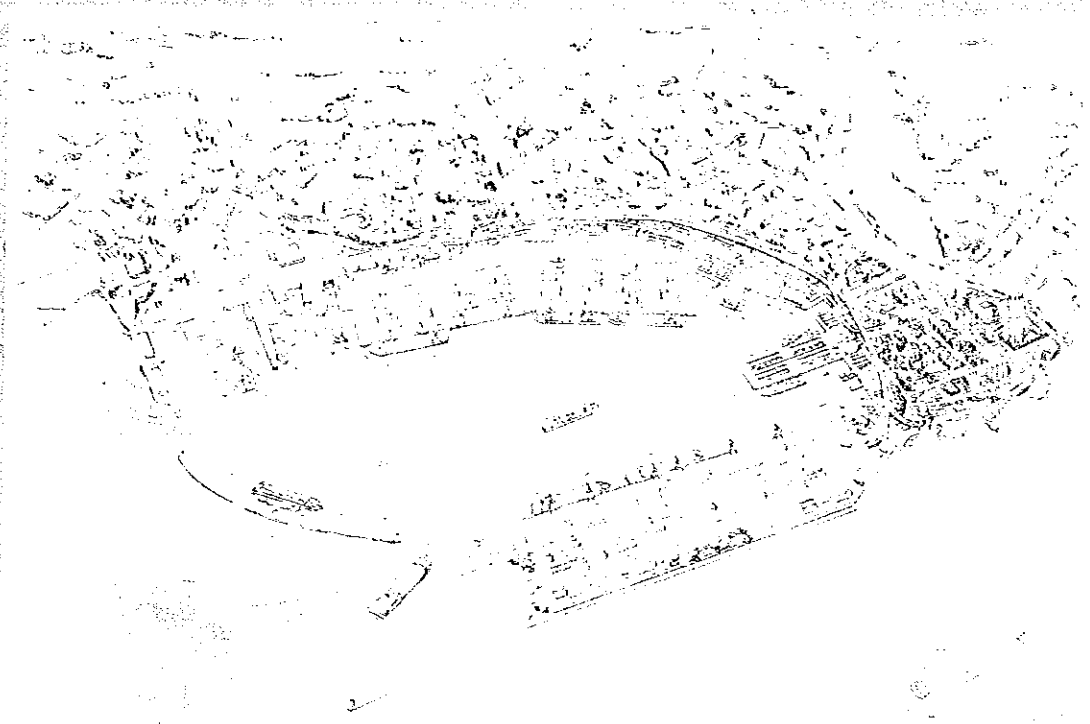


FINAL REPORT

FOR THE DEVELOPMENT STUDY ON THE PORT OF COLOMBO IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA



NOVEMBER 1989

JAPAN INTERNATIONAL COOPERATION AGENCY

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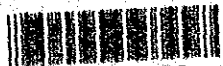
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PREFACE

In response to a request from the Government of the Democratic Socialist Republic of Sri Lanka, the Japanese Government decided to conduct the Development Study on the Port of Colombo and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent to Sri Lanka a survey team headed by Dr. Kazuo Kudo, and composed of members from the Overseas Coastal Area Development Institute of Japan and Japan Port Consultants Ltd., three times from November 1988 to August 1989.

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

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

I wish to express my sincere appreciation to the officials concerned of the Government of Sri Lanka for their close cooperation extended to the team.

November, 1989



Kensuke Yanagiya

President

Japan International Cooperation Agency

LETTER OF TRANSMITTAL

November, 1989

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency

Dear Mr. Yanagiya :

It is my great pleasure to submit herewith the Report for the Development Study on the Port of Colombo in the Democratic Socialist Republic of Sri Lanka.

The Study Team, which consists of the Overseas Coastal Area Development Institute of Japan (OCDI) and Japan Port Consultants (JPC), Ltd., headed by myself, conducted a series of surveys from November 1988 to August 1989 in Sri Lanka, at the request of the Japan International Cooperation Agency.

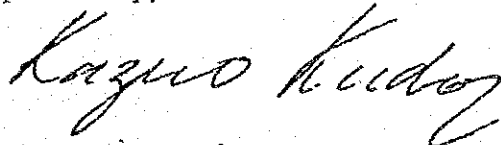
The findings of these surveys were fully discussed with the Sri Lankan counter parts to formulate the Master Plan for the period up to the year 2001 and to formulate the Short Term Development Plan and examine its feasibility for the period up to the year 1995 and were then compiled into this report. As the result of the Study, the implementation of the project herein proposed is regarded as crucial not only to the further development of the port of Colombo but also to the socioeconomic development of the country. The proposed project is considered engineeringly sound, and economically and financially viable.

I earnestly wish that the plan herein proposed will be implemented at the possible earliest by the Government of Sri Lanka.

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

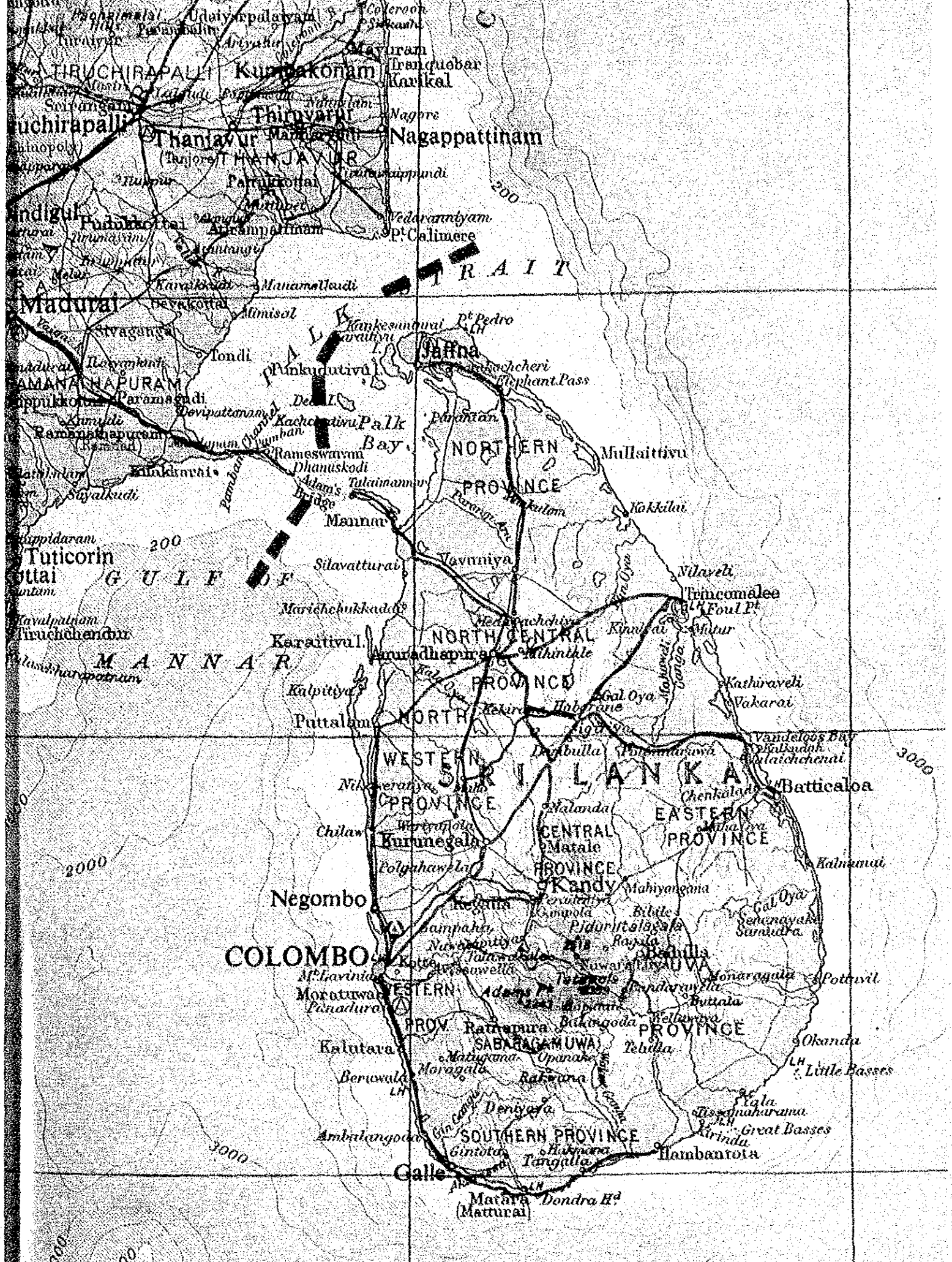
I am also greatly indebted to the Japan International Cooperation Agency, the Ministry of Transport, the Ministry of Foreign Affairs, the Japanese Embassy, and the JICA Office in Sri Lanka for giving us valuable suggestions and assistance during the field surveys and the preparation of this report.

Respectfully,

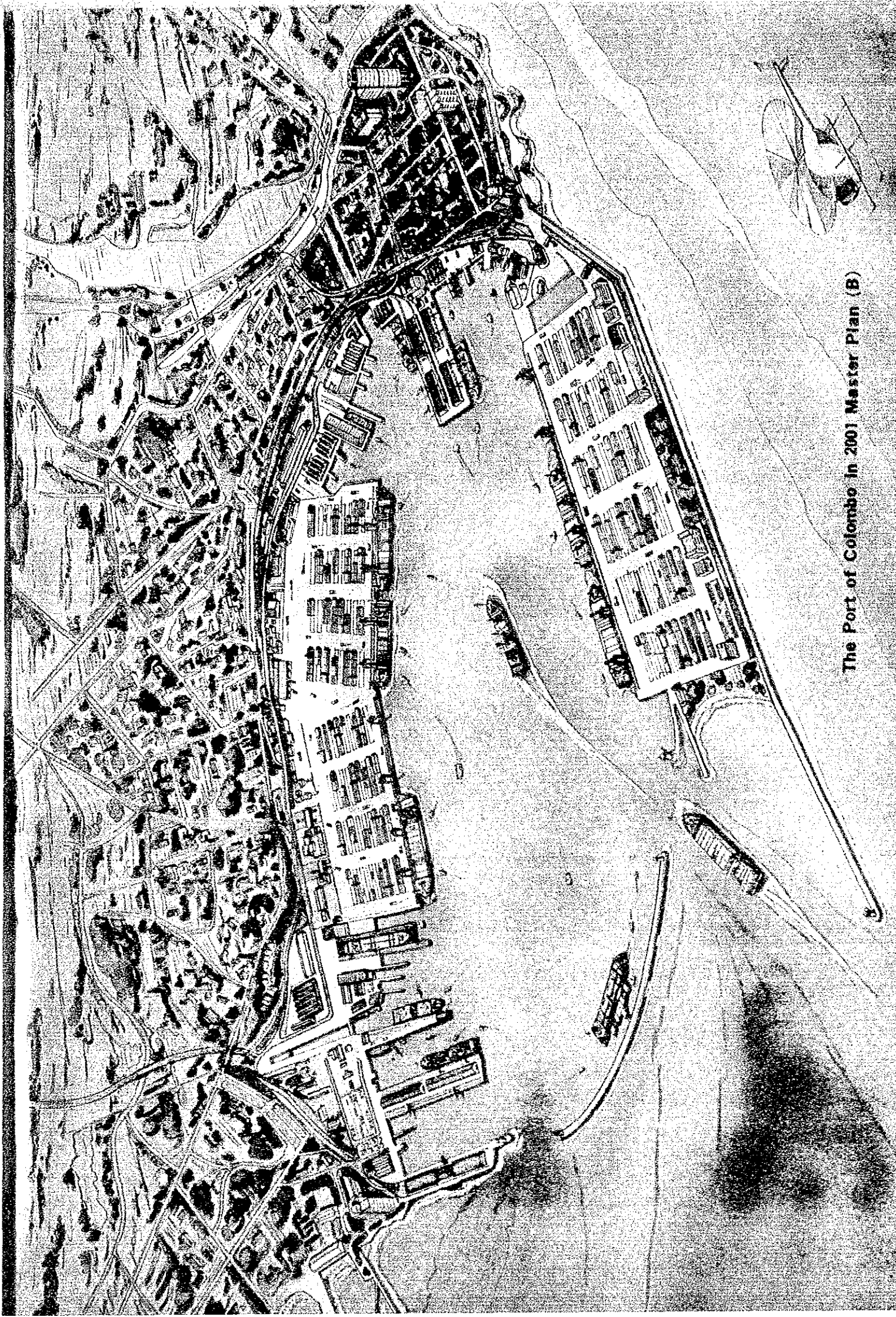


Dr. Kazuo Kudo
Head, JICA Study Team for the
development study of the Port of
Colombo.

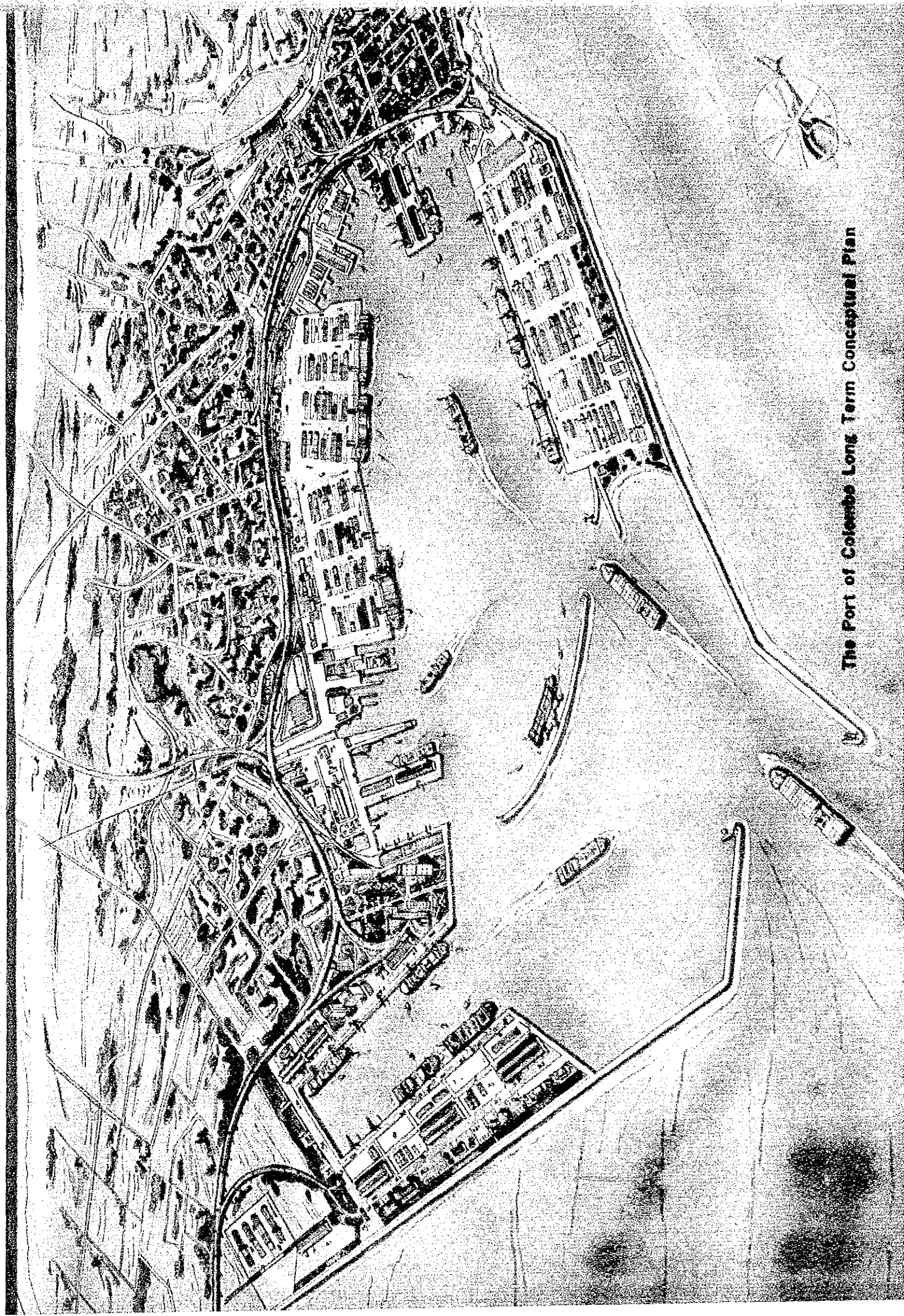
(Senior Adviser, the Overseas
Coastal Area Development Institute
of Japan)



Location Map of the Port of Colombo



The Port of Colombo in 2001 Master Plan (B)



The Port of Colombe Long Term Conceptual Plan

ABBREVIATIONS

A	AAS	Airport and Aviation Services
	APL	American President Lines
	AXCL	Arabian Express Container Line
B	B/L	Bill of Lading
	BH	Bore Hole
	BQ	Bandaranaike Quay
	BXCL	Bengal Express Container Line
C	CB	Coastal Berth
	CDN	Cargo Dispatch Note
	CFB	Central Freight Bureau
	CFC	Conversion Factor for Consumption
	CFS	Container Freight Station
	CG	Coliform Group
	COBRA	Continental Britain Asia Container Service
	COD	Chemical Oxygen Demand
	CPC	Ceylon Petroleum Corporation
	CSC	Ceylon Shipping Corporation
D	D/O	Delivery Order
	D/W	Dead Weight Tonnage
	DWT	Dead Weight Tonnage
E	ECC	Eagle Container Carrier
	EIRR	Economic Internal Rate of Return
	EMC	Evergreen Marine Corporation
	ETA	Estimated Time of Arrival
F	FCL	Full Container Load
	FIRR	Financial Internal Rate of Return
	FOB	Free on Board
	ft	feet
	FTZ	Free Trade Zone
G	GDP	Gross Domestic Product
	GDR	German Democratic Republic
	GFR	Federal Republic of Germany
	GNP	Gross National Product
	GRT	Gross Registered Tonnage

H	H1/3	Significant Wave Height
	Hp	Horse Power
	HWL	High Water Level
I	ICD	Inland Container Depot
	IPZ	Investment Promotion Zone
J	JICA	Japan International Cooperation Agency
L	LCL	Less than Container Load
M	MPM	Meter Per Minute
	MT	metric Tons
N	NE	North East
	NGP	North Guide Pier
	NNP	New North Pier
	NP	North Pier
	NQCT	New Queen Elizabeth Container Terminal
O	OC	Oil Content
	OECF	Over Seas Economic Cooperation Fund Japan
P	PC	Prestressed Concrete
	PIL	Pacific International Line
	PPM	Perts Per Million
	PR&D	Planning Research & Development
	PVQ	Prince Vijaya Quay
Q	QCT	Queen Elizabeth Container Terminal
	QEQ	Queen Elizabeth Quay
R	RP	Rupee
	Rs	Rupees
	RTB	Regional Transport Boards
S	SDR	Special Drawing Rights
	SLCTB	Sri Lanka Central Transport Boards
	SLPA	Sri Lanka Ports Authority
	SLR	Sri Lanka Railways
	SP	South Pier
	SPMB	Single Point Mooring Buoy
	SPT	Standard Penetration Test
SW	South West	

T	TEU	Twenty Feet Equivalent Unit
U	U.S	United States of America
	UAE	United Arab Emirates
	UASC	United Arab Shipping Co.
	UNDP	United Nations Development Programme
	USSR	Union of Soviet Socialist Republics
V	VHF	Very High Frequency Wave
W	WAKL	West Asia Kontena Line
Y	YML	Yang Ming Line
#	#	No.

US\$ 1.00 = Rs. 33.03 = J¥ 125.50

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CONCLUSIONS AND RECOMMENDATIONS

I. Short Term Development Plan (1995)

1. Conclusions

(1) A short term development plan with the target year of 1995 is drawn up to cope with the forecast traffic demand, making full use of the development potential of the existing assets of Colombo port. The core project component of the proposed plan is the construction of JCT No.3 and No.4 berths by which Colombo port will satisfy the strong demand for the international container transshipment, and firmly establish its position as the leading port in the region.

The plan also includes various improvement schemes, namely i) construction of the new North Pier, ii) pipe laying and completion of the new oil terminal, iii) rehabilitation of QEQ No.4 and No.5 berths, iv) introduction of additional transfer cranes for JCT No.1 and No.2 berths, v) deepening of the main entrance channel, and iv) improvement of the port communications system.

(2) The main project components and their features under the proposed short term development plan are summarized as follows:

i) Jaye Container Terminal (JCT)

JCT No.3 Berth

Length (at main berth face) :	330 m
Depth (alongside) :	-13.5 m
Design Vessel :	C - 10 class
Planned Capacity :	300,000 TEUs
Stacking Yards :	6,300 TEUs

JCT No.4 Berth

Length (at main berth face) :	360 m
Depth (alongside) :	-13.5 m
Design Vessel :	C - 10 class
Planned Capacity :	300,000 TEUs
Stacking Yards :	6,150 TEUs
Feeder Berth :	-9.0 m X 170 m

Each berth is planned with two (2) gantry cranes (Post Panamax) and six (6) high speed transfer cranes.

ii) New North Pier (NNP) No.1 and No.2 Berths

NNP No.1 Berth : - 7.5 m X 130 m

Warehouse : 40 m X 160 m

NNP No.2 Berth : -11.0 m X 210 m

Warehouse : 40 m X 160 m

Bulk handling system with two (2) level luffing cranes.

iii) Pipe Laying for New Oil Terminal

iv) Rehabilitation of QEQ No.4 and No.5 Berths

v) Additional Transfer Cranes for JCT No.1 and No.2 Berths (two (2) high speed transfer cranes.)

vi) Deepening of Main Channel

vii) Improvement of Communications System

Details and associated costs are shown in Sec 6-5-4.

(3) JCT No.3 berth is expected to be operational by the end of 1992, and JCT No.4 berth by the end of 1993. The estimated total investment of the proposed short term development plan is 257,849 thousand U.S. dollars of which the foreign currency component is 215,732 thousand U.S. dollars, and the local currency component is 42,117 thousand U.S. dollars or 1,391,124 thousand Sri Lankan Rupees. The share of the foreign currency component is 83.7 percent of the total investment.

(4) The proposed short term development plan is structurally sound, economically feasible, and financially viable. The economic Internal Rate of Return (EIRR) of the project is 21.4 percent and the Financial Internal Rate of Return (FIRR) is 8.7 percent for the base case. Details are discussed in Sec. 7-5 and 7-6.

(5) Since JCT No.3 berth will be put into operation just in time to handle the demand, construction of the next container berth, JCT No.4 berth, will have to be started almost simultaneously with JCT No.3 berth, with a maximum time-lag of about one year.

This situation is very similar to that experienced in the construction of JCT No.1 and No.2 berths. They were put into operation in August 1985 and March 1987 respectively.

(6) Improvement of container handling capacities of QCT, JCT No.1 and No.2 berths shall be realized immediately by the expansion of their yards and the provision of additional handling facilities and equipment. These aspects are discussed in Sec. 6-2 in detail.

2. Recommendations

(1) Since the proposed construction schedule is considered extremely tight, special considerations for shortening the detailed design and tendering period shall be taken to complete the project by the target date.

(2) The key issue for the successful implementation of the project, the construction of JCT No.3 and No.4 berths in particular, is re-location of existing facilities and operations in the planned area. To this aim concerted efforts of all concerned parties are considered necessary. In this relation, a management review and guidance on the progress of "SLPA's task force for re-location" in a timely manner is strongly recommended.

(3) The study team noted that the laying of the submerged pipeline to the newly constructed 60,000 D/W class oil berth at Island Breakwater has been delayed for a long time. This delay not only causes ideling of a costly structure, but also severely hinders orderly port development. The civil works of this oil berth had been virtually completed in march 1987. Therefore, immediate implementation of this scheme is strongly recommended.

Fig. C-1 Short Term Development Plan

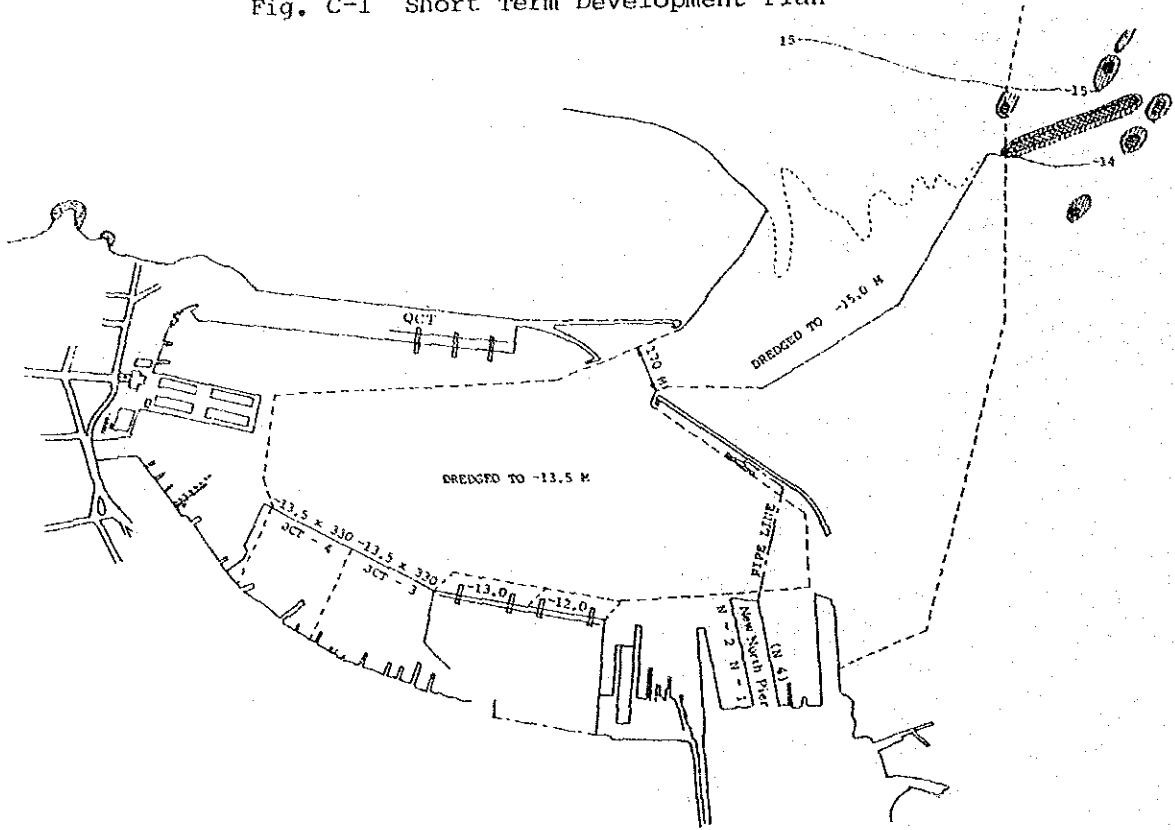


Fig. C-2 Implementing Steps for Short Term Development Plan

	89	90	91	92	93	94	95
QEQ rehabilitation							
JCT Transf. Cr.							
JCT#3							
JCT#4							
NNP #1, #2							
Pipe Laying							
Dredging							
Crown Land							
Roads							
Computer and Communication System							

Table C-1. Summary of Project Cost (Short Term 1995)

No.	Project	Project Cost (1,000 US\$)	Target year	Main Item of Project		
				Description	Quantity	
1	Jaye Container Terminal	173,958				
	(1) JCT NO. 3	93,783	1992	-13.5m Quay Container Yard Container Crane Transfer Crane Dredging	330 159,000 2 6 380,000	m m ² NO NO m ³
	(2) JCT NO. 4	80,175	1993	-13.5m Quay -9.0m Quay Bulkhead Container Yard Container Crane Transfer Crane Dredging	360 170 90 86,000 2 6 250,000	m m m m ² NO NO m ³
2	New North Pier NO. 1 & 2	45,429	1994	-11.0m Quay -7.5m Quay Revetment Yard	210 130 480 45,750	m m m m ²
			1995	Warehouse Level Luffing Crane Bulk Handling Equipment	12,800 2 1	m ² NO Set
3	Pipe Laying For Oil Handling	13,803 (23,303)	1993	Submarine Pipe Onshore Pipe* Loading Arm, etc.	700 1,000	m m*
						Set
4	QEQ Rehabilitation (NO. 4 & 5)	11,197	1992	Yard Paving Road Alignment	83,000	m ² SUM
5	Dredging of Main Channel	7,848	1993	Dredging -15m	1,260,000	m ³
6	Improvement of Communication System	3,016	1993			
7	Transfer Crane for JCT NO. 1 & 2	2,598	1990			
8	Port Access Road ** (Loan was pledged by OECF)	(14,025)	1992	Road	1,500	m
9	Reclamation of Crown Land **	(14,400)	1993	Reclamation	160,000	m ²
10	Grand Total	257,849 (295,774)		Financial Project Cost. Total Project Cost up to 1995.		

Note ; * The construction of the onshore pipeline, which costs approx. 9.5 million US\$, will be carried out by Ceylon Petroleum Corporation.

** The construction costs for items No. 8 and 9 are not considered in the feasibility study of Short Term Project.

II Master Plan (2001)

1. Conclusions

- (1) As the base case scenario, it is assumed that the development of Galle port will not attract a substantial portion of international container transshipment business until 2001, and all of the forecast traffic demand of container cargo shall be handled at Colombo port. The target year of the master plan is set at year 2001, and the additional investment required under this scenario after the completion of the short term development plan (1995) has been examined. As a result, two alternate master plans, namely, Master Plan-A and Master Plan-B, are formulated. The following are the main project components of the additional investment proposed under each master plan.

Master Plan - A

- i) New North Pier (NNP), No.3 and No.4 Berths
- NNP No.3 Berth : - 11.0 m X 210 m
 - NNP No.4 Berth : - 7.5 m X 130 m
 - Wharf cranes : Two (2)
 - Extension of Breakwaters : 60 m X 2
- ii) Fort Container Terminal (FCT)
- Wharf : - 14.0 m X 300 m
 - Yard : 121,000 m²
 - Containers cranes : two (2) post Panamax type
 - Transfer cranes : six (6) high speed type
- iii) New Queen Elizabeth Container Terminal (NQCT)
- NQCT No.1 Berth
- Wharf : - 14.0 m X 350 m
 - Yard : 105,800 m²
 - Containers cranes : two (2) post Panamax type
 - Transfer cranes : six (6) high speed type
- NQCT No.2 Berth
- Wharf : - 14.0 m X 350 m
 - Yard : 53,000 m²

Containers cranes : existing cranes (two sets) will be utilized

Transfer cranes : three (3) high speed type

NQCT No.3 Berth

Wharf : - 12.0 m X 300 m

Yard : 25,200 m²

Containers cranes : existing one set plus one new set.

Transfer cranes : three (3) high speed type

iv) Extension of SW Breakwater (550 m) and Re-alignment of Main Entrance Channel

v) Dredging of Harbour Basin (up to -14.0 m, 0.5 million m³)

vi) Computer Communication and Navigation Aids System

vii) Port Highway System

Master Plan - B

i) New Queen Elizabeth Container Terminal (NQCT)

NQCT No.1 Berth

Wharf : - 14.0 m X 340 m

Yard : 194,000 m²

Containers cranes : two (2) post Panamax type

Transfer cranes : six (6) high speed type

Revetment (980 m) and Office Building (9,800 m²)

NQCT No.2 Berth

Wharf : - 14.0 m X 330 m

Yard : 138,600 m²

Containers cranes : existing one set plus one new set

Transfer cranes : six (6) high speed type

Revetment (330 m)

NQCT No.3 Berth

Wharf : - 14.0 m X 330 m

Yard : 138,600 m²

Containers cranes : existing cranes (two sets) will be utilized

Transfer cranes : six (6) high speed type
Revetment (650 m)

- ii) New SW Breakwater (510 m) and Re-alignment of main Entrance Channel
- iii) Dredging of Harbour Basin (up to -14.0m, 0.6 million m³)
- iv) Computer Communication and Navigation Aids System
- v) Port Highway System

(2) Comparison of the two alternative Master Plans

The differences between the two master plans arises from the different approach to the expansion of QEQ, and the extension of the main breakwater.

Master Plan-A aims to minimize construction cost and to make full use of the existing port layout. Accordingly, the shifting of break bulk operations from BQ and part of QEQ to NNP and the reclamation of Fort basin are proposed. As a result, the container terminals proposed under this scheme are not standard and the handling capacity of each berth is little lower than the standard capacity. The extension of SW breakwater is planned as an independent component which can be implemented without considering the other project components.

Master Plan-B, on the contrary, proposes a substantial reclamation outside of SW breakwater, and the construction of three standard size, fully-equipped container berths. Since the proposed reclamation work shall be carried out in a deep open sea area, the construction cost is substantially higher than that of Master Plan-A (by about 17%). Under Master Plan-B, the proposed breakwater is planned as an extension of the revetment for reclamation, and therefore, its construction shall be started after substantial completion of the revetment works.

Fig. C-3 (1) Master Plan (A)

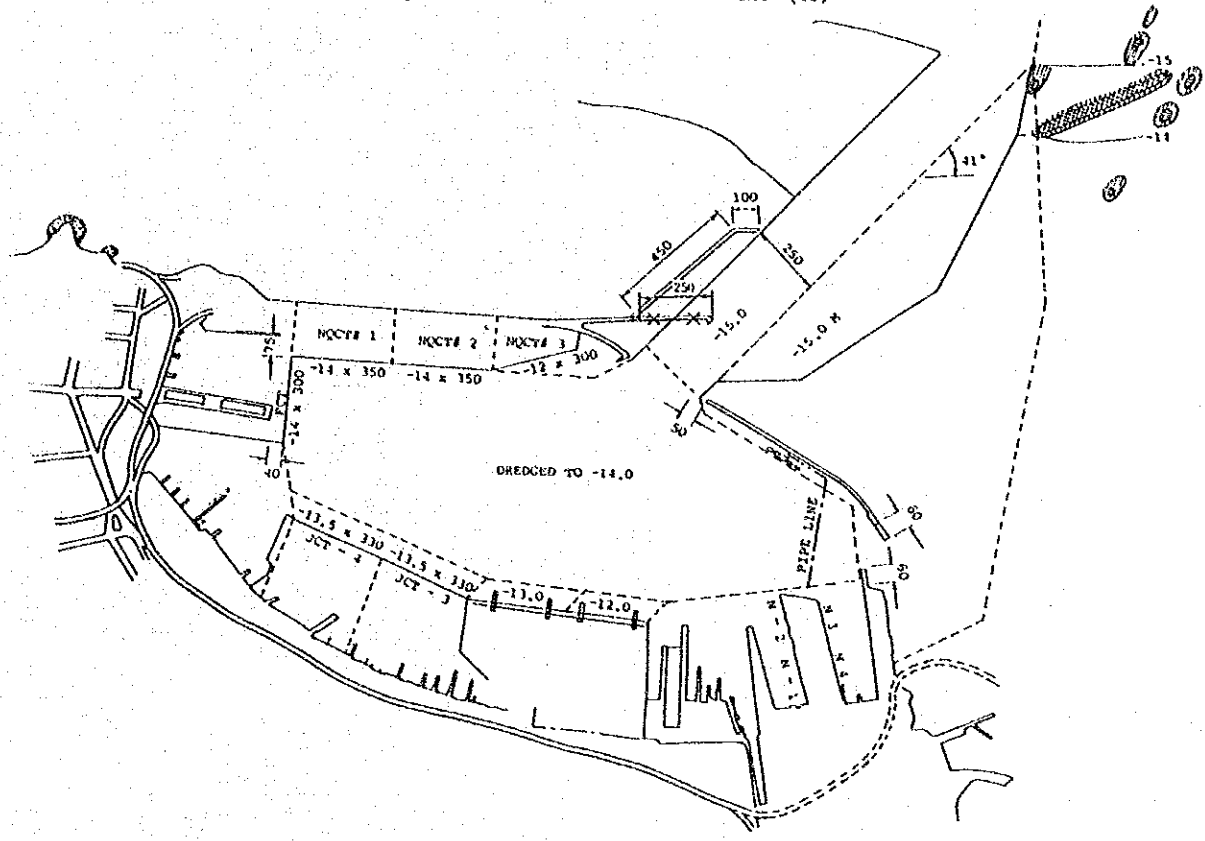


Fig. C-3 (2) Master Plan (B)

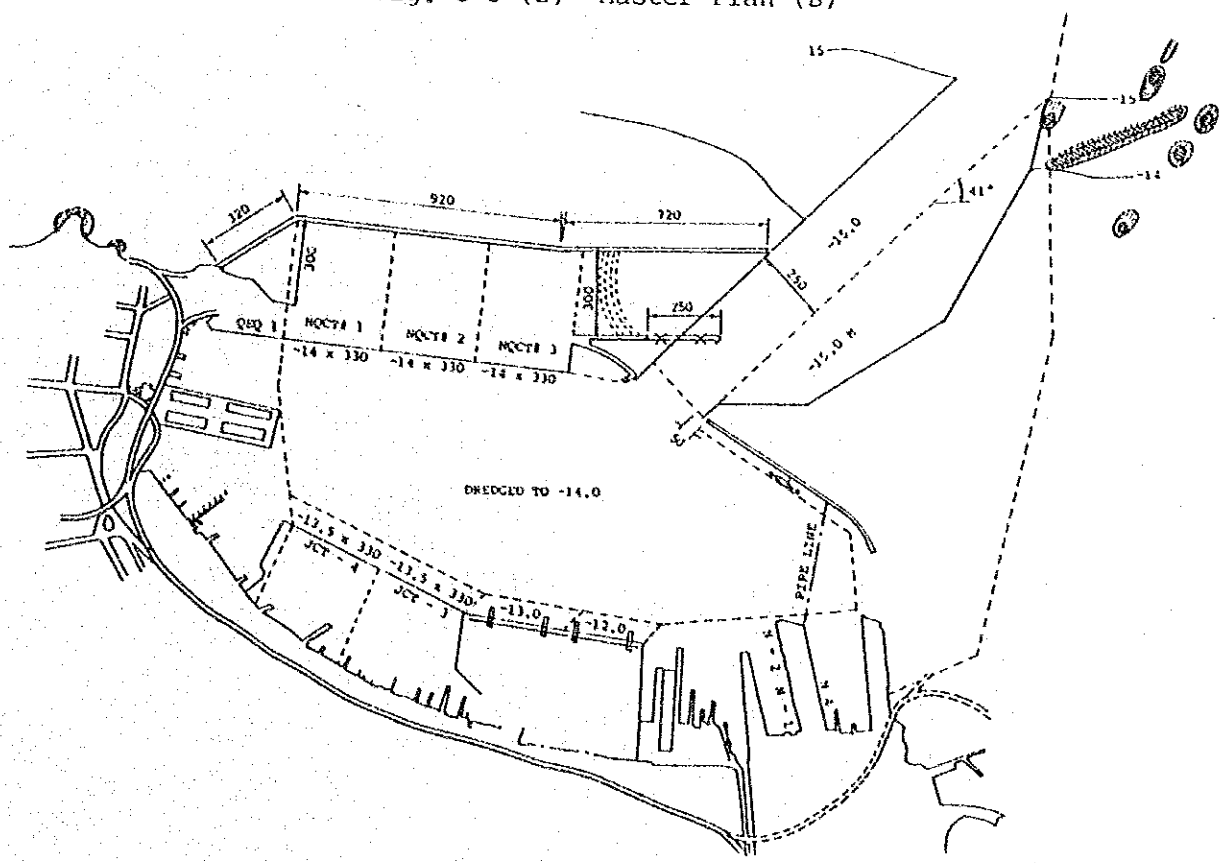


Fig. C-4 (1) Construction Schedule (Alternative - A)

Main Works		1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Remarks
Short Term	JCT No. 3														
	JCT No. 4														
	NNP														
	Pipe Laying														
	QEQ Rehabilitation														
	Dredging Channel														
	Communication System														
	T/C for JCT No. 1&2														
	Port Access Road *														
	Crown Land														
Master Plan	NNP No. 3&4 Berth														
	North Channel														
	FCT														
	QCT No. 1														
	QCT No. 2														
	QCT No. 3														
	SF Breakwater														
	Realignment Channel														
	Dredging Harbour														
	Communication System														
Port Highway															

Fig. C-4 (2) Construction Schedule (Alternative - B)

Main Works		1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Remarks
Short Term	JCT No. 3														
	JCT No. 4														
	NNP														
	Pipe Laying														
	QEQ Rehabilitation														
	Dredging Channel														
	Communication System														
	T/C for JCT No. 1&2														
	Port Access Road *														
	Crown Land														
Master Plan	QCT No. 1														
	QCT No. 2														
	QCT No. 3														
	Realignment Channel														
	Dredging Harbour														
	Communication System														
	Port Highway														

Table C-2 (1) Summary of Project Cost (Master Plan Alternative - A)

No.	Project	Project Cost (1,000 US\$)	Target year	Main Item of Project					
				Description	Quantity				
1	New North Pier	25,703	1994						
	(1) North Entrance Channel	5,223		Breakwater	120	m			
	(2) -11.0m and -7.5m Quay	20,480		Quaywall	340	m			
				Yard Crane	2	NO			
2	Port Container Terminal	(78,534)	1997	-14.0m Quay	300	m			
				Container Yard	121,000	m ²			
				Container Crane	2	NO			
				Transfer Crane	6	NO			
3	Queen Elizabeth Container Terminal	(142,696)	1997	Note: Three existing container cranes will be utilized.					
				-14.0m Quay	350	m			
				Container Yard	105,800	m ²			
				Container Crane	2	NO			
				Transfer Crane	6	NO			
				(2) OCT NO. 2	35,198	1999	-14.0m Quay	350	m
							Container Yard	53,000	m ²
							Transfer Crane	3	NO
				(3) OCT NO. 3	38,027	2000	-12.0 Quay	300	m
Container Yard	25,200	m ²							
Container Crane	1	NO							
				Transfer Crane	3	NO			
4	ST Breakwater	40,545	2000	Extension	550	m			
5	Realignment of Main Channel	12,351	2001	Dredging etc.	150,000	m ³			
6	Dredging of Harbour up to -14m	5,000	1999	Dredging	500,000	m ³			
7	Computer Communication & Radar System	12,357	2000						
8	Port Highway	92,190	2001	Highway	2,000	m			
9	Grand Total	409,376							

Table C-2 (2) Summary of Project Cost (Master Plan Alternative - B)

No.	Project	Project Cost (1,000 US\$)	Target year	Main Item of Project					
				Description	Quantity				
1	Queen Elizabeth Container Terminal	355,636	1997	Note: Three existing container cranes will be utilized.					
				-14.0m Quay	340	m			
				Revetment	580	m			
				Container Yard	191,100	m ²			
				Container Crane	2	NO			
				Transfer Crane	6	NO			
				Office Building	9,800	m ²			
				(2) OCT NO. 2	81,103	1999	-14.0m Quay	330	m
							Revetment	330	m
							Container Yard	138,600	m ²
							Container Crane	1	NO
							Transfer Crane	6	NO
(3) OCT NO. 3	119,318	2000	-14.0m Quay	330	m				
			Revetment	650	m				
			Breakwater	510	m				
			Container Yard	138,600	m ²				
			Transfer Crane	6	NO				
			Office Building	5,200	m ²				
2	Realignment of Main Channel	12,351	2001	Dredging etc.	150,000	m ³			
3	Dredging in Harbour upto -14m	5,000	1999	Dredging	500,000	m ³			
4	Computer Communication & Radar System	12,357	2000						
5	Port Highway	92,190	2001	Highway	2,000	m			
6	Grand Total	478,534							

The single most important merit of Master Plan-B over Master Plan-A is its shorter construction period, by at least one year. In order to cope with the uncertainty arising from the development schedule of Galle port, the one year difference around 1993/1994, the start of the construction work, should not be overlooked.

(3) Development of Galle port

The development of Galle port is one of Sri Lanka's highest priority projects under the present government policy. The port, similar to Colombo, is located on the main shipping routes and has the potential to develop into a container transshipment port and complementing Colombo. Though the port of Galle presently handles a certain amount of cargo, a substantial amount of investment for breakwaters, channels and basins, which will not yield direct financial benefits, is pre-requisite for large-scale development.

In view of rather limited financial resources available, for the time being, within SLPA, the development of Galle heavily depends upon possible financing schemes. Therefore, establishing an exact schedule for its development is extremely difficult at this stage. In order to cope with this situation and establish a balanced development program for Sri Lanka's port system, the Master Plan for Colombo port is made flexible enough for adjustment in response to the different scenarios of development at Galle port.

(4) Port Highway System and Long-term Conceptual Plan

The gateway port of the country should maintain and improve its role as the "face" of the country, which in many cases is integrated with the mother city. Colombo port, in this respect, still has many areas to be improved. The new port highway system, proposed in the master plan, aims not only to assure smooth movement of cargo within the port area but also to alleviate the over-crowded urban traffic.

In order to provide the necessary preparation for land and water area acquisition, which is the key for the creation of a an excellent port/city environment, a long term conceptual plan (after 2001) is

prepared and attached.

(5) Project Cost and Schedule for Implementation

The estimated total investments of the proposed master plans, that is the additional investments after the completion of the proposed short term development plan, are 409,376 thousand U.S. dollars for plan-A and 478,534 thousand U.S. dollars for plan-B.

Outlines of the proposed construction schedules are presented in Fig. C-4(1) and Fig. C-4(2) (for detail, please refer to Sec. 6-5).

(6) Calmness and Ship Maneuverability

A computer-aided simulation study has been made to determine the impacts of the various proposed construction works, which may affect the calmness of the harbour basin and other water areas. Five cases, namely, i) short term development plan, ii) master plan-A, iii) master plan-B, iv) long term conceptual plan-A (extension of master plan-A), and v) long term conceptual plan-B (extension of master plan-B), are tested, and the results show there is practically no problem for all the cases. Details are discussed in Sec. 6-3-3.

Ship maneuverability has been checked by using a ship simulator. The results of the study indicate that it would not be easy to operate large vessels (eq. C-10 plus) in full draft at the narrow and curved channel during inclement weather and under unfavourable sea condition. Therefore, in the master plans, we have proposed i) extension of SW breakwater, and ii) widening, straightening and deepening of the main entrance channel.

However, we have also noted that at present, container ships over 270 meters with a draft of less than 12 meters enter the existing main entrance channel safely, and our simulator study also confirms this.

As this is the actual ship maneuvering, the study team proposes only the deepening of the main entrance channel up to -15 meters for the

short term development plan. Details are discussed in Sec. 6-3-2 and Appendix 6-3-2-1.

(7) Environmental Aspects

At present, the most important environmental issue of Colombo port is the deterioration of water quality in the basin. In this relation, the study team checked water quality at six selected points in the harbour basin. Sampled water was tested for the following six items:

i) hydrogen ion exponent (PH), ii) chemical oxygen demand (COD), iii) oil content (OC), iv) dissolved oxygen (DO), v) sulphide content (S), and vi) coliform group (CG), and the results are compared with the results of the previous investigation of August 1985.

The analysis as a whole reveals a gradual increase in pollution levels. The analysis also clearly indicates that the main source of this pollution is the discharge of domestic waste water through the existing urban storm water drainage.

Fortunately, the present pollution level, except at the barge basin, canal and outflow of city drainage, is not so serious. Therefore, the study team does not recommend any immediate countermeasures. The reason behind this decision is that the improvement of the city storm drainage system, the main source of pollution, is very costly, and this should be examined as part of an urban planning project. However, it is strongly recommended that periodic water quality investigations be undertaken in the coming years with a view to obtaining necessary data for the proper planning of a water quality improvement scheme in the port basin. Details are explained in Sec. 2-8.

2. Recommendations

- (1) The base case of the financial analysis in this report is calculated with the assumption that the interest rate for long-term loans will be 10%, the recent re-lending rate from the government to SLPA.

with this assumption the calculated cash flow for short term investment of SLPA reveals deficits from 1991 to 2007. This deficits could be covered by the short term borrowing at market rates, but this operation is not recommended because SLPA will have to continue a substantial port improvement scheme either at Colombo as indicated in the proposed master plans, or at Galle port.

In view of the above, it is strongly recommended that the re-lending rate of the long term loans from the government to SLPA should be kept as low as possible, say three (3) to five (5) percent.

- (2) In order to make a balanced development program between Colombo and Galle, and to implement the program in an integrated manner, closer monitoring of the development of Galle port by SLPA management is considered absolutely necessary. By the completion of the short term development plan, Colombo port will have the cargo handling capacity, for container handling in particular, to meet the forecast demands in 1997. However, to make new handling capacity available in 1997, improvement schemes for QEQ should be started in 1993 (for plan-A) and 1994 (for plan-B) at the latest.

Assuming the time required for detailed engineering design and the preparation of tender documents as about 18 months, the construction works should be started, at the latest (for plan-B), in mid 1992. The situation is almost the same for Galle port, where the necessary preparations for the development of new container terminals should be completed before 1993*.

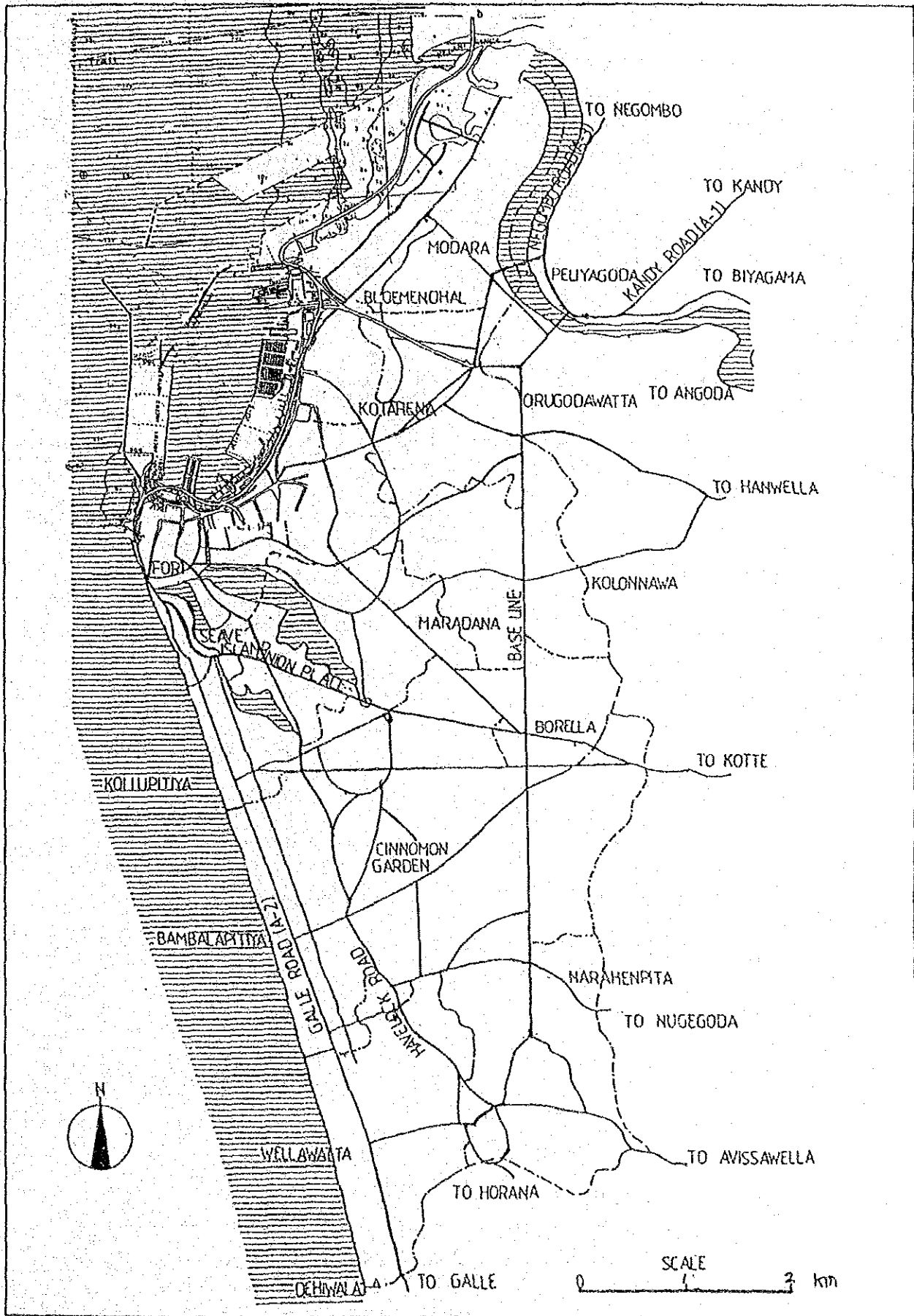
Therefore, it is strongly recommended that an over-all review of the position and re-scheduling, if necessary, be taken in 1991/1992 by SLPA with the assistance of experienced Consultants.

* This discussion presupposes that the construction of breakwaters, channels and basins shall be in progress at that time and completed by 1996.

(3) The improvement of managerial and operational skills is indispensable to make full use of the constructed facilities. For Colombo port, the importance of these aspects is further intensified because the port's main activity, international container transshipment operation, is a foot-loose and extremely cost conscious business.

The proposed master plans (and also the short term development plan to a lesser extent), therefore, have been prepared on the assumption that Colombo port will achieve a high level of efficiency, eg. 300,000 TEU per year per fully equipped container terminal. This requirement becomes very severe since the targeted efficiency should be achieved partly (for JCT No.1 and No.2 berths) before the completion of JCT No.3 berth to cope with the anticipated traffic demand.

Fig. C-5 Long Term Conceptual Plan



CHAPTER 1 INTRODUCTION

1-1 Background

A dynamic port development policy and the advantageous location for transshipment operations have revived the Port of Colombo as the number one container transshipment port in the region. In order to cope with the ever increasing traffic demand, international container transshipment in particular, the Government of Sri Lanka requested the Japanese Government to review the present Master Plan which had been prepared by JICA and SLPA in 1979 with a target year of 1988. In response to the request, the Japanese Government sent the preliminary JICA study team (Team leader: Mr. I. YAMASHITA) and agreed to conduct the Development Study on 8th March, 1988.

Based on the above background and on the findings of the preliminary study team, the objectives of the study were summarized as follows:

- (1) To prepare a Master Plan for the development of the Port of Colombo for the period up to the year 2001, and
- (2) To develop and conduct a feasibility study on a Short Term Development Plan to be formulated for the development of the port within the framework of the Master Plan.

The transshipment operations of the port have been acceleration in 1988 while the dispatching of the JICA Study Team (the Team) had been delayed by various reasons. In this situation, the Government of Sri Lanka, upon the arrival of the JICA Study Team, strongly requested the study on the Jaye Container Terminal No.3 Berth (JCT No. 3 Berth) which was included in the Master Plan of 1979, be completed in the earliest possible stage of the study this time.

With the consent of the Government of Japan, the Scope of Work of the Terms of Reference was modified on 1st December 1988 to respond to pressing needs, and the Team was instructed that the feasibility study of JCT No.3 Berth shall be prepared in the form of a Progress Report.

The Team's study period in Sri Lanka was extended by about two weeks accordingly and the progress report was submitted on 31 th Jan, 1989. The team's activity was continued and all the study was finalized in Oct. 1989.

An outline of the study team's activities is summarized and attached as Appendix 1.

1-2 General Aspects

1-2-1 Geography and Topography

Sri Lanka, an island in the Indian Ocean, is located at the east-southeast tip of the Indian sub continent. Its geographical location spans from latitude 5° 55' to 9° 50' N, and from longitude 70° 40' to 81° 55' E.

Sri Lanka is separated from the sub continent, the distance is less than 30 km at Adam's Bridge, by the Palk Strait and the Gulf of Mannar. The island directly faces the Indian Ocean to the south and west, and the Bay of Bengal to the northeast. South from the center of the country, a highland called the Hill Country, more than 1,000 meters above sea level, extends over Central and Sabaragamuwa Provinces, and Badulla District in Uva Province. There are peaks rising over 2,000 meters in and near the Nuwara Eliya District, which forms the central part of the Hill Country. The land space of Sri Lanka is about 65,000km², approximately 18% of that of Japan.

1-2-2 Climate

Sri Lanka, located southwest of the Asian monsoon zone, has two monsoon seasons, that is the longer southwestern monsoon season from May till September in the summer and the shorter northeastern monsoon season from December to February in the winter.

In the highland, the maximum temperature is around 30° - 32°C, and the minimum temperature is around 23° - 25°C. The mean annual rainfall exceeded 1,000 mm in the 30 years from 1931 - 1960. The rainfall is relatively light in the north, from Jaffna through Anuradhapura, varying around 1,350 - 1,450 mm. Hambantota, located at the south end of the island, records the country's minimum rainfall at around 1,100 mm. From Colombo to the Hill Country annual rainfall exceeds 2,000 mm, while Ratnapura, located in the southern part of the Hill Country, receives nearly 4,000 mm of rainfall each year.

1-2-3 Population

According to the Registrar General's Department the population of Sri Lanka was 15.2 million in 1982 and 16.4 million in 1987, and the average annual growth rate was 1.5% over the above period. The national average population density was 254 person/sq-km in 1986, but population density varied largely by District. The highest is Colombo's 4839 persons/sq-km seconded by Gampaha's 1,069 persons/sq-km and the lowest 35 persons/sq-km was recorded in Mulative, the 2nd northmost District. The population density of the north to southeastern Districts is very low, and the weighted average of these 10 Districts, excluding Jaffna's 420 person/sq-km, is less than 100 person/sq-km.

About 75% of Sri Lankans are of Sinhalese descent, 18% are Tamil and the 7% are Moors. The 1981 statistics indicate the predominate religion to be Buddhism, followed by Hindus at 16% Muslims at 8% and Christians at 8%.

1-2-4 Economy

(1) General

According to the provisional estimate of the Central Bank of Sri Lanka, the Gross National Product (G.N.P) of Sri Lanka recorded 113,307 Million Rupees in 1987 at 1982 factor cost prices. G.N.P. expressed at current (1987) factor cost prices is 173,395 million Rupees or 5,890 million U.S.\$ and GNP per capita is 360 U.S.\$. GNP over the last three years namely, 1985, 1986 and 1987, and sectoral contribution to GNP are summarized in Table 1-1.

Table 1-1 Gross National Product at (1982) Factor Cost Prices

Item	Amount (Rs. million)			% change over previous year	
	1985	1986*	1987*	1986	1987
1. Agriculture, Forestry & Fishing	28,366 (25.9)	29,106 (26.6)	27,409 (23.6)	2.6	-5.8
2. Manufacturing, Mining & Utility services	19,992 (18.2)	21,579 (18.9)	23,308 (20.1)	7.9	8.0
3. Construction	8,070 (7.4)	8,191 (7.2)	8,338 (7.2)	1.5	1.8
4. Trade, Transport & other services	53,142 (48.5)	55,385 (48.4)	56,867 (49.1)	4.2	2.7
5. Gross Domestic Product	109,570 (100)	114,261 (100)	115,922 (100)	4.3	1.5
6. Net Factor Income From Abroad	-2,829	-2,696	-2,615	-	-
7. Gross National Product	106,741	111,565	113,207	4.5	1.6

* Provisional

Sectors weight to GDP shown in brackets

Source: Central Bank of Sri Lanka

The leading growth sectors of the Sri Lankan economy in 1987 are manufacturing, mining and quarrying and trade. The manufacturing sector, maintained its growth momentum in 1987, recording a growth rate of 6.8 per cent. Within the manufacturing sector, a decline in public sector industry was offset by high growth in the private sector. The mining and quarrying sector recorded substantial growth due to the expansion of the gem industry. Due to the effect of adverse weather conditions, the output of paddy, coconut, rubber and sugar cane declined considerably in 1987, reducing the value-added contribution of the agriculture sector to just 8 per cent of GDP. The decline in the agriculture sector was the major reason for the slow growth of the economy in 1987.

(2) Economic Policy

The Sri Lanka government, has taken a liberal economic policy since 1977 and promoting economic reforms which could be summarized in the following three items;

- i) greater reliance on the market mechanism,
- ii) a liberalisation of trade and payment (including re-structuring of the custom tariff system), and
- iii) a large increase in external finance.

With expanded external finance, the government is promoting economic growth by launching large-scale public investment schemes. Major development schemes include:

- i) Accelerated Mahaweli Development Scheme,
- ii) A large Housing and Urban Development Program, and
- iii) Establishment of Free Trade Zones (FTZ).

These schemes are yet to be completed. However, the annual average growth rate of Gross Domestic Product (GDP) till 1986 recorded over 5% which is substantially higher than in 1970 to 1979. Unfortunately, the annual growth rate of DGP fell to 1.5% in 1987 due to unfavourable weather conditions and the prevailing political instability. Table 1-2 is a summary of the average growth rate of GDP and the percentages of capital expenditure against GDP from 1951 to 1985 (from "Facets of Development in Independent Sri Lanka," 1986).

Table 1-2

	GDP Average Growth Rate (%)	Capital Expenditure/ GDP (%)
1951 - 1955	4.5	3.9
1956 - 1960	2.0	4.4
1961 - 1965	4.0	5.9
1966 - 1970	5.4	6.6
1971 - 1975	2.9	6.4
1976 - 1980	5.5	12.2
1981 - 1985	5.2	14.1

Table 1-3 illustrates the achievements of selected River Valleys Development projects in terms of newly added cultivated land and the number of families settled.

Table 1-3 River Valleys Development - Selected Projects

Uda Walawe Project(a)	Unit	1983	1984	1985	1986	1987(a)
1. Capital Investment	Rs.'000	11,164	63,045	60,121	44,102	n.a.
2. Total extent cultivated	Hectares	26,451	25,726	24,871	28,769	30,532
Paddy	"	21,509	22,333	21,706	22,903	22,059
Minor Food Crops(b)	"	4,942	3,393	3,165	5,856	8,473
3. Settlers	No. of families	-	4,652	15,000	-	3,000
4. Employment	No.	852	745	741	802	798
Uda Walawe	"	850	742	738	799	795
Head Office	"	02	03	03	03	03
Mahaweli Development Project	Unit	1983	1984	1985	1986	1987(a)
1. Capital Investment	Rs.'000	7,130,000	6,598,280	5,585,000	4,425,600	4,738,000
2. Total extent cultivated(c)	Hectares	42,404	61,920	64,175	75,504	75,504
Paddy	"	35,699	52,334	52,251	59,894	62,782
Minor Food Crops(b)	"	6,705	9,586	11,924	16,316	12,722
3. Settlers	No. of families	6,323	5,748	5,296	4,750	2,579
4. Employment	No.	3,819	6,732	n.a.	n.a.	n.a.

Sources: Mahaweli Development Board;
Mahaweli Authority of Sri Lanka.

(a) Provisional.

(b) Minor food crops include chillies, onions, yams, cowpea and vegetables.

(c) Figures relate to new lands cultivated under Mahaweli Development Programme.

Table 1-4 summarizes the achievements of Investment Promotion Zones (IPZ) in terms of the number of new jobs and gross export earnings.

Table 1-4 Investment Promotion Zones
Employment and Export Earnings 1986 - 1987

Category	1986		1987(a)	
	Employment (End Dec.)	Gross Export Earnings (f.o.b) Rs.Mn.	Employment (End Dec.)	Export Earnings (f.o.b) Rs.Mn.
1. Food, beverages and tobacco	471	38.8	641	144.7
2. Textiles, wearing apparel and leather products	33,937	4,369.7	38,343	6,100.1
3. Wood and wood products (including furniture)	24	1.3	56	4.0
4. Chemicals, petroleum, coal, rubber and plastic products	1,655	287.2	1,649	262.0
5. Non-metallic mineral products (except petroleum and coal)	1,648	210.8	2,132	317.4
6. Fabricated metal products, machinery and transport equipment	149	79.7	435	176.6
7. Products not elsewhere specified	3,237	199.7	3,683	444.8
8. Services(b)	493	208.5	534	281.8
Total	41,614	5,395.7	47,473	7,731.4

(a) Provisional

(b) Excluding "Air Lanka Ltd."

Source: Greater Colombo Economic Commission.

(3) Foreign Trade

One of the most serious problems in Sri Lanka's economy has been the large trade deficit, but the size of the deficit seems to be decreasing steadily. Figure 1-1 is a summary of the chronological trade deficit in terms of SDR. Original data are taken from Sri Lanka Customs and adjusted by the Central Bank of Sri Lanka.

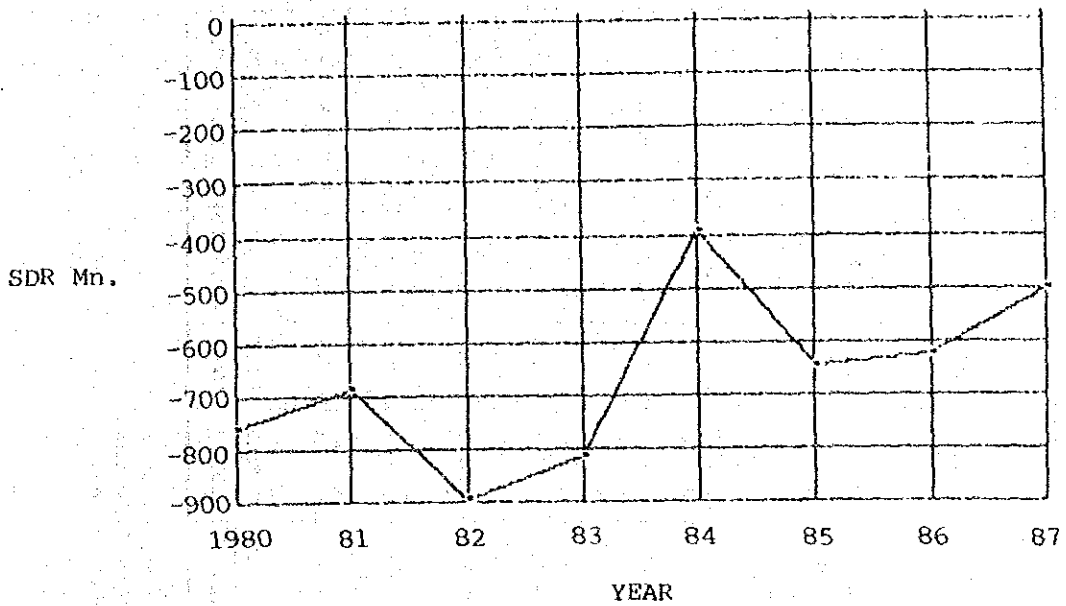


Fig. 1-1 Trade Deficit of Sri Lanka

The composition of exports by major export items for the latest 5 years are shown in Table 1-5. For 1987 the largest export item is "textiles and garments" with a share of 31.4%, followed by tea with 25.9%, and petroleum products, rubber and coconuts with 11.0%, 7.1% and 5.2%.

Table 1-5 Composition of Exports 1983 - 1987

Category	Rs. Million						SDR Million						Percentage of Total					
	1983	1984	1985	1986	1987(d)	1983	1984	1985	1986	1987	1983	1984	1985	1986	1987			
1. Agricultural Exports	14,554	22,575	19,026	15,764	17,437	578.6	865.6	688.7	479.2	457.6	58.0	60.4	52.5	46.3	42.4			
1.1 Tea	8,295	15,764	12,003	9,253	10,654	329.8	604.5	434.5	281.2	279.6	33.1	42.2	33.1	27.2	25.9			
1.2 Rubber	2,852	3,301	2,566	2,622	2,929	113.4	126.6	92.9	79.7	76.9	11.4	8.8	7.1	7.7	7.1			
1.3 Coconut	1,921	2,118	3,093	2,389	2,140	76.4	81.2	111.9	72.6	56.1	7.6	5.7	8.5	7.0	5.2			
1.3.1 Kernel Products	1,409	1,553	2,383	1,609	1,423	56.0	59.5	86.3	48.9	37.3	5.6	4.2	6.6	4.7	3.5			
1.3.2 Other	512	566	710	780	717	20.3	21.7	25.7	23.7	18.8	2.0	1.5	2.0	2.3	1.7			
1.4 Minor Agricultural Crops(a)	1,486	1,391	1,365	1,500	1,714	59.1	53.3	49.4	45.6	45.0	5.9	3.7	3.8	4.4	4.2			
2. Industrial Exports(a)(b)	8,821	12,918	14,295	15,878	20,004	350.7	495.3	517.4	482.6	525.0	35.1	34.6	39.5	46.6	48.6			
2.1 Textile and Garments	4,738	7,566	7,960	9,629	12,897	188.3	290.1	288.1	292.7	338.5	18.9	20.3	22.0	28.3	31.4			
2.2 Petroleum Products	2,682	3,288	3,877	2,358	2,592	106.6	126.1	140.3	71.7	68.0	10.6	8.8	10.7	6.9	6.3			
2.3 Other	1,401	2,064	2,459	3,891	4,515	55.7	79.2	89.0	118.3	118.5	5.6	5.5	6.8	11.4	11.0			
3. Mineral Exports	1,132	834	864	1,182	1,759	45.0	32.0	31.3	35.9	46.2	4.5	2.2	2.4	3.5	4.3			
3.1 Gems	940	617	561	755	1,447	37.4	23.6	20.3	23.0	38.0	3.7	1.6	1.6	2.2	3.5			
3.2 Other	192	217	303	427	311	7.6	8.3	11.0	13.0	8.2	0.8	0.6	0.8	1.3	0.8			
4. Unclassified(c)	589	1,020(e)	2,021(e)	1,249	1,933(e)	23.4	39.1	73.2	38.0	50.7	2.4	2.7	5.6	3.7	4.7			
Total Exports(b)	25,096	37,347	36,207	34,072	41,133	997.7	1,432.1	1,310.5	1,035.7	1,079.5	100.0	100.0	100.0	100.0	100.0			

Sources: Customs, Sri Lanka;
Ceylon Petroleum Corporation;
Central Bank of Sri Lanka.

(a) Selected items
(b) Adjusted
(c) Includes re-exports
(d) Provisional
(e) Includes export of an aircraft

The export composition of 1987 compared with that of 1983 shows a clear contrast, that is the decline of agricultural exports and the increase of industrial exports. This trend becomes more vivid when traced back over a longer time span. Table 1-6 is the comparison of export composition for 1977 and 1987. The most impressive changes occur in three items in this period of time:

- i) Tea, Sri Lanka's traditional major export item, decreased its share from 53% to 26%
- ii) Rubber also decreased its share from 14% to 7%, and on the contrary
- iii) The share of textiles and garments increased over 15 fold, from 2% to 31%. The last item's rapid increase largely depends on the increase of garments exports to the USA. The value of garments exports to the USA represented 67% of Sri Lanka's total garments exports in 1987.

Table 1-6 Changes in Composition of Exports

(SDR Mn. in brackets)

Category	Rs. Million		Percentage of Total	
	1977	1987	1977	1987
1. Agricultural Exports	5,265 (505)	17,437 (458)	80	42
1.1 Tea	3,503 (336)	10,654 (280)	53	26
1.2 Rubber	931 (89)	2,929 (77)	14	7
1.3 Coconut Products	496 (48)	2,140 (56)	8	5
1.4 Minor Agricultural Crops	335 (32)	1,714 (45)	5	4
2. Industrial Exports	918 (88)	20,004 (525)	14	49
2.1 Textile and Garments	143 (14)	12,897 (339)	2	31
2.2 Petroleum Products	597 (57)	2,592 (68)	9	6
2.3 Other	178 (17)	4,515 (118)	3	11
3. Mineral Exports	321 (31)	1,759 (46)	5	4
3.1 Gems	298 (29)	1,447 (38)	5	3
3.2 Other	23 (2)	311 (8)	-	1
4. Unclassified	66 (6)	1,933 (51)	1	5
5. Total Exports (a)	6,570 (630)	41,133 (1,080)	100	100

(a) Adjusted

Sources: Customs, Sri Lanka;

Central Bank of Sri Lanka

The exchange rate of the Rupee against other major currencies over the last five years is summarized in Table 1-7.

Table 1-7 Exchange Rate Movements 1983 - 1987

Currency	End Year Exchange Rates (Rs. per unit of					Percentage Change over previous year(a)				
	1983	1984	1985	1986	1987	1983	1984	1985	1986	1987
U.S. Dollar	25.0000	26,2800	27,4075	28,5200	30,7625	-14.72	- 4.87	- 4.11	- 3.90	- 7.29
Round Sterling	35.8938	30,5111	39,5764	41,7961	57,1721	- 3.57	17.64	-22.91	- 5.31	-26.69
Deutsche Mark	9,1050	8,3495	11,1074	14,6727	19,2826	- 1.37	9.05	-24.83	-24,30	-23,91
Japanese Yen	0,1071	0,1050	0,1360	0,1794	0,2491	-14.83	2,05	-22,81	-24,18	-27,99
French Franc	2,9744	2,7276	3,6167	4,4337	5,6936	- 6,66	9,05	-24,58	-18,43	-22,13
Indian Rupee	2,3531	2,1192	2,2575	2,1645	2,4043	- 8,22	11,04	- 6,13	4,30	- 9,97
Special Drawing Rights	26,1260	25,8065	30,0339	34,7998	43,2684	- 9,83	1,24	-14,08	-13,70	-19,57

Source: Central Bank of Sri Lanka

(a) Changes computed on the basis of the foreign currency equivalent of Sri Lanka Rupee

Minus sign indicates depreciation. End of year exchange rate (1988) for US\$ is US\$1.00 = Rs.33,0325

1-2-5 Transport Sector

(1) Railway

The railway system in Sri Lanka is operated by the Sri Lanka Railways (SLR) as a government department under the Ministry of Transport. The system consists of eight broad gauge lines with about 1,360 km covering most of the island, and about 60 km of narrow gauge line in Kelani Valley. Most of the rail is single track with double track only for the main line (Colombo - Polgahawela) and part of the coast line (Colombo - Panadura). Total rail track is 1,944 km in 1987.

Rolling stock in use comprises 75 diesel locomotives (diesel hydraulic and diesel electric), 36 diesel hydraulic power coaches, about 1,200 passenger coaches and 1,850 freight wagons. In 1987 SLR carried 1,882 million passenger - kilometers and 198 million ton-km of freight. Compared with the previous year, passenger kilometerage decreased by 4.6% and goods kilometerage decreased by 2.6%.

The present roles of SLR could be summarized in the following

three approximately equal functions; i) transport of intercity goods (20% of train - kilometers) ii) transport of intercity long distance and local passengers (60% of train - kilometers), and iii) transport of suburban passengers in the Greater Colombo area (20% of train - kilometers).

(2) Roads

The road network in Sri Lanka totals about 86,000 km, 1.32 km of road per square kilometer, consisting of nearly 30,000 km of paved bituminous roads and 56,000 km of gravel and earth roads. The roads are classified into five categories, Class A to E, according to their importance (criteria for classification is explained in Appendix 1-7), and administered by the Department of Highways (about 25,500 km), local government authorities (about 43,500 km), Department of Irrigation (about 2,700 km), and other Agencies (about 14,600 km). Details of roads maintained by the Department of Highways are summarized in Table 1-8.

Table 1-8 Road Network 1985

Authority Maintaining the Roads	Paved Bituminous Roads (km)	Unpaved Gravel and Earth Roads (km)	Total (km)
Department of Highways	20,693	4,773	25,466
Local Government Authorities	6,239	37,215	43,454
Department of Irrigation	308	2,370	2,678
Other Agencies	2,508	12,112	14,620
TOTAL	29,748	56,470	86,218

Source: Department of Highways *This figure increases slightly to 25,504 in 1987

For passenger service, public bus transport is at present provided by the Sri Lanka Central Transport Board (SLCTB), nine Regional Transport Boards (RTBs) and private bus operators. SLCTB and RTBs own and operate a fleet of about 7,250 buses.

Private bus operators mainly operate mini buses and the number of permits issued by the Department of Private Omnibus Transport of private operators in 1987 records 9,170 and their total seating capacity in about 206,000.

SLRTBs transported 16,027 million passenger-kilometers in 1987 and private omnibus operators slightly more.

It is reported that the shares of passenger service among the SLRTBs, SLR and private sector firms in terms of passenger kilometerage for 1987 are 45%, 7% and 48% respectively.

The road freight transport mainly depends on private operators who account for an estimated 70% of the trading fleet, with most of the companies being one-truck-one-operator firms. The road freight industry in the country is largely unregulated. There are no route and business licenses and freight rates are determined by market forces. Legislation on the load worthiness of vehicles and vehicle weight are the only regulations, and therefore the real figures of road freight transport is not clear.

The Sri Lanka Transport Sector Planning Study (1989) prepared by Louis Berger International Inc. listed the following figures for interzonal freight flow as of 1984.

Freight	
(Million ton-km)	
Rail	263 (19%)
Road	1,100 (81%)

Since the actual record for SLR in 1987 was 198 million ton-km, the share of railways in freight transport at present may be around 15%, and consequently the share of truck transport in freight ton kilometers around 85%.

Some of the performance indicators of public transport organizations for the latest 5 years are summarized in Table 1-9.

Table 1-9 Performance of Public Transport Organizations
1983 - 1987

	Sri Lanka Central Transport Board					Sri Lanka Railways				
	1983	1984	1985	1986	1987	1983	1984	1985	1986	1987
Growth of Passenger Kilometerage (%)	-11.7	- 3.1	- 6.4	0.8	3.8	21.6	- 6.8	- 7.9	- 6.1	- 4.6
Growth of Operated Kilometerage (%)	- 5.1	- 8.9	- 3.9	- 3.6	- 1.5	-17.6	4.9	-	- 7.1	2.5
Passenger Kilometerage per person	1,046	1,002	948	940	900	159	146	133	122	155
Total loss (Rs. '000)	395,830	494,859	449,840	274,934	140,298	452,501	521,967	65,394	289,207	401,124
Loss per Operated Kilometer (Rs.)	0.86	1.18	1.27	0.73	0.38	53.86	73.17	7.69	35.70	49.52

Sources: Sri Lanka Central Transport Board;
Sri Lanka Railways.

(3) Shipping

In Sri Lanka there is virtually only one shipping line. The Ceylon Shipping Corporation (CSC) was established as a private limited liability company in 1969 and became one of the important state enterprises in 1971. During the 1970s, CSC engaged in European and Far East trade by conventional vessels and started its container service for Europe in 1980. The CSC with strong government support, the Central Freight Bureau (CFB) in particular, has successfully expanded its container services. Presently, the CSC operates 11 container ships with a total capacity of about 8,900 TEU. For bulk transport, the Lanka Tankers, a subsidiary of the CSC, owns and operates one 30,000 D/W tanker which is used to import about one-fourth of the country's crude oil from the Persian Gulf. Total tonnage carried by the CSC has grown significantly. In 1980 Ceylon Shipping Line Ltd., a subsidiary of the CSC, introduced a coastal shipping service linking Colombo, Trincomalee, Galle

and the port of Kankasanthurai in Jaffna. However, this service was not successful due to various reasons.

(4) Air Transport

Nearly all passenger traffic to and from Sri Lanka is by air, including significant tourist traffic (about 183,000 passengers in 1987). The national flag carrier, Air Lanka, was founded in 1979 to replace Air Ceylon and has been offering international air transport services in the region and to Europe. Traffic indicators such as the number of passengers transported, the weight of cargo transported and the load factor for the last five years are shown in Table 1-10.

TABLE 1-10 Traffic Indicators of Air Lanka
(1983 - 1987)

	1983	1984	1985	1986	1987
Passengers ('000)	598	622	687	713	583
Cargo ('000 tons)	50	12	14	15	11
Load Factor (%)	63.2	61.6	57.4	61.8	59.5

The decrease in passengers and cargo traffic in 1987 is partly due to the measures taken by the new board of directors trying to recover financial soundness of Air Lanka. These measures were, among others i) to eliminate some unprofitable routes to Europe and ii) sale of two B-747s. As a result, the operating account, before interest payments but after depreciation, became positive in 1987.

Sri Lanka has only one international airport at Katunayake, about 20 km North of Colombo, administered by Airport and Aviation Services (Sri Lanka) Ltd. (AAS Ltd.). A modernization project was recently completed at the airport.