

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

TRANSPORT PLANNING AUTHORITY
MINISTRY OF TRANSPORT
THE ARAB REPUBLIC OF EGYPT

THE STUDY ON THE TRANSPORTATION SYSTEM
AND
THE NATIONAL ROAD TRANSPORTATION MASTER PLAN
EXECUTIVE SUMMARY

OCTOBER 1993

YACHIYO ENGINEERING CO., LTD.
IN ASSOCIATION WITH
PACIFIC CONSULTANTS INTERNATIONAL INC.

JICA
405
737
SSF
LIBRARY

SSF
JR
93-109(1/4)

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

TRANSPORT PLANNING AUTHORITY
MINISTRY OF TRANSPORT
THE ARAB REPUBLIC OF EGYPT

THE STUDY ON THE TRANSPORTATION SYSTEM
AND
THE NATIONAL ROAD TRANSPORTATION MASTER PLAN

EXECUTIVE SUMMARY

JICA LIBRARY



1112802121

26241

OCTOBER 1993

YACHIYO ENGINEERING CO., LTD.
IN ASSOCIATION WITH
PACIFIC CONSULTANTS INTERNATIONAL INC.



Applied Foreign Exchange Rates in
the report are: US\$1.00=LE3.30
LE 1.00=¥36.4
(as of Dec. 1992)

PREFACE

In response to a request from the Government of the Arab Republic of Egypt, the Government of Japan decided to conduct a master plan study on the Transportation System and the National Road Transportation Master Plan and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Egypt a study team headed by Dr. Juro Kodera, and composed of members of Yachiyo Engineering Co. Ltd., and Pacific Consultants International Inc., four times between April 1992 and August 1993.

The team held discussions with the officials concerned of the Government of Egypt, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

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

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

October, 1993



Kensuke Yanagiya
President
Japan International Cooperation Agency

The Study on the Transportation System and
The National Road Transportation Master Plan

Executive Summary

Table of Contents

Outline of The Study.....	1
1 Socio-Economy, Present and Future.....	4
2 Production and Consumption, Present and Future.....	6
3 Passenger and Freight Demand, Present and Future.....	8
4 Modal share, Present and Future.....	10
5 Present Road Network.....	12
6 Present Railway and Waterway Network.....	14
7 Issues of Present Road Network.....	16
8 LDA (Land Use Development Aided Projects).....	18
9 MLS (Maintaining Level of Service Projects).....	20
10 Basic Master Plan Network Projects.....	22
11 Traffic Flow and Economic Evaluation of Basic Network.....	24
12 Structures Improvement.....	26
13 Basic Network Project Location.....	28
14 HLS (Higher Level of Service Projects) Master Plan.....	30
15 HLS Corridor Analysis.....	32
16 Inter City Bus and Taxi Service Master Plan (1).....	34
17 Inter City Bus and Taxi Service Master Plan (2).....	36
18 Inter City Road Freight Transport Master Plan (1).....	38
19 Inter City Road Freight Transport Master Plan (2).....	40
20 Recommendations.....	42

Outline of the Study

1. Objectives and Background

Since Egyptian National Transport Study (ENTS)-I had been issued in 1976, ENTS-II in 1979 and ENTS-III in 1984 were prepared for the national transport policy in the Five Year Plans. As almost 10 years has past since the last ENTS-III, this study was implemented as a part of ENTS-IV to cope with changes of social condition and transportation demand structure, with the following objectives;

- (1) to analyze the transportation system in the country, and
- (2) to prepare a master plan for the improvement and upgrading of the national road network and road transportation system.

2. Transportation Demand, Present and Future

The inter city passenger demand in Egypt is 2.0 million/day in 1992, and will increase to 5.7 million/day or 2.85 times by 2012. The passenger mode shares in terms of passenger/day of private car, taxi+bus and train are 9.9%, 38.3% and 51.8% respectively at present and they will shift to 9.8%, 40.9% and 49.3% in 2012.

The inter city freight demand is 178 million ton/year in 1992 and will increase to 591 million ton/year or 3.32 times by 2012. The freight mode shares in terms of ton/year of road, rail and waterway are 92.8%, 5.4% and 1.8% respectively at present and they will shift to 85.3%, 7.7% and 6.9% in 2012.

The total inter city vehicle traffic demand of private car, taxi, bus and truck in terms of trip end demand is 270 thousands veh./day in 1992 and will increase to 730 thousands or 2.70 times by 2012.

3. Basic Highway Master Plan

Highway projects consisting of 35 projects (2,986.9Km), which has been proposed by governmental agencies (LDA), and 60 projects (2,998.1Km) to maintain the present level of service (MLS) is proposed by 2012 to form a basic highway network. By these projects, the inter city highway network length will increase from 14,028Km in 1992 to 16,259Km in 2012. The percentage of 2 lane sub-standard highway will decrease from 35% to 21.6% and that of 4 and 6 lane divided highways will increase from 13.2% to 24.4%.

2,033Km of highways with the cost of 877.0 Million Egyptian Pound (M.LE) in the 1st phase (1993 - 1997), 1,274.4Km of highways with the cost of 607.4 M.LE in the 2nd phase (1998 - 2002), and 2,677.6Km with the cost of 1,535.7 M.LE in the 3rd phase (2003 - 2012) are scheduled.

19 new Nile bridges in addition to the present 21 bridges are proposed by 2012 to keep the maximum bridge interval at about 50Km. 8 bridges including those under construction are scheduled in the phase 1, 4 in the phase 2 and 7 in the phase 3. The total construction cost is estimated at 565.5 M.LE. 12 bridges are included in the basic highway master plan network.

40 out of existing 54 railway level crossings with inter city highway network are proposed to be multi-graded from the economic view point. The total cost is estimated at 840.0 M.LE. 17 crossings are included in the basic highway master plan network.

Vehicle Operating Cost saving in the basic highway master plan network comparing with Do-Nothing case gives high benefit to the national economy with EIRR 78.8%, NPV 21,680 M.LE

under the discount rate of 12% and B/C 13.1. The total project cost of the basic highway master plan network almost matches with the 3,122 M.LE of accumulated road development investment budget for 1993 - 2012.

4. Freeway Plan

In addition to the basic highway network, 300Km of freeways (HLS) out of future 600Km is proposed to segregate local traffic from inter city flows. Two freeways of Cairo - Alexandria (169Km) and Cairo - Damietta (156Km) are planned by 2012 as toll freeways with a distance related toll system having 0.06 LE/Km charge (Passenger car). The additionally required land by freeways is 4 - 9% of that required by the basic highway master plan network. The project is planned to be commenced in the beginning of the next Five Year Plan (1998) and to be completed by 2012.

Total financial cost of freeways is estimated at 2,742.8 M.LE and VOC saving based on the master plan network without freeways gives a high economic return of EIRR 25.2%, NPV 86.0 M.LE under the discount rate of 12%, and B/C 1.47. VOC saving of the master plan network comparing to Do-Nothing case gives also high economic return of EIRR 78.1%, NPV 1,778.0 M.LE and B/C 9.5.

All the expenditure including initial investment and interest can be covered by toll, under loan conditions of 25 years pay back period and 8% annual interest rate with 5 years grace period. Accumulated balance will turn to net surplus at 24 years after the initiation of the project (year 2012).

5. Road Public Passenger Transport Plan

Inter city taxis in Egypt are operating in the same manner as small size private owned public buses.

They have to operate, from economic view point, in sections where there is insufficient passenger demand for regular bus operation, and they are targeted to transport 42% of bus+taxi passenger in future. Based on this condition, the necessary bus fleet to be added and replaced by 2012 is 12,350 buses. The fare of bus and taxi have to be raised by 15 - 20% from the present level in real terms to keep financially viable operation.

6. Bus and Taxi Terminal Plan

143 inter city bus terminals and 305 inter city taxi terminals improvement is planned for the amenity of passenger and for reducing urban traffic congestion. The total cost is estimated at 7.40 M.LE and 12.21 M.LE respectively. Bus terminals can be improved as a part of operating expense of each bus company, and it will affect their annual expenditure by 0.3% - 0.9%. Taxi terminals can be improved from terminal fee. The accumulated surplus of terminal charge after deducting terminal operation cost can cover improvement cost by the year 2003.

7. Road Freight Transport Plan

4 truck terminals are planned to improve transport efficiency, to reorganize trucking industries by introducing line haul and feeder system, and a truck terminal at Cairo is planned by 2012. A container freight station (CFS) for import commodities and another CFS for domestic container freight are also planned. The costs are estimated at 60.06 M.LE, 53.38 M.LE and 73.16 M.LE respectively.

An increase of turn over by eliminating waiting time enforced by controlling heavy vehicles to enter in urban area in day time, and improvement of loading condition, give annual benefit amounting 29.86 M.LE and high EIRR of 51.34%. The

improvement of loading efficiency by CFSs for import and domestic commodities give high EIRRs of 43.1% and 62.4% respectively.

The minimum terminal fee for the truck terminal, which covers only terminal operation and management cost is 12.5 LE/Veh. This amount equivalents to about 10% of the present freight tariff, which will impose heavy burden to truckers, and the initial investment can not be covered by this amount. The minimum terminal fees for CFSs for import and domestic commodities are 21.9 LE/Veh. and 24.9 LE/Veh. respectively. Both can not cover their initial investment so that public fund have to support the development cost from the view point of high economic returns.

8. Conclusion and Recommendation

(1) After completion of all the projects planned in the Third Five Year Plan, the investments amounting 1,582.7 M.LE are recommended for the Fourth five Year Plan period (1998 - 2002). Net government investment will be 864.4 M.LE, excluding freeway, bus/taxi terminals and a part of truck/container terminals which are expectedly financed by non government fund.

(2) Followings are the main highway projects, which are mostly to cope with demand increase in the Delta (please refer to page 25 for project No.).

- * Cairo-Alex Freeway (6 Lane, 169.0Km)
- * Kafr-El Zayat Bridge - Alexandria Agriculture road 6 lane widening (104.0Km, No.1001)
- * Tanta-Zagazig road 4 lane widening (55.0Km, No.1013 and 2013)
- * Zagagiz-Faquos road 4 lane widening (38.0Km, No.1012)

(3) TPA have to play the following roles in accordance with privatization of public passenger and freight industries.

- review of registration and licensing condition and system of road transport industries and its follow up
- monitor of transport tariff and fares and issuance of guidance for appropriate level
- collection and publication of transport information

(4) In the present transport system analysis, it is forecast that the transport demand for railway and river transport will increase more rapidly than road transport demand in the future. Therefore, it is advisable to develop medium - and long term plans for railway and river transportation to cope with this demand increase.

1 Socio-Economy, Present and Future

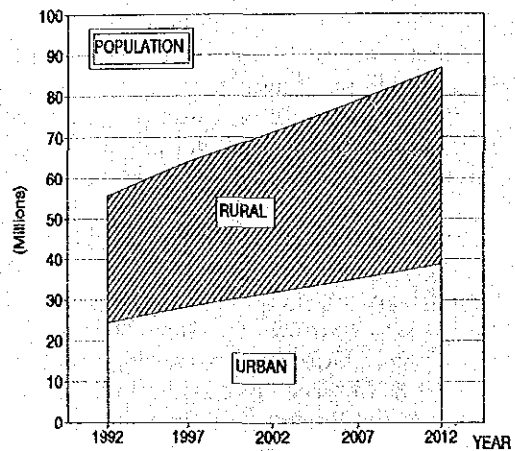
(1) Population

The annual growth rate in 1966 - 1976 period was 1.99% and that in 1976 - 1986 was 2.79% in average, and the population in 1990 was estimated at 55,571 thousands. The population distribution by age shows the typical pyramid shape and the dependent population per 100 independents was calculated at 78.0 and it is slightly increasing.

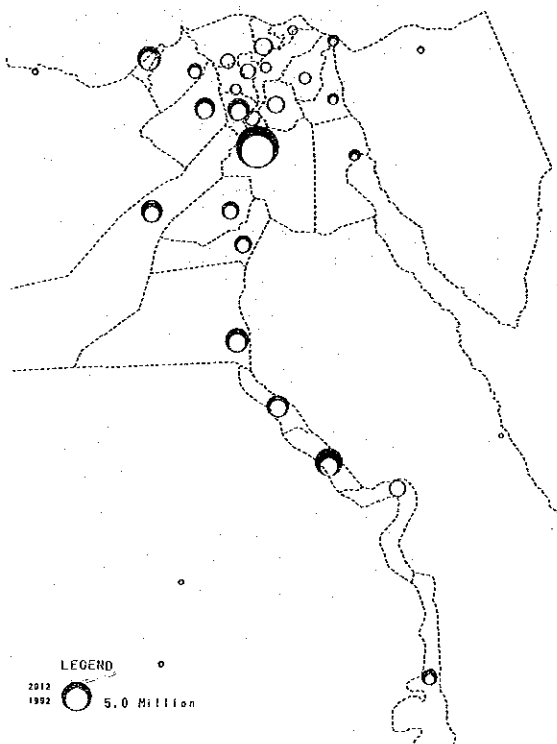
The population in Greater Cairo occupies 20% of the total and that in Delta region occupies 70%. Most of the remaining population live in Upper Egypt region along the Nile River. The population share in the Frontier governorates which occupy 66% of the total area is 1.23%.

The annual population growth rate will decrease from the present 2.9% p.a. to 2.0% p.a. after the year 2001, and total population in the year 2012 will be 86,907 thousand or 1.56 times the 1991 figure.

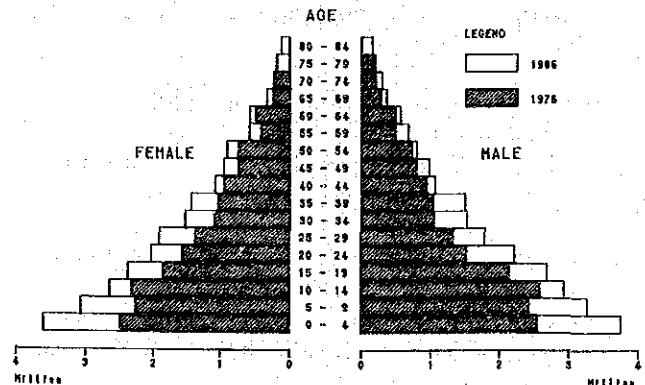
The population in Cairo zone was forecast to increase from 9.9 million in 1991 to 15.4 million in 2012 or 1.56 times the 1991 figure. The shares of zones surrounding Cairo such as Giza and Qaliubia zones show high increase while the shares of big cities as Cairo or Alexandria show a decreasing tendency.



Population Growth



Population Distribution



Population by Age

(2) Gross Domestic Product (GDP)

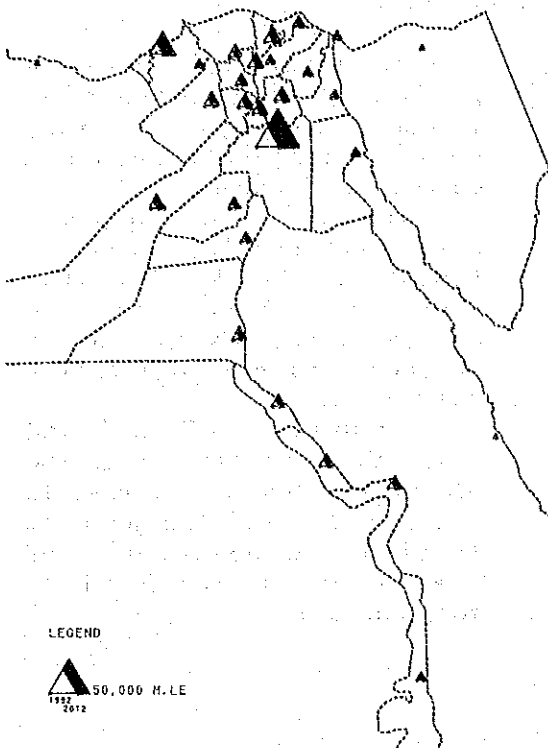
GDP of Egypt in the fiscal year of 1991/92 is 59,107 M.LE in terms of 1986/87 fixed price, and per capita GDP is estimated at US\$ 630. GDP growth rate during 1981/82 - 1986/87 was 6.2% p.a., however that in the following 5 years period of 1986/87 - 1991/92 was reduced to 3.9% p.a. by restructuring policy.

After the present economic restructuring process, GDP growth rate in real terms of 4 to 5% p.a. is forecast in all the sources, therefore GDP growth rates of 5.1% p.a. in the Third Five Year Plan and the Fourth Five Year Plan target of 6.5% p.a. were adopted in the Study. After the Fourth Five Year Plan period, the same GDP growth rate of 6.5% p.a. was assumed from the year 2002 to 2012.

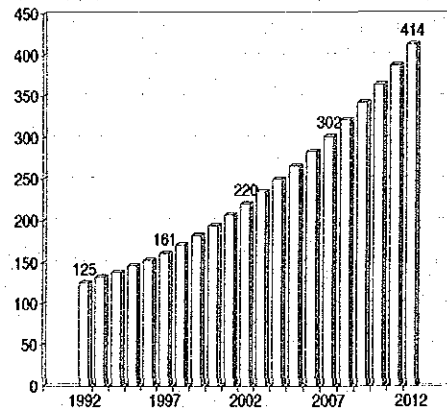
GDP in 2012 was forecast at 414,000 M.LE in terms of 1991/92 fixed price or 3.3 times the 1992 figure of 125,000 M.LE. GDP per capita in 2012 was estimated at 4,760 LE (1,440 US\$) or 2.16 times the 1992 figure of 2,200 LE (670 US\$).

GDP growth factor between the years 1992 and 2012 in the agriculture sector was forecast at relatively low figure of 2.13, while that in the industry and mining sector was 5.80.

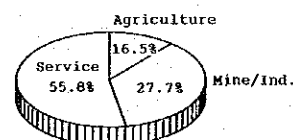
The share of GRDP in Cairo zone occupies 28%, followed by Alexandria (10%) and per capita GRDP in the urban area shows a higher figure of 3,500 LE compared with that in rural area, which is about 1,500 LE.



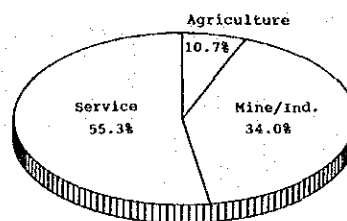
GRDP Distribution



GDP Growth



1992: 125 1,000 M.LE



2012: 414 1,000 M.LE

GDP by Sector

2 Production and Consumption, Present and Future

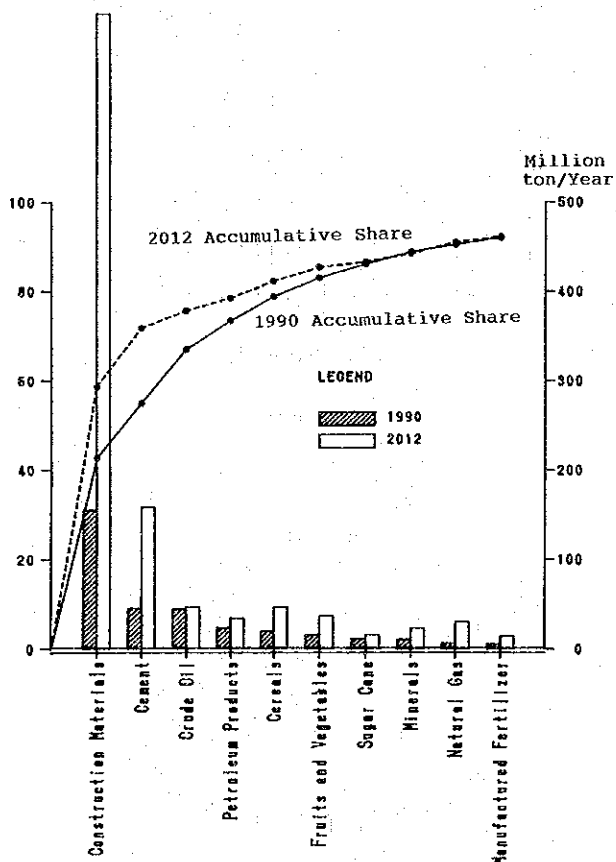
(1) Total Production and Consumption

The total commodity production in 1990 was 363 million ton and the total consumption was 357 million ton. Exports and imports amounted to 16 and 10 million tons.

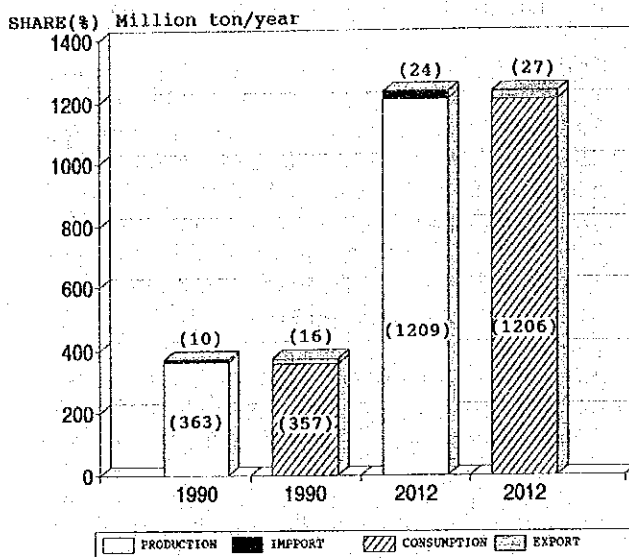
The total commodity production was forecast at 1,216 million ton in 2012 or 3.35 times the 1990 production. The total domestic consumption was forecast at 1,206 million ton in 2012 or 3.37 times the 1990 figure.

(2) Commodity Classification

Commodities are classified into 30 commodity groups for analysis purpose. Construction materials including sand, earth, bricks, etc., occupies about 40% of the total, followed by cement, crude oil and petroleum products. The accumulative top 10 commodities' share reaches to 90% of the total.



Production and Consumption by Commodity



Production and Consumption Growth

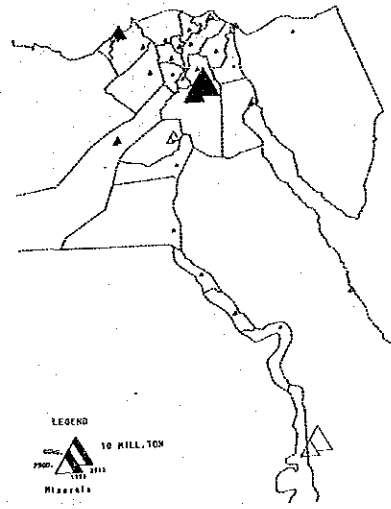
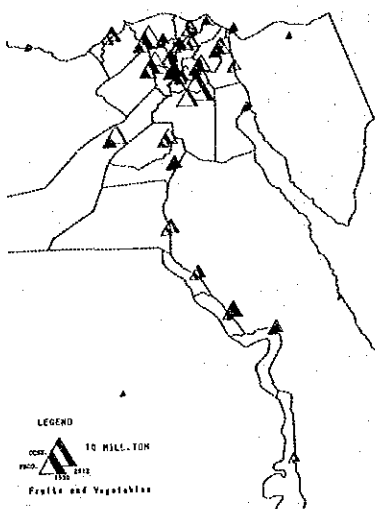
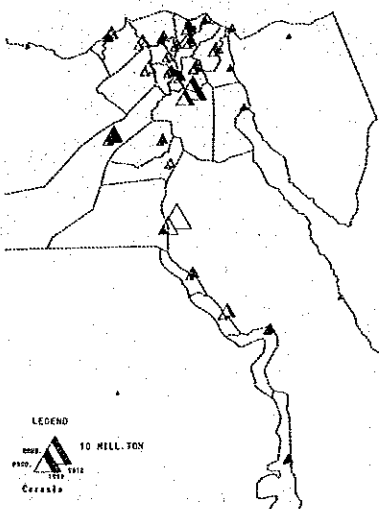
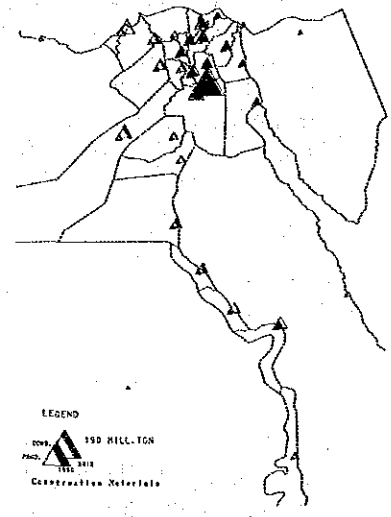
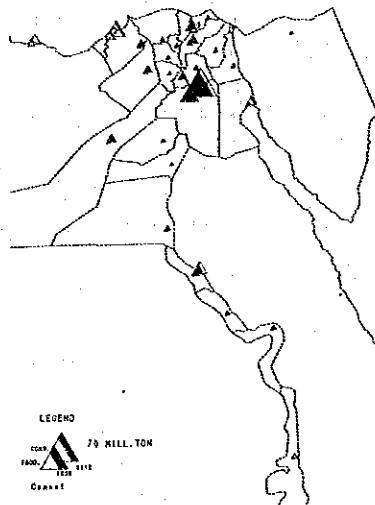
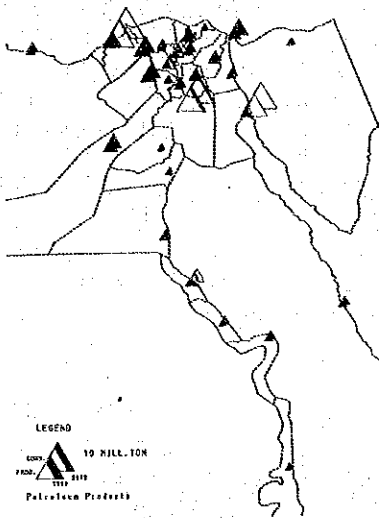
(3) Production and Consumption by Commodity

When the past trend is compared with the forecast in the Third Five Year plan, the following points are characterized;

- (1) The gasoline and kerosene production has increasing tendency in the past records, while the plan forecasts a decreasing tendency.
- (2) The production of phosphate ore is forecast to reach 1.7 times the 1990 level at the final year of the planning period by the development of phosphate mine in New Valley governorate.
- (3) The production of coal and coke at the final year of the planning period is forecast to reach 1.9 times the present level by the development of coal mine in North Sinai governorate.

- (4) Despite the many studies that have pointed out the constraints in agricultural production from the view points of productivity and land area, the plan forecasts 1.1 to 1.5 times increase of the present level, especially in leguminous products a 2.5 times increase is forecast.
- (5) Refined sugar production showed a decreasing tendency in the past records, however the plan forecasts a 1.5 times production of the 1990 level.

- (6) The industrial commodities are forecast to increase in line with the past trend, and especially production of edible oil and fats is forecast to increase 4.0 times the 1990 production at the final year of the planning period.



Production and Consumption Distribution

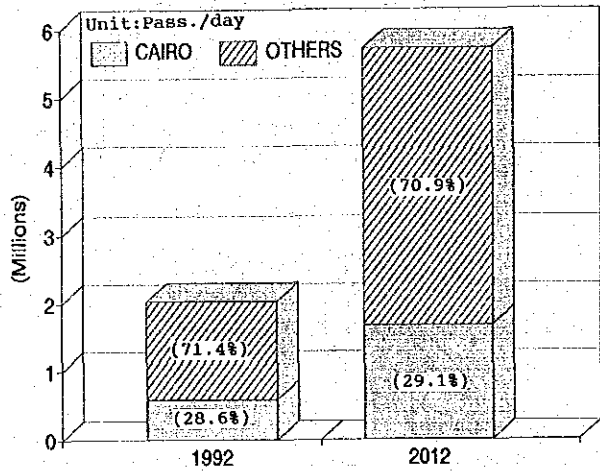
3 Passenger and Freight Demand, Present and Future

(1) Passenger Movement

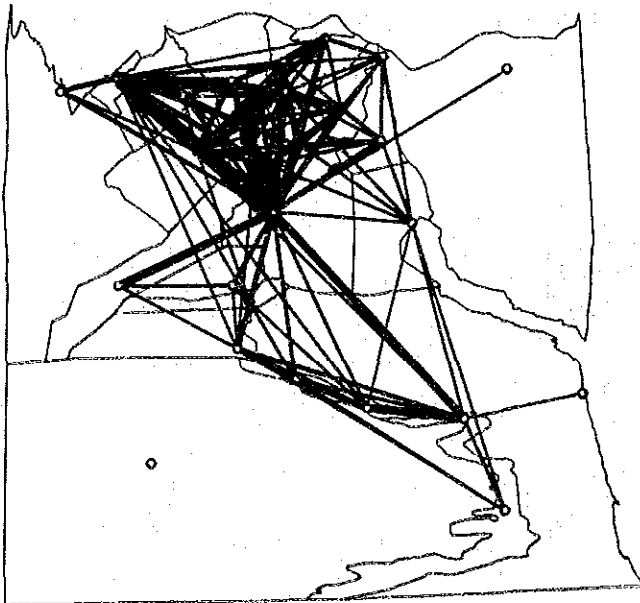
The road side OD survey to collect information on vehicle transport was carried out at a total of 62 survey stations in the whole country. Rail passengers transported are 43,800 million pass.-Km in 1992, of which intra governorate passengers are counted at 24.8% of the total boarding and alighting passengers.

The 1992 total passenger demand excluding 188 zones intra movement was estimated at 2.0 million/day, of which 28.6% has its origin or destination to Greater Cairo Zone. Excluding intra 29 zone movement, the present total inter semi governorate zone passenger is 1.9 million/day, which is 1.92 times the 1979 figure and shows almost the same growth factor as the GDP growth in real terms of 1.97 in this period.

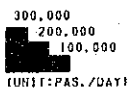
2012 passenger demand was estimated at 5.7 million/day, which is 2.82 times the 1992 figure. The share of demand related to Greater Cairo remains in the same level of 29.1% as 1992.



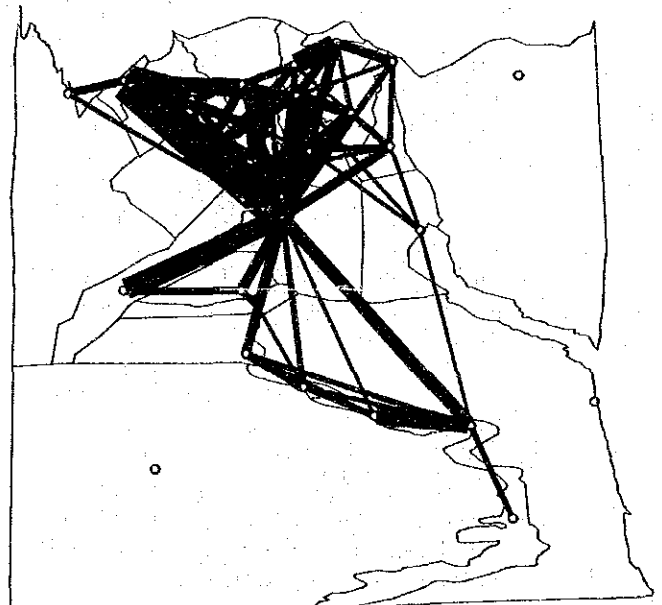
Passenger Demand Growth



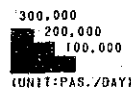
LEGEND



1992 ALL MODE PASSENGER OD
(OD PAIR VOLUME 2000 OR ABOVE)



LEGEND



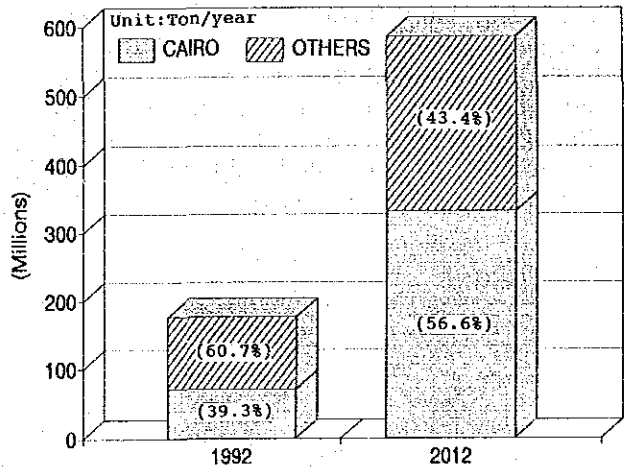
2012 ALL MODE PASSENGER OD
(OD PAIR VOLUME 10000 OR ABOVE)

(2) Freight Movement

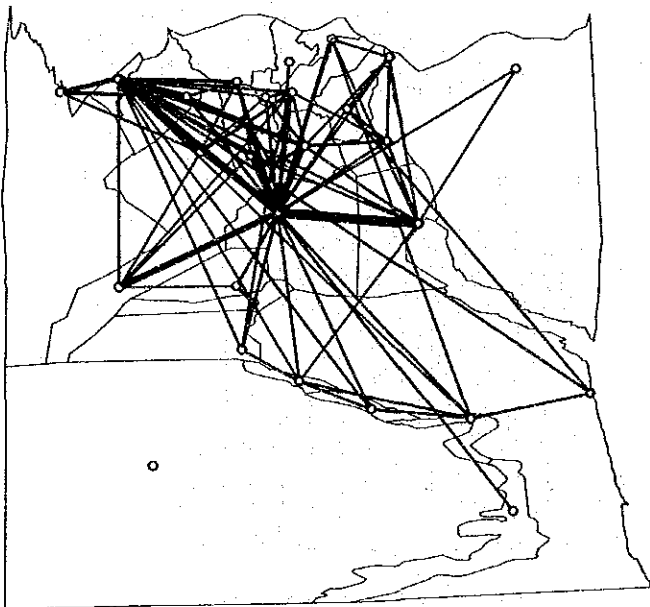
The road side OD survey shows that other construction materials occupies the highest percentage of about 1/4 or 26.5% of the total, followed by fruits and vegetables (8.9%), and petroleum products (6.3%). The total freight by ENR in 1991 was 11 million ton/year. Iron ore shows the highest share of 22.7%, followed by other construction materials (14.1%), wheat (12.4%) and petroleum products (11.4%). In inland waterway, cement shows the highest share of 31.6% of the total, followed by coal/coke (24.5%), other minerals excluding phosphate and iron ores (13.2%), and petroleum products (13.1%), and the total weight of these four commodities exceeds 80% of the total.

The total freight volume of these three modes is 178 million ton a year, which is 2.16 times the 1979 figure. Other construction materials occupies the highest share of 25.0%, followed by cement (15.2%), petroleum products (7.1%) and fruits and vegetables (7.8%).

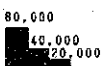
The 2012 total feight was estimated at 591 million ton/year, which is 3.3 times the 1992 figure. The share of freight related to Greater Cairo Zone increased from 39.3% in 1992 to 56.6% in 2012 reflecting high concentration of industry. The highest increase was seen in phosphate freight with 16.5 times the 1992 figure.



Freight Demand Growth

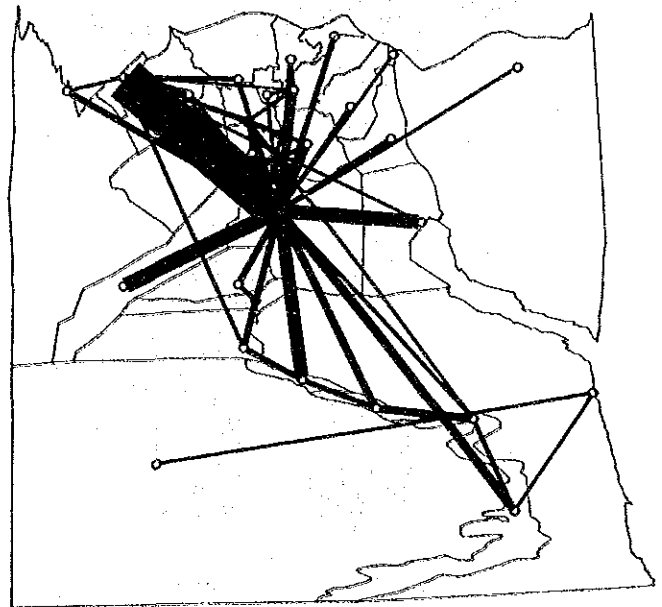


LEGEND

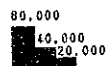


1992 ALL COMMODITY OD
(OD PAIR VOLUME 500 OR ABOVE)

(UNIT: 1,000Ton/Year)



LEGEND



2012 ALL COMMODITY OD
(OD PAIR VOLUME 2000 OR ABOVE)

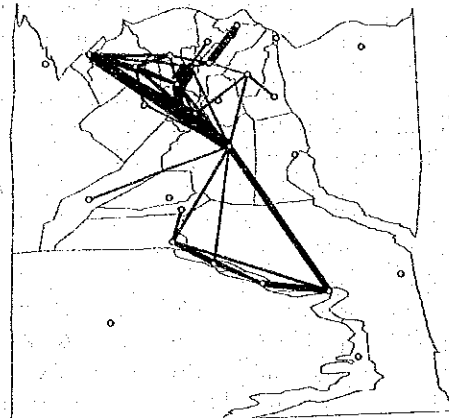
(UNIT: 1,000Ton/Year)

4 Modal share, Present and Future

(1) Passenger Modal Share

The inter 29 zone passenger shares of passenger car, taxi, bus and rail in 1992 are 9.9%, 17.1%, 21.2% and 51.8% respectively. The present passenger mode shares between passenger car and public modes, and bus+taxi and rail were simulated by models with parameters of travel cost differences of two modes.

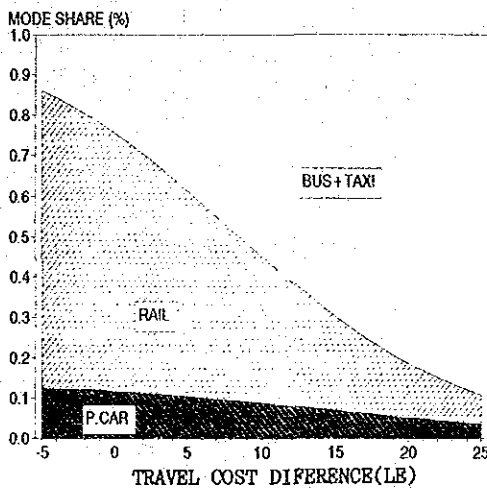
2012 mode shares were estimated applying these models and by binary choice process. The results were 9.8%, 40.9% and 49.3% for passenger car, bus+taxi and rail respectively. The growth factors of passengers between 1992 and 2012 in each mode are 2.85, 2.84 and 2.82.



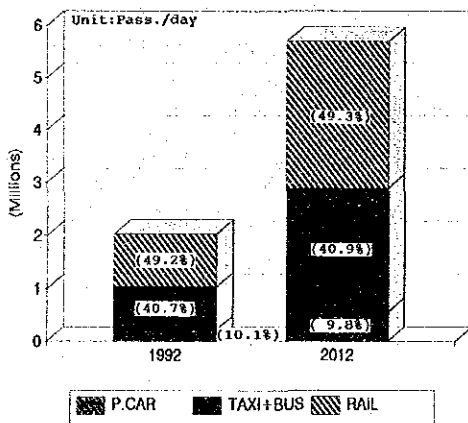
LEGEND
 250,000
 100,000
 50,000
 1992 Rail Passenger OD
 (100 PAIR VOLUME: 5000 OR ABOVE)
 (UNIT: Pass./Day)



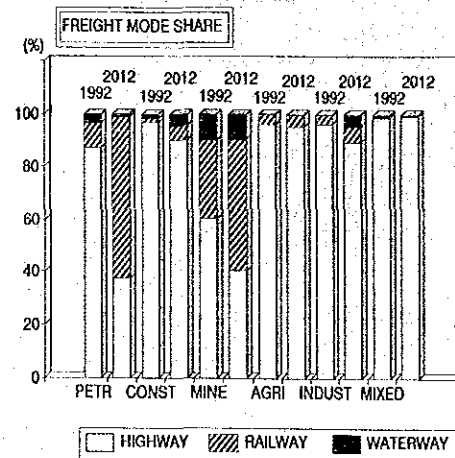
LEGEND
 250,000
 150,000
 50,000
 2012 Rail Passenger OD
 (100 PAIR VOLUME: 5000 OR ABOVE)
 (UNIT: Pass./Day)



Passenger Mode Share



Passenger Demand Growth by Mode

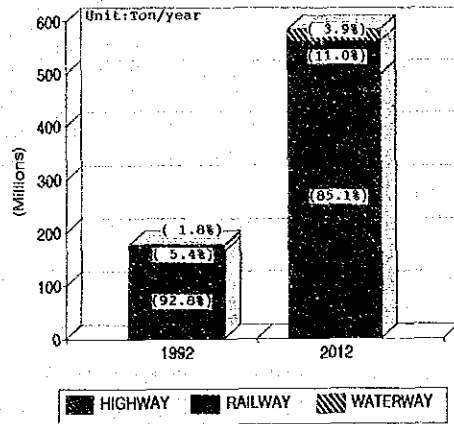


Freight Demand Share by Mode and Commodity Group

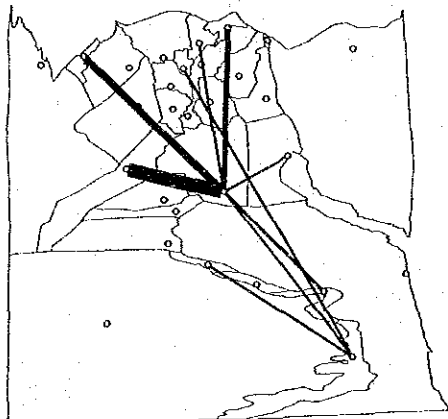
(2) Freight Modal Share

The present freight mode shares in terms of ton shows the predominate share of highway with 92.8%, followed by rail (5.4%) and waterway (1.8%). However in mineral products in six commodity classification, railway and waterway shares reach to about 30% and 10% respectively.

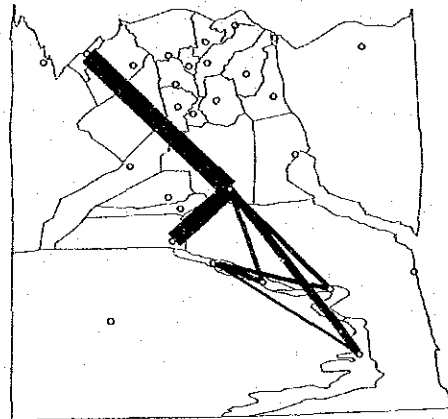
2012 freight mode shares were estimated by pre-determined method referring to the results by present pattern and minimum cost route method. The total shares of highway, railway and waterway are 85.3%, 7.7% and 6.9%. The growth factors of freight between 1992 and 2012 in each mode are 3.0, 4.7 and 12.8.



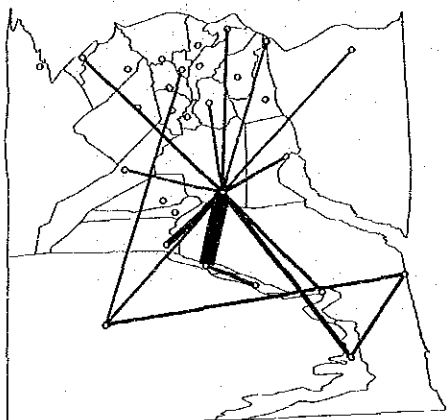
Freight Demand Growth by Mode



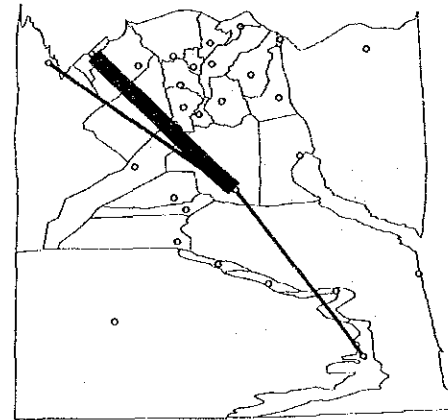
LEGEND
 5,000
 2,000
 1,000
1992 RAILWAY OD
 100 PAIR VOLUME 200 OR ABOVE
 (UNIT: 1,000 Ton/Year)



LEGEND
 1,500
 1,000
 500
1992 WATERWAY OD
 100 PAIR VOLUME 50 OR ABOVE
 (UNIT: 1,000 Ton/Year)



LEGEND
 30,000
 20,000
 10,000
2012 RAILWAY OD
 100 PAIR VOLUME 1000 OR ABOVE
 (UNIT: 1,000 Ton/Year)



LEGEND
 90,000
 60,000
 30,000
2012 WATERWAY OD
 100 PAIR VOLUME 3000 OR ABOVE
 (UNIT: 1,000 Ton/Year)

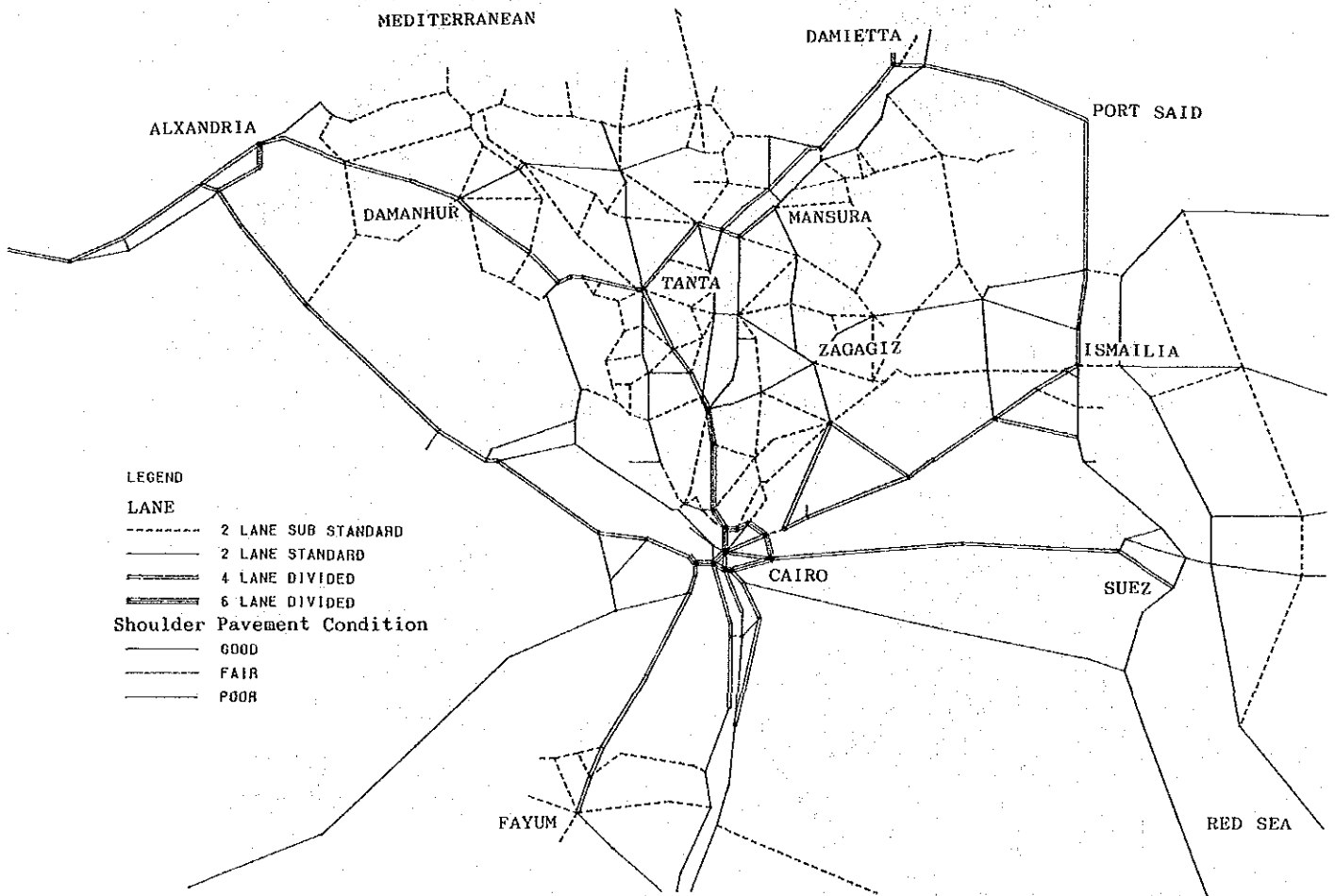
5 Present Road Network

The 1992 intercity road network consists of totally 14,028.0 Km of highways, of which 11.1% or 1,319.4Km belongs to local governments, and the others are under the jurisdiction of Road and Bridge Authority (RBA). RBA network includes 0.4% or 53.1Km of important links such as bridges and barrages. Excluding these links, highways belonging to RBA are 12,417.9 Km, of which 320.5 Km of five routes are toll roads.

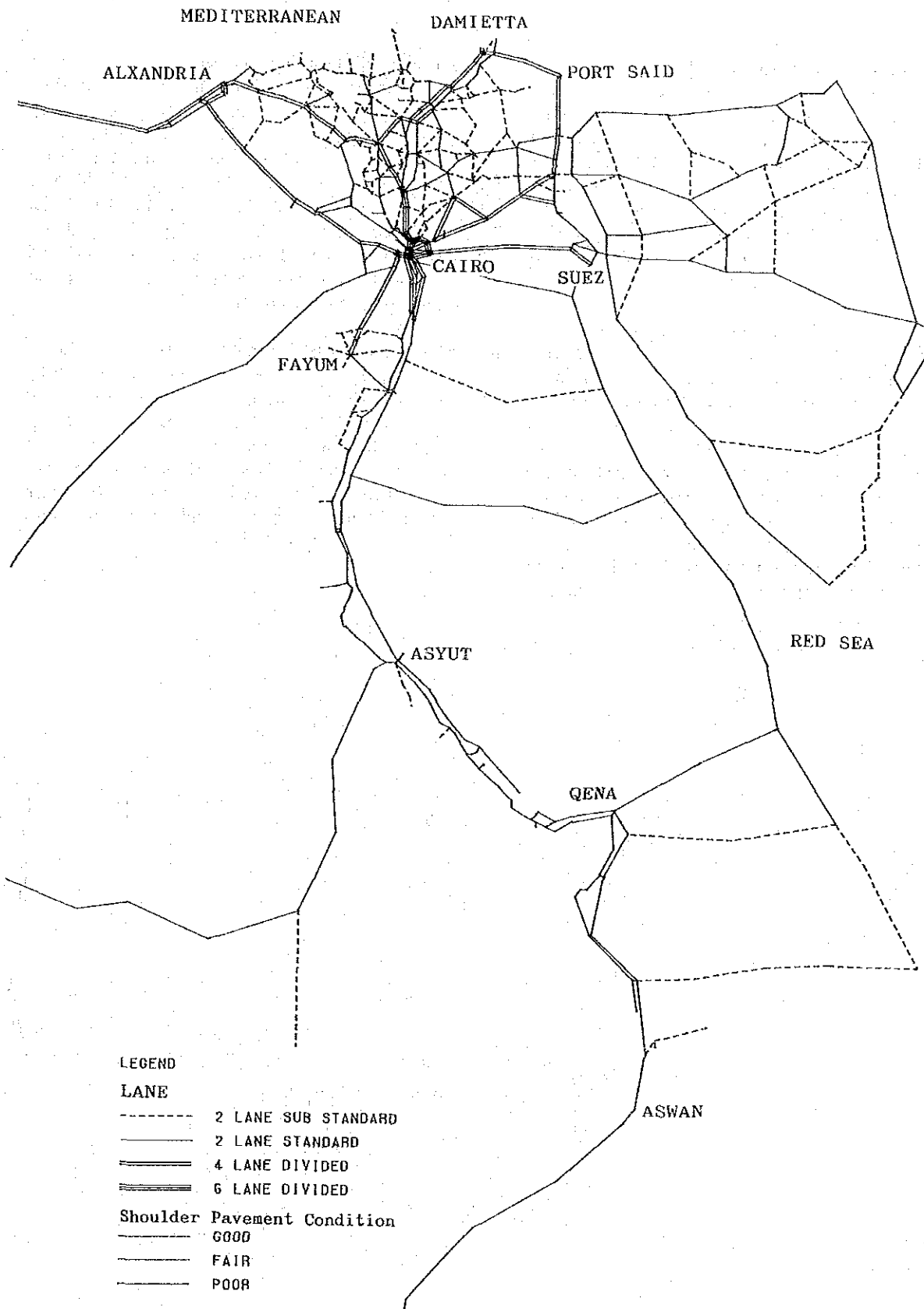
86.7% of the total intercity highways are two way two lane, of which 40.2% is sub-standard with carriageway width of less than 7.5m, 12.3% is four lane divided and 1.0% is six lane divided, which has been started on Cairo-Alexandria Agriculture Road, Cairo - Tanta section.

15.8% of the network in terms of length is classified under poor pavement condition, while 84.2% is in a fair to excellent conditions. Shoulder pavement conditions are lower than carriageway condition. 56.3% is earth and 43.7% is paved, of which only 31.4% is in a good condition.

17 bridges excluding 7 bridges within Greater Cairo urban area are located across the Nile and its two branches, and totally 1030 bridges are located in the whole intercity network, of which 82 bridges are movable type to allow the navigation of barges.



Present Intercity Highway Network (Delta)



Present Intercity Highway Network (All Egypt)

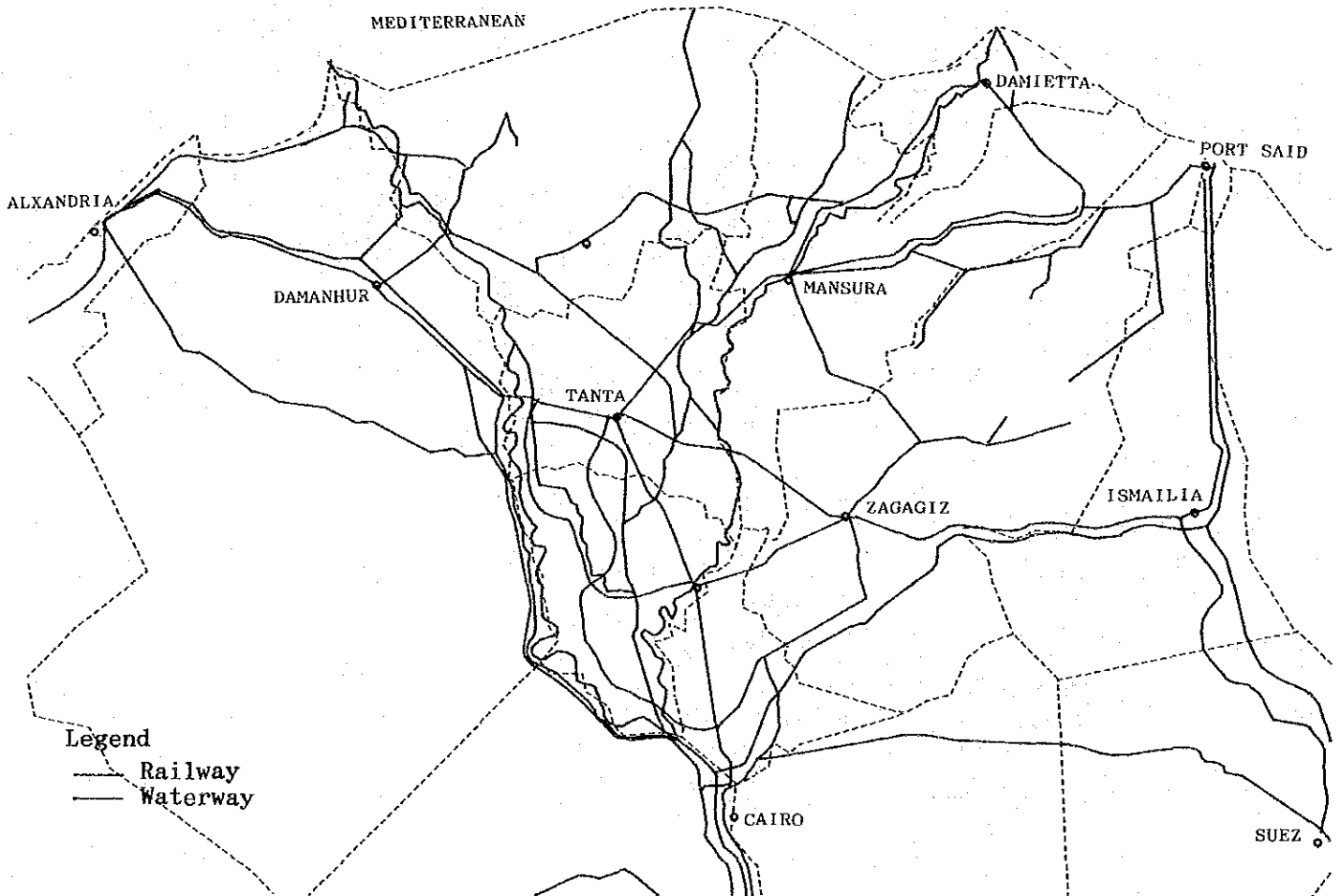
6 Present Railway and Waterway Network

Railway is operated by Egyptian National Railway (ENR), and the network consists of 37 lines and entire length is about 4,000 Km. The railway stations are allocated at 776 locations with average interval of 5 Km. About 19 Km of the network is dual double lines and controlled by CTC system, however most of the network is single line.

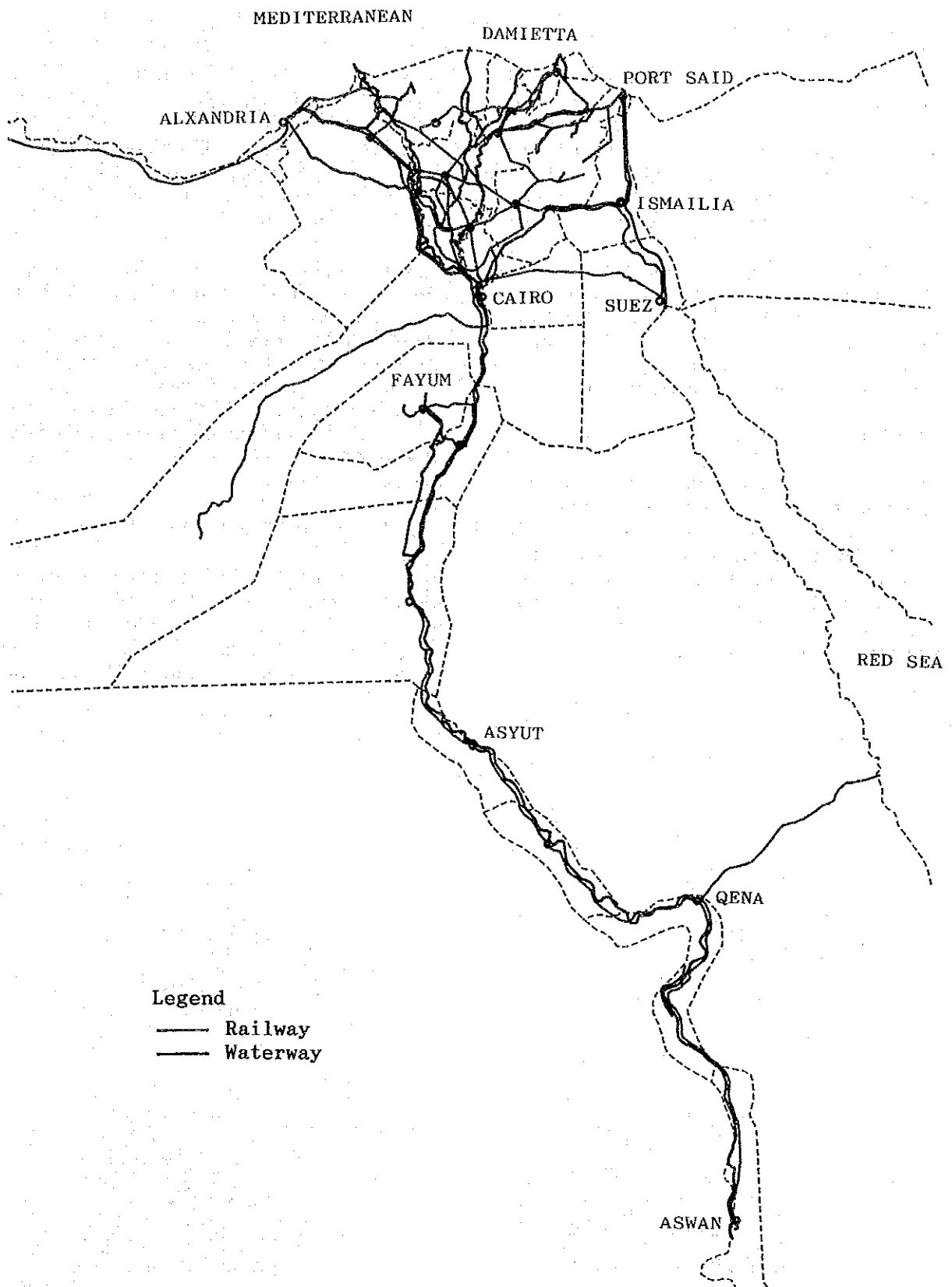
ENR has 521 locomotives, of which 73% or 380 locomotives are assigned exclusively to passenger trains to ensure scheduled operation, and the rest are for freight. ENR has 3,030 passenger cars. 22% of available cars or 495 cars are operating on branch lines, where line lengths are rather short at about 10 Km, and operational performances are low. Total freight wagon number is 10,920 and total capacity is 467,000 ton.

Inland waterway network except for Suez Canal is under the responsibility of River Transport Authority (RTA), and RTA defines all the network into 36 lines and 82 sections. The total length is 3,700 Km. Waterway depths are controlled in relation with the irrigation water demand, and 1.8m is standard at present, however there is a plan to reduce the depth to 1.5m.

The two public waterway transport companies own 295 units, each unit consists of a pusher or tug boat and a barge. The public sugar factory owns 199 self propelled barges and 25 tag boats. The private waterway transport companies own 700 self propelled barges, and 262 tourist boats are registered in RTA.



Present Railway and Waterway Network (Delta)



Legend
 ——— Railway
 - - - - Waterway

Present Railway and Waterway Network (All Egypt)

7 Issues of Present Road Network

(1) Road Hierarchy

The intercity highway network should be classified into primary and secondary levels, so that design, operating and maintenance levels in accordance with the trip characteristics on each level can be applied. The primary highway network connect all the Governorate capitals and Egypt to neighbouring countries, and the secondary network connect capitals of Markazes. The network classification can be shown by the route numbering system, so that drivers can easily find their routes.

(2) Service Level

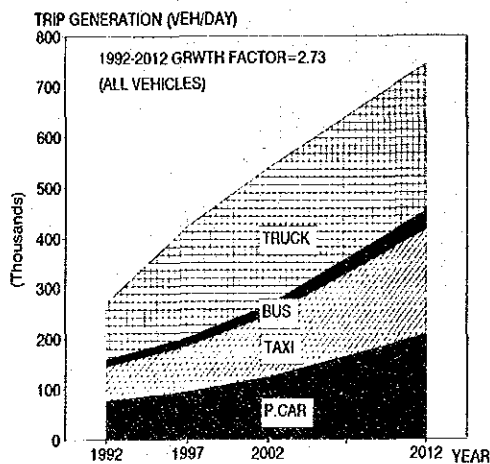
At present, 58% of the entire intercity highway network has service level A, where Volume Capacity Ratio (V/C) is less than 0.40, and vehicles can run with almost free flow speed. Only 2% of the network has service level E or F, where traffic volume exceeds practical capacity.

Vehicle traffic demand will increase from 270,000 veh./day in 1992 to 730,000 veh./day in 2012 or 2.72 times the present. Especially Cairo - Alexandria corridor will have vehicle traffic demand of about 4 times the present.

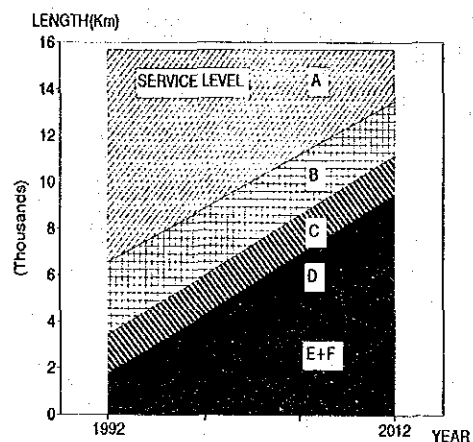
Accordingly in Do-Nothing Case, where no improvement except for works to maintain the road conditions in the present level, will be implemented, the service level of 45% of the entire network will drop to E or F levels in accordance with the traffic demand increase, and the share of service level A will decrease to 14%.

(3) Mixed traffic

Accesses to the intercity highway network are not controlled at present and high speed - long distance trips are sometimes disturbed by low speed - short distance trips on



Vehicle Demand Growth



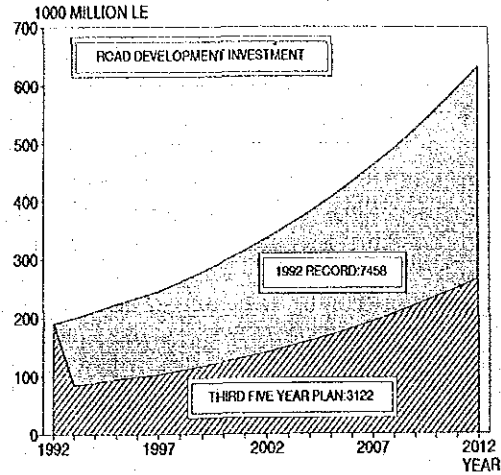
Highway Length by service Level

these inter city highways. Most parts of desert roads do not have accesses for long intervals, while highways in agriculture areas have frequent accesses. Therefore access controlled highways will be needed in these areas in future from the view points of traffic safety and vehicle operating cost savings as well.

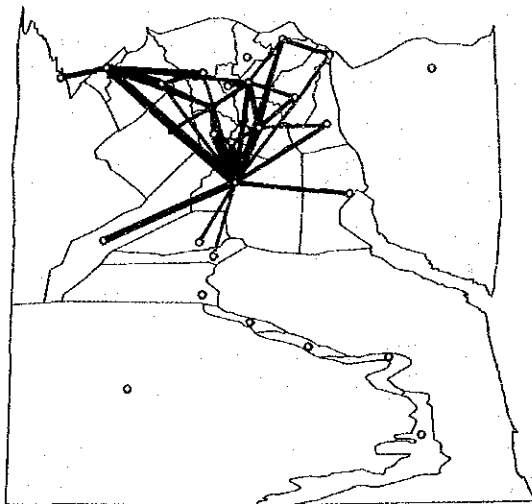
(4) Financial Capability

Based on the road development expenditure record in 1992 and the expected GDP growth rate, the total intercity highway development expenditure during 1993 - 2012 period is estimated at 7,458 M.LE.

In the Third Five Year Plan, almost half the amount of 1992 expenditure level is allocated to the road development, despite of 3.2% increase of the share of all the transport sector budget (9.2% of the total) comparing to that in the Second Five Year Plan. Based on the figure in the Third Five Year Plan, the total amount is estimated at 3,122 M.LE.

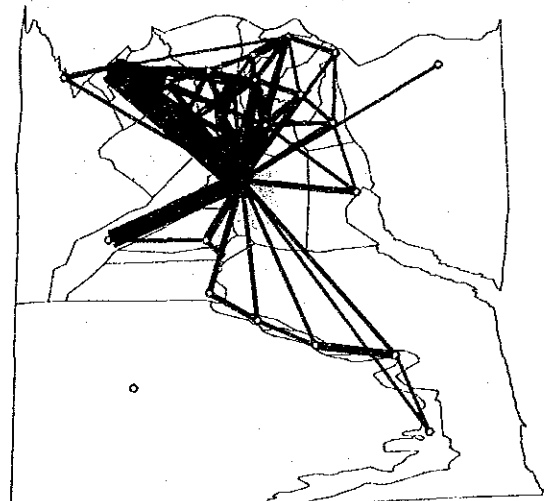


Financial Capability



LEGEND
 50,000
 20,000
 0-20,000
 (UNIT:VEH/DAY)

1992 VEHICLE OD
 (OD PAIR VOLUME 2000 OR ABOVE)



LEGEND
 50,000
 20,000
 0-20,000
 (UNIT:VEH/DAY)

2012 VEHICLE OD
 (OD PAIR VOLUME 2000 OR ABOVE)

8 LDA (Land Development Aimed Projects)

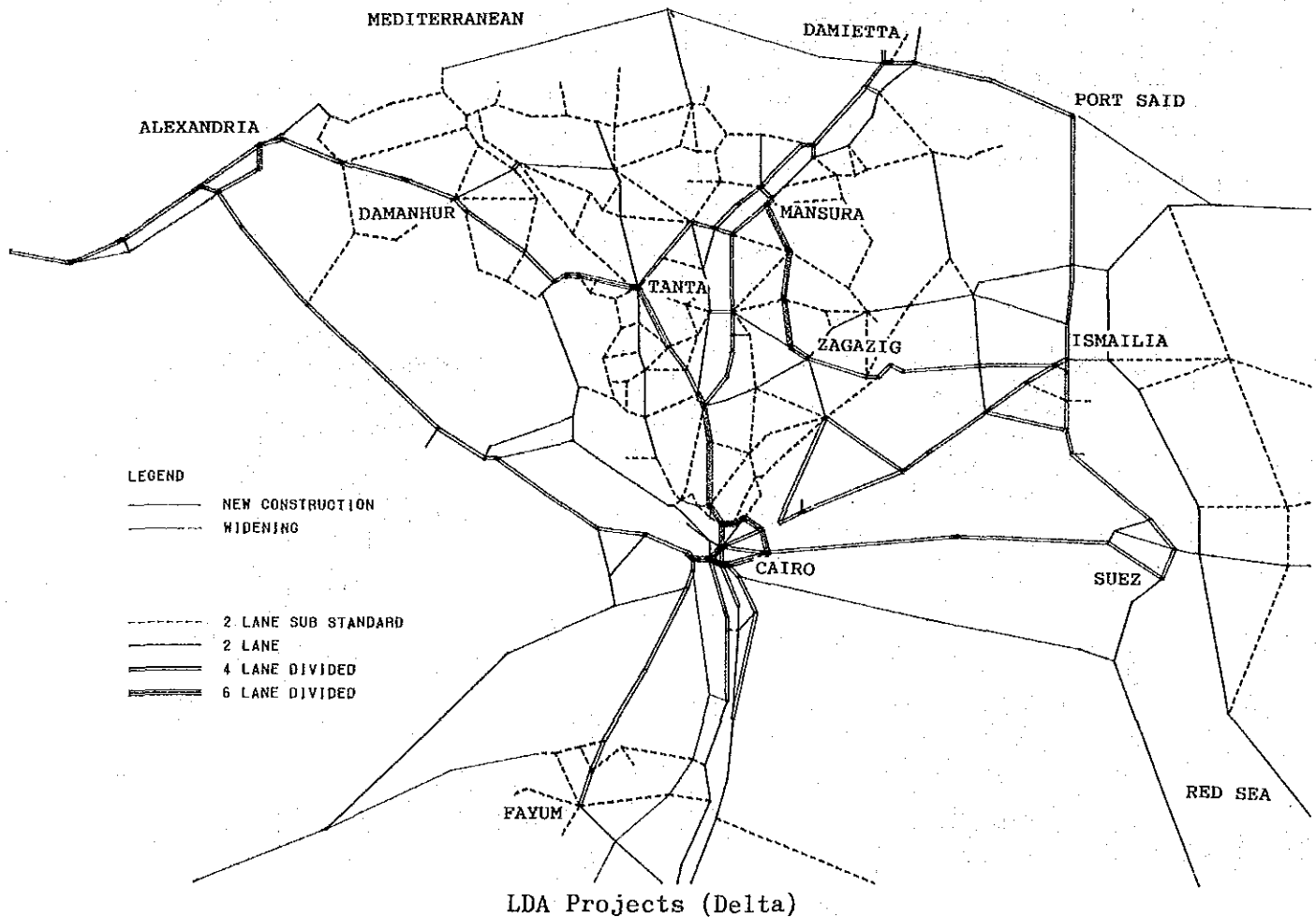
(1) Definition

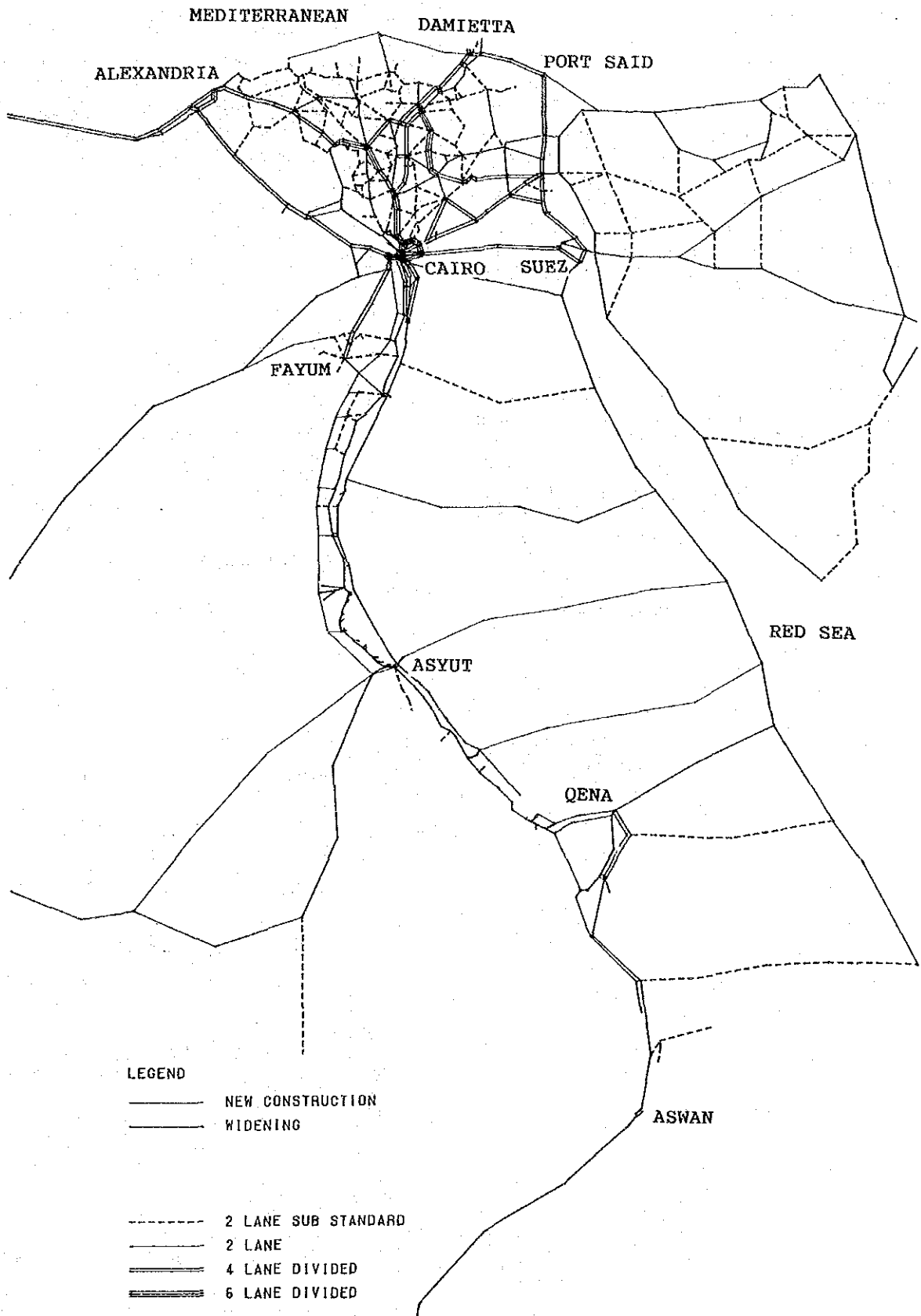
In the Third Five Year Plan, 20 highway development projects proposed from both Ministry of Transport and Ministry of Development are included. Beside these projects, 15 projects were proposed but were not approved and may appear in the next Fourth Five Year Plan. These 35 projects, which are proposed by the governmental agencies mainly to encourage land use in desert area or mining development, have to be included in the Masterplan and are defined as land development aimed projects (LDA).

(2) LDA

LDA consists of totally 2,986.9 Km of routes, of which 1,945.0 Km is new construction such as coastal highway along mediteranian to form international highway from Lybian border to Jordan, transversal highways between Nile valley and Red Sea, Cairo Asyut Desert Road, etc., and 1,041.9 Km is widening of existing intercity highway.

The total financial cost of LDA is estimated at 1,473.7 M.LE and 2,249.7 M.LE in economic cost.





LDA Projects (All Egypt)

9 MLS (Maintaining Level of Service Projects)

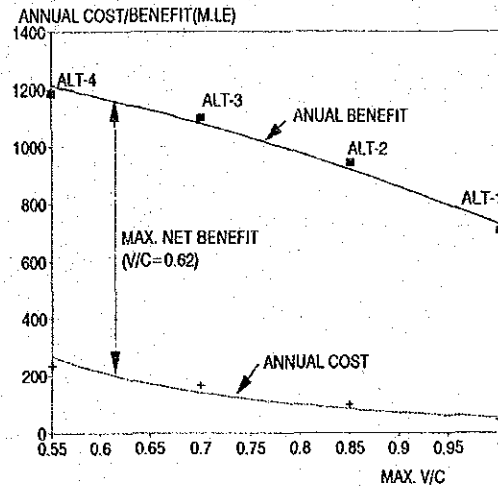
(1) Definition

In addition to LDA, 60 projects mostly in Delta area are needed to maintain the service level of inter-city highway network in the optimum level, which was found to be 0.62 by maximum V/C - investment cost analysis. These 60 projects are defined as Maintaining Level of Service Projects (MLS) and will form the basic Masterplan network in 2012 together with LDA.

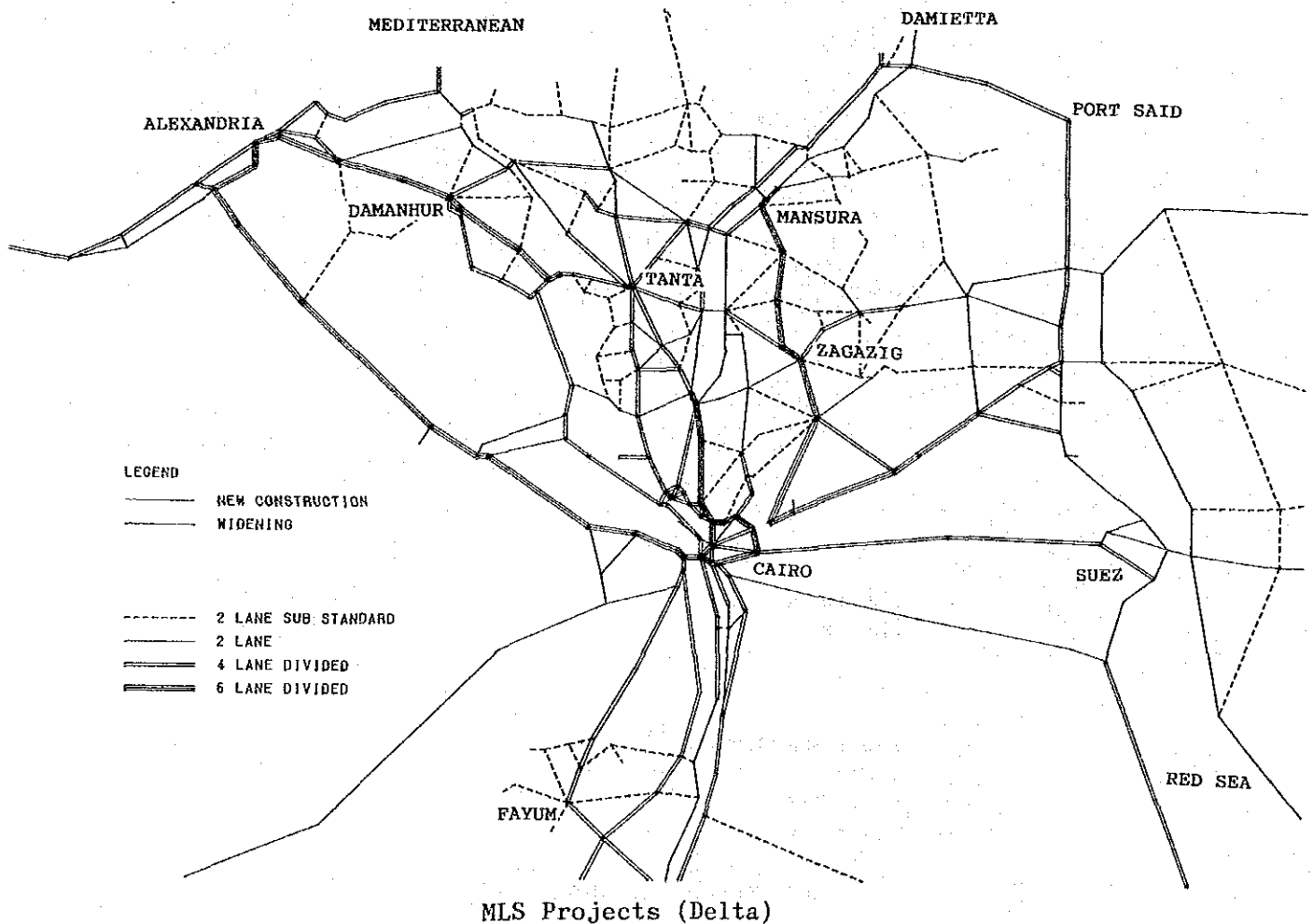
(2) MLS

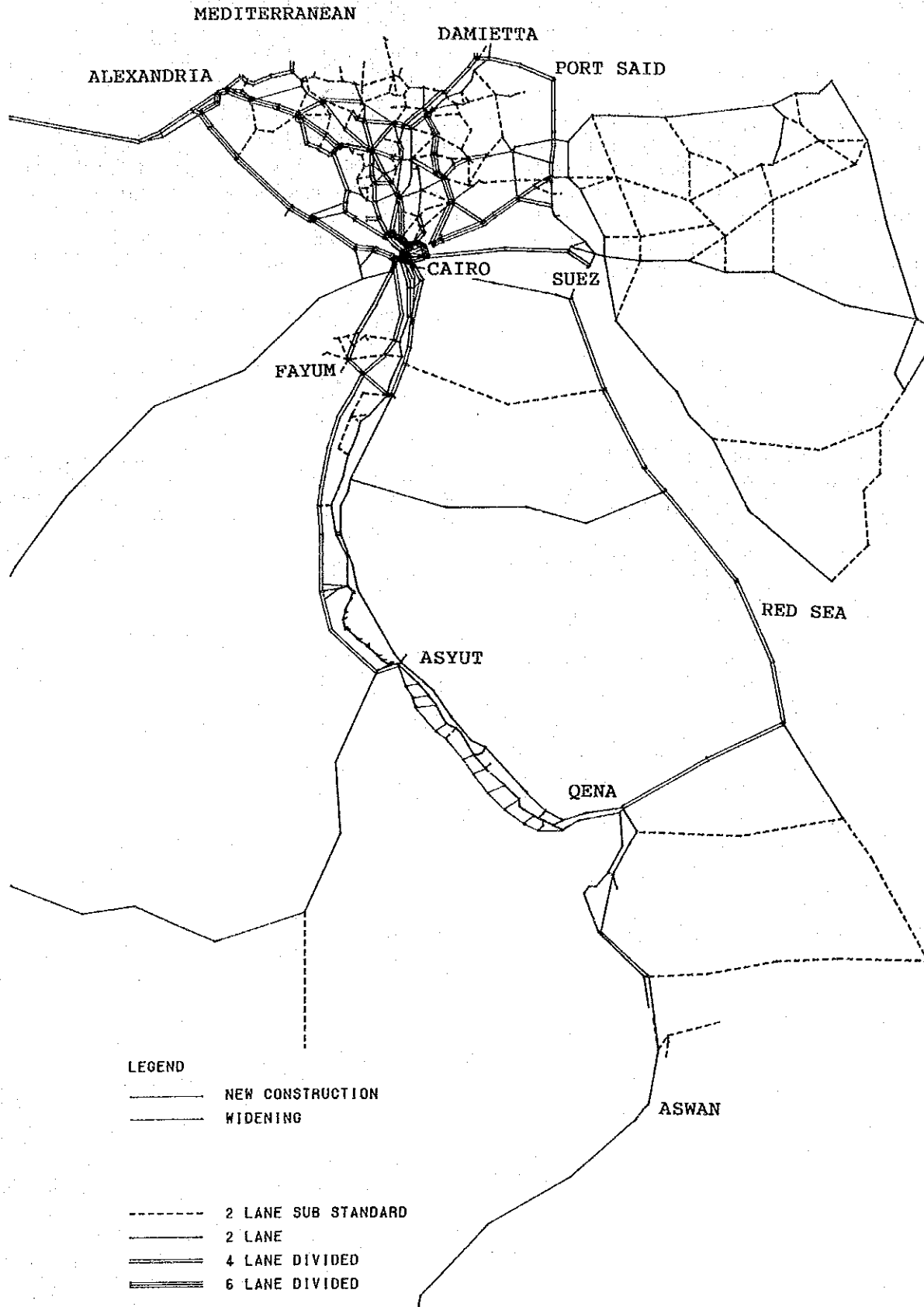
MLS consists of totally 2,998.1 Km of routes mostly to be widened, such as the widening of Cairo - Alexandria Desert and Agriculture roads both to 6 lanes, widening of Cairo Asyut Desert road to 4 lane from the presently planned 2 lane road, etc.

The total construction cost of MLS is estimated at 1,546.5 M.LE in terms of financial cost and 2,126.9 M.LE in terms of economic cost.



Optimum V/C Level



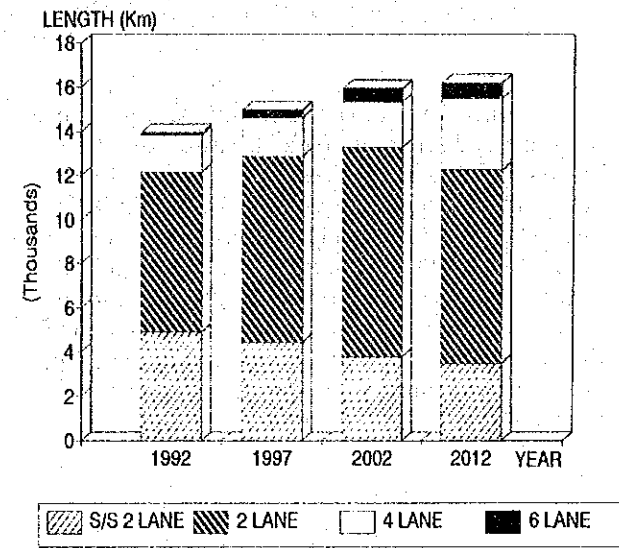


MLS Projects (All Egypt)

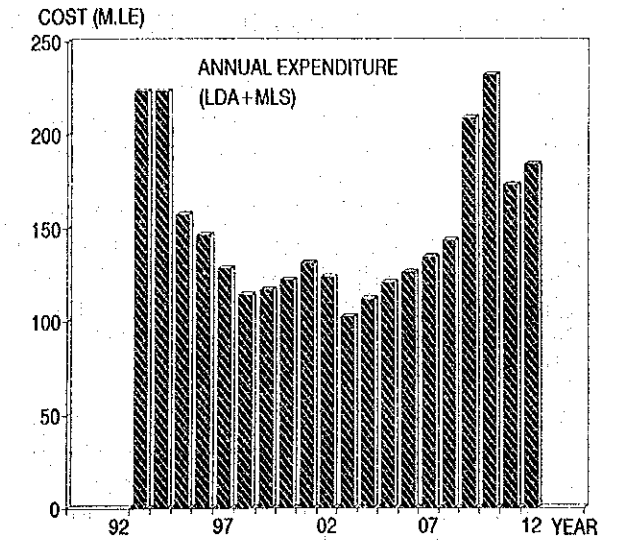
10 Basic Masterplan Network Projects

LDA and MLS form the Basic Masterplan Network, and these projects are allocated to 3 phases of short term (1993 - 1997), middle term (1998 - 2002), and long term (2003 - 2012) plans, in accordance with traffic demand, priorities of each project in terms of investment efficiency in the national economic view point and following the program in the Third Five Year Plan, which is now on going.

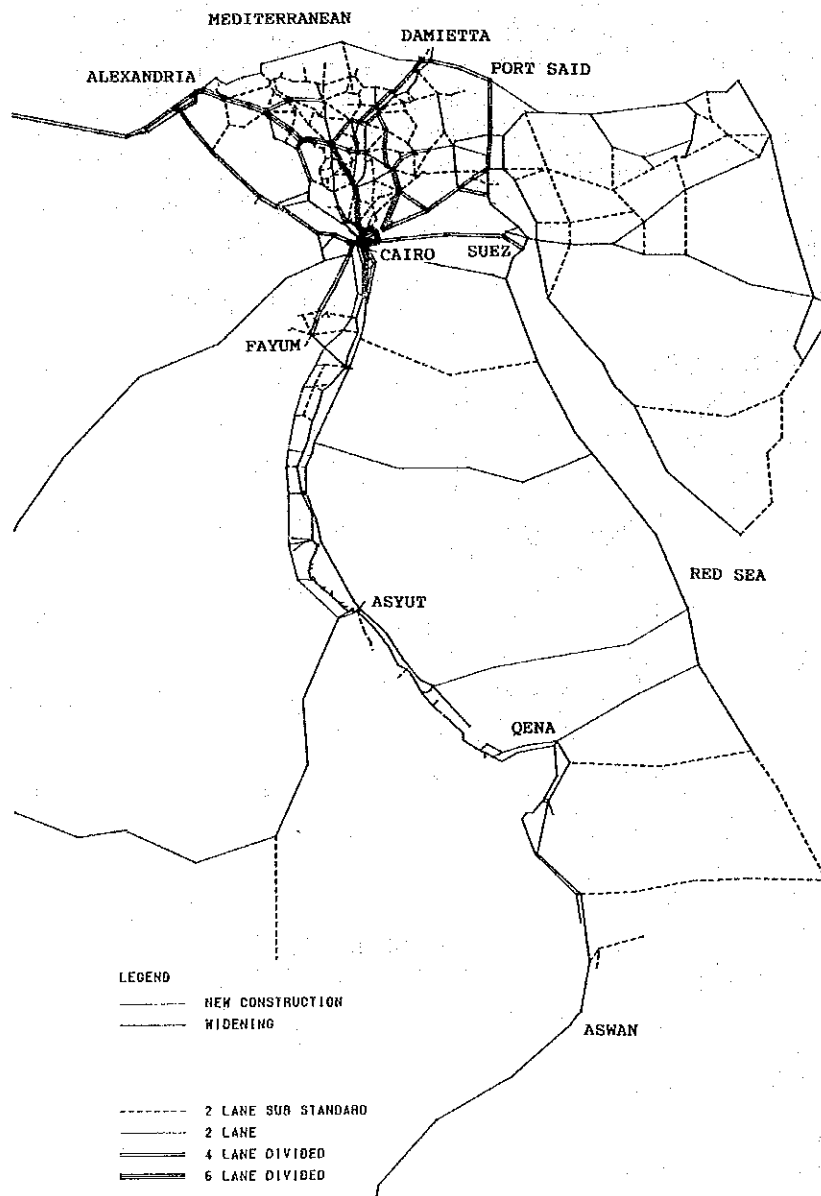
The network lengths of each phase are 15,020 Km in phase I, 16,002 Km in phase II and 16,259 Km in phase III, and the percentage of sub-standard 2 lane 2 way roads will decrease from 35% in 1992 to 21.6% in 2012, and that of divided 4 and 6 lane roads will increase from 13.2% to 24.4%. The total financial and economic costs are estimated at 3,020.1 M.LE and 4,376.7 M.LE.



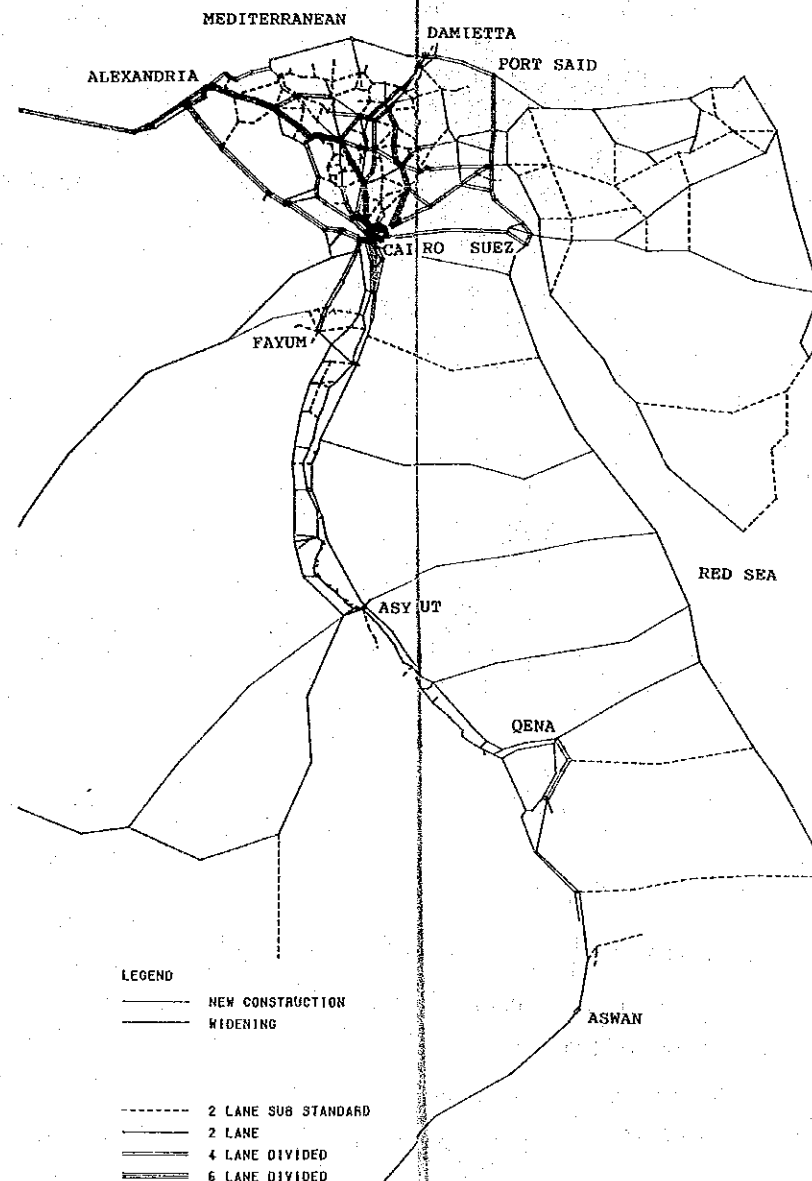
Intercity Highway Length in Basic Master Plan



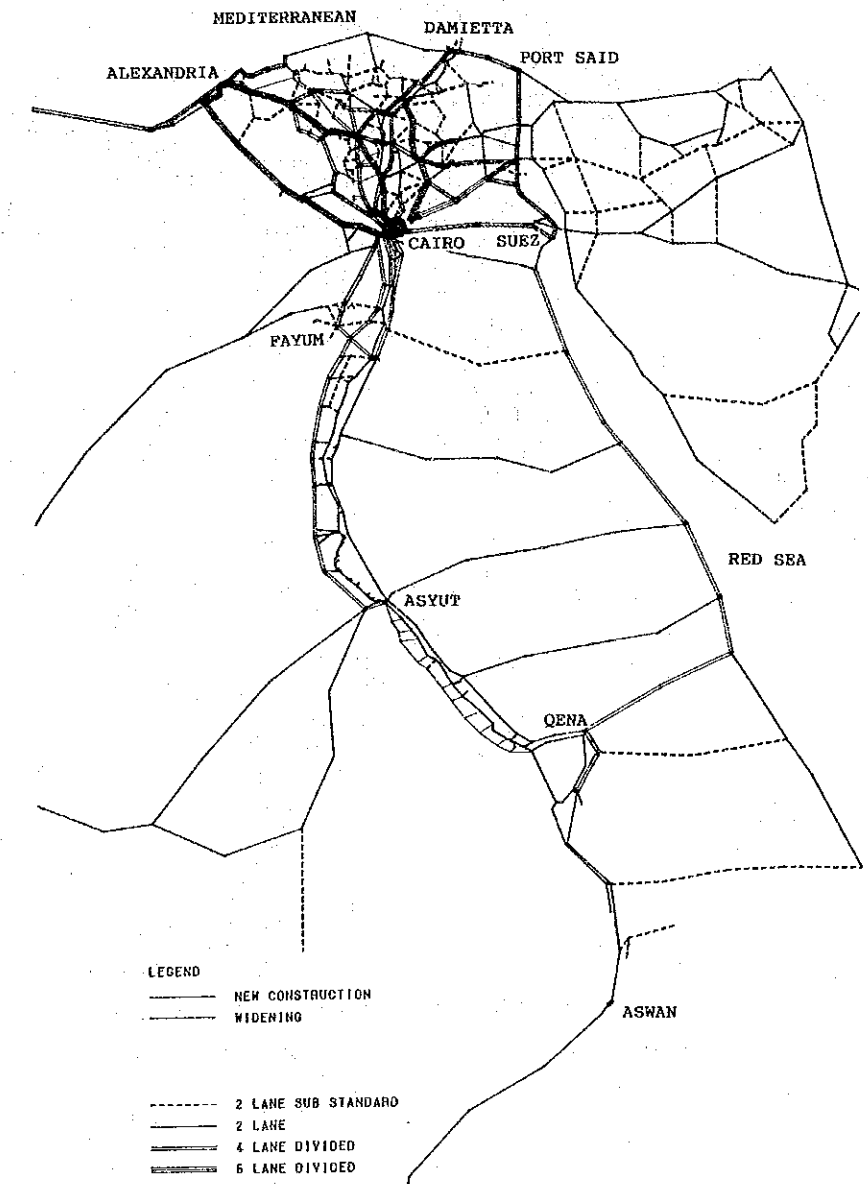
Annual Expenditure in Basic Master Plan



Basic Master Plan Projects (1993 - 1997)



Basic Master Plan Projects (1998 - 2002)



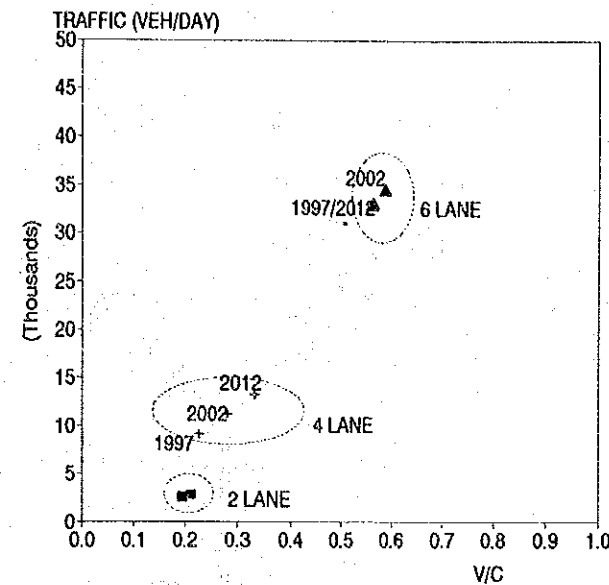
Basic Master Plan Projects (2003 - 2012)

11 Traffic Flow and Economic Evaluation of Basic Network

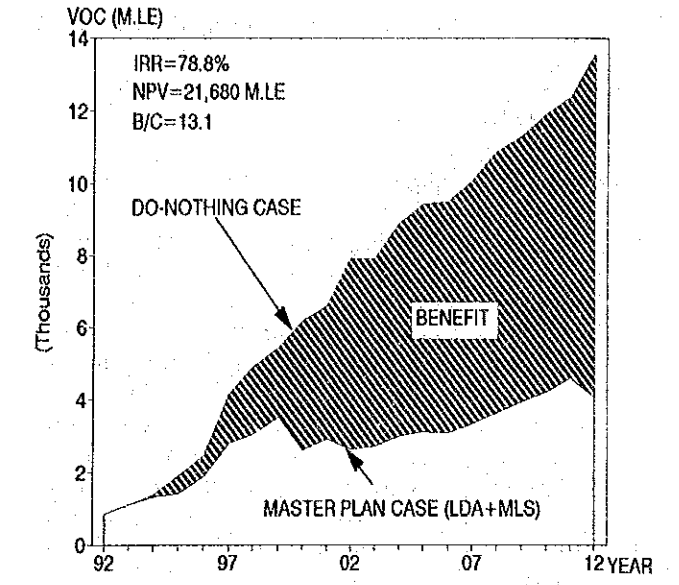
The future vehicle traffic demand was assigned on the Basic Masterplan network by years and phases. The traffic demand between Cairo and Alexandria was accommodated by 2 major highways of Agriculture and Desert Roads and an additional semi-direct 6 lane link between Cairo and Tanta.

The average V/C and daily traffic volume by link lane number shows that the volume on 6 lane roads are always critical from the view point of V/C and those on 4 lane roads will increase in accordance with entire volume increase.

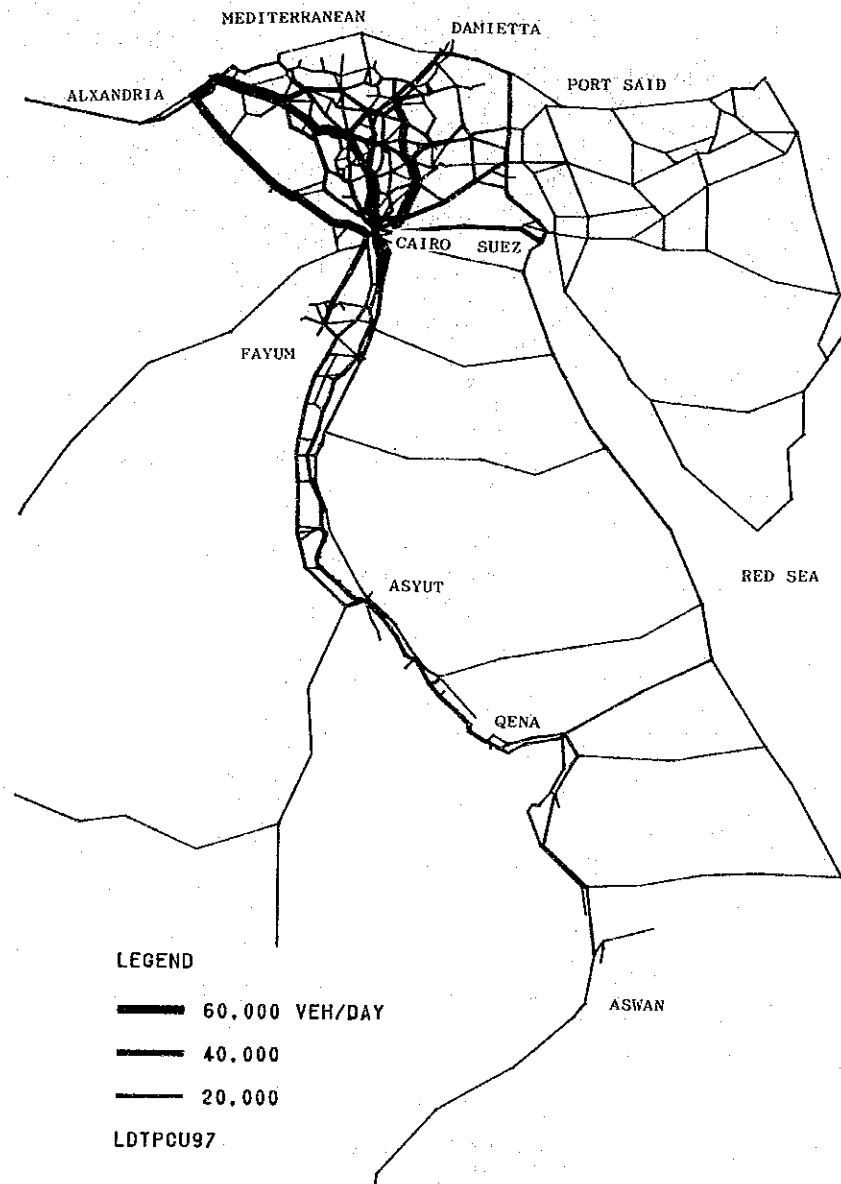
The economic evaluation of the basic master plan network based on Do-Nothing Case by Vehicle Operating Cost (VOC) saving gives EIRR 78.8%, NPV 21,680 M.LE with annual interest rate of 12% and B/C 13.1, which shows the significant high economic return reflecting low improvement cost and extremely uneconomical condition under Do-Nothing case in future.



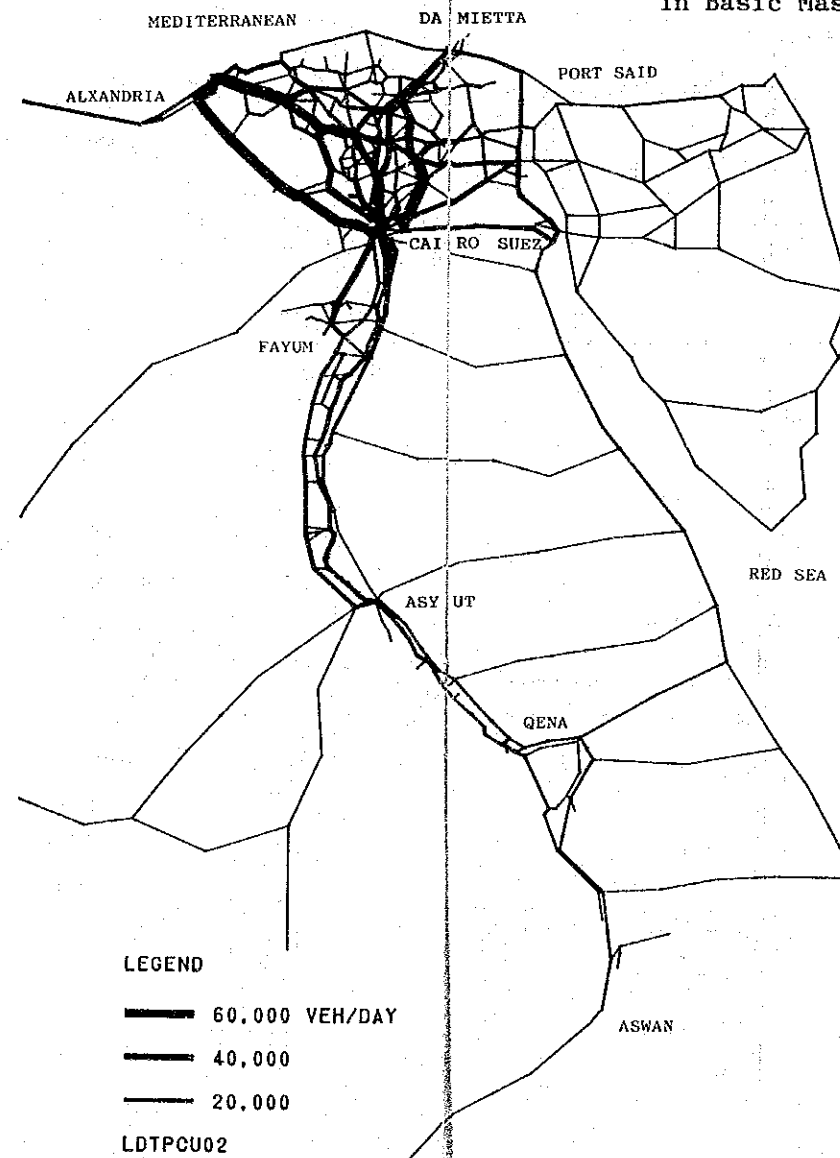
Traffic Volume and V/C change in Basic Master Plan



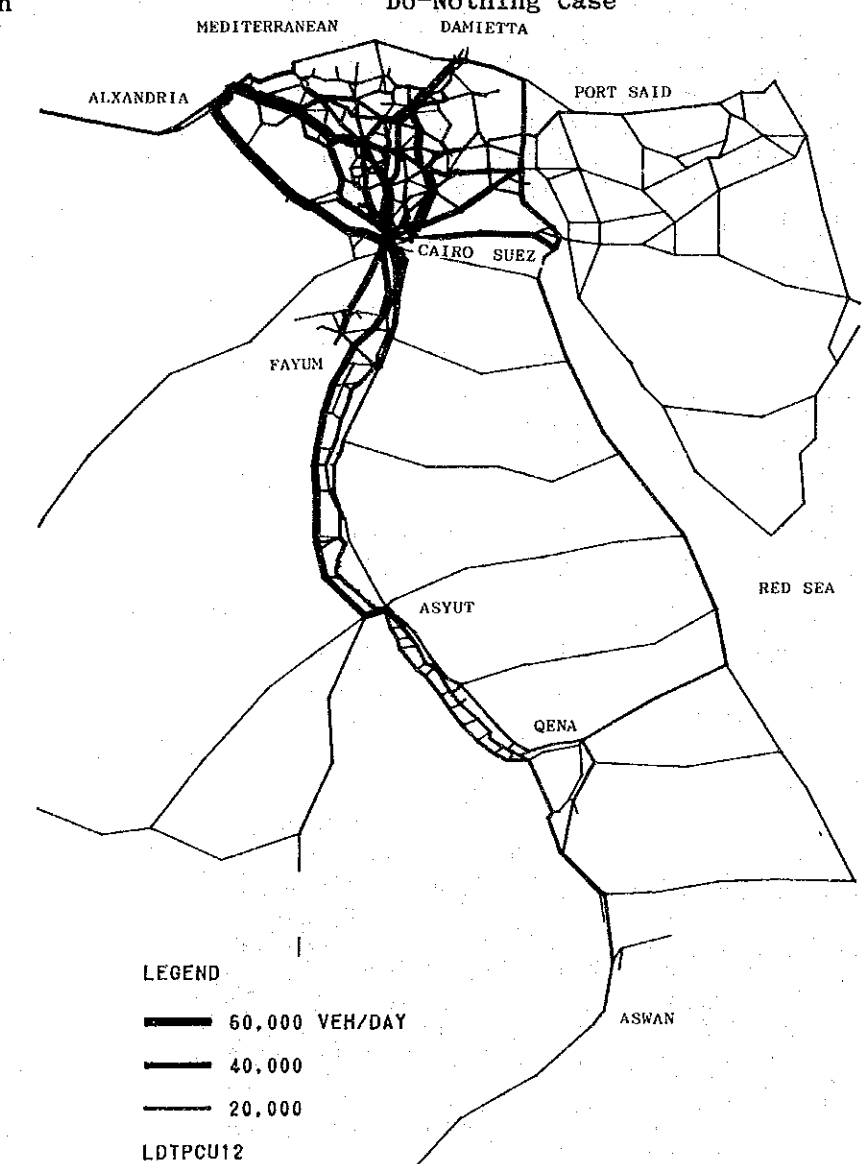
VOC of Basic Master Plan and Do-Nothing Case



Traffic Flow in 1997



Traffic Flow in 2002



Traffic Flow in 2012

12 Structures Improvement

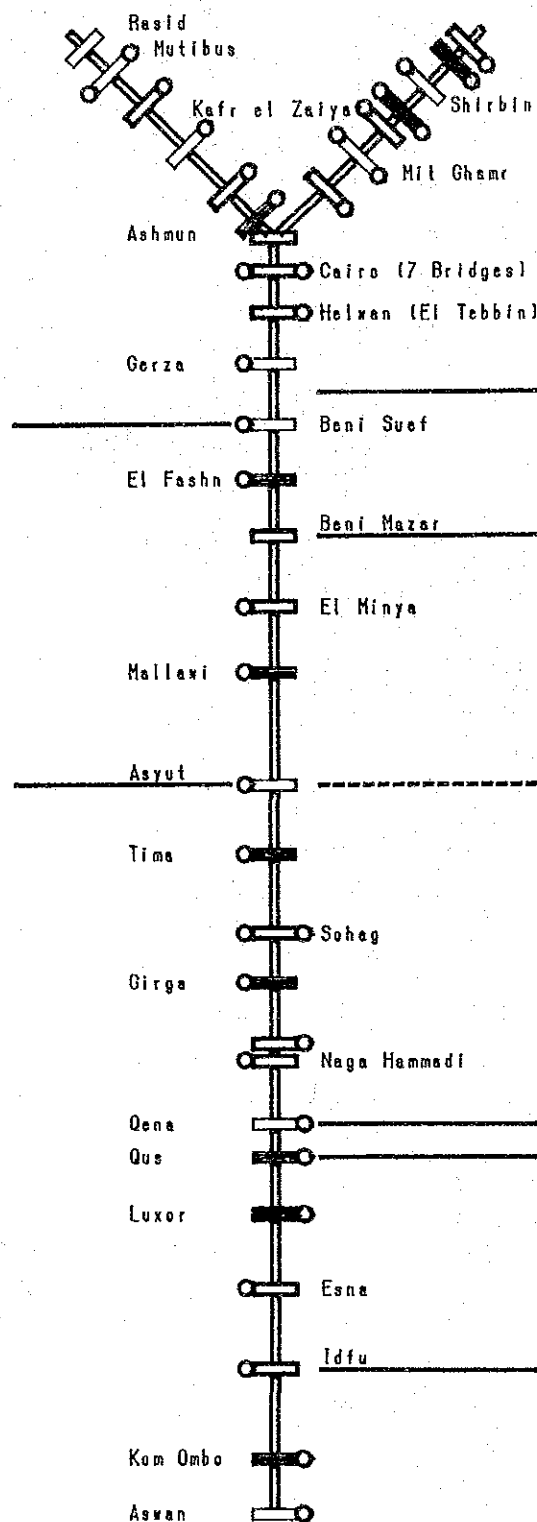
(1) Bridges on Nile

Presently there are 17 bridges and 4 barrages on Nile to serve for both public and limited traffic, and 3 bridges, excluding Cairo Ring Road bridges which are intra urban bridges, are under construction and will be completed within the Third five Year Plan period. In addition to these bridges, 9 bridges are included in the Basic Masterplan intercity highway network, so that there will be totally 33 bridges on Nile. Taking lateral road connection between Nile valley and Red Sea, local traffic demand represented by population density, and average bridge interval of 50Km, 7 more bridges will be needed, therefore 19 more bridges will be constructed by the year 2012. Total financial cost is estimated at 565.5 M.LE, of which 227.5 M.LE is for additional bridges.

Nile Bridge Projects

Bridge Location	Phase	Status	Cost (M.LE)		Remarks
			Financial	Economic	
Rosetta Branch					
1 Rashid	B	1	32.5	32.6	under planning
2 Mutbis	B	2	32.5	32.6	
3 Kafar El Zaiyat	B	2	10.0	10.0	additional 3 lane
4 Ashmun	A	3	32.5	32.6	
Damietta Branch					
5 Faraskour	B	1	26.0	26.1	under construction
6 Shirbin	B	1	32.5	32.6	under planning
7 Talkha	B	1	20.0	20.0	under construction
8 Mit Ghamr(Zifta)	B	1	32.5	32.6	under planning
Nile Valley					
9 Gerza	B	2	32.5	32.6	
10 Girga	A	2	32.5	32.6	
11 El Fashn	A	3	32.5	32.6	
12 Mallawi	A	3	32.5	32.6	
13 Asyut	B	1	32.5	32.6	under planning
14 Tima	A	3	32.5	32.6	
15 Qena	B	3	32.5	32.6	
16 Qift	A	3	32.5	32.6	
17 Luxor	B	1	22.0	22.1	under construction
18 Kom Ombo	A	3	32.5	32.6	
19 Aswan	B	1	32.5	32.6	under planning: Cable Stay Type
Total			565.5	566.9	

Status: A:Additional
 B:Basic Network Project
 Phase: 1:1993-1997
 2:1998-2002
 3:2003-2012

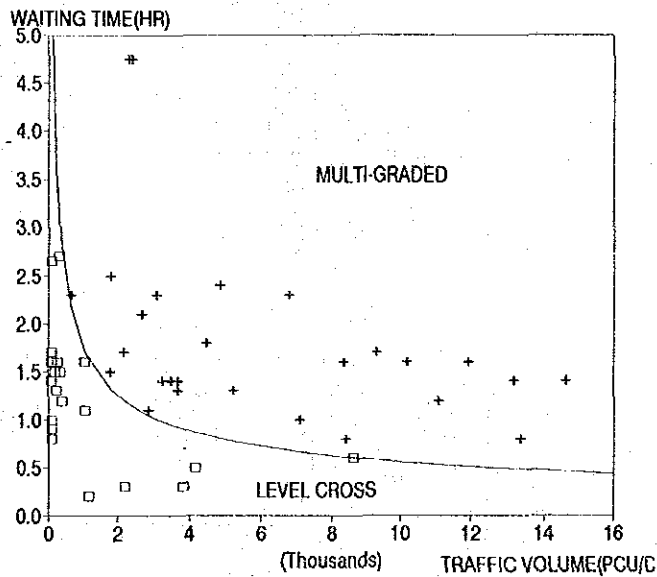


Nile Bridge Location

(2) Railway Crossings

Presently there are 54 level railway crossings with ENR on inter city highway network. These level railway crossings shall be multi-graded in accordance with traffic demand on highway and train frequency from the view points of traffic safety and VOC saving.

According to the economic analysis of VOC saving by total waiting time of vehicles and train frequency, 40 existing level crossings, of which 17 level crosses are included in the basic master plan network have to be multi-graded either by viaduct or by under pass tunnel. The total cost is estimated at 840.0 M.LE.

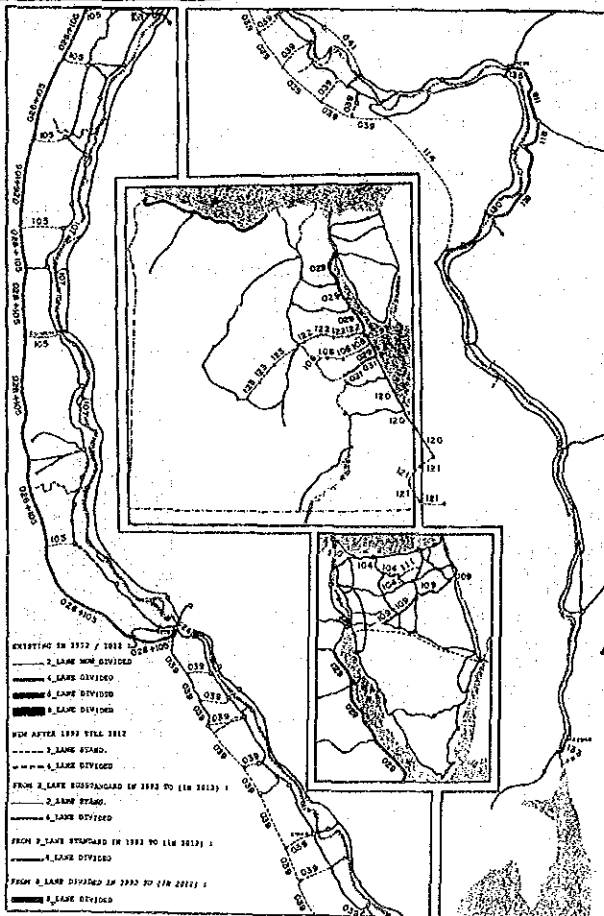
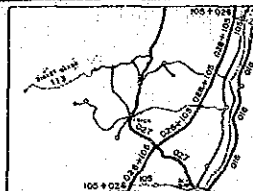
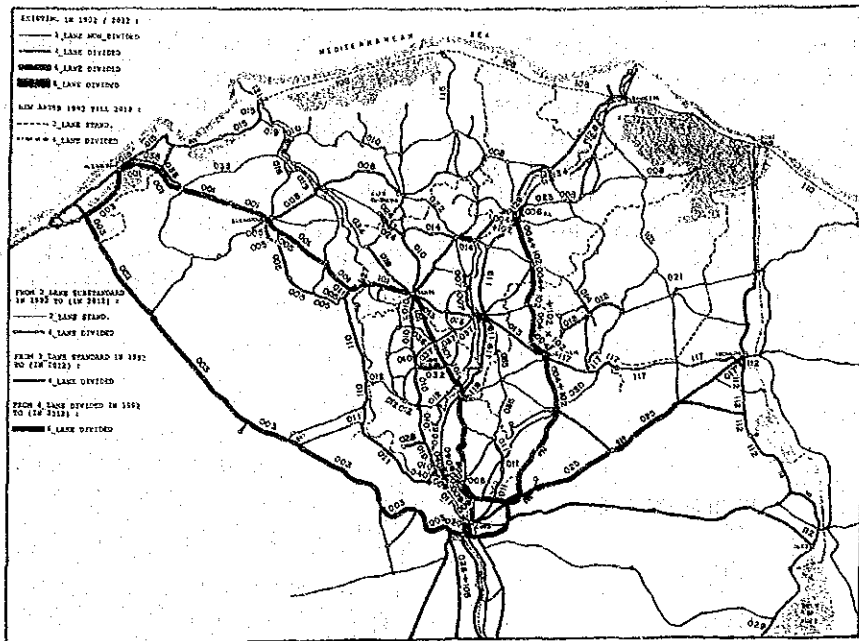


Limit of Multi-grading of Railway Crosses

- ▬ Existing Barrage
- ▬ Existing Bridge
- ▬ Bridge under Construction
- ▬ Basic Network Project
- ▬ Additionally Proposed Bridge
- ▬ Lateral Road Connection



13 Basic Network Projects



Implementation Schedule of Basic Highway Network Projects

PROJECT	DIST (Km)	COST (MLE)	Phase I					Phase II					Phase III									
			93	94	95	96	97	98	99	0	1	2	3	4	5	6	7	8	9	10	11	12
1001	104.0	54.4																				
1002	32.0	16.7																				
1004	18.0	16.7																				
1005	43.0	7.1																				
1006	4.0	2.0																				
1007	16.5	8.4																				
1008	48.0	24.3																				
1009	14.0	2.3																				
1010	14.0	9.1																				
1011	35.0	17.7																				
1012	38.0	19.3																				
1013	25.0	16.8																				
1014	9.0	1.5																				
1015	33.0	5.5																				
1101	44.0	30.0																				
1102	56.5	42.0																				
1103	42.0	10.0																				
1104	100.0	15.0																				
1105	472.0	250.0																				
1106	240.0	100.0																				
1107	40.0	9.0																				
1108	75.0	70.0																				
1109	175.0	32.0																				
1110	45.0	23.0																				
1111	40.0	20.0																				
1124	2.5	35.0																				
1125	3.0	30.0																				
1126	1.0	10.0																				
1127	2.5	10.0																				
1128	4.0	17.0																				
1129	2.5	17.0																				
1130	3.0	22.0																				
1131	2.0	25.0																				
1132	75.0	35.0																				
2003	205.0	107.1																				
2004	56.5	29.5																				
2006	46.0	29.5																				
2008	13.0	2.2																				
2009	14.0	9.4																				
2010	17.0	9.0																				
2011	96.5	40.9																				
2013	30.0	15.2																				
2014	28.5	18.2																				
2015	52.0	31.0																				
2016	18.0	9.1																				
2017	4.0	2.0																				
2018	23.0	3.8																				
2019	14.0	2.3																				
2020	22.0	3.6																				
2021	10.5	1.5																				
2022	26.0	4.3																				
2023	17.6	2.9																				
2024	15.0	2.7																				
2041	20.0	8.4																				
2112	78.9	40.0																				
2113	86.0	35.2																				
2114	60.0	25.2																				
2115	40.0	6.6																				
2117	72.0	48.4																				
2118	61.0	30.9																				
2119	61.0	30.9																				
2120	286.0	19.5																				
2121	321.0	55.5																				
2122	250.0	105.2																				
2123	235.0	98.9																				
2133	6.0	130.0																				
2134	2.0	43.3																				
2135	1.0	0.6																				
2136	1.0	0.5																				
3005	51.0	36.9																				
3008	6.0	0.9																				
3010	77.0	160.7																				
3011	23.5	15.8																				
3012	43.0	7.1																				
3015	5.0	3.4																				
3016	39.0	19.8																				
3018	23.0	15.5																				
3019	24.0	4.0																				
3024	16.0	10.8																				
3025	61.0	31.9																				
3026	389.0	197.2																				
3027	44.0	22.3																				
3028	8.0	5.0																				
3029	399.0	202.3																				
3030	7.0	3.5																				
3031	165.0	83.7																				
3032	11.0	6.9																				
3033	37.0	6.1																				
3034	22.0	3.6																				
3035	39.0	6.5																				
3036	11.0	1.8																				
3037	30.0	5.0																				
3038	26.0	20.8																				
3039	272.0	103.0																				
3040	6.5	37.5																				

— MLS
 - - - LDA

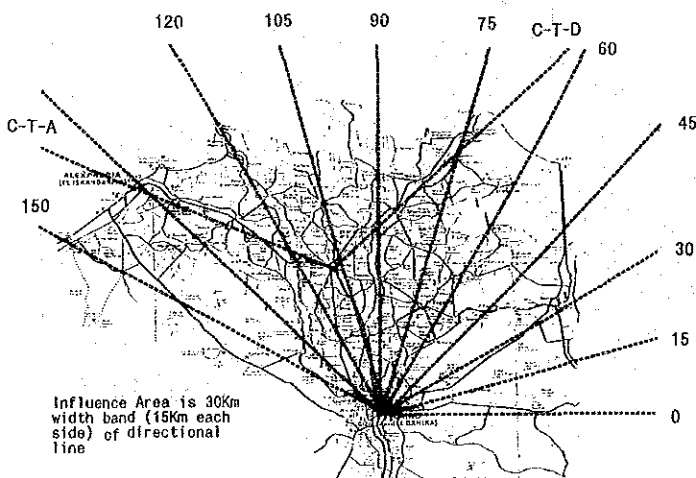
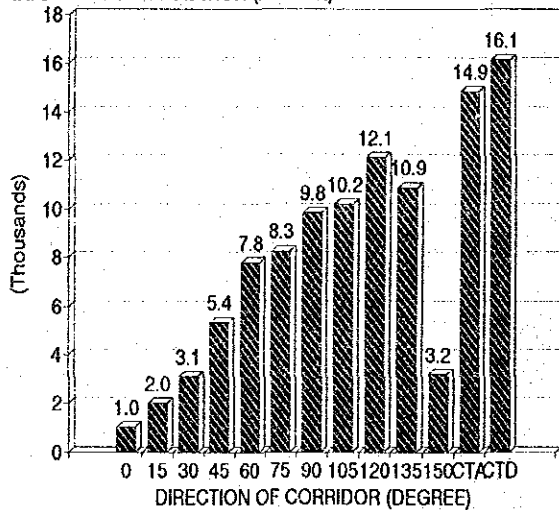
14 HLS (Higher Level of Service Projects) Master Plan

(1) Definition

In addition to the basic masterplan network, freeway network which provides Higher Level of Service (HLS) by full access control system either on embankment or on viaducts was planned. The main purpose of HLS is to segregate local and intercity traffic, therefore they were planned in the highly developed Delta and its adjacent area.

The 120° radial axis from East with its center at Cairo, assuming 15Km of influenced area at both sides, gives the highest influenced population, and the bent axis of Cairo - Tanta - Alexandria, Cairo - Tanta - Damietta give more influenced population.

INFLUENCED POPULATION (MILLION)



Influenced Population by Axis

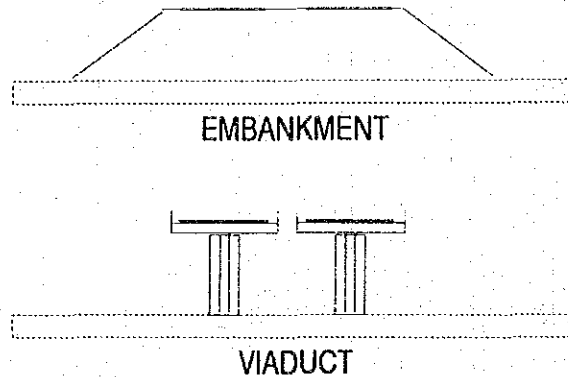


Image of Freeway Cross Sections

(2) Freeway Network

Three alternative freeway networks were planned taking population distribution, freeway intervals, and existing highway network

Alternative-1 aims at equal service to all Delta area with max. 50 Km access to the nearest freeway, following radial shape. Total freeway network length : 673.5 Km.

Alternative-2 aims to form double trunk line networks with existing trunk highways, following radial and circular shape. Total freeway network length : 605.0 Km.

Alternative-3 is planned following high demand generating cities, and radial and transversal shape. Total freeway network length : 585.0 Km.

Operational evaluation of 3 alternatives shows the highest efficiency in the alternative 3, whose PCU-Km and PCU-Hr saving based on the Basic Masterplan Network are the highest.

HLS Alternative Evaluation Indices

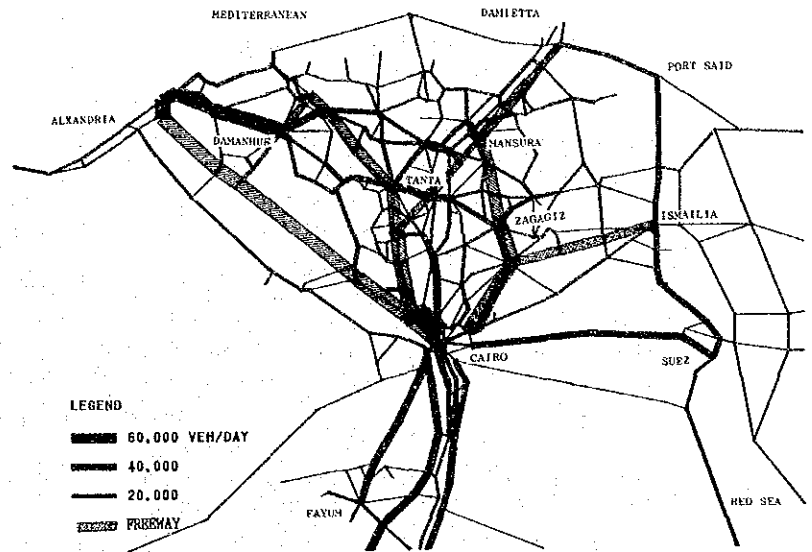
Description	Unit	Alt-1	Alt-2	Alt-3
1 Freeway Length	Km	673.5	605.0	585.0
2 Entry Trip	1,000 PCU	500.1	466.4	559.7
3 PCU-Km Saving	1,000 PCU-Km	44.4	235.1	261.4
4 PCU-Hr Saving	1,000 PCU-Hr	20.1	20.5	23.4
5 Av. Speed	Km/Hr	71	70	71
6 Additional Lane-Km	Lane-Km	902.5	491.5	371.5
	(%)	9.3	5.0	3.8

Some of the demand response widening projects in the Basic Masterplan Network can be canceled by absorbing demand in freeway network, and the additional land, represented by lane-Km, by the construction of freeway network is small, ranging from 3.8% to 9.3% of the land required in the Basic Network Masterplan.

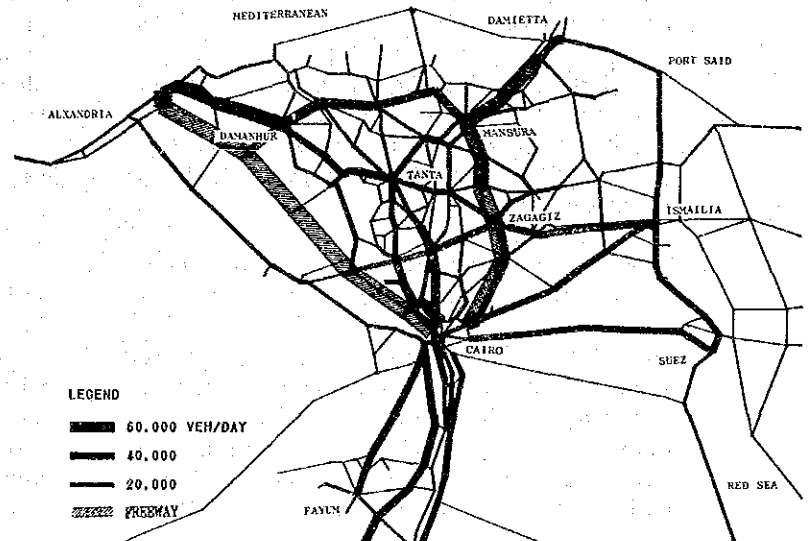
(3) Freeways by 2012

All the three alternatives have the same corridors of Cairo - Alexandria and Cairo - Damietta, where high demand is expected, although two corridors will not be sufficient as freeway network in Egypt beyond 2012.

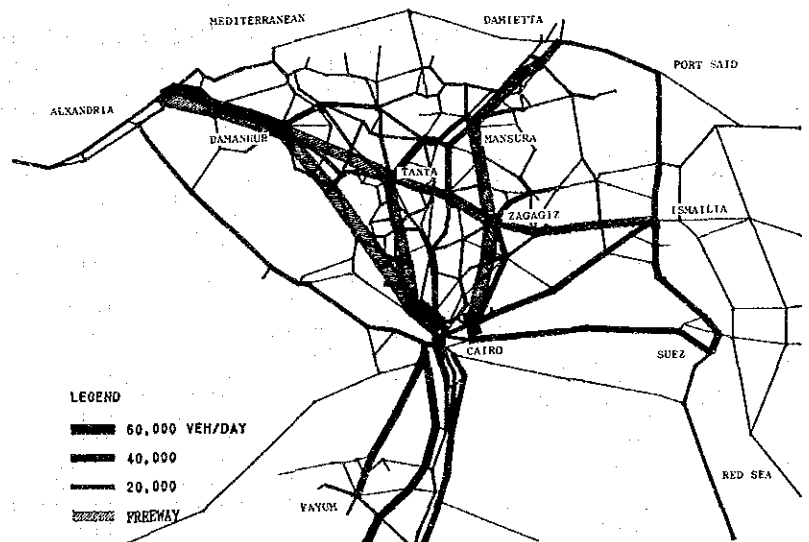
The financial capability in the road development expenditure based on the past investment records allows about 3,000 M.LE additional investment by 2012, so that about 300 Km of freeway was assumed as the maximum possible length which can be invested from the government fund by 2012. Therefore two corridors of Cairo - Alexandria and Cairo - Damietta were selected as the first corridors to be studied in HLS masterplan alternative.



Alternative-1 Network and Traffic Flow



Alternative-2 Network and Traffic Flow



Alternative-3 Network and Traffic Flow

15 HLS Corridor Analysis

(1) Implementation Schedule and Cost Estimate

Cairo - Alexandria Corridor was selected as the first freeway, then Cairo - Damietta freeway was assumed to be completed by the end of 2012. Both freeways are planned to be toll roads. Cairo - Alexandria freeway is planned in the semi-desert area between existing Desert and Agriculture Roads. The optimum toll level, which gives the maximum annual revenue was calculated at 0.06 LE/Km as the distance related toll system. The toll of Cairo - Alexandria (169Km) is about 10 LE for a passenger car, which is almost 10 times the present.

The traffic demand on Cairo - Alexandria freeway was estimated at 89,600 veh./day and 68,600 veh./day on Cairo - Damietta freeway (156Km) in average.

The construction costs including land acquisition costs in financial terms were estimated at 1,116.1 M.LE for Cairo - Alexandria freeway and 1,626.7 M.LE for Cairo - Damietta freeway. The construction of the first freeway will take 7 years from 1998 to 2005. Annual investment was allocated at about 200 M.LE/Year level.

(2) Financial Evaluation

All the expenditure including initial investment and interest can be covered by toll, under loan conditions of 25 years pay back period and 8% annual interest rate with 5 years grace period. Accumulated balance will turn to net surplus at 24 years after the initiation of the project. FIRR was calculated at 5.57%.

(3) Economic Evaluation of Freeways

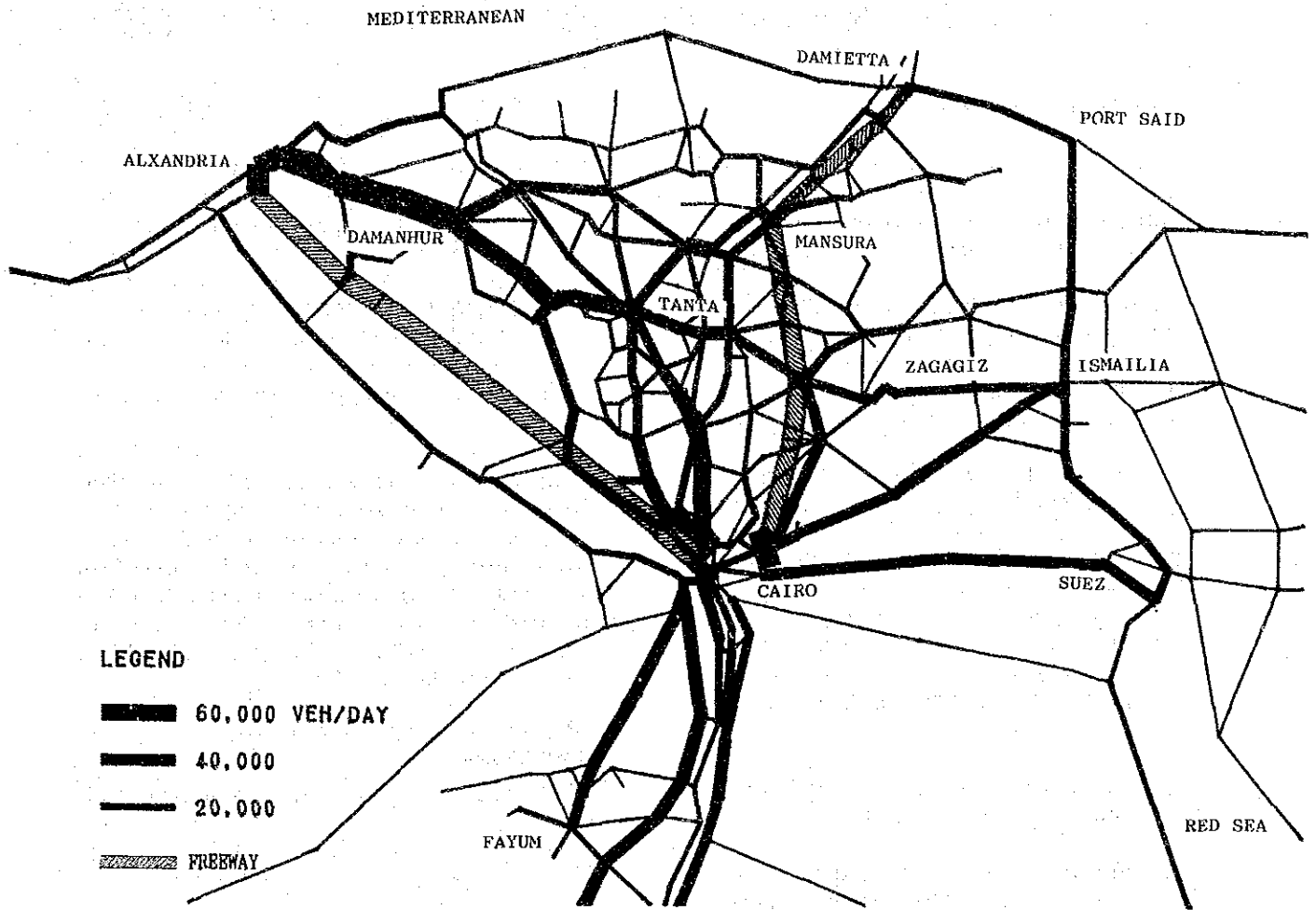
The VOC saving of the freeways on the basis of Masterplan network without freeways gives EIRR 25.2%, NPV 806.0 M.LE in 1992 with 12% of discount rate and 1.47 of B/C, which shows the sufficient economic return.

(4) Economic Evaluation of HLS Masterplan

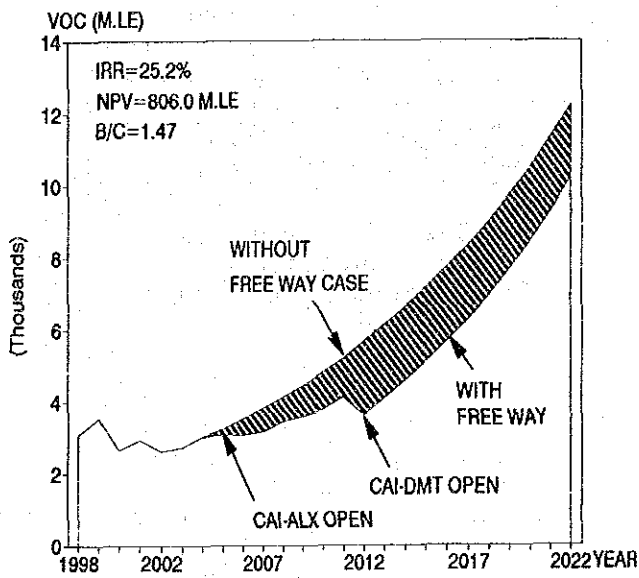
The basic masterplan network will be affected by freeways, and some of LDA and MLS projects can be cancelled from the view point of traffic demand. The allover economic evaluation based on the revised base network gives values of EIRR 78.1%, NPV 17,708 M.LE and B/C 9.5, which are slightly less than those in the basic network masterplan.

CAI-ALX and CAI-DMT Freeway Investment Schedule

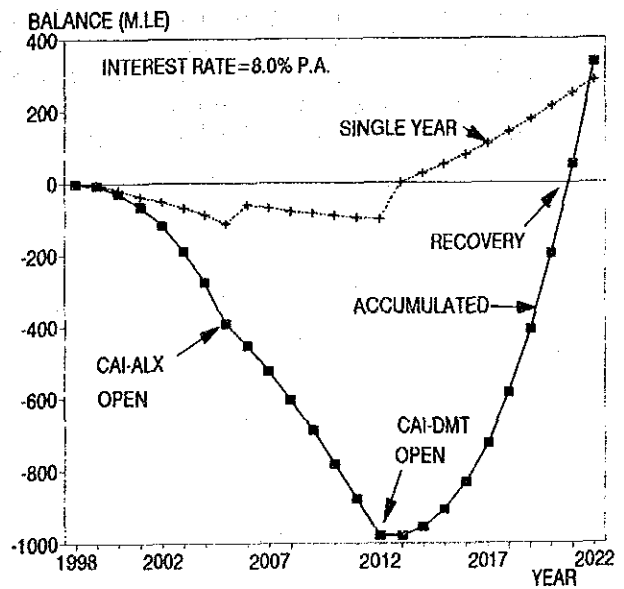
YEAR	FINANCIAL COST (M.LE)				TOTAL	ECONOMIC COST (M.LE)				TOTAL
	CAI-ALX		CAI-DMT			CAI-ALX		CAI-DMT		
	Land	Const	Land	Const		Land	Const	Land	Const	
1998	31.9				31.9	31.9				31.9
1999	31.9				31.9	31.9				31.9
2000		199.4			199.4		265.4			265.4
2001		199.4			199.4		265.4			265.4
2002		199.4			199.4		265.4			265.4
2003		151.4	48.0		199.4		217.4	48.0		265.4
2004		151.4	48.0		199.4		217.4	48.0		265.4
2005		151.4	48.0		199.4		217.4	48.0		265.4
2006				211.8	211.8				273.5	273.5
2007				211.8	211.8				273.5	273.5
2008				211.8	211.8				273.5	273.5
2009				211.8	211.8				273.5	273.5
2010				211.8	211.8				273.5	273.5
2011				211.8	211.8				273.5	273.5
2012				211.8	211.8				273.5	273.5
TOTAL	63.7	1052.4	144.1	1482.6	2742.8	63.7	1448.5	144.1	1914.2	3570.5



Traffic Flow with CAI-ALX and CAI-DMT Freeways in 2012



VOC of Freeway and Revised Basic Master Plan



Freeway Financial Balance

16 Intercity Bus and Taxi Service Master Plan (1)

(1) Future Demand

Demand for public road transport will increase by 2.83 times from 825,000 passengers/day in 1992 to 2,338,000 in 2012.

Currently, buses transport 53% of the demand and taxis, 47%. If future demand is economically shared by bus and taxi, bus share would increase by 5%.

Future Demand for Public Road Transport

	1992	2002	2012	2012/92
Bus	435	771	1,365	3.14
Taxi	390	616	973	2.50
Total	825	1,387	2,338	2.83

(2) Economic Comparison of Taxi and Bus

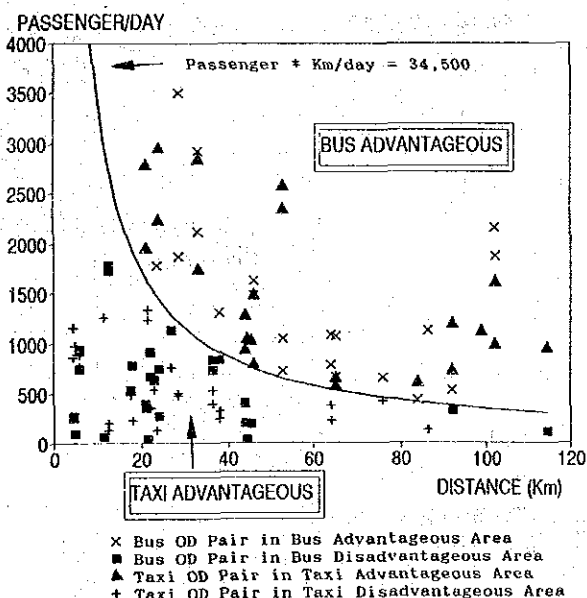
In Egypt, taxis and buses are used in similar way for inter-city passenger transport. However, buses have economic advantages for long distance trip and large volume of demand and taxis have advantages under opposite operations.

Theoretically, buses are less costly when daily demand is more than 34,500 passenger-Km, if calculating based on the present data. Actually, present demand for public transport were classified on OD basis.

(Passenger-Km/day)

	economical use	uneconomical use	Total
Bus	25,779.0	51,909.4	77,688.4
Taxi	45,820.4	22,083.5	67,903.9
Total	71,599.4	73,992.9	145,592.3

Many bus passengers are transported by less economical mode. This suggested the importance of more services by small sized vehicles such as taxi and mini-bus. This should be noted for reformation of bus routes after the privatization of bus companies.



Bus/Taxi OD Pair Distribution in Advantage/Disadvantage Area in 1992

(3) Bus Fleet

Total number of bus fleet under operation has been moderately increased in the past ten years from 2627 in 1982 to 2873 in 1992. During this time period, aged buses increased from 12% to 43%, due to neglecting fleet replacement.

In 2012, more than three times of the present fleet will be needed. Total demand for bus acquisition will be more than 12,000 units in coming 20 years, totaling replacement and fleet for demand increase.

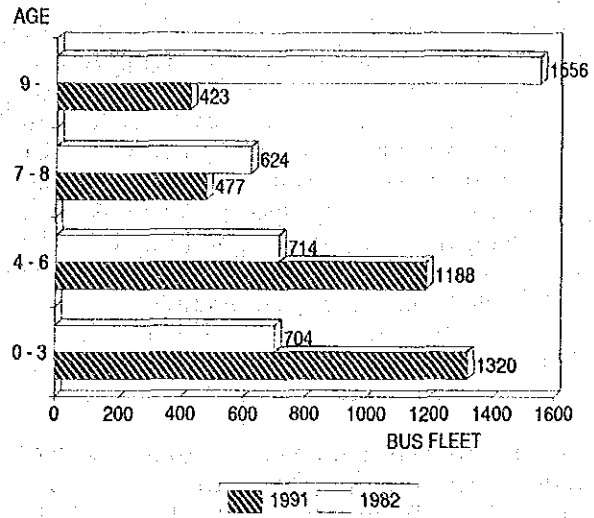
Future Bus Fleet and Necessary Acquisition

	1992	2002	2012
Total Fleet	3,600	6,400	11,200
Net Increase	2,800	4,800	
Replacement	2,720	2,030	
Total Input	5,520	6,830	

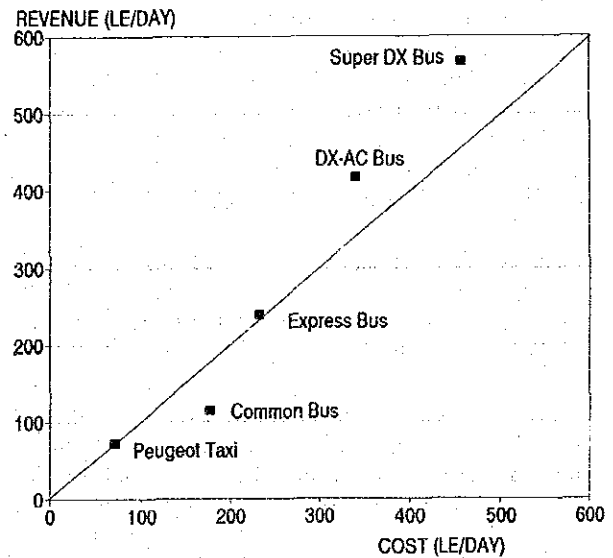
(4) Cost and Revenue

When the average trip length (125Km) is operated by each of taxi and buses, operating cost and revenue are as shown in the Figure.

While buses offering higher priced services get profit, the others result in deficit. To keep their financial management in sound condition, it may be necessary to raise the current fare of common and express bus and taxi, by 15-20%.



Bus Age Distribution



Revenue and Cost of Bus and Taxi

17 Intercity Bus and Taxi Service Master Plan (2)

(1) Present Management System of Terminals

While intercity bus terminals are owned and managed by bus companies, intercity taxi terminals are owned by the Governorates and managed either by the Governorates or by drivers union. Taxis are charged terminal fee at every departure. The amount depends on the taxi's trip length, generally equivalent to 5-10 % of one trip revenue.

(2) Improvement and Relocation Plan of Terminals

In the whole country, there are 224 bus terminals and 237 taxi terminals in 1992. They are classified into six categories according to the present conditions and facilities:

- A. In good or fair conditions and no need to improve.
- B. Need to improve or construct office and other facilities.
- C. In addition to B, need to construct platforms and shed.
- D. In addition to B, need to pave.
- E. In addition to C, need to pave.

37% of bus terminals and only 7% of taxi terminals are in good or fair conditions and the others are need to be improved.

Some taxi terminals in the city centers cannot accommodate the demand and need to be relocated to the periphery of the city, to have enough space. Also development of new taxi terminals will be needed to meet the future demand increase.

Total investment cost of bus terminal is estimated at 7.4 M.LE and of taxi terminals at 10.8 M.LE. It is recommended that all the existing

terminals of bus and taxi should be improved into good conditions by 1997, at a cost of 15.7 M.LE. After 1997, new taxi terminals are to be constructed.

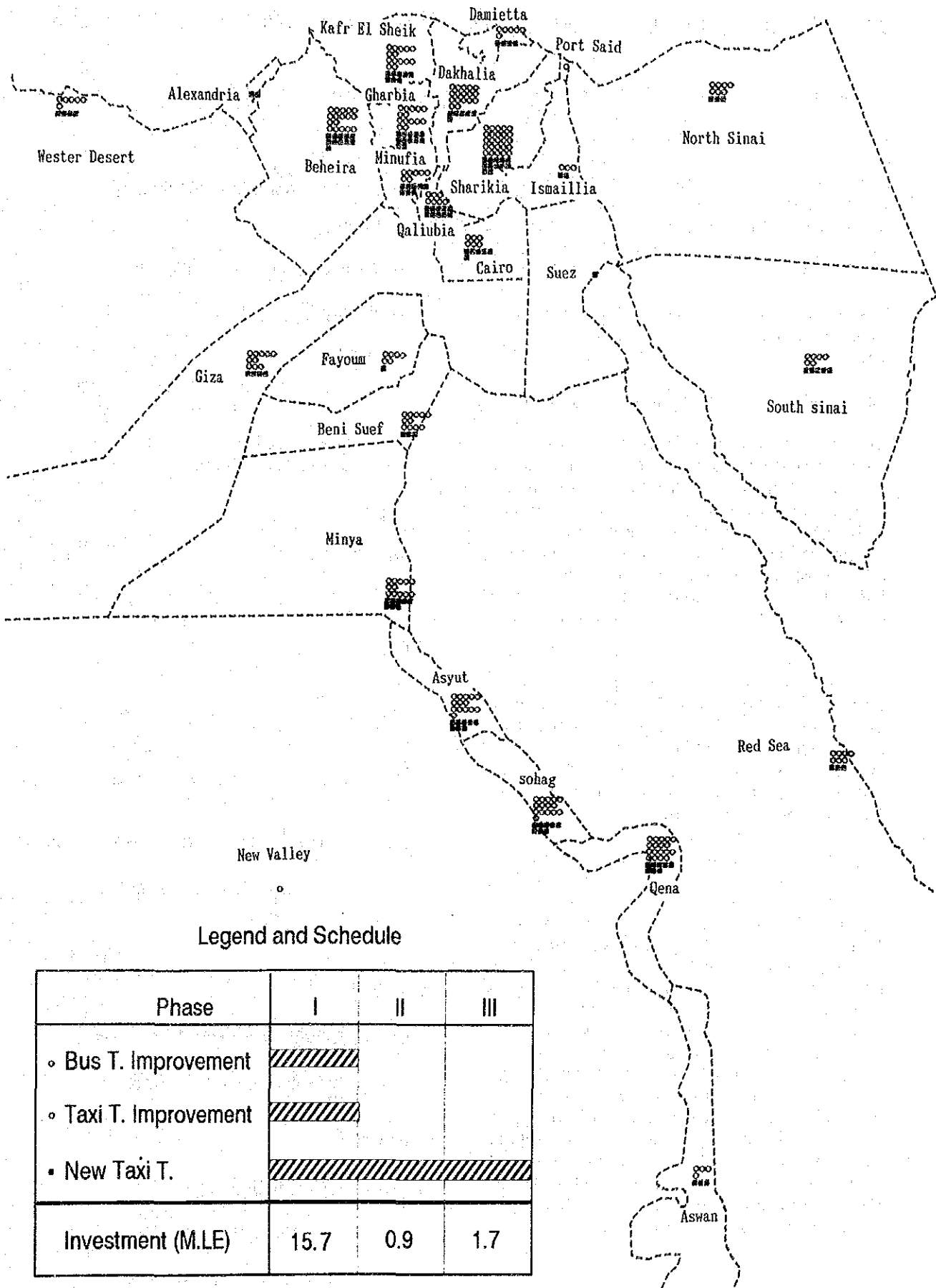
Bus and Taxi Terminal Plan (No. of terminals) 1,000 LE

Project	Bus T.	Taxi T.
A No need to improve	(81)	(22)
B Office building	(11) 233.2	(30) 96.0
C B+Platform and Shed	(46) 1,212.7	(37) 617.9
D B+Paving	(19) 570.0	(60) 1,489.8
E C+D	(67) 5,413.9	(31) 928.8
R Relocation	(-)	(51) 2,715.8
N New Terminal	(-)	(90) 4,936.5
Total	(224) 7,429.8	(327) 10,785.0

(3) Financial Conditions

The revenue from taxi terminal charge is spent for maintenance and operational expense and the Governorates' surcharge. After deducting expenses, some amount of surplus can be expected every year and accumulated total surplus during 1998-2003 will amount to the total investment cost of 10.8 M.LE.

In case of bus terminals, annual investment amount for terminal improvement will be equivalent only to 0.3 to 0.9% of each bus company's current expenditure. Thus, this terminal plan will have no serious difficulty to finance.



Bus and Taxi Terminals Improvement Projects Location

18 Intercity Road Freight Transport Master Plan (1)

(1) Freight Demand and Fleet

The total inter-city road freight demand in 2012 will increase to 498 million ton./year or 3.0 times the 1992 figure, especially construction materials will increase by 4.1 times and agricultural and industrial products will increase by 2.4 times.

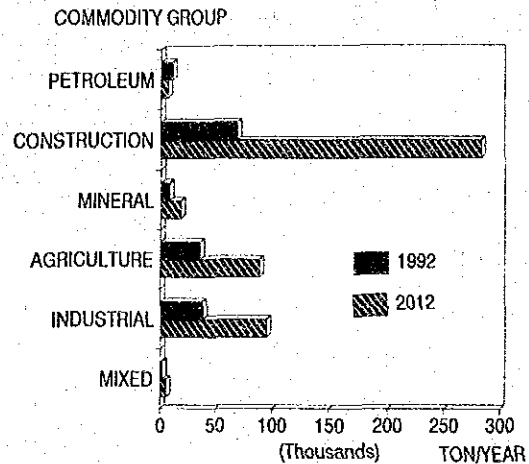
Freight vehicles in 2012 will increase to 873,000 veh. or 2.11 times the present.

(2) Road Freight Transport System

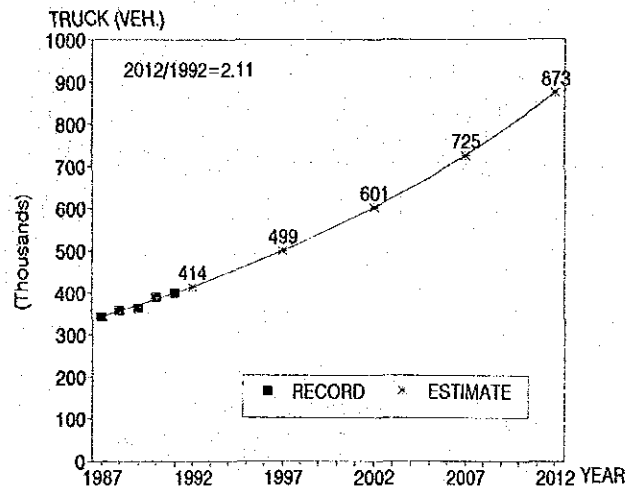
Presently road freight transport industries can be categorized into 5 major groups; 5 public transport companies, own account fleet mostly belonging to public industries, 25 cooperatives, 3 big private transport companies established under the investment law, and small - medium scale private transport industries.

The share of fleet in the small - medium scale companies reaches almost 68.8% of the total fleet, which serve for inter-city freight, while the freight capacity share of own account fleet in terms of ton is estimated at 37% of the total, and that of cooperatives 30%.

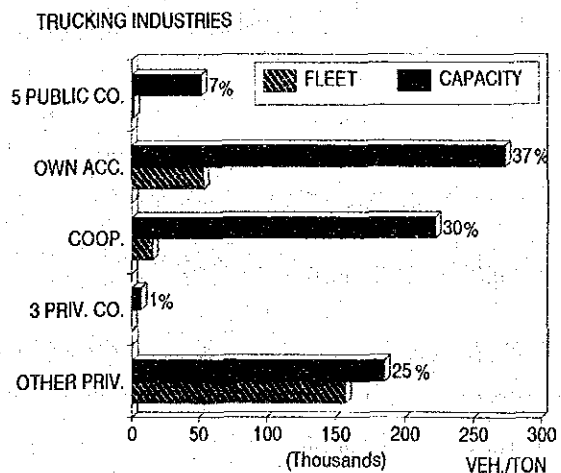
5 public companies, own account fleet and cooperatives are facing privatization process, and their reorganization to ensure their financial condition and to increase economic efficiency are the main objectives of the road freight transport masterplan, and the introduction of line haul system is planned. The lines were planned along the corridors having large road freight demand from Cairo to Alexandria, Mansura and Minya, between Minya and Qena, from Cairo to Alexandria, Damietta and Suez as import/export corridors, and between Cairo and Alexandria as a domestic container freight corridor.



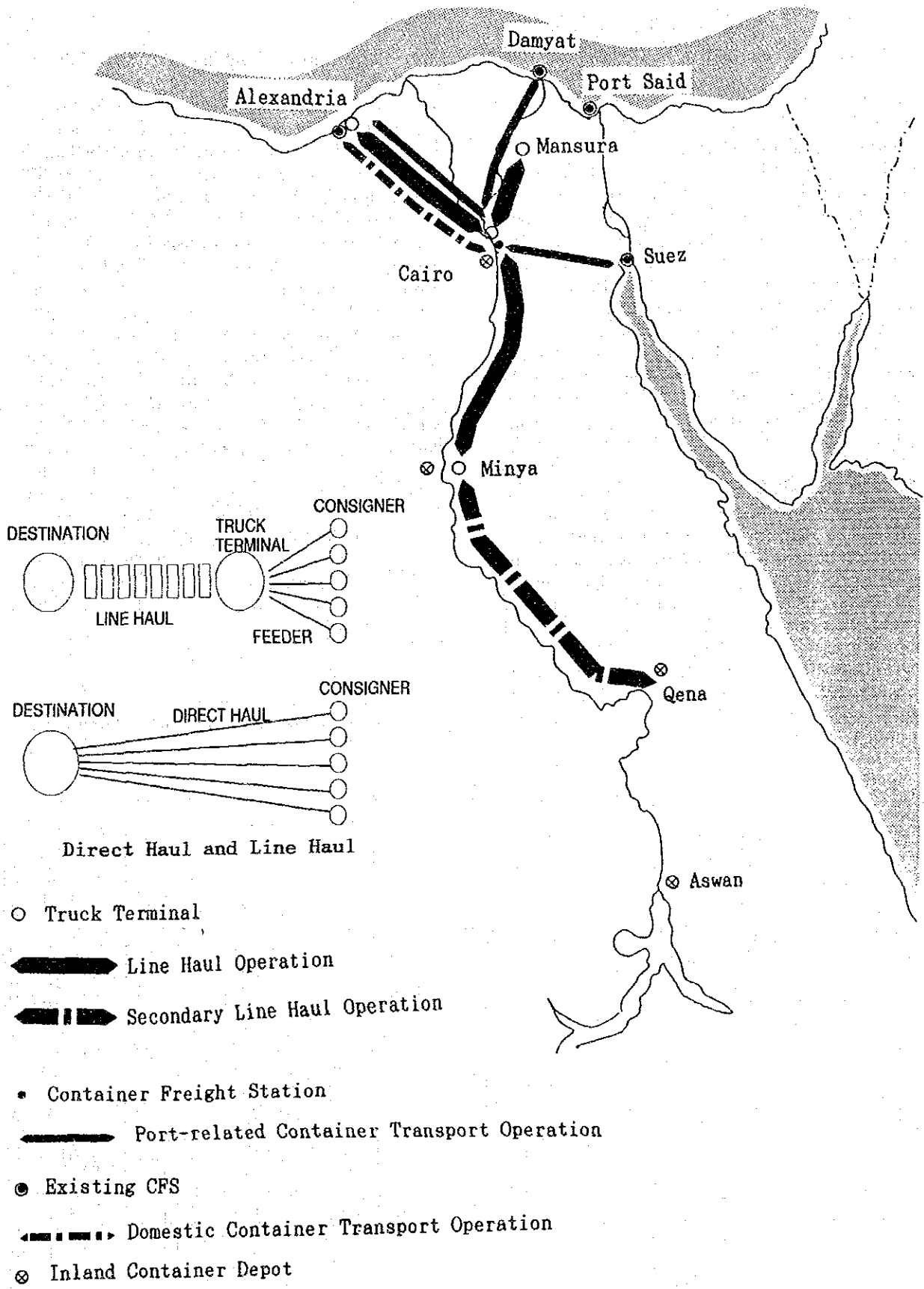
Road Freight Growth by Commodity Group



Freight Vehicle Growth



Road Freight Vehicle Fleet and Transport Capacity by Industry Category

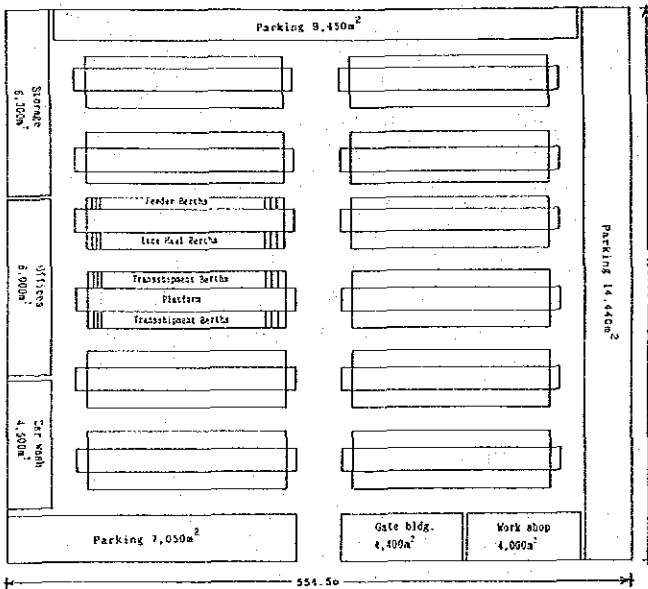


19 Intercity Road Freight Transport Master Plan (2)

(1) Truck terminal

To support line haul system, 4 truck terminals in Cairo, Alexandria, Mansoura and Minya were planned. Bulk commodities such as petroleum products, mineral products and cereals will be transported by big transport companies and cooperatives, and construction materials and fresh agricultural products will be transported by individual truckers in the same manner as at present. Industrial general cargoes and parcels are main commodities to be handled in truck terminals and by small-medium scale trucking companies.

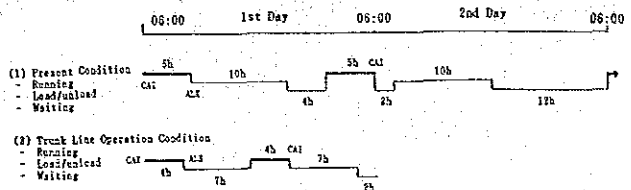
Truck terminals will increase the transport efficiency on line haul, and will decrease congestion on city center caused by cargo handling and enforced waiting time by the regulation to control entering of large vehicles in big cities. Cairo truck terminal was planned by 2012, and the construction cost was estimated at 44.91 M.LE in terms of financial cost and 50.30 M.LE in terms of economic cost.



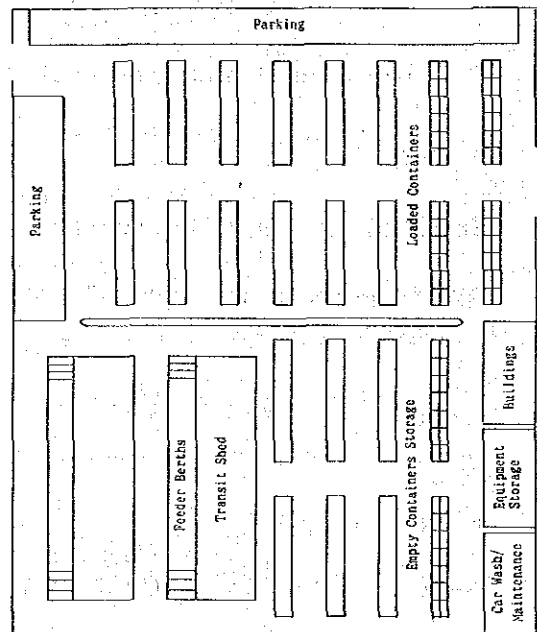
Truck Terminals

(2) Container Freight Station (CFS)

2 container freight terminals (CFS) were planned at Cairo for import goods and for domestic goods between Cairo and Alexandria. The former CFS will support the Government policy to containerize import goods transport so that import sea ports can handle these goods more efficiently, and the later CFS intends to increase loading efficiency of freight between Cairo and Alexandria. The construction costs of CFSs were estimated at 53.38 and 19.78 M.LE respectively in terms of financial cost and 62.55 and 22.84 M.LE in terms of economic cost.



Rotation Change by Truck Terminal



(Not to scale)

Container Freight Stations

(3) Economic Evaluation

With truck terminal, rationalization of loading on truck can reduce fleet number of line haul trucks by 35% of general cargo trucks. Free operation can also reduce long waiting time owing to the traffic control against trucks. Feeder service of the line haul trucks themselves is replaced by that of smaller trucks.

Total benefit in 2012 amounts to 29.9 M.LE per year and the project proves to be very promising with 51% of EIRR.

Container freight stations (CFS) can generate same kinds of benefit. It is reckoned that Cairo CFS for import goods generates 32.0 M.LE of benefit, while Cairo-Alexandria CFS for domestic goods can enhance 13.9 M.LE per year at 2012. EIRRs are 43.1% and 96.2% respectively and prove that both CFSs are very promising projects.

(4) Financial Evaluation

Minimum charge of truck terminal to cover only operation cost is calculated at about 12.5 LE/veh. which equivalents to 10% of present freight tariff and may induce heavy burden for trucking companies to absorb. Minimum charge of CFSs for import and domestic goods are 21.9 and 24.9 LE/veh, far high than truck terminal.

It is suggested that the Government invests all or a part of the initial cost to implement such economically well feasible projects. In order to guarantee minimum investment return of 20% with charge of 20 LE/veh., necessary support amounts to 80% of total cost in the case of truck terminal. With charge of 50 LE/veh., CFSs require the government support amounting to 63% and 81% of construction costs.

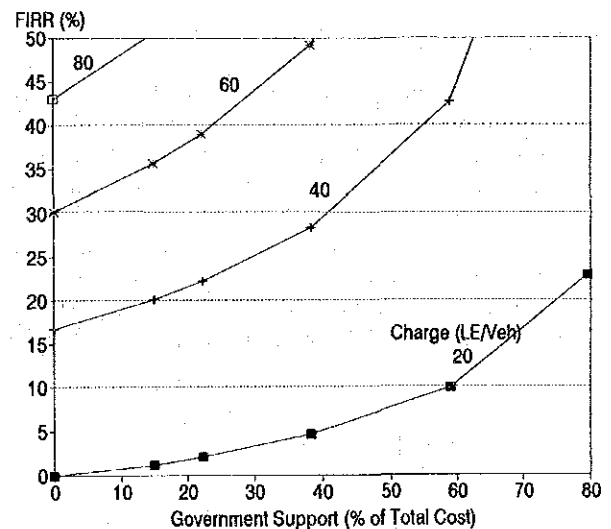
Taking the financial situation into consideration, a truck terminal at Cairo and two CFSs are recommended by 2012.

Truck Terminals

Description	Unit	Cairo	Alex- andria	Mansoura	Minya	Total
Daily Cap.	ton	19,000	5,830	2,470	1,700	29,000
Daily Veh.	Veh.	1,840	590	260	200	2,890
Berth No.	No.	600	200	90	70	960
Area	Sqm	267,546	92,613	54,056	36,608	450,823
Cost	M.LE	44.91	15.15	8.12	6.06	74.24

Container Freight Station

Description	Unit	Cairo Imports	CAI-AIX Domestic	Total
Daily Cap.	TEU	560	200	760
Daily Veh.	Veh.	1,310	470	1,780
Berth No.	No.	500	200	700
Area	Sqm	478,662	158,670	635,332
Cost	M.LE	53.38	19.78	73.16



FIRR of Truck Terminal Project

20 Recommendations

(1) MOT's Roles in Public Transport

By the law 203, transport business is to be privatized and liberalized, abolishing interference by the Government. However, considering strong public nature of transport services, some controls by the Government will be needed to avoid social frictions. In public transport administration, main roles of MOT will be:

- A. To license and approve transport business
- B. To guide fare and tariff based on the "cost-plus-profit" principle
- C. To foster transport business by:
 - * Subsidy to maintain minimum level of public transport service
 - * Finance with soft loans
 - * Aid to research and development
 - * Tax exemption or reduction
- D. Information service
 - * Open use of transport information
 - * Publication of Year Book
 - * Updating of laws and regulations

In order to undertake above roles, MOT, especially TPA needs to be strengthened in respect to budget, staff and equipment. It is also suggested that CTD shall have close cooperation with MOT for the integrate transport administration.

(2) Toward the Freeway Era

The proposed "Basic Network" is able to cope with future traffic increase, keeping the present level of service. Furthermore, aiming at highway services higher in quality, freeway projects were studied as optional plan and it is preliminarily concluded that they will serve a significant volume of traf-

fic demand, will be economically feasible and also financially viable. Therefore, Study Team recommends to start preparation for the introduction of the freeway era early next century.

Total cost of 2,743 million LE is not small amount, but not far beyond the trend of MOT's past budget, and it will be recovered by toll revenue in the long run. To facilitate funding, staffing and flexible activity, it is advisable to establish an entity, which shall be financially independent and responsible for construction and operation of freeways.

(3) Next Five Year Plan (1998-2002)

After completion of all the projects planned in the current Five Year Plan, the following investments are recommended for the next five year plan period:

	M.LE
* Basic Network Project	607.4
* Freeway	662.0
* Nile Bridges, not included above projects	162.5
* Truck/Container Terminal	118.1
* Bus and Taxi Terminals	16.6
Total	1,566.6

Of these, net government investment will be 864.4 M.LE, excluding freeway, bus/taxi terminals and a part of truck/container terminals which are expectedly financed by non governmental fund. Followings are the main road projects, which are mostly to cope with demand increase in the Delta.

- *Cairo-Alex Freeway (169.0Km)
- *Kafr-El Zayat Bridge-Alexandria 6 lane widening (104.0Km)
- *Tanta-Zagazig 4 lane widening (55.0Km)
- *Zagazig-Faquos 4 lane widening (38.0Km)

List of Participants

Advisory Committee	Steering Committee
Prof. Koichi Yamagata	Dr. Ahmed Eisawi Saleh
Eng. Tetsuo Matsumura	Eng. Hussein Halim
Mr. Kota Kishi	Eng. Fouad Abd-El-Aziz
JICA Study Team	Eng. Zakaria Abd-Allah
	Gen. Mohamed El-Tahar Hegab
Dr. Juro Kodera	Gen. Mohamed Maher
Mr. Yoshinobu Nomura	Kandeeel
Mr. Tetsuo Kawamura	Gen. Mohamed Reda Abd-El-Aziz
Mr. Teruhiko Horie	Gen. Hany Hosny
Prof. Mohamed El-Hawary	Prof. Abd-El Gawad Bahgat
Mr. Hidetsune Ishii	Dr. Sayed Abd-El-Kader
Mr. Mahmoud S. Riad	Dr. Mohamed Abd-El-Farah Mongi
Mr. Tetsuo Horie	Dr. Fayka El-Refai
Mr. Tetsuo Wakui	Dr. Abd-El-Salam Gomaa
Mr. Akihisa Kojima	Dr. Sayed Dohia
Egyptian Counter Parts	Mr. Hanafy Selim Kotb
Eng. Hassan Selim	Eng. Mokhtar Mostafa Hassan
Mr. Ibrahim Abbass	Egyptian Officials
Mr. Abd-El-Nabi El-Shasly	Eng. Samir Labib
Mr. Onsi Fahim	Eng. Mohamed Salah-El-Din
Mrs. Taysier Zaghloul	
Mr. Hamdy El-Tokhy	
Eng. Mohamed El-Sabagh	
Eng. Marwa El-Bishri	
Eng. Kamal El-Din	
Eng. Assem El-Faham	
Eng. Goneim Abd-El-Hai	
Eng. Ahmed Ibrahim	
Eng. Mostafa El-Sayed	
Eng. El-Moursy Mohamed El-Helw	
Eng. Sameh Mohamed	
Eng. Nagy Nageeb Ramadan	
	Vice Chairman of TPA
	Chairman of ENR
	Chairman of RBA
	Chairman of RTA
	Assistant Minister of Interior for Specialized Police (Ex.)
	Assistant Minister of Interior for Specialized Police (Ex.)
	Assistant Minister of Interior for Specialized Police
	Undersecretary of Ministry of Maritime Transport
	Professor of Road at El-Azhar University
	Vice Chairman of Industrialization Authority
	Advisor for Minister of Industry
	Deputy Governor of Central Bank for Economic Researches
	Director of Agricultural Research Center
	First Undersecretary of Ministry of Planning
	Undersecretary of Economic Affairs, TPA
	Undersecretary of Technical Affairs, TPA
	Head of Execution and Districts Sector, RBA
	General Director for Roads, RBA

JICA

