation (II)	Improved Governance (public sector)	4	5	0.25	0.20	0.05	4	5	0.28	0.10	0.03	0.15	0.10	0.01	0.15	0.10	0.01	0.55	0.10	0.05	0.15	0.10	0.01
	Regulatory Framework	4	5	0.25	0.20	0.05	4	5	0.28	0.19	0.05	0.15	0.19	0.03	0.15	0.19	0.03	0.55	0.19	0.10	0.15	0.19	0.03
	Stakeholder Involvement	4	5	0.25	0.20	0.05	4	5	0.28	0.22	0.06	0.15	0.22	0.03	0.15	0.22	0.03	0.55	0.22	0.12	0.15	0.22	0.03
	Private sector potential	4	5	0.25	0.20	0.05	4	5	0.28	0.27	0.08	0.15	0.27	0.04	0.15	0.27	0.04	0.55	0.27	0.15	0.15	0.27	0.04
	Development Cost	4	5	0.25	0.20	0.05	4	5	0.28	0.22	0.06	0.15	0.22	0.03	0.15	0.22	0.03	0.55	0.22	0.12	0.15	0.22	0.03
System Sustainability (SSI)	Environmental Impact (Total Env.I)	4	5	0.25	0.20	0.05	4	5	0.21	0.23	0.05	0.15	0.23	0.03	0.15	0.23	0.03	0.15	0.23	0.03	0.55	0.23	0.13
	Transport Safety	4	5	0.25	0.20	0.05	4	5	0.21	0.22	0.05	0.15	0.22	0.03	0.15	0.22	0.03	0.15	0.22	0.03	0.55	0.22	0.12
	Job creation	4	5	0.25	0.20	0.05	4	5	0.21	0.28	0.06	0.15	0.28	0.04	0.15	0.28	0.04	0.15	0.28	0.04	0.55	0.28	0.16
	Gateway Center Connectivity	4	5	0.25	0.20	0.05	4	5	0.21	0.12	0.02	0.15	0.12	0.02	0.15	0.12	0.02	0.15	0.12	0.02	0.55	0.12	0.06
	Regional Center Connectivity	4	5	0.25	0.20	0.05	4	5	0.21	0.15	0.03	0.15	0.15	0.02	0.15	0.15	0.02	0.15	0.15	0.02	0.55	0.15	0.08

Source: JICA Study Team

The evaluation clearly shows that there is a need for concrete priority initiatives at the three levels, with highest priority list of 10 initiatives consisting of:

- Infrastructure Developments
 - VAL (Value Added Logistics) Center at 6th of October City;
 - Railway link for 6th of October City;
 - Railway link between Sokhna Port to Helwan;
 - Double tracking of bypass line for Cairo - New Alexandria;
 - Improvement of station facilities for freight services (2stations);

- Cairo Alexandria Desert Expressway (upgrade to 8-lanes);
- Logistics Centers including improvement of station facilities for freight services;
- Software Developments
 - Development of the Egypt Transport Center;;
- Humanware Developments
 - Extension of ENR transformation plan,
 - Extension of IWT NICHE/RIRT program.

These ten priority projects/programs are consistent with the government's objectives of modernizing the transport sector and increasing its efficiency via modernization and intermodal integration. Each of above projects has been proposed and specifically designed to achieve just that:

- The Egypt Transport Center is an essential development to modernize the sector and increase its efficiency because expert knowledge and modern planning and monitoring technology have become indispensable tools for governing an increasingly complex transport and logistics sector;
- The development of the Intermodal Transport Corridor is a high-priority infrastructure development program that aims at creating efficient national and international freight transport flows while simultaneously increasing the competitiveness of the Egyptian transport and logistics sector by creating new market-oriented services. Several of the priority infrastructure investments are directly associated with this program:
 - The VAL Center at 6th of October City is essential to stimulate the development of intermodal transport, increase freight transport efficiency and open the sector to new services and applications. This project is the central element in the ITC development program which has as priority aim to develop intermodal transport and new value-added logistics services;
 - The railway link between Alexandria and the VAL Center is an imperative investment for the successful development and exploitation of the VAL Center as it links the center to the key gateway for the traffic susceptible of being treated along the corridor.
 - The same is true for the railway link between Sokhna and Helwan where the need is even higher as planned investments in Sokhna port will create a new prime gateway for Egypt, needing imperatively a railway connection to the main consumption and production center of Egypt.
 - Upgrading the Cairo-Alexandria Desert Expressway to 8-lanes will be necessary to safely accommodate expected road traffic growth. In spite the efforts on the ITC corridor to shift cargo from the road to the railways, the role of road transport will continue to be very important and the upgrading of the key road connection between the two cities is of strategic importance to ensure safe and secure traffic of goods and persons.
- The extension of the ENR transformation plan is logically high in the ranking because it targets the extension of current support to ENR officers' capacity development to ensure in the short-term future proper operations and marketing programs for passenger and freight transport. Considering that ENR is planned to become the backbone of Egypt's transport system and the principal replacement for road transport, ensuring modern and appropriate expertise and know-how is urgent and imperative.

- The extension of the NICHE/RIRT program in the inland waterway transport sector has the same priority as the transformation plan and therewith at a similar level of importance. The current support to RTA officers for capacity development, especially RTA management and operation capacities and strengthening of marketing and logistics knowledge and skills, including the utilization of modern databases and other information systems needs to be continued to ensure that the IWT sector one day will become competitive and represent a true alternative for the road transport sector.

The two remaining (infrastructure) projects in the top 10, the improvement of station facilities for passenger transport and the development of logistics centers for freight services score equally high as these are important elements in the effort of improving freight transport and the transfer of cargo from one mode to another. The development of these transport and logistics centers will also provide an impetus in developing new modern logistics services, an essential component in the Government's sector modernization program.

S.10.4 The Ranked Structure

The in-depth testing of quantifiable objectively verifiable criteria against the Government's strategic policy objectives and the repetitive consultation of the key sector stakeholders and of various representatives from the Ministry of Transport has lead to a final weighting system has generated a highly sustainable model that generated results that are totally consistent and logical. Consequently, the top ten results that emerged out of the MCA do not need any additional analysis to uphold an implementation logic that maximizes the potential benefits of proposed investments.

The results clearly focus three key components of a modern transport system, namely:

1. Modern governance (Egypt Transport Center),
2. Efficient intermodal transport (Intermodal Transport Corridor, several terminal and station developments), and
3. Adequate expertise (ENR Transformation and IWT programs).

If any improvement can be made to the MCA results, these are at the lower level of the ranking where some projects could be upgraded as they link directly or indirectly to the top ten projects. When looking at the next ten projects in the ranking, it is noted that the sequential implementation of the top ten projects, followed by the sequential implementation of the next ten projects seems a more logical approach. The projects scoring 11 to 20 in the ranking are :

11. Training in modern road maintenance techniques;
12. Passenger Intermodal facilities;
13. IWT port improvement for Upper Egypt;
14. Cairo - Ismailia - Port Said Road (expressway);
15. IWT port linking the Nile River with the ITC;
16. Double tracking for Mansoura – Damietta;
17. Cairo -Suez Road (expressway);
18. Following two projects have an equal score:

- i. Road safety initiative (3E; Engineering, Education and Enforcement);
 - ii. Training in modern traffic management and control systems;
20. Improvement of station facilities for freight services.

The initial logic in the first ten projects is also maintained in the following ten projects, but the projects now also focus river transport and terminals. The development of the Cairo river terminal “completes” the development of the Intermodal Transport Corridor with the upgrading of river terminals in Upper Egypt will further improve the competitiveness of river transport.

Considering that road transport will continue to dominate also in the future and in spite of the many efforts to improve rail and river transport competitiveness, training in modern road maintenance techniques is particularly important as it will contribute to expanding the lifespan of main roads and improve safety of travel due to better quality roads. The second group of road projects is improving the links between important production and consumption centers namely Ismalia and Port Said and Cairo with Suez. The program of improving stations and terminals is also continued in the second group of projects with projects for the development of intermodal stations for passengers and the improvement of a further six freight stations.

Finally, road safety and traffic management are the last two projects in the list and are considered equally important. In particular the training in traffic planning and control systems is an important follow-up of the establishment of the Egypt Transport Center and in preparation of the long-term vision of establishing a national transport management center.

In order to ensure that in the short- and medium-term future, all important projects are coherent and all necessary projects are considered for implementation at the appropriate time, the next ten (to rank 30) projects are:

- 21. Cairo Alex Agriculture Bypass Kafr El Zayat - Alexandria ;
- 22. Rehabilitation of tracks for Qena – Safaga;
- 23. Railway safety initiative;
- 24. Development of management and operation for multi purpose terminal in El Dekheila Port;
- 25. Western Cairo - Alexandria Expressway;
- 26. Cairo - Asyut Desert Western Road (expressway);
- 27. High Speed Railway for Cairo – Alexandria (250kph technology applied, commercial speed as 200-230kph);
- 28. Development of road design, capacity and traffic control devices manuals;
- 29. Alexandria Bypass ; and,
- 30. Following two projects have an equal score:
 - i. Suez Ras El Nakab Road (expressway)
 - ii. Introduction of state-of-the-art railway systems and control.

The third group of projects is in large majority of very specific transport infrastructure projects ranked; except for the projects ranked 23 and 30(ii) that are respectively the railway safety initiative and the introduction of a modern railway system and control.

The presence of a large majority of very specific infrastructure development / rehabilitation projects suggests that the first 20 projects are coherent, necessary to be implemented during the same short and medium term future and will combined modernize the Egyptian transport sector.

S.10.5 Implementation Logic

Considering the individual relationships between the different projects, it is conceivable to develop a slightly amended listing of the first 20 projects to ensure that the implementation order of the projects consolidates the development program for the Egypt Transport Center and the Intermodal Transport Corridor, two key projects to modernize the Egyptian transport sector (Table S.10.3).

Table S. 10.3 Implementation Logic for the Short and Medium Term Planning Horizon

Type	Project
Software	1. Egypt Transport Center
Intermodal Transport Corridor (Hardware)	1. VAL (Value Added Logistics) Center at 6th of October City 2. Railway link for 6th of October City 3. Railway link between Sokhna Port and Helwan 4. Cairo Alexandria Desert Expressway (upgrade to 8-lanes) 5. IWT port linking Nile River with Intermodal Transport Corridor 6. Development of management and operation for multi purpose terminal at El Dekheila Port 7. Alexandria Bypass
Humanware and Software	1. Extension of ENR transformation plan 2. Training in modern road maintenance techniques 3. Road safety initiative (3E's: Engineering, Education and Enforcement) 4. Development of road design, capacity and traffic control device standards 5. Training in modern traffic management and control systems 6. Railway safety initiative 7. Extension of IWT NICHE/RIRT program 8. Introduction of modern railway systems and control
Hardware	1. Improvement of station facilities for freight services at Alexandria 2. Suez - Ras el Nakab Road (expressway) 3. Logistics centers including improvement of station facilities for freight services 4. Passenger intermodal facilities 5. IWT port improvement for Upper Egypt 6. Cairo - Ismailia - Port Said Road (expressway) 7. Double tracking for Mansoura – Damietta rail link 8. Cairo -Suez Road (expressway) 9. Improvement of station facilities for freight services at upper Egypt 10. Cairo - Alexandria Agriculture Bypass Kafr El Zayat - Alexandria 11. Rehabilitation of tracks for Qena – Safaga 12. Western Cairo Alexandria Expressway 13. Cairo - Asyut Desert Western Road (expressway) 14. High speed railway for Cairo – Alexandria (200 km/hr commercial speed) 15. Double tracking of bypass line for Cairo - New Alexandria

Source: JICA Study Team

Although the previous table suggests a sequential implementation of the different projects, the proposed software, hardware, and humanware projects can start simultaneously because the implementation time and components that together make up the respective projects differ, allowing an approach as suggested in Figure S.10.1.

The first, urgent, and most important project for the modernization of the Egyptian transport sector is the establishment of the Egypt Transport Center which will be supplied with state-of-the-art software and trained personnel. It will be the key tool for public decision-makers for transport planning and strategy development.

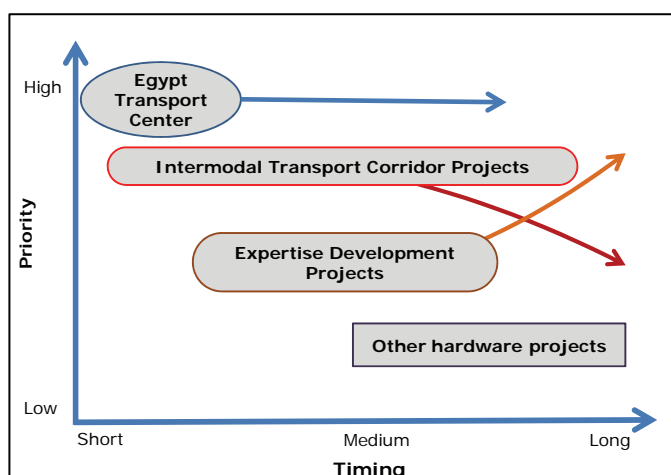
With the ETC expertise and equipment available, the Egyptian government will no longer need expensive external assets to assess the performance of the transport sector nor forecast the future evolution of transport in Egypt, both being key inputs to the long-term monitoring of the MiNTS Transport Master Plan.

The contribution to the modernization and transformation of the Egyptian transport sector will be continuous and should in the long-term future lead to the creation of a governmental transport management system that will control, manage and govern the sector at the national level.

The second key project of which the implementation should not be delayed is the gradual development of the Intermodal Transport Corridor. This project will be spread over a long period of time as it involves different sometimes important infrastructure investments which should be implemented in a sequential order of decreasing importance as suggested in more detail in Figure S.10.2.

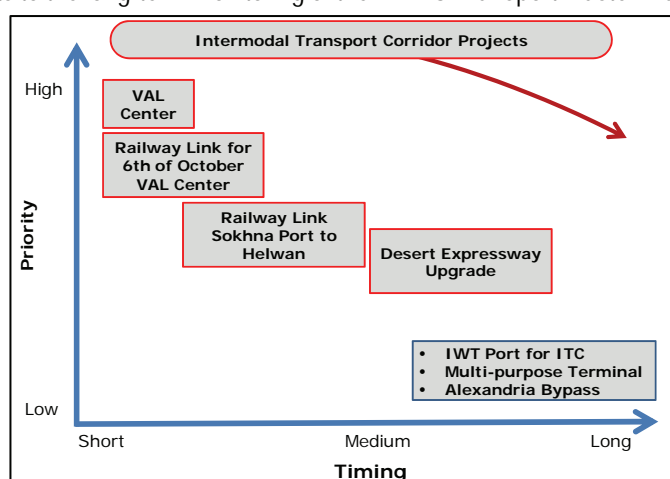
The construction of the VAL center at 6th of October City is undoubtedly the first project of the ITC program that needs to be realized as soon as possible for several reasons:

- It is located at the center of Egyptian consumption and production;
- It will generate benefits as soon as the infrastructure is operational;
- Its development cost is low; and,



Source: JICA Study Team

Figure S.10.1 Consolidated Implementation Logic



Source: JICA Study Team

Figure S.10.2 Implementation Logic:
Intermodal Transport Corridor

- The need is immediate.

But to maximize the benefits of this investment and to ensure the center can play in full its role in the envisaged transport corridor, it should be linked to the Alexandria – Cairo railway connection, hence making the link between the center and the railway network an equally important investment.

Once these two projects have been initiated, the other components of the ITC project can be envisaged, with the highest priority in the short- to medium-term attributed to the railway link to the port of Sokhna, the eastern terminus of the Alexandria – Cairo – Sokhna corridor. To a lesser extent, upgrading the Desert Expressway can also be envisaged because road transport will remain a dominant mode of transport for bringing freight from Alexandria port to the Cairo region. The three remaining projects, although important, are to be envisaged in the long-term, with the IWT port in the Cairo region to link to the ITC corridor as first in line of implementation.

The third group of projects of which the first ones should start once the Egypt Transport Center is realized, is the increased know-how and expertise of all stakeholders as well as programs to improve the traffic conditions on the infrastructure (maintenance and control applications), with the highest priority to be attributed to the road sector, followed by the railway sector, corresponding to their respective roles in the transport of freight and passengers in Egypt.

All remaining hardware projects, are developments to be considered in the long-term, and its implementation can be realized in the order as proposed in the multi-criteria analysis, with a priority to the projects listed from 21 to 30 in above Section S.10.4. The final timing of the concrete development will most likely be decided based upon budgetary considerations rather than on considerations of priority. Given that these projects all can be considered as amendments to the above priority projects, the concrete implementation of some of these projects could be considered in case of a budgetary surplus, but only if most if not all short- and medium-term projects have been realized.

S.11 FISCAL CONSIDERATIONS

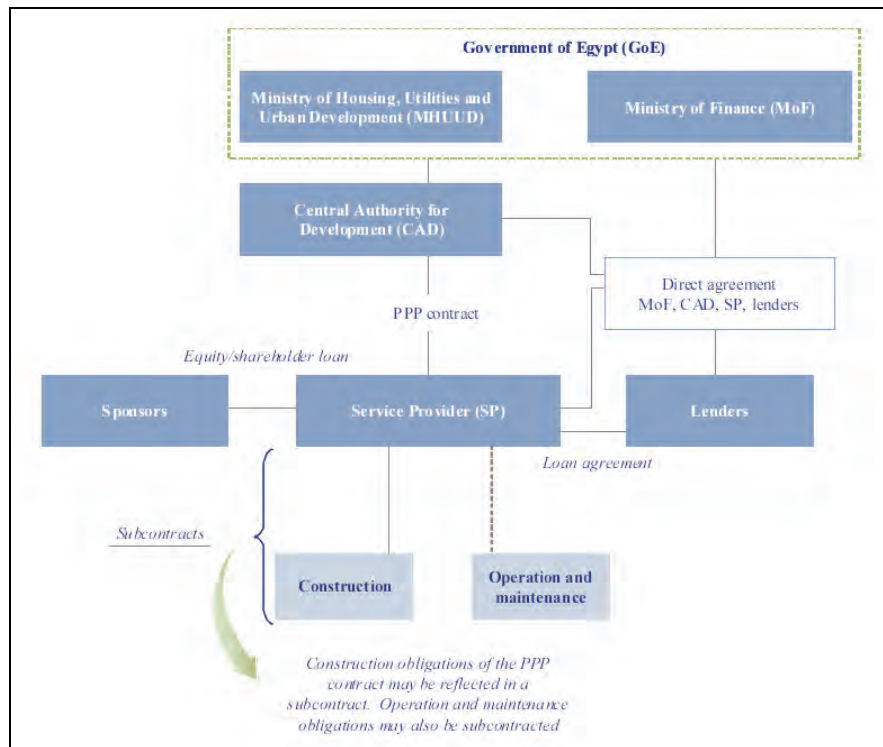
The Egyptian Government has been strategically promoting and increasing private sector involvement in the country's economic and social development plans particularly in the area of public utility services. Affirming government's commitment to take initiative in Public Private Partnership (PPP), a PPP Central Unit was established within the Ministry of Finance that reports directly to the Minister. The PPP Unit is in charge of coordinating the PPP national program across ministries and public bodies as well as of the study, application, and implementation to develop PPP in a policy framework based on a clear action plan. The PPP Central Unit's vision is to be a "center of expertise" vested with the mission to introduce and disseminate the PPP policy, develop practices, and to take a vital role in the delivery of initial projects. The centre will bring in support and experience from domestic and overseas experts.

The Central PPP Unit has produced a guide for the first time in Egypt to help those who undertake the effort and bear responsibility to procure the first PPP projects in Egypt. It will help them become more familiar with the overall structure of the process in delivering a PPP project as well as with new concepts introduced. The guide is written in a simple and practical manner to ensure that what is required is understood at both the managerial and working levels. It should be noted though that the guide alone is not enough for inexperienced authorities to achieve proper structuring and procurement of PPP projects. Authorities must always, in accordance with the government's guidance, seek experienced advice for the specific technical, financial and legal matters relevant to each project under procurement.

According to MOF Public Private Partnership Central Unit, the current PPP procurement process in Egypt consists of the following five steps:

- Step 1: Preparing for procurement
- Step 2: Selection of candidates and short listing
- Step 3: Invitation to candidates to present detailed proposals
- Step 4: Dialogue/discussion phase leading to final offers
- Step 5: Call for final offers on the basis of agreed proposals, evaluation, and contract award

A contractual structure, which may, as an example, consist of such main players of the PPP project as Government of Egypt, Central Authority for Development, Service Provider, Subcontractor, Sponsor and Lender, can be depicted as shown in Figure S.11.1.



Source: MOF

Figure S.11.1 Contractual Structure of the Project

The project is classified to be either viable or non-viable based on feasibility studies. In case of the project is deemed non-viable and yet there is a national need for construction, the project capital will be provided by the Government. In case the project is considered viable, capital will be provided by concession or PPP depending on the result of the risk assessment.

Attempts have been made to implement a Build Operate Transfer (BOT) structure for road procurement during the last ten years but none of them have reached the implementation stage. At present there are only two active projects being pipeline construction and highway construction. The latter is Rod El Faraq Corridor. This undertaking is generally seen as a pilot project. Other past potential candidates for concessions and PPP roads are:

- Cairo –Alexandria – Matrouh 470 km
- Port Said – Alexandria 285 km
- Shoubra – Banha 45 km
- Toukh – Zaghazeig 45 km
- Khafr Zayat – Hosh Eisa – Alexandria 110 km
- Mehalla –Kafr El Sheikh – Desouk – Damanhoor 76 km
- Tanta – Kafr El Sheikh 37 km

Planning for the transport sector must take into account its fiscal importance and affordability, now and in future. Recent data suggest an annual transport infrastructure investment in vicinity of 20 billion LE. Historically, annual investment has ranged, roughly speaking, from two to three percent of GDP. The year 2008/2009 experience confirms a total GDP share of 2.06 percent, with 1.36 percent derived from public funds, and 0.70 percent from private sector funds (Table S.11.1).

Table S.11.1 Historic National Transport Investment

	Transport Investment (LE billion, current)			Transport Investment (% to GDP, current)		
	public	private	total	public	private	total
2002/2003	8.04	1.76	9.80	1.93	0.42	2.35
2003/2004	9.91	2.72	12.63	2.04	0.56	2.60
2004/2005	10.33	2.22	12.55	1.92	0.41	2.33
2005/2006	7.87	7.34	15.21	1.27	1.19	2.46
2006/2007	10.31	5.31	15.62	1.38	0.71	2.10
2007/2008	12.90	12.02	24.92	1.44	1.34	2.78
2008/2009	14.08	7.26	21.35	1.36	0.70	2.06

Source: Ministry of Economic Development

Then how much should be invested on transport infrastructure in Egypt? This is a difficult question to answer, because it is affected by socio-economic condition, political will and past achievements.

If similar levels of investment are assumed in future, the allocated amounts must address not only national-level projects such as those contained within MiNTS, but also urban projects, transport projects within urban new developments and investments in air sector. The Cairo metropolitan area, for example, has, in the early part of the 2000's decade, accounted for roughly one-fourth of national capital transport expenditure. This is unlikely to decrease, and quite possibly increase, in light of commitments towards Cairo International Airport as well as Metro Lines 3 and 4.

Obviously, the role of the private sector remains an opportunity. However, as noted in early part of this Chapter 10, and borne out by recent experiences, there are few "success stories" for private sector investment in the Egyptian road, rail and inland waterway sectors. The lessons of history thus suggest that a likely expectation is that the majority of funding will arise from public sources, which, historically, have averaged some one to two percent of GDP per annum.

Current data on public investment to transport sector for the 6th 5-year Development Plan have been made available from the website of the Ministry of Planning as shown in S.11.2, which indicates that the expenditure to the pure government sector accounts for 50% of the total public investment on average for the transport sector.

Table S.11.2 Government Investment on Transport Infrastructure: Sixth 5-Year Plan

Responsibility		Fiscal Year				
		2007/2008	2008/2009	2009/2010	2010/2011 Expected	2011/2012 Planned
Governmental Sector	Billion LE	5.1	7.6	11.0	7.1	9.2
	%	39.5	49.0	65.5	49.0	42.8
Economic Public Organizations	Billion LE	4.2	4.3	2.6	3.1	4.9
	%	32.6	27.8	15.5	21.0	22.8
Public Companies	Billion LE	3.6	3.6	3.2	4.3	7.4
	%	27.9	23.2	19.0	30.0	34.4
Total	Billion LE	12.9	15.5	16.8	14.5	21.5
	%	100	100	100	100	100

Source: Report of Development Plans, 2011/2012 Plan, website of MOP

Further, assuming that 50% of the pure government sector expenditure is applied to the urban and air transport sectors the remaining portion, i.e. quarter to half percent of GDP can be dedicated to pure MiNTS projects. Thus, based on the estimated future GDP, the fiscal framework affordable to implement the MiNTS projects is derived as follows:

- In case Quarter percent of GDP Affordable budget up to 2027=72.8 billion LE
- In case of Half percent of GDP Affordable budget up to 2027=145.5 billion LE

In consultation with MOT, it was accepted to assume that a target affordable budget of the respective future 5-Year Plan could reach the vicinity of 50 billion LE for MiNTS projects

S.12 STAGING THE PLAN

The MiNTS Transport Master Plan has been staged over three consecutive 5 year periods; namely, short-term (present to year 2017), mid-term (years 2018-2022) and long-term (years 2023-2027). The proposed Master Plan requires a total expenditure of 320 billion LE over this composite time period. Forty one percent of this expenditure is linked to the public sector with the remaining expenditure potentially associated with the private sector.

The allocation of projects and programs within each of the 5 year planning periods is depicted in Tables S.12.1 through S.12.3, as well as Figures S.12.1 through S.12.3

Table S.12.1 Initiative Staging – Short Term Planning Period (Present to Year 2017)

Category	Hardware					Software	Humanware
	Roads	Railways	IWT	Ports	Logistic/others		
Public	5 projects 8.8 bil.LE	10 projects 22.3 bil.LE	2 projects 2.0 bil.LE	-	3 projects 4.5 bil.LE	5 projects 10.2 bil.LE	4 projects 1.2 bil.LE
Private	8 projects 18.6 bil.LE	-	-	2 projects 2.2 bil.LE	-	-	-
Total	Public: 49.0 billion LE, Private: 20.8 billion LE						

Source: JICA Study Team. Refer Figure S.12.1 for project locations.

Table S.12.2 Initiative Staging – Mid-Term Planning Period (Year 2018 through Year 2022)

Category	Hardware					Software	Humanware
	Roads	Railways	IWT	Ports	Logistic/others		
Public	20 projects 26.4 bil.LE	9 projects 10.2 bil.LE	2 projects 0.9 bil.LE	-	-	2 projects 0.9 bil.LE	1 projects 0.3 bil.LE
Private	6 projects 17.9 bil.LE	1 project ⁽¹⁾ 19.9 bil.LE	-	2 projects 3.0 bil.LE	-	-	-
Total	Public: 38.7 billion LE, Private: 40.8 billion LE						

Source: JICA Study Team. Refer Figure S.12.2 for project locations.

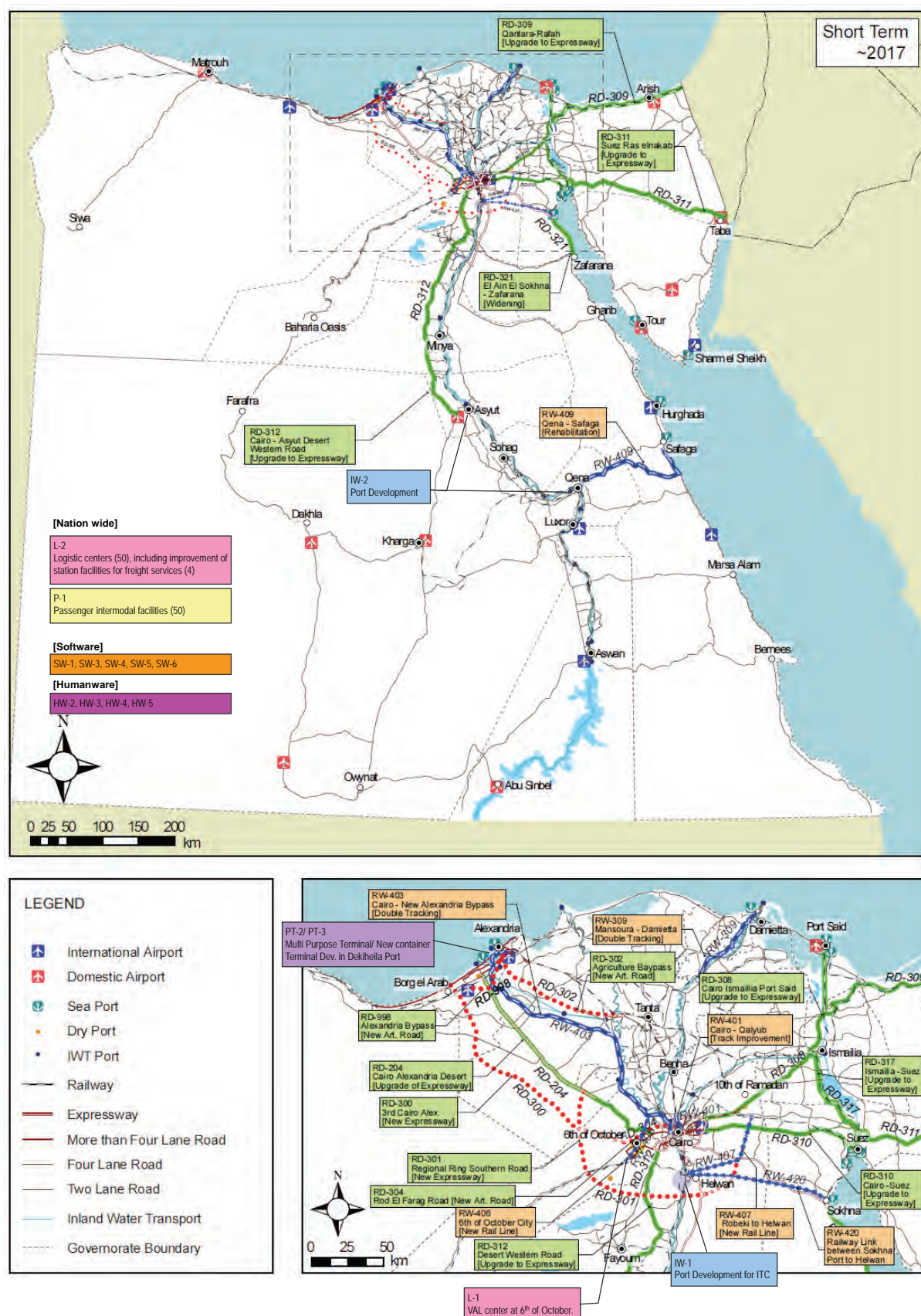
(1) High speed rail project, Cairo-Alexandria, 90% of total 22.1 billion LE cost for private sector investment with a 10% public contribution.

Table S.12.3 Initiative Staging – Long Term Planning Period (Year 2023 through Year 2027)

Category	Hardware					Software	Humanware
	Roads	Railways	IWT	Ports	Logistic/others		
Public	12 projects 19.0 bil.LE	7 projects 24.0 bil.LE	2 projects 1.1 bil.LE	1 projects 1.0 bil.LE	-	-	-
Private	-	1 project ⁽²⁾ 125.6 bil.LE	-	-	-	-	-
Total	Public: 45.1 billion LE, Private: 125.6 billion LE						

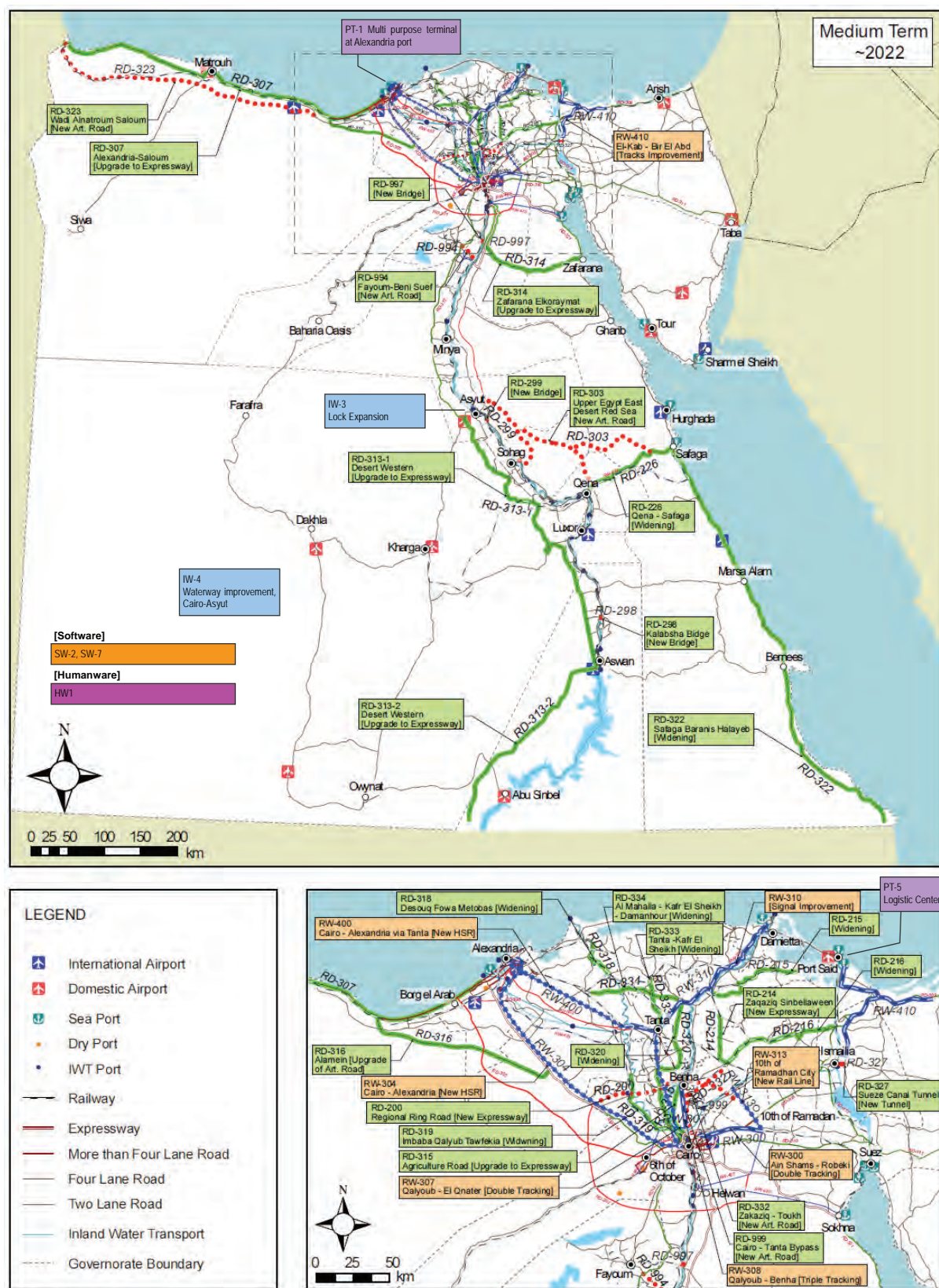
Source: JICA Study Team. Refer Figure S.12.3 for project locations.

(1) High speed rail project, Cairo-Aswan, 90% of total 139.5 billion LE cost for private sector investment with a 10% public contribution.



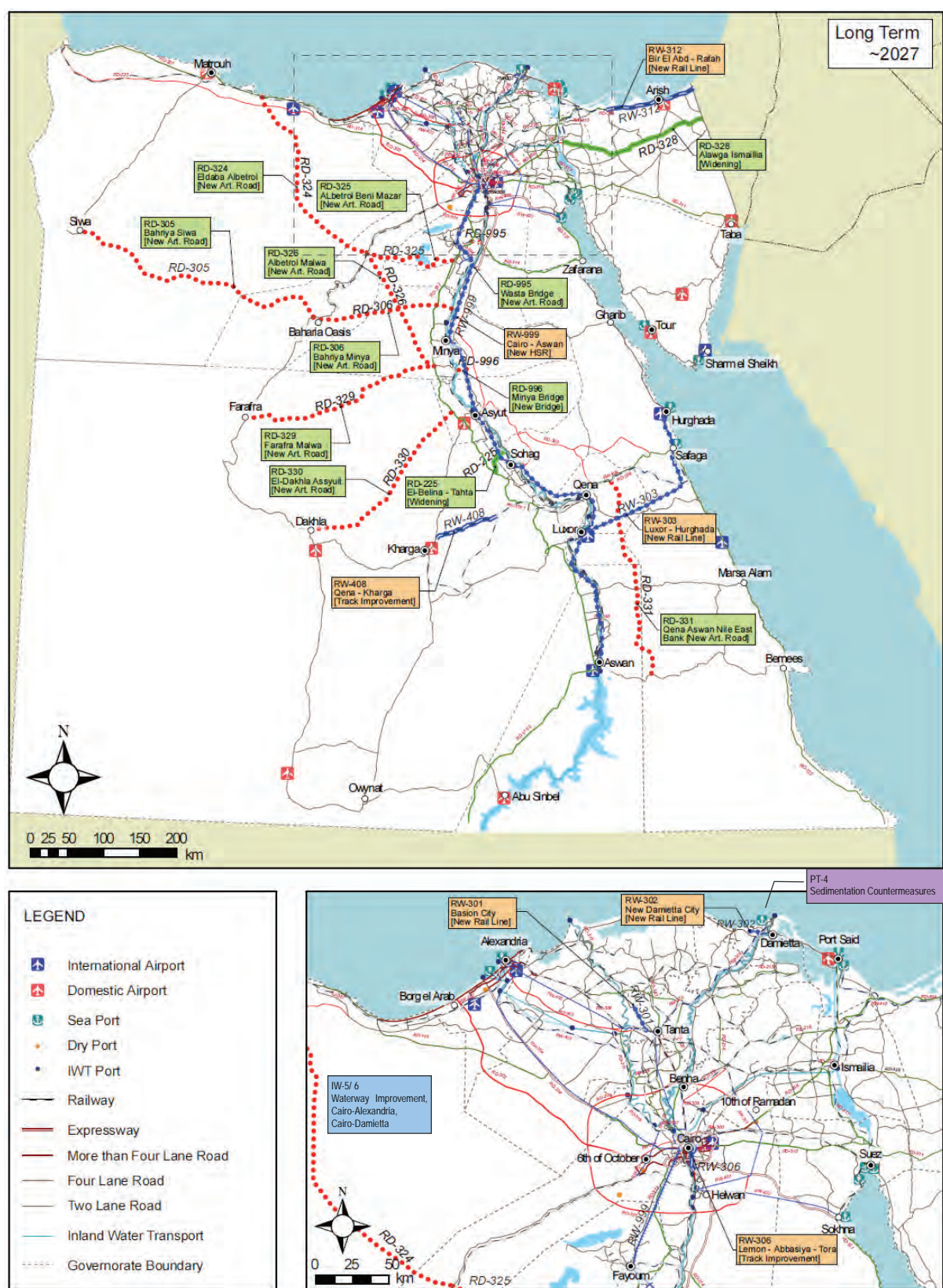
Source: JICA Study Team. Project details contained in Chapters 6,7 and 8 of the main volume as well as annexes to this summary.

Figure S.12.1 Locations of Initiatives – Short Term Planning Period (Present to Year 2017)



Source: JICA Study Team. Project details contained in Chapters 6,7 and 8 of the main volume as well as annexes to this summary.

Figure S.12.2 Locations of Initiatives – Mid-Term Planning Period (Year 2018 through Year 2022)



Source: JICA Study Team. Project details contained in Chapters 6,7 and 8 of the main volume as well as annexes to this summary.

Figure S.12.3 Locations of Initiatives – Long Term Planning Period (Year 2023 through Year 2027)

The proposed MiNTS master plan requires an investment of 320 billion LE between years 2011 and 2027 including hardware, humanware and software projects/programs. The investment, converted to an economic cost of 289 billion LE, is shown as producing direct economic benefits of 13.6 billion LE by year 2027, and a benefit-cost ratio of 1.10 (using a 12 percent discount rate). The economic internal rate of return (EIRR) is estimated at 17.8 percent. The result of sensitivity analysis shows that the "worst case scenario", defined as experiencing minus 10 percent benefits and plus 10 percent costs, exhibits an EIRR of more or less 12 percent.

It may therefore be concluded that the MiNTS initiatives are economically viable and worth being implemented in terms of a national economic context.

S.13 RECOMMENDED FEASIBILITY AND FOLLOW-ON STUDIES

It is recommended that four initiatives be immediately considered due to their critical importance to the realization of the nationwide integrated transport system in Egypt. The nominated projects and programs include not only hardware (infrastructure development), but also software and humanware initiatives. All have been ranked highly as part of the multi-criteria analysis.

- Egypt Transport Center;
- Intermodal Transport Corridor;
- Road Maintenance and Safety; and,
- Mediterranean Corridor .

S.13.1 Egypt Transport Center

As discussed in Chapter 8 (Software Opportunities), the Egypt Transport Center (Project SW-1) is expected play a crucial role in the enhancement and development of transport planning in Egypt.

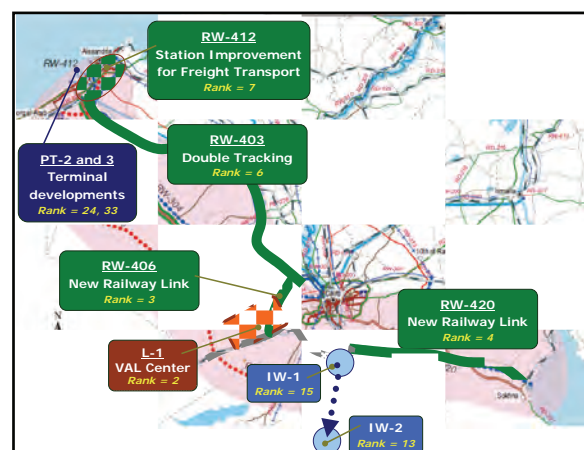
Core initial activities during the immediate action stage of the Egypt Transport Center would be maintain and enhance the MiNTS national transport model; maintain and expand the MiNTS national geodatabase; carry out Ministry-wide transport studies and reviews; create “smart systems” for on-going data monitoring; humanware development; road safety systems and similar initiatives. The focus can address both national (MiNTS) and urban matters. In the latter case, this could include re-activating the recent CREATS (Cairo Regional Area Transport Study) computerized transport model/database and monitoring of urban transport systems to include, for example, performance of the expanding Cairo metro urban rail network.

The Center should be realized within the institutional framework of the Ministry of Transport. Initial important steps are establishing the framework for structuring of the Center and recruitment of sufficient numbers of staff having suitable professional capabilities. Both domestic or international resources, from within and external to the Ministry of Transport, must be marshalled for these purposes. The Ministry of Transport should concurrently seek the cooperation of domestic academies, institutions of higher learning and international organization for technical support.

S.13.2 Intermodal Transport Corridor

The highest ranked hardware package is the Intermodal Transport Corridor. This is a new sector for value added logistics services with projects as shown in Figure S.13.1. This package is roughly estimated to total approximately 16.0 billion LE (10.7 billion LE for railways, 2.0 billion for inland waterways, 2.2 billion for ports, and other associated works).

A follow-on feasibility study for realizing the



Source: JICA Study Team

Figure S.13.1 ITC Projects Grouping

ITC should include:

- “Road Mapping” toward realization of this corridor with several types of investments for infrastructure and logistics service developments. Legal and administrative issues will need to be explored, clarified and put in place. It will be necessary to discuss amongst, and seek consensus of, possible stakeholders for the creation of integrated plans. These will form the framework for possible investors, as well as future demand and logistics markets after realization of the corridor concept.
- Detailed investigations to confirm the viability of individual and grouped projects across a spectrum of locational, technical, environmental and financial considerations. A key initial element is siting of the 6th October VAL center given that several possible locations exist. The dedicated railway lines and VAL Center offer strong potential for private sector participation. An enhanced focus, using detailed viability approaches, should therefore be dedicated to PPP activities.

Close coordination with latest EU initiatives, to include the Mediterranean Motorways of the Seas (MEDA-MOS), will need to be maintained throughout the conduct of the feasibility study.

S.13.3 Road Maintenance and Road Safety Initiatives

Software Project 4 (Road Safety Initiative) and Humanware Project 3 (Training in Modern Road Maintenance Techniques) are ranked highly.

Core elements of a **road safety assessment and action plan** should include:

- Identify a lead agency in government to guide the national road safety effort. While the Ministry of Interior (the Police) at present has considerable responsibilities in this area, a lead agency would have legal authority to make decisions, control resources, coordinate the efforts of all participating sectors of government and liaise with non-governmental entities.
- Assess the current issues, constraints and opportunities within the sector. Part and parcel of this element would be options for enhancing data availability to include automated procedures for information recording, detailed to the site level of detail (“black spot reporting”).
- Prepare a national strategy and Plan of Action. This emphasizes the multisectorial and multidisciplinary dimensions of the task, engaging a broad range of stakeholders. A national strategy in road safety should also be linked with strategies in other sectors, and set safety targets complemented by a plan of action designed to achieve those targets.
- Implement specific actions and interventions to prevent road crashes as well as minimize injuries and fatalities. In essence, this is the implementation of the Plan of Action and would include a variety of initiatives.
- Support a sustainable approach to road safety, by having available dedicated funding sources to support continuous activity by the designated lead agency, and to enhance cooperation with international agencies to participate in global plans of action and safety initiatives.

The primary focus of **road network management** is to foster development of a road network that is fundamental to national evolution and development. Network management includes the challenge which has been to promote policy reforms aimed at sustaining road networks and preserving road assets. In

other words, to maximize the condition of existing roads prior to expending limited capital resources to build additional infrastructure. Road maintenance reforms are to be built on three pillars: improved road maintenance financing, improved road maintenance management capacity and improved execution capacity. Formulation should be undertaken to review the legal and institutional framework for road agencies in Egypt. The purpose of the follow-on work is to:

- Assess the legal and institutional framework under which road agencies operate with a view to identifying some of the common features which may indicate good practice for others to subsequently follow. The task is also to unearth specific approaches taken in some countries which may not as yet have been universally adopted, but which may merit further consideration.
- Assess the performance of road administrations and the impact of the changes in the institutional framework for road maintenance; and
- Provide guidelines to improve performance of road institutions and efficiency of the institutional framework for road maintenance.

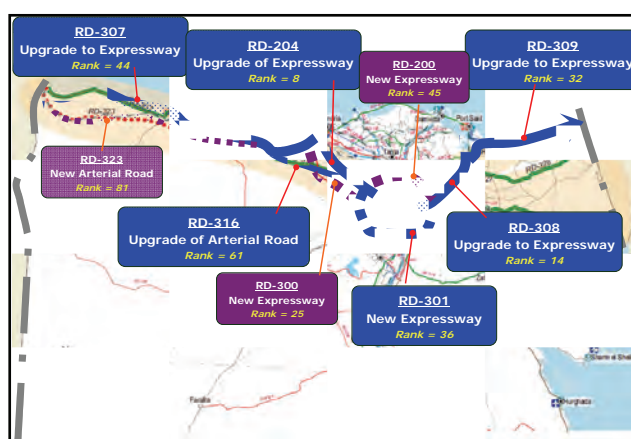
It is urged that both SW-4 and HW-3 should be the subject of follow-on reviews and initiatives.

S.13.4 Mediterranean Corridor

Figure S.13.2 shows the expressway package for establishment of the Mediterranean Corridor network. Costs for high-order roads are estimated at approximately 15 billion LE. The feeder and supporting secondary road network will require an additional outlay of 11.4 billion LE.

The corridor is seen as fulfilling a number of domestic functions, including services to planned new settlements and contributing to the alleviation of current congestion in the Nile Delta. The corridor includes realization of key links of the Cairo Outer Ring Road. The international linkages of the corridor will provide a strong foundation for realization of the Republic's regional international aspirations. The core road network consists of expressways; hence exhibits considerable potential for private sector participation.

It is recommended that the Mediterranean Corridor projects grouping proceed to further feasibility study. Efforts should include the definition of more precise alignments, and cost implications arising therefrom. External issues such as the Qattara Depression, more precise locations of new settlements, World War II minefields, and soil conditions must be considered. International land transport implications within both the Libyan and Palestinian context must be considered, as well as the broader Mediterranean road network building program (such as the MEDA network). The feasibility review should also offer opportunity for more precise and numeric indicators involving possible PPP activities.



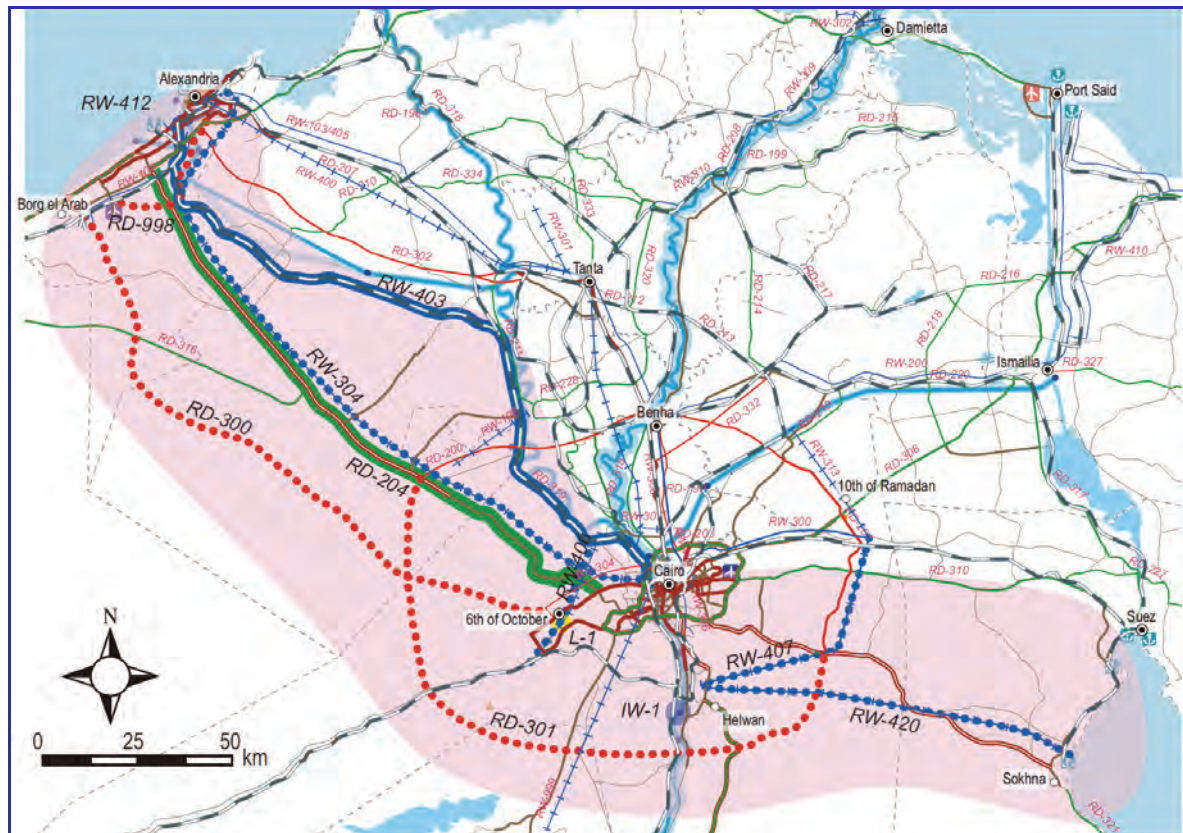
Source: JICA Study Team

Figure S.13.2 Mediterranean Corridor Projects Grouping

Annex 1 - 8

Project Listings within MiNTS Transport Corridors

Annex 1: Intermodal Transport Corridor



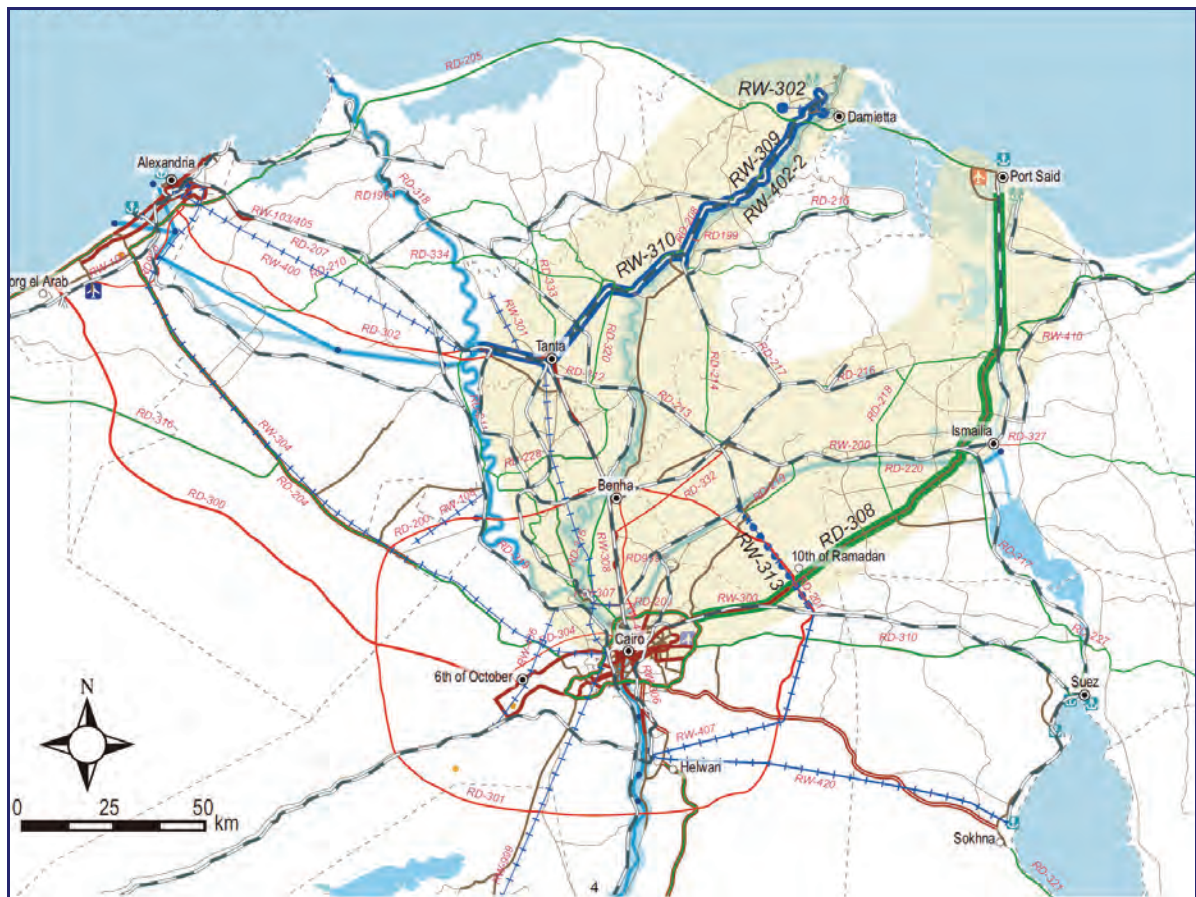
Corridor Project Listing

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-300	3rd Cairo Alex Expressway	connects from Cairo to Borg el Arab in desert area by 6-lanes, 120km/h [New Expressway]	2,608
RD-204	Cairo Alexandria Desert Expressway (Upgrade to 8-lanes)	Committed project is 6-lanes. upgraded to 8-lanes [Upgrade of Expressway]	1,775
RD-301	3rd Stage Regional Ring Road (Southern Part of Expressway)	forms southern part of Outer Ring Road, 6-lanes, 100km/h [New Expressway]	3,026
RD-998	Alexandria Bypass	forms urban ring road connects the Cairo-Alex desert expressway, 4-lanes, 80km/h [New Art. Road]	1,650
RW-403	Double Tracking of Bypass Line for Cairo - New Alexandria	for freight line (diesel) with local passenger	4,125
RW-406	Railway Link for 6th of October City	connects from RW-403 and Baharia line via L-1 [New Rail Line]	2,400
RW-407	Railway Link between Robeki to Helwan	forms a part of south ring railway route [New Rail Line]	2,100
RW-412	Improvement of Station Facilities for Freight Services (2stations)	Good intermodal connection & facilities, railway layout/arrangement, warehouse and station office at Qabbary and other station	1,025
RW-420	Railway Link between Sokhna Port to Helwan	New freight railway line for direct link from Sokhna port to 6th of October [New Rail Line]	3,750
RW-304	High Speed Railway for Cairo - Alexandria [High/Higher speed Alt-1]	connects to Alex. to Cairo (6th of October, Smart city) along Cairo - Alex. dessert road, directly, max.speed 250kph technology, [New HSR]	22,080
L-1	VAL (Value Added Logistics) Center at 6 th of October City	New VAL/ Distribution Center	1,000

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
IW-1	IWT port for ITC	connects to south ring railway route around Helwan, Tebbin port improvement, includes waterway, navigation and lock operation improvement.	1,000
IW-5	Waterway Improvement on Cairo - Alexandria	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 1.5m x203km).	500
PT-1	Establishment of a Multi Purpose Terminal (Containers and General Cargo) at Alexandria Port	to ensure the capacity of future container demand for Alex. and Dekheila, 1) The development of the berths area (55,56,57,58,59,60), 2) Dredging the berths to reach a depth of 14 m instead of 5,6,9,10m, 3) Using the soil resulting from the dredging operations in the establishment of the terminal's yards, 4) The lengths of the berths are expected to reach 1,630m, 5) The area = approx. 290 thousand m2, (proposed by previous JICA study in 1990)	1,500
PT-2	Development of Management and Operation for Multi Purpose Terminal in El Dekheila Port	to ensure future cargo demand in 2027 as an essential port for the window of Intermodal Transport Corridor to connect to railway and road with smooth and well organized, located between berth 91 and 92, A maritime dock composed of 2 berths with total length up to 800m and a depth not less than 14-15m, Storing yards, warehouses and administrative buildings over an area up to 262.370 thousand m2, Water surface of about 162 thousand m2, Breakwater project is under construction.	700
PT-3	Dekheira Port: New Container Terminal	to ensure future cargo demand in 2027 as a window of Intermodal Transport Corridor, to access to railway and road with smooth and well organized connection, Breakwater construction project is under implementation	1,500

Note: RD: Road, RW: Railway, L: Logistics, IW: Inland Waterway Transport, PT, Sea Port

Annex 2: Cairo-Damietta/Port Said Corridor

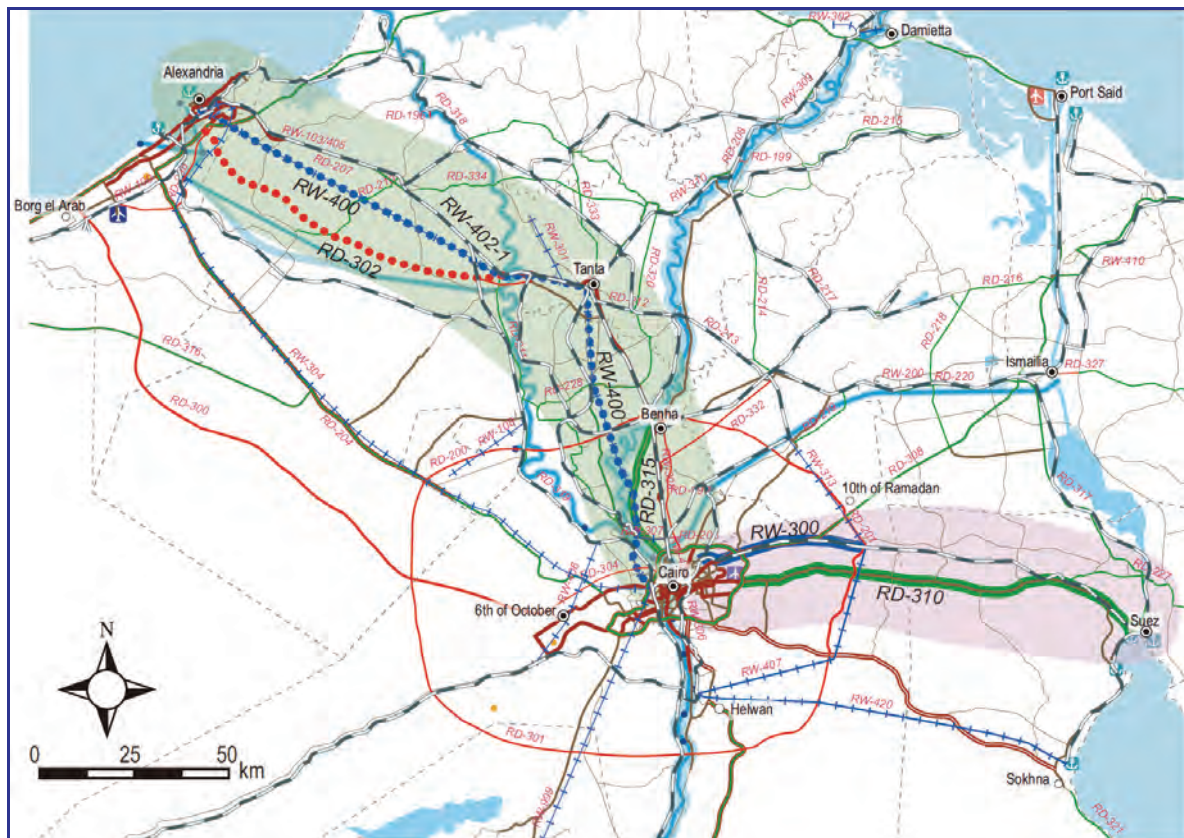


Corridor Project Listing

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-308	Cairo Ismailia Port Said Road (Expressway)	connects from ring road to Port Said, 6-lanes, 100km/h [Upgrade to Expressway]	3,125
RW-313	Railway Link for 10th of Ramadhan City	connects between Tel el Kebir to Robeki through Logistics Center [New Rail Line]	2,295
RW-302	Single Tracking for Kafr El-Batikh - New Damietta City	Damietta City only [New Rail Line]	105
RW-309	Double Tracking for Mansoura - Damietta	connects to Damietta [Double Tracking]	625
RW-310	Improvement of Signaling System for Increase of Freight Trains	connects for Tanta - Mansoura - Damietta [Signal Improvement]	875
RW-402-2	Improvement of Tracks	1)Track renewal, 2) New track maintenance machines, Damietta, Port Said line	922
IW-6	Waterway Improvement on Cairo - Damietta	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 2m x200km).	600
PT-4	Damietta Port; Study on Sedimentation problem	detailed study (10mil.LE) is required to find suitable solution to sedimentation problem. Note that Damietta port authority used about 75mil.LE for annual maintenance for dredging.	1,000
PT-5	Port Said East: Logistic Center	exist the plan by 1st Stage in 2008, for bonded area and distribution center for import/export cargo	1,500

Note: RD: Road, RW: Railway, IW: Inland Waterway Transport, PT: Sea Port

Annex 3: Cairo-Alexandria Corridor and Cairo-Suez Corridor



Project Listing: Cairo-Alexandria Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-302	Cairo Alex Agriculture Bypass Kafr El Zayat - Alexandria	bypass road for Tanta to Alex. in south side of agricultural road in 6-lanes [New Art. Road]	1,759
RD-315	Shubra elkhema - Banha Agriculture Road (Expressway)	bypass road for Cairo to Benha in west side, 6-lanes, 100km/h [Upgrade to Expressway]	2,500
RW-400	High Speed Railway for Cairo - Alexandria via Tanta [High/Higher speed Alt-2]	Alternative route of Italian proposal [RW-304 Alt-1], max. speed 250kph technology <only for confirming demands compared with RW-304> [New HSR]	36,000
RW-402-1	Improvement of Tracks	1)Track renewal, 2)New track maintenance machines, Cairo - Tanta - Alex.	627

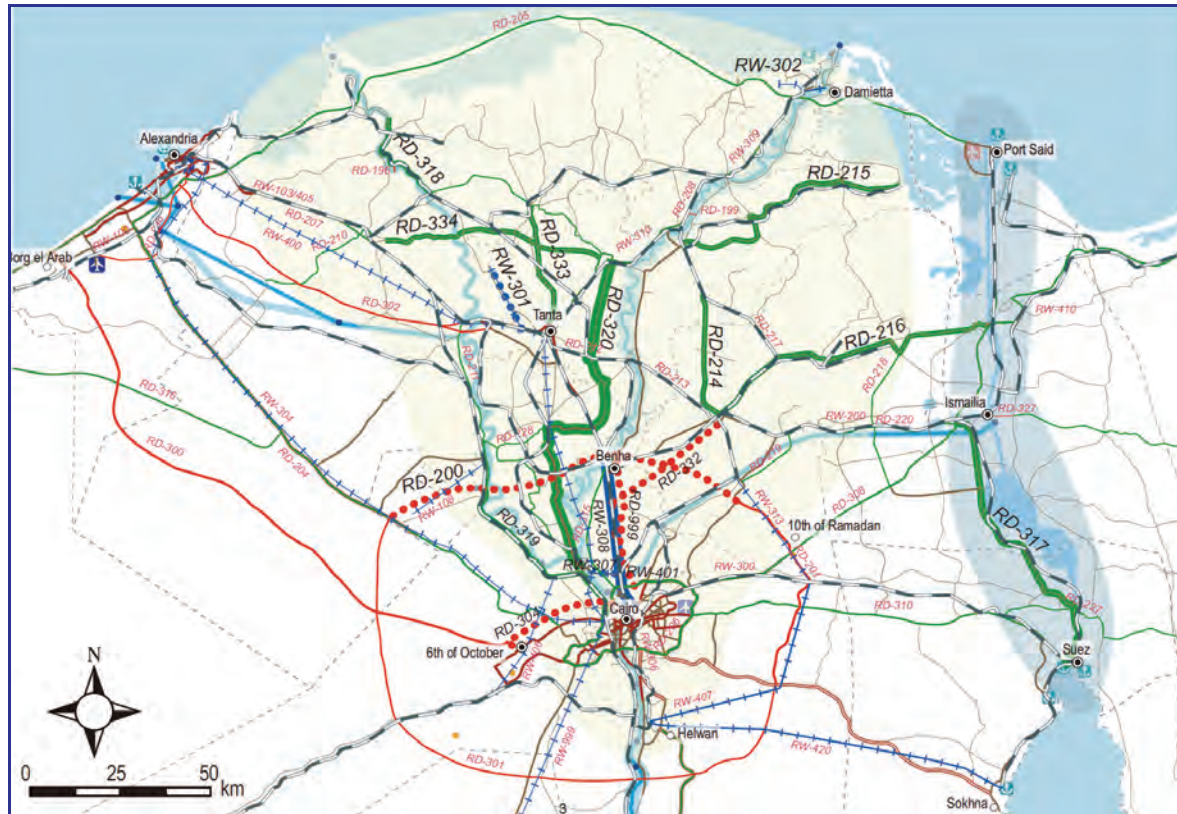
Note: RD: Road, RW: Railway

Project Listing: Cairo-Suez Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-310	Cairo -Suez Road (Expressway)	connects form ring road to Suez, 6-lanes, 100km/h [Upgrade to Expressway]	2,500
RW-300	Double Tracking for Ain Shams - Robeki	from Cairo - Robekki along Cairo - Suez line [Double Tracking]	625

Note: RD: Road, RW: Railway

Annex 4: Inland Delta and Suez Canal Development Corridor



Project Listing: Inland Delta Corridors

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-999	Cairo - Tanta Bypass	bypass road for Cairo to Tanta in east side, 4-lanes, 80km/h [New Art. Road]	2,500
RD-332	Zakaziq - Toukh	bypass road for Benha to Zagazik in south side, 4-lanes, 80km/h [New Art. Road]	420
RD-304	Rod El Farag Road	connects from Cairo city to 6th of October, 6-lanes, 80km/h [New Art. Road]	1,455
RD-333	Tanta - Kafr El Sheikh	forms regional road for north bound from Tanta, 4-lanes, 80km/h [Widening]	238
RD-334	Al Mahalla - Kafr El Sheikh - Damanhour	connects regional road located on the north side of Tanta, 4-lanes, 80km/h [Widening]	452
RD-318	Desouq Fowa Metobas Road	located along Nile river right side near Alex., 4-lanes, 80km/h [Widening]	250
RD-319	Imbaba Qalyub Tawfekia Road	located along Nile river left side from Cairo, 4-lanes, 80km/h [Widening]	625
RD-320	El-Qanater El-Bagour Shebin El-Koum Tanta Mahalla Matboul Road	In parallel to Cairo - Tanta agricultural road, 4-lanes, 80km/h [Widening]	688
RD-200	Belbeis-Banha-El Bagour-El Khatatba Regional Ring Road	forms Northern part of Outer Ring Road, also the role of Mediterranean Corridor, 6-lanes, 100km/h [New Expressway]	4,375
RD-214	Zaqaziq Sinbellaween Road	under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]	550
RD-215	Mansoura Talha Dekernes Mataria Road	under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]	900
RD-216	Qantara Salheya Faqous Abu Kbeir Hehya Zaqaziq Road	under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]	650

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RW-301	Single Tracking for Basion City	not in main line between Cairo - Alex. [New Rail Line]	300
RW-307	Double Tracking for Qalyoub - El Qnater	not in main line between Cairo - Alex. [Double Tracking]	125
RW-308	Triple Tracking for Qalyoub - Benha	connects Cairo - Qalyoub with triple tracks [Triple Tracking]	500
RW-401	Improvement of Track Arrangement for Cairo - Qalyub	Cairo and Qalyub Station: Rearrangement of track lines, Qalyub Station: Construction of elevated railway, [Track Improvement]	900

Note: RD: Road, RW: Railway

Project Listing: Suez Canal Development Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-317	Ismailia Suez Road (Expressway)	connects from Suez to Ismailia at west side of Suez canal, 6-lanes, 100km/h, connects to RD-308 (upgrade to Expressway from Ismailia to Port Said) [Upgrade to Expressway] Note: Railway projects related this corridor are RW-200 (west side, signal improvement (on-going) and RW-410 (east side, railway rehabilitation)	1,001

Note: RD: Road

Annex 5: Mediterranean Corridor and Sinai Corridor



Project Listing: Mediterranean Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-323	Wadi Alnatroum Saloum Road	connects to Libya, in parallel to RD-307 in desert area, 4-lanes, 80km/h [New Art. Road]	3,599
RD-307	Alexandria-Saloum Road	connects to Libya along coastline, 4-lanes, 100km/h [Upgrade to Expressway]	4,104
RD-309	Qantara-Rafah Road	connects to Rafah along coast line, 6-lane, 100kmh [Upgrade to Expressway]	2,147
RD-316	Alamein Road	forms shortcut route from Cairo-Alex. Desert Road to Western Mediterranean Coast Roads, 4-lanes, 80km/h [Upgrade of Art. Road]	855
RW-312	Single Tracking for Bir El Abd - Rafah	connects to Rafah along coast line [New Rail Line]	1,200
RW-410	Rehabilitation of Tracks for El-Kab - Bir El Abd	connects to Suez bridge, Port Said East and RW-312 [Track Improvement]	2,000

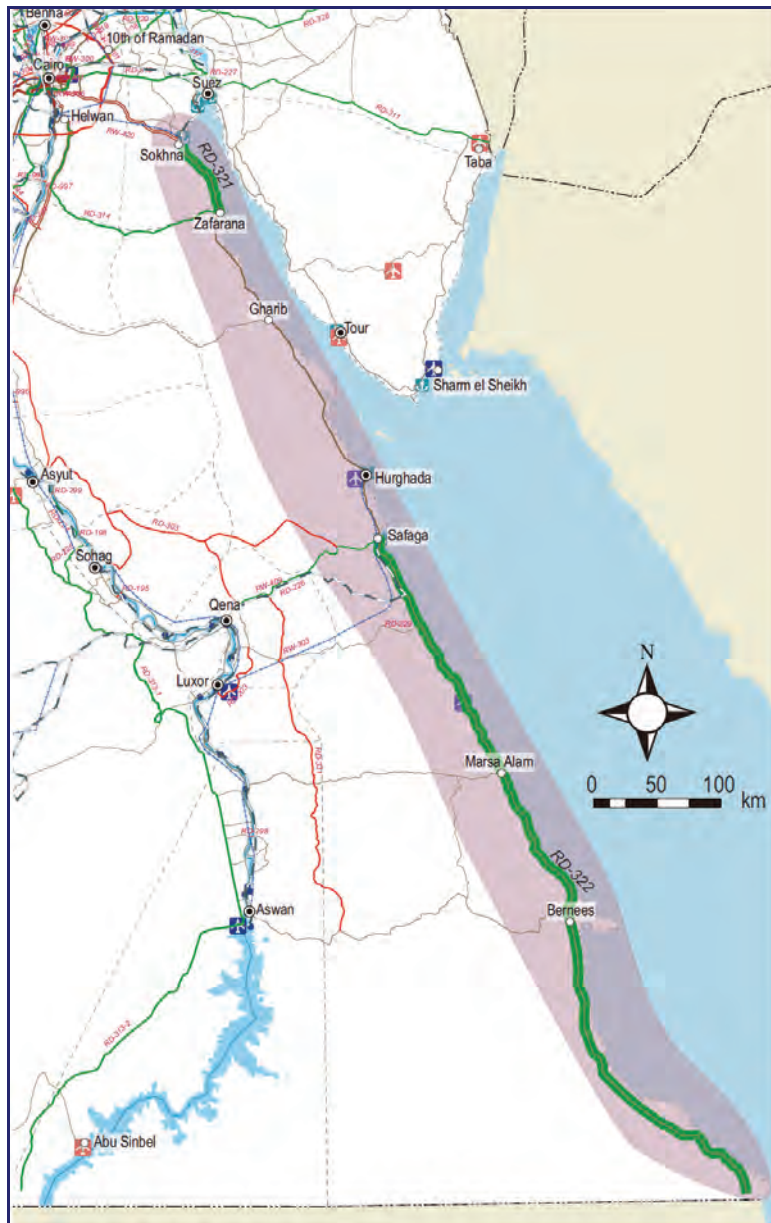
Note: RD: Road, RW: Railway

Project Listing: Sinai Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-311	Suez Ras elnakab Road (Expressway)	connects from Suez to Taba border, 4-lanes, 100km/h [Upgrade to Expressway]	2,276
RD-327	Suez Canal Tunnel Ismailia	New tunnel at Suez Canal to connect RD-328, 4-lanes, 80km/h [New Tunnel]	1,163
RD-328	Alawga Ismailia Road	connects from Ismailia to Alawaga border, 4-lanes, 80km/h [Widening]	1,342

Note: RD: Road

Annex 6: Red Sea Corridor

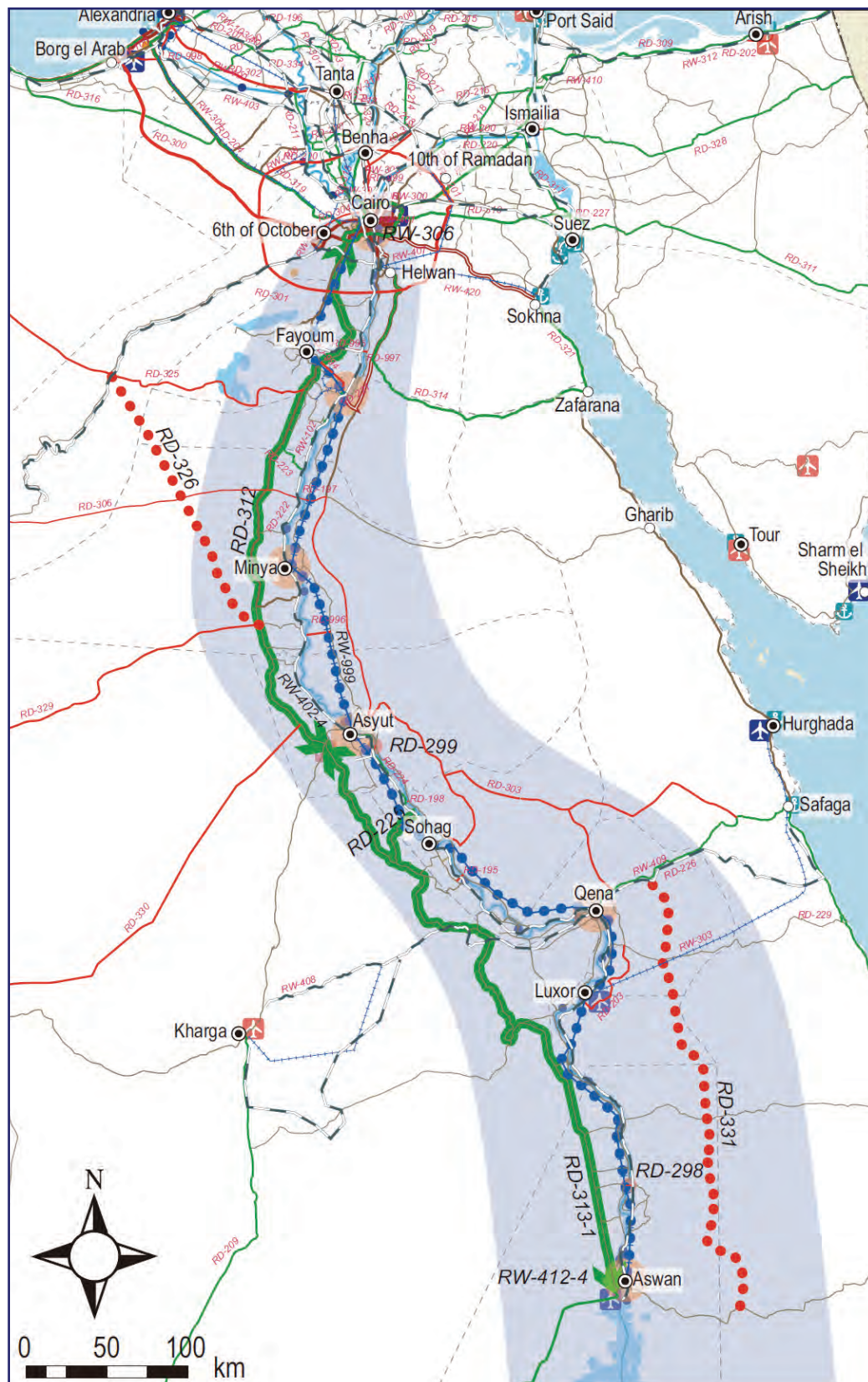


Project Listing: Red Sea Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-321	El Ain El Sokhna - Zafarana Road	Northern side of Red Sea coastline, 4-lanes, 80km/h [Widening]	341
RD-322	Safaga Baranis Halayeb Road	Southern side of Red Sea coastline, 4-lanes, 80km/h [Widening]	3,281

Note: RD: Road

Annex 7: Upper Egypt Corridor

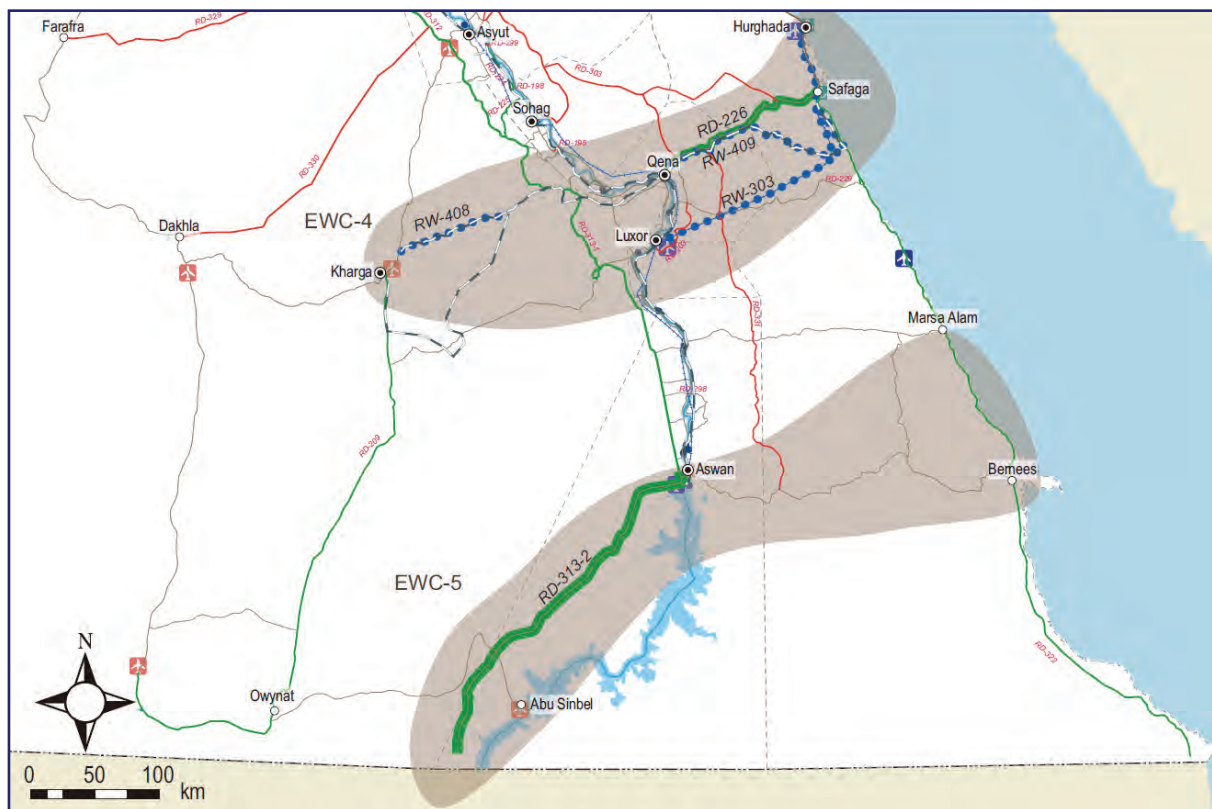
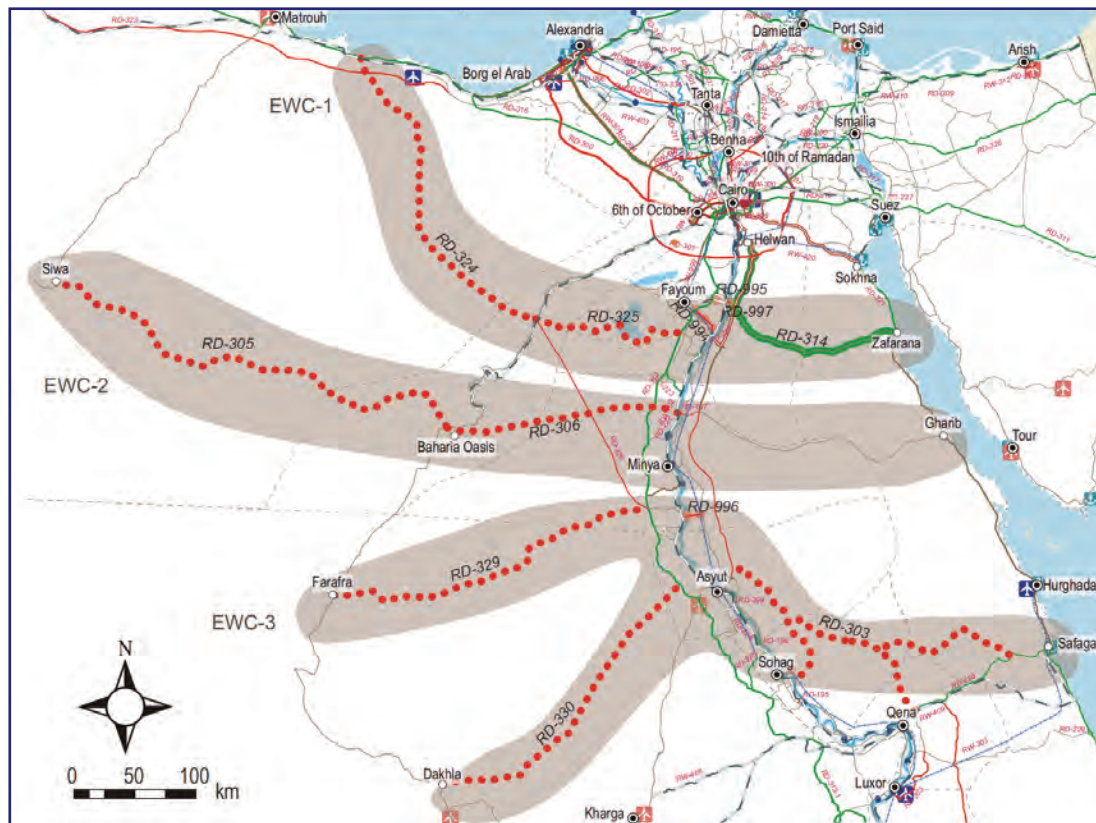


Project Listing: Upper Egypt Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-326	Albetrol Malwa Road	forms shortcut route from Borg el Arab to Asyut, 4-lanes, 80km/h [New Art. Road]	1,600
RD-331	Qena Aswan Nile East Bank Road	runs to the east side of Nile river in desert, 4-lanes, 80km/h [New Art. Road]	2,844
RD-312	Cairo - Asyut Desert Western Road (Expressway)	runs to the west side of Nile river in desert, 6-lanes, 100km/h [Upgrade to Expressway]	3,702
RD-313-1	Asyut Aswan Abu simble Desert Western Road (Expressway) Asyut to Aswan	connects from RW-312 in desert, 6-lanes, 100km/h [Upgrade to Expressway]	4,634
RD-225	El-Belina - Tahta Road	connects from RD-312 to west agricultural road, under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]	250
RD-298	Kalabsha Bridge (Koum Ombo) (Aswan)	connects to both side of Nile river [New Bridge]	625
RD-299	Abo Tig Bridge and Selim Coast (Asyut)	connects to both side of Nile river [New Bridge]	344
RW-999	(High) Speed Railway for Cairo - Aswan [Electrified]	New line for passenger railway (200kph) stopping at only major cities [New HSR]	139,500
RW-306	Development of Railway Bridge for Lemon - Abbasiya - Tora	runs in southern area of greater Cairo region [Track Improvement]	125
RW-402-4	Improvement of Tracks	1) Track renewal, 2) New track maintenance machines on Cairo - Aswan	2,139
RW-412-4	Improvement of Station Facilities for Freight Services (6 stations)	Good intermodal connection & facilities, railway layout/arrangement, warehouse and station office at stations of Imbaba, Beni Suef, Minya, Asyut, Qena and Aswan	2,813
IW-2	IWT port improvement for Upper Egypt	connects roads/ railway smoothly, Asyut and Quena ports port improvement, includes waterway, navigation and lock operation improvement.	1,000
IW-3	Lock Expansion with Comprehensive Lock Operation Improvement	upgrades the present capacity of Asyut Barrage Lock by expansion and improves operation of other locks.	290
IW-4	Waterway Improvement on Cairo - Asyut	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 2m x200km).	650

Note: RD: Road, RW: Railway, L: Logistics, IW: Inland Waterway Transport

Annex 8: East-West Corridors



Project Listing: East-West Corridor 1

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-324	Eldaba Albetrol Road	connects from Fayoum to Mediterranean sea, 4-lanes, 80km/h [New Art. Road]	2,492
RD-325	Albetrol Beni Mazar Road	connects RD-324 to Fayoum, 4-lanes, 80km/h [New Art. Road]	1,189
RD-994	Fayoum-Beni Suef Bypass	connects from Fayoum to Nile east side, 4-lanes, 80km/h [New Art. Road]	220
RD-995	Wasta Bridge Connection	connects from Fayoum to Nile east side, 2-lanes, 80km/h [New Art. Road]	114
RD-997	Helwan-Beni Suef Bridge	connects from Fayoum to Nile east side, 4-lanes, 80km/h [New Bridge]	306
RD-314	Zafarana Elkoraymat Road (Expressway)	creates expressway connection from Fayoum, Helwan to Red Sea (Zafarana), 6-lanes, 100km/h [Upgrade to Expressway]	2,264

Project Listing: East-West Corridor 2

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-305	Bahriya Siwa Road	connects from Siwa to Nile river for west section, 2-lanes, 80km/h [New Art. Road]	2,324
RD-306	Bahriya Minya Road	connects from Siwa to Nile river for east section, 2-lanes, 80km/h [New Art. Road]	1,295

Project Listing: East-West Corridor 3

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-996	Minya Bridge	cross the Nile river [New Bridge]	388
RD-303	Upper Egypt East Desert Red Sea Road	connects from Asyut to Red Sea (Safaga), 4-lanes, 80km/h [New Art. Road]	5,009
RD-329	Farafra Malwa Road	connects from Farafra to Nile river, 4-lanes, 80km/h [New Art. Road]	2,675
RD-330	El-Dakhla Assyuit Road	connects from Dakhla to Nile river, 4-lanes, 80km/h [New Art. Road]	2,504

Project Listing: East-West Corridor 4

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-226	Qena - Safaga Road	connects from Qena to Safaga for under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]	750
RW-303	Single Tracking for Luxor - Hurghada [Electrified]	for tourists from Hurghada to Luxor to save travel time, max.150kph, [New Rail Line]	5,400
RW-409	Rehabilitation of Tracks for Qena - Safaga	for local passenger and cargo traffic connected to red sea and Qena and Luxor [Rehabilitation]	2,375
RW-408	Rehabilitation of Tracks for Qena - Kharga	for passenger, even the paralleled cargo line from Kharga to Qena are existed [Track Improvement]	2,875

Project Listing: East-West Corridor 5

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-313-2	Asyut Aswan Abu simble Desert Western Road (Expressway) South part from Aswan	connects from Aswan to Abou Sembel, RW-313-1 in desert, 6-lanes, 100km/h [Upgrade to Expressway]	3,073

Note: RD: Road, RW: Railway