

# **Evaluation Study of Selected Development Studies**

March 2001

Japan International Cooperation Agency

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## Preface

The Japan International Cooperation Agency (JICA) has conducted a large number of Development Studies as part of its technical cooperation program designed to assist in the nation-building of developing countries.

A Development Study is basically completed when a final report is completed and submitted to recipient government. However, since a Development Study is conducted at the preparatory stage of a project, it can greatly contribute to the progress of developing countries when the findings of the study are utilized in a project, and this enables effective technology transfer.

The findings of the Development Studies and advice contained therein are utilized under to the recipient governments own initiative, and are used in a wide variety of ways. As gathering information on completed studies can be difficult, JICA has been conducting follow-up studies annually since fiscal year of 1984 to gather and compile relevant information regarding completed Development Studies.

As a part of series of follow-up studies, evaluation studies were experimentally undertaken since last year that was intended to improve the quality of Development Studies and the efficiency of their implementation. Last year, we evaluated transportation and water resource development projects and this year, by taking into account of the results from the last year study, we evaluated a total of twelve development studies selected from water supply development studies in Kenya and Mauritius and port development studies in Indonesia, Philippines, and Sri Lanka.

We are still trying to define the scope and methodology for evaluation of the Development Studies, and in this regard, we welcome the opinions and suggestions from readers of this report to help us improving future follow-up studies.

This evaluation study was carried out by the Japan International Cooperation Center (JICE) and the International Development Center of Japan (IDCJ) under a contract with JICA.

2001 March,

Managing Director of Social Development Study  
Development  
Japan International Cooperation Agency

# Contents

## Preface

### CHAPTER 1. OUTLINE OF THE STUDY

1-1 Purpose of the Study .....	1
1-2 Countries, Sectors, and Projects for Evaluation .....	1
1-3 Coverage of the Evaluations.....	2
1-4 On-Site Study Schedules and Main Informants.....	3

### CHAPTER 2. EVALUATION METHOD

2-1 Structure of the PDM .....	11
2-2 Relationship between the PDM and the 5 Evaluation Items .....	14
2-3 Preparation of an Evaluation Grid .....	15

### CHAPTER 3 - INDONESIA:

#### Development Plan of the Port of Semarang (Phase I)

#### Development Plan of the Port of Semarang (Phase II) (M/P+F/S)

3-1 Overview of Target Subjects .....	17
3-2 Results from the Five Evaluation Criteria.....	24
3-3 Conclusions and Lessons Learned.....	33

### CHAPTER 4 —SRILANKA:

#### Study on Development Project of the Port of Colombo (M/P+F/S),

#### Study on Development of the Port of Colombo (M/P+F/S),

#### Study on Development Project of New Port of Colombo (M/P+F/S)

4-1 Overview of Target Studies.....	35
4-2 Results from the Five Evaluation Items .....	42
4-3 Conclusions and Lessons Learned.....	51

**CHAPTER 5 —PHILIPPINES:**  
**Study on Development Project on the Port of Batangas (M/P+F/S)**

5-1 Overview of Target Study .....	53
5-2 Results from the Five Evaluation Criteria.....	55
5-3 Results from the Five Evaluation Criteria.....	66

**CHAPTER 6 —PHILIPPINES:**  
**National Ferry Transport Plan Study (M/P+F/S)**

6-1 Overview of Target Subjects .....	69
6-2 Results from the Five Evaluation Criteria.....	72
6-3 Conclusions and Lessons Learned.....	79

**CHAPTER 7 —KENYA:**  
**Development Study on the Water Supply Plan for Meru County**

7-1 Outline of this JICA Study .....	81
7-2 Results of the evaluation study using the five evaluation items.....	86
7-3 Summary and lessons.....	88

**CHAPTER 8 —KENYA:**  
**Malewa Dam Construction Plan (F/S plan)**

8-1 Outline of this JICA Study .....	91
8-2 Results of the evaluation study using the five evaluation items.....	95
8-3 Summary and lessons.....	97

**CHAPTER 9 —KENYA:**  
**Water Supply Reinforcement Plan for the Mombasa District (F/S Plan)**

9-1 Outline of this JICA Study .....	99
9-2 Results of the evaluation study using the five evaluation items.....	104
9-3 Summary and lessons.....	106

**CHAPTER 10 —Mauritius (F/S, D/D):  
Water Supply Plan for Port Louis City**

10-1 Outline of this JICA Study ..... 109  
10-2 Results of the evaluation study using the five evaluation items..... 112  
10-3 Summary and lessons ..... 115

**CHAPTER 11 —PROPOSALS**

11-1 Ports..... 117  
11-2 Waterworks..... 118

## **List of Figures and Tables**

### **CHAPTER 1. OUTLINE OF THE STUDY**

Figure 1-1 Flow of Development Studies .....	2
--	---

### **CHAPTER 2. EVALUATION METHOD**

Table 2-1 Role of External Conditions.....	13
Table 2-2 Logical Structure of the PDM and Positioning of the 5 Evaluation Items .....	14
Table 2-3 Basic Form of the Evaluation Grid .....	16

### **CHAPTER 3 - INDONESIA:**

#### **Development Plan of the Port of Semarang (Phase I)**

#### **Development Plan of the Port of Semarang (Phase II) (M/P+F/S)**

Figure 3-1 Long-Term Plan for Semarang Port (Phase I) .....	19
Figure 3-2 Trends in Amounts of Freight Handled at Semarang Port .....	27
Figure 3-3 Breakdown of Freight Handled at Semarang Port .....	28
Figure 3-4 Composition of GRDP by Industrial Sector in Central Java Province .....	29
Figure 3-5 Comparison between JICA s Master Plan proposed in the Development Plan of the Port of Semarang (Phase II) .....	31
Figure 3-6 Comparison of Master Plan Proposed in Phase II and the Current Master Plan (Provisional) Targeted for Fiscal 2005 .....	32

### **CHAPTER 4 —SRILANKA:**

#### **Study on Development Project of the Port of Colombo (M/P+F/S),**

#### **Study on Development of the Port of Colombo (M/P+F/S),**

#### **Study on Development Project of New Port of Colombo (M/P+F/S)**

Table 4-1 OECF (JBIC) Loan for Development of Colombo Port.....	45
---	----

Figure 4-1 Locations of Completed Projects at Colombo Port .....	46
Table 4-2 Trends in Numbers of Containers Handled .....	47
Table 4-3 Trends for Enterprises Registered with BOI.....	48
Table 4-4 SLPA Business Performance .....	51

## **CHAPTER 5 —PHILIPPINES:**

### **Study on Development Project on the Port of Batangas (M/P+F/S)**

Figure 5-1 Locations of Completed Projects at Batangas Port.....	58
Figure 5-2 Projections for Cargo Handling and Numbers of Passengers at Batangas Port.....	59
Table 5-1 Ship Landings and Berth Occupation Rate at Batangas Port .....	59
Table 5-2 Changes in Ro/Ro Traffic Between Batangas Port and Calapan Port (Before and After Completion of Project) .....	60
Table 5-3 Changes in High-Speed Passenger Boat Traffic Between Batangas Port and Calapan Port (Before and After Completion of Project) .....	60
Table 5-4 Trends in the Amount of Cargo Handled, Number of Passengers, and Berth Occupancy Rates at Batangas Port .....	62
Table 5-5 Discrepancies Between Project Proposals and the Projects Formed.....	64

## **CHAPTER 6 —PHILIPPINES:**

### **National Ferry Transport Plan Study (M/P+F/S)**

Table 6-1 Priority of Routes Targeted in the Study According to the Master Plan.....	70
Table 6-2 Lists of Actual Results and Plans for RORO Port Improvements After August of 1992 .....	74
Table 6-3 Progress Status of Master Plan By Route .....	75

## **CHAPTER 1. OUTLINE OF THE STUDY**



## CHAPTER 1. OUTLINE OF THE STUDY

### 1-1 Purpose of the Study

Demands for more transparency in ODA projects have brought a greater awareness of the importance of conducting evaluations of Development Studies. Already, from the standpoint of supervision of projects following Development Studies, follow-up studies have been conducted to examine how Development Studies that have been implemented are being utilized. Over the past few years, as we have come to gain a more systematic grasp of the Development Studies, we have begun to implement more comprehensive evaluations that tie together technical cooperation, grant aid, and loan aid, most of this work being done by the Office of Evaluation and Post-Project Monitoring (currently the Planning and Evaluation Department's Office of Evaluation and Post-Project Monitoring).

Although the Social Development Study Department began conducting evaluations of individual Development Studies in fiscal 1998 on a trial basis, it is only now that evaluations of the Development Studies as a whole have begun. There is therefore still a need to build a history of evaluation results, and establish evaluation methods. Thus, the goal of the present study is to draw lessons from the results of the evaluations that will improve the quality of future Development Study projects in each field, by utilizing an approach based on evaluating each of these fields individually.

### 1-2 Countries, Sectors, and Projects for Evaluation

As one aspect of follow-up studies conducted after social Development Studies made last fiscal year, studies targeted transportation, traffic, and water resource development sectors. This year we have focused on the water supply and port sectors, evaluating the completed projects of Development Studies implemented in the African and Asian regions. Kenya and Mauritius were selected as the countries in the African region for which Development Studies related to water supply were to be conducted, while Indonesia, Philippines, and Sri Lanka were selected as the countries in the Asian region for evaluations of port Development Studies. The table below indicates the subjects to be covered by this year's studies.

( Waterworks )

Country	Subject	Types of Study	Year of Completion
Kenya	Mombasa District Water Supply Reinforcement Plan	F/S	1981
Kenya	Malewa Dam Construction Plan	F/S	1990
Kenya	Meru Water Supply Plan Study	M/P + F/S	1997
Mauritius	Port Louis Municipal Water Supply Plan	F/S	1989
Mauritius	Port Louis Municipal Water Supply Plan	D/D	1991

(F/S: feasibility study, M/P: master plan, D/D: detailed design)

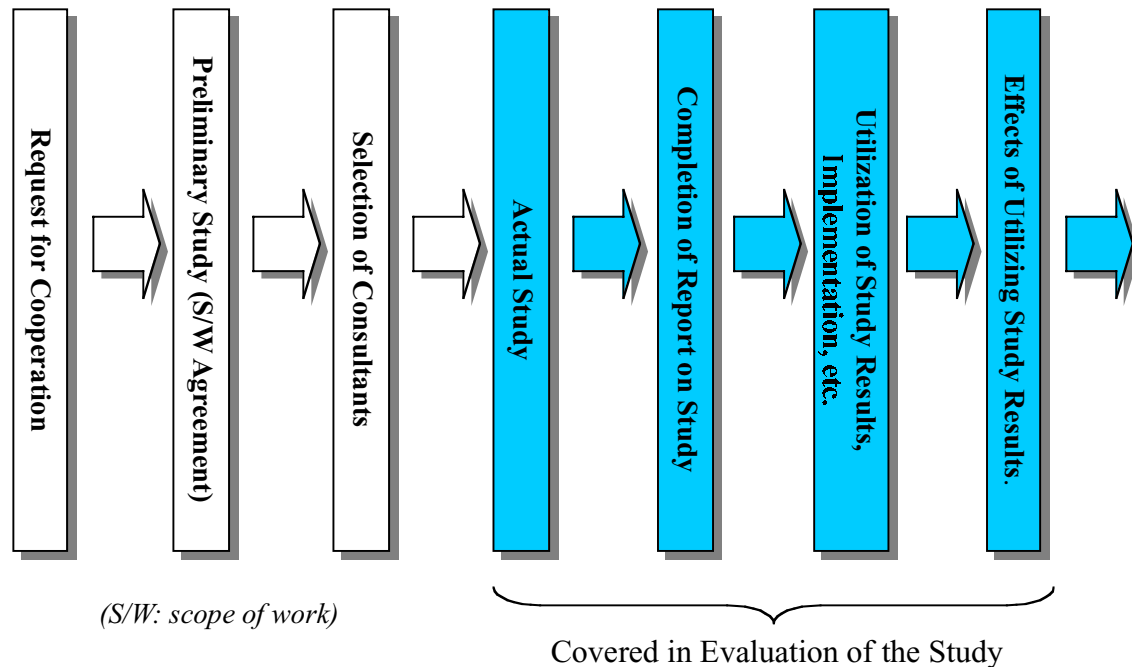
( Ports )

Country	Sector	Types of Study	Year of Completion
Indonesia	Semarang Port Facilities Improvement Plan Study Phase I	M/P+F/S	1978
Indonesia	Semarang Port Facilities Improvement Plan Study Phase II	M/P+F/S	1986
Philippines	Batan Gas Port Facilities Plan Study	M/P+F/S	1985
Philippines	Nationwide Ferry Transport Plan	M/P+F/S	1992
Sri Lanka	Colombo Port Facilities Improvement Plan Study	M/P+F/S	1980
Sri Lanka	Colombo Port Facilities Improvement Plan Study	M/P+F/S	1989
Sri Lanka	New Colombo Port Facilities Improvement Plan Study	M/P+F/S	1996

### 1-3 Coverage of the Evaluations

This evaluation covers 1) the actual studies, 2) completion of the reports, 3) utilization of the results of the studies, and 4) the effects of utilizing the results of the studies. Development Studies proceed as shown below in Figure 1-1.

Figure 1-1 Flow of Development Studies



The term "actual study" refers to period starting with the study team, comprising consultants dispatched from Japan to the recipient country in cooperation with the study team from the recipient country's government, starts the actual study, and continuing up to the point at which the study is completed and the results of the study are compiled as a final report.

The term "completion of the report" refers to the point at which the Japanese study team submits the report to the government of the recipient country.

The term "utilization of study results" refers to the stage during which the government of the recipient country studies the suggestions of the final report and then prepares and implements utilization of the recommendations by applying the transfer of technology to other cases or, based on the suggested framework, proceeds to the next phase of the study and makes concrete moves towards implementation of the findings.

The term "effects of utilizing study results" (and subsequent activities) refers to the maintenance and management of the implemented projects and technology transfer to promote further independent development.

#### **1-4 On-Site Study Schedules and Main Informants**

As indicated in the following tables, on-site studies were implemented in Asia from November 5 to November 24 and in Africa from November 19 to December 11. Information was gathered during the on-site studies through the collection of questionnaires distributed before the study, hearings, collection of data, site surveys, and by other means.

##### **1-4-1 Indonesia**

###### **Study Team**

Team Leader/Overseer	Eiji Tomita Social Development Department, JICA
Evaluation Studies/Planning	Junko Sawada Planning Section, Social Development Department, JICA
Evaluation Studies/Planning	Mimi Nishikawa International Development Center of Japan
Evaluation Studies/Planning	Mitsuaki Hosono Japan International Cooperation Center

###### **Study Schedules**

<b>Date</b>	<b>Study Schedule</b>	<b>Lodging Location</b>
November 5 (Sun)	Tokyo Jakarta	Jakarta
November 6 (Mon)	Visit Japanese Embassy, Indonesia Visit and Meetings at JICA Indonesian Offices BAPPENAS Hearing	Jakarta
November 7 (Tue)	Collection of Questionnaires Distributed to Transport Bureau	Jakarta
November 8 (Wed)	Jakarta Semarang Hearing at Semarang Port Management Offices	Semang
November 9 (Thu)	Semang Surabaya Indonesia Port Corp. III Hearing Surabaya Jakarta	Jakarta

November 10 (Fri)	Additional DGSC Hearing (Hosono, Nishikawa) Visit Japanese Embassy, Indonesia (Report) Visit JICA Indonesian Offices (Report) Jakarta Tokyo (Tomita, Sawada)	Jakarta (Hosono, Nishikawa only)
November 11 (Sat)	Compiling Data (Hosono, Nishikawa)	Jakarta (Hosono, Nishikawa only)
November 12 (Sun)	Jakarta Colombo	

### Main Informants

<b>Date of Visit</b>	<b>Agency</b>	<b>Name (Position)</b>
November 6 (Mon)	Japanese Embassy, Indonesia JICA Indonesian Offices BAPPENAS	Shigueki Murata (First Secretary) JICA Specialist Higuchi Drs. Petrus Sumarsono, Akt, MA
November 7 (Tue)	Transport Bureau (DGSC)  JBIC Indonesia Office	Ir. Suwandi Saputro (Head of Sub Directorate of Port Engineering) Lollan Andy SP, ST (Directorate of Port and Dredging) Hidehiko Noda (Staff Member)
November 8 (Wed)	PT.(PERSERO) Pelabuhan Indonesia III Cabang Tanjung EMAS	Adji Pamungkas (Kepala Cabang)  Ir. Edi Prayitno, MT, PMP (R&D Manager, Business Development Dept)
November 9 (Thu)	Indonesia Port Corp.III  TPS	Djarwo Surjanto (Technical Director), Ir. Herry Subagio (Senior Manager Pengembangan Fasilitas), Wiwin Kwintadi Soeprapto (Assistant Senior Manager of Infrastructure) Ir. Adji Pamungkas (Kepala Cabang) Satoto Prayasutiksno (President Director) Risnoewardhono (Engineering Director)
November 10 (Fri)	Transport Bureau  Visit Japanese Embassy, Indonesia  JICA Indonesia Office	Aripurnomo Kartohard Jono (Directorate of Port & Dredging)  Shigueki Murata (First Secretary)  Hiroyoshi Ihara (Resident Representative)

## 1-4-2 Sri Lanka

### Study Team

Team Leader/Overseer	Makoto Matsuda Planning Section, Social Development Department, JICA
Evaluation Studies/Planning	Mimi Nishikawa International Development Center of Japan
Evaluation Studies/Planning	Mitsuaki Hosono Japan International Cooperation Center

### Study Schedules

Date	Study Schedule	Lodging Location
November 12 (Sun)	Tokyo Colombo (Team Leader Matsuda) Jakarta Colombo (Nishikawa , Hosono)	Colombo
November 13 (Mon)	Visit JICA Sri Lanka Offices Visit Japanese Embassy, Sri Lanka Hearing at DER	Colombo
November 14 (Tue)	Hearing at SLPA Hearing at DNP Hearing at ADB-SL	Colombo
November 15 (Wed)	Survey of Colombo Port	Colombo
November 16 (Thu)	Report to JICA Sri Lanka Office Report to Japanese Embassy, Sri Lanka Hearing at JBIC Sri Lanka Offices Hearing at MPDSD	Colombo (Nishikawa, Hosono only)
November 17 (Fri)	Colombo Tokyo (Team Leader Matsuda) Colombo Manila (Nishikawa , Hosono)	

### Main Informants

Date of Visit	Agency	Name (Position)
November 13 (Mon)	JICA Sri Lanka Office Courtesy Call to Japanese Embassy, Sri Lanka DER	Seiji Kaiho (Resident Representative) Kenji Seiyama (Second Secretary) J. H. J. Jayamaha (Director-Japan Division)
November 14 (Tue)	SLPA  DNP  ADB Sri Lanka Office	Admiral M. Samarasekera (Chairman) G. P. Weerasinghe (Chief Engineer) D. Godage (Chief Engineer) K. W. D. U. Dahanayake (Director) D. A. P. Abeysekera (Assistant Director) M. Muthulingam (Assistant Director) J. R. Cooney (Resident Representative)
November 15 (Wed)	SLPA	G. P. Weerasinghe (Chief Engineer) D. Godage (Chief Engineer)
November 16 (Thu)	JBIC Sri Lanka Office MPDSD	K. Toyama (Representative) D. M. P. B. Dasanayake (Secretary)

### 1-4-3 Philippines

#### Study Team

Team Leader/Overseer	Haruyuki Shimada Planning Section, Social Development Department, JICA
Evaluation Studies/Planning	Mimi Nishikawa International Development Center of Japan
Evaluation Studies/Planning	Mitsuaki Hosono Japan International Cooperation Center

#### Study Schedules

Date	Study Schedule	Lodging Location
November 17 (Fri)	Colombo Manila (Nishikawa , Hosono)	Manila
November 18 (Sat)	Compiling of Data (Nishikawa , Hosono)	Manila
November 19 (Sun)	Tokyo Manila (Team Leader Shimada) Compiling of Data Colombo (Nishikawa , Hosono)	Manila
November 20 (Mon)	Visit to JICA Philippines Office Hearing at NEDA	Manila
November 21 (Tue)	Hearings at DOTC, PPA Collection of Data from ADB	Manila
November 22 (Wed)	Manila Batangas (Overland) Hearing at PMO-Batangas Hearing at AAS Survey of Batangas Port	Batangas
November 23 (Wed)	Batangas Manila (Overland) Hearing at JBIC Philippines Office	Manila
November 24 (Wed)	Report to JICA Philippines Office Manila Tokyo	

#### Main Informants

Date of Visit	Agency	Name (Position)
November 20 (Mon)	JICA Philippines Office NEDA-PIS	Motofumi Kohara (Deputy Resident Rep.) J. P. Toleutino (PIS) S. G. P. Snarez (PMS) E. M. Planta (IS) E. Santiago (PIS)
November 21 (Tue)	DOTC PPA	S. C. Custodio (Director) T. Iletto (Project Director) R. T. Mascarina (Manager) JICA Specialist Kobune
November 22 (Wed)	PMO-Batangas  AAS	E. C. Pilar (Port Manager) V. A. Arellano (PSD Manager) A. L. Bayani (ACTG/ESO Manager) J. H. M. Balita (AASI Operation Manager)
November 23 (Thu)	JBIC Manila Office	Teruhide Kaneda (Representative)

#### 1-4-4 Kenya

##### Study Team

Team Leader/Overseer	Makoto Kitanaka Planning Section, Social Development Department, JICA
Evaluation Studies/Planning	Aya Saitoh International Development Center of Japan
Evaluation Studies/Planning	Yasuyuki Kuroda Japan International Cooperation Center

##### Study Schedules

Date	Study Schedule	Lodging Location
November 19 (Sun)	Tokyo Nairobi (via London)	Nairobi
November 20 (Mon)	Arrive in Nairobi, Consultation on Study Progress at JICA Offices	Nairobi
November 21 (Tue)	Conference with the Vice Minister for the Environment and Natural Resources: C/P and Three Subjects for Discussion	Nairobi
November 22 (Wed)	Inspection of Nakuru Site	Nakuru
November 23 (Thu)	Inspection of Nakuru Site	Nakuru
November 24 (Fri)	Report to Embassy and JICA Kenya Office	Nairobi
November 25 (Sat)	Compiling of Data	Nairobi
November 26 (Sun)	Compiling of Data	Nairobi
November 27 (Mon)	Conference with NWPCC (Specialist Kobayashi)	Nairobi
November 28 (Tue)	Conference with NWPCC (Mr. Eng. M. O. Ochieng, Chief Development Services Manager)	Nairobi
November 29 (Wed)	Conference with NWPCC (Stanley. M. Amuti , Chief Finance Manager)	Nairobi
November 30 (Thu)	Conference with NWPCC (Stanley. M. Amuti , Chief Finance Manager)	Nairobi
December 1 (Fri)	Report to JICA Kenya Office	Nairobi
December 2 (Sat)	Travel from Kenya to Tanzania	Tanzania
December 3 (Sun)	Compiling of Data	Tanzania
December 4 (Mon)	Travel from Tanzania to Mauritius	Mauritius

## Main Informants

<b>Date of Visit</b>	<b>Agency</b>	<b>Name (Position)</b>
November 20 (Mon)	JICA Kenya Office	MIYAGAWA. Masaaki, Development Program Officer NITTA Tom, Deputy Resident Representative MATSUYAMA Satoru, Assistant Resident Representative
November 21 (Tue)	Ministry of Environment and Natural Resources	Ir. Suwandi Saputro (Head of Sub Directorate of Port Engineering) Lollan Andy SP, ST (Directorate of Port and Dredging) Hidehiko Noda (Staff Member)
November 24 (Fri)	Japanese Embassy, Nairobi	KAWATO Hideki, First Secretary
November 27 (Mon)	JICA Specialists	ISHIHARA. Heihachiro, Development Plan in Water Supply, Ministry of Environment and Natural Resources KOBAYASHI Yoshihiko, Management of Water Supply Organization, NWPC TSUJISHITA Kenji, Advisor, Smallholder Irrigation, Ministry of Agriculture and Rural Development
November 28 (Fri) November 29 (Sat)	NWCPC	Daniel K.Punyua, Managing Director. M.O.Ochieng, Chief Development Services Manager Stanley M.Amuti, Chief Finance Manager J.V.Shikalo, Acting Chief Operations Manager P.A.Ogut, Engineer W.M.Ndemwa, Senior Chemist



### 1-4-5 Mauritius

#### Study Team

Evaluation Studies/Planning Yasuyuki Kuroda  
Japan International Cooperation Center

#### Study Schedules

Date	Study Schedule	Lodging Location
December 4 (Mon)	Travel from Tanzania to Mauritius	Mauritius
December 5 (Tue)	Conference with Vice Minister Mr. Krish Ponnusamy, Ministry of Public Utilities	Mauritius
December 6 (Wed)	Conference with Mr. Joseph, Deputy General Manager (Administration), CWA;	Mauritius
December 7 (Thu)	Conference with Dr. H.R. Sharma, Head, Water Resources Unit, Ministry of Public Utilities	Mauritius
December 8 (Fri)	Conference with Dr. H.R. Sharma, Head, Water Resources Unit, Ministry of Public Utilities	Mauritius
December 9 (Sat)	Compiling of Data	Mauritius
December 10 (Sun)	Travel from Mauritius to Singapore	Mauritius
December 11 (Mon)	Travel from Singapore to Tokyo	

#### Main Informants

Date of Visit	Agency	Name (Position)
December 5 (Mon) December 7 (Thu) December 8 (Fri)	Ministry of Public Utility	Krish Ponnusamy, Permanent Secretary Jayraj Peeroo, Assistant Secretary H.R. Sharma, Head, Water Resources Unit Juggoo Lomesh, Engineer, Water Resources Unit R. Bhoojhowon, Engineer, Water Resources Unit
December 6 (Wed)	CWA	Rohit Manager, Deputy General Manager (Tech.) H. Joseph, Deputy General Manager (Administration)

## **CHAPTER 2. EVALUATION METHOD**

## CHAPTER 2 —EVALUATION METHOD

The basic policy concerning the methods used in these evaluations comprises three main points: 1) an evaluative standpoint is based on the logical structure of the Project Design Matrix (PDM<sup>1</sup>); 2) aspects of the study being evaluated can automatically be classified into one of the five evaluation items (Efficiency, Effectiveness, Impact, Relevance, or Sustainability) following the logical structure of the PDM evaluation categories; and 3) evaluation grids are used in each of the five evaluation categories to give the evaluations more specific focus.

This chapter describes each of the evaluation categories and methods used in these evaluation studies, including the structure of the PDM (Section 2-1), the relationship between the PDM and the five evaluation items (Section 2-2), and the structure of the evaluation grid (Section 2-3).

### 2-1 Structure of the PDM

#### Purpose to Create the PDM

The following points are the objectives to create the PDM.

- (1) The PDM clarifies the focus of the evaluation by allowing the development study of the subject under evaluation to be understood logically as a continuous sequence from implementation to the stage following implementation. This clarifies the manner in which the development study is evaluated and how the evaluation Output is interpreted.
- (2) The process to clarify the logical structure of the PDM also clarifies the objectives of the development studies themselves.
- (3) Ensuring that evaluators and others involved in implementing the evaluations (not only the evaluation study teams, but those who are involved in the evaluation process such as informants) all have a common understanding of issues and processes allows the implementation of the evaluation to proceed more smoothly.

It is important that evaluations be implemented after specifying the evaluation methods, for it is only then that the Output of the evaluations will be meaningful. Implementing evaluations without first clarifying the evaluation methods raises a distinct possibility that evaluation Output will be based on arbitrary evaluator interpretations, leading to questions about the meaningfulness of the evaluations themselves.

Applying the entire development study process to the logical structure of the PDM clarifies the evaluative perspective (i.e., how the development study is to be evaluated) when the evaluation is implemented. This makes it possible to interpret the evaluation Output (i.e., how the Output are understood) with a concrete perspective according to the chosen evaluation category.

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<sup>1</sup> The project summary referred to as the Project Design Matrix is used in managing operations for development assistance projects.

## **Creating a PDM after Implementation**

Ideally, a PDM should be made prior to implementation of the project, with the PCM method<sup>2</sup> used to carry out an analysis of participants and issues. However, as PDMs were not used in all twelve target studies, the sequential progression of the development studies was applied to the logical structure of the PDM for the evaluation. Since the majority of projects has been completed for ten years or more, in some cases the PDM created for evaluation could not be made to accurately reflect the content of the study at the time it was conducted. However, it was considered in this study that previous conditions are reflected as accurately as possible referring to the data in existing S/W and final reports.

## **Basic Role of the PDM for the Present Evaluation Study**

The logical structure of the PDM consists of "Inputs," "Activities," "Output," "Project Purpose," and "Overall Goal" sequentially. However, PDMs may vary with the type of the development study (e.g. M/P<sup>3</sup> or F/S<sup>4</sup>) and their goals. Therefore, based on the relationship between the above-mentioned sequence of development study and the logical structure of the PDM, PDMs for the evaluation in this study were made by different types of development study as follows:

- 1) M/P Study: study for drawing up a development plan:
- 2) F/S Study or D/D Study: study for creating a specific project for the purpose of its materialization
- 3) M/P+F/S Study: study for drawing up a development plan and creating specific projects under the framework of the development plan for the purpose of its materialization

### **(1) M/P Study**

The content of the PDM for the M/P is described below.

**Input:** members on the study team, training course for counterparts, equipment, and seminars from Japanese side counterpart members, seminars and training courses sponsored by counterpart, and equipment from recipient countries.

**Activities:** implementation of the study and technology transfer.

**Output:** grasp of conditions regarding the target area by the study and technology transfer to the counterpart through the process of the study.

**Project Purpose:** creation of a long-term, comprehensive development plan for the target area based on the grasped conditions.

**Overall Goal:** implementation of subsequent studies such as F/S and D/D for the project under the framework of the development plan. (Although realization of the

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<sup>2</sup> PCM is an operations management method used in the PDM cycle of planning, development, and evaluation of development assistance projects.

<sup>3</sup> Master Plan

<sup>4</sup> Feasibility Study

development project based on F/S or D/D might be regarded as Overall Goal, it should be regarded as an additional goal beyond the Overall Goal.)

(2) F/S and D/D Studies

The contents of "Project Purpose" and "Overall Goal" for the PDM in the F/S and D/D studies differ from those in the M/P studies. In the F/S and D/D studies, "Project Purpose" is defined creation of a basic plan for the specific projects in the F/S and D/D studies. Moreover, "Overall Goal" is defined materialization of the project based on the basic plan after concrete preparation by the recipient country s government.

(3) M/P+F/S Study

The M/P+F/S study is a combination of the M/P and F/S studies described above. Only the "Project Purpose" and "Overall Goal" are defined separately by the type of study, while other components are same as those in the M/P study. In short, "Project Purpose" of the M/P study means creation of a development plan for a specific sector in a specific region, and "Project Purpose" of the F/S study means a basic plan of specific project for a specific sector in a specific region. Meanwhile, "Overall Goal" of the M/P study is defined implementation of subsequent studies such as F/S and D/D for the project under the framework of the development plan, whereas "Overall Goal" of the F/S is defined materialization of the project based on the basic plan after concrete preparation by the recipient country s government.

**The Role of External Conditions for the PDM**

The basic rule regarding external conditions for the PDM is that it is necessary that external conditions be met at all times in order to enable the logical structure of the PDM to progress from lower to higher order. In other words, the process cannot proceed to the next stage unless the external conditions are satisfied, so meeting precondition (1) enables progress to the Inputs and Activities stages, satisfying preconditions (2) is necessary for an action to be linked to Outputs, and precondition (3) is required to bring the Output forward to Project Purpose (refer to Table 2–4 below).

Table 2–4 Role of External Conditions

Project summary	Indicator	Means of acquiring indicators	External conditions
Overall goal			Conditions for sustaining effects of development
Project purpose			Condition 3
Outputs			Condition 2
Activities	Inputs		Condition 1
			Preconditions

Since it is not possible to grasp the external conditions from the existing documents, external conditions in this study mean all factors outside the scope of the studies indicated by the S/W prior to implementation of the development study.

For example, in development study, whose project purpose is a construction of dam construction, it is assumed that an Environmental Impact Assessment (EIA) is carried out in the implementation period of the project and eventually the project is cancelled due to an environmental problem. In this case, if the EIA had been included in the scope of work prior to implementation of the development study, any environmental problems that arise would be considered external conditions, or, in other words, to be out of the scope of the development study. Rather than being considered a factor in the development study itself, if an external condition is not satisfied, it is evaluated as a factor causing the project to be discontinued.

Conversely, if implementation of EIA is included in S/W and the EIA cannot detect a problem due to its inefficiency, it is evaluated that the development study itself has a problem.

This report details the project designs of each target study upon which the creation of the PDM was based. For reference, the PDM for Phase I of the Semarang Port Plan Study in Indonesia is included in the ANNEX as an example of a PDM.

## 2-2 Relationship between the PDM and the 5 Evaluation Items

Using the PDM for the evaluation clarifies the logical structure of the PDM as well as the scope of the evaluation that constitute five evaluation items (Efficiency, Effectiveness, Impact, Relevance, and Sustainability). The scope of each of the five evaluation items is shown in Table 2-2, and the main focus point in each of the five evaluation items is given below.

Table 2-2 Logical Structure of the PDM and Positioning of the 5 Evaluation Items

	Efficiency	Effectiveness	Impact	Relevance	Sustainability
Overall Goal					
Project Purpose					
Outputs					
Activities /Inputs					

**(1) Efficiency**

"Efficiency" is the item to examine whether the development study is conducted efficiently in terms of the relationship between Activities/Inputs and Outputs. This includes verifying that the development study is implemented according to the initial scope, that there are sufficient inputs in the study and communication between the study team members and their counterparts, and that data is being utilized as fully as possible

**(2) Effectiveness**

"Effectiveness" is the item to examine to what extent the development study achieves its objective. This includes verifying that proposals are made after sufficient consideration (technologically, economically, socially, environmentally, etc.), that the composition and content of the final report are understandable sufficiently, and that technology transfer is carried out effectively.

**(3) Impact**

"Impact" is the item to examine whether proposals and technology transfer resulting from the development study are sufficiently utilized. This includes verifying the degree to which proposals and transferred technology are being utilized, the state of progress to realization of proposed projects, and social and economic effects if proposed project has been implemented.

**(4) Relevance**

"Relevance" is the item to examine whether the development study was incorporated in the development plan by the recipient country/region/organization, actions taken by JICA or other donors, and beneficiary needs when it was conducted, and whether a realized project based on the proposals have met current needs when an evaluation is conducted. Furthermore if the proposed project has been realized, this item also examines if the contents of the realized project has followed the proposals and when the project is modified whether the reason is relevant.

**(5) Sustainability**

"Sustainability" is the item to examine whether transferred technologies and proposed projects are sufficiently maintained and managed after the completion of study, and moreover whether they are independently sustainable.

**2-3 Preparation of an Evaluation Grid**

An evaluation grid is an effective evaluation tool for more concrete verification from an evaluative viewpoint. Evaluation grids for each target study were made using this technique. The basic form of the evaluation grid used in this study is shown in Table 2-3.

Table 2-3 Basic Form of the Evaluation Grid

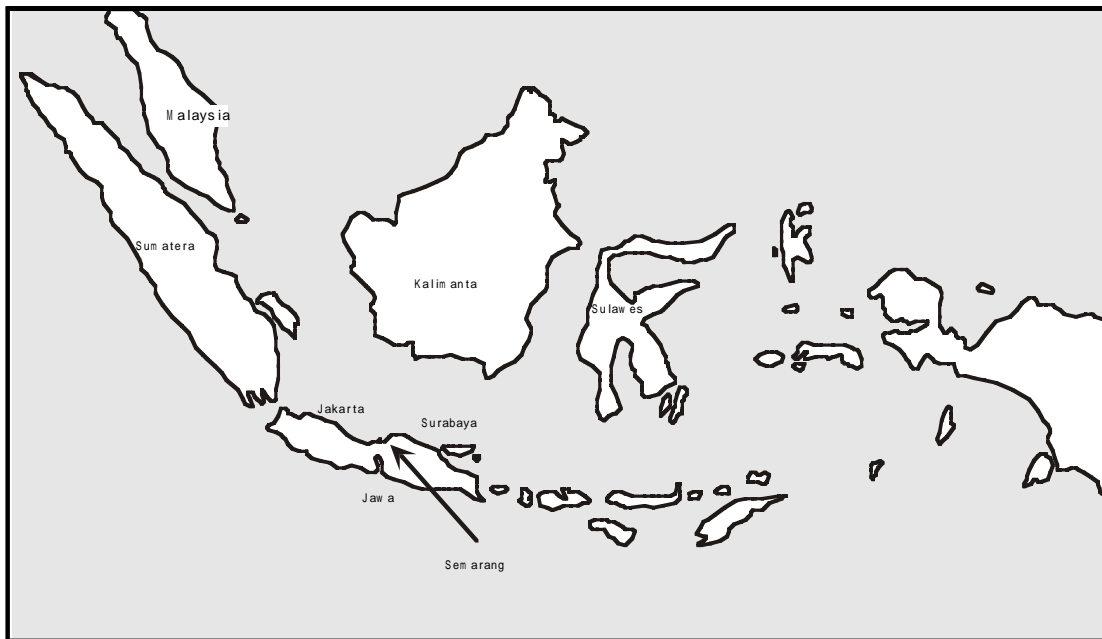
Criteria	Evaluation Category	Actual Questions	Data	Collection Methods	Japan Members		Philippine Members					Intl. Organizations	
					A	B	C	D	E	F	G	H	I
Efficiency													
Effectiveness													
Impact	Action Prep. Stage												
	Action/ Post-Action Stage												
Relevance													
Sustainability													

In "Evaluation Category" of basic form, more detailed subsection is described. Questions to examine the contents of "Evaluation Category" are described in "Actual Questions." During the on-site study, interviews and questionnaire survey were conducted in line with the "Actual Questions". Quantitative/qualitative data and relevant information to correspond to "Actual Questions" are described in "Data." Methods to collect information in "Data" is described in "Collection Method." The columns A-I are filled by the name of organization, from which information should be obtained and the boxes are checked if the organization is concerned in each "Evaluation Item."



**CHAPTER 3 - INDONESIA:**  
**Development Plan of the Port of Semarang (Phase I)**  
**Development Plan of the Port of Semarang (Phase II)**  
**(M/P+F/S)**

## Indonesia: Location of the Study Area



View of Semarang Po



Container Terminal Built by JBIC's L

**CHAPTER 3 - INDONESIA:  
Development Plan of the Port of Semarang (Phase I),  
Development Plan of the Port of Semarang (Phase II) (M/P + F/S)**

**3-1 Overview of Target Subjects**

**(1) Background of the Development Study, Proposed Projects, and Current Status**

1. Background of the Development Study

Semarang Port, located in central Java, is one of the main ports in Central Java province. At the time Phase I of the present study was requested, Semarang Port had a wharf with a water depth of 5.5 meters; Sand deposits and other effects of the shoreline current, however, had decreased the effective water depth to about 4 meters. This meant any main ship larger medium size would be unable to enter the inner harbor directly, necessitating offshore loading and unloading. In effect, the port's limited facilities left it unable to cope with the increasing amounts of cargo being handled as a result of the economic development of the province.

Phase I of the Semarang Study for Port Development was implemented with the aim of promoting the economic development of central Java province, bringing about harmonization in Indonesia overall, and preparing a harbor of suitable scale and function to handle foreign cargo. In this study, a three-stage port development plan was proposed: an "urgent development plan" targeted for completion in fiscal 1980; a "short-term improvement plan" slated for fiscal 1985; and a "long-term plan" targeted for the year 2000.

Phase II of the Semarang Study for Port Development, based on a plan for coal exports that was included in the Indonesian government's national policy, was implemented with the aim of reviewing the plans to construct a coal berth, as well as Phase I.

2. Study Implementation Period

Development Plan of the Port of Semarang Phase I: September 1997 —August 1978

Development Plan of the Port of Semarang Phase II: May 1985 —August 1986

3. Counterpart

Development Plan of the Port of Semarang Phase I: Directorate General of Sea Communications (DGSC)

Development Plan of the Port of Semarang Phase II: Directorate General of Sea Communications (DGSC)

4. Overseeing Consultants

Development Plan of the Port of Semarang Phase I: Overseas Coastal Area Development Institute of Japan, Japan Port Consultants Ltd., Pacific Consultants International Co. Ltd.

Development Plan of the Port of Semarang Phase II: Overseas Coastal Area Development Institute of Japan

## 5. Main Proposed Projects

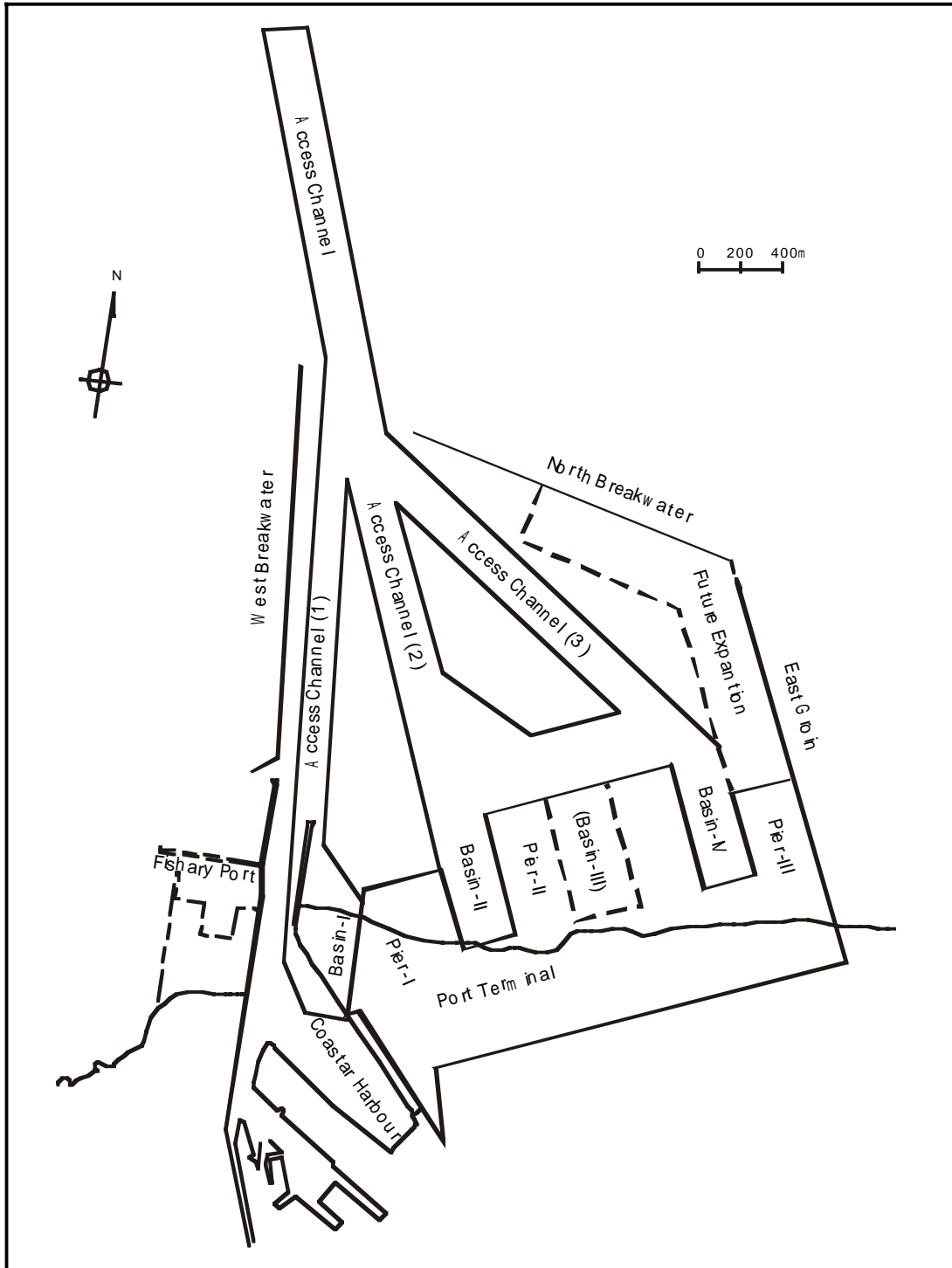
### Development Plan of the Port of Semarang Phase I

#### ***Long-term Plan***

The long-term vision established for Semarang Port is described in Figure 3–4, with 2000 as the projected target date for completion of the project. The following were targeted as primary factors affecting plan actions.

- (1) Expand facilities for Semarang Port, as the harbor in central Java has inadequate foreign cargo handling
- (2) Develop Semarang Port to promote economic development in central Java and further the regional economy.
- (3) Advance industrial development in central Java, secure the necessary land for shoreline works, and develop Semarang Port so as to allow it to function as a harbor featuring both distribution and industrial functions.
- (4) Cease offshore handling of freight with barges, allowing loading and unloading from the wharf to deal with industrial development of central Java.

Figure 3-1 Long-Term Plan for Semarang Port (Phase I)



### ***Short-term Plan/Urgent Plan***

The short-term plan was targeted for completion in 1985. Main facilities included six berths with ten-meter wharves for handling increased volume of foreign cargo, a ten-meter access channel, berths, and east, west, and north breakwaters. For the urgent plan targeted for fiscal 1980, a -10 m wharf with 3 berths, and access channel and berths with -9 m water depth were planned. Details of the urgent plan are shown below.

#### Urgent Plan (Targeted for Fiscal 1980)

##### - Dredging

Access Channel	Width: 150 meters Depth: 9 meters Length: approximately 4 km Dredged material: approximately 5 million square meters
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##### Berths

##### - Marine Facilities

North Breakwater	1,600 meters
East Breakwater	1,700 meters
West Breakwater	1,900 meters
Wharf Facilities	Shore roads, stockyards, water supply facilities, service supply ships, etc.

##### - Other

Port Facilities	Sheds, warehouses, offices for management
Port Equipment	Light beacons, lighted buoys

#### Development Plan of the Port of Semarang Phase III:

### ***Long-term Plan***

Phase II of the Master Plan, targeted for completion in 2005, at the request of the Indonesian government, was to provide additional industrial functions to the land utilization plan of Phase I. Details of the land utilization plan, which was part of the Master Plan, are shown in the following.

##### - Space for Cargo Distribution

International Terminal	General international wharf, container wharf, scrap wharf, grain wharf
Domestic Terminal	Domestic wharf for inter-island ships, small boat and sailboat wharf, passenger wharf (for official use)
Distribution	Land for distribution operations

##### - Space for Manufacturing and Industry

Land for Marine Industries	Coal wharf, cement delivery wharf, chemical wharf
Land for Manufacturing	Lumber processing, manufacture of furniture, electricity, food processing, automobiles, shipbuilding

- Space for Workers and Officials

Sites for Official Use	Lots for port offices, police, quarantine, etc.
Business Use	Shipping companies, trucking companies, harbor transport

Railway Land

***Urgent Development Plan***

To deal with the rapid increase in the volume of foreign cargo, accelerating use of coal, and popularization of fertilizers, the Indonesian government asked the government of Japan for assistance with an urgent development plan, with 1990 as the target date of completion. This was due to inquiries coming from enterprises including lumber, fertilizers, chemical plant, coal, and other business after completion of Phase I. Especially as concerned plans for a coal terminal, the Indonesian government had a strong desire to use this as part of the policy to transform the country into an energy resource. Details of the plan are shown below.

Urgent Plan (Targeted for Fiscal 1990)

(5) Facility	Required Berth Length	Number of Berths
10-Meter Wharves	345 m	2.3
7.5-Meter Wharf	100 m	1
Coal Terminal	150 m	1
Fertilizer	150 m	1
Metal (Scrap)	100 m	1
Passenger	150 m	1 (Multipurpose)

(6) Area	Surface Area (ha)
International Freight Terminal	19 (12)
Domestic Terminal	65 (0)
Distribution	12 (12)
Marine Industries	25 (25)
Manufacturing	23 (23)
Official Sites	16 (9)
Business	39 (39)
Total	199 (126)

Note: Figures in parentheses indicate area of newly reclaimed land

6. Current Status: Progress in Applying the Phase I M/P and Complete Implementation of the F/S, Progress in Applying the Phase II M/P and Partial Implementation of the F/S

The development of Semarang Port, primarily financed by OECF (present JBIC) with other private capital, by and large progressed in line with plans proposed in the JICA development study. Henceforth, projects will be formed according to the Semarang Port Phase III Urgent Development Plan, implemented using their own funds.

## **(2) Monitoring with the PDM**

### **Semarang Port (Indonesia) Facilities Improvement Plan Study Phase I (M/P + F/S)**

#### 1. Overall Goal

M/P: Start developing a true international harbor capable of handling foreign cargo that will help in developing the surrounding regions, with the recipient country's government making concrete preparations towards the of plans.

F/S: For the urgent plan —i.e., the first stage of development —construction of three foreign cargo berths with a depth of 10 meters, access channels with a depth of nine meters, and breakwaters to eliminate the immediate problem of offshore loading at this port.

#### 2. Project Purpose

M/P: Develop a facilities expansion plan for Semarang Port based on a long-term view of improvements in infrastructure linked to the overall development plan for central Java.

F/S: Carry out economic and financial analyses of Semarang Port's "Urgent Development Plan" and of the content of the plan that is created.

#### 3. Input

Japan Study Team: 8 Specialists (30 M/M), OJT for C/P

Indonesia Team: Study staff from the Semarang Port Director's office, arrangements for study office.

#### 4. Activities

In Japan, compile and analyze data from past studies, and collect and analyze information and opinions. In Indonesia, compile and analyze data, and collect and analyze technical data from studies implemented on-site. Based on the above and other related information, investigate the following:

- Study of economic conditions of and effects on the natural environment by Semarang Port
- Estimated demand for Semarang Port's harbor freight services
- Current and projected shipping conditions at Semarang Port
- Analysis of conditions and problems concerning management and administration of the Port
- Environmental assessment

#### 5. Output

- Long-term Master Plan for Semarang Port based on current conditions and projected demand to be created for Semarang Port and regions targeted in the study
- Formation of short-term plans based on the long-term Master Plan
- Creation of emergency improvement plans and clarification of the feasibility of such plans
- Indonesian team to acquire means and knowledge to develop port F/S based on the JICA s F/S



## 6. Preconditions

Using estimates of foreign cargo demand, two scenarios for the increase in central Java's GRP for 1979 and beyond were presented, one showing minimum growth and one maximum growth, based on a growth rate of 7.5% between 1976 and 1978.

In the low-growth scenario, central Java province's GRP is assumed to expand at the national average growth rate of 7%; in the high-growth scenario, the province's per-capita GRP—which in 1975 was only 55% of the national average—is assumed to reach the national average.

## **Semarang Port (Indonesia) Facilities Improvement Plan Study Phase II (M/P + F/S)**

### 1. Overall Goal

M/P: In accordance with the long- and short-term plans for Semarang Port, improve the harbor to promote industrial and economic development of the entire central Java region; that is, Indonesia takes concrete steps towards formation of projects.

F/S: Implement the urgent plan (targeted for 1990) constituting the first stage of development, to deal with rapidly increasing foreign cargo, increased coal utilization, and the increased use of fertilizers.

### 2. Project Purpose

M/P: Develop Master Plan for Semarang Port, to be targeted for 2005.

F/S: Prepare urgent facilities improvement plan and implement feasibility study.

### 3. Input

Japan Study Team: 9 Specialists (61.15 M/M), OJT for C/P

Indonesia Team: Six members from DGSC, 13 persons for study staff from the Semarang Port Director's office, arrangements for study office.

### 4. Activities

In Japan, compile and analyze data from past studies, and collect and analyze information and opinions. In Indonesia, compile and analyze data, and collect and analyze technical data from studies implemented on-site. Based on the above and other related information, investigate the following:

- Study of economic conditions of and effects on the natural environment by Semarang Port
- Examination of existing Master Plan (based on gateway port policies, assumption of appropriate share of responsibility for port functions, examination of roles and tasks, estimation of harbor traffic until 2005, development of land and sea use plans for surrounding region.
- Estimate of harbor traffic until feasibility studies for short-term and emergency facilities improvement plans, creation of short-term facilities improvement plan including examination of appropriate utilization of various current port facilities and equipment.

### 5. Output

- Creation of Master Plan, targeted for fiscal 2005, based on current conditions and projected demand to be created for Semarang Port and regions targeted in the study.

- Formation of short-term facilities improvement plan, targeted for fiscal 1995 and based on the Master Plan
- Creation of emergency improvement plans targeted for fiscal 1990 and clarification of the feasibility of such plans
- Indonesian team to acquire means and knowledge to develop port F/S based on the JICA s F/S

#### 6. Preconditions

Two scenarios describing possible amounts of cargo that could be handled were drawn up. In the first scenario, the government would be making no improvements to infrastructure beyond current conditions, and without taking drastic measures for industrialization (% of GRP: 6% in 1985-1990, 3-4% in 1990-1995, 0-2% in 1995-2005). In the second scenario, the government works for the region's economic development, while also considering investments in ports, roads, and other necessary elements (% of GRP: 7.5% in 1985-1990, 9% in 1990-2000). Furthermore, in the latter case, one presumption is that Indonesia's overall economic dimensions (per capita national income) would reach the level of Malaysia and South Korea by the year 2000. The present Master Plan was drawn up based on the second scenario.

### 3-2 Results from the Five Evaluation Criteria

This evaluation was implemented by reviewing related documentation, in addition to the questionnaires submitted to the JICA study team in the implemented development study, questionnaires sent to other related agencies and groups, interviews, and on-site surveys of Semarang Port. We were able to obtain information directly from the DGSC personnel who were actually involved in the study in Phase II, but as we were unable to locate Indonesian members involved at the time of the Phase I development study, evaluations were made based on indirect information from DGSC personnel.

#### (1) Efficiency

In Phases I and II, reports were written according to the S/W in both phases, and it was ensured that the content of these reports was conformed to DGSC expectations. Over the course of the study, the counterparts confirmed the size of the JICA study team, data collection, the adequacy of communication between the Indonesian members and the JICA study team were sufficient, and because there were no donors for the development of Semarang Port other than Japan, there were problems in coordinating efforts with such donors. Accordingly, this development study was evaluated overall to have had a high level of efficiency.

#### (2) Effectiveness

##### Content of Final Report

Confirmed here were the results of Phase I and Phase II, including whether or not they were handled based on sufficient social and economic analyses and were in line with the counterparts' expectations and wishes. However, although the general environmental assessment carried out in Phase I was comprehensive and wide-ranging from an environmental standpoint, it was judged in Phase II to have been inadequate. Furthermore, in light of the continuing subsidence of Semarang City's foundation, it was

determined that implementation of an environmental assessment was required in Phase II as well.

### Technology Transfer

We were unable to locate counterparts from Phase I of the Semarang Port Facilities Improvement Plan, and thus were unable to confirm the level of technology transfer in that phase. However, according to information gathered from counterparts participating in Phase II, confirmation of the following led to an evaluation that adequate transfer of technology had been achieved:

1. Counterparts and persons from agencies involved in projects (MOC, BAPPENAS, etc.) learned the methods needed to create a Master Plan (flow of the process from study of conditions to projected demand).
2. Knowledge concerning port planning in Indonesia was gained, and further, this knowledge is also useful in executing present operations (source: Mr. Aripurnomo, Secretary of Port Structure, DGSC)
3. Transferred technology was also useful in drawing up Phase III of the Semarang Port Development Plan<sup>1</sup>

### **(3) Impact**

#### Moves Toward Project Implementation

After completion of this development study, DGSC at all times placed high priority on the implementation of projects from the plans proposed in Phases I and II. Furthermore, DGSC distributed reports to the Ministry of Communication, Regional Office of the Ministry of Communication, local governments, the Ministry of Trade and Industry, the Ministry of Public Works, and other agencies so as to secure support for implementation of these plans from the relevant agencies. Moreover, DGSC implemented Phase III as a next-stage study to follow Phases I and II, using its own funds. The Phase III report was completed in October of 1999, and the projects proposed in this report are slated for advancement. There are no reports of organizations other than DGSC (including international organizations and NGOs) proceeding to next-stage studies based on the results of this study.

Meanwhile, with recent implementation of port facility improvement projects in general, we found that NGOs are increasingly recognizing the importance of project implementation. DGSC, with the aim of rapidly creating projects for Phase III, has been distributing reports from this study to relevant NGO personnel as well as to related government agencies. This is believed to be deepening and expanding understanding of the content of plan projects.

#### Project Implementation Status

In regards to the Urgent Plan, drawn up in Phase I and targeted for fiscal 1980, OECF (present JBIC) implemented a detailed design plan in 1980 (L/A No. IP-200), with project financing arranged 1981 (L/A No. IP-232) and the actual construction for the project completed in March of 1986. Additionally, immediately upon completion of the project, damage from waves affected a portion of the west breakwater constructed as part of this project, but reinforcement of the breakwater using yen loans was completed in September, 1989 (L/A No. IP-326). Of the financing, 16.506 billion yen went to

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<sup>1</sup> "Implementation Program for Urgent Development Plan of Semarang Port Phase III," Oct. 1999

execution of the main project and 2.088 billion yen was provided for the supplementary reinforcement. Details of the projects are shown below. However, these projects do not diverge in any particular way from the plans proposed in the development study.

#### Implementation with OECF Financing

##### **Implemented with a budget of 17.3 billion yen in 1981, completed in 1986.**

- Dredging
  - Channel    Width: 150 meters    Depth: 7 meters    Length: Approx. 2,346 meters
  - Displacement: 442,200 m<sup>3</sup>/9 m depth
  
- Marine Facilities
  - North Breakwater    1,700 meters
  - East Breakwater    1,320 meters
  - West Breakwater    1,950 meters
  - Wharf Facilities    3x160-m berths; depth: 9 meters
  
- Other
  - Port Facilities    Sheds, warehouses, offices for management
  - Port Equipment    Forklifts, tugboats

##### **Implemented with a budget of 2.42 billion yen in 1987, completed in 1989**

- Reinforcement Project
  - West Breakwater    Repair and Reinforcement of 427 meters of the breakwater

Furthermore, referring to the results from the Phase II study, yen loans were provided in two parts, in 1991 and in 1992, and the following projects were implemented.

#### Implemented with JBIC Financing (Completed August, 1999)

Second Term, First Stage    (1991; 7.53 billion yen)  
   Container wharves  
   Container yards  
   Container warehouse facilities  
   Dredging and other works

Second Term, Second Stage    (1992; 3.59 billion yen)

##### 1) Procurement of Equipment

Gantry cranes (35.5-ton x 2)  
Transfer cranes (3)  
10-ton forklifts for empty containers (2)  
2-ton CFS forklifts (6)  
Tractors (10)  
Trailers (20)  
Fire engine  
Transformers and generators  
Procurement of computer hardware systems

2) Computer Systems

3) Consulting Services

Additionally, a local wharf of two meters in depth was constructed with 3 billion Rupiah supplied by the Indonesian government (Ministry of Fisheries). Furthermore, a local study confirmed that 30 billion Rupiah had been secured for the construction of Perindo III, a new berth proposed in Phase III.

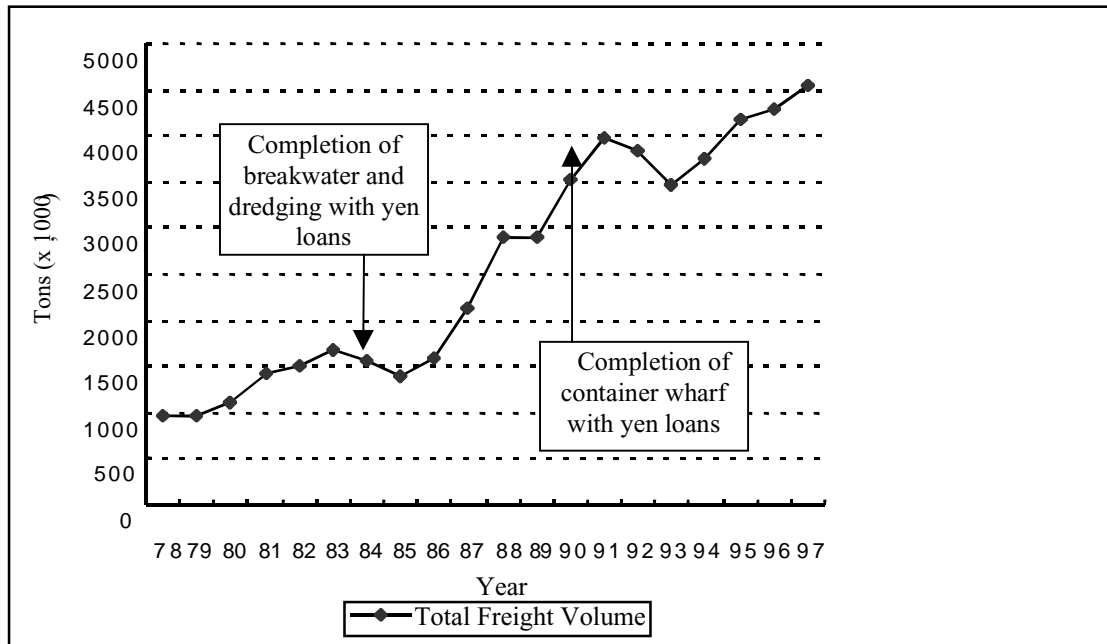
Economic and Social Effects of the Projects

It was confirmed that implementation of the development projects for Semarang Port increased Semarang Port's cargo handling capacity, reduced the number of days ships remained in port, and increased the economic effects<sup>2</sup> in the surrounding area. Details of the effect on each are given below.

1. Increased Cargo Handling at Semarang Port

Cargo handled at Semarang Port increased from 980 thousand tons in 1978 to 1 million 117 thousand tons in 1980, 1 million 573 thousand tons in 1985, 3 million 629 thousand tons in 1990, and 4 million 536 thousand tons in 1998 (refer to Figure 3-2). Of particular note was the increase in freight volume upon construction of the OECF-financed breakwaters.

Figure 3-2 Trends in Amounts of Freight Handled at Semarang Port

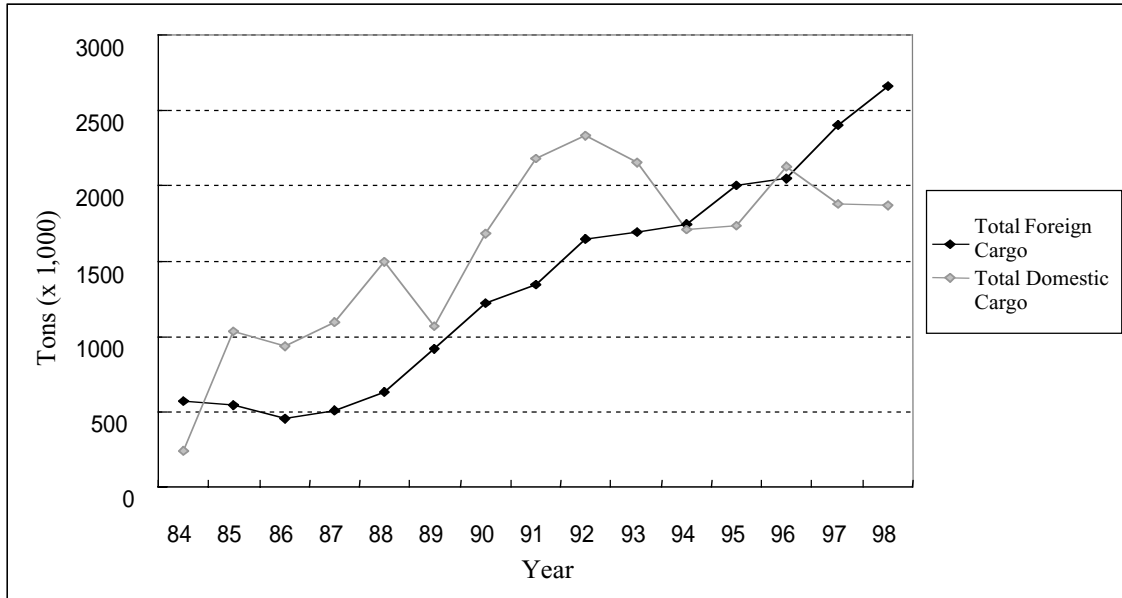


Source: Data from 1976 to 1984 was obtained from ADPEL Semarang, and data from 1985 to 1997 was obtained from DGSC

<sup>2</sup> According to the Phase I report, the surrounding area of Semarang Port consisted of central Java province and the provinces of Pekalongan, Batang, and Pematang.

There has been an especially steep climb in container freight: in 1984, 16,000 tons of container freight were handled, but after the construction of a container terminal through an OECF loan in 1991, this figure skyrocketed to 3,529,00 tons, and is expected to grow even further. Moreover, as shown by the breakdown below, the increase in freight handled arising from foreign trade far outstripped the increase from domestic trade. Since the increase in foreign trade-driven freight handling ties in directly to increased foreign trade revenues, it can be concluded that the Semarang Port development projects have had a tremendous effect on Indonesian economy.

Figure 3-3 Breakdown of Freight Handled at Semarang Port



Source: DGSC

## 2. Reduction of Days in Port

In 1985, foreign cargo liners averaged 139 hours (5.8 days) of time in port per ship, with 53 hours (2.21 days) of this time spent idle, while waiting or due to other causes. In winter especially, as waters are rough during the western monsoon season, it is inevitable that shipping backs up due to the inability of servicing boats to leave their docks. However, with construction of the OECF-financed breakwaters eliminating this problem, port time was reduced to 41 hours (1.7 days, of which waiting time was 0.08 days) in 1989, one-third of the 1985 figure. Remarkable improvement was similarly seen with domestic cargo ships as well.

## 3. Economic Development of Surrounding Areas

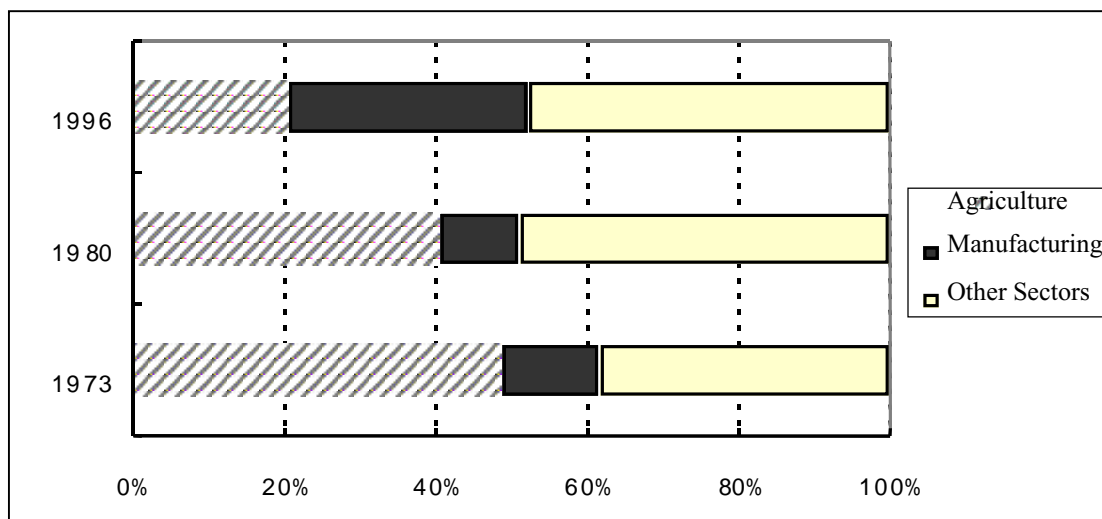
A province-by-province comparison of per capita GRP (Gross Regional Product) shows that Central Java ranked 23<sup>rd</sup> of 27 provinces in 1980, rising to 17<sup>th</sup> place in 1997. A similarly significant development of manufacturing in the same region was found.

As shown in Figure 3-4, the agricultural sector's share of GRP fell from 49% in 1973, to 40% in 1980, and then to 20% in 1996. This period saw a corresponding rise in the industrial sector's share of GRP, which went from 13%, to 10%, and then to 32% of the total in these same years. In addition, the number of registered mid- to large-scale enterprises in central Java province increased from 2,089 in 1975 to 3,946 in 1996. Especially from 1991 on, there was a conspicuous increase in manufacturing firms that engaged in industrial works near Semarang Port because of the attractions of container

transport.

After completion of the development study, development of Semarang Port saw parallel development of Semarang City, with the provision of three industrial complexes, Tanjung Emas Export Processing Zone (TEPZ), Terboyo Megah Industrial Park (TMIP), and Terboyo Industrial Park Semarang (TIPS). It is believed that the results were an important factor in bringing about such efforts to attract business enterprises. In the Phase II report it was mentioned that economic development of the neighboring area was one goal of the development of Semarang Port, and the management of this as one aspect of the regional development plan was strongly recommended for Semarang Port's development. As development of Semarang Port to the present time has been carried out in accordance with proposals made in this sort of development study, as seen from the standpoint of central Java's economic development, output is increasing as expected.

Figure 3-4 Composition of GRDP by Industrial Sector in Central Java Province



Source: "Provincial Income in Indonesia," Biro Pusat Statistik

#### (4) Relevance

##### Relevance at the Development Study's Implementation Stage

The national development plan (Second Five-Year Plan: Repelita II) concurrent with implementation of the Phase I Study aimed for a 50% increase in the volume of domestic inter-island cargo and advocated measures such as attracting marine industries that could utilize the convenience in transport available through Semarang Port. This increased the necessity of making increased understanding so as to gain wider acceptance of the harbor facilities as a goal of the study when it is implemented. The National development plan coinciding with implementation of the Phase II Study (Repelita IV) also recommended continued promotion of inter-island trade as well as foreign trade, with strongly support for equipping ports so as to enable handling of container cargo as well as conventional freight. Thus the Semarang Port Development Plan Phase I and Phase II at the stage of implementation of the development study were evaluated as being highly relevant.

##### Post-Study and Current Relevance

##### ***Long-Term Development Trends***

At present, Indonesia's main development strategy is to promote exports in order to

increase foreign earnings, and the development of Semarang Port plays a crucial role in contributing to this end. Under these conditions, DGSC implemented a Phase III based on the outputs and study procedures of Phases I and II. The Phase II study outputs were given highest priority in the proposed national development plan, designated as "Propenas," put forth by the Indonesian government in January, 2001. The development policies proposed in the Phase I and II development studies are presently still relevant to Indonesia's needs, and thus can be said to mirror the trends of the national development plan.

### ***Divergence of Projects from Proposals***

In the F/S portion in Phase I, projects were on the whole created in line with the proposals. However, in regards to Phase II, the rapid increase in container ship handling after the completion of the study resulted in a change in specifications for the multipurpose terminal proposed in the study output, substituted by construction of a container terminal. Moreover, as the container terminal had to be built to accommodate larger vessels, rather than extending the eastern portion as proposed in the study, it was recommended that the western part be extended due to the greater depth and lower dredging costs (refer to Figure 3-2). If only the changes in specifications are considered, the proposed land use plan was not relevant. However, it was found that the rapid increase in container traffic far exceeded expectations held at the time the study was implemented.<sup>3</sup> Accordingly, changes in the project were judged not to have been a factor in the relevance of the development study output.

An additional reason for giving development of the west side priority over the east side was the problem of squatters illegally occupying the area. Roughly 2000 squatter households occupied the eastern shoreline, engaging in fishing activities while requesting rights to the land from the Semarang City government. The current mayor of Semarang City is seen as likely to agree with such requests. As granting of such rights would likely incur considerable expense in the form of compensation paid to inhabitants for relocating, further development of the east portion is expected to be increasingly problematic. Although there is mention of the matter of relocating squatters in the Phase II report, this is an issue that must be resolved by the Indonesians, and so no detailed study was made. Although this issue was not a study subject falling within the scope of works, as thus could be considered not to have been a factor in the relevance of the development study, it was found that a detailed study was required due to aggravation of this issue.

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<sup>3</sup> In contrast to the total container freight capacity of 32,900 TEU included in the implementation of the Phase II study in 1995, actual figures amounted to 103,849 TEU.



Figure 3-5 Comparison between JICA's Master Plan proposed in the Development Plan of the Port of Semarang (Phase II) and the Draft Master plan of Semarang Port targeted year of 2025

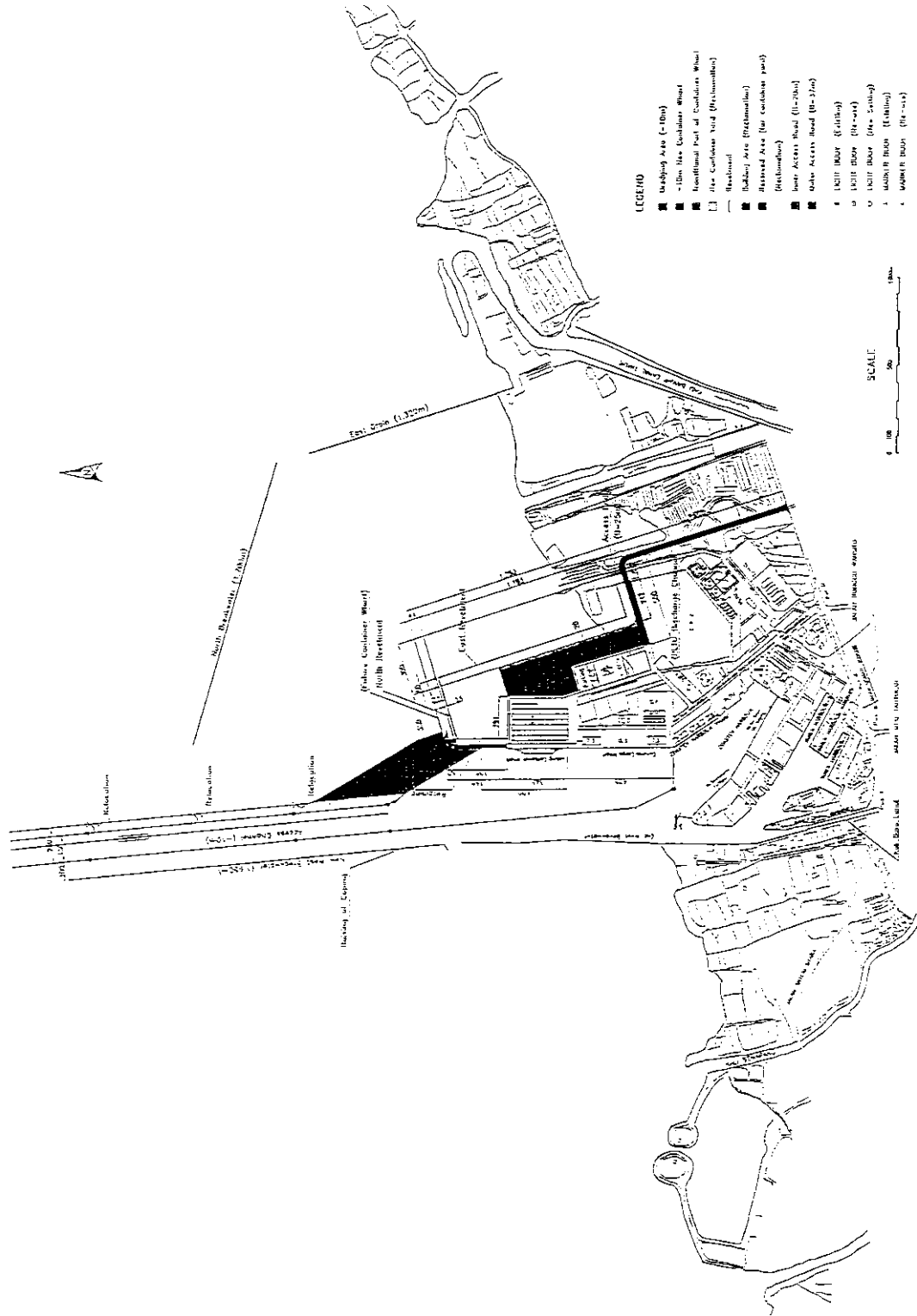
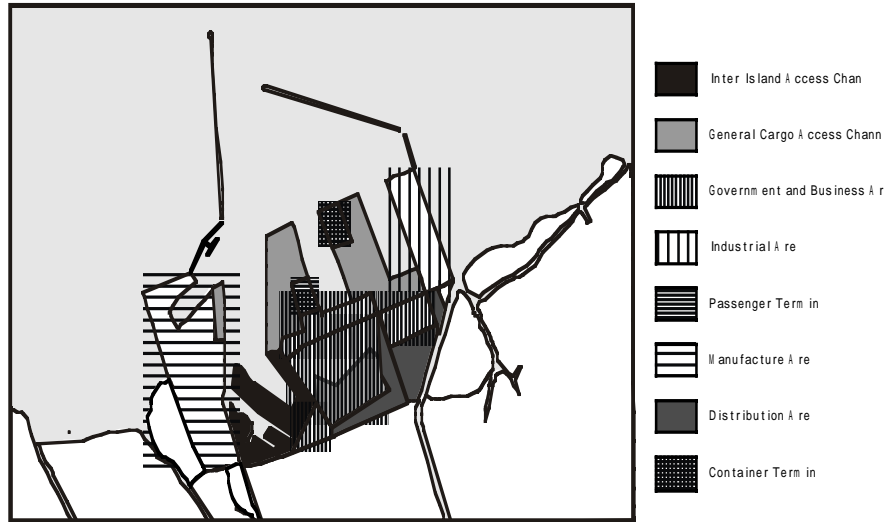


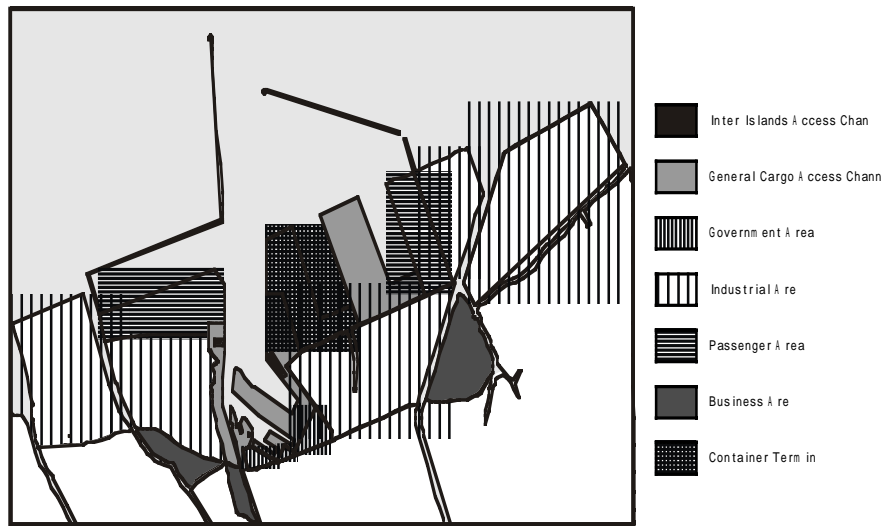
Figure 3-6 Comparison of Master Plan Proposed in Phase II and the Current Master Plan (Provisional) Targeted for Fiscal 2005

Development Plan of the Port of Semarang targeted year of 2012



source Semarang Study for Port Development Project Phase II (P+FS) J1

Draft Master Plan of Port of Semarang targeted year of 2012



Source: Per

## **(5) Sustainability**

Confirmation of the following points permitted an assessment that the study outputs of Phases I and II are independently sustainable.

### Administration

From "Improvement of Port Control Organizations and Systems" proposed in Phase I, the Indonesians came to recognize that administration of the port by Badan Pengusahaan Pelabuhan (BPP) was inefficient. BPP had previously been affiliated with the Ministry of Communication and the Ministry of Finance, without the ability to determine a cohesive policy for administration of the port. However, subjects proposed in Phase I, wherein a competent high government official would administer the port, was followed in 1983 with the government's enactment of Governmental Regulation No.13 Year 1983. This transferred jurisdiction for administration of the port from BPP to Perusahaan Umum (PERUM) Pelabuhan. In 1991, jurisdiction for administration of the port was transferred from PERUM to PERSERO (Corporation/ Perindo I IV). This allowed more efficient administration of the port than was previously available.

### Continued Management of Implemented Projects

Under the supervision of DGSC, continued management of the port as implemented in Perindo III has been satisfactory. However, taking an overall perspective of Semarang Port, because portions of the harbor district are in danger of becoming submerged at high tide due to the sinking foundations, it is hoped that land reclamation and raising of the structural level will be undertaken without delay.

### Technology from Drawing Up Development Plans

Using the study techniques learned in Phases I and II, DGSC on its own went on to create the Semarang Port Development Plan Phase III. Thus, the technology from implementing the development study is still being utilized effectively, and so the study is evaluated as being sustainable.

## **3-3 Conclusions and Lessons Learned**

The development study (Phase I and Phase II) targeted in this evaluation was implemented efficiently, was linked to the projects, and when view in light of the additional implementation of Phase III, is evaluated as a success. However, the on-site studies made in this evaluation make it clear that further examination of the following points in the development study are necessary to qualitatively improve the development study.

### Creation of a development study for Semarang Port from the perspective of comparative rank and competitiveness

At the time the Phase I and II reports were written, Semarang Port was primarily in use for domestic trade. Thus, the port development plan was drawn up with projected demand for port cargo services from the economic activity in the area surrounding Semarang Port. However, in consideration of the fact that Semarang Port has recently assumed a more expanded role as an international port, future international port plans of

a similar nature should grasp the conditions of facilities at nearby (international) ports, as well as a more global view of the facilities at competing ports (for example, as compared to competing ports, Semarang Port has facilities are inadequate, there are systems management and administration issues). Furthermore, the challenges should not be seen only with consideration given to facilities and infrastructure; business incentives (such as cuts in the taxes levied on mooring fees and piloting charges) must also be examined.

#### Development of Plans Based on the Trend of Further Decentralization of Power

In 1999, Indonesia enacted a bill for the management of natural resources whereby local governments profit independently. Currently, ports are recognized as a part of the national marine transport system, and as such, implementation and administration of port projects is conducted by DGSC and Perindo. However, there is a strong possibility that with the continued decentralization of power, the equipping, management, and administration of ports will devolve to local governments. Thus, national and local governments' respective roles and responsibilities should be clarified, and it is hoped that a development study will be implemented for the restructuring of port administration, including project, management, and administrative systems that are compatible with this decentralization of power.

#### Observations on Social Impacts

As mentioned previously, development of the east side of Semarang Port was suspended primarily because of dredging costs and problems relocating illegal inhabitants. The status of these issues was touched upon in the Phase II report. These problems are outside the scope of the study, and are entirely the responsibility of the Indonesian government. However, including the social and economic impacts of relocating residents in the development study, and providing an objective analysis based on a third-party perspective of the financial dimension and other aspects related to such relocations would result in valuable reference material for planning projects for the development plans.

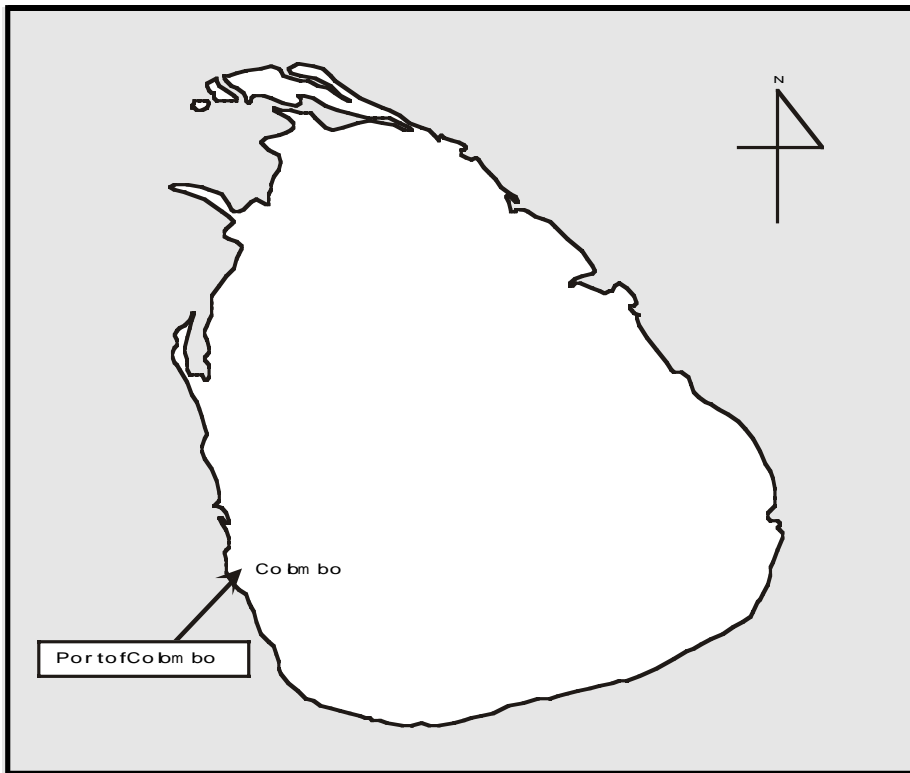
**CHAPTER 4 —SRILANKA:**

**Study on Development Project of the Port of Colombo (M/P+F/S),**

**Study on Development of the Port of Colombo (M/P+F/S),**

**Study on Development Project of New Port of Colombo (M/P+F/S)**

**S ri Lanka: Locat bn of the Study Area**



Com plete View of Port  
Colom bo



View of Jaya Container  
Term inal

**CHAPTER 4 —SRI LANKA:**  
**Study on Development Project of the Port of Colombo (M/P + F/S),**  
**Study on Development of the Port of Colombo (M/P + F/S),**  
**Study on Development of New Port of Colombo (M/P + F/S)**

#### **4-1 Overview of Target Studies**

##### **(1) Background, Proposed Projects, and Current Status**

###### **1. Background of the Development Studies**

Colombo Port, positioned on the sea lanes connecting Europe with the Far East, is one of the main ports in South Asia. In the latter half of the 1970s, the government of Sri Lanka was placing greater importance on developing the port as part of its overall economic development program. At this time the government expanded the port in anticipation of increasing amounts of cargo and containerization in global shipping, to provide Colombo Port with the facilities to give the country a major international port. A study on "Development Project of the Port of Colombo" was thus implemented at the request of the Sri Lankan government.

In the mid-1980s, with construction of the container terminal and other works proposed in the "Study on Development Project of the Port of Colombo", Colombo profited from its role as a relay point, and Colombo Port became the largest container relay port in South Asia. However, the amount of cargo being handled far surpassed projected estimates, and a new development plan for improving and strengthening the port's functions was urgently needed. Thus, based on a request from the Sri Lankan government, a study on "Development of the Port of Colombo" was implemented in 1988 and 1989.

Expansion of the container terminal and other works proposed in the "Study on Development of the Port of Colombo" were carried out in the mid-1990s, and cargo volume at Colombo Port increased satisfactorily. However, many containers shipped to and from India were being relayed through Singapore, and it was determined that this represented potential demand. Furthermore, it was found that, compared to Singapore Port, Colombo Port lagged behind in the scale of its port facilities, its container handling efficiency, and quality of service. Thus, in order to make Colombo Port the hub port for South Asia, its development into a modern container port became a matter of great urgency. Therefore, at the request of the Sri Lankan government, a study on "Development of New Port of Colombo" was implemented in 1995 and 1996.

###### **2. Study Implementation Period**

Study on Development Project of the Port of Colombo: June 1979 —March 1980

Study on Development of the Port of Colombo: November 1988 —November 1989

Study on Development of New Port of Colombo: July 1995 —October 1996

###### **3. Counterpart**

Study on Development Project of the Port of Colombo: Sri Lanka Port Authority (SLPA)

Study on Development of the Port of Colombo: Sri Lanka Port Authority (SLPA)

Study on Development of New Port of Colombo: Sri Lanka Port Authority (SLPA)

#### 4. Consultants

Study on Development Project of the Port of Colombo: Overseas Coastal Area  
Development Institute of Japan (OCDI)

Study on Development of the Port of Colombo: Overseas Coastal Area  
Development Institute of Japan (OCDI), Japan Port Consultants Ltd.

Study on Development of New Port of Colombo: Overseas Coastal Area  
Development Institute of Japan (OCDI), Japan Port Consultants Ltd.

#### 5. Proposed Projects

##### Study on Development Project of the Port of Colombo

##### ***Master Plan***

Establishment of the master plan was based on the following policy, with 1988 as the projected target date for completion of the project.

1. To meet the future increases in cargo traffic, and reduce the existing and anticipated port congestion.
2. To meet an urgent demand of containerization.
3. To consider more effective and adequate land use.
4. To improve the existing road network.
5. To reduce existing safety problems within the port.
6. To develop large vessel repair facilities.

The following projects were created as main proposed projects:

- Conventional Berths: Construction of one new berth, expansion of one existing berth into two berths, conversion of three berths into ship repair facilities
- Container Berths: Construction of three new berths, containerization of one existing conventional berth
- Oil Berth: Construction of one new berth, installation of Type 1 Dolphin Pipeline
- Loading Equipment: Procurement of forklifts, cranes, etc.
- Harbor Roads: Upgrade to four-lane roads

##### ***Urgent Plan***

The urgent plan, targeted for completion in 1983, comprised the plans for urgently needed improvements that were included in the master plan.

- Container Berths: Construction of one new berth, containerization of one existing conventional berth
- Harbor Roads: Upgrade to two-lane roads
- Loading Equipment: Procurement of forklifts, cranes, etc.



## Study on Development of the Port of Colombo

### ***Master Plan***

Targeted for completion in fiscal 2001, this was drawn up with the goal of providing additional financing after the following short-term development plan listed below, with the goal of handling the total expected demand for container cargo at Colombo Port, rather than having the port operating as a relay for international containers, as had been the goal up to that time. In consideration of project costs and construction time, two plans (Plans A and B) were developed, with the aims of Plan A being to keep costs down and Plan B to shorten the period of construction.

#### 1. Plan A

- 1) Construction of Berths NNP #3 and #4
- 2) Construction of Fort Container Terminal (FCT)
- 3) Construction of New Queen Elizabeth Container Terminal (NQCT) (small-scale)
- 4) Extension of southwest breakwater and improvement of main entrance channel
- 5) Dredging of harbor basin
- 6) Computer communication and navigation aids system
- 7) Port highway system

#### 2. Plan B

- 1) Construction of New Queen Elizabeth Container Terminal (NQCT) (small-scale)
- 2) Construction of new southwest breakwater and re-alignment of main access channels
- 3) Dredging of harbor basin
- 4) Computer communication and navigation aid system
- 5) Port highway system

### ***Short-Term Development Plan***

This plan, targeted for completion in fiscal 1995, included matters that had to be dealt with before master plans commenced.

- 1) Construction of Jaya Container Terminal (JCT) Berths #3 and #4
- 2) Construction of New North Pier (NNP) Berths #1 and #2
- 3) Laying pipeline to new oil terminal (completed in 1987)
- 4) Construction of Queen Elizabeth Quay (QEY) Berths #4 and #5
- 5) Additional transfer cranes for JCT Berths #1 and #2
- 6) Deepening access channels
- 7) Improvement of communication systems

## Study on Development of New Port of Colombo

### ***Master Plan***

Targeted for completion in fiscal 2015, this plan was developed under the basic policies listed below, with the goal of realizing Colombo Port's geographical potential to enable it to become the hub port for South Asia. Plans for three types of scenarios were drawn up, based on different prospective rates of growth in demand.

1. To enable the port to accommodate post-Panamax ships.
2. To widen the West Entrance and assure safe maneuvering.

3. To comply with an urgent need for increasing the capacity of container handling.
4. To be flexible to cope with future demand.
5. To mitigate adverse effects on the environment.

Low- to Mid-Growth: Develop South Port

High-Growth (1): Develop South Port, North Port, and Prince Vijaya Quay (PVQ), North Section

High-Growth (2): Develop South Port and North Port (Crow Island Offshore Development)

#### ***Short-Term Development Plan***

From the results of a comparison of the three development scenarios based on the Master Plan, financing, port layout, and other considerations, development of the southern part of the port was selected as the goal for the short-term development plan, which was targeted for completion in fiscal 2005.

- 1) Development of QEQ Outer Terminal
- 2) Redevelopment of Bandaranaike Quay
- 3) Navigation Safety Measures (equipping with tugboats, channel signals, etc.)
- 4) Widening the West Entrance
- 5) North Channel Dredging
- 6) Road Development
- 7) Expansion of JCT Cargo Handling Equipment

#### ***Urgent Development Plan***

This plan, targeted for completion in 2000, covered urgent projects included in the short-term improvement plan.

- 1) QEQ Redevelopment and Outer Expansion
- 2) Redevelopment of Bandaranaike Quay
- 3) North Channel Dredging
- 4) Navigation Assistance
- 5) JCT Container Handling Equipment
- 6) North Pier Development
- 7) Ancillary Facilities

## 6. Status

Study on Development Project of the Port of Colombo: Implementation Completed

Projects were for the most part developed according to the proposals in the urgent plan of this study as the "Colombo Port Development Projects (I)-(IV)," with financing from OECF (now JBIC).

Study on Development of the Port of Colombo: Implementation Completed

Projects were for the most part developed according to the proposals in the short-term development plan of this study as the "Colombo Port Expansion Projects (I)-(IV)" and the "Colombo Port Improvement Projects (I)-(II)," with financing from OECF (now JBIC).

Study on Development of New Port of Colombo: Under Implementation

Projects were for the most part developed according to the proposals in the short-term development plan of this study as "Colombo Port Urgent Improvement Project" with financing from OECF (now JBIC).

**(2) Monitoring with the PDM**

**Study on Development Project of the Port of Colombo :**

1. Overall Goal

M/P: The Sri Lankan government is to implement Colombo Port facilities improvement projects to meet projected demand for cargo handling, that is, make concrete preparations towards the development of projects, according to the "Master Plan".

F/S: The Sri Lankan government is to implement Colombo Port facilities improvement projects to meet projected demand for cargo handling, that is, make concrete preparations towards the development of projects, according to the "Urgent Plan."

2. Project Purpose

M/P: Development of the "Master Plan," targeted for completion in fiscal 1988, for the development of Colombo Port.

F/S: Development of the "Urgent Plan," targeted for completion in fiscal 1983, and implementation of economic and financial analyses.

3. Input

Japan Study Team: 9 Experts (46.14 M/M), OJT for Counter Part

Sri Lanka Team: Officers from SLPA, arrangements for study office.

4. Activities

In Japan, compile and analyze data from past studies, and collect and analyze information and opinions. In Sri Lanka, compile and analyze data, and collect and analyze technical data from studies implemented on-site. Based on the above and other related information, investigate the following:

- Study of natural and geographic conditions for Colombo Port
- Study of Colombo Port's facilities and management methods
- Projection of demand for cargo handling at Colombo Port

5. Output

- Development of Basic Plan for improvement of facilities at Colombo Port based on current conditions at Colombo Port and regions targeted in the study
- Formation of short-term and urgent plans based on the Urgent Plan and clarification of the feasibility of such plans
- Sri Lankan team to acquire means and knowledge to develop port facilities improvement plan based on experience in the original study

6. Pre-conditions

From 1979 to 1983, with annual growth rate in GDP at 5.5%, the manufacturing industry would increase 4.6% per year, the agricultural industry would rise 4.5% per

year, and the population would increase by 1.5% per year, estimates of demand for cargo were to be implemented.

### **Study on Development of the Port of Colombo :**

#### 1. Overall Goal

M/P: The Sri Lankan government is to implement Colombo Port facilities improvement projects to meet projected demand for cargo handling, that is, make concrete preparations towards the development of projects, according to the "Master Plan."

F/S: The Sri Lankan government is to implement Colombo Port facilities improvement projects to meet projected demand for cargo handling, that is, make concrete preparations towards the development of projects, according to the "Short-Term Plan."

#### 2. Project Purpose

M/P: Development of the "Master Plan" for the development of Colombo Port, targeted for completion in fiscal 2001.

F/S: Development of the "Short-Term Development Plan" based on an outline of the "Master Plan" and targeted for completion in fiscal 1993, and implementation economic and financial analyses.

#### 3. Input

Japan Study Team: 10 Experts (52.66 M/M), OJT for C/P

Sri Lanka Team: Officers from SLPA, arrangements for study office.

#### 4. Activities

In Japan, compile and analyze data from past studies, and collect and analyze information and opinions. In Sri Lanka, compile and analyze data, and collect and analyze technical data from studies implemented on-site. Based on the above and other related information, investigate the following:

- Study of current facilities and administrative conditions for Colombo Port
- Study of natural conditions in Colombo Port and surrounding areas
- Study of trends regarding private shipping companies using Colombo Port
- Projected demand for cargo handling at Colombo Port

#### 5. Output

- After an understanding of the current conditions at Colombo Port had been gained, the Master Plan was to be drawn up for the development of Colombo Port.
- A short-term plan for urgent projects from the Master Plan was to be developed and the feasibility of such a plan clarified.
- The Sri Lankan team was to acquire means and knowledge to develop port facilities improvement plan based on experience in the original study.

#### 6. Pre-conditions

With the annual growth rate in GDP up to 2001 at 4.5%, based on 1988 data for the share of the amount of relayed cargo, projections for relayed cargo volume and macro-estimates for trade cargo volume were implemented. Based on estimates produced with relevant data, such as data from regression analysis of trade volume for major trade categories, macro estimates were to be implemented for the volume of trade cargo.

## **Study on Development of New Port of Colombo:**

### 1. Overall Goal

M/P: In line with the "Urgent Plan" and "Short-Term Plan," the Sri Lankan government was to implement development improvement projects in Colombo Port in order to create a hub port for southern Asia realizing the location's geographic potential, that is, to make concrete preparations towards the development of projects.

F/S: In line with the "Master Plan," the Sri Lankan government was to implement repairs of existing facilities along with new port development with the aim of strengthening cargo-handling capacity, that is, to make concrete preparations towards the development of projects

### 2. Project Purpose

M/P: The "Master Plan" for the new Colombo Port development, targeted for completion in fiscal 2001, was to be drawn up. Additionally, policies for Sri Lankan port development were to be worked out.

F/S: Economic and financial analyses of the New Colombo Port Development "Short-Term Improvement Plan," targeted for completion in fiscal 2005, and the "Urgent Improvement Plan," targeted for completion in fiscal 2000 and covering projects in the "Short-Term Improvement Plan" that were deemed urgent, were to be implemented.

### 3. Input

Japan Study Team: 12 Experts (75.41 M/M), OJT for C/P, and Provision of Survey Equipment

Sri Lanka Team: Officers from SLPA, arrangements for study office.

### 4. Activities

In Japan, compile and analyze data from past studies, and collect and analyze information and opinions. In Sri Lanka, compile and analyze data, and collect and analyze technical data from studies implemented on-site. Based on the above and other related information, investigate the following:

- Study of current conditions regarding shipping in the South Asian and trends for relay ports in the Asian region
- Study of current conditions in Colombo Port
- Estimates of demand for cargo handling
- Environmental impact assessment

### 5. Output

- After regarding conditions at Colombo Port and shipping industry trends by which the port is affected, the Master Plan targeted for fiscal 2005 was to be drawn up for the improvement of facilities at Colombo Port.
- A feasibility study for urgent projects from the Master Plan was to be developed.
- The Sri Lankan team was to acquire means and knowledge to regarding port facilities improvement plan based on experience in the original study.

### 6. Pre-conditions

Three projections for annual GDP growth rate patterns up to 2015, high growth (7.7%), medium growth (5.6%), and low growth (4.3%), were made, and estimates of

domestic and relayed cargo volume were implemented using correlated regressive analysis based on these values.

## **4-2 Results from the Five Evaluation Items**

This evaluation was implemented by reviewing related documentation, in addition to the questionnaires submitted to and interviews with JICA experts participating in the development study, questionnaires sent to other related agencies and groups, and interviews with these groups. With regard to the C/P in particular, members participating in all three of these studies are registered in SLPA, allowing us to learn in detail about the conditions existing at the times the studies were implemented.

### **(1) Efficiency**

Although we did find some inefficiency caused by attitudes and approaches of some in the recipient government, generally speaking the studies were evaluated as being satisfactorily efficient. Details regarding efficiency are given below.

#### Efficiency in Implementing the Studies

Regarding the final reports, it was confirmed that content of the three studies, "Study on Development Project of the Port of Colombo", "Study on Development of the Port of Colombo", and "Study on Development of New Port of Colombo", were produced in accordance with the S/W and that the content met the expectations of SLPA, and furthermore that the scale of the study groups in all three studies was appropriate.

Through all three studies, the JICA study team sufficiently explained the contents of the studies and the state of progress, confirming smooth communication between the JICA study team and counterparts. Furthermore, most of the counterparts participated in all three studies, deepening their understanding of JICA and JICA's development studies with each study. This is thought to have built a favorable relationship between the study team and counterparts.

Although no seminars or other such programs were held after the completion of the studies, reports were distributed to the respective ministries and organizations involved, meetings were held with relevant ministries, particularly in regard to proposed projects, and information was exchanged, thus feedback was efficiently delivered to the relevant organizations.

#### Efficiency in the Study Process

Preserving consistency and coordination with other aid agencies helps maintain efficiency in the study itself. However, since no aid agencies other than JICA and OECF were central in supporting the development of Colombo Port at the time the "Study on Development Project of the Port of Colombo" and "Study on Development of the Port of Colombo" were conducted, there was sufficient coordination, and the results were judged to have been obtained efficiently. However, overlapping somewhat with implementation of the "Study on Development of New Port of Colombo", the Sri Lankan government solicited through the BOT alternative proposals to the study from private enterprises, and proposed alternate schemes to a consortium of private shipping companies. This was thought to have presented problems from the standpoint of efficiency in the study. Immediately preceding the start of this study, however, there was a change of government, and the new government's promotion of public was thought to

have brought further inefficiency, and so the conclusion was that inevitably the study itself would be affected.

## **(2) Effectiveness**

As described in the following section, it was determined that the final reports for the three studies properly conformed to the S/W, that they were composed in a logical fashion, and that they sufficiently achieved the intended outcomes. Regarding the proposed projects, with the exception of certain projects in the "Study on Development of New Port of Colombo", projects were formed from the content of each of the short-term plans, for the most part achieving the primary goals. Regarding technology transfer as well, in the course of each study, technology was transferred to the C/P for the development of the port, and again, the primary goals were achieved. Accordingly, the degree to which the primary goals had been achieved was found to be satisfactory overall.

### Content of Final Report

The final report for "Study on Development Project of the Port of Colombo" included information covering Colombo Port's geographical and social conditions, current conditions at Colombo Port, estimated demand for cargo handling, the basic improvement plan, and the urgent improvement plan; the final report for "Study on Development of the Port of Colombo" covered current conditions at Colombo Port, the natural/environmental status, conditions regarding international container transport and estimated demand, the Master Plan, and the short-term development plan; and the final report for "Study on Development of New Port of Colombo" comprised information on shipping conditions in South Asia, current conditions at Colombo Port, the Master Plan, and the short-term development plan. Final reports for each of the three studies were properly composed, clearly written, and easy to understand.

Although the S/W and the content of the implemented studies were compared, the final report for "Study on Development Project of the Port of Colombo" S/W could not be obtained, thus the report could not be assessed. However, the final reports for "Study on Development of the Port of Colombo" and "Study on Development of New Port of Colombo" were satisfactory and sufficiently covered the S/W.

### Technology Transfer

The following describes technology transferred that was confirmed, with all three studies evaluated as having achieved adequate transfer of technology, with the transferred technology being utilized effectively.

- In the course of the studies, C/P members acquired skills in port planning methods, studies of natural conditions, estimating demand, and structures, simulations of ship arrivals and piloting in port, and other techniques and technology related to port development.
- In addition to utilization in daily port operations at Colombo Port, the transferred knowledge and technology introduced via the C/P members is also to be applied in drawing up the development plan for Galle Port, located in southern Sri Lanka.

### **(3) Impact**

#### Utilization of Study Output

Although details are given below, the projects created from the "Study on Development Project of the Port of Colombo" and "Study on Development of the Port of Colombo" generally conformed to the projects (plans) proposed in those studies and are being utilized adequately. Some of the projects created from the "Study on Development of New Port of Colombo" also conformed to the projects (plans) proposed in that study, and are being utilized effectively, for example in the 1997 "National Ports and Shipping Policy of Sri Lanka," where the information was utilized in estimating demand.

#### ***Study on Development Project of the Port of Colombo***

The projects proposed in this study's short-term and urgent plans were materialized in some ways, as the projects "Development of Port of Colombo (I)-(IV)" (total combined loans: 18,496 million yen), financed by OECF (now JBIC).

The long-term basic plan of this study was to follow and re-examine the basic progress of development by referring to conditions current at the time of the JICA "Study on Development of the Port of Colombo".

#### ***Study on Development of the Port of Colombo***

The projects created were generally in line with those proposed in this study's short-term plan, with the formation of the projects "Expansion Projects of Port Colombo (I)-(IV)" (total combined loans: 46,133 million yen) and the projects "Improvement Projects of Port of Colombo (I)-(II)" (total combined loans: 11,400 million yen), financed by OECF (now JBIC).

The long-term basic plan of this study was to re-examine the JICA "Study on Development of New Port of Colombo" with reference to current conditions at that time.

#### ***Study on Development of New Port of Colombo***

Redevelopment of the North Pier and dredging of the North Channel in the short-term development plan of this study are under implementation as the projects "Improvement of Port of Colombo (I)-(II)" (total combined loans: 248 million yen), with financing provided by OECF (now JBIC). Although the QEQ project proposed in the short-term development plan mentioned earlier was initially included in the projects "Improvement of Port of Colombo (I)-(II)", development of the QEQ was implemented by a consortium of private shipping companies using BOT scheme, and in the end was not implemented as proposed. Presently, that consortium is implementing the QEQ redevelopment project.

Regarding this study's Master Plan, development projects for the South Port (with the exception of the breakwater) were implemented by BOT as mentioned above, and thus did not result in project formation. As the breakwater has not greatly benefited the general public, nor has it been profitable, the F/S of development projects for the South Port, including the breakwater, has been newly implemented with financing from the ADB, and the breakwater project was ended in January, 2001. However, the outputs of the "Study on Development of New Port of Colombo" are referenced in the original F/S.

Estimates for demand in container cargo handling in this study are cited in the MSPRR s (now MPDSD) "National Ports and Shipping Policy of Sri Lanka" (1997),



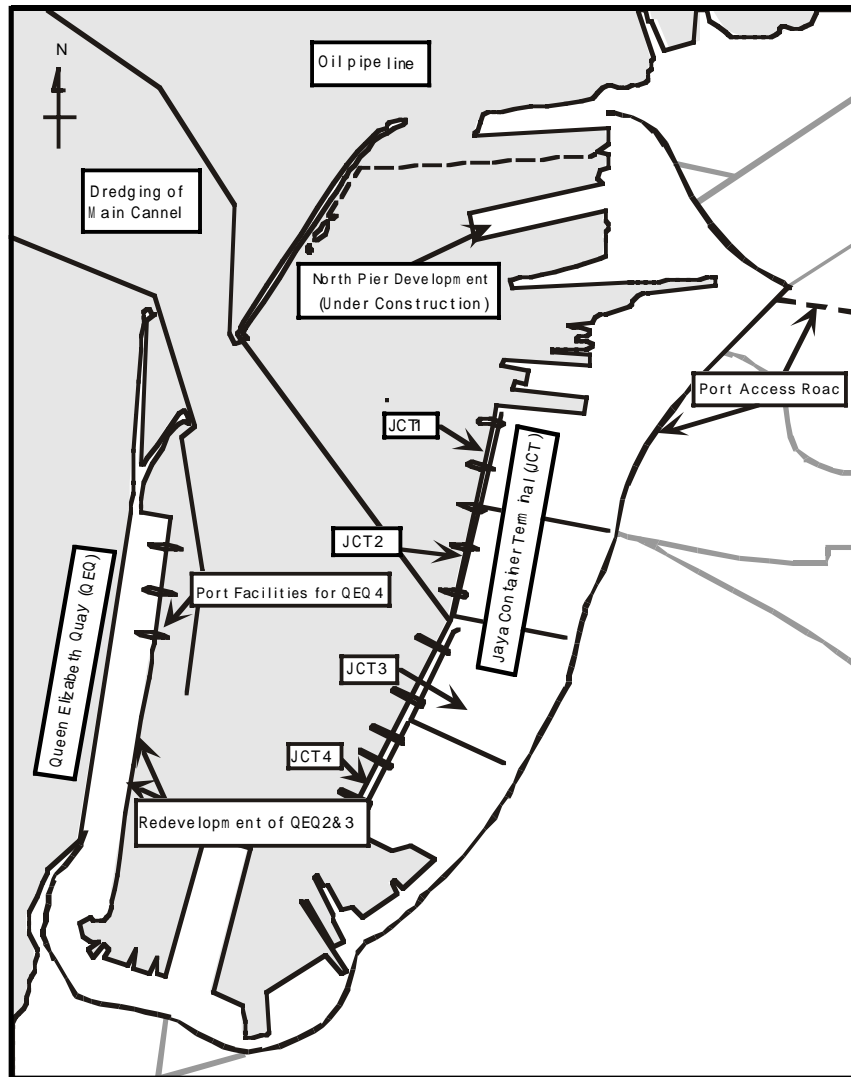
and have been utilized effectively as a logical ground for the necessity of Colombo Port's development plan.

Table 4-1 OECF (JBIC) Loan for Development of Colombo Port

Project Name	Loan Amount (Million Yen)	Date of L/A	Project Content (G/C: Gantry Crane, T/C: Transfer Crane)
Development of Port of Colombo (I)	7,600	Oct., 1980	Construction of new container terminal (JCT1), procurement of equipment for JCT1 (2 G/Cs, 4 T/C)
Development of Port of Colombo (II)	6,362	Apr., 1984	Construction of new container terminal (JCT2), servicing of port waterways, construction of oil berth
Development of Port of Colombo (III)	2,579	May, 1985	Procurement of equipment for JCT2 (2 G/Cs, 4 T/Cs), procurement of equipment for JCT1 and JCT2 (2 T/Cs)
Development of Port of Colombo (IV)	1,955	Oct., 1987	Servicing of access channels, procurement of equipment for QEQ (1 G/C)
Expansion of Port of Colombo (I)	6,392	Mar., 1990	Construction of new container terminal (JCT3), procurement of equipment for JCT3 (2 G/Cs, 6 T/Cs)
Expansion of Port of Colombo (II)	11,021	Mar., 1991	Procurement of equipment for JCT1 and JCT2 (2 T/Cs)
Expansion of Port of Colombo (III)	21,055	Mar., 1992	Construction of new container terminal (JCT4), servicing of pipelines, dredging, procurement of equipment for JCT1 and 2 (1 G/C, 3 T/Cs)
Expansion of Port of Colombo (IV)	7,728	Aug., 1993	Procurement of equipment for JCT4 and feeder berth (4 G/Cs, 9 T/Cs), harbor management consulting services
Improvement of Port of Colombo (I)	5,668	Jul., 1994	Construction of new North Pier (NNP)
Improvement of Port of Colombo (II)	5,742	Aug., 1995	Procurement of equipment for NNP and computers for operations management
Urgent Upgrading of Port of Colombo	2,048	Aug., 1999	Dredging of north channel, installation of lighthouse and channel buoys

Source: JBIC Data

Figure 4-1 Locations of Completed Projects at Colombo Port



### Social and Economic Impacts

As a direct effect of the projects from the above-mentioned improvement and development of Colombo Port, increased container handling and transshipment capacity has led to acquisition of foreign currencies. An additional indirect effect is the promotion of domestic industry, principally in the export processing sector. Generally speaking, the stepped improvements from the projects proposed in the three studies has raised Colombo Port's profile as the relay hub port for the South Asian region, and appear to be having the desired impact.

#### 1. Container Handling Capacity

Container terminal improvements from the mid-1980s were planned so as to steadily boost Colombo Port's container handling capacity, with container handling figures showing an increase from approximately 42,000 TEU in 1980 to approximately 1,704,000 TEU in 1990, an increase of about forty times over the 1980 figure. The rise in the amount of relayed container handled is particularly notable, increasing about ninety-six times from the 1980 figure of approximately 12,000 TEU to approximately 1,153,000 TEU in 1990.

Such a rise in container handling is thought to be the caused by two factors creating steady demand: the spread of containerization and improvements made to container terminals. Meanwhile, in comparison with container handling volume at container ports around the world, Colombo Port ranked 77<sup>th</sup> in 1983, rising to 24<sup>th</sup> in 1999. Judging from this, it is estimated that a huge driving of steady demand from improvements to the container terminals at this port will result.

However, the growth in the amount of container cargo handled has slowed since 1997. This is said to be due to inefficient port administration and limited capabilities of existing facilities.

Table 4-2 Trends in Numbers of Containers Handled

	Domestic Container Imports (TEU)	Domestic Container Exports (TEU)	Domestic Container Total (TEU)	Relayed Containers (TEU)	Containers Handled Total (TEU)	Rank of Ports in the World by Volume of Handled Container
1979	9,057	7,501	16,558	1,122	17,680	n.a.
1980	15,145	14,425	29,570	12,052	41,622	n.a.
1981	26,354	23,633	49,987	7,820	59,471	n.a.
1982	37,560	33,423	70,983	32,261	106,120	n.a.
1983	38,741	38,268	77,009	65,801	146,590	77
1984	46,160	47,219	93,379	88,105	187,727	59
1985	52,742	50,571	103,313	112,563	220,207	56
1986	60,389	60,561	120,950	220,456	348,142	44
1987	65,174	63,902	129,076	300,222	435,618	38
1988	68,804	66,635	135,439	485,501	628,485	26
1989	78,401	80,579	158,980	385,217	551,810	32
1990	87,917	85,122	173,039	410,772	595,356	31
1991	95,197	92,986	188,183	469,519	669,488	31
1992	107,033	104,898	211,931	451,213	675,776	34
1993	127,405	124,494	251,899	590,654	858,398	29
1994	146,636	142,839	289,475	665,840	972,642	28
1995	165,158	163,096	328,254	700,492	1,049,044	31
1996	179,632	170,168	349,800	979,882	1,356,301	26
1997	209,973	206,824	416,797	1,232,685	1,687,184	21
1998	237,570	241,128	478,698	1,191,157	1,714,077	24
1999	256,776	254,842	511,618	1,152,928	1,704,389	24

Source: SLPA

## 2. Acquiring Foreign Capital

In the mid-1980s, transshipments for nearby ports accounted for more than 50% of the total number of containers handled at Colombo Port, and fees (in dollars) were a source of foreign income for the SLPA. Actual figures for foreign income show approximately 15.6 million dollars in 1986, increasing nearly ten times to approximately 170 million dollars in 1997.

## 3. Incentives for International Investment and Promotion of Domestic Industry

Developments in the containerization of cargo transport have increased demand for the export processing sector, factories in the vicinity of the city of Colombo, distribution-related enterprises. These and other phenomena are expected to provide

incentives for foreign investment as well as promote domestic industries and accelerate employment. Figures for the number of foreign enterprises, investments, employment figures, and total export profits registered at the Board of Investment (BOI) all show steady growth. 1993 figures show 280 companies and 179,878 employees, with these numbers rising to 1,399 companies and 294,381 employees in 1998, exhibiting tremendous growth.

Table 4-3 Trends for Enterprises Registered with BOI

	Employees	Registered Enterprises	Foreign Investment (millions of rupees)	Total Export Profits (millions of rupees)
1993	179,878	280	22,161	76,740
1994	205,660	514	41,881	88,035
1995	233,374	606	50,370	113,363
1996	241,967	863	60,957	133,483
1997	258,185	985	78,687	154,888
1998	294,381	1,358	100,232	181,758
1999	327,059*	1,399*	116,972*	200,205*

\*Estimated Source: Sri Lanka Central Bank

#### (4) Relevance

In the following, we find that the "Study on Development Project of the Port of Colombo" and "Study on Development of the Port of Colombo" were consistent with Sri Lankan domestic policy, and that the proposed projects, which for the most part were converted into projects, were thus sufficiently relevant as well. However, while projects were formed only for some of the proposed projects in the "Study on Development of New Port of Colombo", development has proceeded privately according to a BOT scheme utilizing the output of this study, thus the study was judged to be sufficiently relevant.

#### Relevance of the Studies and the Proposed Projects

##### ***Study on Development Project of the Port of Colombo***

When the "Study on Development Project of the Port of Colombo" was implemented in 1980, there were no official announcements of the national economic plan, so whether or not the "Study on Development Project of the Port of Colombo" was consistent with the national economic plan could not be clearly known. However, after the change in government in 1977, under the Jayawardena administration, in addition to working to set up a free trade zone and special investment zone with the aim of attracting export-oriented industries and improving employment opportunities, also unified the double conversion system and implemented other measures to free up import restrictions. With port development expected to present an unavoidable challenge, the "Study on Development Project of the Port of Colombo" was found to be sufficiently relevant to national policy.

After completion of the "Study on Development Project of the Port of Colombo" in March of 1980, the Sri Lankan government contracted loan agreement with the OECF for a project "Development of Port of Colombo (I)" in October of that year, and thus projects were initiated. Then with the "Colombo Port Development Projects (II)-(IV)" implemented later with OECF financing, it began to appear highly likely that the Sri Lankan government would be using yen loans to create the projects from the project

proposals in this study. However, the content of the created projects generally conformed to the proposed projects in this study, thus the content of the proposals were found to have been sufficiently relevant for the Sri Lankans to be able to use them.

#### ***Study on Development of the Port of Colombo***

When the "Study on Development of the Port of Colombo" was implemented, the Sri Lankan government had continued with its liberal economic policies and was in the midst of further plans including the establishment of a free trade zone. Meanwhile, Colombo Port's active port development policies and the benefits of its geographical location allowed it to become the largest container relay port in South Asia, while the container volume being handled surpassed the estimates for demand as presented in the "Study on Development Project of the Port of Colombo". Therefore, the Master Plan worked out in the "Study on Development Project of the Port of Colombo" was redone, and the new master Plan, the "Study on Development of the Port of Colombo", that was drawn up was found to be sufficiently relevant.

After completion of the "Study on Development of the Port of Colombo" in November of 1989, the Sri Lankan government contracted with the OECF for financing for the "Colombo Port Expansion Project (I)" in March of the following year, and thus projects were initiated. Then with the "Colombo Port Development Projects (II)-(IV)" and "Colombo Port Improvement Projects (I)-(II)" implemented later with OECF financing. Due to the timing of these projects, it began to appear highly likely that the Sri Lankan government would be using yen loans to create the projects from the project proposals in this study. However, the content of the created projects generally conformed to the proposed projects in this study, thus the content of the proposals were found to have been sufficiently relevant for the Sri Lankans to be able to use them.

#### ***Study on Development of New Port of Colombo***

When the "New Study for Port Development Plan" was implemented in 1995, Sri Lankan economic development and policies opening up the economy in neighboring India made it increasingly apparent that there would be even greater container traffic at Colombo Port. Thus, the "Study on Development of New Port of Colombo" drawn up to create plans for improving existing facilities at Colombo Port and bringing new development to the surrounding area was found to be sufficiently relevant.

In 1994, immediately preceding the implementation of this study, however, there was a change of government, with the United National Party (UNP), which had been in control of the government for 17 years, giving way to the People's Alliance (PA). As the new administration promoted the entry of private investment in the development of public facilities, redevelopment of the QEJ and development of the South Port ended up being developed by BOT (except the breakwater, which was an SLPA project financed by the ADB and others). BOT for port development was referenced in the port development plans devised in this study, while the port development plans from this study were referenced in actual BOT for port development, with these development policies generally following each other closely. Furthermore, since a portion of the proposed projects in the "Study on Development of New Port of Colombo" were converted as the OECF-financed "Colombo Port Urgent Improvement Project," the content of the proposals were found to have been sufficiently relevant.

## **(5) Sustainability**

As described in the following, although independent development of the study results of the three studies for which projects were formed generally could be accomplished based on administration and management by the C/P, international conditions in recent years, and changes in port management, and civil war and other changes in domestic conditions have brought doubts about future sustainability. However, these matters were unforeseeable at the time the studies were implemented, the three studies gave due consideration to sustainability of the proposed projects at the time the studies were made.

### Administration and Management Systems

Facilities resulting from the projects have come to be administered and managed by SLPA, the counterparts in the three studies. SLPA, originally constituted in 1979 under the provisions of the Sri Lanka Ports Authority Act, is an organization that was established completely with government funds that uses special accounting for its books and that is independently profitable without support from government financial aid. In line with the improvements for Colombo Port made in projects created from project proposals in the three studies, business at Colombo Port expanded, and SLPA's income also grew satisfactorily. Total income, which in 1991 was 3,752 million rupees, rose 400% by 1999, when total income reached 15,086 million rupees. Following such growth in income, net after-tax profits also stabilized, and by 1998, SLPA was operating in the black. However, in 1999, a Special Levy imposed by the government increased dramatically, and SLPA dropped back into the red. It is believed that this was due to an increase in financial investments being steered towards the civil war.

Concurrent with these changes in financial conditions, changes in port management and development methods are also continuing. As mentioned previously, from the beginning of the 1980s to the mid-1990s, the period when projects proposed in the "Study on Development Project of the Port of Colombo" and "Study on Development of the Port of Colombo" were implemented, the port was developed and managed by SLPA. However, as explained before, after the change in government in 1994, private-sector activity came to be recommended for development of the port, and the BOT development model for port development came to be introduced. This resulted in pressures from competition in the port between SLPA and the private enterprises, and the competition involving projects between SLPA, which had a public role that involved numerous employees, and the private enterprises, which were pursuing economic efficiency with a goal of making profits, put SLPA at a disadvantage in administering projects, and SLPA itself is sensing crisis with its future projects. With the Sri Lankan government facing harsh financial conditions, clear recommendations for private development and administration of public facilities including port facilities, were made in the national development plan, "Six Year Development Programme 1999-2004," thus it is anticipated that SLPA will find itself surrounded in an more severe environment.

Table 4-4 SLPA Business Performance

Year	Total Income (millions of rupees)	Total Expenditures (millions of rupees)	Net Pre-Tax Profits (millions of rupees)	Net After-Tax Profits (millions of rupees)	Number of Employees
1991	3,752	2,715	1,037	420	18,312
1992	4,031	3,093	938	448	17,843
1993	4,931	3,982	949	308	17,345
1994	5,197	4,670	527	319	16,910
1995	6,819	5,460	1,360	466	16,492
1996	9,007	6,551	2,456	440	17,476
1997	10,974	8,196	2,778	1,530	19,038
1998	13,638	8,589	5,048	1,301	18,953
1999	15,086	8,765	5,324	- 638	18,930

Source: SLPA

### 4-3 Conclusions and Lessons Learned

Regarding the study process for these development studies ("Study on Development Project of the Port of Colombo", "Study on Development of the Port of Colombo", and "Study on Development of New Port of Colombo"), it was determined that the studies were implemented efficiently and technology was transferred efficiently, thus achieving the intended aims. Projects created from the project proposals in the "Study on Development Project of the Port of Colombo" and "Study on Development of the Port of Colombo" generally conformed to the F/S project proposals. As for the "Study on Development of New Port of Colombo", the output of this study is being utilized in the BOT model development plan currently in progress, while a portion of the F/S project proposals are being turned into projects, thus it was judged that the general aims were achieved.

However, in order to raise the quality of JICA development studies even more, we believe that the following points must be considered during the course of development studies.

#### Organization Capacity Analyses of Entities in Port Development and Administration

In the "Study on Development of New Port of Colombo", three development scenarios were suggested, based on whether or not there were private participation in the development and management of the port, and upon the scale of such participation, and economic and financial analyses were implemented, but in the end, the Sri Lankan government decided to implement development and management of the port using the BOT model with private enterprises autonomously implementing development and administration of the port. The resulting pressures from competition between port projects administered by SLPA and port projects being managed by private enterprises meant that competition between SLPA, which remained in its role as a public organization, and the private enterprises pursuing profits put SLPA at a disadvantage in administering projects, thus placing serious doubt on SLPA's ability to continue with the projects.

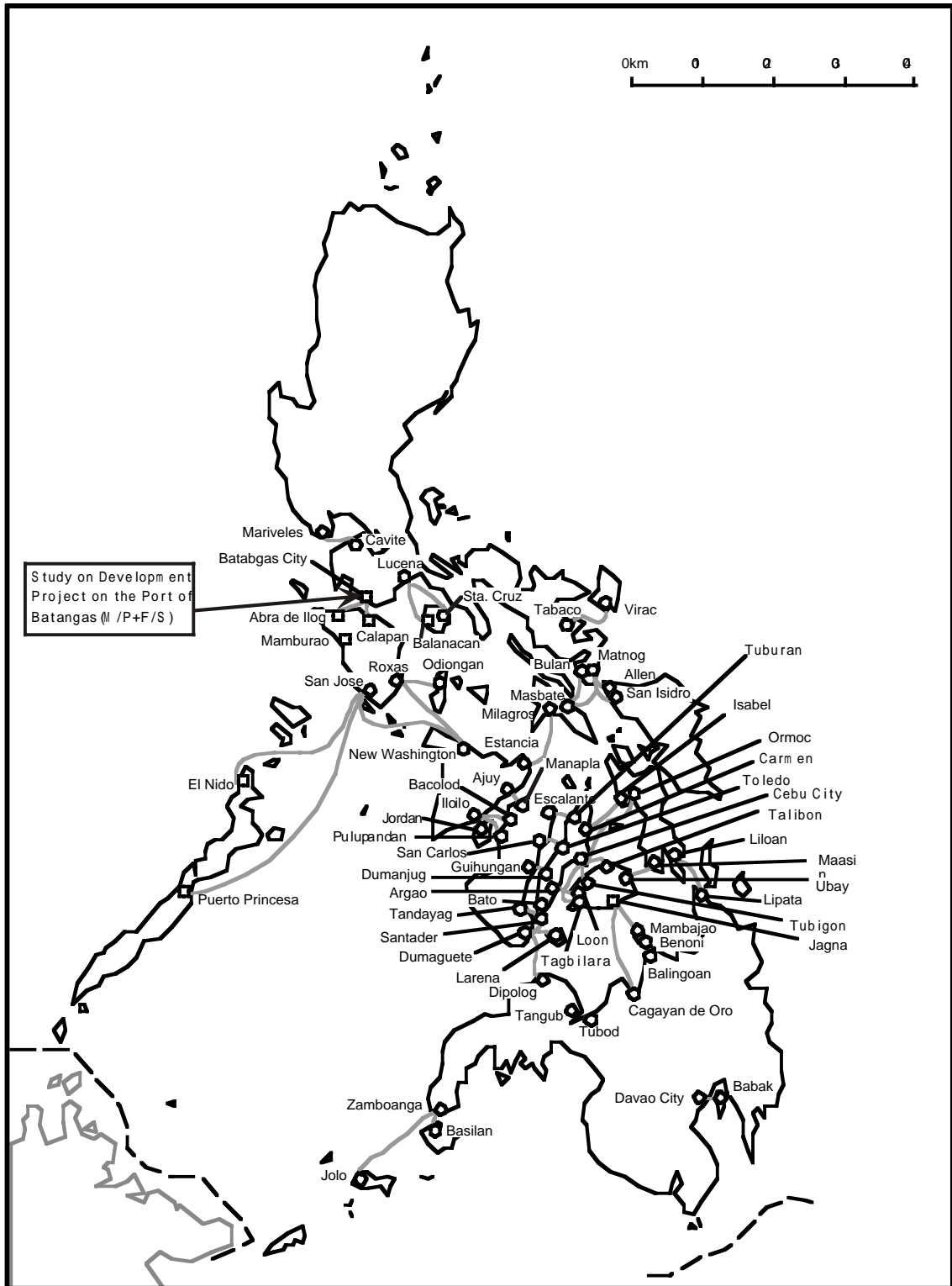
Although this matter of selecting the entity to run the port is the responsibility for the Sri Lankan government, it must be made according to the organizational capacities of the group in charge of the project (experts' capabilities, clarification of authority and roles, incentives, etc.) in order to have project proposals in development studies bring adequate development outputs. In this light, it is necessary to implement analyses of the organizational capabilities entities carrying out projects.

In the previous development studies, including the " Study on Development of New Port of Colombo", where the authority and roles of organizations implementation projects, specialists' capabilities, and other such information is described, references to any changes in authority and roles and in specialists' capabilities necessitated by changes in the main group handling the project are scant. Therefore, it is necessary to clearly make reference to such authority and roles following such changes. Furthermore, if no incentive exists for concerned persons in an organization working on a project, one could fully anticipate that the project will not be implemented as presumed, and thus it is necessary for the incentives regarding the project can be seen.



**CHAPTER 5 —PHILIPPINES:**  
**Study on Development Project on the Port of Batangas (M/P+F/S)**

# Philippines : Location of the Study A





View from RORO Terminal to Passenger Terminal, Port of Batangas



Complete View of Port of Batangas



Wharf of RORO Vessels of Batangas

## **CHAPTER 5 —PHILIPPINES: Study on Development Project on the Port of Batangas (M/P + F/S)**

### **5-1 Overview of Target Study**

#### **(1) Background of the Development Study, Proposed Projects, and Current Status**

##### 1. Background of the Development Study

Batangas Port is located in the southwest region of Luzon Island, approximately 100 kilometers from the Manila metropolitan area. Blessed with favorable natural conditions, this port plays a central role in the transport of produce from the surrounding area that comprises the center of Batangas province, while also playing an important role as a distribution route for Mindoro Island offshore. It also benefits geographically from its proximity to Manila as industrialization in the surrounding area has progressed with the establishment of oil refineries, sugar refineries, cement factories, and the like.

However, in the first half of the 1980s, utilization of the land and waters surrounding Batangas was not implemented according to any defined system, which limited regional and economic development of the area around Batangas Port. Furthermore, the facilities at Batangas Port itself were becoming superannuated, which led to even greater disorder and congestion.

Under such conditions, the Japanese government responded to a request from the government of the Philippines to draw up a plan for improvements at Batangas Port, and a feasibility study was implemented for this.

##### 2. Study Implementation Period: September 1984 —December 1985

##### 3. Counterpart: Philippines Ports Authority (PPA)

##### 4. Consultants: Overseas Coastal Area Development Institute of Japan (OCDI)

##### 5. Proposed Projects

#### ***Master Plan***

Creation of master plan, targeted for completion in fiscal 2000, was based on three concepts outlined below.

- 1) Role as the gateway to Mindoro Island
- 2) Role as a central port for the economic development of the hinterland
- 3) Role in conjunction with Metro Manila

In concrete terms, the following projects were proposed, and a plan for equipping the port with 17 berths, including existing berths, was put into action.

- Ro/Ro-Related Facilities: 4 berths (2 new berths, 2 refurbished berths), parking lots, pedestrian overpasses/footbridges, parks
- Domestic Trade -Related Facilities: Construction of 6 new berths
- Foreign Trade -Related Facilities: Construction of 3 new berths
- Other Land Facilities: Construction of docks, breakwaters, sheds, warehouses, and stockyards, and securing land for steel processing

### ***Short-Term Development Plan***

The short-term plan, targeted for completion in fiscal 1990, covered urgently requested facilities outlined in the Master Plan. This plan called for 11 berths in total, including existing berths and the newly constructed berths listed below.

- Ro/Ro-Related Facilities: Construction of 2 new berths
- Domestic Trade -Related Facilities: Construction of 1 new berth
- Foreign Trade -Related Facilities: Construction of 2 new berths

#### 6. Status: Currently under implementation

The project proposals in this study are now being formed as projects with financing from JBIC (formerly OECF). Projects proposed at the time of the E/S by the OECF were divided into four phases as the "Batangas Port Development Projects," with Phase I corresponding to the "Short-Term Development Plan" and Phase II and after to the "Master Plan." Loan agreement for Phase I were contracted in July of 1991, and its construction was completed in March of 1999. However, problems arose during implementation of the projects in resettlement of squatters occupying the site, the funds were temporarily frozen, and as a result, the completion of construction was greatly delayed. Loan agreement for Phase II was contracted in April of 1998, but due to problems including those involving land expropriation, progress of this project was greatly delayed as well.

## **(2) Monitoring with the PDM**

### 1. Overall Goal

M/P: According to the "Master Plan." This was created in response to projections for cargo demand; the Philippine government is to carry out implementation, that is, make concrete preparations for the creation of projects.

F/S: According to the "Short-Term Development Plan." As this was created in response to projections for cargo demand; the Philippine government is to carry out implementation, that is, make concrete preparations for the creation of projects.

### 2. Project Purpose

M/P: Creation of the "Master Plan," targeted for completion in fiscal 2000 and based on the basic strategy for Batangas Port (high priority for the berth for RoRo boats, utilization of the natural conditions, links with the Metro Manila) and cargo estimates for demand.

F/S: Creation of the "Short-Term Development Plan," targeted for completion in fiscal 1990, within the scope covered by the "Master Plan" and devised in order to cope with expected increases in cargo demand, in addition to implementation of economic and financial analyses.

### 3. Input

Japan Study Team: 10 Experts (76.49 M/M), OJT for C/P, training in Japan for 3 C/P members

Philippine Team: Officers from PPA headquarters and PPA Batangas Port Management Unit, arrangements for study office

### 4. Activities

In Japan, compile and analyze data from past studies, and collect and analyze information and opinions. In the Philippines, compile and analyze data, and collect and analyze technical data from studies implemented on-site. Based on the above and other related information, investigate the following:

- Study on general conditions in the South Tagalog region
- Study on the status of harbor activity in the vicinity of Batangas Port
- Study on current status of natural conditions at Batangas Port
- Estimation of demand for passenger and cargo handling at Batangas Port

#### 5. Output

- Policies were proposed for regional utilization plans for the Batangas Port shoreline area.
- Review of the basic principles of Batangas Port development
- Formation of master and short-term development plans for Batangas Port based on current conditions and estimated demand for Batangas Port and targeted regions
- Feasibility study for the short term development plan including economic and financial analyses
- Philippine team to acquire means and knowledge to develop port facilities improvement and development plans based on experience in the original study

#### 6. Preconditions

Regarding estimates of demand for handling of passenger traffic, along with inbound and outbound shipping of needed products (rice, copra, cement, ore, fertilizer, lumber, and steel), recurring analyses were made based on data for incoming capacity in the 1970s, when the study was implemented, to 1983, and results were interpreted. Because of this, trends for each of the above elements regarding inflows and outflows are assumed to be continuations of trends occurring prior to implementation of the study.

## **5-2 Results from the Five Evaluation Criteria**

This evaluation was implemented by reviewing related documentation, in addition to the questionnaires submitted to and interviews with JICA experts participating in the development study, questionnaires sent to other related agencies and groups, and interviews with these groups. As members of the Philippine team participating when the development study was implemented are not presently worked for PPA, we were unable to hear about the conditions existing at the time the study was implemented, but we were able to learn about conditions at the time the development study was implemented through PPA staff who are indirectly related to the study.

### **(1) Efficiency**

As described below, the efficiency of the system of implementation, content, and other matters related to the "Study on Development Project on the Port of Batangas" were judged to be adequate.

#### Efficiency in Implementing the Studies

Regarding the final reports, it was confirmed that, in the main, the scope of the study as indicated in the S/W was well covered, that the study was implemented in accordance with the proposal, and that the content met the expectations of PPA. In further regard to the scale of the study groups, it was also confirmed that the scale of these groups was appropriate. There were comments that opportunities for C/P participation in the study were hindered by PPA personnel limitations, which appears to have created some slight inefficiency.

Regarding communication between the JICA study team and counterpart members, it was confirmed that although study team experienced some problems linguistically, using interpreters allowed a mutual understanding with the Philippine side regarding wishes and intentions to develop smoothly. Furthermore, with briefings held by the study team and other actions, study content and the status of progress of the study were amply communicated.

It was also confirmed that the qualitative and quantitative data gained from implementing the study was very well organized and that the study was conducted efficiently. Additionally, seminars for discussion of study proposals and other subjects were held, and feedback was provided to relevant organizations.

#### Efficiency in the Study Process

Since NEDA (National Economic and Development Agency) had fully considered the need to maintain coordination and consistency between aid organizations and projects, no problem was found in coordinating this study with projects run by other aid organizations. Although one project, the "South Luzon Highway Project," had a tremendous influence on how and what projects in the study were proposed, in this study, the project was carefully thought out before implementation.

## **(2) Effectiveness**

It was found that the final report for "Study on Development Project on the Port of Batangas" properly conformed to the S/W, that the contents were composed in a logical fashion, and that they sufficiently achieved the intended outcomes. However, while not included in the S/W of that study, and thus not evaluated subjects, it was determined that environmental impact assessments and consideration of resettlement of squatters preferably should be included as subjects in the study. Regarding project proposals, it was found that projects in the "Short-Term Improvement Plan" generally were formed as proposed. With "Master Plan" projects still being drawn up from the project proposals, the primary goals are being achieved. Regarding technology transfer, as technology for the port development was transferred to the C/P through the study, and since the C/P are utilizing the transferred adequately, the goals are being met.

#### Content of Final Report

As described in the following section, it was determined that the final report, which clarified general conditions in the southern Tagalog region and at harbors in the vicinity of Batangas Port, the natural conditions at Batangas Port, plans for utilization of the shoreline areas, basic principles for development of the port, demand estimates, port planning, design, and inventories, and economic and financial analyses, and thus was found to be easy to grasp and properly composed. The content also provided ample information and explained conditions of regions included in the plans. Regarding project plans, development plans were specified with explanations as to the necessity of

implementing the projects in terms of the basic development principles, while bearing in mind the development plans for regions in the vicinity. For this and related reasons, it was found that the content was generally satisfactory.

No environmental impact assessment (EIA) was implemented, and no mention of effects on the environment by the proposed projects was made in the study report. At hearings with PPA, there were comments that this was due to the fact that the Philippine government did not consider environmental impact assessments to be of such importance at the time the original study was implemented. However, the S/W report mentions that the Philippine government "strongly desired implementation of an environmental assessment, but expressed the view that this was not possible due to time and financial limitations, thus ultimately no comments concerning environmental issues were included in the study." Therefore, it was found that environmental issues were not given sufficient treatment in this report.

When projects came to be formed from the project proposals, although the problem of resettlement of squatters from the project site arose, the report from the original study makes only limited reference to the existence of squatters, and does not deal with issues regarding the decisions taken in regard to squatters and measures to resettle them. It was found that this was due to the recognition at the time the study was implemented that the problem of squatters was a matter for the Philippine government, and that the issue was not included in the scope of the original study's S/W.

### **(3) Impact**

#### Utilization of Study Output

The output of the "Study on Development Project on the Port of Batangas" was applied to two JICA studies, the "Calabarzon Integrated Regional Development Study" (1991) and the "Study on Greater Capital Region Integrated Port Development" (1994). The earlier study adopted the development of Batangas Port as a key point in the overall development of the Calabarzon area, with roads connecting Batangas and Manila featured as an important project. The latter study proposed Batangas Port as an alternative port for Manila Port in the greater Metro Manila, with containerization preferred, and the alternate plans in the "Study on Development Project on the Port of Batangas" were proposed.

#### Projects based on the Study Output

Based on the "Short-Term Development Plan" from the "Study on Development Project on the Port of Batangas", the "Batangas Port Development Project" was created with financing from OECF, and project was completed in March of 1999. Furthermore, the "Batangas Port Development Project (II)-(IV)," based on the "Master Plan" and financed by OECF (JBIC), are currently underway. Thus, the formation of projects from the project proposals constituting the primary goals was judged to have been thoroughly achieved.

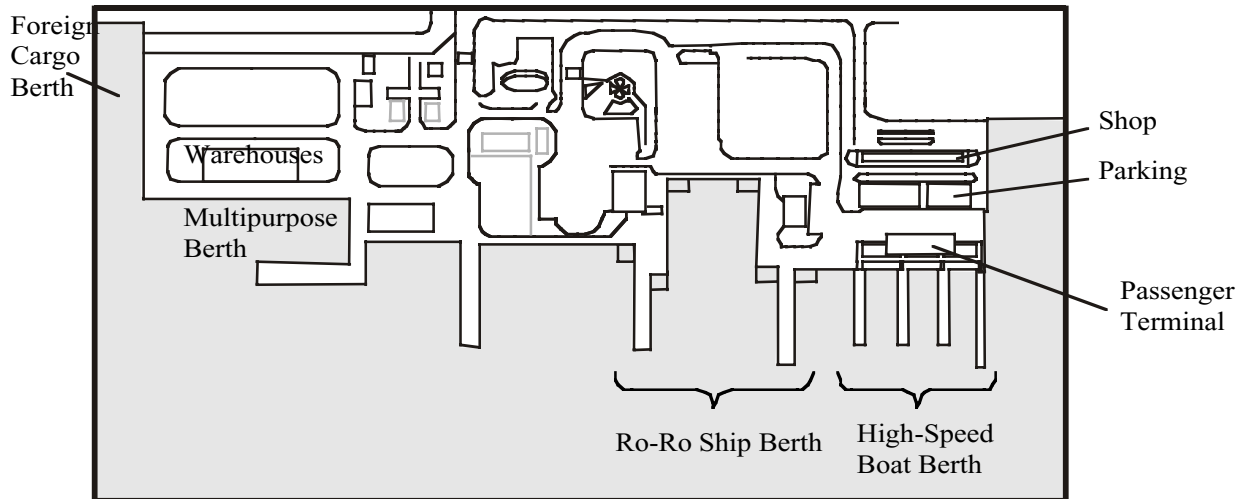
The loan agreement for the "Batangas Port Development Project" (for funds of 57.88 million yen) was contracted in July of 1991, and the project was completed in March of 1999. According to the initial plan, the project was to have been completed in August of 1995, but with the issue of resettlement of squatters during the period of implementation, in agreement with the contract with OECF, the project was suspended for one year and seven months, and the scope of the project was altered, which extended the period of construction by about one and a half years, thus resulting in a delay of



about three and a half years.

The loan agreement for the "Batangas Port Development Project (II)" (for funds of 14.555 million yen) was signed in September of 1998. However, due problems with land appropriations and other issues, the project did not proceed to the beginning phase. At the present time, there are no plans for creation of the "Batangas Port Development Project (III) and (IV)."

Figure 5-1 Locations of Completed Projects at Batangas Port



#### Technology Transfer

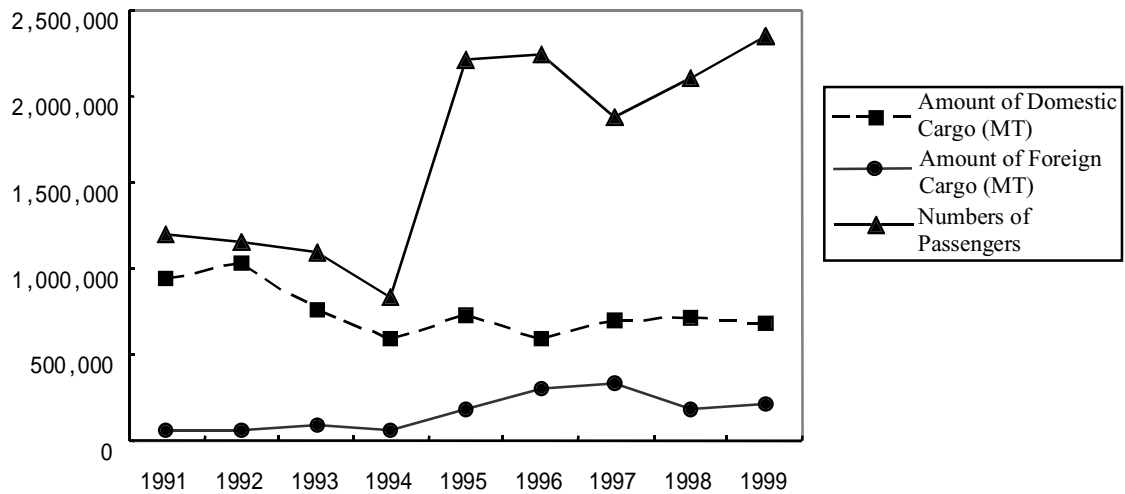
Through the process of repeated meetings and consultations between the JICA study team and the C/P members, the team was able to accomplish transfer of technologies, including methods for conducting economic and financial analyses and for designating port development plan, to the C/P members. Additionally, three PPA members attended training in Japan, acquiring related knowledge and technology in the process.

Transferred technology was also applied later when devising policies for the PPA's own self-funded port development plans, such as the Dumaguete Port Development Plan and the Iloilo Port Development Plan.

#### Economic and Social Output

Direct effects of the "Batangas Port Development Project" included more efficient and stable port operations due to the construction of separate dedicated berths for Ro/Ro boats, high-speed passenger boats, and general cargo ships, and with the construction of the general cargo terminal, a start on handling of containers. Additional indirect impacts include the improved traffic and greater number of passengers moving between Batangas Port and Mindoro Island across the water, promoting the development of Batangas Province with Batangas Port regarded as the port for shipping products from the industrial sites.

Figure 5-2 Projections for Cargo Handling and Numbers of Passengers at Batangas Port



Source: PPA Data

#### 1) Improvements in Safety and Efficiency

Before implementation of the project, the facilities at Batangas Port were cramped and outdated, squeezed on 2.6 hectares, making orderly and efficient operation of the port impossible. However, implementation of the project expanded the amount of land for the facilities to 23 hectares, and with construction of separate dedicated berths for Ro/Ro boats, high-speed passenger boats, and general cargo ships, cargo, vehicle, and passenger traffic were kept separate, allowing more efficient operation of the facilities. The Berth Occupancy Rate (BOR), which in the 1990s, at the middle phase the project before completion of construction stood at over 90%, thus resulting in considerable congestion, but this situation improved with the completion of the project in fiscal 1999, when the figure had dropped to 29%. There were also some problems with crime, such as luggage theft in the waiting room, but safety was ensured by isolating the passenger terminal from the exterior and strengthening security.

Table 5-1 Ship Landings and Berth Occupation Rate at Batangas Port

		1991	1992	1993	1994	1995	1996	1997	1998	1999
Ship Landings	Domestic	5,648	6,735	7,106	8,293	13,994	15,688	19,404	20,406	21,977
	Foreign	51	40	48	41	89	88	102	111	141
	Total	5,231	5,699	6,775	7,154	8,334	14,083	15,776	20,517	22,118
Berth Occupancy Rate (%)		n.a.	n.a.	n.a.	n.a.	95	90	99	93	29

Source: PPA Data

#### 2) Ro-Ro Ship and High-Speed Passenger Boat Berths

With completion of the Ro/Ro berth, the number of Ro/Ro shipping firms increased from three companies to eight, in addition to a reduction in time spent waiting for berths,

such that the required time between Batangas Port and Mindoro across the water has been reduced to about two hours. Moreover, whereas two round trips between the islands could be accommodated in one day, this rose to three round trips, thus more than doubling the total daily number of trips from 24 to 52.

With completion of the berth for high-speed passenger boats, use of improvised lighting and other problems had previously been affecting passenger safety during embarkation and disembarkation, but these safety concerns were addressed, and with the completion of a deeper multipurpose berth and foreign cargo berth, large cargo ships can now be handled at the shore.

Table 5-2 Changes in Ro/Ro Traffic Between Batangas Port and Calapan Port (Before and After Completion of Project)

	1997 (Before Completion of Project)	1999 (After Completion of Project)
Dedicated Berths	0	6
Firms Operating	3	8
Daily Round Trips Per Ship	2	3
Number of Vessels	10	18
Wait for Berths at Batangas Port (Hours)	2-3	0
Daily Departures from Batangas Port	24	52

Source: PPA Data

Table 5-3 Changes in High-Speed Passenger Boat Traffic Between Batangas Port and Calapan Port (Before and After Completion of Project)

	1997 (Before Completion of Project)	1999 (After Completion of Project)
Dedicated Berths	0	7
Firms Operating	2	3
Daily Round Trips Per Ship	3-6	4-7
Number of Vessels	7	7
Wait for Berths at Batangas Port (Hours)	0	0
Daily Departures from Batangas Port	32	35

Source: PPA Data

### 3) Influence to Mindoro Island

Mindoro Island, opposite Batangas Port, is a source of agricultural and marine products for consumption in the Metro Manila and southern Tagalog region. However, the completion of the Ro/Ro berth has made distribution more efficient, which is very important in transport of fresh food products. Furthermore, an expansion of markets can be seen to provide an incentive for the people of Mindoro to increase agricultural and marine production capacity. Moreover, the shortened passage between Mindoro and Batangas Port with the introduction of high-speed water transport has resulted in an increase of Mindoro residents making day trips to Batangas as well as bringing more tourists to Mindoro.

### 4) Influence to Hinterland of Batangas Port

Batangas Port has triggered investment in the area around it, as well as in Batangas Province, with an increase in industrial sites looking to the port as a point of shipment. In 1995, Batangas Province had only one industrial complex, but in 1995 the figure had risen to 15 such sites, and a number of the now more advanced enterprises have already begun to ship in containers from Batangas Port.

### 5) Resettlement of Squatters

One negative impact of the "Batangas Port Development Project" at the time of implementation was the problem of resettlement of squatters. Implementation of this project necessitated the resettlement of 718 households, so new housing sites were selected through the cooperative efforts of PPA with the National Housing Authority (NHA) and the Baranguay Association. However, the power of factions within the squatters who were opposed to the action made negotiations with the government difficult. Repeated eviction notices were issued without response, and the government finally resorted to implementing forced demolition of houses and buildings. The Japanese government temporarily froze funding because of this move, but funding was reinstated as the number of squatters agreeing to the resettlement increased. However, with the aim of supporting the resettled squatters, the provision of medical facilities in the new sites, roads to these areas, and the construction and outfitting of shops within the Batangas Port site were added to the "Batangas Port Development Project."

Table 5-4 Trends in the Amount of Cargo Handled, Number of Passengers, and Berth Occupancy Rates at Batangas Port

		1991	1992	1993	1994	1995	1996	1997	1998	1999
Number of Ship Landings	Domestic	5,648	6,735	7,106	8,293	13,994	15,688	19,404	20,406	21,977
	Foreign	51	40	48	41	89	88	102	111	141
	Total	5,231	5,699	6,775	7,154	8,334	14,083	15,776	20,517	22,118
Amount of Domestic Cargo (MT)	Incoming	381,411	429,067	319,203	267,629	348,693	323,874	385,292	382,279	365,453
	Non-Containerized	381,411	429,067	319,203	267,629	348,693	323,874	385,292	382,279	365,334
	Containerized	0	0	0	0	0	0	0	0	119
	Outgoing	562,165	594,758	437,303	327,444	385,075	270,593	315,437	330,619	308,952
	Non-Containerized	562,165	594,758	437,303	327,444	385,075	270,593	315,437	330,619	308,952
	Containerized	0	0	0	0	0	0	0	0	0
Total	943,576	1,023,825	756,506	595,073	733,768	594,467	700,729	712,898	674,405	
Amount of Foreign Cargo (MT)	Exports	4,972	10,468	3,556	729	40	0	278	0	1,435
	Non-Containerized	4,972	10,468	3,556	729	40	0	278	0	1,271
	Containerized	0	0	0	0	0	0	0	0	164
	Imports	51,055	48,094	85,625	60,553	174,964	308,454	335,689	187,198	205,423
	Non-Containerized	51,055	48,094	85,625	60,553	174,964	308,454	335,689	187,198	205,391
	Containerized	0	0	0	0	0	0	0	0	32
Total	56,027	58,562	89,181	61,282	175,004	308,454	335,967	187,198	206,858	
Number of Passengers	Boardings	599,139	586,636	538,178	408,210	979,412	963,254	853,032	978,809	1,070,378
	Landings	601,295	558,867	547,855	423,132	1,233,339	1,273,516	1,020,726	1,221,148	1,271,591
	Total	1,200,434	1,145,503	1,086,033	831,342	2,212,751	2,236,770	1,873,758	2,100,957	2,341,969
Berth Occupancy Rate (%)	n.a.	n.a.	n.a.	n.a.	95	90	99	93	29	

Source: PPA Data

#### (4) Relevance

From the following points concerning the relationship between the study policies at the time the study was implemented and development plans, both national and regional, we can interpret that the study was generally well-coordinated. Furthermore, it can be said that the study was sufficiently relevant, since the proposed projects were materialized immediately after the completion of the study and the content of materialized projects were almost same as that of the proposed projects.

##### Relevance at the Stage of Implementing the Study

The "Updated Philippine Development Plan 1984-1987", in aiming to achieve a balance between agriculture and industry along with equal opportunities for securing one's livelihood, and stressed the importance of transportation-related infrastructure as a means of eliminating the disparity among the country's different regions. Meanwhile, goals of this development study included promoting port development at Mindoro Port

and furthering chances for development in the surrounding area, and of supporting the Metro Manila, thus the process of drawing up the development project on the port of Batangas can be judged as being sufficiently consistent with the "Updated Philippine Development Plan 1984-1987" and the study policies of the original development study. Furthermore, with shipping seen as a crucial element in inter-island traffic, the "Updated Southern Tagalog Region Development Plan 1984-1987" recognized the inadequacy of existing port facilities, and one aim of improving transportation-related infrastructure was the upgrade and repair of existing port facilities. In particular, as it has been mentioned that investments related to port facilities were being focussed on major strategic ports, thus from this standpoint, the original development study that treated Batangas Port as the main port for the southern Tagalog region can be said to have been sufficiently consistent with the "Updated Southern Tagalog Region Development Plan 1984-1987".

#### Relevance at Completion of the Study and Current Relevance

Although the development study was consistent with the National Development Plan and other related plans at the time the development study was completed, during the course of nearly fifteen years following completion of the study as described below, certain problems in coordination have been noted, as described below. This has required adjustments to the development policies when implementing projects, but it was determined that overall consistency has been maintained.

According to the "Medium-Term Philippine Development Plan 1987-1992", the southern Tagalog region was divided into two types of district, the "Growth Corridor" and the "Resource Subregion," to achieve development with a balance of agriculture and industry. By joining Tagalog Province, with its advancing industrialization, and Mindoro Island, a region supplying agricultural products, Batangas Port occupies a crucial position in the development of southern Tagalog. This matter of port improvements is especially true of Batangas Port, with investments in the port tying the agricultural production regions and the cities in which populations are concentrated.

The "Medium-Term Philippine Development Plan 1993-1998" announced the securing of agricultural resources and the mobility of people and goods between cities as aims for improving transportation infrastructure. In concrete terms, this included improvements to facilities for the Ro/Ro ferry. This was consistent with construction of the Ro/Ro ferry terminal from the "Batangas Port Development Project."

According to the "Medium-Term Philippine Development Plan 1999-2004", Batangas Port is named as one of the sites for development as international ports. In this plan, policies include easing regulations, promoting competition, privatization, and decentralization in line with reductions in governmental investment as a new approach to improving transportation infrastructure. This includes the anticipated restructuring and privatization of PPA's management of the port in the future and devolution of authority held by the Port Management Office (PMO), which oversees management of local ports. In this regard, whereas the projects in the "Batangas Port Development Project (II)" were initially discussed by the BOT, in the end, JBIC-financed PPA projects have abated.

#### Discrepancies Between Project Proposals and the Projects Formed

Regarding the main differences between the projects proposed in the study and the actual projects as they were implemented, Phase I projects included the addition of seven berths of high-speed boats following the introduction of high-speed passenger

craft and the addition of a project related to financial compensation paid to resettled squatters were relocated, while the Phase II and later projects included measures made in response to the increases in estimated demand and large-scale ships, and thus was a larger-scale than the "master plan."

With the exception of compensation to the resettled squatters, these changes in formation of the projects were additional matters, and overall it is thought that the relevance of the project proposal was sufficient. The matter of the compensation mentioned before was difficult to judge, as the resettlement issue was not included in the S/W, but as resettlement of squatters was an issue that could have been anticipated, it is deemed that measures dealing with relocation of residents are needed to maintain relevance of the studies.

Table 5-5 Discrepancies Between Project Proposals and the Projects Formed

	"Study on Development Project on the Port of Batangas" Short-Term Development Plan	"Batangas Port Development Project (I)" Appraisal	"Batangas Port Development Project (I)" Actual Results
Harbor-Related Ro/Ro Berths	2 new berths, 1 existing berth	4 new berths, 2 improved berths	6 new berths
Foreign Cargo Berth	1 new berth	1 new berth	1 new berth
Domestic Cargo Berths	2 new berths, 1 existing berth	2 new berths	Cancelled (Extended to Phase II project)
Multipurpose Berths	-----	1 new berth	1 new berth
Small Craft Docks	1	1	7 new berths for high-speed boats
Ferry Berths	4 existing berths	-----	-----
Other Building Construction	Passenger terminal, warehouses, parking lots, etc	Passenger terminal, warehouses, parking lots, etc.	Passenger terminal, warehouses, parking lots, etc.
Support for Resettled Squatters	-----	-----	Paving of roads to new areas after relocation New shops in port facilities

Source: JICA, JBIC Data

#### Actions Leading Up to Project Formation

Although the "Study on Development Project on the Port of Batangas " was completed in December of 1985, in June of the following year, a special commission for the resettlement of squatters was established by the PPA, the city of Batangas, and other entities, and loan agreement with OECF for the "Batangas Port Development Project E/S" was signed in January of 1988. Another contract with OECF was signed in July of 1991 for financing the "Batangas Port Development Project." Due to the timing of these projects, it began to appear highly likely that the Philippine government would be using yen loans to create the projects from the project proposals in this study. Therefore, it appeared that the content of the proposals was such that the Philippine side was able to tackle them.

#### **(5) Sustainability**

As described in the following, with the "Batangas Port Development Project (I)"

already completed, management of the facilities constructed was assumed by the PPA's Batangas PMO (Port Management Office), whereas a private operator is in charge of operations, so while there have been a number of problems related to cargo handling, independent sustainability has been maintained. However, the Philippines port management system is undergoing a period of decentralization, privatization, and other reforms, and there is a possibility that there will be a serious decline in the future. Moreover, as problems have occurred with land expropriations and access roads are still not completed, it is believed that there will be problems with sustainability.

#### Management System (PPA)

The principle consideration in supporting sustainability is the agency responsible for maintenance and management of Batangas Port, the PPA Batangas PMO. While the Batangas PMO is in charge of port management (maintenance and management of the facilities, supervision of procedural and regulatory compliance, security, etc.), the port's cargo loading operations and terminal operations are consigned to a private operator which pays a fee determined by PPA, with a fixed percentage of the profits paid to the PMO.

Operational revenue in fiscal 1998 (port use fees, income from commissions, etc.) totaled 30.3 million pesos, and with maintenance and management cost of 29.1 million pesos (personnel expenses, etc.), an operational profit of approximately one million pesos was realized. Accordingly, a particular challenge to sustainability under these conditions is that the "Medium-Term Philippine Development Plan 1999-2004" advocates decentralization and privatization of port management, and it is unclear whether or not this current system of management of the port can be maintained in the future. If major changes are made to the system in the future, it will possibly have a very major effect on sustainability.

#### Operations System (Private Operator)

Since port operations are handled by a private operator, the second most important consideration in the matter of sustainability is this operator. In line with the type called for in the "Batangas Port Development Project," the self-capitalized firm uses a computer-controlled berth allotment system and has medical services and other facilities provided inside the passenger terminal. The firm also plans to install one new gantry crane at the foreign cargo terminal in the near future. Up to the present, the number of passenger traffic has increased with the introduction of high-speed passenger craft, and the handling of passenger traffic has been said to be profitable. However, while the port has been handling containers since the completion of the multipurpose and foreign cargo berths, the matter of beginning reception of containers from industrial complexes in the surrounding areas is unresolved, as access roads connecting Batangas Port and the industrial sites have yet to be completed, thus checking increases in the amount of cargo handled, and contracts with precision equipment manufacturers are being cancelled due to the unfavorable situation with the roads.

#### Actions Following the "Batangas Port Development Project Phase II

Regarding the "Batangas Port Development Project" Phases II-IV, a container terminal was planned for the port in order to have it function both as an alternate to Manila Port and as a port for outbound products from industrial complexes in the areas surrounding Batangas Port. However, as described in the following, the projects themselves and the sustainability of them are in serious doubt.



Without the appropriation of land for these projects by PPA, and because of issues regarding the restoration of land excavated in construction for these same projects, it was understood that executing these projects according to the initial plan would be difficult, and the projects essentially were cancelled.

Furthermore, to ensure sustainability of container handling at Batangas Port, provision of a trunk highway connecting Batangas Port and its surrounding area to the Metro Manila is indispensable. At present, the Luzon expressway connecting the Metro Manila and Batangas Port is planned, but due to the problem of securing land, there is no prospect of construction being carried out on some sections.

### **5-3 Results from the Five Evaluation Criteria**

The subject study can be judged as having been implemented efficiently and effectively, and furthermore, as projects continue to be formed from the project proposals, that the study was successful overall. The following problems arose when the projects came to be formed, however, and it is necessary to learn from the experience to improve the development study qualitatively in the face of such problems.

#### Create Plans with Consideration Given to Squatters and their Resettlement

In the scope of the preliminary study to the development study, no mention is made of the treatment of these squatters. At the time the study was implemented, the existence of the problem of illegal occupants opposing the Philippine government was recognized. Although this was included in the study's final report as a problem of squatters affecting port operations, no measures to resolve the problem were studied. In reality, however, when the "Batangas Port Development Project" was implemented, as previously mentioned, there arose the problem of resettlement of squatters in implementing the project, which was a cause in the serious delay in the progress of implementation.

Although basic responsibility for the problem of illegal occupants can be considered to have been that of the Philippines government, as seen when projects came to be formed from the study, it is clear that the issue is one that affects the progress of project formation and even whether or not the projects are possible. Furthermore, when the matter of compensation for relocation arises, it becomes much more likely that results of economic and financial analyses made at the implementation of the development study will be fundamentally overturned. Therefore, the possible necessity for resettlement upon implementation of projects, and if relocation is necessary, the measures devised to deal with it, should be additional study and examination criteria in development studies.

#### The Necessity of Linking Port Development and Access Roads to Development of Included Local Areas

In the master plan of the subject study, expectations were that Batangas Port would be provided with the functionality needed to make it an alternative international port to Manila Port, and construction of access roads between the Metro Manila and the southern Tagalog region is indispensable for such function to be achieved. Therefore, this study was planned so that it would be consistent with the "South Luzon Expressway Project." After planning as well, the "Calabarzon Integrated Regional Development Study" clearly specifies the connection between the two plans. However, no schedule

for land appropriations has been made for part of the "South Luzon Expressway Construction Plan," so the project has been stalled, and the project proposals from which the project was created cannot be utilized effectively. This example demonstrates the importance of repeatedly ensuring harmonization between port development plans and plans for access road construction.

#### Institutional Analysis of Organizations Developing and Operating the Port

Although not necessarily related directly to the subject study, decentralization and privatization in the operation of state-operated ports and public involvement in port development is an international trend that has continued in recent years. The Philippines is another example of this, with a national development plan that advocates decentralization and privatization in port operations, and where partial realization of decentralization has begun.

Amid expectations of continued decentralization and privatization in port operations and public involvement in port development, future port-related development studies may require analyses of existing organizational capacity central to the operation of ports and an examination of port development and methods used in developing ports based on the results of these analyses.

**CHAPTER 6 —PHILIPPINES:  
National Ferry Transport Plan Study (M/P+F/S)**

**CHAPTER 6 —PHILIPPINES:  
Nationwide Roll-on Roll-off Transport System Development Study  
(M/P + F/S)**

**6-1 Overview of Target Subjects**

**(1) Background of the Development Study, Proposed Projects, and Current Status**

1. Background of the Development Study

In the Philippines, a nation comprising numerous islands, passengers and freight are transported within the country over roads with connecting marine transport. In particular, ferries are an extremely important means of transport between the major regional islands of Luzon, the Bisaya island group, and Mindanao. However, no system of administration for organizing the routes and scheduling of ferry transport had been established at the time this study was implemented, and the state of facilities was very poor; thus, there was a need for improvements in safety and efficiency. Against this background, the Philippine government requested technical aid from the Japanese government for a national ferry transport plan.

2. Study Implementation Period: April 1991 —August 1992

3. Counterpart: Ministry of Transportation and Communications

4. Overseeing Consultants for the Development Study: Overseas Coastal Area Development Institute of Japan, Pacific Consultants International Co. Ltd.

5. Main Projects Proposed:

The M/P called for a facilities plan that included development of RORO terminals, refurbishments, and other improvements so that by 2012, boats would be running in the first- and second-ranked priority groups from 42 RORO routes targeted in the study (Table 6-1). The total project cost was projected at 2.7 billion pesos. Additionally, a RORO terminal facilities improvement plan for the Iloilo-Bacolod route was developed in the F/S. The total cost of the RORO terminals for both ports was projected at 2.99 million pesos.

6. Current Status: M/P is progressing and being applied; F/S is delayed, suspended

Facilities for the RORO transportation system proposed in the M/P is self-funded and currently being implemented. Projects proposed in the F/S have been delayed. The main reason for the delay is reduced demand for marine transport utilizing the RORO ferries in the planed areas.

Table 6-1 Priority of Routes Targeted in the Study According to the Master Plan

Priority in Nationwide Roll-on Roll-off Transport System Development Study M/P	RORO Route	
Priority 1	Batangas	Capalan
	Toledo	San Carlos
	Matnog	San Isidro
	Matnog	Allen
	Cebu	Tagbilaran
	Iloilo City	Bacolod
	Liloan	Lipata
	Cebu	Ormoc
	Cebu	Tubigon
	Danao, Escalante	Turban
	Tandayag	Bato
	Guihulgan	Dumanjug
	Priority 2	Dumaguete
Iloilo City		Jordan
Tubod		Tangub
Dumaguete		Puluan
Iloilo City		Pulupandan
Batangas		Abra De Ilog
Jagna		Cagayan de Oro
Lucena		Balanacan
Zamboanga		Basilan
Zamboanga		Jolo
Benoni		Balingoan
Tabaco		Virac
Bulan		Masbate
Cebu		Talibon
Priority 3		Ajuy
	Cavite	Mariveles
	Matnog	Mabate
	Davao	Babak
	San Jose Min. Occ.	New Washington
	Roxas, Min. Occ.	New Washington
	Argao	Loon
	Carmen	Isabel
	Lucena	Sta. Cruz Marinduque
	Ubay	Massin
	Dumaguete	Karena
	Roxas, Min. Occ.	Odiogan
	Jagna	Mambajao
	Milagros	Estancia

## **(2) Monitoring with the PDM**

### 1. Overall Goal

M/P: Harbor improvements were to be implemented by the Philippine government according to the long-term and short-term plans, with the aim of improving the efficiency and convenience of marine transport among the islands comprising the Philippine nation. That is, the Philippine government was making concrete preparations for the creation of projects.

F/S: Improvements made to the RORO terminals at Iloilo Port and Bacolod Port were to deal with passenger and cargo demand at both ports, in addition to realizing a number of other aims, including reduction of loading costs, theft of and damage to cargo, and trucking expenditures.

### 2. Project Purpose

M/P: Creation of the Master Plan for a RORO ferry transport system in the Philippines. The Master Plan was to include policy guidelines created to attain an efficient RORO ferry transport system and selection of priority routes.

F/S: Economic and financial analyses of improvements made to the RORO terminals at Iloilo Port and Bacolod Port were to be carried out.

### 3. Input

Japan Study Team: 12 Specialists (71.10 M/M), OJT for C/P

Philippine Team: Study staff from DOTC, NEDA, DPWH, and PPA, arrangements for study office

### 4. Activities

In Japan, study the information listed below, compiling and analyzing data from past studies (organization and system, operation licenses, fares, approval procedures for purchasing RORO craft, etc.), collecting and analyzing information and opinions, carrying out a collective analysis of data for Indonesia, and collect and analyze technical data from studies implemented on-site.

- \_ Estimates for future demand (cargo and passenger OD studies, demand estimates for inter-island traffic, estimates of ferry traffic with breakdown by mode)
- \_ Proposed policy guidelines for marine transport policies
- \_ Creation of a long-term development plan for a national RORO transport system (concept for RORO ferry port arrangement, selection of RORO ferry models, decisions regarding RORO ferry port development policies, ranking RORO port facility priorities)
- \_ Implementation of F/S on the short-term port facilities improvement plan (Iloilo-Bacolod route)
- \_ Workshops

### 5. Output

- 1) A grasp of the demand for nationwide RORO transport to be obtained.
- 2) A Master Plan for the national RORO transport system to be drawn up.
- 3) Priority RORO routes to be established.
- 4) The short-term improvement plan to be implemented and of the feasibility study to be clarified.

5) The Philippine team to acquire means and knowledge to develop port M/P and F/S based on experience in this study.

#### 6. Preconditions

RORO craft per-trip transport volume, deck surface area, structure comparisons by model type, occupied area by model type, and load ratings were determined, and net transport volume with a load ration of 65% for each model is shown below.

300 GRT: 27.3 tons; 500 GRT: 35.1 tons; 1000 GRT: 52 tons; 2000 GRT: 79.3 tons

Short-term port facilities improvement plan (Iloilo-Bacolod route) preconditions were as follows

- \_ At Iloilo Port in 2010, a 2000 GRT model RORO craft must make three trips per day. Additionally, two berths are required in each port to allow four round-trip vessels to use each port on a fixed schedule.
- \_ Year-to-year growth rate was used for 1997 passenger estimates. PPA statistical data was used in order to get a grasp of previous growth in the amount of cargo handled and the reference fiscal year transport volume.
- \_ In the target year of 1997, the population of Panay Island was estimated to be 3,395,000, and the population of Negros Island was estimated to be 3,537,000. Furthermore, with future economic estimates in the Philippines, Region VI consumer spending showed growth of 4.5%.

## **6-2 Results from the Five Evaluation Criteria**

### **(1) Efficiency**

According to the counterpart at the time the study was implemented, the counterpart experienced no problem with the study, the period of the study, the scope of the study team, or the communication between the JICA study team and the Philippine government, and found that the study progressed efficiently. In particular, there were comments stating that although explanations of the system of implementation of the study by the JICA study team during implementation of the study and the status of progress were given repeatedly, the efficiency of the study was high. Moreover, it was confirmed that workshops with counterpart organizations were held during the study and at the final stage and that there was a high level of participation.

While the study team implementing the study chartered aircraft and use other means to attain an understanding of the general conditions in the vicinity of the ports, it was confirmed that the RORO port improvement plans were drawn up while given due consideration to maintaining consistency with improvement plans for tertiary ports as well.

Regarding the study system used by the Philippine side, some differences of opinion between the Philippine counterparts and the JICA study team were evident. Participating in this study were DOTC, regarded as the lead organization, with staff from NEDA, PPA, MARINA, and DPWH participating as well. It was thought that the Philippine contingent considered that, was necessary for the ferry transport improvement plans for the study to cover a wide range, including not only improvement of the ports but access roads and other necessary improvements, the information and connections provided by the inclusion of staff from related ministries other than DOTC would be beneficial to the study. However, members of the JICA study team participating in this study pointed

out that with a counterpart consisting of multiple organizations, it was unclear which would have proper authority, which would act to reduce the efficiency of the study, and could not say that the Philippine team's system of implementation was at all efficient.

## **(2) Effectiveness**

### Content of Final Report

From the counterparts' comments mentioning that the final report conformed to the content of the S/W and that the report was easy to use, we can judge that the report was prepared in line with the counterparts' expectations. Furthermore, the counterparts highly valued the content of the report drawn up by the study team, which among other content, 1) amply reviewed existing data, including National and Regional Socio-Economic Data, Socio-Economic Development Plans for the Nation and Regions, Government Policy for Regional Development, Land Use and the Forecast of Socio-Economic Framework, 2) revised the environmental assessment criteria for implementation of the RORO project and carried out other procedures in line with Philippine national environmental assessment procedures (particularly in regard to the detailed environmental impact assessment for the Bacolod-Iloilo route targeted in the F/S), providing a separate section within the report and conducting environmental analyses, and 3) conducted hearing studies in passenger terminals inside the boats with people using the RORO craft for the 42 ports targeted in the study and.

### Technology Transfer

It was confirmed that the techniques and technologies listed below were transferred by the JICA study team to the Philippine counterparts, and that these have contributed to improving the capabilities of the Philippine counterparts.

- The Philippine counterparts learned the process and methods of a sequentially-arranged study in the fashioning of the M/P and F/S. In concrete terms, this included reassessment and analysis of existing data, inspections studies, analyses of routes, rethinking of marine transport policies, drawing up policies for marine transport, estimates of socioeconomic developments, demand estimates, port/ferry operations, management plans, financial analyses.
- To put the knowledge acquired from the JICA study team into practice, the Philippine counterparts independently implemented two F/S in parallel with this study. One, a study of the Escalante-Tuburan, Carlos-Toredo, and Bato-Tandayag RORO ferry routes was completed in July of 1992. The other, a revised study of the Carlos-Toredo RORO ferry route, was completed in February of 1993.

## **(3) Impact**

### Moves Towards Implementation of Projects

In addition to furnishing relevant government ministries with copies of the final report of this study, DOTC also distributed the report to the Domestic Shipowners Association (DSA), the European Community (EC), the ADB, and other groups, worked to form projects from the proposed development plans, and upgraded a number of ports to RORO ports with its own funds. Furthermore, DOTC has asked JICA to carry out a revised study of this master plan. Either currently being implemented or slated for implementation as next-phase studies are the Bohol Ferry Link and Terminal Feasibility



Study (PPA), the Updated Nationwide Roll-on Roll-off Transport Development Study (JICA experts), and the Trans-Visayas Intermodal Transport Network Projects (PCI).

Status Regarding Implementation of Projects

As mentioned above, the Philippine government has up to now furnished a number of RORO ports using its own funds. However, the progress status of the Master Plan was not being monitored separately by DOTC, details of project implementation after completion of the study (project years, sources of funding, project contents) were not sufficiently grasped. Due to these circumstances, JICA specialists dispatched to DOTC are conducting a progress study of the project implementation of Master Plan.

Lists showing actual results and plans for RORO port improvements following the completion of the study in August of 1992 (Table 6-2) and Master Plan progress status, by route from on-site information (Table 6-3), are shown below.

However, projects proposed in the F/S have been delayed. Given as main reasons for this are the fact that in terms of both port improvements and management, Iloilo Port greatly lags behind the private Bacolod Port, while craft demand for marine transport in the same area using the RORO continues to decline. Presently, travel from Bacolod to Iloilo is not made by RORO, but primarily by passenger ferry.

Table 6-2 Lists of Actual Results and Plans for RORO Port Improvements After August of 1992

Target Year of Implementation	Port Name	Total Project Cost (Million Pesos)	Source of Funding	Remarks (as of Sept. 2000)	Priority in Nationwide Roll-on Roll-off Transport System Development Study M/P
2001 Plans for Implementation	Massin Port	137	Internal	15% project completion up to present	3
	Hilongos Port	22	Internal	32.10% project completion up to present, including wharf rehabilitation	N/A
	Depitan Port (Pulauan)	50	Internal	Includes high-speed ferry berth	2
	Isabela Port, Basilan	23	Internal	15% project completion up to present	
2000 Results	Virac Port, Catanduanes	24	Internal	RORO: part of project construction completed July, 2000	2
	Gatafe Port, Bohol	6	Internal	55.14% project completion up to present	N/A
	San Carlos Port	267	Internal	RORO: part of project construction completed May, 2000	1
	Hilongos Port	22	Internal	RORO: part of project	N/A
	Maguino-o Port	10	Internal		N/A
	Balbagon Port	5	Internal	RORO: part of project construction completed February, 2000	N/A
	Delcalmen Port	16	Internal	Under implementation	N/A
	Dapa Port	11	Internal	48% project completion up to present	N/A
	Ligan Port	7	Internal	Concrete plans being prepared	N/A

1999 Results	Dumaguete Port	152	Internal	RORO: part of project construction completed November, 1999	2
	Nasipit Port, Agusan del Norte	91	Internal	RORO: part of project construction completed November, 1999	N/A
	Port of Calapan II	79	Internal	RORO: part of project construction completed February, 1999	1
	Matnog Port	29	Internal	RORO: part of project construction completed February, 1999	3
1998 Results	Jordan Port	33	Internal	RORO: part of project construction completed October, 1998	2
	Catbalogan Port	11	Internal	RORO: part of project construction completed July, 1998	N/A
	Coron Port	56	Internal	RORO: part of project construction completed May, 1998	N/A
	Poctoy Port	28	Internal	RORO: part of project construction completed March, 1998	N/A
1996 Results	Balanacan Port	6	Internal	Completed November, 1996	2
	Dalahican II Port	51	Internal	RORO: part of project construction completed October, 1996	N/A
1994 Results	Port of Calapan III	11	Internal	RORO: part of project construction completed October, 1994	1
1993 Results	Iligan II Port	9	Internal	RORO: part of project construction completed November, 1993	N/A
	Cebu Port	24	Internal	RORO: part of project construction completed May, 1993	1

Note: N/A indicates ports not targeted in the M/P study

Source: Summary- Capital Outlay Projects prepared by DOTC

Table 6-3 Progress Status of Master Plan By Route

Priority in Nationwide Roll-on Roll-off Transport System Development Study M/P	RORO Route				RORO Route Facilities Improvement Status
	Name of Port	Operating/Managing Organization	Name of Port	Operating/Managing Organization	
Priority I	Batangas	PPA	Capalan	PPA	RORO improvements made at both ports.
	Toledo	CPA	San Carlos	PPA	RORO facilities at both ports, but RORO facilities at Toledo are superannuated.
	Matnog	PPA	San Isidro	PPA	RORO improvements made at both ports.
	Matnog	Public	Allen	Private	Unknown
	Cebu	CPA	Tagbilaran	PPA	RORO facilities at both ports. Aging continues at Cebu RORO, necessitating rehabilitation.
	Iloilo City	PPA	Bacolod	Private	No RORO facilities at either port. Bacolod is a private port, thus use is limited to specific shipping companies.
	Liloan	PPA	Lipata	PPA	RORO facilities at both ports.
	Cebu	CPA	Ormoc	PPA	Unknown
	Cebu	CPA	Tubigon	PPA	Tubigon equipped only with RORO ramp.
Danao, Escalante	PPA	Turban	CPA	RORO facilities at both ports, but RORO facilities at Turban are superannuated.	

	Tandayag	PPA	Bato	Private	RORO facilities pre-existing at Tandayag. Bato is a private port, thus use is limited to specified enterprises.
	Guihulgan	Unknown	Dumanjug	Unknown	RORO facilities at Guihulgan.
Priority 2	Dumaguete	PPA	Satandar	CPA	No port facilities at Satandar. Future plans unclear.
	Iloilo City	PPA	Jordan	PPA	RORO facilities at both ports.
	Tubod	Unknown	Tangub	Unknown	RORO facilities at both ports, but project for bridge connecting both ports has been proposed.
	Dumaguete	PPA	Pulauan	Unknown	RORO improvements made at Dumaguete, but no improvements being made at Pulauan. No RORO improvements being made at Pulauan.
	Iloilo City	PPA	Pulupandan	PPA	No improvements for RORO facilities to connect the two ports made, but RORO running from Iloilo to Jordan.
	Batangas	PPA	Abra De Ilog	PPA	No improvements for RORO facilities to connect the two ports made. No breakwater improvements at Abra de Ilog Port, making it unsuitable for RORO.
	Jagna	PPA	Cagayan de Oro	PPA	No improvements for RORO facilities to connect the two ports made. No breakwater improvements at Jagna Port, making it unsuitable for RORO. Improvements being studied for Guindulman Port as an alternative to Jagna.
	Lucena	PPA	Balanacan	PPA	RORO facilities improved at Lucena, but not at Balanacan
	Zamboanga	PPA	Basilan	PPA	No RORO facilities improvements at either port. Land for RORO facilities at Basilan cannot be secured. Zamboanga Port severely crowded; RORO facilities must be constructed at site outside port.
	Zamboanga	PPA	Jolo	ARMM	No RORO facilities at either port.
	Benoni	PPA	Balingoan	PPA	RORO facilities at both ports, but no RORO service on same route.
	Tabaco	PPA	Virac	PPA	RORO facilities at both ports.
	Bulan	PPA	Masbate	PPA	Pre-existing RORO facilities at Masbate, but not in use for trips to Bulan.
	Cebu	PPA	Talibon	PPA	Privately provided RORO ramp and Talibon Port.
Priority 3	Ajuy	Unknown	Manapla	Unknown	Manapla a fishing port, so low possibility of use for RORO. Cadiz Port proposed as an alternate port. Water depth a problem at Ajuy, so low possibility of use for RORO. Conception Port possible as an alternate port.
	Cavite	Unknown	Mariveles	Unknown	No port facilities at Cavite, but expected to play role as alternate port to Manila Port. High-speed passenger ferry main craft for Mariveles.
	Matnog	Unknown	Masbate	Unknown	RORO pre-existing at both ports, but no RORO service on same route. High-speed passenger ferry main craft.
	Davao	Unknown	Babak	Unknown	Privately furnished RORO facilities at both ports.
	San Jose Min. Occ.	Unknown	New Washington	Unknown	No RORO facilities at either port. Furthermore, use for RORO not planned.

	Roxas, Min. Occ.	Unknown	New Washington	Unknown	No RORO improvements at either port. Large-scale dredging necessary at San Jose Min. Occ. Port, thus local government considering RORO improvements at Sta. Teresa.
	Argao	Unknown	Loon	Unknown	Pre-existing RORO facilities at both ports, but not function as such.
	Carmen	CPA/LGU	Isabel	LGU	Pre-existing RORO facilities at both ports, but not function as such.
	Lucena	PPA	Sta. Cruz Marinduque	DPWH/LGU	Pre-existing RORO facilities at both ports, but not function as such.
	Ubay	PPA	Massin	PPA	High-speed passenger ferry main craft at Ubay. No RORO facilities improvements at Massin.
	Dumaguete	PPA	Karena	PPA	RORO facilities at both ports, but no improvements for RORO to connect the ports.
	Roxas, Min. Occ.	DOTC	Odiogan	PPA	No improvements for RORO to connect the ports.
	Jagna		Mambajao		RORO not planned for either port. Guindulman proposed as an alternate port to Jagna, Guinsiliban as an alternate to Mambajao.
	Milagros		Estancia		No RORO facilities at either port.

#### Economic and Social Impact from Project Implementation

In general, mentioned as output of the improvements made to RORO ports are impacts such as economic growth and industrial development due to higher efficiency and increased commerce. As mentioned above, details of projects implemented after the completion of the Master Plan (project years, sources of funds, project contents) were not adequately understood, so it is not possible to evaluate the economic and social impacts of the implementation of individual projects at the present time from existing data. The impact of the RORO ship berths, completed as part of the OECF (currently JBIC) financed Batangas Port Development Projects, is reported below. Although the scale of the project varied at each port, it is conjectured that the other ports equipped with RORO berths had a similar social and economic impact.

- \_ Constructing separate, dedicated berths for RORO craft, high-speed passenger boats, and general cargo ships, thus keeping the movements of cargo, vehicles, and passengers separate, allows more efficient operation.
- \_ There is a greater number of firms running RORO craft.
- \_ Berth wait times have been eliminated, and as a result, it has become possible to reduce run times.
- \_ The number of vessels has increased, and there has been an increase in the amount of cargo handled.
- \_ Distribution times have been reduced, making transport of fresh agricultural and marine products possible.

#### **(4) Relevance**

##### Relevance at the Stage of Implementing the Development Study

In the chapter on infrastructure development plans in the 1991 Philippine

Development Report, it was confirmed that improving the efficiency ferry services was proposed as a way to reduce local distribution costs, and a national ferry transport system was given high priority by JICA as a concrete project to achieve this. Thus, this was evaluated as being highly relevant at the stage of implementing the study.

#### Relevance at Completion of the Study and Current Relevance

##### ***Relevance of the Master Plan***

Regarding the current relevance of the content proposed in the Master Plan of the development study, from the proposals in the Philippine Transport Strategy Study implemented by the ADB that measures including implementation and review of studies for a national ferry transport plan were necessary, along with mentions in the mid-term Philippine development plan from 1993 to 1998 as well as the mid-term Philippine development plan from 1999 to 2004 of the necessity of forming projects at ports ranked as being high priority ports in the national ferry transport plan by the JICA allow the study to be evaluated as relevant. Furthermore, considering the financial state of the Philippines, in selection of the structural format of port facilities in implementation of the plans, it was proposed in the plan that concrete, rather than steel, be used in order to suppress maintenance costs. In view of the country's harsh current financial conditions, it can be evaluated that the judgement that this kind of consideration on the part of the study team was extremely appropriate.

On the other hand, when considering the relevance of the "project implementation plan" proposed in the Master Plan, it does not appear that the proposed content could be created in line with the plan. Thus, relevance in this aspect can only be evaluated as low. Although the Master proposed prioritizing projects for RORO routes throughout the nation into three categories, starting with projects for those ports ranked with the highest priority, it did not actually progress in this manner. The reason given for the Transportation and Communications Ministry's inability to form the projects was that the cost of implementing the RORO transport system with its own funds was too high for the Philippines. According to the 1999-2004 mid-term Philippine development plan, costs requested by PPA for port development totaled 5 billion 522 million pesos, of which 0.7%, or 40 million pesos (8 million pesos per year) was requested as a budget for RORO traffic improvements. The largest budget allotted was 4 billion 731 million pesos for international port development (85.6% of the requested funds). In the Master Plan, estimates of facilities improvement cost per vessel ranged from a minimum of 2.6 million pesos to a maximum of 275.3 million pesos, but with an average annual budget of 8 million pesos (at the 1992 exchange rate of five yen per peso), creating projects certainly would have been difficult. Currently, RORO transport improvements are being integrated in larger-scale port improvement projects, with the continuing policy being to do whatever is possible.

##### Relevance of the Feasibility Study

Projects for RORO facilities improvement for the Iloilo-Bacolod route targeted in the F/S have not yet been formed. Given as main reasons for this are the fact that in terms of both port improvements and management, Iloilo Port greatly lags behind the private Bacolod Port, while craft demand for marine transport in the same area using the RORO continues to decline. Presently, travel from Bacolod to Iloilo is not made by RORO, but primarily by passenger ferry, and there is little likelihood that the proposed projects will be implemented in the future. Therefore, short-term development proposed in this study were evaluated as being of little relevance.

## **(5) Sustainability**

As current conditions at ports for which projects were implemented are still unknown, evaluation of sustainability at this time is not appropriate.

## **6-3 Conclusions and Lessons Learned**

As the present development study was implemented efficiently, and since project implementation was given high priority within the national development plans after completion of the study, it was evaluated as having sufficiently achieved the intended outcomes. However, since proposed projects have not been implemented in a way that accorded with the plan, the overall goal has not yet been attained. Based on this evaluation, it is believed that improvement of the development study is linked to the following.

### Clarification of the Counterpart

In the development study, the counterpart, with the DOTC in the central role, also included participating staff from NEDA, PPA, MARINA, and DPWH. When drawing up the ferry transport plan, this made it necessary to make studies not only of the ports themselves, but also of access roads and a wide range of subjects. This resulted in participation in the study by government agencies other than DOTC, which according to comments by DOTC was useful from the standpoint of gathering information and making appointments. However, the JICA study team's view was that this system of implementing studies made it unclear where authority lays. Even if project implementation proceeds after completion of the study, lack of clarity as to which organizations are implementing the projects constitutes a major impediment. It was found that improving this system by vesting responsibility for post-implementation monitoring to a single organization is important for realizing early implementation of projects.

### Observations on Project Implementation

In the M/P, 67 ports were selected for the study, and improvement of RORO transport system facilities was planned. However, it does not appear that recommendations made by the JICA study team at that time, stating that the plan should be executed strategically, were not realized. One reason for the plan not being implemented in a strategic manner was the problem of securing funds. Project costs for RORO improvements were too high for the Philippine government to raise on its own; this is covered in more detail in the section on relevance.

One reason for the delay in the implementation of projects was that operation and management for port improvements was not entrusted to DOTC, the organization that implemented the development study. DOTC's role in the port improvements was limited by policy, so there was practically no participation by DOTC in operations, management, or investment plans.

In concrete terms, while the nation has a total of 1,250 ports of all sizes, DOTC's direct participation in operations, management, and raising of financing was limited to small-scale ports. Financing, operating, and managing other large- and medium-scale

ports were carried out separately by PPA (123 ports), the Cebu Port Authority<sup>8</sup> (CPA: Cebu Port and other ports in Cebu's islands), private operators (220 ports), Subic Port Metropolitan Authority (Subic Port), Cagayan Economic Zone Authority (CEZA: Irene Free Port), Bases Conversion Development Authority (BCDA: San Fernando Port), the Ministry of Fisheries, and local governments.

Since RORO facilities comprise two ports that first have to be improved so as to handle RORO craft, it is indispensable that there be coordination between the ports being upgraded. However, such variation in the way operations are carried out at each port creates difficulty in making RORO improvements simultaneously and in parallel, with coordination being extremely difficult especially when working with privately operated ports.

Under these sorts of conditions, if a revised study of the M/P were to be implemented, it would be necessary to consider making measures to raise funding and coordination of all concerned implementing agencies for project implementation. Furthermore, it was found that revising methods of raising funding was necessary to allow large budget requests, wherein RORO improvement projects for the 42 routes proposed in the M/P can be packaged together into groups of a number of routes.

If a system to make RORO transport system improvements already exists in a large-scale port facilities improvement plan, one idea would be to continue with this approach and implement project proposed in the M/P by incorporating into this. In this case, implementation of a new "National Port Facilities Improvement Plan" development study would be necessary, including a revision of the RORO transport improvements.

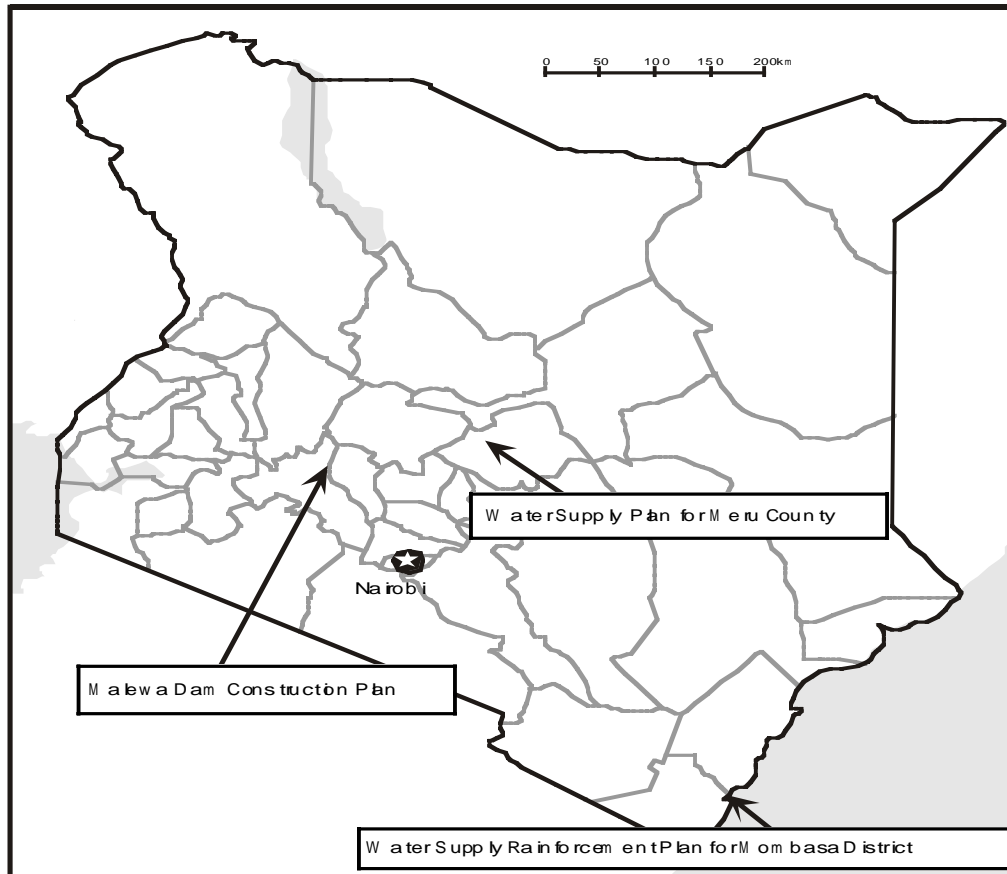
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<sup>8</sup> From 1997, port improvements on Cebu Island have been under the jurisdiction of the Cebu Port Authority (CPA). This has made coordination between DOTC, PPA, and CPA all the more necessary for RORO transport system development nationwide.

**CHAPTER 7 —KENYA:**  
**Development Study on the Water Supply Plan for Meru County**



## Kenya: Project locations designated by the JICA Development Studies



This photograph shows a water treatment plant prepared by the Greater Nakuru Water Supply Project. The construction of the plant was financed by OEDF loan.



This photo shows a sewerage treatment facility. The construction of this facility was done from the year 1995 to 97 by Japanese donation.

## **CHAPTER7- KENYA: Development Study on the Water Supply Plan for Meru Country**

### **7-1. Outline of this JICA Study**

#### **(1) Necessity to implement this study, proposed projects, and their present status of implementation**

Background of the implementation of development studies

A master plan for water resources over the whole country of Kenya was prepared in 1992 by JICA Study. It proposed a water supply plan for households and industrial use by setting the objective of supplying safe water to the entire population. More specifically, the plan proposed:

to implement safe and stable water supply to cities with a population over 5000 and all prefectures in the country by the year 2000 and arrange sewage treatment facilities for these areas by 2010.

The state of the water supply in the Eastern Prefecture lagged significantly behind this national target. For example, the water supply facility for Meru City at that time only met 20% of the demand and the existing water supply facility itself was obsolete. Isiolo city also used to have a shortage of water supply due to dry up of the Isiolo River during the dry season.

Therefore, a water supply plan in the Eastern Prefecture was urgently needed in order to meet the existing water supply demand. Under these circumstances, the Government of Kenya asked the Government of Japan to implement surveys to improve the water supply systems in the seven areas in that prefecture (Meru, Nikipu, Isiolo, Chuka, Chogolia, Maua, and Tigania).

Period of the implementation of the development studies: July 1996 to Nov. 1997  
Counterpart: Ministry of Water Resources Development  
Consultant in charge of development studies: Nippon Koei Co., Ltd., Nissui  
Consultant Co., Ltd.  
Proposed project

The basic policy for the water supply plan to be proposed in the master plan focused on the following three points:

- 1) Supply clean and high-quality drinking water to the target areas of the plan.

- 2) Utilize the gravity flow system to the maximum extent and adopt a simplified treatment process system with raw water of high quality to ease the maintenance and management of facilities.
- 3) Determine the priority order of implementation site among the target areas of the plan

These basic policies are based on the 16 suggestions proposed in the preliminary report as of April 1996, which will be described later.

Projects proposed in the master plan are:

- 1) Intake weir and water transmission pipe: The facilities will be designed to prevent the inflow of floating materials and sediment. Furthermore, the facilities will be designed to maintain a certain flow velocity in the conduit so that the water is always kept clean.
- 2) Water treatment plant: A facility that adopts a simplified processing method and uses raw water of high quality.
- 3) Distribution reservoir: The storage capacity in rural areas will meet 12 hour- supply, while the capacity in urban areas will meet 24 hour- supply to allow maintenance inspections and urgent stops in cases of emergency.
- 4) Treated water transmission pipe: The diameter of the treated water transmission pipe will be determined based on the daily average water supply volume in the downstream areas and the peak flow of the transmission pipe.

After comparing the seven cities in the above-mentioned master plan, it was decided to give the first priority to the water supply plan for the Meru area. Because this city was in urgent need and had advantages to implement the plan. A feasibility study was then prepared on the subject of Meru City. The projects proposed in the feasibility study are provided below. The proposed projects were also based on the suggestions in the preliminary report as of April 1996, which will be described later.

#### 1) Design policy

The preliminary design will aim at a system that enables easy maintenance and simple supply system. The intake weir will be constructed on Mt. Kenya to collect raw water of high quality and thus the weir could reduce water treatment frequency. The gravity flow system is a basic principle. The water treatment plant will adopt a system that can be maintained and managed easily without using excessive chemicals or electrical power.

#### 2) Intake weir and water transmission pipe

The intake weir will be designed so that it can be maintained easily to prevent the intrusion of sediment and floating materials. The intake weir and the upper-stream portion of the conduit will be constructed in a deep canyon, and therefore access to the

work site and working conditions will be severe. A steel pipe with a diameter of 50 cm will be used for the water transmission pipe, and water will flow at a velocity that will not allow deposits to remain inside the pipe.

3) Water treatment plant

The water treatment plant will have a capacity of 10,000 m<sup>3</sup>/day. The facility will be composed of a receiving well, sedimentation tank, chlorination facility, reservoir, and office building.

4) Water supply and distribution facility

The pipeline will be designed so that it can meet the demand in 2010. The total length of the water distribution pipe will be 61 km, based on the assumption that 46 km of piping will be distributed to individual households by the Ministry of Water Resources Development.

5) Repair plan and leakage protection plan

Understanding that the maintenance of the new improved system is more important than the construction of new facilities, the following expenses will be included in the project cost.

- 1) Replacement of valves and valve meters
- 2) Repair or replacement of existing household meters
- 3) Water leak prevention facilities and their transportation

Present status

The Government of Japan will assist the projects proposed in the water supply plan for Meru City by gratuitous aid. The conditions of this assistance, based on the proposals in the development studies, are:

- 1) A metering system will be implemented completely.
- 2) A non-revenue water reduction program will be initiated.
- 3) Aid from the government or a third nation will be provided in the fields of non-revenue water reduction, organizational improvement, construction management, and other related areas.

The Government of Japan requested for the Government of Kenya to implement the above three. These conditions come from this development study, stating that it is essential for the success in these proposed projects to lower the ratio of non-revenue water, improve financial conditions, improve the accounting method, and review the rate collecting system every year.

No improvement actions for these three items were taken by Kenyan side for a period of time after the submission of the final report. However, commencement of action has been recently recognized. The basic designs for the projects proposed in the feasibility study, therefore, are now (Nov. 2000) in the process by the Japanese

consultants. The designs are planned to be completed by Jan. 2001. Detailed design and construction of sewage treatment facilities will be implemented thereafter.

## **(2)Monitoring by PDM**

### 1. Objectives of the superior plans

The superior plan offers:

- 1) to implement a safe and stable water supply to cities with population over 5000 and all prefectures in the country by the year 2000.
- 2) to provide sewage treatment facilities for these areas by the year 2010. Based on this plan, the JICA F/S aims to prepare a water supply plan for Meru County. The implementation of the plans proposed in the F/S would result in solution of the water supply shortage for Meru County by implementing the proposals in the feasibility study.

### 2. Objectives

- 1) to establish a master plan for water supply systems in six cities and one area in the Eastern Prefecture of Kenya with the target completion year 2010.
- 2) to implement feasibility studies with the target completion year 2005 in an area selected among the whole areas of the master plan of 185 km<sup>2</sup> as a target region having necessity of urgently improving the water supply systems.

### 3. Input

The Government of Japan will dispatch a survey team (59 MM of experts). The Government of Kenya will organize a counterpart team, mainly consisting of the Ministry of Water Resource Development. Furthermore, a steering committee will be established composed of representatives of the Ministry of Finance, Ministry of Local Autonomy, Ministry of Health, Ministry of Environment and Natural Resources, Ministry of Land and Settlement, Ministry of Land Development, Local Areas, and Water Resources to promote coordination among these ministries and agencies.

### 4. Activities

Activities for preparation of the master plan are:

- 1) Demand forecast
- 2) Study of the present status of water resources and water supply methods
- 3) Water quality analysis and examination of water treatment methods
- 4) Installation plans for the water transmission pipe, water treatment plant, distribution tank, treated water transmission pipe, etc.
- 5) Cost estimation
- 6) Selection of a target area to implement the feasibility studies

Activities for preparation of the feasibility study are:

- 1) Demand forecast
- 2) Water supply facilities  
Intake weir and water transmission pipe  
Water treatment facility: Receiving well, sedimentation tank, chlorinating facility, reservoir, etc.

Water supply and distribution facilities

- 3) Cost estimation and construction plan
- 4) Organization and management
- 5) Environmental impacts evaluation
- 6) Economic and financial analysis

The preliminary report in April 1996 suggested:

- 1) Offer an action program having the target implementation of the year 2000, with assumption of the implementation by grant aid.
- 2) Prepare facility plans as maintenance-free as possible by utilizing the experience and suitable technologies at the site.
- 3) Provide a water supply system and financial management that enable rational and fair rate collection from the standpoint of the users.
- 4) There is a mixture of cities and villages in the relevant areas. Much of the population is concentrated on the boundaries between urban districts and rural districts. They are ineligible for water supply services from urban districts or rural districts since they are on the borderline. A pilot project will be implemented to cover such areas under close cooperation with local NGOs and the birth control promotion project implemented by the Health Care Cooperation Department of JICA.
- 5) Since too much load is imposed on the existing water treatment facility in Meru City, a pilot treatment facility will be examined using a simplified method. Improvement measures will be proposed to Kenyan C/P.
- 6) Measures will be taken to implement projects as soon as possible through grant aid upon the completion of this JICA study. In addition, pilot projects and monitoring of the trial construction will be implemented through full liaisons with the Kenyan Office of JICA, dispatched experts, and members of the Youth for Overseas Cooperation, among others, to verify the sustainability of projects.
- 7) The water supply areas are presently located at the bases of Mt. Kenya and Mt. Nyanben, therefore, facilities that utilize geographical advantages will be constructed.
- 8) The water treatment plant facilities will be suitable to the local technological level.
- 9) The facilities will require minimal maintenance and management costs.

- 10) Facilities will be constructed using materials procured in Kenya. The C/P ideas of the design and sustainability of the facility shall be regarded as important.
- 11) Facilities that distinguish between drinking water, sewage, and drinking water for cattle will be provided in the installation of public taps.
- 12) Establishment of organizations that can be administrated by each community will be proposed.
- 13) Consultations will be conducted with the Ministry of Tourism and Wild Animals.
- 14) A plan to use materials that cannot be damaged by wild animals for the water transmission pipe from the intake weir to the water treatment plant will be established.
- 15) A water intake facility that enables water intake throughout the year will be planned in the Isiolo district, which is located in a semi-dry zone.
- 16) Considerations will be included in the preliminary design of facilities in the F/S to allow for future increases in the populations water supply.

## 5. Results

- 1) A master plan for water supplies in relevant areas will be prepared based on the demand forecast up to 2010, and the areas in which to perform feasibility studies will be selected.
- 2) A water supply plan, organization and management plan, and evaluation of environmental impacts will be prepared based on the demand forecast in the area of the feasibility studies (the Meru area).
- 3) The Kenyan C/P will improve the pertinent preparations with regard to the water supply plans through a transfer of technology.

## **7-2 Results of an evaluation study using the five evaluation items**

### **(1) Efficiency**

The unanimous opinions of the Kenyan counterpart and the Japanese development study implementation consultants were as follows. It can be said that the development study was implemented efficiently in overall.

- 1) This study was implemented in line with the scope of the S/W.
- 2) Positive participation by the Kenyan team was observed in the study.
- 3) Communications between the Japanese and Kenyan teams proceeded sufficiently smoothly during the period of the development study with no particular problems.
- 4) Reliable data was provided by the Kenyan team.
- 5) The Japanese implementation consultants held seminars and workshops during the period of the development study.

During an on-site survey in Nov. 2000, the counterpart stated that they had learned many things about the method and approach for the water supply plans in this development study. However, they pointed out the following problems:

- 7) Since the data analysis was performed in Japan, the Kenyan team had no opportunity to learn the process.
- 8) Some experts could not communicate in English, which hindered discussions.

## **(2) Objective Realization**

Proposals made in the construction plan (F/S) from of this development study were:

- 1) Construction cost: \$10 million
- 2) Organization and management such as non-revenue water reduction and its recording rate collection increase, staff training, leakage protection, repair of meters, and enhancement of quality control activities.
- 3) Environmental impacts: Restriction of traffic during construction work, arrangement of sewage treatment facilities

The unanimous opinions of the Kenyan counterpart and the Japanese development study implementation consultants were:

- 1) Development studies were implemented by fully considering the financial problems of the Kenyan implementation organization.
- 2) The current water rate is too low and must be raised. The current water rate only enables the recovery of maintenance and management costs and does not enable the recovery of investments in facilities. (This was the basis for constructing facilities using grant aid.)
- 3) The solvency of the inhabitants was also fully analyzed. Regional piping was proposed for those areas where the cost of water distribution to individual households cannot be borne.
- 4) The proposed projects generally met the inhabitants' needs.
- 5) The contents of the final report met the requests made by the Government of Kenya.

The Kenyan counterpart highly evaluated this development study since it fully considers the present status of the communities in the relevant areas, and in particular because it allows the inhabitants to participate in the implementation of projects.

## **(3) Impact**

As described previously, no improvement actions were taken by the Kenyan side to address the three points mentioned above for a period of time after the final report of the development study was submitted in Sept. 1997. However, since such actions have recently commenced, the basic designs for the projects proposed in the feasibility study



are now (Nov. 2000) in the process by Japanese consultants. The detailed design and construction of sewage treatment facilities are planned to be implemented from 2001.

Since the proposed projects have not yet been implemented, it is too early to examine the social and economic impacts of implementation.

#### **(4) Consistency**

This development study has consistency to the superior plans both during and after its implementation for the following reasons:

- 1) It was implemented as part of the Kenyan national water resource master plan prepared by JICA in 1992. Furthermore, the proposed projects will be incorporated into the national development plan after the completion of this study.
- 2) The proposed projects meet the current needs and the basic design is now in progress.

The Kenyan master plan of national water resource, as mentioned before, was prepared in 1992 based on the results of surveys performed by JICA. As described above, it proposed a water supply plan for household and industrial use by setting the objective of supplying safe water to the entire population by the year 2010. Specifically, it proposed to implement safe and stable water supply to cities with a population over 5000 and all prefectures in the country by 2000 and provide sewage treatment facilities for these areas by 2010.

The state of the water supply in the Eastern Prefecture lagged significantly behind this national target. For example, the water supply facility for Meru City at that time only met 20% of the demand and the existing water supply facility itself was obsolete. Isiolo city also used to have a shortage of water supply dry up due to dry up of the Isiolo River during the dry season. Therefore, a water supply plan in the Eastern Prefecture was urgently needed in order to meet the existing water supply demand. The implementation of this study was consistent to superior plans to solve the above issues.

#### **(5) Sustainability**

The basic design of the proposed facilities is in progress and has not yet been constructed. It is, therefore, too early to discuss the sustainability of this development study.

### **7-3 Summary and lessons**

This development study has the following features:

- 1) Studies were conducted in such a way that the investment capacity and management ability of the implementation organization on the Kenyan side were taken fully into consideration in designing the facilities to be constructed, and the inhabitants were allowed to participate in the planning stage.
- 2) Conditions were imposed on the gratuitous aid for implementation of projects.

The design policies with regard to item 1) above are :

- a) The preliminary design was aimed at a system that enables minimal maintenance and management and is simple in structure.
- b) The design included constructing an intake weir on Mt. Kenya to collect high-quality raw water and thus reduce the frequency of water treatment as much as possible.

This development study was implemented by taking into consideration of the 16 suggestions proposed in the preliminary report in April 1996. The Kenyan counterpart highly evaluated this development study, because the study considers the present status of the community in the relevant area, and it allows the inhabitants to participate in the implementation of projects.

The burdens of water charges at the current tariff accounted for 4.7% of a household expenditure with a lower income, 2.2% of that with a middle-income, and 1.4% of that with higher income. The water tariff set at 1.2% of the monthly income is appropriate, according to the World Bank. It will be necessary to set the water tariff at affordable level by users.

As described previously, gratuitous aid imposes conditions; a metering system will be completely implemented, a non-revenue water reduction program will be commenced, and other policies will be set.

In summary, the lessons listed below can be derived from this development study.

### **Importance of the study design in the preliminary study stage**

Proposals by the preliminary study shapes the scope and manner of the full-scale study. Careful studies from viewpoints of hardware and software are essential to implement proposals of the full-scale study.

### **Conditioning for gratuitous aid**

Conditioning seems to foster self-help efforts by the Kenyans. Two aspects are essential for cooperation from Japan: a response to the counterpart requests as well as transferring the policy of Japan clearly to the counterpart.

**CHAPTER 8 —KENYA:**  
**Malewa Dam Construction Plan (F/S plan)**

## **CHAPTER 8. KENYA: Malewa Dam Construction Plan (F/S plan)**

### **8-1. Outline of this JICA Study**

#### **(1) Necessity to implement this study, proposed projects, and their present status of implementation**

Background of the implementation of development studies

The Eastern area is located at the core of the main artery of Kenya, connecting Mombasa, Nairobi, Nakuru, and Kisumu, and had already undergone substantial population growth at the time of the development study. Nakuru City's population growth rate exceeds 10% every year due to the rapid inflow of inhabitants from rural areas. Demand for household water increased rapidly in that district under these circumstances, and there was concern about a future water shortage.

Therefore, in 1982 the Kenyan Ministry of Water Resources assigned the preparation of a water supply plan for the Greater Nakuru district by the year 2005 to Sir Alexander Gibb & Partner, a British consultant (hereafter referred to as Gibb ). In response to this request, Gibb established a water supply plan by dividing the Greater Nakuru district into three divisions (Eastern, Western, and Southern Baringo) and the periods into stages one, two, and three.

The Government of Kenya asked for loans from Japan to implement the plan of the stage one for the Eastern division. Subsequently, as a result of negotiations between the governments, Japan accepted the request from Kenya and decided to implement a feasibility study on the Malewa Dam. To execute the plan of the stage one for the Eastern division, the Government of Kenya implemented the Greater Nakuru Water Supply Project, Eastern Division, stage one, by a yen loan from OECF, and construction of a pipeline from the Trashe River to Nakuru City was commenced. Construction of the Malewa Dam was included in stage two. This plan is an F/S plan to assure and enhance the water supply to the three urban districts of Nakuru City, Girugiru Town, and Naibasha Town as well as the two agricultural districts of Girugiru and Eburu in the eastern area of Rift Valley Prefecture. The combination of these three urban districts and two agricultural villages is called the Greater Nakuru District.

An outline of the plan is:

Implementation period of the development study: Jan. 1989 to Nov. 1990

Counterpart: The Ministry of Water Development, National Water Conservation and Pipeline Corporation (NWPC)

Consultant in charge of development studies: Nippon Koei Co., Ltd., I.N.A. Co., Ltd.

Proposed projects

Specific projects were:

1) Malewa Dam

Type: Center core type rock-fill dam

Crest elevation: EL. 2,154 m  
Crest length: 360 m  
Crest width: 10 m

2) Malewa reservoir:

Reservoir capacity: 7.18 million m<sup>3</sup>

Catchment area: 635 km<sup>2</sup>

Normal water level: EL. 2,149 m

Minimum water level: EL. 2,123 m

Flood elevation: EL. 2,151 m

- 3) A tunnel with a length of 2,400 m between the Malewa reservoir and the Trashe River
- 4) Intake facilities including an intake on the Trashe river
- 5) Water supply facilities (water transmission pipe, water treatment plant, Nakuru/Naivasha treated water transmission pipe, Girugiru/Eburu water supply facilities for agricultural villages, Baruku water supply facility)

#### Present status

Following the completion of the development studies, campaigns against the construction of Malewa Dam were launched by environmental protection groups and others, and the Government of Kenya halted implementation of this project.

## **(2) Monitoring by PDM**

### 1. Objectives of the superior plans

The sixth five-year plan of Kenya at that time (1989 to 1993) set the objective of supplying water to 61% of the population by 1993. Specifically, it intended to supply water to 95% of the 5.6 million people in urban districts and to 50% of the 21.6 million people in agricultural villages. To achieve this objective, the government planned to invest 950 million Kenyan shillings in the water supply/electric power sector during this five-year plan. The Greater Nakuru District water supply plan and the Malewa Dam construction plan were established as a part of this plan. It was expected that the water supply shortage in the Nakuru district would be resolved by implementation of the proposals in the feasibility study.

### 2. Objectives

The following three objectives were established:

- 1) Implement a feasibility study on the construction of a dam in the Malewa basin as part of the Greater Nakuru District water supply plan.
- 2) Determine the optimal size of the Malewa Dam and distribution of reservoir capacities.
- 3) Teach the Kenyan team dam construction methods through a transfer of technology

### 3. Input

The Government of Japan will dispatch a survey team (72 MM of experts). Equipment and materials required for a topographic survey, boring survey, etc. will also be included.

### 4. Activities

Activities will be divided into the dam plan and hydrological survey.

The dam plan is described below.

- 1) Survey of the water supply demand
- 2) Preparation of topographical maps, including areas around the dam site as well as reservoirs
- 3) Geological survey: A rough survey will be implemented based on a 1/2000 topographic map to examine the geology of the reservoir and its peripheral areas, and a topographical map will then be prepared. Trenches will be excavated around the dam as required to prepare a geological map and geological section.
- 4) Boring survey: Mechanical boring will be performed to examine the rock formation. Permeability tests will be conducted together with boring excavation.
- 5) Laboratory tests: Physical and mechanical tests will be conducted on the materials collected in the boring and topographic surveys.
- 6) Core material survey
- 7) Core material test

The following will then be conducted in the hydrological surveys:

- 1) Water supply plan: Water demand forecast, examination of safe yield, examination of normal flow, etc.
- 2) Flood control plan: Flood analysis based on the monitoring result of flood flow and preparation of a rain flow conversion model
- 3) Environmental impact assessment: A simple model to assess the impacts of dam construction on Lake Naivasha and Lake Nakuru will be prepared to estimate the decrease of the water level, deterioration of salinity and water quality. Feasible measures will be proposed according to the necessity.
- 4) Determination of the appropriate dam size: The appropriate size for the dam will be proposed by considering the water demand forecast, examination of safe yield, examination of normal flow, and construction cost.  
Thus, an environmental impact assessment and proposal of countermeasures were required.

### 5. Resultse

The expected results would be:

- 1) To obtain knowledge regarding the geological/topological conditions around the dam site

- 2) To verify the feasibility of the Malewa Dam and its assumptions to make it feasible
- 3) To transfer to Kenyan side technology of assessing the geological/topological conditions required for preparing dam construction plans

#### 6. Assumptions

As described above, it was predicted by the preliminary study in 1986 that construction of the Malewa Dam may cause problems such as a drop in the water level in Lake Naivasha and a rise in the water level and contamination of Lake Nakuru. This JICA study describes more details about impacts on the Lake Naivasha.

- 1) Many intake facilities will become inoperable for a lengthy period if the water level lowers to EL. 1880 m. This will significantly damage vegetation.
- 2) The bottom of the lake between the Crescent Peninsula and the east coast of the lake is at EL. 1,881 m. If the water level of the lake drops to EL. 1880 m, the lake bottom will be exposed and the lake surface will be divided between the Crescent Peninsula and the east coast. This area is a sightseeing spot, so dredging of the lake will be required to secure transportation on this lake.
- 3) Though quantitative assessment is difficult in the present stage, it is inevitable that a decreased water volume and lake area will adversely influence the ecosystem of aquatic animals and plants and the value of the lake as a tourist attraction.

This report proposes that the minimum water level of the lake not be allowed to become lower than EL. 1883 m to prevent such influences. It is expected that the following results will be realized by constraining the water level:

- 1) The water level of the lake at E.L. 1883 m will not present any particular hindrance to the existing intake facilities.
- 2) Division of Crescent Bay can be prevented.
- 3) Because there will be no particular change in water quality, lake water can be used for irrigation without any problem.

This report makes the following statements with regard to the rise in water level and contamination of Lake Nakuru and proposes the discharge of treated water to another basin:

- 1) A rise in the water level of the lake will result in substantial immersion of the south end of Nakuru City, roads around the lake, and the pasture on the southern edge of the lake. This pasture is an important food resource for wild animals, and its immersion will greatly influence the survival of wild animals in the National Park.
- 2) The density of the lake water salinity will decrease significantly, resulting in substantial changes in the environment of aquatic organisms. It will also greatly influence the existing flamingo habitat.

## **8-2 Results of the evaluation study using the five evaluation items**

### **(1) Efficiency**

The unanimous opinions of the Kenyan counterpart and the Japanese development study implementation consultants are listed below. It can be stated that the development study was implemented efficiently for the most part.

- 1) This study was implemented in line with the scope of the S/W.
- 2) Positive participation in the study by the Kenyan team was observed.
- 3) During the period of the development study, communication between the Japanese side and the Kenyan team was generally smooth with no particular problems.
- 4) Reliable data was provided by the Kenyan team.

The counterpart stated during the site survey in Nov. 2000 that they had learned many things about environmental impact evaluations in this development study.

### **(2) Objective realization**

The proposed projects are:

Construction cost: \$244 million

Operation and management: NWCPC

Environmental impacts: Installation of a monitoring organization consisting of a governmental liaison committee and others was proposed.

The implementation consultant on the Japanese side stated :

- 1) The investment plan was prepared in careful consideration of the budgets of the implementation organizations on the Kenyan side.
- 2) The water rates were set by fully considering the recovery of investments by the implementation organization on the Kenyan side as well as the affordability of the inhabitants.

However, the Kenyan counterpart indicated that sufficient considerations were not given to item (1) above. In addition, studies into a decision-making system involving the participation of inhabitants were not included in the S/W, and therefore were not considered in this development study.

### **(3) Impact**

As described previously, the Government of Kenya halted implementation of this project because it may cause environmental destruction. However, the development study on the sewage treatment facility in Nakuru City was implemented in 1994 as an environmental protection measure in connection with the Greater Nakuru Water Supply



Project, Eastern Division, stage one, and the construction of this facility by gratuitous aid was implemented during 1995 to 1997. In addition, the Kenyan government proceeded with a F/S for the Nakuru Water Supply Project based on the development of ground water in the period from the year 1996 to 1998.

#### **(4) Consistency**

The basic concept of Malewa River Dam is to utilize a combination of the surface waters of the Malewa River and Trashe River. When the flow quantity of the Trashe River drops below the water supply demand, the water of the Malewa reservoir will be discharged to the Trashe River. Since both the Malewa River and Trashe River flow into Lake Naivasha, it was predicted from the outset that the water level of Lake Naivasha would lower after construction of the Malewa Dam. Furthermore, the water carried from both rivers and used in Nakuru City will be discharged to Lake Nakuru. There was some concern that the lake may be contaminated with such waste water since there no river flows out of that lake. However, according to a statement from the counterpart in Nov. 2000, construction of the Malewa Dam is considered to be the most effective way to cope with the increase in the water supply demand in Nakuru City since the Malewa River has a large volume of water and the proposed dam would be located closer to Nakuru City than would the other candidate locations. The final report of this development study also stated that Water of the Malewa River is the only precious resource that is suitable for the objective of this project both in terms of quality and volume (page 5).

In addition, 38% of the citizens of Nakuru City expressed concerns at that time that the existing water supply in the city may cause problems for public health and sanitation. It was expected that the water supply volume would become stable if the proposals of this development study were implemented, and as a result of improved water quality, the occurrence of epidemics would be prevented due to the use of fluorine. The water supply was insufficient both in terms of volume and quality, particularly in agricultural villages, and therefore significant effects of the implementation of the proposals were expected.

In this connection, the Malewa Dam construction plan met the local needs accurately during the implementation of the development study. Since the Government of Kenya halted the construction of Malewa Dam after completion of the development study, this plan was not incorporated in the five-year plan or any regional development plan in Kenya. However, the environmental impact assessment (EIA) implemented during this development study was later used in seminars. It is considered meaningful that this EIA was provided to the Kenyan side and led to abandonment of the plan to construct Malewa Dam from the standpoint of environmental protection.

## **(5) Sustainability**

Though the proposals of this development study are not yet implemented, the counterpart stated that the proposals were conveyed to the following organizations and utilized there effectively:

- 1) Ministry of Environment and Natural resources
- 2) Ministry of Local Government
- 3) Kenya Wildlife Service
- 4) Nakuru Municipal Council
- 5) Naivasha Municipal Council

## **8-3 Summary and lessons**

The implementation of this development study does not demonstrate any issue in efficiency, objective realization, and consistency. It may have been a problem that this development study was implemented in response to the strong will of the Government of Kenya, even though it had been predicted in the preliminary report in 1986 that the construction of Malewa Dam would cause problems: the lowering of the water level of Lake Naivasha and a rise in the water level and contamination of Lake Nakuru. The Government of Kenya gives a higher priority to meeting the increasing demand for water supply in Nakuru City.

The counterpart stated during the on-site survey in Nov. 2000 that although they had predicted environmental impacts before implementation of the study, they had not been able to quantify the degree of such impacts. There was less awareness of environmental protection in 1989, when the study was started, which we consider could have also have been a factor in allowing implementation of the study.

Construction of Malewa Dam at that time was a project that demanded a choice between two alternatives--development or environment. Construction may have destroyed the existing environment of both lakes, but its suspension would hinder the development of Nakuru City, which could have generated remarkable economic growth and an increase in population. In response to the result of this development study, the Government of Kenya selected to conserve the environment. As a result, some enterprises and industries in Nakuru City moved to other locations.

In summary, we can learn the lessons described below from this development study.

### **Flexibility in changing the decision to implement a development study after the project has been adopted**

One significant factor that led to the abandonment of this proposal is that the Kenyan side strongly favored the implementation of the dam construction plan despite the prediction in the preliminary report that the construction of Malewa Dam would cause problems, such as lowering the water level of Lake Naivasha and a rise in the water and contamination levels of Lake Nakuru.

However, the Japanese side must also be flexible in regard to reviewing the proposal once any negative impact has been confirmed.

**Implementation of development studies in terms of urbanization and environmental protection**

As described above, Lake Nakuru is a saline lake into which waste and sewage water of Nakuru City flows. This lake is also a world-famous flamingo habitat. However, according to the survey in Nakuru City at the time of the development study, 38% of the citizens believed that the existing water supply in that city may cause problems to public health and sanitation. It was expected that the water supply volume would become stable if the proposals out of this development study were implemented and that as a result of improved water quality, the occurrence of epidemics would be prevented due to the use of fluorine. Thus, a development study in terms of urbanization and environmental protection should be carefully implemented, meeting the increase in water demand due population growth with systems, for example, to reuse waste water and circulate water.

**CHAPTER 9 —KENYA:**

**Water Supply Reinforcement Plan for the Mombasa District (F/S Plan)**

## **CHAPTER 9.—KENYA: Water Supply Reinforcement Plan for the Mombasa District (F/S Plan)**

### **9-1. Outline of this JICA study**

#### **(1)Necessity to implement this study, proposed projects, and their present status of implementation**

Background of the implementation of development studies

The primary objective of the fourth national development plan in the Republic of Kenya (1979 to 1983) was the mitigation of poverty. The stabilization and reinforcement of the water supply was important to realize this objective. Then, Mombasa city obtained the water supply from nearby springs, including Mzima Springs, as well as the Sabaki River to the north of the city. Mombasa city, however, suffered so severely from a shortage of water that it imposed a daily 12-hour water supply restriction. Furthermore, because that city is the center of transports, foreign trade, manufacturing industries, and the tourist industry, an increased demand for water supply in the future was expected. The tourist industry in particular was concerned; it was predicted that the number of tourists who used hotels at the time of the development study would redouble by the year 2000. Therefore, implementation of a water supply plan that could meet the demand for water in that city was urgently needed.

In this connection, the Government of Kenya asked the Government of Japan to prepare a water supply plan for the Mombasa district.

The purpose of this JICA study was to proceed with a feasibility study to reinforce the water supply by prospecting the water demand up to the year 2000 in an area that included Mombasa City, seven local small and medium-sized towns, and an agricultural village (an area with boundaries at the Sabaki river to the north, coastal area at the east, Tanzania to the south, and Tsavo National Park to the southwest).

Period of the implementation of development studies: Feb. 1980 to Sept. 1981

Counterpart: Ministry of Water Development (MOWD)

Consultant in charge of development studies:Nippon Koei Co., Ltd., Japan Water Supply Consultant

Proposed project

No. 2 Mujima pipeline and Tsavo reservoir plan (Max. water supply volume: 1.2 m<sup>3</sup>, hereafter referred to as the No. 2 Mujima plan )

Wachi pipeline and Lale reservoir plan (Max. water supply volume: 2.5 m<sup>3</sup>, hereafter referred to as the Lale plan )

Muwati pipeline and Muwati reservoir plan (Max. water supply volume: 3.0 m<sup>3</sup>, hereafter referred to as the Muwati plan )

Of the above, studies for the Muwati plan had to be suspended because it was found that most of the hydrologic data was unreliable. The actual projects proposed in the No. 2 Mujima plan and the Lale plan are :

## No. 2 Mujima plan

This plan is a combination of the pipeline from the Mujima spring to Mombasa with a length of 219 km, the Tsavo dam and reservoir constructed on the Tsavo River. The purpose of this reservoir is to guarantee flow quantity of water drawn from the Mujima spring, to assure the water quantity in the Sabaki pipeline in the lower stream of the Sabaki River and to maintain the ecosystem and environment in the lower stream area of the Tsavo dam. The actual projects proposed were:

Dam and reservoir

Expansion of the intake

Pipeline to Mombasa (219 km)

Spring intake facility (600-mm overflow pipe)

Treated water transmission pipe (Pipe aperture: 1,000 mm to 1,3000 mm)

Pressure-reducing valve

Branch water transmission pipe:

- (1) Pipe with a length of 40 km and diameter of 300 mm from the dam water distribution reservoir to the Banga area
- (2) Pipe with a length of 3 km and diameter of 350 mm from the Mujima pipeline to the Mariakani area
- (3) Pipe with a length of 17 km and diameter of 500 mm from the Mazeras reservoir to the Changam water distribution reservoir
- (4) Pipe with a length of 17 km and diameter of 400 mm from the Marere pipeline to the Kayabon water distribution reservoir

Lale plan:

This is a combination plan for the reservoir on the Lale River. Water of the Sabaki River is introduced to this reservoir during the wet season and is stored and supplied under controlled conditions. The actual projects proposed were:

Intake facility on the Sabaki River

Water canal from the Lale reservoir

Dam on the Lale River

Construction of pipeline from the reservoir to Mombasa (70 km)

Intake facility on the reservoir

Raw water intake facility

Head-neck work and installation of three pumps (first phase, first stage)

Other pumps (in three stages)

Raw water transmission pipe (Pipe with an aperture of 1,500 mm)

Water treatment plant

Water pump station

Treated water transmission pipe

Implementation of these proposed projects are expected to allow a daily 24-hour water supply and to meet the future demand.

#### Present status

The projects proposed out of this development study had not been implemented as of Nov. 2000 because the quotation for the project (\$420 million) was too large for the Government of Kenya to invest in a single project at that time.

Bidding was subsequently reopened in 1992 with loans from the World Bank for a consultant service to prepare an F/S and D/D on the Mombasa water supply plan, including the No. 2 Mujima pipeline plan. Italian consultants received the order in 1994. These consultants implemented an F/S and D/D from 1996 to 1998 (the amount of investment in the proposed project was \$220 million). During an on-site survey in Nov. 2000, the counterpart stated that they will implement that plan as soon as funds have been procured.

## **(2) Monitoring by PDM**

### 1. Upper-order objectives

Mombasa City began developing rapidly as a tourist city around 1980. The introduction of foreign tourists was an important means for Kenya to obtain foreign currencies, and therefore construction of additional tourist facilities in that city was urgently needed. However, there was a water supply shortage at that time and hours of restricted water supply were set. There was concern that tourist development may be restricted by this shortage of water supply and that the water supply volume would be unable to accommodate any future increase in population.

Therefore, expansion of the water supply and sewage facilities to meet the future demands for water was adopted as a national policy. This development study was aimed at preparing a water supply plan for the area bordered by the Sabaki river to the north, coastal area to the east, Tanzania to the south, and Tsavo National Park to the southwest. It was expected that the water supply shortage in the Mombasa district would be resolved by implementing the proposals in the feasibility study.

### 2. Objectives

The objectives were as follows:

- 1) To accurately estimate the water demand up to the year 2000 for the vast Mombasa-Coastal area and implement feasibility studies on water resource development to meet such demand
- 2) The demand is expected to exceed the supply after 1985 even if replenishment of water from the Sabaki system was continued. Therefore, the objective was to establish the optimal medium-term water supply plan and implement feasibility studies on that project.

- 3) To transfer the techniques required for preparing water supply plans to the counterpart

### 3. Input

The Japanese side will dispatch a survey team (11 MM experts including foreign experts from Norway, Sweden, etc.).

### 4. Activities

On-site surveys divided into Parts 1 and 2 will be implemented. Survey items are listed below.

#### Part 1

- Collect, arrange, and analyze existing data about natural conditions (hydrological, meteorological, topological, and geological).
- Survey existing water-related facilities in the relevant area of the project.
- Survey individual industrial fields for a future forecast on the relevant area.
- Establish water supply districts and estimate the water supply demand.
- Survey the water resources that can be developed for the relevant area and measure the water volume planned to be developed.
- Conduct social, economic, and environmental surveys.
- Assign priority to alternative projects.

#### Part 2

In Part 2, a feasibility study will be implemented on the most promising project among the medium-term water supply reinforcement plans after 1985.

- Estimate the water volume that can be developed from the Mujima water resource  
Provide plans for water supply facilities.
- Determine seasonal variations of construction materials, their quality and volume.
- Prepare project implementation plan, fund plan, and economic assessment.
- Present maintenance and management policies in the operation stage.

### 5. Results

- 1) The present status of the water supply and sanitary facilities in the relevant area will be understood and a water supply plan will be prepared based on the demand forecast.
- 2) The feasibility and its assumptions will be clarified.
- 3) Techniques required for preparing water supply plans will be transferred to the Kenyan side.



## 6. Assumption

A financial analysis on the No. 2 Mijima plan and Lale plan indicated that a huge amount of debt will be accumulated for a long period in both plans. Therefore, a heavy financial burden from implementation must be considered regardless of which plan is adopted. This development study set the following propositions for the project proposed: If the amount of investment relies on foreign aid, low-interest and long-term loans should be sought due to the substantial construction cost. The huge amount of debt that is expected to accumulate in the Coastal Water Supply Office, the implementation organization for this project, must also be borne by beneficiaries through the government.

## 9-2 Results of the evaluation study using the five evaluation items

### (1) Efficiency

According to the Kenyan counterpart, the development study was implemented efficiently for the most part.

- 1) This study was implemented in line with the scope of the S/W.
- 2) Positive participation by the Kenyan team in the study was observed.
- 3) Reliable data was provided by the Kenyan team.

However, during the on-site survey in Nov. 2000, the Kenyan team expressed dissatisfaction due to their missed opportunity to learn data analysis.

### (2) Objective realization

Construction plans are:

Construction cost: No. 2 Mujima plan, \$421 million; Lale plan, \$452 million.

Implementation organization:

The Ministry of Water Resource Development and the Coastal Water Supply Office are in charge of design, construction, maintenance and management.

The Kenyan counterpart evaluated this development study as follows.

- 1) The affordability of the local inhabitants was comprehensively analyzed.
- 2) The project proposed meets most of the needs of the inhabitants.
- 3) The contents of the final report satisfy the requirements of the Kenyan side (during the on-site survey in Nov. 2000).

### (3) Impact

As described previously, bidding was opened again with loans from the World Bank for a consultant service to prepare an F/S and D/D on the water supply plan for the Mombasa district, including the No. 2 Mujima pipeline plan. Italian consultants

received the order in 1994. The consultants implemented the F/S and D/D during 1996 to 1998 (the amount of investment in the proposed project was \$220 million). During an on-site survey in Nov. 2000, the Kenyan counterpart stated that they will implement that plan as soon as funds had been procured. In this connection, since the proposals from this development study are not yet implemented, it is too early to discuss their impacts.

#### **(4) Consistency**

According to statistics from the W.H.O., Kenya had a high incidence of infectious diseases, such as malaria, and a high mortality rate for infants due to enteritis, diarrhea, etc. around 1980 due to poor sanitary conditions for the population. Poor water quality accounted for a large portion of the causes of these diseases. Therefore, the Government of Kenya adopted the improvement of health conditions for the population and improvement of water supply conditions as priority policies and gave the Ministry of Water Resource Development independence. In addition, stabilization and reinforcement of the water supply was adopted as an important item in the fourth national development plan (1979 to 1983). This plan was also prepared to achieve stabilization and reinforcement of the water supply, and corresponded to the policy of the Government of Kenya at the time of implementation of the development study. The Kenyan counterpart presently indicates that they would like to implement this plan as soon as fund procurement has been determined.

#### **(5) Sustainability**

Though the proposal from this development study is not yet implemented, the counterpart highly evaluated this development study as it developed into a study under loans from the World Bank (during the on-site survey in Nov. 2000). In addition, the counterpart stated that the proposals out of this development study were redirected to, among others, the Ministry of Environment and Natural Resources, NWCCP, the Ministry of Local Government, Kenya Wildlife Service, and the Mombasa Municipal Council and were utilized there effectively.

### **9-3 Summary and lessons**

Though the Water Supply Reinforcement Plan for the Mombasa District was given the highest priority in terms of local needs, the investment amount of \$420 million for the proposed project was too much to invest in a single project, and it had not been implemented as of 2000. Even if ODA to Kenya in 1980, \$650 million, and foreign direct investment, \$57 million, are considered, the investment amount of \$420 million is considered too large for a single project.

Let us examine the investment and repayment ability of the implementation organization. The implementation organization for the Water Supply Reinforcement Plan for the Mombasa District is the NWCPC. The NWCPC currently supplies water to 4 million people in 43 districts including the Mombasa district. The NWCPC is currently the only public water supply corporation. Although its investment budget depends on expenditures from the central government, it aims to be a self-supporting account for which the investment and maintenance costs could be recovered by the revenues.

1) A constantly large deficit

The NWCPC has had financial deficits for three consecutive years. In 1998/99 (July 1998 to June 1999), there were annual revenues of KSHS 1,002 million as the sum of the income from water rates of KSHS 967 million, governmental subsidies and other funds of KSHS 14 million. However, the cost was KSHS 1,175, resulting in an ordinary loss of KSHS 173 million. Such loss is as large as 15% of the annual revenues. In addition, NWCPC obtained large deficits, such as KSHS 388 million (37% of the revenues) in 1997/98 and KSHS 269 million (26% of the revenues) in 1996/97.

2) Causes of the deficit are low water rates and high depreciation

It is considered that the causes of the deficit are low water rates and high depreciation. The NWCPC holds the same opinion (Dec. 2000, consultation with the NWCPC Chief Finance Manager).

**Low water tariff**

The turnover of total assets, which represents the income of water rates per total assets, can be obtained by:

$$\text{KSHA } 966 \text{ million} / \text{KSHS } 15,879 \text{ million} = 0.06$$

The turnover of total assets of private enterprises listed in the First Section of the Tokyo Stock Exchange in Japan is 1.1 (average of 20 years from 1966 to 1985). Similarly, that of U.S. private enterprises with assets of 100 million dollars is 1.1 (average of 25 years from 1965 to 1989). The NWCPC figure of 0.06 is low. This is due to both the low income from water rates and too large assets. The water tariff is, however, restricted by the Ministry of Water Resource Development with no discretion to raise the rate allotted to the NWCPC.

The Central Water Authority (CWA), Mauritius, also has a low turnover of total assets, 0.08 in 2000 (July 1999 to June 2000). The counterpart stated during the on-site survey that the cause of such a low turnover lies in the low water tariff.

### **Large depreciation cost**

The excessive assets described above result in a large burden of depreciation. The depreciation of the NWCPC in 1998/99 was KSHS 418 million, which accounts for as much as 36% of the total cost. Even in Japanese steel-making enterprises, which require significant investments in plants and equipment, depreciation is 30% or less of the total cost.

In brief, the NWCPC does not collect water revenues enough to cover the investment cost due to restriction of tariff increase by regulation. Therefore, investments in the Water Supply Plan for Meru County, for example, must be implemented by gratuitous aid. From the long-term standpoint, it will become necessary to implement a development study to propose policies that include a review of water tariffs. The development study on the Water Supply Plan for Meru County also indicated that, The current water tariff is too low and will be revised. It is impossible to recover the investments with the current water tariff.

On the other hand, the Government of Kenya, possibly recognizing the inability to pay back the loan to invest to the water supply facilities, shoulders the loan. The item corresponding to fixed assets is not long-term debt but capital on the balance sheet of the NWCPC. It can be said that the NWCPC is exempt from any obligation to refund loans for investments in plants and equipment.

#### 3) Water charges receivable more than the annual revenue

The balance of water charges receivable as of June 1999 was KSHS 1,186 million, which corresponds to the revenue of more than 15 months.

$KSHS\ 1,186\ \text{million} / KSHS\ 966\ \text{million} = 1.23\ \text{years}\ (15\ \text{months})$

The situation with such a large accounts receivable suggests structural problems in management. Since accounting is performed on an accrual basis, recovery of the accounts receivable will have no effect on short-term profits and losses; the large margin of deficit will not be improved. However, cash flow will be improved, and it will improve the profit-loss over the long term as a decrease in the questionable debts decrease. According to the NWCPC, possible causes for the large amount of water rates receivable are:

- 1) The bill is delivered to each household immediately before the specified date of payment.
- 2) There are many errors in the amounts of the bill.
- 3) There are families with low income who cannot pay the water rates.

Of the above, 1) The bill is delivered to each household immediately before the specified date of payment and 2) There are many errors in the amount written on the bill are management problems.

In summary, the management problems in the NWCPC are:

- 1) The NWCPC is a public corporation, and therefore the government can impose many restrictions on the setting of tariffs, thus hindering independent management.
- 2) It is difficult to recover any investments with income at the current tariffs.
- 3) They lack incentives for efficient management, such as timely delivery of bills and reduction of non-revenue water.
- 4) Development of new water resources is necessary as the population increases. The income at the current water tariff brings losses. This deficit will increase with a new investment in the future.

In this connection, the following lessons are deduced:

### **Importance of examining the investing ability of the implementation organization**

It is important to take the following steps for each project:

- 1) Estimate the approximate amount of investment for the project in the stage of the preliminary report.
- 2) Decide whether the local implementation organization can finance or procure such an amount.

If the amount of investment for the project is not within a range that can be procured by the implementation organization, it is necessary to propose a reduced or alternate plan to the implementation organization in the initial stage of the development study.

### **Implementation of a development study to propose policies, including a review of water tariffs and improvement of managerial ability**

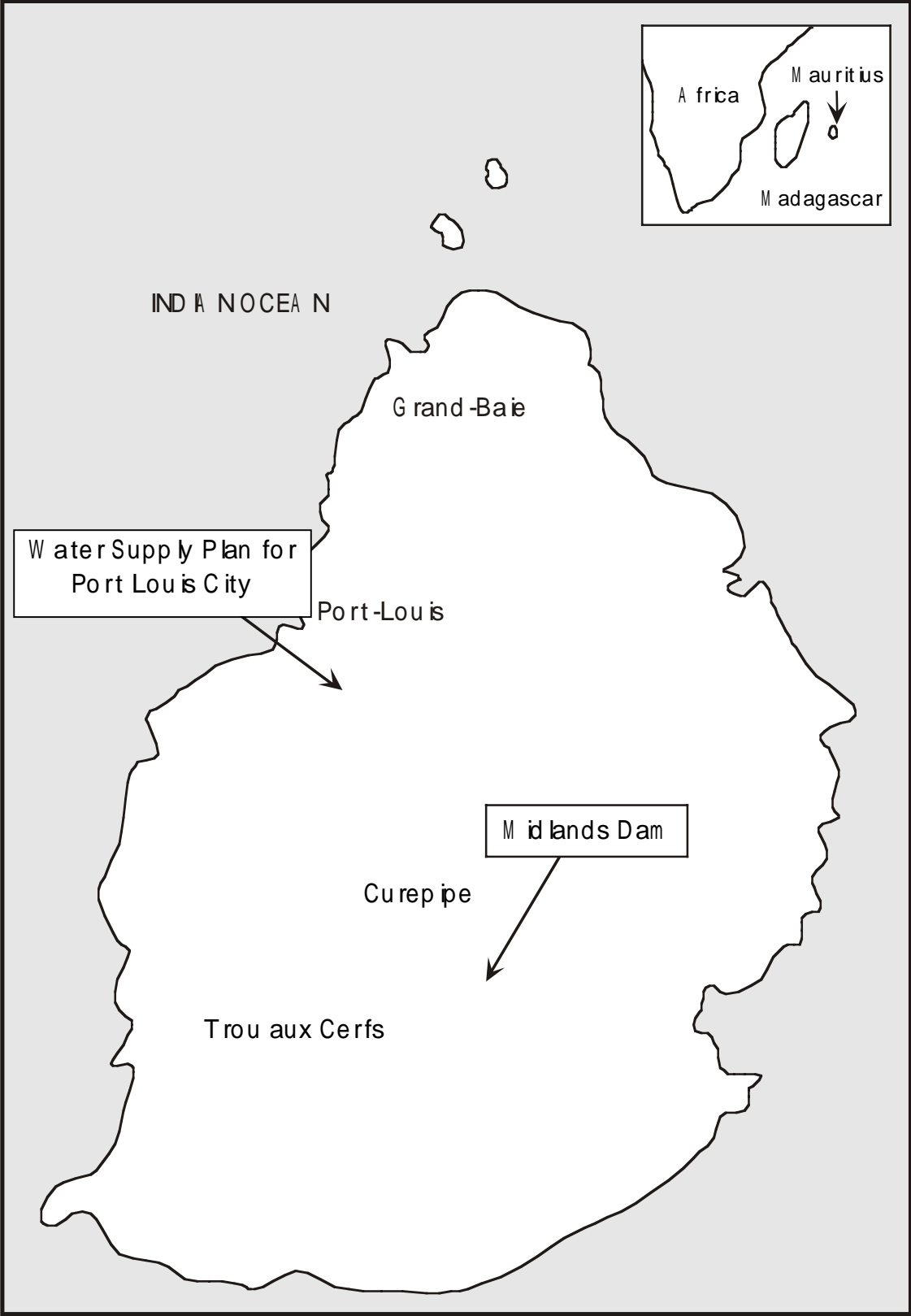
Enhancement of a new investment in a water supply with neglect of the management problems cited above will further aggravate financial conditions. The Japanese side can finance a part or whole of the investment cost but cannot fund maintenance costs. Improvements in the recovery of investments and enhanced managerial abilities on the side of the implementation organization are necessary for the sustainability of future water supply projects. Therefore, implementation of a development study to propose policies that include a review of water tariffs, recovery of investments, and improvements to managerial abilities will be required in Kenya in the future.

### **Further transfer of technologies**

During the survey held in Kenya in Nov. 2000, the counterpart requested that the technologies for the water supply plan be transferred continuously. However, they stated that since the data analysis was performed in Japan, they had little opportunity to learn it, and that it takes too long for the development study to be implemented.

**CHAPTER 10 —Mauritius (F/S, D/D):  
Water Supply Plan for Port Louis City**

Mauritius: Location of the Study Area



## **CHAPTER 10 —MAURITIUS: Water Supply Plan for Port Louis City (F/S, D/D)**

### **10-1. Outline of this JICA Study**

#### **(1) Necessity to implement this study, proposed projects, and their present status of implementation**

Background of the implementation of development studies

At the time of the development study, the water demand in Port Louis City was increasing steeply due to the rapid development of light industries and the accompanying increase in population. However, the existing water supply system exhibited the following problems.

- 1) Since the water transmission pipes are obsolete, the loss by leakage accounts for 40- 50% of the total water production.
- 2) The existing water source has seasonal fluctuations of water quantity, and the system has no reservoir function. Therefore it is difficult to secure a stable water supply throughout the year. A shortage in the water supply occurs in Port Louis City every year during the dry season from July to November.
- 3) The existing facility cannot treat highly turbid water properly due to limitation of treatment ability. Therefore, the water supply must often be suspended in the flood season as well.

To cope with these problems, the Government of Mauritius requested loans from the Africa Development Bank (AfDB) in 1983 to implement a dam construction plan. However, that request was denied due to problems such as the necessity for substantial funds and insufficient technical content. Therefore, the Government of Mauritius requested that the Government of Japan implement a feasibility study on that plan.

The objective of this development study is to prepare a water resource plan for the GRNW (Grand River North West) basin to improve the water supply for Port Louis City and meet the increase in water demand up to the year 2010. After several alternative development sites are prepared, the most suitable location will be selected from among from them. A feasibility study on the water supply plan at this location will be implemented.

Period of the implementation of development studies: Apr. 1988 to June 1989

Counterpart: Ministry of Energy, Water Resources and Postal Services

Consultant in charge of development studies: Nippon Koei Co., Ltd., Nissui Consultant Co., Ltd.

A detailed design will be prepared to implement the proposals from this feasibility



study.

Period of the implementation of development studies: Mar. 1990 to Mar. 1992

Counterpart: Central Water Authority (CWA)

Consultant in charge of development studies: Nippon Koei Co., Ltd., Nissui Consultant Co., Ltd.

#### Proposed projects

In the basic plan, six candidate locations for dam construction were selected and then compared and examined. Topographic and geological surveys were performed for each location and a rough design based on those surveys was used for comparisons from the standpoints of cost, technology, and economic and financial conditions. As a result, the TRO point was selected.

A feasibility study was implemented aiming at production of the necessary water volume at the minimum expense. The construction of a dam dedicated to the water supply was then proposed. The following projects were proposed:

- 1) The dam and its facilities: Flood discharge channel, diversion tunnels, intake, and discharge channel
- 2) Water transmission facility
- 3) Water treatment facility

The construction period was 46 months (approximately four years). Due to restrictions on fund procurement, it was proposed that the project be implemented by dividing it into three lots.

Lot 1 Preparation work for construction of the diversion tunnel

Lot 2 Dam and its facilities

Lot 3 Water transmission pipe and water treatment facility

To execute this proposal, the Government of Mauritius asked the Government of Japan to implement a detailed design. The detailed design was implemented on Lots 1, 2, and 3 above.

#### Present status

The project proposed from this development study and the detailed design had not been implemented as of Nov. 2000 for the following reasons.

- 1) The investment of \$107,000 for the proposed project was too large for the government to afford at that time.
- 2) The proposed project has a much higher cost of unit water production than that of the Midland Dam plan.

## **(2) Monitoring by PDM**

1. Objectives of the superior plans

The objective of this development study was to prepare a water resource plan for the GRNW (Grand River North West) basin to improve the water supply to Port Louis City and meet the increase in water demand up to the year 2010. It was pursued to achieve the following objectives through implementation of the plan:

- 1) Reduce the water leakage loss.
- 2) Secure a stable water volume throughout the year and eliminate the shortage of water during the dry season.
- 3) Improve the water treatment capacity of the treatment facility so that highly turbid water could be treated properly.

## 2. Objectives

The objectives were as follows.

- 1) Prepare several alternative dam development points and then select the most suitable point among them.
- 2) Implement a feasibility study on the water supply plant at this most suitable point.
- 3) Implement a detailed design on the dam, water treatment facilities, etc. proposed from the feasibility study.
- 4) To transfer technologies for preparation of water supply plans to the Ministry of Energy, Water Resources, and Postal Services and the Central Water Authority as the counterpart through implementation of this development study

## 3. Input

The Japanese side would dispatch a survey team (67 MM of experts in the feasibility study and 134 MM of experts in the detailed design). In addition, surveying instruments, physical searching devices, and vehicles would be brought in.

## 4. Activities

The following surveys would be implemented as preliminary survey activities:

Existing water supply facilities

Water demand

Water resources

On-site surveys including topographic measurements and geological surveys

Selection of suitable locations

Surveys of the following would be implemented in the feasibility study:

On-site surveys including topographic measurements and geological surveys

Project planning

Estimation of cost and benefit

Economic and financial assessment

Project implementation schedule

Manpower plan

The detailed design is:

- Lot 1 Preparation work for construction of the diversion tunnel, etc.
- Lot 2 Dam and its apparatus
- Lot 3 Water transmission pipe and water treatment facility

## 5. Results

The following results could be expected:

- 1) Study of both the existing water supply system and the water demand in the future.
- 2) Selection of the most suitable location among from candidate dam construction sites by comparing them from the standpoints of cost, technology, and economic and financial conditions by means of a rough design based on topographic and geological surveys.
- 3) Verification of the feasibility of the water supply plan involving the dam, water treatment facility, etc.
- 4) Completion of the detailed design of the dam, water treatment facility, etc.
- 5) Transfer of the technologies necessary for preparing water supply plans to the Mauritius side.

## **10-2 Results of the evaluation study using the five evaluation items**

### **(1) Efficiency**

The unanimous opinions of the Mauritian counterpart and the Japanese development study implementation consultants are provided below. It can be said that the development study was implemented efficiently for the most part.

- 1) This study was implemented in line with the scope of the S/W.
- 2) Positive participation by the Mauritian team in the study was observed.
- 3) During the period of the development study, communication between the Japanese side and the Mauritian team progressed relatively smoothly with no particular problems.
- 4) Reliable data was provided by the Mauritian team.
- 5) The Japanese implementation consultant held seminars and workshops during the period of the development study.
- 6) During the on-site survey in Nov. 2000, the counterpart stated that transfer of technology was effected to some extent but that the technologies were not important ones.

### **(2) Objective realization**

Proposals made in the construction plan (D/D) from this development study are:

- 1) Construction cost: \$107 million
- 2) Organization and management: CWA (Central Water Authority); thereafter, water resource development involving the construction of the dam would be undertaken by the Government of Mauritius through the Ministry of Energy, Water Resources and Postal Services while water treatment and distribution to users would be managed by the CWA.

The unanimous opinions of the Mauritian counterpart and the Japanese development study implementation consultants were:

- 1) The proposed project would meet the needs of the inhabitants.
- 2) The contents of the final report met the requests made by the Government of Mauritius.

However, the Mauritian counterpart stated during the on-site survey held in Dec. 2000 that they cannot say that the financial affordability of the implementation organization was fully considered in this JICA study.

#### **(4) Impact**

As described previously, the project proposed in this development study and the detailed design had not been implemented as of Nov. 2000, so there has been no social or economic impacts from implementation.

#### **(4) Consistency**

The implementation of this development study was in line with the policy of the Government of Mauritius. However, since the Government of Mauritius decided not to implement the proposed project after completion of the development study, this plan was not incorporated into the five-year plan or any regional development plan in Mauritius. Two reasons are:

1. The amount of investment of \$107 million for the proposed project was too large to invest in a single project at that time
2. The proposed project had a much higher cost of unit water production than that of the Midland Dam plan.

The investment expenditure of the Mauritius Central Government in 1996 was \$150 million (Work Development Report 1998/1999, World Bank, \$151 million x 3.6% = \$150 million). The investment amount of \$107 million for the proposed project, therefore, was too large as investment in a single project, as stated before, Even if the ODA of \$17 million and direct investments of \$37 million in the same year are also

taken into consideration, it remains true that the investment amount of \$107 million is too high for a single project. Furthermore, the OECF had already provided a loan of 2 billion yen to the Government of Mauritius for investment in the landslide protection project, and the OECF informally stated at that time that it was difficult to offer an additional loan of 100 million dollars to a country with a small GNP.

With regard to reason 2, The proposed project had a much higher cost of unit water production, six (6) times of the cost in the Midland Dam Plan. ( $3.5/0.6 = 6$ ).

	A	B	C	D	E	F
	Annual water production	Dam construction cost	Annual depreciation	Annual maintenance	Total annual expenditures	Water production/m <sup>3</sup>
Unit	Million M <sup>3</sup>	Million Rs	Million Rs	Million Rs	Million Rs	Rs
Calculation manner			B x 1%	B x 1%	C + D	E/A
Project proposed in the JICA study	6.3	1100	11	11	22	3.5
Midland Dam	41.2	1300	13	13	26	0.6

The purpose of the Midland Dam plan, supplying water for households and irrigation use in the northern part of Mauritius, differs from that of this development study, supplying water to Port Louis. It is, therefore, difficult to unconditionally compare these projects. However, a six times difference in water production cost per m<sup>3</sup> is significant enough to cancel the implementation of the dam proposed in this JICA study.

As a matter of fact, the Government of Mauritius chose to construct the Midland Dam rather than the project proposed in this development study. The F/S for that plan was implemented during 1991 to 1993 and, through subsequent bidding, construction work was started in Dec. 1999. The total construction cost is \$60 million and the work is planned to be completed in Dec. 2002. The objectives of this work are:

- 1) Supply drinking water to inhabitants and tourists in the northern part of Mauritius.
- 2) Supply irrigation water to 4000 ha of farmland in the northern part of Mauritius

The \$60 million construction of the Midland Dam was financed:

- 1) Government of Mauritius: \$40 million
- 2) Kuwait Fund: \$10 million
- 3) Arab Bank for Economic Development in Africa (BADEA): \$10 million

The Government of Mauritius plans to supply water to Port Louis not by the Midland Dam but by the construction of the Bagatelle Dam (Rover Terre Rouge). The F/S for this construction is planned to be implemented in the future.

### **(5) Sustainability**

The proposed dam in this JICA study is not yet implemented, therefore, it is not possible to discuss the sustainability of this development study.

## **10-3 Summary and lessons**

The Water Supply Plan for Port Louis City was not yet implemented as of the year 2000. The reasons are, as described previously:

1. The amount of investment of \$107 million for the proposed project was too large to invest in a single project at that time.
2. The proposed project had a much higher cost of unit water production than that of the Midland Dam plan.

Summing up, the two lessons could be derived:

### **Importance of examining the investment affordability of the implementation organization**

As described in the section for the Water Supply Reinforcement Plan for the Mombasa District, Kenya, it is important to study the financial affordability to invest in the conceived project. If the amount of investment for the conceived project is not within a range that can be financed or procured by the implementation organization, it is necessary to propose a reduced or alternate plan to the implementation organization in the initial stage of the development study.

### **Full examinations in the initial stage of the development study involving alternative plans**

As described above, the objective of the development study for the Port Louis City Water Supply Plan was to prepare a water resource plan for the GRNW (Grand River North West) basin to improve the water supply for Port Louis City and meet the increase in demand for water supply up to 2010. Therefore, the implementation consultants for this development study were unable to offer a dam construction at a site other than GRNW. It will be necessary in the future to fully examine those alternative plans to determine the most suitable location.

## **CHAPTER 11 —PROPOSALS**

## CHAPTER 11 —PROPOSALS

### 11-1 Ports

#### **1) Creation of National Port Development Plan and Selection of Development and Management System of Port, which are Enable Public Good to be Compatible with Economic Efficiency**

In recent years, decentralization, privatization, and involvement of private sector are a trend in order to improve inefficiency of central government and lessen its financial deficit both in developed and developing countries. Hence, development/management of public facilities including port facilities has been affected by this trend. In Sri Lanka, involvement of private sector into development/management of national ports such as BOT are encouraged. In Indonesia, change of operation/management of ports is expected in accordance with decentralization of the central government. In a similar fashion, decentralization and privatization of port management are also being considered in the Philippines.

This trend is so significant in international container ports that they have to seek for economic efficiency to respond to international competition. In further regard to development of container ports, enormous investments in the development to accommodate larger container ships in recent years and government's financial difficulties results in introducing BOT.

As mentioned above, the body to develop and manage ports has been changed from public corporations under the central government to various development/management bodies under the influence of decentralization in order to increase efficiency of economy and human resource. As the result, development/management of each port is dealt separately, and then it is afraid that national shipping and port policy is hindered. Although reductions in employees are expected to achieve economic efficiency, it should be taken into account that public facilities including ports provide a large number of job opportunities. Since it is difficult to state unconditionally the best form of organization for port development and management, therefore, deep consideration must be given to the situation of each port.

Hence, it is getting important more than ever to create a nationwide port development strategy that supervises comprehensively different plans by various development/management bodies. Furthermore, an institutional analysis of development and management bodies in terms of their financial and personnel matters is necessary to create port development/operation/maintenance systems which are enable public good to be compatible with economic efficiency.



## **2) Introduction of Socio-economic Analysis of the Community nearby Project Sites to Promote Efficient Realization of Proposed Projects**

Considering the case of Batangas Port in the Philippines, the problem of resettling squatters arose at the time the proposed projects were implemented. As there had been numerous households of squatters at the project site at Indonesia's Semarang Port as well, it could be expected that this problem will affect project development in the future.

Although recipient countries should be responsible for the problem of resettling squatters, it would be desirable for smooth realization of proposed projects to conduct socio-economic survey to communities at or nearby project sites and to examine countermeasures/policy to the problem in development studies.

In developing countries, legal status of residence is often ambiguous due to unclear land tenure. Thus, socio-economic survey must cover not only those who hold land titles, but also the squatters. In particular, sites for port development are in shoreline, where many squatters lived in. Therefore, sufficient consideration of this fact is necessary.

## **11-2 Waterworks**

### **Regarding Implementation of New Development Studies**

#### **1) Implementation of Policy Proposal Study Including Rethinking of Water Rates and Improvement of Management Capabilities**

Putting aside the problems of the management of implementing organizations while pressing on with moves for new investment sometimes results in even greater management failures. Even when Japan is able to assist with the costs of investment, this aid cannot be extended to maintaining the costs of continuing management. Recovery of investments for implementing organizations and improvement of management capabilities is indispensable for the sustainability of future waterworks projects. Therefore, a study of policy proposals, including revision of water rates, recovery of investments, and improvement of management capabilities is proposed for implementation in Kenya.

#### **2) Implementation of a Development Study with a Theme of Urbanization and Environmental Preservation**

Conducting development studies with a theme of "Urbanization and Environmental Preservation" is a necessity for targeted areas such as Kenya's Nakuru region. With previous development studies predicting damage to the environment, it was found that creation of plans to eliminate insufficient water supplies accompanying urbanization--without damaging the environment--are needed. In concrete terms, one plan is to employ systems that use grey water, recovered water supplies, or other means of dealing with increased demand for water concurrent with population growth.

This study would be of significance not only to the Nakuru region, but to other regions facing the same sorts of problems.

## **Regarding Processes Prior to and During Development Studies**

### **1) Bringing Investigation of "Soft" Aspects into the Design in the Preliminary Study**

As mentioned in the evaluation for the Nakuru municipal water supply plan, the design of the study at the preliminary study stage determines the scope of the actual study. To carry out proposals covering certain aspects related to waterworks, it is necessary to fully examine the matter in terms of both the "hard" (physical) and "soft" (abstract) aspects. Accordingly, designing the actual study at the preliminary stage such that the "soft" aspects are sufficiently investigated is of great importance.

### **2) Obtaining Rough Estimates of Investment Costs and Views Regarding Ability of Local Implementing Organizations to Procure Funding**

As mentioned in the evaluations plans for buildup of water supplies in the Mombasa district and municipal water supplies in Port Louis, it was proposed that approximate costs of investment for anticipated projects and a clear idea of the ability of local implementing organizations to raise financing be investigated at the preliminary study stage. If the investments necessary for the proposed projects are not within the range of the implementing organizations' abilities to raise, it is then necessary to propose scaled-down or separate projects to the implementing organizations at the preliminary study stage.

### **3) Flexibility in Changing Policy for Implementation of Development Studies After Adoption of Proposals**

Regardless of the exacerbation of environmental problems predicted in the Malewa Dam preliminary report, the counterparts resolutely called for construction of the dam. It was also difficult for the Japanese group to overturn the outcome of the preliminary study after the decision to go ahead with the Malewa Dam construction development study was reached in project selection meetings. It is important that future decisions on implementation of projects be made in project selection meeting be subject to change later on if new information is discovered.

### **4) Even Further Transfer of Technology**

In hearings held in Kenya in November of 2000, the counterparts pointed out that in three cases, "since analysis of the data took place in Japan, the Kenya team had little opportunity to study it." Accordingly, JICA must make clear to consultants exactly what technology is to be transferred when tendering bids for actual studies.