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FINAL REPORT

THE STUDY ON THE DEVELOPMENT OF THE PORTS OF ALGIERS, ORAN AND ANNABA IN ALGERIA

SUMMARY

FEBRUARY 1993

JAPAN INTERNATIONAL COOPERATION AGENCY

MINISTRY OF TRANSPORT
ALGERIA

FINAL REPORT

THE STUDY ON THE DEVELOPMENT OF THE PORTS OF ALGIERS, ORAN AND ANNABA IN ALGERIA

SUMMARY

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PREFACE

In response to a request from the Government of Democratic and Popular Republic of Algeria, the Government of Japan decided to conduct a study on the Development of the Port of Algiers, Oran and Annaba in Algeria and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Algeria a study team four times between September 1991 and December 1992, which was headed by Mr. Takao Hirota, President of the Overseas Coastal Area Development Institute of Japan(OCDI) and was composed of the staff members of the OCDI and the Nippon Koei Co.,Ltd.

The team conducted field surveys at the three ports, and held discussions with the Coordination Committee composed of officials concerned of the Government of Algeria and other public organizations. After the team returned to Japan, further studies were made and this 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 Algeria and other public organizations for the close cooperation they extended to the team.

February, 1993

Kensuke Yanagiya
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

February, 1993

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency

Dear Mr. Yanagiya:

It is my great pleasure to submit herewith the Report for the Study on the Development of the Ports of Algiers, Oran and Annaba in Algeria.

The Study Team which consists of the Overseas Coastal Area Development Institute of Japan and the Nippon Koei Co.,Ltd., headed by myself, conducted a survey in Algeria from September 1991 to December 1992 as per the contract with the Japan International Cooperation Agency.

The findings of this survey were fully discussed with the Algerian counterpart through the Coordination Committee composed of concerned officials of the Government of Algeria and related public organizations, to formulate the Master Plan for the period up to the year 2010 and to formulate and examine the feasibility of the Short-term Plan for the period up to the year 1997 and were then compiled into this report.

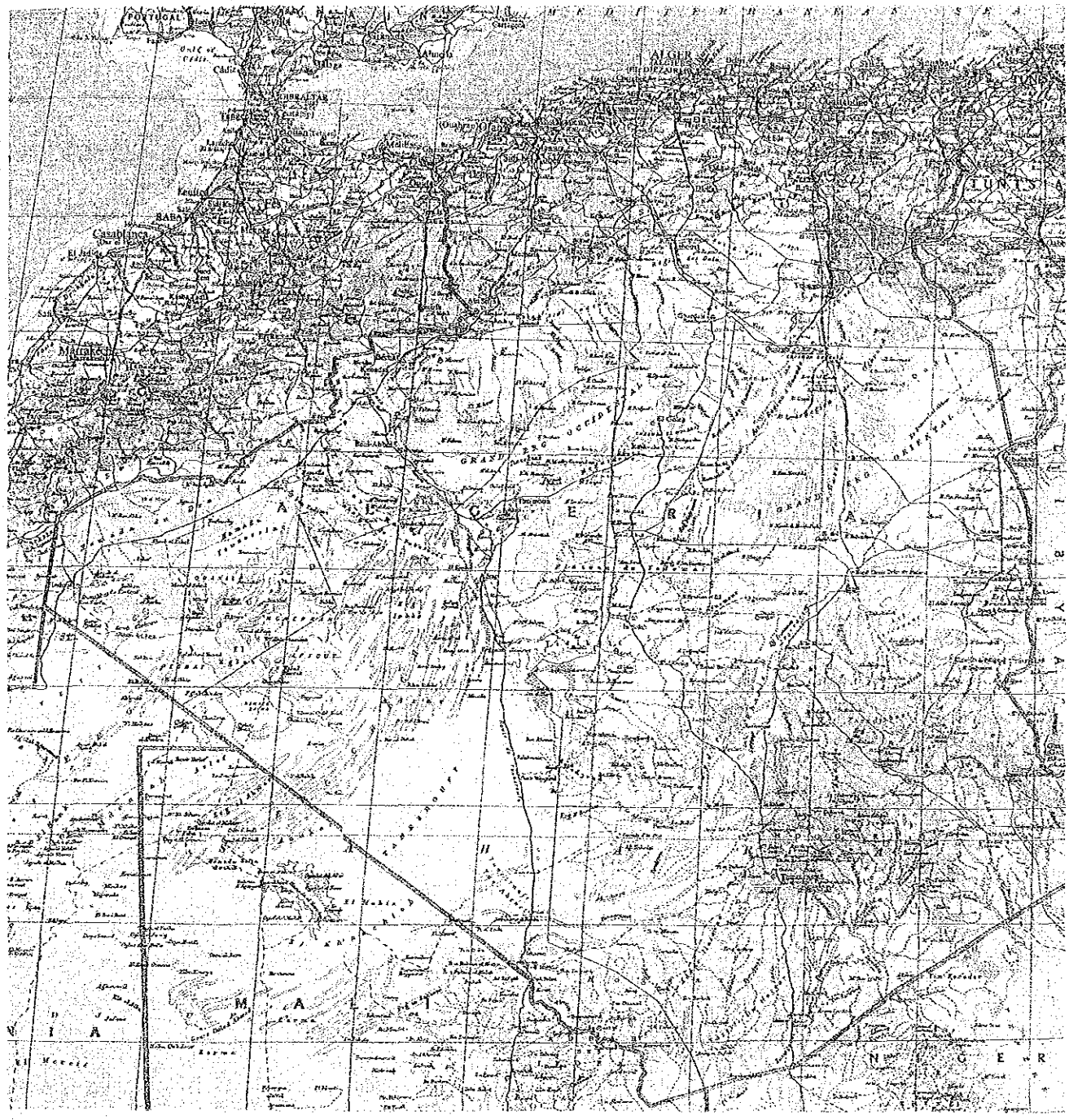
On behalf of the Study Team, I would like to express my deepest appreciation to the Government of Algeria and the various agencies concerned with the study for their brilliant cooperation and assistance and for the heartfelt hospitality which they extended to the Study Team during their stay in Algeria.

I am also greatly indebted to the Japan International Cooperation Agency, the Ministry of Foreign Affairs, the Ministry of Transport, and the Embassy of Japan in Algeria for giving us valuable suggestions and assistance during the field surveys and the preparation of this report.

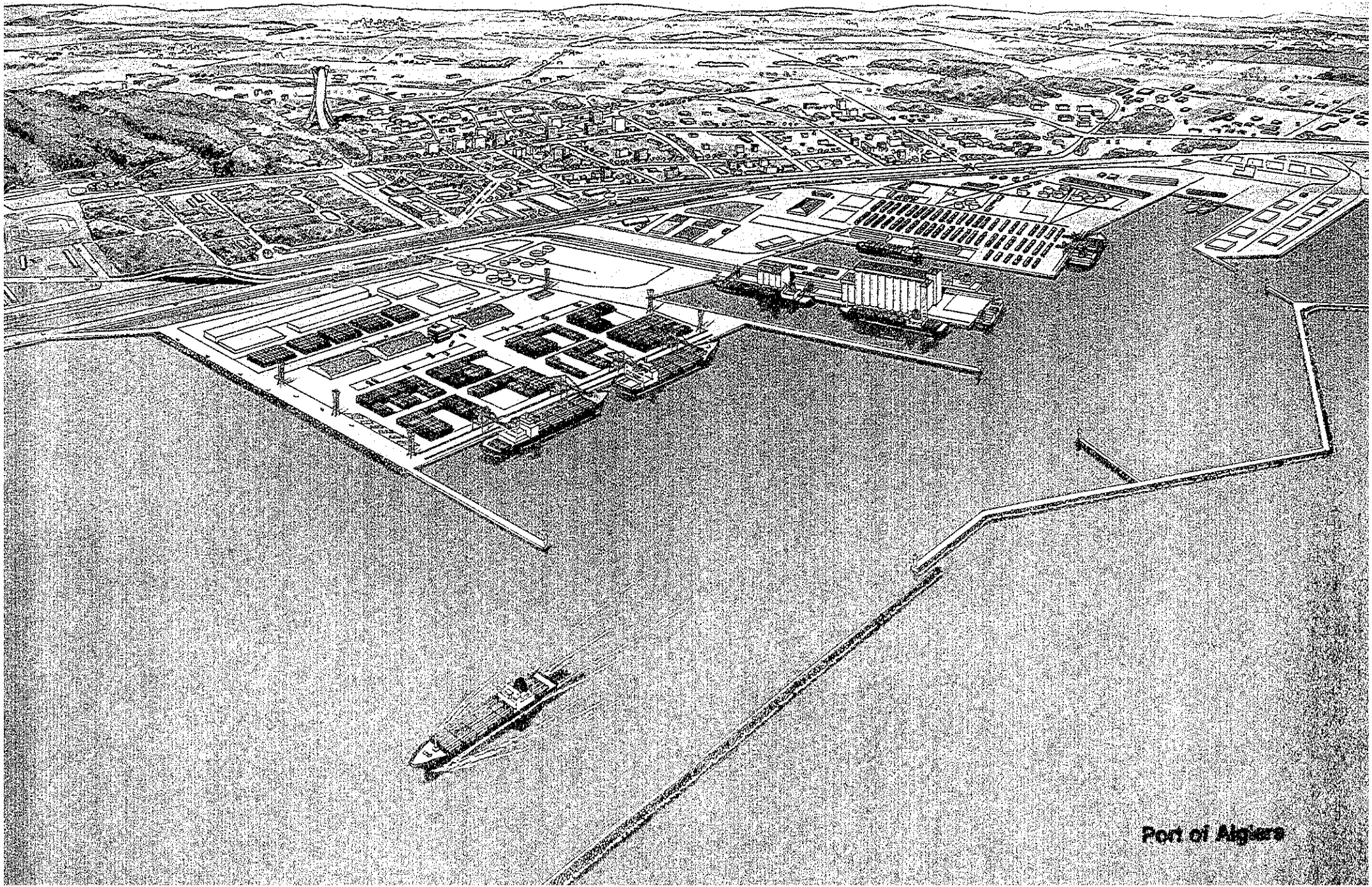
Respectfully,

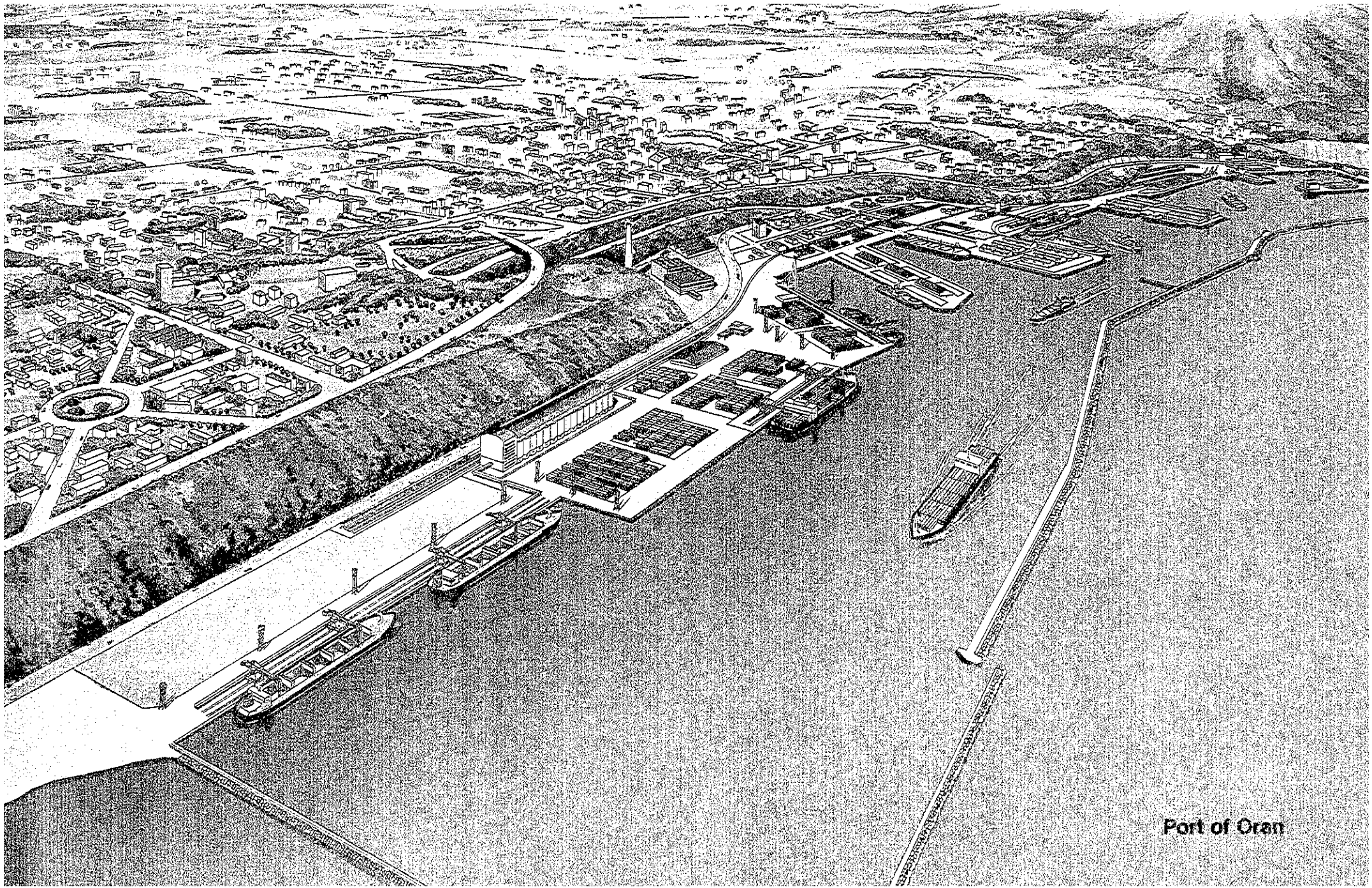
Takao Hirota

Takao Hirota
Leader, Study Team for the
the Study on the Development of
the Ports of Algiers, Oran and
Annaba in Algeria
(President, the Overseas Coastal
Area Development Institute of
Japan)



Geography of ALGERIA


Port of Algiers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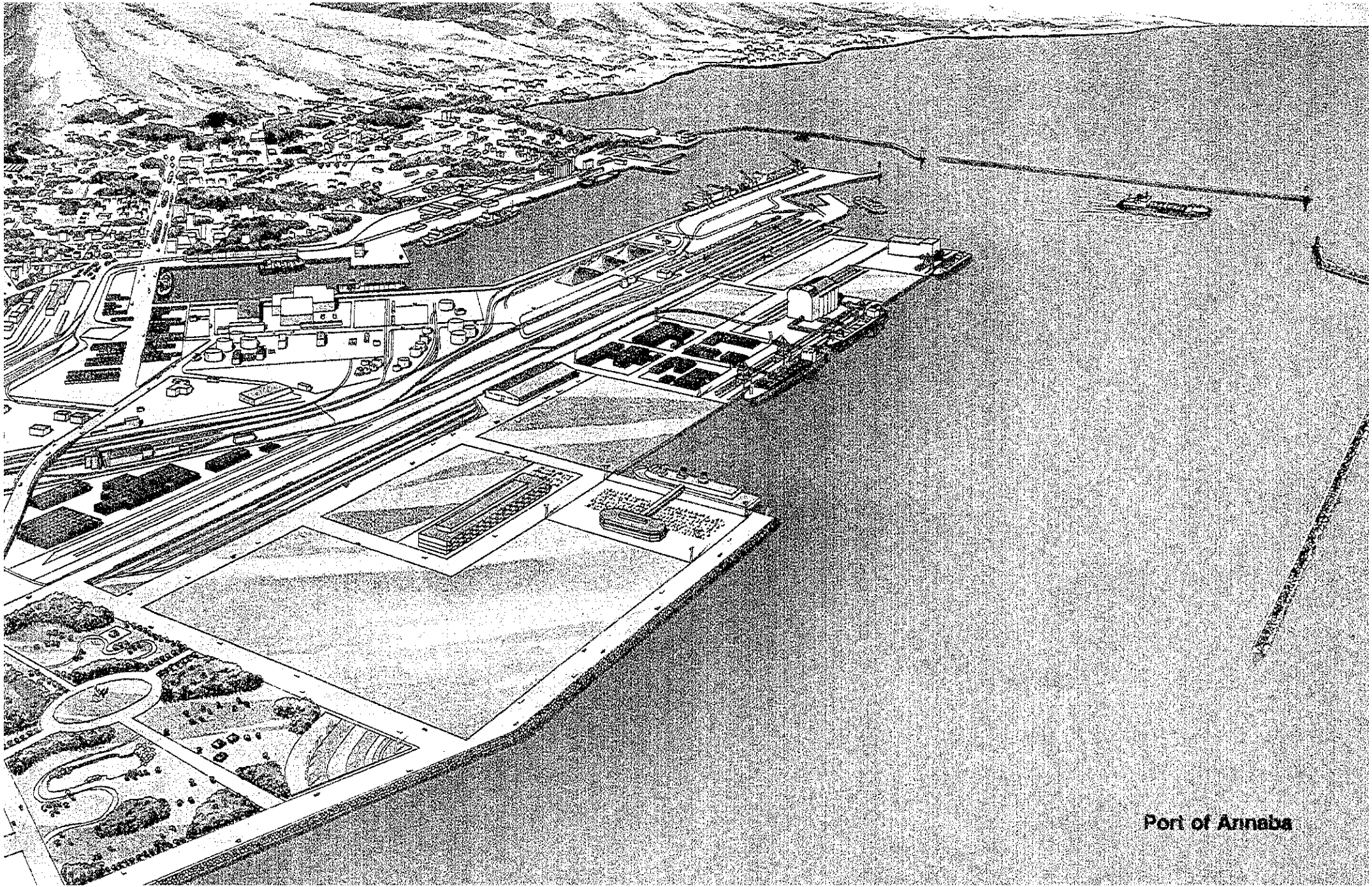
Port of Arinaba

ABBREVIATION LIST

A	ASMIDAL	Entreprise Nationale D'Engrais et des Produits Phytosanitaires
C	CFS	Container Freight Station
	CNP	Conseil National de la Planification
	CALTRAM	Compagnie Algero-Libyenne de Transport Maritime
D	DA	Algerian Dinar
	DTP	Direction des Travaux Publics
	DWT	Dead Weight Tonnage
E	ENCG	Enterprise Nationale des Corps Gias
	ENTMV	Enterprise Nationale de Transports Maritimes des Voyageurs
	EIRR	Economic Internal Rate of Returns
	EP	Enterprise Portuaire
	EPAL	Entreprise Portuaire d'Alger
	EPAN	Entreprise Portuaire d'Annaba
	EPOR	Entreprise Portuaire d'Oran
F	FERPHOS	Entreprise Publique Economique du Fer et du Phosphate
	FIG	Figure
	FIRR	Financial Internal Rate of Returns
G	GDP	Gross Domestic Products
H	H	Wave Height
	HA	Hectare(s)
K	KM	Kilometer(s)
L	LPG	Liquefied Petroleum Gas
M	M	Meter(s)
	MARPOL	Final Act of the International on Marine Pollution
	MOE	Ministry of Equipment

M	MOT	Ministry of Transport
N	NAFTAL	Entreprise Nationale de Raffinage et de Distribution de Produits Petroliers
	NGA	Niveau General Algerien
O	OAIC	Office Algerien De L'Agrculture
	ONAB	Office National des Aliments du Betail
	ONS	Office National Des Statistiques
Q	Q'ty	Quantities
R	Ro-Ro	Roll on Roll off
S	SIDER	Enterprise Nationale de Siderurgie
	SNTF	Societe Nationale des Transports Ferroviaires
	SNTM-CNAN	Societe Nationale de Transportes Maritime & Companie Nationale Algerienne de Nav.
	SNTM-HYPROC	Societe Nationale de Transportes Maritimes des Hydrocarbures et des Produits Chimiques
	SPT	Standard Penetrian Test
	SQ.M	Square Meters
T	T	Wave Period
	TEU	Twenty-foot Equivalant Unit
V	VAT	Taxe sur la Valeur Ajoutee
Z	ZH	Hydrographic Zero

Exchange Rate

US$1.00 = DA 21.90 = ¥ 131.25

CONTENTS

INTRODUCTION

INTRODUCTION

In response to a request from the Government of Algeria, the Government of Japan decided to conduct a Study on the Development of the Ports of Algiers, Oran and Annaba in Algeria. The objectives of this study were as follows:

1) To formulate Master Plans for the Ports of Algiers, Oran and Annaba for the period up to the year 2010.

2) To conduct feasibility studies of the Short-Term Improvement Plans for the Ports of Algiers, Oran and Annaba up to the year 1997.

To achieve those objectives, Japan International Cooperation Agency entrusted the study to the Overseas Coastal Area Development Institute of Japan (hereinafter referred to as "OCDI") and Nippon Koei Co.,Ltd. (hereinafter refferred to as "NK"). On the Algerian side, Ministry of Transport (hereinafter referred to as "MOT") was appointed as the counterpart of the study, and a Coordination Committee was organized under the Chairmanship of the Director of Ports, MOT and was responsible on the Algerian side for the overall administration and coordination of the progress of the study.

The Study Team, composed of members of OCDI and NK visited Algeria on September 1991 for the first time and the study was started. The study team continued its study till December 1992 visiting Algeria four times to conduct surveys and hold discussions with the Algerian side.

According to the progress of the study, Inception Report, Progress Report, Interim Report I, Interim Report II and Draft Final Report were submitted to the Ministry of Transport. In addition, many opinions and discussions were exchanged and held between the study team and the Coordination Committee aiming at the completion of this Final Report.

The members of the Study Team and the Coordination Committee are as follows:

MEMBERS OF THE STUDY TEAM FOR THE STUDY ON THE DEVELOPMENT OF THE PORTS OF ALGIERS, ORAN AND ANNABA IN ALGERIA

Mr. Takao HIROTA	(Team Leader) Overall Management	OCDI
Mr. Yugo OTSUKI	(Co-Leader) Port Planning I	OCDI
Mr. Masayuki FUJIKI	Port Planning II	OCDI
Mr. Hirofumi OHATA	Cargo Handling System	OCDI
Mr. Takuya KITATSUJI	Demand Forecast, Economic Analysis	OCDI
Mr. Hiroshi MASUDA	Management and Operations, Financial Analysis	OCDI
Mr. Masahiro SATO	Interpreter	OCDI
Dr. Shintaro YANO	Design of Cargo-Handling Equipment	NK
Mr. Mamoru WATABE	Design of Port Facilities	NK
Mr. Isamu SUZUKI	Construction Method, Cost Estimation	NK
Ms. POPESCU. J. CARMEN	Natural Conditions I (Sounding and Soil Materials Survey)	NK
Mr. Kenji NOMURA	Natural Conditions II (Meteorological and Marine Conditions)	NK

MEMBERS OF THE COORDINATION COMMITTEE

Mr. REGAINIA Ghazi	Directeur	Min/Transports
Mr. M'HAREB M'hamed	Sous directeur	Min/Transports
Mr. NEMOUCHI Mohamed	Sous directeur	Min/Transports
Mr. MESSAOUDI Arezki	Chef de bureau	Min/Transports
Mr. CHALOUCHE Boualem	Ingenieur	Min/Transports
Mr. OUARET Abdelhamid	Directeur	EPAL
Mr. ABOUB Abdelkrim	Charge d'etudes	EPAL
Mr. DJIDJELLI Zahir	Subdivisionaire	DTP Alger
Mr. BOUTOUIL M'hamed	Chef de departement	EPO
Mr. BENMORSLI Reda	Subdivisionaire	DTP Oran
Mr. MESSEGHMINE Baghdad	Ingenieur	EPO
Mr. LIHOUM Ali	Subdivisionaire	DTP Annaba
Mr. YAHI Amor	Directeur	EPAN
Mr. HECINI Lazhari	Sous directeur	Min/Equipment

CONCLUSION AND RECOMMENDATIONS

CONCLUSION AND RECOMMENDATION

1 CONCLUSION

1.1 General

Long term master plans for three major ports in Algeria, namely Oran, Algiers and Annaba, for the year of 2010 have been developed. At the same time, within the scope of these long term plan, development programs for the short period until 1997 have been made.

The Algerian economy experienced impressive progress during the 1970s and early '80s. When an economic recession caused by the collapse of hydrocarbon prices and poor harvests by persistent drought hit in late '80s, volume of trade through the Algerian ports declined.

On the other hand, growth rate of population in Algeria marked over 3.1% per annum during the early '80s and 2.7% per annum in late '80s.

With strenuous efforts to reform the country's economy, recovery of the world economy together with growing population, Algerian economy will inevitably revert to the normal line of progress. Economic recovery would be immediately reflected in the traffic volume, thus the ports in Algeria should be prepared for it.

Presently, common problems observed among these three ports are shortage of land space in the port area including covered and open storage space as well as aprons along the quay sides. This is partly due to the aged port facilities and inadequate layout which are based upon a cargo handling system of several decades ago. Containerization of general cargo requires ample space for handling and storage of containers as well as modern handling equipment.

At the same time, the limited port space is being occupied by various industries and other land users which are not directly related to the cargo handling.

Insufficient capacity of the cereal handling facilities is another important factor that increases a ship's waiting time for berths throughout these three

ports. In spite of intensive efforts to increase domestic production of cereals, substantial growth of demands for imported cereals is expected within the planning period.

Lack of maintenance for the port facilities including cargo handling equipment and pavement throughout the port area require urgent attention. This lack of maintenance not only reduces cargo handling efficiency in the ports but also causes a high rate of damage to the cargoes.

For the long term master plans, special consideration has been given for the possible renovation of overall cargo handling systems including expansion of containerization and increase of vessel's size. At the same time, possible room for future development beyond this planning period is also well considered.

Containerization in Algeria, at present, is still at the early stage of development. This is mainly because of insufficient receiving facilities both in the port and at the final destinations. At the same time inadequate institutional systems including custom regulations, tariff structures and financial arrangements combined with lack of proper knowledge concerning container systems among potential users have also contributed to the problem. Those obstacles have, however, gradually been overcome and further expansion of container handling facilities is inevitable according to the prospects of containerization in the future.

Provision of container handling facilities is one of the most important items to be considered in the planning. Initial stage of containerization programs are already covered by the World Bank project until 1994.

Most cargoes by Ro-Ro vessels are handled in the same way as conventional vessels. They are normally placed on the ship's deck in containers, in crates and on pallets. And they are discharged by forklift trucks. Cargoes loaded on trailers or trucks have only a fractional part of the total load. A part of these cargoes will gradually be shifted to container ships. But substantial part of Ro-Ro cargo will remain for some period partly because of insufficient container handling facilities, and partly because they are originated from short distant ports or unsuitable for containerization such as plants or irregular sized cargoes.

Construction materials such as cement, various steel products and timbers are important cargoes to support rapid urban development. They require specialized berths to secure efficient and safe cargo handling.

Modernization and streamlining of port operation will effectively improve port efficiency beside physical improvement and expansion of facilities. They are not only applicable for the specialization of terminals and cargo handling methods but also for organizational structures in the port administration.

Cereal handling facilities are also important issues among major ports in Algeria. Since rapid growth of cereal consumption in the country is expected in the planning period, provision of sufficient cereal importation facilities including construction of silos in these ports is particularly important.

Environment aspects have also been one of the important issues during the course of this study. The bottom soil in the harbors has been contaminated by various pollutants such as oil, heavy metals and chemicals. These pollutants have been accumulated over a long period and also include discharged bilge from vessels, spilled water from quay surface, and inflow from city sewerage.

This makes the dumping of dredged soil from the harbors to the sea very difficult. And special arrangements to place these dredged materials into enclosed site have been made to avoid further pollution of environment. Reception facilities of waste water and bilge from vessels are also contemplated in conformity with the MARPOL convention.

The short-term projects until 1997 are identified in each port and economic and financial evaluations are made. During this period, many works have to be done in order to catch up with the ever increasing demand and progress of port activities. In this study, all the major works expected to be done during this period are listed.

Most of the important works will be executed by the Ministry of Equipment and the respective port authorities. Some parts, however, will be implemented by other agencies such as OAIC and SNTF.

Expenditures for maintenance and repair works for the existing port facilities and cargo handling equipment are excluded from the subjects for the

short term feasibility analysis. On-going works under the World Bank finance and other already determined procurement projects by different financial sources are also excluded from this study.

1.2 Master Plans

1.2.1 Algiers

Serious congestion of the port has been observed in the entire port area. This is mainly due to shortage of space in the port including quay, marshaling yard, road and covered and open storage space.

Congestion of access road is also serious and is more so at the old harbor area and to a less degree at the new harbor. This is because the old harbor area is located at the vicinity of old town where streets are congested. At the Eastern part of the shore line, the street network is more developed and there is better access to the express way. Thus the new development of the port of Algiers must avoid Western part of the town for better access.

There is an ongoing port improvement project financed by the World Bank for a container terminal. The project is to convert existing berths No.27 to No.31-1 to a new container berth of 320 linear meters with -11 meter water depth alongside by filling water basin No.7 and creating a 17 hectare container terminal. This project is scheduled to be completed by the end of 1994. Consequently, this project is treated as a given condition of Terminal-1 indicated in our report.

The contents of the Master plan until the year 2010 proposed by this study are as follows:

(1) Terminal-2

Three alternative plans for Terminal-2 were examined during the course of this study. One of the alternatives was to develop a new terminal area by filling water in front of the existing breakwater at the central port area. This plan, however, was considered to be impractical because of its difficulty in access to the land and less potential for future development. The other two are

basically the same except with slight difference in details.

The selected alternative is located at the East side of the existing outer harbor which has a total quay length of 600 meter or two berths with water depth of 13 m with 4 units of 40 ton gantry cranes.

The terminal has a total area of 42.0 hectares which includes a 25.1 hectare container yard, 7.7 hectare backup area for warehouses and offices of port-related companies and 3.0 hectares for others. In addition to the main terminal area, an access road of 1.8 km or 2.6 hectares and railway yard of 3.6 hectares connected with the new terminal and the main highway and the trunk rail line are planned.

Construction of a breakwater of 660 meters which is to cover proposed container Terminal-2 adjacent to the existing main breakwater, and construction of a secondary breakwater of 270 meters at the East side of the new terminal is planned.

The new breakwater covers a new harbor basin of 19.7 hectares with a water depth of 13 m throughout the area.

The access channel to the new harbor has a breadth of 260 meters.

(2) Terminal-1

At Terminal-1, two units of gantry cranes of 40 ton capacity for containers are added to increase handling capacity of the terminal.

(3) Cereal Terminal

Expansion of cereal terminal including construction of additional silos of 220 thousand tons capacity and conversion of additional two berths at the Wharf of Skikda is planned. Additional 4 units of rail-mounted pneumatic unloaders which have nominal capacity of 400 tons per hour each will be installed with necessary belt conveyors, siding railways and loaders for railway wagons.

(4) Miscellaneous facilities

Facilities for reception of waste from vessels will be provided in the vicinity of the existing facilities in order to increase present waste water handling capacity and thus satisfy the MARPOL Convention requirement.

1.2.2 Oran

Shortage of space, both on land and water, is the main problem in this port. Only possible way for expansion is to develop towards East coast by extending the main breakwater.

The degree of congestion in Oran, at this moment, is less serious compared with Algiers. Still, shortage of cereal handling facilities in the port of Oran is the major cause of ship's waiting time for the berth. Other cargoes have yet to reach their maximum capacity, all the same, the saturation point will be reached in the not too distant future.

With regard to the container terminal, berth No.21, now assigned for cereal direct discharge to lorries, will be converted to a container terminal by the World Bank financed project for the year 1994.

Items to be developed as part of the master plan for the year 2010 are summarized as follows:.

1) Construction of a breakwater of 800 meters to extend harbor basin towards the East, and construction of a secondary breakwater of 465 meters in the length and 640 meters East of the existing secondary breakwater.

2) Reclamation of land of 40 hectares at the East side of quay No.22 including 5.3 hectares of reserved area for future needs.

3) Construction of two new berths with water depth of 14 m and length of 500 m long for cereal handling and 105,000 ton cereal silos on the new reclaimed land.

4) Construction of an additional container berth, 300 meters in length and with -13m water depth, which is extended to the site adjacent to the quay No.22.

5) Necessary road and rail lines will also be planned in the newly developed quay area and are connected to the existing lines.

1.2.3 Annaba

The problem of shortage in space is also severe at the port of Annaba. Moreover, a large part is allocated for various industries which are under long term leasing contract with the Port. Although, some of those leased berths are not quite fully utilized due to the recent economic recession.

For the 1994 short term development program, the World Bank has financed a container terminal which will convert berth No.1 and No.2. At the same time, new 30,000 ton cereal silos are already planned to be constructed.

For the future development of the port of Annaba, it is quite logical to plan a new terminal area at the East side of the existing industry wharf. Several plans have been proposed in the past but not realized partly because of apprehensions over the existence of a fault in the sea bed which prohibits construction of structures without exorbitant costs. The result of this study has revealed that there is no evidence that a significant fault exists in this area and the soil conditions are manageable, if not stable.

Under these circumstances, the master plan for the year 2010 proposes as follows:

1) Development of a new harbor basin at the East side of the Industrial wharf. This new harbor development include;

   a. Construction of a new North breakwater of 900 meters and a secondary breakwater of 2,120 meters to cover the new harbor basin.
   b. Reclamation of land of 87 hectares at the East side of the existing jetty.
   c. Construction of a new container terminal of 300 meters quay length.

d. Construction of a new cereal terminal which has 250 meters quay length and silos of 25,000 ton capacity.
e. Construction of a new car ferry terminal of 200 meters.
f. Construction of a new sulfur/potash handling berth of 200 meter quay length.
g. Construction of a new petroleum products berth at the North end of the existing industrial jetty.
h. On the newly reclaimed land, a coal storage yard of 1.3 hectares will be created as an extension to the existing coal yard.
i. Also on the newly reclaimed land, additional rail yard to serve these terminals will be created.
j. A 8.6 hectares lot at the foot of the reclaimed area is produced by land filling with dredged material from the existing harbor. This area will serve as a green belt to separate proposed port and industrial area from existing urban area.

2) On the new reclaimed land, 32 hectares land space is reserved for further expansion in various cargo handling and industrial activities.

3) Further more, additional area of 101 hectares is reserved for future reclamation at the inside of the East breakwater and in front of the shore.

1.3 Short-Term Plans

1.3.1 Algiers

The proposed short-term project for the period until 1997 under the scope of this study is described as follows:

(1) Terminal-2

The short term works for Terminal-2 includes:

1) A 300 meter long berth with -13 meter water depth along side as a container terminal. For the initial stage, however, the terminal will be used for general cargoes.

2) Reclamation of land along the coast with total area of 40.4 hectares, including open yard and warehouse space of 5.4 hectares, access road of 2.6 hectares, a railway yard of 3.6 hectares, backup area of 10.0 hectares and other area of 1.5 hectares, and the remaining 11.1 hectares for the next stage of development.

3) Procurement of four 35 ton forklift trucks and eight 3 ton forklift trucks.

4) Construction of a breakwater of 480 meters as an extension to the existing main breakwater and a sub-breakwater of 320 meters parallel to the existing sub-breakwater.

5) Dredging works to create the new harbor basin and the approach channel.

(2) Terminal-1

Installation of two units of gantry cranes of 40 ton capacity at the Terminal-1.

(3) Open yard for steel products and timbers

Demolition of an existing warehouse behind quay No.20-1 on the wharf of Ghara Djebilet for an open yard for steel products and wood and timber handling and storage.

(4) Cereal Terminal

Construction of 100,000 ton silos for cereal at quay No.35-1 on the Wharf of Skikda. The silos will be served with two rail-mounted pneumatic unloaders of 400 ton per hour capacity each and connected with belt conveyors accompanied by a set of railway sidings and loader for railway wagons.

(5) Facilities for reception of waste water from vessels

In conformity with MARPOL convention requirement, additional waste water treatment plant will be installed in the vicinity of the existing plant.

(6) An express way bridge over the siding railway.

In order to eliminate traffic congestion at the rail road crossing, a new express way bridge over the siding railway will be constructed at an appropriate location.

(7) Construction

Construction costs for the short term project are estimated as follows:

1) Infrastructures including breakwaters, dredging of navigation channel and harbor basin, reclamation of land for Terminal-2, quay wall, open yard and access road within the port area will be constructed by the Ministry of Equipment and the costs are estimated to be 2,973 million DA.

2) Construction of superstructures such as warehouse, office buildings etc., will be done by the EPAL and the costs are estimated to be 181 million DA.

3) Cargo handling equipment includes gantry cranes for Terminal-1 and forklift trucks for Terminal-2. Their costs are estimated as 445 million DA and are procured by the EPAL.

4) Construction cost of the new silos and related cargo handling equipment including unloaders, conveyors as well as loaders for the railway wagons are estimated to be 1,840 million DA and they are provided by the OAIC.

5) The railway yard including a siding railway at Terminal-2 is provided by the SNTF with finance from the MOT. Construction cost of the railway yard is estimated to be 59 million DA.

(8) Economic evaluations

Economic evaluations were made separately for Terminal-2 and the cereal terminal.

The benefit for both terminals in the short term period is mainly in the elimination of ship's waiting time for the berth and avoidance of land

transportation cost after saturation of the berthing capacity for the "without" case.

The Economic Internal Rate of Return is calculated as 20.7% for Terminal-2 and 16.7% for the cereal terminal. The results of these EIRRs exceed the opportunity cost of capitals in Algeria. Therefore, the project is fully feasible and recommended for early implementation.

(9) Financial analysis

A Financial analysis was made separately for the Terminal-2, Terminal-1 and the Cereal terminal.

The Financial Internal Rate of Returns based upon present demarcation of works for infrastructures and superstructures and their relevant financial and budgetary practice are calculated as 12.51% for Terminal-2, 5.80% for Terminal-1 and 11.81 % for the cereal terminal. The combined result is 11.94% for all three terminals.

1.3.2 Oran

The proposed short term project for the period of 1993 to 1997 is summarized as follows:

(1) New terminal

Construction of a new cereal handling terminal with a new 200 meter long berth at the East side of quay No.23. The new berth, which is planned as a part of the container berth in the master plan, will be built and used temporarily for cereal handling.

Construction of a set of new 35,000 ton silos with three tire-mounted pneumatic unloaders with 200 ton per hour capacity each on the reclaimed land at behind the new berth. The silos are connected by a belt conveyor system with the new berth.

Reclamation of land with a total area of 14.1 hectares for the new

terminal including 3.3 hectares container yard, 2.3 hectares road and 1.4 hectares railway yard and connecting access roads and railways.

(2) Container Freight Station (CFS)

Construction of the CFS of 2000 square meters immediately behind the quay No.21.

(3) Facilities for reception of ballast and bilge from vessels

Installation of a facility for reception of ballast and bilge water from vessels at a space behind quay No.7 in conformity with the MARPOL convention requirement.

(4) Construction

Construction cost for the short term project is estimated as follows:

1) Infrastructures including reclamation of land, construction of a new quay and pavement of quay apron and road are estimated to be 419 million DA and are executed by the Ministry of Equipment.

2) Cereal silos, pavement and related cargo handling equipment including pneumatic unloaders and belt conveyors are estimated to be 675 million DA and they will be built by the EPO.

3) Costs for the CFS and the facilities for ballast and bilge treatment plant are estimated to be 62.7 million DA and provided by the EPO. These costs, however, are excluded from the subject for the economic evaluation because they are supplementary functions to the existing activities.

(5) Economic evaluation

Economic benefit is mainly accrued from the saving in ship's waiting time for the cereal berth. Savings in marine transportation costs by increasing ship size is another aspect of the benefit.

Calculated economic internal rate of return for the new terminal is 18.4%. The results of the EIRR exceeds the opportunity cost of capitals in Algeria. Therefore, the project is fully feasible and recommended for early implementation.

(6) Financial evaluation

The Financial Internal Rate of Return is calculated for the container yard and the cereal facility separately.

The results of the FIRRs based upon present demarcation of infrastructures and superstructures and their financial and budgetary practice are calculated as 18.15% for the container terminal, 12.41% for the Cereal terminal and the combined result is 12.59% for both facilities.

1.3.4 Annaba

During the short term period until year 1997, no substantial new work is planned other than world Bank's project, some minor repair and improvement works for the existing facilities.

This does not mean denial of the importance nor the potential of the industrial port of Annaba. On the contrary, with its accumulated industrial hinterland and resources, needs for further expansion of the port of Annaba is quite obvious.

The reasons for no immediate short term project at this moment are partly because the prospects of the world economy in connection with various industries in Annaba are not determined and which causes uncertainty for planning of future development.

If and when these development plans are collectively agreed upon with an appropriate time schedule among local business as well as the local government concerned, there is no reason to defer proceeding with a new feasibility study for the short term even before the year 1997.

During the period for the short term until 1997, following works need to

be carried out. Namely, rehabilitation of petroleum terminal and replacement unloader and installation of a slant conveyor for bulk sugar are urgently required. Construction costs for these works are estimated to be 5.5 million DA.

2 RECOMMENDATION

In accordance with the results of the study and the results of the discussions with the Coordinating Committee and the team, it is recommended that the Government of Algeria implement the Development Project of ports in Algiers and Oran with the Short-Term Plan with the target year of 1997 to cope with the forecasted demand of port traffic.

The contents of the project are summarized as follows:

2.1 Algiers

2.1.1 Projects Included in the Feasibility Analysis.

(1)Terminal-2

- Project site: East of the Brise-Lames Est
- Dimensions: Terminal area: 11.6 hectares
- Berth: Length: 300 meters, Water depth: 13 meters
- Main breakwaters:
  Length: 480 meters
- Sub-breakwaters:
  Length: 320 meters
- Access channel:
  Breadth: 260 meters
- Basin: Area: 18.9 hectares, Water depth: 13 meters
- Cargo-handling facilities:
  4 Forklifts of 35 ton capacity
  8 Forklifts of 3 ton capacity
- Other main facilities:
  Warehouse, Terminal office
- Access road: 1.8 km
- Railway Yard: Area: 3.6 hectares

(2) Terminal-1

- Cargo-handling facilities:
  2 Units of gantry cranes of 40 ton capacity for containers

(3) Open yard for steel products and timbers

- Project site: Wharf of Ghara Djebilet
- Demolishing the existing warehouse behind Quay No. 20-1 to prepare an open yard

(4) Cereal Terminal

- Project site: Wharf of Skikda
- Cargo-handling facilities:
  2 Units of rail-mounted pneumatic unloaders, nominal capacity of 400 tons/hour each
- Silos of 100,000 ton capacity
- Other main facilities:
  belt conveyors, siding railway loaders for railway wagons

(5) Facilities for Reception of Waste Water from Vessels

- Project site: near the existing facilities

2.2 Oran

2.2.1 Projects Included in the Feasibility Analysis.

(1) New Berth

- Project site: adjacent to the Quay No.23 (new container berth planned in the Master Plan)
- Total area of reclamation:
  14.1 hectares
- Berth: length: 200 meters, Water depth: 13 meters
- Silos of 35,000 ton capacity
- Cargo handling facilities:
  1) three tire-mounted pneumatic unloaders (200 tons/hour each)
  2) belt conveyor system (600 tons/hour) between quay and new silo
- Access road: 2.3 hectares
- Railway yard: 1.4 hectares

(2) Container Freight Station (CFS)

- Project site: immediately behind Quay No.21
- Total area: 2000 sqm (50 m x 40 m)

(3) Facilities for reception of ballast and bilge from vessels

- Project site: behind Quay No.7.

2.3 Annaba

Feasibility Study for the year 2000 is recommended as soon as the local development plan becomes matured based upon the master plan of the port of Annaba for the year 2010.

2.4 Port Operation

2.4.1 Subjects Common to three Ports in the Study

1) Adjustment of the tariff level and structures.
2) Reorganization of port operation systems.
3) More attention to the maintenance of cargo handling equipment including selection of proper size of equipment, improvement maintenance facilities, introduction of regular check up systems as well as re-training of the operators and the mechanics.
4) Review on demarcation of works and financial and budgetary practice between the Ministry of Equipment and the Port Authorities.
5) Introduction of privatization into a part of the port operation will achieve efficiency and flexibility in operation.
   - Private stevedoring company(ies) may be introduced for specialized quay operations.
   - Major repair work for the cargo handling equipment may be suitable for private operation.
6) Request budget allocation for city sewerage treatment plants to the respective municipal authorities concerned.

2.4.2 Subjects Particular to the Respective Port

1) Algiers

- Introduction of specialized berths according to the commodities handled such as steel products and wood.
- Immediate deployment of storage spaces at the proposed Terminal-2 area.

2) Oran

3) Annaba

- Repair and improvement of facilities in the industry wharves.
- Reallocation of leased areas for industries in order to secure better utilization of the limited water front.

SUMMARY

(Part I)

SUMMARY

1.1 Socio-Economic Conditions

(1) Population

The population of Algeria increased at an annual rate of about 3% from 1979 to 1988 and reached 24,697 thousand in 1990. This is primarily due to a decline in the death rate, from 2.4% in the early 1950s to less than 1% in the 1980s.

According to the projection by Conseil National de la Planification, it is expected that the population of Algeria will continue to increase and reach 33,000 thousand in 2000. Also the United Nations estimates that the population of Algeria will reach 33,000 thousand in 2000 and 41,000 thousand in 2010.

(2) Economic Activities

Since the late 1960s, the Algerian economy, as measured by the GDP evolution, had witnessed impressive growth. The average annual rate of growth was 7% during the 1970s, and 5% between 1980 and 1985.

However, since 1986, Algeria has experienced an economic stagnation due to falling demand for hydrocarbon, the collapse of hydrocarbon prices, and poor harvests marked by persistent drought. GDP growth fell from about 5% per year during 1981-1985, to about 1.1% in 1986, and recessions in 1987 and 1988 resulted in a further decline 0.7% and 2.1% respectively.

As a solution to these difficult conditions, the government has been promoting drastic socio-economic reforms, such as reintroducing market mechanisms into the economy, transforming public enterprises into commercial enterprises, liberalizing the price system to bring it in line with the restoration of market mechanisms and so on. In addition, the new policy of encouraging joint ventures with foreign companies is expected to stimulate the growth of investments.

Providing that the socioeconomic reforms in Algeria are successful, the Algerian economy will be revitalized in the near future. In fact, GDP showed a growth rate of 3.4% in 1989, and 3% in 1990 (at constant price).

(3) General View of Industry

The Hydrocarbon industry (oil and natural gas), Heavy chemical industry (developed in large part from rich income derived from hydrocarbon exports) and Agriculture compose Algeria's principal industry.

Because of the past rapid industrialization created an imbalance in the industrial structure, the Algerian government implemented a program of reforms in order to attempt more balanced economy by reinforcing agriculture and light industry and improving the efficiency in industry.

Hydrocarbon resources are very important for Algerian economical development. Export of hydrocarbon products composes about 95% of total exports.

While the verified estimated amount of oil reserve is 9.2 billion barrels and the output is about 700,000 barrels per day, natural gas estimated reserve is close to 8,000 billion cubic meters, and ranking fourth in the world, behind the Soviet Union, Iran, and the United States. Furthermore, the output of natural gas is increasing, and reached to 96 million tons per year in 1989.

As a result of the economic stagnation due to the collapse of the hydrocarbon price, industrial production indices by sector changed only slightly in 1987 and 1988.

In order to encourage economic activity, the Algerian government is trying to promote a series of reforms, such as transforming public enterprises into commercial enterprises and making better use of existing production capacities to raise the productivity.

(4) Agriculture

In order to relieve the heavy burden of food imports due to low agricultural productivity, the Algerian government introduced a series of reforms such as the partial liberalization of the agricultural sector from administrative controls.

Despite these measures, they have not achieved the expected results, because of persistent droughts in 1983, 1987, 1988, a locust invasion in 1988, and a shortage of production materials (such as agricultural machines, fertilizer and seeds) caused by the stagnant economy since 1986.

The rate of self-sufficiency in cereals is about 30%, and the supply of sugar and coffee beans is exclusively dependent on imports. A few products such as citrus fruits and dates are exported. Imported foodstuffs have more

than a 20% share of total imports, and in 1989, as a result of drought, the share rose to almost 29% (As shown in Table 1.4.1).

The Algerian government is making efforts to increase productivity in the middle or long term by planning an irrigation project and by conducting a study for seed reform.

(5) Trade and Balance of Payments

The exports of hydrocarbon products (crude oil, condensate, petroleum products, natural gas and so on) had about a 95% share of the total exports, and played an important role in Algerian economic development.

The value of hydrocarbon exports was on an upward trend until 1985, but it declined abruptly with the collapse in oil price in 1986. Since 1987, however, it has experienced a steady resurgence, climbing to 69 billion DA in 1989.

Besides hydrocarbon, there are a few other export products of value such as wine, phosphate ore, dates, citrus fruits and so on.

As regards import products, in 1989, industrial materials had a 36% share, machine and equipment had a 23% share, and foodstuffs remained a high share of 29% (which is 12% larger than its share in 1986).