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Third Party Evaluation  
entrusted by JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
in JFY 2001 - 2002

# **COUNTRY PROGRAM EVALUATION OF SRI LANKA**

## **Annex: Program Evaluation**

October 2002

KRI International Corp.

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This report is made up based on data/information in April-May 2002 when the field survey was conducted.

The opinions represented on this report is belong to evaluation study team, which do not represent the JICA's ones.

## Program Evaluation List by Sector

Priority Sector	Program Name (Program Component)	Program Evaluation	Page
<b>Building and Improving Economic and Social Infrastructure</b>	*Improvement of The Rupavhini National Channel ( GA ) *Television Broadcasting Engineering (Dispatch of 4 experts) *Technology of color broadcasting (Third - color group training)	<b>Development of Television Broadcasting Program</b>	1-7
	*Study on Telecommunication Networks in Democratic Socialist Republic of Sri Lanka (Technical Assistance for Development Studies) *Maintenance of the domestic phone switching system (Dispatch of Experts) *International phone switching technology (Dispatch of Experts)	<b>Development of The Telecommunication Networks Program</b>	8-16
	*The Project for Construction of Mahaweli Road Bridge (GA)	<b>The Project for Construction of Mahaweli Road Bridge</b>	17-32
	*The Master Plan on Bridge Development in Sri Lanka(Technical Assistance for Development Studies) *The Project for Reconstruction of Five Bridges (Phase 1/2, Phase 2/2) (GA)	<b>Bridge Reconstruction Program</b>	33-45
	*Master Plan for Development of the Transmission System of the Ceylon Electricity Board (Technical Assistance for Development Studies)	<b>Program for Development of the Transmission System</b>	46-63
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	*The Project for Improvement of Refuse Disposal Management in Colombo (GA) *The Project for Improvement of Refuse Disposal Management in Colombo Metropolitan Area (GA)	<b>Program for Improvement of Refuse Disposal Management in Colombo Metropolitan Area</b>	83-91
	*The Project for Improvement of Drinking Water Supply in Rural Area (GA)	<b>Program for Improvement of Drinking Water Supply in Rural Area</b>	92-99
<b>Development of Mining and Manufacturing Industries</b>	*The Project for Establishment of Institute of Computer Technology, including the Follow-up (Project Type Technical Cooperation) *The After-care Technical Cooperation for the ICT Project (Phase 1) *The Third Country Training Programme (Phase-1: Structured System Analysis and Design Methodology	<b>Institute of Computer Technology</b>	100-105
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	*The Project on Quality Improvement of Textile and Clothing Products in Sri Lanka (Project Type Technical Cooperation) Quality Improvement of Apparel products (Third Country Training Program) *Short Term Expert on Dyeing	<b>The Quality Improvement of Textile and Clothing Products</b>	114-120
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## Program Evaluation List by Sector *(continued)*

Priority Sector	Program Name (Program Component)	Program Evaluation	Page
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	*Plan for Establishment of the Srijayawardanepura National Nursing School (GA) *Project for Nursing Education (Project type Technical Cooperation)	<b>Nursing Education Program</b>	219-228
	*Population Information Project (Project-type Technical Cooperation) * Dispatch of 2 expert,	<b>Information System Program</b>	229-237
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Note: Italic lettered project is additional one for evaluation afterward because the study team realized the relationship is high for component nevertheless it was not included in the first program evaluation list.

Building and Improving Economic and  
Social Infrastructure

## DEVELOPMENT OF TELEVISION BROADCASTING PROGRAM

### 1. Program Summary and JICA's Cooperation



Colombo



Operation Room

Studio

#### (1) Program Purpose

Sri Lanka Government wants to use television broadcasting as indispensable media to develop the country and improve the people's livelihood.

The Rupavahini National Channel is a television station which Japanese Government has cooperated from the early stage of the foundation, and Grant assistance has been conducted three times, in 1979, 1980, and 1984. However, the equipment of broadcasting and the building had become too old, and the technical problems in the program production, the technology of broadcasting reception, and the maintenance of the instruments have occurred, so that it has been hard for them to produce various programs. Therefore, Sri Lanka Government requested Japanese Government to conduct Grant assistance to update the broadcasting equipment and build a new building and dispatch the experts to strength the technology of broadcasting.

#### (2) Program Objectives and Overall Goal

The Program was executed in order to enrich TV programs and provide the people with high-quality information by the maintenance of the broadcasting equipment of the Rupavhini National Channel and the technical assistance to the staffs.

#### (3) Program Scope

Grant Assistance: Because the broadcasting equipment of the Rupavhini National Channel which is the only television station in Sri Lanka has become too old and the broadcasting may stop, we supplied them with the substitutes for the equipment which became too old or runs short.

Technical assistance: The technical assistance about the establishment of the management system of parts and materials for maintenance and the creation of the operation manual was conducted. Also we executed the technical aid to implement Third-country Group Training.

#### **(4) Program Component**

The Program consists of the following projects:

- Improvement of The Rupavhini National Channel (GA: Fiscal 1996/13.6 hundred million yen)
- Television Broadcasting Engineering (Dispatch of experts: 90.12–93/3, 93/9– 95/9, 95/9–97/8,97/8–99/8)
- Technology of color broadcasting (Third - color group training: 1988 – 1997)

#### **(5) Executing Agency**

The Rupavhini National Channel

#### **(6) Present Status of the Program/Viewpoint fro Evaluation**

Only Japanese Government supports the Rupavhini National Channel continuously. Therefore we can say that the aid by Japanese Government contributes to the improvement of the broadcasting ability of the TV station one hundred percent. In this evaluation, we pay attention not only to the direct effect by the aid but also to the ripple effect and we evaluate comprehensively.

## **2. Evaluation Results**

### **(1) Relevance**

Only Japanese Government supports the Rupavhini National Channel (Sri Lanka Rupavanini Corporation: SLRC ) in the cooperation of instruments and technology, and the purpose of Grant assistance of 1996 was to update and displace the instruments which had been supplied in Grant assistance of 1980's. Also the technical assistance in 1990's was conducted in the maintenance of the instruments which were supplied and the program production, so the relevance of the Plan can be approved from the viewpoint of improvement of the broadcasting ability.

The questionnaire survey to the persons concerned shows that the aid by Japanese Government to improve the technology of the television broadcasting and the ability of the program production is recognized to especially contribute to the human resources



development using a television program.

**(2) Effectiveness**

SLRC has attempted to improve itself in quality quantity it as public broadcasting by using the results of the past aid by Japanese Government. For example, the average broadcasting time per day which was 7.7 hours in 1990, extended to 16.9 hours in 2000, and to 18.0 hours in 2001. The broadcasting program has diversified, such as education, news, sports, music, and drama, and 41 programs were broadcasted averagely in 2001. (Table 1)

**< Table 1: Operation Indicators >**

Year	Average Number of Broadcasting Program per Day		Average Broadcasting Time per Day		Rate of Non-Coverage of TV Broadcasting	
	CH-1	CH-2	CH-1	CH-2	CH-1	CH-2
1990	N.A.	N.A.	7.7	N.A.	10%	N.A.
2001	26	15	18.0	10.0	10%	40%

Source) SLRC

Note) CH-2 opened in 1998.

Also the renewal of instruments by Grant assistance in 1998 provided stereo sound and bilingual broadcasting between Shinhala and English and Shinhala and Tamil. As the result of it, it seems to have contributed to the improvement of the racial differential related to TV viewing.

**(3) Efficiency**

The procured instruments<sup>1)</sup> were installed according to the plan and each dispatched expert conducted the task according to the schedule.

Also the questionnaire to the persons related to broadcasting and the study results of interview show that in the technical assistance by individual expert, they could not absorb their knowledge and experience one hundred percent because of the different languages, but they had a high opinion of the technical transfer.

**(4) Impacts**

The staff of the broadcasting station repaired the equipment which was replaced by the renewal of the instruments and other matters, and they opened CH-2 by themselves. The

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<sup>1)</sup> On the procurement of the spare parts of the instruments, the manufacturer guarantees the supply of parts for 10 years, and the parts for which they place an order with the local supplier are delivered without any delay. However it usually takes 3-4 months from order to delivery, so SLRC hopes the

implementation of Third-country Training which introduces the learned technology to circumferential countries seems to have contributed to the rearing of the necessary personnel in the TV broadcasting engineering in circumferential countries. The impact of the evaluation program is strong, such as unexpected effect and the contribution to circumferential countries.

Also in 1989, “OSHIN” was broadcasted in Sinhala and gained public favor. In the sense of improvement of understanding on Japan, the broadcasting station plays a role.

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

SLRC produces about 90 % of all programs by itself by making use of the results of the aid by Japanese Government. Also they opened a new channel by themselves and they conducts the maintenance of the relay facility by themselves. So we estimate that the ability related to sustainability is high. Moreover the capacity building, such as the implementation of the training program not only to the engineers and the staffs of program production but also to the management, is conducted sufficiently.

Until recently, SLRC has gained the income of about 150 million rupee for one year by adding certain broadcasting rates on purchasing TV set. But in 2000, the collection of the TV license fees was abolished according to the government’s policy, so that SLRC depends on the income from sponsors as well as other commercial broadcasting stations. Now it gains 100 % of the income from sponsors. It has to produce the programs which attracts sponsors because it cannot help depending on the income from sponsors, but it is a problem to secure the high quality of programs as public broadcasting without inclining toward the commercialism.

#### **(6) Other achievement**

The results of the past technical assistance by Japanese Government are shown in the form of the improvement of the staff’s ability, such as opening a new channel by the staffs themselves and other matters. Also in Third Country Group Training Program, the staffs of SLRC conduct the technical assistance and they earn participants’ good opinions about the contents of the training. We can say that this is also the results of the technical transfer to the counterparts of SLRC by individual experts.

#### **(7) Summary**

The procurement of instruments by Grant assistance is connected efficiently with the continual technical assistance, which contributes to the reinforcement of the ability to produce programs and the improvement of the staff’s skill in SLRC. And they introduce

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shortening of the period.

the ability which they obtained in the technical assistance to the projectionist of the circumferential countries by implementing Third Country Group Training and other matters. The relevance, the effectiveness, the efficiency, and the impact are extremely strong.

### **3. Lesson Learnt**

The continual technical assistance realizes and the cooperation between grant assistance and technical assistance makes the persistence and sustainability more strong.

### **4. Suggestion**

Because SLRC is a state-run broadcasting, it has an obligation to produce and provide the necessary programs from the political viewpoints, the development of the national economy and the society and the improvement of the national welfare. Today SLRC broadcasts two channels: One specializes public broadcasting even if it is difficult to get sponsors. The other specializes sports and entertainment which can get sponsors easily. By these self-help efforts, SLRC tries to secure the income of the broadcasting, and more management improvement is expected.

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
DEVELOPMENT OF TELEVISION BROADCASTING PROGRAM

**5. Annex**

**[PDMe]**

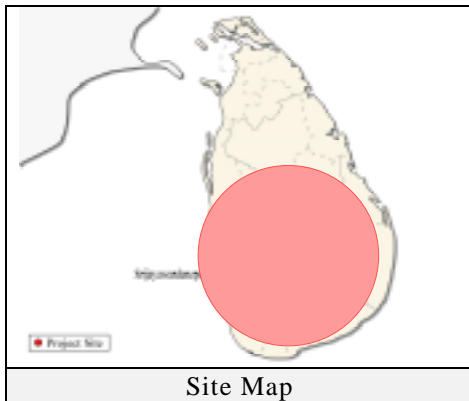
Summary	Indicators	Performances	External Conditions
<p><b><u>Overall Goal</u></b></p> <p>To enrich the programs, such as education, agricultural technology, and health care, and contribute to the development of the nation and the improvement of the public welfare by improving and reinforcing the system of television broadcasting</p>	* Growth rate of agricultural production	1991-1995: 2.3%, 1996-2000: 1.4%	Internal conflict
	* Death rate of babies	1980: 34, 1998: 16 (per 1000 person)	
	* Rate of illiteracy	1998: 6%(male), 12%(female)	
	* Net rate of school attendance (elementary)	1980: 96%, 1997: 100%	
	* Net rate of school attendance (secondary)	1980: 59%, 1997: 76%	
<p><b><u>Program Objective</u></b></p> <p>To improve and strengthen the facility and technology of television broadcasting</p>	* Average number of programs per day	2001: 26(CH-1), 15(CH-2)	Nothing in particular
	* Average broadcasting hours per day	1990-95: 10.7H, 1996-2001: 15.9H	
	* Areas with poor reception	CH-1: 10%, CH-2: 40%	
	* Rate of multilingual programs	3%	
<p><b><u>Project Objective</u></b></p> <p>1. To improve the facility and instruments of the broadcasting station (by getting instruments free)</p> <p>2. To improve the broadcasting technology (by individual expert)</p> <p>3. To improve the skills of participants (by Third Country Group Training)</p>	1 Specification of necessary equipment and materials	1 The following equipment and materials were supplied.	Nothing in particular
<p><b><u>Outputs</u></b></p> <p>Improvement of the Rupavhini National</p>	1.1 Exchange of transmitters of	1. The left equipment was supplied and the facilities were	Nothing in particular

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
DEVELOPMENT OF TELEVISION BROADCASTING PROGRAM

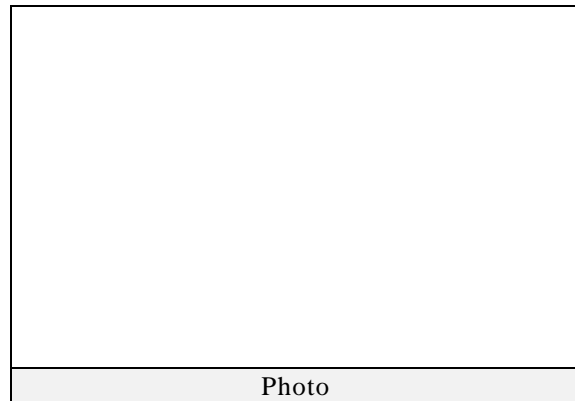
<p>Channel (GA)</p> <p>Completion of technical assistance by individual expert</p> <p>Implementation of Third Country Group Training</p>	<p>Bidortalagala key station</p> <p>1.2 New construction of Primrosehill relay station</p> <p>1.3 Supply of equipment and materials to produce and deliver programs to Colombo Broadcasting Hall</p> <p>2.1 Establishment of the management system of parts and materials for maintenance</p> <p>2.2 Creation of the operation manual</p> <p>3 Ex post evaluation by participants</p>	<p>constructed.</p> <p>2. The dispatch was continued.</p> <p>3. The left training and evaluation were conducted.</p>	
<p><b><u>Inputs</u></b></p> <p>Improvement of the Rupavhini National Channel (GA)</p> <p>Individual experts</p> <p>Third Country Group Training</p>	<p><b><u>Summary</u></b></p> <p>1 1.359 billion yen</p> <p>2 Television Broadcasting Engineering (4 persons)</p> <p>3 Joint auspices between SLRC and Japanese Government</p>	<p>1. Supply of equipment/ Construction of facilities</p> <p>2.1 Assistance of program production</p> <p>2.2 Technical assistance of operation and maintenance of instruments to produce programs</p> <p>2.3 Cooperation in implementation of Third Country Training</p> <p>3. Offer of equipment of SLRC and technology personnel</p>	<p>Nothing in particular</p>

## DEVELOPMENT OF THE TELECOMMUNICATION NETWORKS PROGRAM

### 1. Program Summary and JICA's Cooperation



Site Map



Photo

#### (1) Program Background

In the 14<sup>th</sup> (1992-96) and the 15<sup>th</sup> Five Year Public Investment Plan (1997-2001), the development of telecommunication is a high-priority field as well as the improvement of the productivity in industry, agriculture, service business, and others, and the reinforcement of the social infrastructure such as electric power and transportation. However, because of the social disorder caused by internal conflict and the delay of plan and design caused by the budgetary deficit, it was difficult to satisfy the increasing potential demand. In the light of this situation, Sri Lanka Government requested Japanese Government to aid the development for the purpose of reinforcement of the telecommunication networks. Accepting the request, Japan Government conducted the study on Telecommunication Networks in Democratic Socialist Republic of Sri Lanka and the dispatch of experts. In the evaluation, these projects are integrated into one program “Telecommunication Networks in Democratic Socialist Republic of Sri Lanka.”

#### (2) Program Objectives

Technical Assistance for Development Studies: To decide the master plan regarding the telecommunication covering all over Sri Lanka and to conduct the feasibility study of the high priority project.

Dispatch of Experts: To improve the switching technology of domestic and international call and to improve the maintenance of the switching system in Sri Lanka Telecommunication Corporation (at present: Sri Lanka Telecom Ltd.)

**(3) Program Scope**

Technical Assistance for Development Studies: After estimating the demand and traffic and deciding the standard of the target of Telecommunication Networks, Telecommunication Network whose target year is 2015 was designed and the high-priority project was selected.

Dispatch of Experts: About rearing of the persons who engages in the maintenance of the domestic phone switching system, and the technology of international phone switching, the technical assistance and the technical transfer were conducted.

**(4) Program Component**

The Program consists of the following three individual project.

- Study on Telecommunication Networks in Democratic Socialist Republic of Sri Lanka (Technical Assistance for Development Studies: 95.03-96.04/2.42 hundred million yen)
- Maintenance of the domestic phone switching system ( Dispatch of Experts: 95.09-96.09)
- International phone switching technology ( Dispatch of Experts: 95.09-97.02)

**(5) Organization which conducts the Program**

Sri Lanka Telecommunication Corporation (at present: Sri Lanka Telecom Ltd.)

**(6) Present Status of the Program/Viewpoint for Evaluation**

Since 1998, NTT has taken part in the management of Sri Lanka Telecom Ltd. and has conducted the technical assistance. At present it is difficult to evaluate “Effectiveness” and “Impacts” of the Program because NTT takes part in the management. And the evaluation of the Program becomes definite because the experts who was dispatched come back home during their tenure when the domestic conflict intensifies.

<b>2. Evaluation Results</b>
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**(1) Relevance**

The promotion of Telecommunication Networks was shown in the 14<sup>th</sup> Five Year Plan (1992-96), and individual project corresponded to the development plan of Sri Lanka Government.

However, after the Technical Assistance for development studies, Sri Lanka

Telecommunication Corporation was privatised and became Sri Lanka Telecom Ltd. (SLTL) in September of 1996 when Sri Lanka Government executed the policy which opens the telecommunication business to the private sector. Moreover, when NTT gained the stock of SLTL and took part in the management in August of 1997, the management system of the organization changed drastically.

Because the situation of the business has changed drastically like this, it is difficult to argue the Impacts of the Plan at present.

## (2) Effectiveness

By using the three kinds of operation indicators obtained from SLTL, the change of the development in 1990's will be pursued and the effectiveness of the target program will be evaluated (Table 1). The indicators to be used are: Telephone main lines in operation Waiting list for main lines Total capacity of local public switching exchange. "Phone line on standby" is the number of phone line which is not opened and is on standby in spite of making an application for telephone, and it is an important problem to reduce the indicators. Also "Total capacity of local public switching exchange" means the max number of subscriber phone line which can connect the subscriber's line to the switching equipment containing directly, and the increase of the number means the improvement of the telecommunication capacity. <sup>1</sup>

**< Table 1: Effect Indicators >**

(Unit: Line)

Year	Telephone main lines in operation	Waiting list for main lines	Total capacity of local public switching exchange
1990	121,388	47,945	N.A.
1991	125,834	66,574	159,667
1992	137,741	94,774	179,324
1993	155,475	123,839	216,858
1994	180,724	186,245	237,586
1995	205,943	227,198	271,250
1996	254,523	274,991	340,643
1997	315,865	283,782	428,447
1998	460,468	315,157	541,082
1999	579,202	262,844	766,295
2000	650,488	269,457	854,936

Source) SLTL

From the above data, the elongation percentage of each year was found, the times of

<sup>1</sup> Speaking strictly, the capacity depends on the subscriber traffic even if the same switching equipment is used.



1990's were divided into three parts; the period when Japanese Government aided, and the period when NTT took part in the management, and other period. The results are shown in the following table.

**< Table 2: Elongation Rate >**

(Unit: %)

		Year	Telephone main lines in operation		Waiting list for main lines		Total capacity of local public switching exchange	
Before the Program		1991	3.7	(Average) 11.2	38.9	(Average) 36.9	N.A.	(Average) 14.2
		1992	9.5		42.4		12.3	
		1993	12.9		30.7		20.9	
		1994	16.2		50.4		9.6	
		1995	14.0		22.0		14.2	
After the Program	Before NTT took part in the management	1996	23.6	(Average) 23.9	21.0	(Average) 12.1	25.6	(Average) 25.7
		1997	24.1		3.2		25.8	
	After NTT took part in the management	1998	45.8	(Average) 28.0	11.1	(Average) -1.0	26.3	(Average) 26.5
		1999	25.8		-16.6		41.6	
		2000	12.3		2.5		11.6	

When the average value of each indicators in 1991-95 in which Japanese Government did not start aid is compared with the one of the same indicators in 1996 and 97 when the Technical Assistance for Development Studies and dispatch of experts by JICA were conducted, we find that each indicators was improved greatly after the execution of aid. The results of questionnaire survey to SLTL say that the high-priority projects proposed in the Technical Assistance for Development Studies were executed partly or thoroughly, and it is thinkable that the assistance of Japanese Government contributes to the improvement of the indicators.<sup>2</sup> However, because NTT has took part in the management and the improvement of the management, the technology transfer, and others have been executed since 1996, it is difficult to pick out the effectiveness of the

<sup>2</sup> Before the field work of the evaluation, the questionnaire survey of each evaluation item was executed to SLTL. The evaluation items are: Relevance Effectiveness Efficiency Effect/Impacts Sustainability Effect of technical assistance.

Program.

**(3) Efficiency**

The Technical Assistance for Development Studies was executed according to the plan. After comments were given by Sri Lanka Government and required modification was conducted, the final report was produced. In the dispatch of experts to Sri Lanka Telecommunication Corporation, the working form changed from the work at office to the work at home and finally they could not help coming back home during their tenure because of the influence of terrorist activities, and in such situation the technology transfer could not been executed efficiently. So we can say that the external condition of the social unrest spoiled a part of the relevance of the Program.

**(4) Impacts**

As mentioned earlier, it is NTT that has impacted mostly the improvement of the management and the telecommunication technology of SLTL from 1997 up to now. We can guess that NTT influences SLTL more stronger than the reform of the management and organization which was proposed by the Technical Assistance for Development Studies, the advice for personnel development, and the effect of technical assistance by two experts. However, the questionnaire survey to SLTL shows that the persons who engage in the development of the telecommunication field recognize the development of the said field contributes to the improvement of the nation's life condition. And Sri Lanka Government made the loan contract with JBIC after the Technical Assistance for Development Studies, which shows that the items to be evaluated support the expansion of the foundation of telecommunication in Sri Lanka.

**(5) Sustainability**

From the change of the recent revenue condition, we can say that the revenue structure before 1998 was that the low domestic telephone charges had been covered by high international telephone charges, but they increased the domestic telephone charges by 20% individually in 1998 and 1999, while they reduced the international telephone charges by 8% individually. These revisions of the charges made the revenue foundation stronger. However, today the market of cellular phone has spread rapidly, so the influence to the revenue of SLTL which mostly depends on fixed telephone is worried about.

**< Table 3: Revenue Structure >**

(Unit: million rupee (%))

Year	1997		1998		1999		2000*	
Revenue of domestic telephone	3,648	(26.7)	4,999	(29.3)	7,488	(41.0)	8,733	(44.5)
Revenue of international telephone	8,880	(64.9)	10,486	(61.4)	8,580	(46.9)	8,181	(41.7)
Others	1,157	(8.5)	1,597	(9.3)	2,213	(12.1)	2,691	(13.7)
Total	13,685	(100.0)	17,082	(100.0)	18,281	(100.0)	19,605	(100.0)

Source) SLTL

Note) The value of 2000 is expectancy.

From the “fixed long-term relevance ratios” which shows the stability of financial affairs for a long period, we can say that the increase of the fund burden caused by the execution of the large-scale project makes the indicators worse, and the stability of financial affairs is worried about. (Table 4)

**< Table 4: Indicators of Management Analysis >**

Year	Fixed assets (million rupee)	Net assets + Funded debt (million rupee)	Fixed long-term relevance ratios ( = / ) (%)
1997	41,922	45,461	92.2
1998	48,652	50,027	97.3
1999	60,004	59,968	100.1
2000*	63,567	63,623	99.9

Source) SLTL

Note) The value of 2000 is expectancy.

On the other hand, after the establishment of SLTL, the service to customers, such as the introduction of ISDN, the extension of the operating hours, and the establishment of service stations, has been expanded. Moreover with the participation of NTT, the organization of SLTL was reformed, the organization structure was simplified, the decision making time was shortened, and the consciousness of employees has been changing.<sup>3</sup>

These circumstances show that the sustainability of SLTL has been reinforced by the organization reform and the improvement of service items but SLTL has unstable factors regarding the stability in the future operating revenue and the financial affairs.

<sup>3</sup> JIBC “Ex Post Evaluation Report 2000”

**(6) Other achievement**

While 2 experts were dispatched, Sri Lanka Telecommunication Corporation was targeted by LTTE as the terrorist activity and the staffs and experts could not conduct their duties in the Agency quietly. So the working form of the experts was changed from the viewpoint of safety measures and they had to come back home during their tenure. It is clear that this circumstance prevented the effective technology transfer. However the questionnaire survey says that the dialog between individual expert and the counterpart was conducted positively in each case, which shows they wrestled with the technical assistance in the difficult situation.

**(7) Conclusion**

The policy of Sri Lanka Government in the telecommunication field in the latter half of 1990's was to target the efficient development which makes use of the privatisation as a lever. So Sri Lanka Telecommunication Corporation which was the implementing agency of the evaluation program became a joint-stock company in 1996, and the management form has changed such as the participation of NTT in 1997, and. In the changing period, "Study on Telecommunication Networks in Democratic Socialist Republic of Sri Lanka" (95.03 – 96.04), and the Dispatch of Experts to Sri Lanka Telecommunication Corporation (Maintenance of the domestic telephone switching system: 95.09 – 96.09, International phone switching technology: 95.09 – 97.02) were executed. Grasping the effectiveness and impacts of this assistance to SLTL is definite because the impacts of the management reform and technical assistance by NTT are much stronger than one of the Program as the survey shows.

**3. Lesson Learnt**

The effects of the assistance and the impacts greatly depend on not only economic condition but also political and social conditions of the ages. Especially the dispatch of experts should be considered more carefully in the time when the state of society is unstable.

**4. Suggestion**

Nothing in particular

**5. Annex**

**【PDM<sub>F</sub>】**

Summary	Indicators	Performances	External Conditions	
<p><b><u>Overall Goal</u></b></p> <p>To improve the efficiency of the industry and contribute to the development of the economy by the improvement and progress of the telecommunication service</p>	* GNP per person	* US\$820 (1999)	Nothing in particular	
	* Human development index	* 0.735 ( 1999 )		
	* The rate of poverty (less than 1 dollar per day)	* 6.6% ( 1995 )		
	* Jini coefficient	* 34.4 ( 1995 )		
<p><b><u>Program Objective</u></b></p> <p>Improvement of the telecommunication service in quantity and quality</p> <p>2. Improvement of the efficiency of telecommunication service providing body</p>	* Direct Exchange Lines	Elongation Percentage 1991-1995      1996-2000 (%)		Development Policy (Promotion of privatisation)
		11.2                  26.3		
	* Waiters	36.9                  4.2		
	* Total Switching Capacity	14.2                  26.2		
* Revenue Structure (2000)	Domestic telephone : 44.5%, International telephone : 41.7%			
<p><b><u>Project Objective</u></b></p> <p>1. The Telecommunication Networks is conducted (based on the results of technical Assistance for Development Studies).</p> <p>2. The organization and system of SLT, and the ability of decision of Telecommunication Networks are strengthen.</p> <p>3. The technology of domestic and international phone switching is improved (as a result of Dispatch of Experts).</p>	<p>1 and 2. The following condition of the items of study report</p> <p>3. The degree of fixation of the technology</p>	<p>1 Two kinds of loan assistance which targets at Colombo capital region were executed.</p> <p>2 NTT influences significantly because NTT took part in the management (There is no cause-effect relationship with the Project.</p> <p>3 ditto</p>	<ul style="list-style-type: none"> <li>• Sri Lanka Telecommunication Corporation changed into a joint stock company.</li> <li>• Capital participation of NTT</li> <li>• Domestic conflict</li> </ul>	

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
DEVELOPMENT OF THE TELECOMMUNICATION NETWORKS PROGRAM

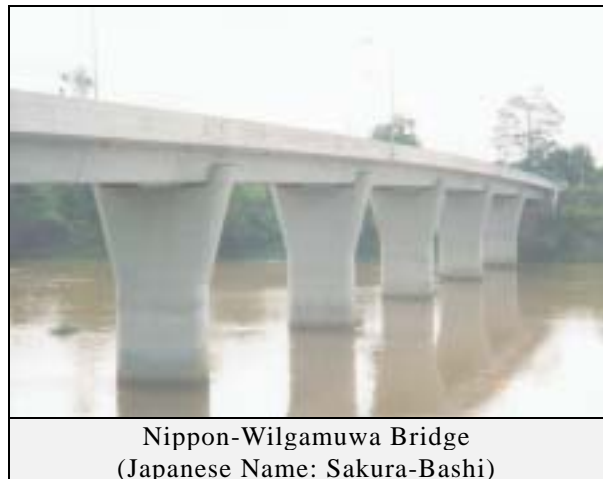
<p><b><u>Outputs</u></b></p> <p>Study report of study on Telecommunication Networks in Democratic Socialist of Sri Lanka</p>	<p>1.1 Estimate of macro telephone demand 1.2 Maintenance/operation plan 1.3 Personnel development plan 1.4 Organization/management plan 1.5 Impact analysis with the participation of private enterprisers 2. The transfer of phone switching technology</p>	<p>1. The left plan was decided. 2. The period of the dispatch was shortened and the original business plan was prevented.</p>	<p>1. Nothing in particular 2. Domestic conflict</p>
<p><b><u>Inputs</u></b></p> <p>Study on Telecommunication Networks in Democratic Socialist of Sri Lanka  Dispatch of Experts</p>	<p><b><u>Summary</u></b></p> <p>1 242 million yen 2.1 Maintenance of domestic phone switching system (1 person) 2.2 International phone switching technology (1 person)</p>	<p>1. Report on Technical Assistance for Development Studies 2.1 Technical assistance about the maintenance of domestic phone switching system 2.2 Technical assistance about operation and maintenance of the international phone switching equipment</p>	<p>Nothing in particular</p>

## THE PROJECT FOR CONSTRUCTION OF MAHAWELI ROAD BRIDGE

### 1. Program Summary and JICA's Cooperation



Mahaweli



Nippon-Wilgamuwa Bridge  
(Japanese Name: Sakura-Bashi)

#### (1) Program Background

In Minipe (population of the time: 75000) which locates on the left bank of the Mahaweli River running from the central part of Sri Lanka to the eastern part, the convenience of the transportation has been bad since the past and the development of the economic activities such as agriculture has been prevented. Mahaweli System C district <sup>1</sup>, the agriculture area which was developed under loan aid of Japanese Government, locates on the right bank of the river, and the standard of life in Minipe was lower relatively. Under this situation, Sri Lanka Government requested Japanese Government to cooperate in the decision of the development plan including Minipe area, and “Integrated Agricultural Development in Mahaweli District (F/S)” was executed by JICA in 1985-1986. In the Project, the following proposal was made: “The repair of the irrigation facility” and “the infrastructure and maintenance such as water supply, the repairs of the existing roads, the construction of bridges and access roads” should be given priority.

<sup>1</sup> System C is to arrange the life environment, secure the job opportunity, and attempt to establish and increase the agricultural production in the new farm land by developing the agricultural land of 18,500ha and immigrate 18,500 farm families and 6,500 non-farm families there as a part of the Mahaweli Development Promotion. This is the matter of joint financing among International Bank for Reconstruction and Development, Kuwait Fund, and Overseas Economic Cooperation Fund (Now Japan Bank for International Cooperation)

**(2) Program Objectives and Overall Goal**

To activate the economic activity of Minipe area on the left bank of the Mahaweli River, improve the standard of life in the area, and contribute to the equal development in the area on the right bank and the left bank of the Mahaweli River by maintaining the traffic infrastructure (road bridge).

**(3) Program Scope**

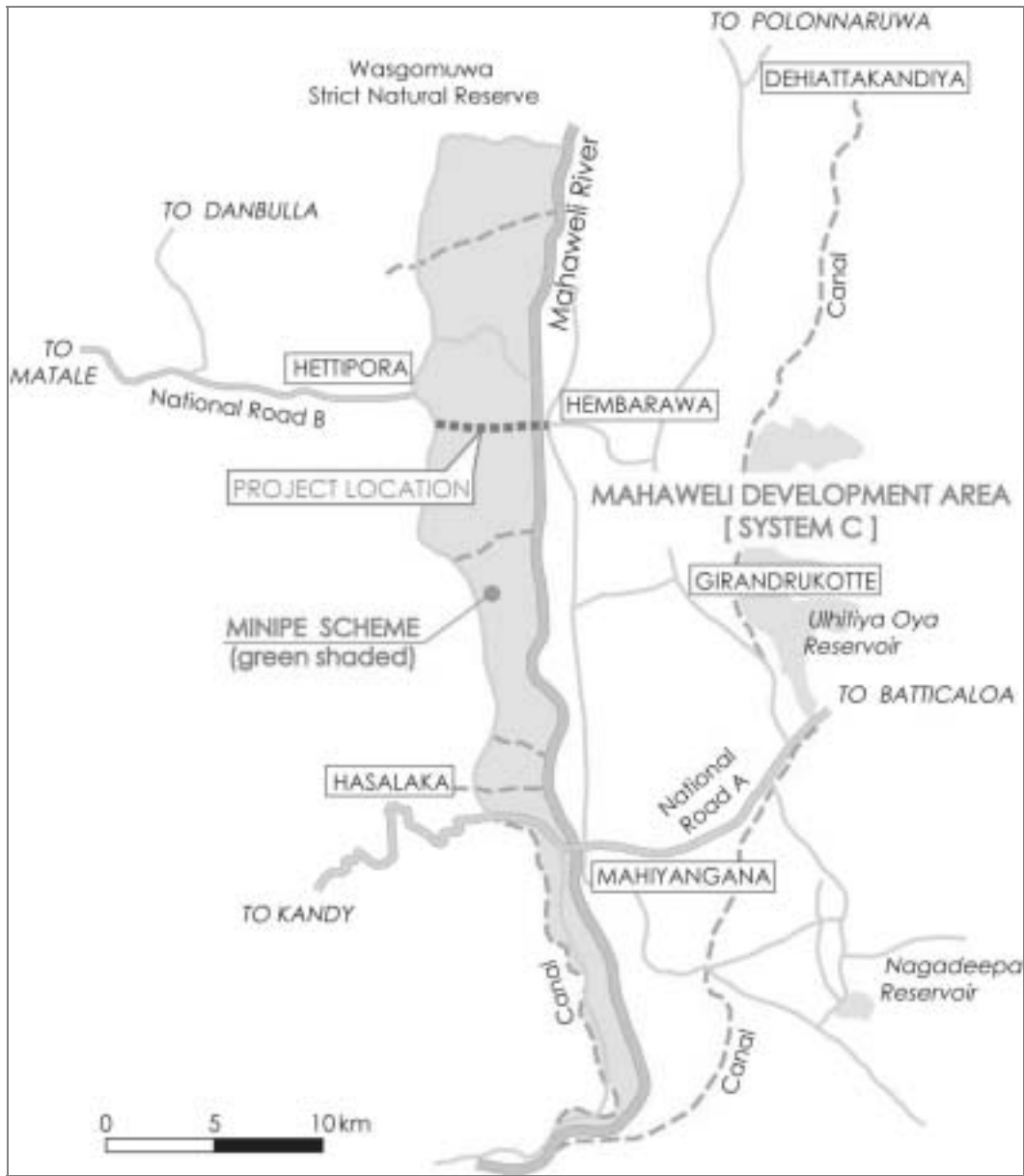
According to the above development project (F/S), Sri Lanka Government planed to divide the infrastructure in the said area into three stages and to execute each project under financial assistance by Japanese Government. Stage I and II included the road restoration, the new construction and repair of wells, and the maintenance of the irrigation system, and they were executed from 1989 to 1998. “The Project for Construction of Mahaweli Road Bridge” is Stage III which included the construction of bridges and maintenance of the access roads.

**(4) Program Component**

- The Project for Construction of Mahaweli Road Bridge (GA, 1995-1998: 2276 million yen)



< Figure 1: Location Map of the Project >



**(5) Executing Agency**

Ministry of Irrigation & Power Irrigation Department

**(6) Viewpoint for Evaluation**

The road bridge maintenance is the Project III under the Technical Assistance for Development Studies (F/S) which was examined in 1980's. About ten years have passed from the submission of F/S report to the execution of Grant assistance, which means that the relevance of project purpose should be considered carefully in the stage of the execution of Grant assistance. And in this evaluation, we will pay attention to the

Overall Goal of the Project, how the target road and bridge contribute to the equal development in the right bank area and the left bank area of the Mahaweli River and the function as a main route connecting the eastern part and western part of Sri Lanka.

## **2. Evaluation Results**

### **(1) Relevance**

When the Technical Assistance for Development Studies (F/S) was executed, there were great difference between the right bank area of the Mahaweli River and Minipe area in the standard of life and infrastructure (in the right bank area, system C development had been completed), the development in Minipe area was judged to be required extremely, and the project was given the high priority. About ten years had passed from F/S to the implementation, and during the period the special projects was not conducted in Minipe area, so that the gap between two areas was not closed in the standard of life and infrastructure. Therefore the relevance of the project purpose was kept even in the implementation stage.

Also the section of road bridge maintained in the Project is one of three sections where we can cross the Mahaweli River by road (other two sections locate in Mahitangana: upstream from the section of the Project and in Mahitangana : downstream from the section of the Project, and each section is about 40 km away from the section of the Project), and Road Development Agency (RDA) wants to promote the maintenance of the before and after road sections including this section and make it a main road connecting the eastern part and the central part of Sri Lanka. So the political meaning of the Project is kept even now in the meaning of the broad road traffic infrastructure.

### **(2) Effectiveness**

#### **2-1) Resolution of Area Dividing**

They expected that the completion of the Project will make the division of the both bank areas of the Mahaweli River in traffic resolved and will support the equal development economically and socially. When the evaluation study was conducted, the viewpoints of the evaluation, “the improvement of access to the facilities related to life (schools, hospitals, and others) which are located in the right bank area and left bank area of the River”, “the improvement of access to the agricultural market ‘Dambulla’”, and “the exchange between the both bank areas”, were set up, and the ex post condition was checked in the hearing to the related agencies (Irrigation Department and Road Development Agency). Also the beneficiary survey was conducted against the residents around the areas, and the investigation was executed from the viewpoint

of beneficiary. The evaluation about the resolution of the area division is as follows.

Because many facilities related to life, such as a hospitals and a schools, are located in the main villages (Girandurukotte and Mahiyangana) of the right bank area, many residents in the left bank area cross the road bridge on foot and by bicycle and visit their target facilities (once a week or everyday). On the other hand, there are many markets for daily necessities (shopping streets) in a village (Hettipola) of the left bank area and the residents of the right bank area visit it once a month. Before the road bridge had been constructed, the only method to move to another area is to cross the bridge which is located 40km upstream or downstream, or to cross the river on foot when the water level falls and the both areas were divided practically. But the completion of the Project dissolved the situation. And the beneficiary survey shows that one of the main reasons to visit another bank area by crossing the bridge is “to visit relatives and friends” and the reason is high rate (1 person out of 4 in the left bank area and 1 person out of 3 in the right bank area). As above, the Project functions effectively in the meaning of increasing the opportunity of exchanges of the both bank areas.

## **2-2) Facilities Utilization Conditions**

Here the traffic of the vehicles which pass the road bridge of the Project <sup>2</sup> is checked and the rate of utilization of the facility is evaluated. A checkpoint of the police is set up on the left bank of the target bridge (at foot of the bridge) permanently, and the staffs say that the rate of trucks to transport farm products and others is high on weekdays and the rate of passenger cars is high on weekend. The traffic volume is about 50-60 cars per day on weekdays and it reduces by half on weekend, about 25cars per day (April of 2002). As compared with the traffic at the defect inspection (1998) (about 100 cars per day on weekdays, about 200 cars per day on weekend), the both traffic on weekdays and weekend reduces by half. From the interviews to the staffs of the checkpoint and the residents, we can guess that the reason of the reduction of the traffic is the following.

First, about the traffic on weekdays, we can point out that the traffic of the trucks was light because the field work was conducted at the off-peak period of the crop season. Moreover the staffs of the checkpoint say that the vehicles from the eastern part have reduced since about 2000 because of the aggravated ethnic conflict.

On the other hand, about the traffic on weekend, the following reason is convincing from the information of the staffs of the checkpoint and the residents. There is a

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<sup>2</sup> About the traffic data relating to the Road Bridge, Road Development Agency has no appropriate ones so we only ascertained when we visited the site of the Project.

national park in the north of the left bank area (Wasgomuwa Strict National Reserve), and many people visit it every year. If they have access to the park from the western part of Sri Lanka (Kandy), the shortest route is [Kandy Hasalaka Hettipola National Park] (Figure 2, Route A), and they select this route usually. However, when the bridge was completed, at first many people selected the detour [Kandy Hasalaka Mahiyangana Hembarawa the Bridge Hettipola National Park] (same, Route B) because of the novel and beautiful style of the bridge, and they visited the Bridge on their way to the National Park. But today, a few years passing after the completion, the novelty of the facility has faded, and the usual shortest course (Route A) is selected again.

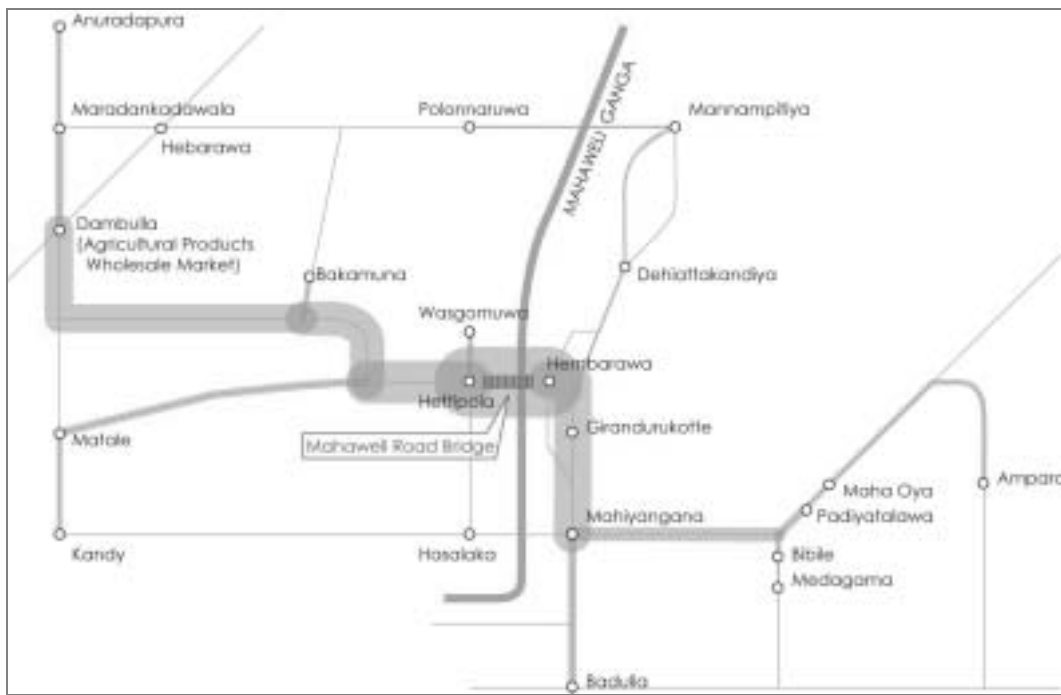
< Figure 2: Access Route to National Park >



### 2-3) Main Route between the eastern part and the western part of Sri Lanka

In Figure-3, OD sections (Origin and Destination) of the vehicles which pass the Road Bridge are shown. In the figure, the line of pink connects the origin with the destination, and the width of the line shows the traffic volume (Wider the line is, heavier the traffic is.)

< **Figure 3: Figure of OD Section of the Vehicle Passing the Road Bride** >



Note) This figure was created under the interview results to drivers (30 samples).

The above figure was created based on the definite information of a day on weekdays, so all OD<sup>3</sup> patterns are not shown. However as a basic item, we can indicate the following characteristics.

The traffic between Mahiyangana, a main village on the right bank area of the Mahaweli River, and Dambulla, where the best agricultural wholesale market in Sri Lanka is located, is heavy.

There is traffic to Ampara (east) and Anuradapura (west) which are distant relatively (more than 100km). There is also traffic from Kandy to Hettipola and Hembarawa by way of Matala, but it is not so heavy.

The Executing Agency said that most of vehicles passing the Project section were for the distribution to the agricultural wholesale market in Dambulla, and the figure shows the same thing. And though the traffic is light, there are traffic from (or to) the distant areas which are away more than 100km, Ampara and Anuradapura, and we can consider it the symptom of “the main route between the eastern part and the western part” which was expected at the planning. Today Road Development Agency has partly started the

<sup>3</sup> Abbreviation of Origin-Destination. It means the starting point and the end.

Road Project (widening and changing of line shape) in about 70km between Hettipola-Matale, and when the project completes, the traffic access to Kandy, the large city in the central part of Sri Lanka, will be improved. After the completion of the Project, the main route, Kandy — Matale — Hettipola — the Road Bridge — Hembarawa — Dehiattakandiya — Mannampitiya — the eastern area in Sri Lanka, will be reinforced and the increasing of the traffic is expected.

### **(3) Efficiency**

The project has completed according to the plan without the special changes in the range, the cost, and the implementation period. However, with a view to the above light traffic, we would have to say that the performance is low from the viewpoint of cost to effect.

### **(4) Impacts**

#### **4-1) Improvement of Female Job Opportunity**

There are clothing factories in the right bank areas of the Mahaweli River, Girandurukotte and Mhiyangana. After the completion of the Road Bridge, transport facilities, such as a bus, started the services (still at low frequency, one service per hour), and housewives of farming families in Minipe area of the left bank began to go out to factories. This case means that the completion of the Road Bridge increases the opportunity to gain cash earnings.

**< Figure 4: Housewives in Minipe waiting for the bus going to the right bank area >**



#### **4-2) Improvement of the Standard of Life**

Also Irrigation Department says that the completion of the Road Bridge improves the traffic access, so that many buyers of farm products visit the farmyard to purchase farm goods. In Minipe area, the previous trading form was buyer's market in which farmers brought and sold the products to a near village, Hettipola, but it changed to seller's market (sellers select buyers) in which a seller trades plural buyers. As a result, it is said that the profit increase has been realized. The profit increase of farmers in the area can be seen from the following change of matters.

**< Table 5: Change of the rate of holding household goods >**

Household	Before the Project	After the Project (Now)
TV Set	1 per 5 households	Almost all households
Car	1 per 100 households	1 per 30-50 households
Farm Machine (Tractors and others)	1 per 100 household100	1 per 10 househods10

Note) By Irrigation Department

The factor to improve the standard of life is not only the improvement of the traffic access of the Project but also other matters (for example, the improvement of the productivity by farming assistance, the effect of the production increase caused by the improvement of species of rice, and others). But if the traffic access had not been improved by the completion of the Project, the commercial products would not have been transported efficiently and the income would not have increased. So the Project is considered to greatly contribute to the improvement of the standard of life.

#### **4-3) Evaluation by Beneficiary**

The results of the beneficiary survey (a visit interview to 80 people in the both bank areas) which was conducted as a part of this evaluation study says that the respondents think that the completion of the Project has improved the traffic access and they are satisfied with the actual situation. Concretely the majority of them appreciate the following points: “Shortening of traffic time”, “Improvement of the security (on traffic)”, and “Improvement of the standard of life”. This results from 80 samples. So the statistic significance is low as impacts of the whole Project, but the Project is appreciated actively. More than 90 % of the residents knew the Project had been completed under the assistance by Japanese Government because the commemorative plates were established at the both ends of the bridge.

**< Table 6: Summary of the results of beneficiary survey >**

Questions	Target	Answer ( % ) N = 80
How is the traffic access improved? (SA)		
It was improved very well.		65 (81%)
It was improved to some degree.		15 (19%)
How are you satisfied with the bridge? (SA)		
I am satisfied very much.		70 (88%)
I am satisfied to some degree.		10 (12%)
What points are good? (MA)		
The traffic time shortened.		71 (89%)
The security was improved.		47 (59%)
It is convenient for the transportation of agriculture products.		28 (35%)
Stores and factories were constructed in the neighbourhood.		15 (19%)
Daily commodities are delivered on time.		22 (28%)
The standard of life was improved.		42 (53%)
Do you know the assistance by Japanese Government to the Project? (SA)		
Yes		74 (93%)
No		6 (7%)

Note) In the figure, SA indicates the alternative answer, and MA indicates the plural selective answer.

**< Figure 7: Commemorative plates where the sentences of the completion by Japanese Government Assistance are inscribed >**

(left: English, right:Shinhala)





## **(5) Sustainability**

### **5-1) Facility Conditions**

The Road and the Bridge are in good conditions, and the vehicles ride comfortably. Though it is a local road, the conditions which are equivalent to the standard more than the national road is kept substantially. But although there are outdoor lights which were set up in the Project, they do not function as illumination because the power supply is cut. When it was completed, electric power was supplied from the right bank area (Mahiyangana). But after that the supply was stopped because of some reason, and now it is being stopped. Some residents in the neighbourhood and drivers require the comeback of the illumination function to secure the safety in night run. It is desirable that the agency concerned (Road Development Agency which is a main body of maintenance) grasps the fact and handles it adequately.

### **5-2) Management System of the Facility**

The Road Bridge facility was planned to be transferred to Road Development Agency immediately after the completion (July of 1998). Even at the defect inspection in October of 1998, the sentences of "Irrigation Department has conducted the management and maintenance till the defect period. But the investigation is completed this time, so it is planned to be transferred to Road Development Agency." were described. The transfer procedure was expected to complete immediately after that. But, at the hearing to Road Development Agency at this evaluation, we found that the transfer procedure had not been completed. At the beginning of 2002, it was declared that the procedure to transfer the facility from Irrigation Department to Road Development Agency would start formally, and in April of the year the person in charge has just conducted the field work. At the time of the evaluation study (May of 2002), they say that they are still getting ready for the transfer. We can guess that this delay was caused by the lack of the adjustments in Irrigation Department, in Road Development Agency, and of the intermediation between the two. And Irrigation Department has taken responsibility for the maintenance temporarily from the completion to now. Because the level of the facility specification is high and the bridge structure itself is maintenance-free basically, the special repairs have not been required.

In the project of road and bridge, it is general that Road Development Agency becomes the implementing agency and the Agency keeps taking responsibility for the maintenance after the completion. This Project, in the character (the aim is to improve the standard of life in agricultural region), takes form that Irrigation Department is designated as the executing agency and it is transferred to Road Development Agency after the completion. The responsibility sharing form is not popular, which seems to influence the delay of the transfer procedure.

### 5-3) Technology

Here we will show the technical side of Road Development Agency which will take responsibility for the maintenance after this. In the following table, the information gained from the hearing to the Agency is classified each section. We can see that in Plan section and Implementation section, the quality and quantity is insufficient, but the special problem about the maintenance is not pointed.

**< Table 8: Actual condition and problem of organization and personnel >**

Section	Evaluation of Actual Condition
Plan section	Plans and personnel in charge are running absolutely. Broad range of planning ability such as Feasibility study, Economy Analysis, and Traffic Analysis, is required, but insufficient.
Implementation section	The number of personnel in charge is sufficient, but the technical level is low. Especially they are short of the knowledge and experience about the large bridge.
Maintenance section	Maintenance is under the control of the state branch of Road Development Agency, and we can see that the number of personnel and the technical level is in a certain level.

Note) By answer from Road Development Agency

On the training to keep and improve the technical level of the staffs, there is a regular training system which covers the technology of construction and the maintenance of road, and a general manual on the maintenance of bridges is prepared, so that the basic technical level is kept. At hearing to Road Development Agency, they do not say that they have no worries especially, so we consider that there is no technical problem about the maintenance of the Road Bridge improved by the Project.

### (6) Other achievement

In the evaluation, Irrigation Department which is Executing Agency says that it could gain the technology and knowledge about the bridge construction through the overseas training program at the implementation of the Project. On the other hand, Road Development Agency which will take responsibility for the maintenance after the completion says the following comments and reflections: From the viewpoint of smooth maintenance after the completion of the Project, Road Development Agency should have been Executing Agency. The communication between Japanese engineers and the staffs of Road Development Agency was insufficient in the basic plan and design stage. When we confirmed these matters to the consultant in charge of the plan and design of the Project, those days seemed to be under the conditions listed below in those days.

#### Road Development Agency should have been Executing Agency

At that time, a consultant (B/D Research Group) proposed to Road

Development Agency that the Agency should be an executing agency of the Project, but the Agency did not agree. This seems to come from the thought that the Agency was not under the situation which it accepted the proposal from the consultant easily because the Project was requested by Irrigation Department originally and the wall, vertical administrative system, stood in front of them, and that it had other high-priority bridge project.

**Exchange of Japanese engineers and Road Development Agency in the plan and design stage**

The consultant does not think that the communication between them was insufficient. He said that when he visited the Agency, he discussed the technology, and he proposed the dispatch of engineers from the Agency on the construction. As a result, the dispatch of engineers is not realized because it was prevented by the wall of the vertical administrative system that the executing agency is not Road Development Agency but Irrigation Department. And in the past, the dispatched engineer had left office after technical learning, so the Agency seemed to be too passive in exchange between the consultant and the Agency.

As above, in terms of technology transfer to the maintenance agency (it is secondary effect), it is hard to say that the Project achieved good success. If the technology transfer is conducted effectively and efficiently, it is desirable to execute it flexibly, such as the selection of the right person as a counterpart and a dispatched engineer form the right place.

**(7) Conclusion**

The bridge building project contributes to the increase and efficiency of the exchange between the both areas and the through traffic (dealing with the traffic from external area to other external area) by connecting the areas which are divided by the river. In this Road Bridge construction project, we can appreciate some progress on the activation of the exchange between the both bank areas and the supply of a new route. And we could find qualitatively that the improvement of traffic access raised the life convenience of the residents in surrounding areas, and lead to the acquisition of the job opportunity, the improvement of the income, and the improvement of the standard of life. In the future, it is expected that the road connecting to the section of the Project will be maintained smoothly and the position as east- west main route will be established.

### 3. Lesson Learnt

#### **The selection of executing agency in the light of the maintenance after the completion and the consideration of the transfer procedure:**

In this Project, the governments had made an agreement that Irrigation Department was designated, as executing agency and the facility would be transferred to Road Development Agency after the completion because of the background of the Project. But the transfer have not been executed smoothly (at the time of this evaluation: May of 2002 in the transfer procedure). This structure is high quality in specification and construction, so that large repairs have not been required. But when the same project is executed in the future, the following items should be taken notice of to establish the maintenance system smoothly after the completion: 1) The executing agency of the road bridge project is Road Development Agency basically. 2) If the agency except Road Development Agency becomes the executing agency because of the background and characteristic of the project, the maintenance body after the completion (for example: Road Development Agency) should be defined at the time of planning, a liaison conference should be established at the first of the project implementation, and the opportunity to exchange the information about the progress of the Project should be secured.

### 4. Suggestion

#### **Analysis of the cause about the delay of the transfer procedure:**

The persons concerned should hold consultations about the cause that the transfer procedure was not executed smoothly after the completion, and they should adopt measures to conduct the same procedure efficiently in the future. Although this case is only procedure delay of the administration, we should think that it is the phenomenon of so-called vertical administrative system, which exists in different ministries and agencies and we should make use of it as a lesson after this.

**5. Annex**

**[PDMe]**

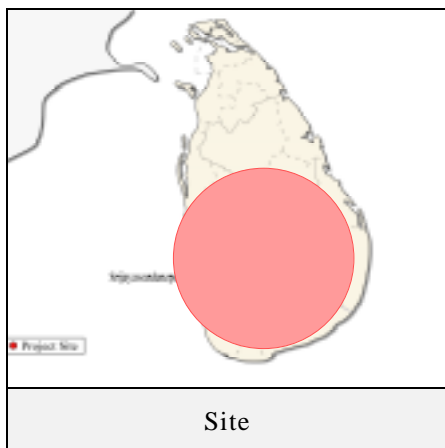
Summary	Indicators and Contents		External Conditions • Important Matters
	Indicators	Contents	
<b><u>Overall Goal ( IMPACT )</u></b>			
To become the main road section which runs from the eastern part to the western part of Sri Lanka, and contribute to the improvement of the convenience of the traffic between other ara.	1.1 (Passing) Traffic in the target road section (age value)	Traffic data according to types of car • OD	100 cars / day on weekdays 200 cars / day on weekend (Report on Defect Inspection)
	1.2 Actual situation of the road use	No data	
<b><u>Project Objective</u></b>			
To dissolve the division of the east bank area and the west bank area of the Mahaweli River, and develop the both areas in economy and society equally	Accessibility to public facilities (schools, hospitals) in the west area (Hettipola) from the east area (Hembarawa)	No data	The comparison of data of the east area and the west areas are required in each case. (East area = System-C area (Nagadeeba included) West area = Minipe ) Improvement of the existing roads connecting the both ends of the target Road Bridge sector Other related projects (Field of agriculture)
	Accessibility to the agricultural market	No data	
	Exchange between the east area and the west area (Population mobility)	No data	
	1.4 Indicator of the economic activity of the target area Agricultural output Gross production in area	No data	
	1.5 Indication of the standard of life Income and possession condition of property, such as TV set, car, and others	No data	

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
THE PROJECT FOR CONSTRUCTION OF MAHAWELI ROAD BRIDGE

<p><b>Output</b> Roads and Bridges which were constructed and repaired</p>	<p>1.1 Bridge (New construction)</p>	<p>l = 224 m, w = 10.4 m Superstructure : Continuous PC two-box girder bridge (7 spans) Substructure : 2 buttressed RC abutment, 6 reversed T-type RC piers Foundation: Spread Foundation</p>	<p>In report on the defect inspection (GA), special change is not reported. But after the completion, repairs and improvement were required in a part of the facility because of the problem such as the use condition by the residents. So in the period of the defect inspection, repairs and improvement were conducted. (Attached List 2)</p>
	<p>1.2 Connected roads</p>	<p>Length of left bank (west) : 4.80 km (to join up with road from Hasalaka to Hettipola) Length of right bank (east) : 0.35 km (to join up with the Dehiattakandiya-Giradurukotte road) Road Structure: Asphalt Concrete Surface of 50 mm over a 350 mm layer consisting of Base Course and lower Base Course. The Sub Base and Sub grade was the old road that existed.</p>	
<p><b>Input</b> The project for Construction of Mahaweli Road Bridge</p>	<p>Business expenses Period of construction work</p>	<p>2.2 billion yen 96.01-98.07</p>	

## BRIDGE RECONSTRUCTION PROGRAM

### 1 . Program Summary and JICA's Cooperation



#### (1) Program Background

In Sri Lanka where the people mostly depend on the road traffic for the inland traffic (cargo: 95%, passenger: 85%), they have conducted the maintenance of roads by making use of the funds from donors, but they could not afford to repair and reconstruct the existing bridges (the rate of bridge reconstruction of the time was about 20% because of the budgetary deficit and the lack of skills of Road Development Agency, an executing agency of the Road Bridge Sector). So the bridges had become too old and had been damaged extremely, and they had been anxious about the physical and artificial damage caused by the collapse of bridges. Also there was fear that the interruption of traffic by such accidents will have harmful influence on the economic activity of the regional society.

#### (2) Program Objectives and Overall Goal

To transfer the technology which contributes to the promotion of efficient and effective bridge reconstruction, and to support the reconstruction project of the bridge which needs to be repaired in top-priority in light of the degree of damage, the immediacy of reconstruction, and the economic development in the areas near the bridge.

#### (3) Program Scope

We designed the Master Plan on Bridge Development in Sri Lanka (Master Plan) according to the Technical Assistance for Development Studies (TADS), and proposed the system to judge the priority of repairing on the basis of the degree of bridge damage, the traffic importance, and the impact on the local economy in 4,000 bridges all over the

country. Consequently, we reconstructed, by two Grant assistance and Japanese bridge building technology, five bridges which were judged to be in the highest priority of the reconstruction.

#### **(4) Program Component**

The Program consists of the following three projects:

- The Master Plan on Bridge Development in Sri Lanka (95.03-96.07: 1.73 hundred million yen)
- The Project for Reconstruction of Five Bridges (Phase 1/2) (GA 1998: 4.68 hundred million year)
- The Project for Reconstruction of Five Bridges (Phase 2/2) (GA 99-2000: 6.04 hundred million yen)

#### **(5) Executing Agency**

Ministry of Transport & Highway, Road Development Agency (RDA)

#### **(6) Viewpoint for Evaluation**

The three projects consisting of the Program has not been evaluated, and the conditions of the effects after the completion and the conditions of the maintenance have not been confirmed sufficiently. In this evaluation, we focus on not only the actual conditions and the conditions of the effects of the bridges which were reconstructed with GA, but also the progress conditions of Bridge Development in Sri Lanka and the sustainability of which Road Development Agency has charge of the reconstruction of bridges.

## **2 . Evaluation Results**

### **(1) Relevance**

It is the necessary policy on the limited government budget that, while the bridges are decaying and being damaged, those conditions are evaluated objectively in light of technology, the influence on the regional society and economic activity is considered, the priority of reconstruction are elicited, and the reconstruction projects are conducted consequently. In this point, the design of the Master Plan on Bridge Development in Sri Lank (hereinafter the Master Plan) was reasonable politically, and as a result, it was also reasonable on humanitarian grounds that the bridge which was considered to be the most urgent in the repair was reconstructed with GA.

And at the evaluation, Sri Lanka Government considers that the improvement of the



traffic access is important from the viewpoint of the activation of economy in the whole country, so that the road sector including the bridge plays an important role still. Now it is said that the restriction of government budget is still severe, but the utilization of the judgement system of reconstruction priority proposed by the Master Plan is kept in terms of effective use of the budget.

## (2) Effectiveness

### 2-1) The Conditions of the Bridge Reconstruction

According to the performance number of bridge reconstruction (the following table: year value) after TADS, the rate of the progress is average 15 bridges per year though the value is different each year. TADS specified 253 bridges, which needed to be reconstructed, out of 4430 in the whole country according to the results of the sample studies of 100 bridges, and the Master Plan indicated the schedule that all of them would be reconstructed by 2010. However if the present space of the reconstruction is kept, the project will end in about 2015. <sup>1)</sup>

**< Table 1: The performance of reconstruction and repair of bridges >**

	1998	1999	2000	2001
The number of reconstruction and repair	11	23	13	11
Total	11	34	47	58

Source) Road Development Agency

Note) The performance numbers previous to 1997 were not known because of the inadequacy of the data.

Road Development Agency, an executing agency, says that finance of Sri Lanka became stringent because of intensification of the ethnical conflicts and others, so that we could not take the budgetary steps which were planed at first and the reconstruction tends to be late.

### 2-2) The Conditions of Technology Transfer Regarding Bridge Reconstruction Program /Execution

In TADS, the study and strength evaluation on the existing bridges were conducted by using a certain format. At the time, two different kinds of format were used in a steel bridge, and a concrete and other structural bridge, but after that they were revised, integrated into collective format, and it is used now. Also the Japanese experts who was dispatched after that reviewed the criteria of reconstruction priority, and proposed the

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1) In the medium-term budget planning in 2002-2007, the authorities request to reconstruct 118 bridges in total. If the appropriate budgetary steps are taken, it will be difficult to complete all repair construction in 2001.

rating method which gave rational results.<sup>2)</sup> Road Development Agency authorities want to judge the reconstruction priority of all bridges, about 4,400 in the whole country on the basis of such improvement.

On the other hand, on the bridge reconstruction project with GA, the executing agency said as follows: In Phase I, three small bridges (the length of span: 10~30m) were reconstructed, and in Phase II, two relatively large bridges (the length of span: more than 40m) were reconstructed. But, from the viewpoint of technology transfer which is thought to be secondary effect of GA, it would be effective that large bridges which were rare in Sri Lanka would be made target bridges. The small bridges were selected as the target bridge of GA because they were high-priority of repair in the damage and deterioration of the time, but the executing agency says that the equal-scale bridges could be reconstructed with the technology of engineers of Sri Lanka.

### **2-3) The Utilization Conditions and Effects of the Reconstructed Five Bridges**

The bridges which were reconstructed with GA are in good conditions (See Annex 2). The increase of traffic lanes (from one lane to two lanes) makes the traffic congestion ease, the access in the area was improved, also the safety of pedestrians was improved (establishment of sidewalks), and as above we found that the expected effects were almost realized. The traffic data (ADT: Average Daily Traffic) prior to and subsequent to the project could not be obtained, so that it is hard to analyze the change of the utilization degree according to the comparison of the traffic.

### **(3) Efficiency**

In both TADS and GA, the projects completed without changing the range, the period, and the costs of the project. And Road Development Agency says that the cooperation and exchange between the Japanese team and the Agency during the period of TADS were satisfactory, and we estimate that the useful guideline and the criteria of reconstruction priority in the promotion of the bridge reconstruction were completed as a result of the conditions.

### **(4) Impacts**

The Master Plan established on the basis of TADS is ranked as a substantial master plan relating to the bridge reconstruction in Road Development Agency authorities, and also the judgement system of reconstruction priority was established at any rate. The priority

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2) In the judgement system of the Master Plan, there were many cases in which plural bridges gained the same point indicating the priority of repair, so that personnel could not help deciding the priority after that. In order to resolve such flaws in the system, the criteria is weighted to make the points scattered. In this method, there is fewer room to be judged by personnel in the process of the judgement of repair priority, so the objectivity of the judgement is improved

judgement was widely applied to 500~600 bridges by the authorities, with collaboration from the Japanese experts who were dispatched after that, but the situation is far from the repair of 4,400 bridges in the whole country.

On the other hand, five bridges which were reconstructed with GA improved the traffic access in the neighbourhood (regularly), and the residents near them appreciated them. Figure-2 shows the results of the beneficiary survey which was conducted this time.<sup>3)</sup> The beneficiaries are much satisfied with the reconstructed bridges, and especially they appreciate “Shortening the traffic time” and “Improvement of the safety”.

**< Figure 2: Summary of the results of the beneficiary survey >**

Questions	Target	Gilimale Bridge N=72		Narthupama Bridge N=80	
How is the traffic access improved? (SA)					
• It was improved very well.		65	(90%)	77	(96%)
• It was improved to some degree.		3	(4%)	3	(4%)
• Unclear or no-response		4	(6%)	0	(0%)
How are you satisfied with the actual conditions? (SA)					
• I am satisfied very much.		64	(89%)	79	(99%)
• I am satisfied to some degree.		8	(11%)	1	(1%)
what points are good? (MA)					
• The traffic time shortened.		72	(100%)	80	(100%)
• The safety was improved.		66	(92%)	61	(76%)
• It is useful for the transportation of agriculture products.		46	(64%)	43	(54%)
• Stores and factories were constructed in the neighbourhood.		28	(39%)	23	(29%)
Do you know the assistance by the Japanese Government to the Project? (SA)					
• Yes		68	(94%)	77	(96%)
• No		3	(4%)	3	(4%)
• Unclear or no-response		1	(1%)	0	(0%)

Note) In the figure, SA indicates the alternative answer, and MA indicates the plural selective answer.

And it is well known that the bridges were rebuilt with the cooperation by the Japanese Government, and especially the Barthupama Bridge (Rainbow Bridge) is a steel arched bridge which is rare in the country, so that many sightseers visit it to take a picture, and in this way unexpected impact occurs.

3) It was conducted on the Gilimale Bridge which had been reconstructed in the first phase and the Narthupana Bridge which had been reconstructed in the second phase. Field work investigators went to the areas and the study was conducted in the visiting form with the aim to obtain 80 effective samples individually. (It was conducted in May of 2002.)

## (5) Sustainability

### 5-1) Personnel and Organization

Figure-3 shows the interview results to Road Development Agency. It shows that the skill level of Planning section and Implementation section is generally low. They say that the maintenance is in charge of the state branch and has no problem, but the special organization which was proposed by the Master Plan is not established.

**< Figure 3: Personnel conditions >**

Section	Actual Condition Evaluation
Planning section (47 persons)	Personnel who are in charge of plans are insufficient absolutely. The review of the Master Plan requires the broad planning ability such as feasibility study, economy analysis, and traffic analysis, but the skill level is low.
Implementation section ( 311 )	Personnel who are in charge of implementation are sufficient in the number, but the skill level is low. Especially they are short of the knowledge and experience about the large bridge.
Maintenance Section ( 379 )	The maintenance is under the control of the state branch of Road Development Agency, and we find that the number of personnel and the technical level is in a certain level. The Master Plan proposed the establishment of the organization which specializes the maintenance of bridge, but they think that there is no need to do it.

Source) Answer by Road Development Agency

Note) The number of personnel in each section is the number as of March 30, 2002.

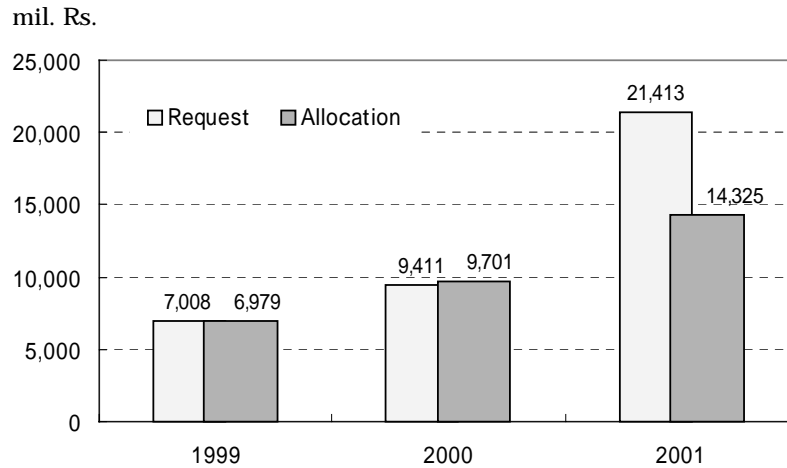
### 5-2) Technology

In the above, it is pointed that the technical level in planning and implementation is low, but this is also obtained from the training system of the authorities. There are regular training systems, but most of them relate to the construction technology and the maintenance, and the management skill such as the planning, the execution management, and the traffic management is not covered. Also Road Development Agency says that they have a general manual regarding the maintenance of bridge and they conduct the regular service and the maintenance, but they do not have a maintenance manual regarding to special structures like large span sell arched bridge, so that they worry about sufficient service to customers.

### 5-3) Finance

Figure-4 shows the budgets of Road Development Agency of the past three years. The budget data of only reconstruction could not be gained, so concrete conditions cannot be grasped. But the budget allocation changes smoothly. (In 2001 there is a large gap between requested sum and allocated sum because the contribution of the international fund is overdue according to the intensification of conflicts.)

**< Figure 4: The budget conditions of Road Development Agency (the requested sum and allocated sum)>**



\*By data from Road Development Agency

The Road Maintenance Project including the bridge reconstruction is assisted in technology by JICA, and in great finance by the Ministry of Foreign Affairs of Japan, Japan Bank for International Cooperation (JIBC), Asian Development Bank, and Kuwait Fund for Arab Economic Development, and they support the capital spending which the government budget cannot cover. It is important requirements for the secureness of bridge reconstruction funds that the assistance by each country is reopened regularly with the conclusion of conflict.

**(6) Other achievement**

In TADS, the technology to evaluate the conditions of the bridges was transferred, the foundations to judge the reconstruction priority comprehensively were established. But looking at the preceding conditions, the reconstruction schedule which was indicated in the Master Plan is late because of the shortage of personnel and budget. On GA, we estimate that the effects of technology transfer is secondarily achieved.

**(7) Conclusion**

The Program is the combination of the Technical Assistance for Development Studies and the concrete bridge reconstruction project with Grant Assistance after the studies, and provided them with the system; study planning creation of concrete project implementation of project. We evaluate that this flow had been established in the authorities, and we expect that the system will be reinforced by self-help efforts after this. And good function needs human resources and funds. However on the human resources, the personnel who take responsibility for planning is judged to be running

short especially, and the expansion of the number and the enrichment of the skill training are expected. And on funds, it is hard to refer because the detailed data regarding to the bridge reconstruction could not be gained, but if the special organization of the bridge maintenance is established, the budget can be allocated by themselves, so we think whether the establishment of the organization is right or wrong should be reviewed.

### **3 . Lesson Learnt**

#### **Establishment of the Nationwide Project with a Series of Assistance from the Study and Planning to the Implementation of the Project:**

The Program consists of the Technical Assistance for Development Studies and Grant Assistance (exactly the role of Dispatch of Experts is important too), formed the foundation of the large-scale project development, Reconstruction of Bridge, and contributed to the start. Though the project doesn't progress on schedule because of the financial stringency of the Sri Lanka Government, the political priority of the Project is still high, so Road Development Agency thinks that they should wrestle with it positively. In this Reconstruction of Bridge, though each sub project is small and self-complete, it seems to have had an impact upon the whole sub sectors appropriately. In other sub sectors such as the port development (Port of Colombo), electric power, and telecommunications, there was a case of the combination between Technical Assistance for Development Studies of JICA and Loan assistance of JBIC. It is considered as an effective approach in the intervention to the partner's sector in all Japan structure. The immediacy and mobility of the project are required strongly, and if sub project is small, the combination between Technical Assistance for Development Studies and Grant assistance is effective. On the other hand, the project requires over-concentration large-scale funds, the combination between Technical Assistance for Development Studies and Loan Assistance seems to become the base.

### **4 . Suggestion**

#### **Confirmation of the Safety Regarding to Old Bridges and prompt measures:**

On Narthupama Bridge, one of five bridges which were reconstructed, they made a public commitment to remove the old bridge at the completion of the new bridge. However, at the time of the evaluation (2000.05), the old bridge has not been removed yet, and is used as a footbridge. When we asked the Agency about the matter, they answered that they intended to remove the old bridge as soon as a new place to construct

it is found. We can understand the thought of the Agency that they want to convert available bridge at another place even if it is an old one, and though we are not going to exclude the idea, the safety is worried about because some of them were constructed more than 50 years ago. Consequently, the safety of the old bridge is checked technically, and we expect that appropriate measures to remove it will be taken as soon as possible if necessary.

## 5 . Annex

### [PDMe]

Program Objective and Overall Goal

Overall PDMe items with Input of the following program 1 and 2, Output, and Project Objective

Summary	Indicators and Plan /Performances		External Conditions/Important Matters
	Indicators	Plan/Performances	
<u>Overall Goal</u> <i>1. To support the achievement of the effect of road network maintenance in Sri Lanka, and to contribute to the economy development of Sri Lanka.</i>	<i>1.1 GDP 1.2 Statistical Data of the Traffic</i>	No data No data	
<u>Program Objective</u>			
1. To achieve the desirable impact of social economy in the area near the reconstructed bridge.	<i>2.1 Consciousness of the resident in the circumferential areas</i>	No data	
<b>Project 1 Input, Output, and Project Objective of “The Master Plan Study on Bridge Development in Sri Lanka”</b>			
Summary	Indicators and Plan/Performances		External Conditions/Important Matters
	Indicators	Plan/Performances	
<u>Project Objective</u>			
<i>1. (The Master Plan Study on Bridge Development in Sri Lanka) To design the master plan to specify the old bridges which needs to be repaired urgently and to contribute to the promotion of the intentional reconstruction work.</i>	<i>1.1 The number of bridge which were repaired or reconstructed. 1.2 The ratio of bridge which were repaired or reconstructed.</i>	No data About 20 % at the point of TADS	Is the bridge reconstructed according to the schedule based on the Master Plan? RDA should manage the plan in its own because of the technology transfer at the point of TADS.
<u>Output</u>			

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
BRIDGE RECONSTRUCTION PROGRAM

1. The Master Plan Study on Bridge Development in Sri Lanka	To create “The Master Plan on Bridge Development” and “Guideline of Inspection and Maintenance of Bridge” whose completion year is 2010 and whose objects are all bridges along National Highway A and the bridges to need urgent repair along National Highway B. The number of the target bridges in the Master Plan is about 100, and 10 of them will be examined in detail.		
<u>Input</u> 1. The Master Plan Study on Bridge Development in Sri Lanka XXXXX yen ( 19XX ) For 14 months from 1995.03 to 1996.05	Operation to divide 100 bridges of the study target into 3 groups according to the necessity of urgent repair, and estimate the budget and schedule.	No.1G: 35bridges ( 1996 – 2000 ) No.2G: 35bridges ( 2001 – 2005 ) No.3G: 30 bridges ( 2006 – 2010 )	
	1.2 Operation to apply the output of 1.1 extensively and estimate the budget on the target 253 bridges (including 206 bridges which had been selected by RDA) which were judged to need repair in 4,430 bridges selected by RDA.	No.1G: 86 Bridge 1,474 million rupee No.2G: 86 Bridge 1,030 million rupee No.3G: 81 Bridge 940 million rupee  Capital Requirement Total 3,445 million rupee	• They expect that the government budget which can be allotted for the bridge repair from 1996 to 2010 is 4,044 million rupee at the point of TADS, which can cover the bridge repair funds. But the fund shortage of 276 million rupee was expected in Phase I, 1996-2000. (Summary of the final report on the Master Plan Study on Bridge Development in Sri Lanka)
	1.3 Confirmation of economic relevance	No.1G ( 1996 – 2000 ) EIRR = 21.5 % CBR = 1.97 PV = 2.4 million Rs No.2G ( 2001 – 2005 ) EIRR = 35.9 % CBR = 3.80 PV = 3.1 million Rs No.3G ( 2006 – 2010 ) EIRR = 14.6 % CBR = 1.40 PV = 0.0 million Rs Whole EIRR = 24.5 % CBR = 2.44 PV = 1.7 million Rs Discount rate for the calculation of CBR and PV is 12% individually	



BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
BRIDGE RECONSTRUCTION PROGRAM

	<p>1.4 Investigation of matters related to nature and social environment</p>	<p>Indication of the necessity of IEE (Initial Environmental Examination) about 80 bridges (the following items) Resident transfer, Acquisition of the site Influence on the river utilization Traffic obstruction and safety of pedestrians under construction Other matters (ruins, cultural assets, views and others)</p>	<ul style="list-style-type: none"> <li>• Are thorough attentions paid to them in the bridge repair construction after that?</li> </ul>
	<p>1.5 Arrangement of proposal</p>	<p>To arrange the bridge register covering all bridges in Sri Lanka, and create the operation and maintenance program. To create the bridge maintenance manual. To establish the special organization of bridge management in RDA technical station. It is necessary to secure proper budget for the bridge management. The compatibility with Road Network Maintenance Program is necessary.</p>	<ul style="list-style-type: none"> <li>• Were the bridge register and the operation and maintenance program created?</li> <li>• Was the maintenance manual created? Or is it used effectively?</li> <li>Was the said organization established? If it has been established, how is the structure of the system, the activity, and the effectiveness?</li> <li>• How is the conditions of secureness of the budget about the bridge maintenance?</li> <li>• How is the compatibility between Road Networks Maintenance Program and Bridge Development? How is the compatibility conducted?</li> </ul>

Project 2 Input, Output, and Project Objective of “The Project for Reconstruction of Five Bridges (Phase I, II) (GA)”

Summary	Indicators and Plan /Performances		External Conditions/Important Matters
	Indicators	Plan/Performance s	
<u>Project Objective</u>			
<i>1. (GA) (About 5 bridges) To secure the safe and smooth road traffic by replacing the bridges with durable ones.</i>	<i>1.1 Data of traffic per day of the target bridge (the comparison of the data previous to the project with one in the present)</i>	<i>XX cars / day(each bridge)</i>	The Report says Replacing the bridges with durable ones made the traffic safe and smooth, but the grounds are insufficient. (The Report on Defect Study)
<u>Output</u>			

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
BRIDGE RECONSTRUCTION PROGRAM

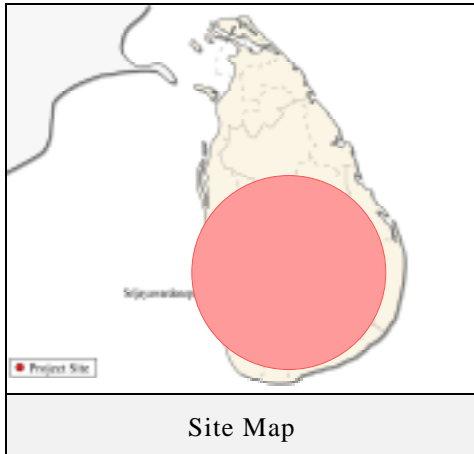
<p>1. The Project for Reconstruction of Five Bridges (Phase I,II) (GA)</p> <p>1.1 ( 1/2 Phase )</p> <p>No. 31 Moda Ela Bridge (Gol District, South State)</p> <p>No. 32 Bolawatta Bridge (Puttalam District, North West State)</p> <p>No. 38 Gilimale Bridge ( Rathunapura District, Sabaragamuwa State )</p>	<p>• Technical specification is shown in Attached List 1</p> <p>• The inaugural year of the service is shown in the right section</p>	<p>No.31: 2000. 4 Service-start</p> <p>No.32: 2000. 3 Service-start</p> <p>No.38: 2000. 4 Service-start</p>	<p>Three bridges which were reconstructed in 1/2 Phase have no special problem at the time of the defect inspection report (the Report on Defect Inspection) We have no data concerning two bridges of 2/2 phase.</p>
<p>1.2 ( 2/2 Phase )</p> <p>No. 33 Naruthupana Bridge (Kalutara District, West State)</p> <p>No. 70 Kospalana Bridge (Colombo District, West State)</p>		<p>No.33: 2001. 3 Start-service</p> <p>No.70: 2001. 5 Start-service (Confirmation is needed)</p>	<p>O&amp;M of the bridge is conducted according to the management program, but the regular inspection (once a month and after the monsoon season) based on the thought of the Preventive Maintenance ) needs to be firmly fixed. (the Report on Defect Inspection) Early detection and repair of inferior parts makes the durable year last appropriately and leads to the reduction of the cost of maintenance.</p>
<p><b>Input</b></p> <p>1. The Project for Reconstruction of Five Bridges (1/2, 2/2) (GA)</p>	<p>Business Expenses 1/2 Phase: 4.68 hundred million yen, 2/2 Phase: 8.78 hundred million yen, Total 13.46 hundred million yen (All is Grant Assistance)</p> <p>The period of construction work is as follows:</p> <p>(1/2 Phase)</p> <p>Basic design: 1998. 03 – 1998. 07</p> <p>Detail design: 1998. 10 – 1998. 12</p> <p>Construction period: 1999. 2 – 2000. 2</p> <p>(2/2 Phase)</p> <p>Basic design: the same as 1/2 Phase</p> <p>Detail design: the same as 1/2 Phase</p> <p>1.3 Construction period: 1999. 11 – 2001. 03</p>	<p>On the three bridges of 1/2 Phase, the design was not changed in the execution. (Completion Notification of The Project for Reconstruction of Five Bridges (1/2))</p> <p>In No.70 Koaparana Bridge, the changes of design such as reinforcement of bridge piers were conducted ( Completion Notification of The Project for Reconstruction of Five Bridges (2/2))</p> <p>There was no overrun in cost individually. (Completion Notification of each period)</p>	

**< Summary of the Study Results of the Five Bridges >**

	The Project for Reconstruction of Five Bridges (1/2) It was completed in February of 2000.			The Project for Reconstruction of Five Bridges (2/2) It was completed in March of 2001.	
	Bolawatta Bridge Puttalam District	Gilimale Bridge Rathunapura District	Moda Ela Bridge Gol District	Kospalana Bridge (Sunrise Bridge) Colombo District	Narthupana Bridge ( Rainbow Bridge ) Kalutara District
Facility	1 Span PC Slab bridge ( 14m )	1 Span Concrete bridge ( 25m )	PC Box Girder bridge ( 14m )	3 Span PC Slab bridge ( 42m )	1 Span Steel Arched bridge ( 75m )
Facility conditions	Good	Good  Buses come to go through the bridge, and a part of parapets of the bridge is broken because of the collision at the curve.	Good	Good  The curve of the connected road is an acute angle, so that large-size cars turn right or left with a little difficulty.	Good  The previous bridge which was constructed in 1943 (it was planned to remove after the completion of the new bridge) is used as the bridge for pedestrian even now. Problem in safety.
Effects/Impacts	The Bridge locates in the link section to a national road, and contributes to the improvement of the traffic utilization between Dankotuwa-Bolawatta. To ease traffic congestion in the front and rear of the Bridge.	It is useful for the transportation of goods from Tea Plantation in the circumference. It locates in the bus course for the pilgrims to Mt. Slipada near it (the peak is from January to May every year). It was a one-lane road so that the traffic congestion was heavy, but since it became two-lane road, the congestion has been eased. The area was hard to reach transportation before, and moreover in the rainy season the water collected and the upriver area were covered with water since the bridge had many piers. But when the bridge had one span, these problems were resolved. (Talk by the residents in the circumference)	The executing agency says that the traffic congestion backward and forward of the Bridge was resolved drastically.	It was a "one-lane and without sidewalk road", but after the reconstruction , it became a "two-lane and with sidewalk road", and the traffic comes to flow smoothly. The traffic congestion was eased and the traffic access in the area was improved drastically.	The shortcut between Matugama-Moratuwa was formed (reinforced) , and the distance of about 40 km was reduced. The bus lane which stopped on this side of the bridge before is extended. (beyond the bridge)
Note		In connection with the construction, the private lot was purchased. The compensation was sufficient so that some people built new houses by using it. ADT of 1995 was 240. ADT of 1996 was 450.年		• ADT of 1995 was 6,900.	The executing agency says that the old bridges would be removed as soon as they find a new place to transfer them.

## PROGRAM FOR DEVELOPMENT OF THE TRANSMISSION SYSTEM

### 1 . Program Summary and JICA's Cooperation



#### (1) Program Background

In 1990's, the sales of electric power increased over 8% per year, so it is the urgent problem that the electric power system including power facilities and transmission/distribution system should be expanded in response to it. Though the traditional electric system plan (master plan) had been developed with considering on the long-term power generation plan in the support program by World Bank, the system plan of transmission and distribution system was insufficient so that the design of the plan was required. The performance of Ceylon Electricity Board (CEB) which plays a central role of electric power sector was bad in the amount of supplied electric power (lack of power), the quality (potential drop), and the reliability of supply (electric power failure and system malfunction), so much improvement concerning these matters should have been conducted.

#### (2) Program Objectives and Overall Goal

The objectives of the project was to create national maintenance plan concerning the transmission system under the traditional long-term power demand estimate and long-term power capacity reinforcement plan which had been prepared by CEB, and to transfer the technology and knowledge necessary for the transmission system plan to the department of CEB through creating the plan.

#### (3) Program Scope

The study of development plan to create the future development plan of the transmission system by researching the actual conditions of electric system in Sri Lanka, the estimate

of power demand and the review of the development plan, the evaluation in economy and financial affairs.

**(4) Program Component**

- Master Plan for Development of the Transmission System of the Ceylon Electricity Board (TADS, 1996.01-1997. 01: 172 million yen)

**(5) Executing Agency**

Ceylon Electricity Board (CEB)

**(6) Present Status of the Program /Viewpoint for Evaluation**

After creating Master Plan for Development of the Transmission System of the Ceylon Electricity Board (Master Plan) according to the project, in 1998 two Loan Assistance projects concerning transmission and distribution system were adopted. In the evaluation, we pay attention to the technology transfer during the creation of Master Plan and the effectiveness of the plan, the output. Also we make a survey of the standard of the maintenance in present Electric Power Sector in Sri Lanka (including the transmission and distribution system) and classify the future problems.

<b>2 . Evaluation Results</b>
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**(1) Relevance**

It was thought that the expansion of the power supply system (power facilities and transmission and distribution system) was an urgent problem in response to the power demand which was expected to continue to increase. They had still priority over the expansion of power capacity by increasing the supply source of electric power. On the other hand, the old transmission system and the lack of power capacity lead to potential drop and the deterioration of the efficiency of transmission remarkably, so it is urgent necessity that they develop the stable power supply system by reinforcing the transmission and distribution system continuously. The objective of the study of development plan is to examine and design the development plan of the efficient and effective transmission system from long-term point of view, and we find that the relevance of the objective is sufficient.

Now, the concrete projects on the expansion of power capacity are as follows: long-term expansion of hydroelectric power which shoulders most of supplied power to Sri Lanka and CEB (development of large-scale dam and deployment of small hydroelectric power

in rural area), promotion of thermal power which is effective measures concerning the lack of electric power which grows into serious problem (including the introduction of private sector vitalization), and development of the alternative energy such as wind power and photovoltaic generation to reduce the load to environment. However they have priority over the development of hydroelectric power still. The development of transmission and distribution system is also necessary for the efficient transmission of the electric power generated, so they advance it. Now new power facilities are not constructed as scheduled<sup>1)</sup>, the steady development (new construction and renewal) of transmission system is effective to effectively transmit the electric power which is generated and increases in importance. (reinforcement and establishment of transmission system with little system loss and breakdown) Consequently we consider that the objective of development plan of transmission system is still held.

## **(2) Effectiveness**

### **2-1) Effectiveness of Master Plan and Technology Transfer**

The Plan for Development of the Transmission System which was designed in the study of development plan was located as overall goal of the transmission department of CEB, and after that the staff of the department revise it every year. Though it is located as rolling plan system in which the plan is revised every year after the study of development plan, the staff of CEB conduct the operation, so we consider that on technology, knowledge, and procedure concerning the design and review of the plan technology transfer was conducted sufficiently through the study of development plan. The latest plan is “Long Term Transmission Development Plan 2001-2010”, and they review the estimate of power demand each grid, and they review the priority of the project according to the results of many surveys concerning the development of electric power system.

### **2-2) Actual Conditions of the Proposed Urgent Project**

In the light of the conditions of transmission development at the time, the project which is considered to execute urgently was proposed in the study of development plan. Figure 1 of the next page shows the list of the projects. Six of fourteen projects in all are being conducting at the point of the evaluation. As two of the rest, eight projects, were reviewed after that, the urgency of the projects reduced and they are considered that they could be industrialized on CEB own budget. Six projects, the rest of them, are still in high urgency, but the procedure of fund raising is late. The projects are a few years behind schedule totally. In this point, we wonder if the capability of the industrialization of CEB including fund raising is sufficient.

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1) About the thermal electric power plant in Mawella which was expected to complete at this time, the project is frustrated because of the environment problem.

After the study of development plan, Transmission and Substation Development Project (TSDP) was conducted with Loan Assistance by Japanese Government. Some of urgent projects were industrialized: upgrading of 132kV Biyagama-Pannipitiya Line to 220kV, Construction of Ratnapura 132kV Substation, and Construction of Athurugiriya 132kV Grid Substation. In this way, the survey and plan assistance by JICA and the implementation assistance by JBIC collaboratively contribute to Development of the Transmission System in Sri Lanka.

**< Figure 1: The progress conditions of urgent projects proposed in the study of development plan >**

Project Name	Estimated year of operation commencement (estimated year of completion)	Business expenses		Note/Actual conditions	Source of funds	
		A: Original estimate	B: Actual business expenses			
		Foreign currency	Domestic currency			
Upgrading of 132kV Biyagama—Pannipitiya Line to 220kV	2000 (2003)	A	11,597	2,370	In progress	JBIC
		B	6,639	1,125		
Reconductoring of Kolonnawa—Pannipitiya 132kV line	2000	A	1,338	471	In review	CEB
		B	Yet to be decided			
Construction of Ratrapura 132kV Substation	1998 (2003)	A	8,907	2,316	In progress	JBIC
		B	2,644	576		
Construction of Aniyakanda 132kV Grid Substation	1998 (2003)	A	5,748	1,453	Under adjustment of budget	JBIC
		B	3,488	628		
Construction of Athurugiriya 132kV Grid Substation	1998 (2003)	A	6,549	1,629	In progress	JBIC
		B	3,398	573		
Construction of Sri Jayawardenapura 132kV Grid Substation	1998 (2005)	A	5,727	1,448	In progress	KfW
		B	3,871	1,048		
Construction of New Galle 132kV Grid Substation	2000 (2003)	A	5,858	1,482	Under adjustment of budget	In the air
		B	3,503	1,064		
Construction of Matugama—New Galle 132kV Line	2000 (2003)	A	6,886	1,783	Under adjustment of budget	In the air
		B	7,350	1,275		
Construction of Kelaniya 132kV GIS Grid Substation	2000 (2004)	A	11,528	2,336	Under adjustment of budget	KfW
		B	1,999	519		
Construction of 132kV Dehiwala Grid Substation	2000 (2005)	A	8,551	2,053	In progress	KfW
		B	6,670	1,227		
Construction of Kuliypitiya 132kV Grid Substation	2001 (2003)	A	6,368	1,687	Under adjustment of budget	In the air
		B	4,638	913		
Construction of Polonnawa 132kV Grid Substation	2001 (2003)	A	3,352	1,143	Under adjustment of budget	NOR AD
		B	2,363	506		
Construction of Ambalangoda 132kV	2001	A	4,882	1,275	Under	JBIC

Grid Substation	(2003)	B	3,052	1,010	adjustment of budget	
Construction of Hambantota 132kV Grid Substation and Embilipitiya—Hambantota 132kV Transmission Line	2001 (2002)	A	6,458	2,475	In progress	CEB
		B	4,230	708		
Total	--	A	93,479	23,921		
		B	53,845	11,172		

Source) Data from CEB ( End of 2002.04 )

Though the development does not progress as scheduled, the standard of development is improving as compared with that in 1995. Figure 2 shows the development conditions of key transmission lines (220kV lines and 132kV lines) and main substation, and each of them has an increasing tendency. Especially the total extension of 220kV Transmission line in 2000 reached double length of that in 1995.

**< Figure 2: Development standard of main transmission and substation facilities >**

	1995	2000
<b>Transmission Line</b>		
• 220kV Route Length (km)	168	315
• 132kV Route Length (km) *	1,294	1,405
<b>Grid Substation</b>		
• 220/132/33kV (nos.)	27	32
• 132/11kV (nos.)		2

Source) Ceylon Electricity Board

Note) \*: Excludes 296km of 132kV lines not in use due to disturbances in the North & East.

### 2-3) Ability of CEB Staff

A senior engineer who took part in the study of development plan at the time is Chief of the project for department, and many staff are still in the transmission department and engage in the promotion of the project for transmission system development. Some of them resigned from CEB and entered colleges to study the development of electric power again (it is not desirable in respect of the outflow of human resource), and they must be stimulated in the motivation of increasing individual technology and knowledge by the exchange with the Japanese experts team in the study of development plan.

### (3) Efficiency

The study of development plan was conducted as scheduled in scope, period, and expenses. It was reported that Japanese experts team and the staff of CEB worked jointly and closely in the selection and layout of substation of the plan operation, and we think they exchanged each other positively.



#### (4) Impacts

##### 4-1) Planned Expansion of the Capacity of Power Supply

As mentioned earlier, the study of development plan formed the foundation of the Master Plan in the transmission department of Electric Power Sector in Sri Lanka, after that it was revised every year, and Development of the Transmission System including substations has been renewed. The projects which have been executed include projects which were not listed as urgent projects in the time but added in consideration of the change of social and economic states and were changed in scope.

Figure 3 shows the change of the capacity of infrastructure in Electric Power Sector in Sri Lanka in 1990's. Installed capacity (MW), Maximum Demand (MW), Annual units generated (GWh), and sales have increasing tendencies consistently, and they are expected to increase in the future. For the stable supply of electric power, it is important to reinforce and expand the capacity of transmission and distribution according to the plan with the maintenance and improvement of the capacity of electric power. The study of development plan which formed the foundation of Development of the Transmission System with nationwide and long-term vision played an important role in Electric Power Sector in Sri Lanka.

By the way, CEB is satisfied with the study of development plan very much, and the basic concept, "To improve and expand the traditional tree-form (branched) transmission network into a ring-form (circle)" is being succeeded.

**< Figure 3: Performance of electric power supply and sales in Sri Lanka >**

Index	unit	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Installed Capacity [all Sri Lanka]	MW	1,289	1,409	1,409	1,409	1,409	1,410	1,575	1,636	1,691	1,779
Installed Capacity [CEB]	MW	1,289	1,409	1,409	1,409	1,409	1,409	1,542	1,542	1,593	1,593
Maximum Demand (= Peak Load)	MW	685	742	812	911	980	968	1,037	1,137	1,291	1,405
Units Generated [all Sri Lanka]	GWh	3,376	3,540	3,979	4,364	4,783	4,530	5,145	5,683	6,184	6,686
Units Generated [CEB]	GWh	3,376	3,540	3,979	4,364	4,783	4,223	4,495	5,155	5,551	5,362
Sales [CEB]	GWh	2,662	2,916	3,269	3,565	3,915	3,740	4,039	4,521	4,809	5,259

Source) CEB

##### 4-2) Expansion of the Target of Electric Power Supply

The expansion of the capacity of electric power supply is increasing the users who can

receive the power supply service. The change of household electrification ratio and consumer accounts in Figure 4 show an increasing tendency individually. It is supposable that other projects such as Electrification Program in Rural Area contribute to the increase of household electrification ratio and consumer accounts, and also the expansion of transmission network does.

**< Figure 4: Household electrification ratio and consumer accounts (number of consumers) >**

Index	unit	1995	1996	1997	1998	1999	2000
Household Electrification Ratio	%	45.0	46.8	48.3	52.4	56.6	61.2
Consumer Accounts	1,000	--	1,691	1,851	2,038	2,259	2,490
Average Per-capita Consumption	kWh	--	204	230	247	258	280

Source) CEB

#### 4-3) Efficiency of Electric Power Supply

The study of development plan advised to enrich the number and the technology standard of CEB technical staff and improve the efficiency of electric power supply. Figure 5 shows that the number of all employees is increasing gradually and the number of customers per an employee is increasing little by little. Also it shows that the number of customers per distance of transmission line is increasing gradually and the number of beneficiaries per constant cost increasing. It seems that the efficiency is being improved. However, on the other hand, the transmission loss ratio exceeded 20% again and indicated high value of 21.4% in 2000.

**< Figure 5: Relation between transmission loss ratio and number of employees and customers >**

Index	unit	1995	1996	1997	1998	1999	2000
Transmission and Distribution Loss	%	20.0	18.0	17.7	18.8	20.9	21.4
Total Employed	persons	13,930	14,039	14,054	14,329	14,409	14,599
Consumer/Employee	persons	--	120	132	142	157	171
Consumer/100km line	persons	--	2,800	3,000	3,100	3,200	3,300

Source) CEB

The transmission network is expanding gradually, while appropriate maintenance is not conducted, so that it seems that the transmission loss is going to mount. The cause of deterioration of transmission loss is classified into two types: system loss which results from defect and aging of the transmission equipment, and non system loss concerning the efficiency of maintenance which persons execute. System loss can be improved with comparative ease by renewing the system, but non system loss is human loss concerning

the maintenance activity. So the efficiency cannot be improved easily.

## (5) Sustainability

### 5-1) Personnel and organization

Figure 6 shows the change of the number of all staff of CEB. When we compare 1995 with 2000, about 670 persons increased in all (4.8%), but only 215 persons increased in the technical department (2.1%). The personnel of non technical department centre on clerical work increases relatively, and we can see that it suppresses the improvement of the maintenance efficiency in the organization. When we interviewed chief of transmission department of CEB, he pointed that the technical staff concerning the plan and development of the department are sufficient in ability but running short in number, so it is not easy to improve the operation effectiveness. Careful examination is required on the problems of personnel and organization, such as the number of all staff and the distribution of technical work and non technical work. In the light of the trend of simultaneous execution of the downsizing and the improvement of operation effectiveness which are requested of whole public sectors of the day, we think that CEB needs to improve the organization effectiveness by reducing the number of non technical staff. Moreover it is necessary to adjust engineering work and farm out a part of maintenance in order to avoid the long-term stabilization of human resource.

**< Figure 6: Change of number of technical staff and non technical staff >**

Index	unit	1995	1996	1997	1998	1999	2000
Technical Staff	persons	10,123 (0.73)	10,204 (0.73)	10,002 (0.71)	10,270 (0.72)	10,333 (0.72)	10,338 (0.71)
Non-Technical Staff	persons	3,807 (0.27)	3,835 (0.27)	4,052 (0.29)	4,059 (0.28)	4,076 (0.28)	4,261 (0.29)
Total	persons	13,930 (1.00)	14,039 (1.00)	14,054 (1.00)	14,329 (1.00)	14,409 (1.00)	14,599 (1.00)

Source) CEB

### 5-2) Finance

Figure 7 shows the change of performance of electric power sales. Gross sales has increased at average 10%, and sales revenue has increased at average annual rate of 15% in cooperation with the rise of average sales price. However average power cost is about 7 Sri Lanka rupee (performance of 2001) and exceeds average unit, and it is reported that it brings in back spread (according to the survey of World Bank.) The power charges policy of the government controls sales unit, so that CEB cannot improve the profit structure easily.

**< Figure 7: Performance of power sales of CEB >**

	1996	1997	1998	1999	2000
Gross Units Sold (GWh)	3,740	4,039	4,521	4,809	5,259
Average Sales Price (Rs/kWh)	4.01	4.15	4.46	4.43	4.53
Sales Revenue (million Rs)	14,983	16,782	20,176	21,304	23,837

Source) CEB

On the investment of new facilities concerning an electric power plant, a substation, and transmission and distribution network, there is a limit to CEB to obtain funds itself, and it depends on Grant Assistance from international organizations and other countries (Asia Development Bank, Japan, Germany, and others) for most of the funds. Though more demand of capital investment is expected, the earning capacity and finance of CEB cannot lead to the realization.

### **5-3) Problem of Electric Power Sector**

The electric power sector in Sri Lanka improved the supply capacity gradually in 1990's. However, because of long-term planned electricity failure which has been conducted since July of 2001 in connection with lack of rainfall, and the negative spread in sales, the surroundings around CEB is severe and the future state of it is made an issue of socially. There are two issues mainly. First, how does it solve the insufficiency of the power supply (capacity) to demand as seen in the execution of the planned electricity failure? Secondly, how does it solve the problem between the price control by the government and the high cost tendency? We will classify the contents according to the issue hereafter.

#### **1) Insufficient and Unstable Supply Capacity**

The shortage of rain since 2000 has reduced the available storage capacity of hydroelectric dams shapely, so the planned electricity failure of 1 hour per day started in July of 2001. The water shortage grew into a serious problem gradually, and consequently the planned electricity failure of 8 hours per day was conducted from September to December of the same year. After that, in the middle of December, it was shortened to 1 hour per day, but early in the new year it was extended to 2.5 hours per day. At the time of the evaluation (2002.05) the planned electricity failure is still continued, and the state of power supply is still unstable.

Such conditions have a damage effect on economic and industrial worlds. Apart from large enterprises and large plants which are equipped with their own generator sets, for medium and small companies and plants which make

up the majority of the industry sector, unstable power supply means unstable operation, namely unstable management. The restriction on hydroelectric also have a damage effect on the management of CEB. They purchased part of shortage electric power which could not be supplied by their own hydroelectric, and they sold it to end users. But the purchase unit cost (7.20Rs/kWh) exceeded the sales unit cost (5.53Rs/kWh), so negative spread was generated and the loss of 1.5 billion Sri Lanka rupee (equivalent to 28.9 billion Wh) was added together in fiscal 2001. Under a strong influence of it, CEB generated the business deficit of 9 billion rupee and could not pay 4.5 billion rupee which should be repaid to the government. If it is a transient phenomenon, it will not take on immense importance. But the radical cause is said to exist in the basic attitude which Sri Lanka Government have taken to Electric Power Sector, namely the electric power development policy which is partial to the hydroelectric. This matter was already pointed out in the first half of 1990's, and since then the development of thermal power plants (e.g. Upper Cotamare) was planned and would be conducted, with the development of large scale hydroelectric power plant (e.g. Mawera). However they faced the opposition of ecology movement and others which have become active since the latter half of 1990's, and the progress is late drastically.

It is clear that the first problem of Electric Power Sector in Sri Lanka is to establish the system of sufficient and stable power generation. To solve the problems, with keeping the power demand, which is expected to increase much more, firmly in mind, they must execute the following matters: to aim at the system in which the base power source is thermal power for medium-term and long-term targets with hastening the completion of the development of hydroelectric power (the construction of Upper Cotamare 2) is already late more than five years), and to change the role of the hydroelectric development form the traditional base power source to middle peak response which depends on the change of demand. In addition to the above planned electricity failure, the breakdown caused by the failure of the system is also regarded as questionable. To solve it, it is necessary to renew old system promptly and to reinforce and expand the system of personnel and organization which can respond to urgency immediately and accurately.

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2) Hydroelectric power plant which will be constructed in the Cotamare River, arm of the Mahavery River, in inland of Sri Lanka, and its facility capacity is 150MW. The industrialization was too late because of environmental problem, but the project plan was reviewed to minimize the environment burden with special Loan Assistance (33.3 billion yen, signed on March of 2002) by Japanese Government, and the facility which satisfies both the stable power supply necessary for the economic growth and the environmental conservation is under construction.

## **2) Problem between Price Control and High Cost Tendency**

The current power charge is set up at the Cross Subsidy system, in which the price for industry is high, and the price for living is low, under the price control of Government which takes the capacity of economic burden of users consideration. It compels CEB to get to the situation where average unit price (about 5.5Rs/kWh) is under average cost (about 7.2Rs/kWh). CEB wants to raise the rates by 30% to cover the current cost, but the control by Government complicates it. The only method to improve the cost subject to the rate system is to improve the power supply system of CEB. It is the quick and easy method of the fixed cost reduction to streamline the increasing personnel, and simultaneously it is effective to reduce the transmission loss. If the transmission loss of over 20% is reduced to 15%, 350 billion Wh is cut for a year by estimate, which is relevant to the capacity of a (thermal) power plant of 50MW. The re-maintenance and renewal of the existing transmission and distribution network are requirements to dissolve imbalance between sales and costs, and they have to advance it promptly.

### **(6) Other achievement**

We think that the skills of study and planning which were transferred in the planning design process are firmly fixed to the staff of CEB and they are used effectively at the review of the plan which is executed every year.

### **(7) Conclusion**

“Master Plan for Development of the Transmission System of the Ceylon Electricity Board” which is the results of development plan study formed the base of the Master Plan in transmission department of CEB. The concept in which the transmission network is upgraded by changing from the traditional tree form to the ring form, holds its effectiveness, and according to it, a sub project is being executed. Also judging that the concrete project concerning the transmission network is executed according to Loan Assistance project after the study of development plan, we can say that this is a good example of Japanese Government’s support to the infrastructure maintenance of Sri Lanka by the cooperation of JICA and JBIC.

### 3 . Lesson Learnt

#### **Cooperation of Technical Assistance and Loan Assistance:**

In the infrastructure department, there are many cooperation patterns in which JICK conducts development study, and JBIC supplies Loan Assistance against the project which was listed in the study (cf. development of Colombo Port, Development of Telecommunication Networks). The Project is similar, and after the design of the development plan, some Loan Assistance concerning development of the transmission system was supplied. The method has a flow of study, planning, and embodiment of project, and it is actual approach when intervening in the sector of partner country. It is desirable to reinforce the cooperation between them as much as the present time.

### 4 . Suggestion

#### **Improvement of the Management Capacity of the Project:**

It is necessary to improve the personal ability concerning the management with the improvement and renewal of hard system such as transmission network.

#### **Establishment of the Power Supply Structure which is not Partial to Hydraulic Power:**

In Sri Lanka which is not rich in fossil fuel, it cannot help depending on hydroelectric power generation. But in the light of the progress conditions of the hydroelectric power development, the nature that the power supply capability depends on the climate condition is not improved unless the substitute for it such as thermal power is expanded. It is important to secure the substitute power such as thermal power, wind power, and photovoltaics in rural area, and to reinforce the concrete measures concerning it.

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
PROGRAM FOR DEVELOPMENT OF THE TRANSMISSION SYSTEM

**5 . Annex**

**[PDMe]**

Summary	Performance Indicators and Plan/Performance		External Conditions/Important Matters
	Indicators	Contents	
<p><u>Overall Goal</u> To appropriately and independently promote the maintenance of Electric Power Sector in Sri Lanka, especially the transmission network.</p>	<p>1.1 Indicators which show the performances of the transmission system.</p>	<p>Total extension of the transmission system Age performance of power demand capacity Age performance of sales power capacity (sales power capacity by customer) Nationwide electrification population and electrification ratio Loss rate of transmission and distribution</p>	<p>&lt; Cooperation with Loan Assistance Project &gt; The following two Loan Assistance projects were adopted in September of 1998. Transmission and Substation Development Project Medium Voltage Distribution Reinforcement Project</p>
<p><u>Program Objective</u> 1. To improve the technical standard concerning the operation of the transmission system plan, and to independently conduct the plan and design and the execution.</p> <p>2. To transfer the technology to C/P through the operation of Master Plan design.</p>	<p>1.1 The review of the plan after the design of Master Plan and the conditions of project realization.</p> <p>1.2 The technology transfer in the operation of Master Plan design</p> <p>1.3 Active state of participating C/P</p>	<p>No data</p> <p>No data</p> <p>No data</p>	<p>The operation concerning the maintenance of facilities should be conducted appropriately. The maintenance group is organized relatively well, but the maintenance manual is incomplete. Manuals, drawings, and data are not stored appropriately. The maintenance skills of new technology are not established. Qualified engineers are insufficient. Is the maintenance plan progressing? How is the feasibility of Master Plan?</p>



BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
PROGRAM FOR DEVELOPMENT OF THE TRANSMISSION SYSTEM

<p><u>Output</u></p> <p>1. Completion of Report on Master Plan Study for Development of the Transmission System of the Ceylon Electricity Board (Master Plan)</p>	<p>Classification of problems in the existing transmission system</p> <p>Development plan of transmission system</p> <p>Urgent plan</p> <p>Classification of administrative arrangement items (conditions) concerning the promotion of the plan</p> <p>Advice concerning the whole plan</p>		<p>On condition that all transmission system plans which have obtained funds at the time of the development study will be realized as scheduled. (Report on the Development Study)</p> <p>In the Report on the Development Study, the following sentences about the development plan of transmission system, “The close discussion with the engineer of CEB was conducted about the location of added substation for distribution.” and “ The power flow plan was designed by C/P engineers of CEB.” are included. Is the plan capacity of CEB heightened sufficiently ?</p> <p>How does the rate system change?</p> <ul style="list-style-type: none"> <li>• How has the sub project been realized after that? Has the enough study been conducted (especially environment assessment) ?</li> <li>• The conditions of administrative system, rate system, and funds supply (by the government).</li> </ul>
<p><u>Input</u></p> <p>1. Master Plan Study for Development of the Transmission System of the Ceylon Electricity Board</p>	<p>172 million yen 1</p> <p>For 13 months from 1996.01 to 1997. 01</p>	<p>Study activity in the following items</p> <p>Actual condition of power system</p> <p>Estimate of power demand and development plan of CEB</p> <p>Development plan of transmission system</p> <p>Evaluation in economy and financial affairs</p> <p>Reduction of energy and loss</p> <p>Environmental preservation plan</p> <p>Future funds plan</p> <p>Design of working plan of urgent plan</p>	

## **Transmission and Substation Development Project (II)**

### **Loan Assistance of September of 1998**

Loan ceiling: 4,030 million yen

Interest: 1.8% (body) 0.75% (consulting service)

Redemption period / Deferment period in it : 30 years/10 years (body), 40 years/10 years (consulting service)

Procurement condition: general untied (body), Two countries tied (consulting service)

#### **(1) Necessity of the Project**

Recently Sri Lanka have achieved the economic growth of an annual rate of 5-6%, and the importance of Electric Power Sector which supports economic and social activities has increased every year. The electrification ratio of Sri Lanka was less than 45% in 1996, so the promotion of electric power spread is expected in order to improve the living standard of nation. Also the stabilization of electric power supply is an important problem to support the positive foreign capital introduction policy from the viewpoint of the investment environment maintenance. In the future the electric power sales in Sri Lanka is expected to increase at annual rate of 9-10%, so the planned development of electric power resources and the maintenance of transmission and distribution network are required in order to secure the stable power supply.

The traditional investment to power facilities in Sri Lanka is partial to power generation facilities and the maintenance of transmission and distribution network from the viewpoint of medium-term and long-term have not been conducted. So the shortage of the capacity of transmission system becomes problems and the electric supply reliability and the quality of electric supply such as voltage and frequency are under unstable conditions. To improve this situation and establish the power supply system which is nationwide, stable, and high-level, at the request of Sri Lanka Government, Japan International Cooperation Agency (JICA) Master Plan (Master Plan Study for Development of the Transmission System of the Ceylon Electricity Board) was created in 1997. In the Master Plan, the nationwide development policy of the transmission system till 2015 is proposed according to the demand expectation. In this project, the project which is proposed in the Master Plan will be conducted after "Transmission and Substation Development Project" (3,114 million yen) whose L/A was concluded in August of 1997.

#### **(2) Contents of the Project**

In the project, the following six sub projects (small project) which are urgent and necessary ones among the projects planned in JICA Master Plan are conducted, and the

electric power is supplied stably in the said area.

1. New construction of Ratnapura substation
2. New construction of Athurugiriya substation
3. Reinforcement of transmission line of 132kV Keranitisa-Coronawa
4. Expansion of Turuhiriya substation
5. Establishment of switch gear in Chira substation
6. Expansion of Keranitisa and Pannipitiya substation

### **(3) Effect of the Project**

By the expansion of transmission lines and substations in the project, the response to the increase of power demand, the reduction of transmission and distribution loss, the contribution to the improvement of the quality of power supply (improvement of voltage drop and reliability) are expected. The loan funds are allotted to the supply funds of machinery and materials, engineering works and consulting service (assistance of bid document creation, execution management, and training) which are necessary for the project. Business owner is Ceylon Electricity Board (CEB). (Address: 50, Sir Chittampalam A Gardiner Mawatha, Colombo 2, Sri Lanka, Tel: 941-324842, FAX: 941-348587)

## **Medium Voltage Distribution Reinforcement Project**

### **Loan Assistance of September of 1998**

Loan ceiling: 5,973 million yen

Interest: 1.8% (body), 0.75%(consulting service)

Redemption period / Deferment period in it: 30 years / 10years (body), 40 years / 10 years (consulting service)

Procurement condition: general untied (body), two countries tied (consulting service)

#### **(1) Necessity of the Project**

The medium voltage distribution system (33kV, 11k) of Sri Lanka has been patched up and expanded according to the demand, and consequently the electric power is transmitted in the tree form for a long distance, which causes problems of shortage of capacity, voltage drop, and high loss ratio of distribution. To improve such conditions and respond to the power demand which is expected to increase in the future, CEB designed the master plan of nationwide medium voltage distribution, "Medium Voltage Distribution Development Plan 1995-2005" according to the forecasted data of power demand for 10 years ahead. In the plan, construction of express lines and establishment of distribution gantries were proposed as a method of reinforcing the tree form distribution network at the highest investment efficiency. The targets of the project are express lines and distribution gantries which are proposed in the above plan, must be completed by 2000, and have great urgency, and the implementation of the project is necessary because they can expect the reinforcement of capacity of medium voltage distribution, the reduction of distribution loss, and the contribution to the improvement of the quality of power supply.

#### **(2) Contents of the Project**

The Project aims at the reinforcement of the system capacity, the reduction of loss, the improvement of quality of power supply (power voltage), and the stable supply of power in the said area by construction of express lines and distribution gantries in the medium voltage (33kV) distribution system of Sri Lanka.

1. Construction of 33kV express lines
2. Construction of 33kV distribution gantries

#### **(3) Effects of the Project**

These matters, the response to the increase of power demand, the reduction of distribution loss, and the contribution to the improvement of the quality of power supply (improvement of voltage drop and reliability), are expected by means of the project. The

loan funds are allotted to the supply funds of machinery and materials, engineering works and consulting service (assistance of bid document creation, and execution management) which are necessary for the project. Business owner is Ceylon Electricity Board (CEB). (address: 50, Sir Chittampalam A Gardiner Mawatha, Colombo 2, Sri Lanka, Tel: 941-430471, FAX: 941-449572)

## NEW COLOMBO PORT DEVELOPMENT

### 1 . Program Summary and JICA's Cooperation



#### (1) Program Background

The assistance to Colombo Port Development by Japanese Government started in 1980's, and many assistance projects, besides the expansion of main facilities, JCT (Jaya Container Terminal) and QUQ (Queen Elizabeth Quay) have been conducted. (The next page, Figure 1) After that, by the steep increase of transit containerised cargo with the economic growth in the Indian subcontinent in 1990's, the annual amount of container handling in Colombo Port in 1995 was 103 million TEU <sup>1</sup>. Though the Port locates the advantageous position of marine transport, in the scale of the harbor facilities, the efficiency of container handling, and the quality of service, the country falls behind Singapore <sup>2</sup> and many main ports, so that the further development as modern container port was urgent problem for the purpose of developing as a hub port in South Asia.

#### (2) Program Objectives and Overall Goal

The final goal was to establish the position as a hub port in South West Asia, to reinforce the transit business of containerised cargo, to contribute to more acquisition of foreign currency.

<sup>1</sup> Abbreviation of Twenty-foot Equivalent Unit: In containers, there are 20-foot container (8x8x20) and 40-foot container in size. The number of containers which convert them into 20 feet container is unit indicating the amount of containerized cargo.

<sup>2</sup> Singapore has been a hub port of Southeast Asia in containerized cargo since it constructed the first container terminal in Southeast Asia in 1972. They say that the development of Singapore Port is resulted from the efficient facilities of cargo work, the introduction of harbor information system, the distribution of skilled workers, the substantial services, such as repair of ships and supply of fuel and food, which have been provided around the clock from an early time, besides the advantage in geographical conditions.

As the first step, the design of the development plan of Colombo Port is the objectives of the Project.

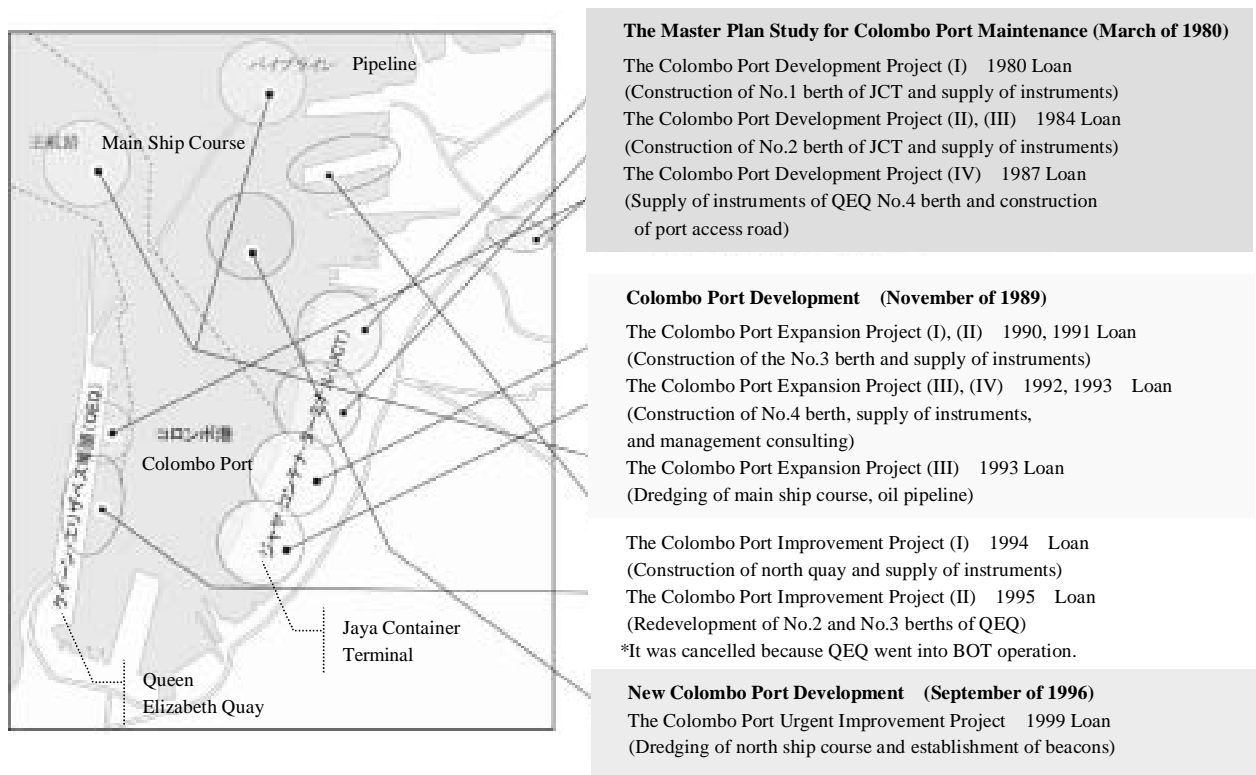
**(3) Program Scope**

To design the long-term development plan whose target year is 2015, to design the short-term maintenance plan whose target year is 2005, and to examine the feasibility including the finance and organization in order to reinforce and improve the scale of Colombo Port, the cargo work efficiency, and the quality of service.

**(4) Program Component**

- New Colombo Port Development (95.07-96.09: 3.43 hundred million yen)

**< Figure 1: Assistance Performances by Japanese Government to Colombo Port >**



Note) As above, following The Master Plan Study for Colombo Port Maintenance (JICA) which was conducted in 1980, the loan assistance of the Colombo Port Development Project (I), (II), (III), and (IV) was conducted. After Colombo Port Development (JICA) of 1989, the loan assistance of the Colombo Port Expansion Project (I), (II), (III), and (IV) was conducted. Moreover two loan assistance (The Colombo Improvement Project (I), (II)) was conducted in order to improve the facilities in the middle of 1990's. The target project of the Evaluation is the new development study which was conducted in 1996, but only a part of the proposed projects was achieved as the urgent improvement project (loan assistance), unlike the past development study.

**(5) Executing Agency**

Sri Lanka Port Authority ( SLPA )

**(6) Viewpoint for Evaluation**

After the completion of TADS, receiving the proposal of the international organizations such as World Bank (hereinafter: WB) and Asian Development Bank (hereinafter: AsDB), Sri Lanka Government came out with the privatization of port services as the baseline. (Privatization or Commercialization of JCT Terminal and the development of QEQ container yard by the stimulation of the private sector are concrete projects.) So now, the port development is not promoted according to the Long-term Development Plan which was proposed in TADS. Though a part of urgent projects (dredging of north ship course and others) was conducted in the loan assistance project (it was signed in 1999), the facility expansion which is the objective of the Long-term Development Plan has not been realized. With a view to such conditions, we will pay attention to 1) the grasp of the actual conditions of Colombo Port (operation and effect), and 2) the inspection of effectiveness of the contents of the proposed Long-term Development Plan which has not been realized.

<b>2 . Evaluation Results</b>
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**(1) Relevance**

As we told in Program Background, with the economic growth in the Indian subcontinent in 1990's, the transit containerised cargo increased steeply, the annual amount of container handling in Colombo Port in 1995 was over 100 ten thousand TEU. At that time, though about 20 % of containers which were loaded and unloaded at India transited Colombo, many containers transited Singapore which is far from the country and more demand was expected potentially. Though Colombo Port was advantageous geographically, in the scale of the harbor facilities, the efficiency of container handling, and the quality of service, the Port falls behind Singapore considerably and the development as a modern container port was an urgent problem to develop as a hub port in South Asia. Therefore the relevance of TADS was sufficient.

In June of 1997 after the completion of TADS, "National Ports and Shipping Policy of Sri Lanka" was announced by the Ministry of Shipping Ports and Reconstruction. The main contents <sup>3</sup> are to further develop Colombo Port as a hub port in South Asia in light of the

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<sup>3</sup> In the policy, the following goals were declared: To develop and maintain Colombo Port as a hub port so that Sri Lanka becomes a shipping center of South Asia. To develop and maintain Gol Port as a multipurpose port to supplement Colombo Port. To develop and maintain Torincomalee Port as an



market trend of the shipping sector, and to develop the local ports as a base of community development and domestic cargo shipping which handles general merchandise mainly. However the organization and system relating to the port management was not mentioned especially, and the management based on the traditional government leading was approved. After that, in 1999, the government budget became tight, and the policy of the port management changed to the promotion of the privatisation by the intervention of WB and AsDB. Though the stance of the Government relating to the port management converted drastically, the policy line to develop Colombo Port on a large scale in consideration of the future transit container demand was not changed and the major point of the TADS to finally establish the position of a hub port in South West Asia is held even now. And the effectiveness of the plan at the present time will be inspected in the following “(2) Effectiveness”.

## **(2) Effectiveness**

Five years have passed since the design of the TADS, and now the development of the port sector in Sri Lanka has converted from the traditional government leading to the privatisation drastically, and the structure adjustment support concerning the reform of organizations and system has been mainly conducted by WB and AsDB which support it strongly. In the TADS, the items such as the future estimate about the amount of transit cargo, the arrangement of problems regarding to Colombo Port, the maintenance policy of Gol Port, the maintenance policy of a new port, and the estimate of impact on the environment, were examined and proposed in the middle of 1990's before the privatisation line had been come out with. In this evaluation, the effectiveness of the TADS will be inspected from the viewpoint of the conditions of retaining the relevance of each item at the present time

### **2-1) Effectiveness of Cargo Demand Estimate**

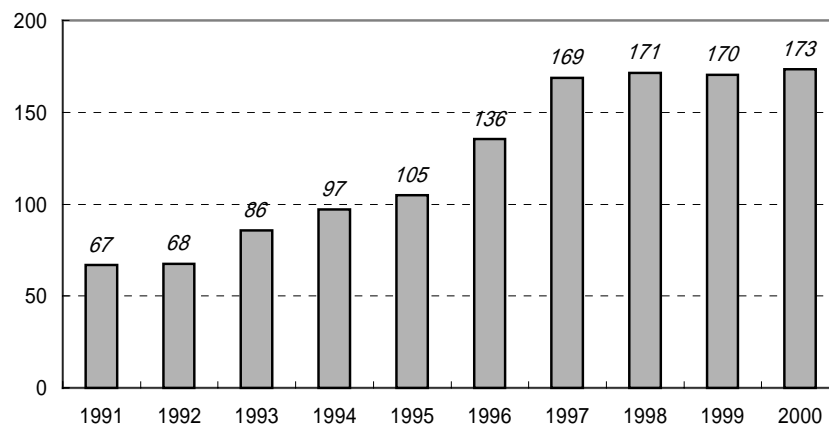
Figure 2 shows the amount of containerized cargo handling in Colombo Port from 1991 to 2000. From 1991 to 1997, the total handling ability reached 1.8 million TEU (JCT is 1.4 million TEU, and QEQ is 40 ten thousand TEU) caused by the completion of JCT No.3 berth and No.4 berth by financial assistance of Japanese Government, and the amount of containerised cargo handling increased smoothly. However, the handling ability can not be reinforced as before and the amount of containerized cargo handling peaked in 1998 because new capital investments are stagnant. By the way, the performance of QWQ (number) which

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port for bulk cargo and industry. To develop and maintain Kankesantoray as a port for foreign currency bulk and domestic physical distribution. To construct Oruberi Port as a port for domestic physical distribution. To construct a port to handle oil and dry cargo in Hanbantota. To maintain a free port. To maintain domestic cargo repacking facilities. To promote private investment To maintain the facilities to support sailing along the coast. To maintain and operate the infrastructure to efficiently handle domestic cargo. To enrich the supplement of the function among ports.

started to be used together as container terminal of private management <sup>4</sup> in 1999 was 6.8 ten thousand TEU (4% of whole Colombo Port) in 1999, and 3.01 million TEU (same 17%) in 2000. If the redevelopment of QEO which is now promoted in BOT method <sup>5</sup> is completed, the handling ability of containerized cargo of whole Colombo Port is expected to reach about 3 million TEU.

**< Figure 2: Change of the amount of containerized cargo handling in Colombo Port (Unit: ten thousand TEU) >**



Note) It was created on the basis of SLPA data.

In the TADS, the future demand of containerised cargo was estimated to be 2.3 – 3.5 million TEU in 2005 and 3.8 – 6.7 million TEU in 2015. To inspect the relevance, actually the whole amount of containerised cargo in the world or Asia should be estimated and the share of each main port should be analyzed. But here simply we refer to the recent increase of the containerised cargo, apply it to Colombo Port, and then estimate the future demand of the Port. Figure 3 shows the recent performance of containerised cargo handling in other main ports for three years from 1998 to 2000. Being based on this, if the annual increase is supposed to be 1.05 at the low position and 1.10 at the high position, apply it to the amount of container cargo handling of Colombo Port in 2000, and find the future value by power multiplier, the value is 2.2 – 2.8 million TEU in 2005 and 3.6 – 7.2 million TEU. Consequently, the future demand estimate is considered to be in the appropriate range at the time of TADS.

<sup>4</sup> SAGT (South Asian Gateway Terminal), a consortium made up mainly of private enterprises, runs centrally. The manager company of the Consortium is P&O Company ( Peninsular and Oriental Steam Navigation Company ) , a shipping firm of English registry, and the controlling share is 30%. SLPA holds 15% shares of the company, and the local retailers hold the rest shares.

<sup>5</sup> Abbreviation of Build-Operate-Transfer: The business system in which the facilities and equipment are maintained and operated with the private funds, and after a certain period passes, the assets and management right are transferred to the Government.

**< Figure 3: The performance of containerized cargo handling in other main ports >**

(Upper section: Handling amount (ten thousand TEU),

Lower section: Increase rate to the previous year)

	1998	1999	2000
Singapore	1,514	1,621 (1.07)	1,810 (1.12)
Hong Kong (China)	1,459	1,595 (1.09)	1,704 (1.07)
Kao-hsiung (Taiwan)	627	698 (1.11)	743 (1.06)
Pusan (Korea)	595	644 (1.08)	754 (1.17)
Dubai ( UAE )	260	280 (1.08)	300 (1.07)

Source) Containerisation International Yearbook

However, even if the demand increases in the future, the appropriate reinforcement of the handling ability of containerized cargo is needed in order to connect the demand with the performances. If they hope to reach 3.5 million TEU in 2005 and 7.2 million ton in 2015, it goes without saying that they should prepare for the faculty which is required to do it by the target year.

**2-2) Problems of Colombo Port and Measures**

The problems and proposals which was pointed at the TADS are mainly classified into hardware (facility and machinery) and soft ware (organization and system).

On hardware, the following items were pointed out: the curved ship course to the port and the narrow port entrance, the lack of water depth of ship course and anchorage, unmaintained north ship course, (lack of maintenance), uncontrolled incoming and outgoing ship (lack), the lack of area of QEQ. To solve them, the long-term project whose target year is 2015, the short-term maintenance project whose target year is 2005, and the urgent maintenance project which should be conducted immediately in the short-term maintenance project were designed. After that the Loan assistance was applied to dredging of north ship course and the maintenance of beacons which had been indicated in the urgent maintenance project and these projects were executed. The redevelopment plan to extend the area of QEQ terminal are in progress by SAGT, private consortium which was established in 1999 and is a business owner in BOT method. The TADS showed that civil partnership was examined about the maintenance system of the harbor facilities and the appropriate industrialization system should be introduced. But on QEQ, BOT by the ground lease system was applied eventually.

On the other hand, on software, the improvement of efficiency in the cargo work and the management of facilities was indicated. After that the experts of JICA were dispatched to

JCT terminal which was operated directly by SLPA, and they assist on the improvement of the efficiency of containerised cargo handling and the reinforcement of management system. And they make the efforts to improve the management system, such as the conduction of the renewal of computer system of JCT, in the Colombo Port Improvement Project.

Like this, though the problems pointed out in the TADS are under the changing conditions about the development of Colombo Port, they are being resolved gradually by the measures by Sri Lanka Government and SLPA, and the assistance by Japanese Government and other donors. The TADS was not evaluated as formal top project, but we think that it was effective on the discovery of problems and the proposal of measures.

### 2-3) The maintenance Conditions of Col Port

Gol Port is the third largest port in Sri Lanka and locates in South state. In the TADS, the following policy was considered to be appropriate; at first, it would be maintained for bulk cargo and traditional cargo mainly, and in the future, it would be maintained to play a complementary role of Colombo Port as an transit port of containers from the location. However the concrete port maintenance project has not been conducted till now.

**< Figure 4: The amount of cargo handling in main 3 ports in Sri Lanka (thousand ton) >**

	1995	1996	1997	1998	1999	2000
Colombo Port	17,414	20,885	25,117	24,793	24,825	25,222
Gol Port	238	236	182	402	439	597
Torincomalee Port	1,855	1,602	1,533	1,652	1,730	2,216

Source) SLPA

### 2-4) Maintenance Policy of New Colombo Port

The Lon-term Maintenance Project of new Colombo Port was designed under the following policy.

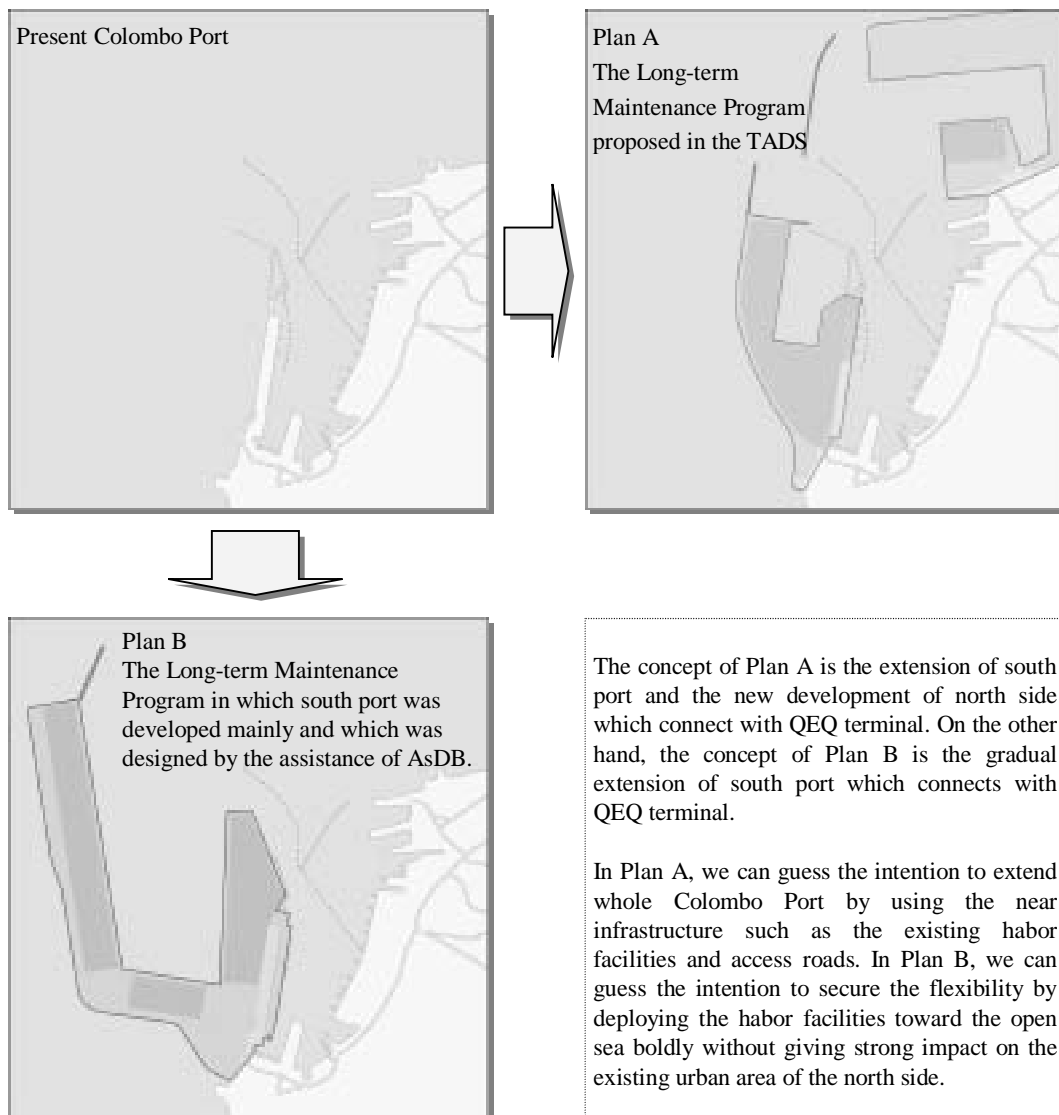
#### **< New port maintenance policy in the TADS >**

The independent development of north side sea level requires great deal of prior investment to breakwaters, so that the development of south side whose initial investment is small should be conducted earlier than north side. After the north side sea level is shut out from the wave, the development of north side should be conducted flexibly according to the increase of the demand. It is important to borrow a part of it for as short period as possible and lead to the increase of the amount of cargo handling as early as possible.

However, the maintenance program which had been designed under the above policy (Figure 5 Plan A) was not positioned as a formal master plan finally. After that the study on South

Habor Development Plan (SHDP) was executed by the assistance of AsDB which supported the privatisation of the harbor sector, and the maintenance plan which had been proposed in the study (Figure 5 Plan B) is positioned as a actual master plan concerning the present development of Colombo Port. (It is supposed to maintain by BOT system.)

**< Figure 5: Two Long-term Maintenance Programs in Colombo Port >**



On the balance of the development in the north side and the south side, as shown in the frame, the policies are different in between the TADS (Plan A) and the South Port Development Program (Plan B). However Chief of Planning Department of SLPA says that AsDB team referred to the results of TADSD in the investigation of the program and the Study was used effectively in the examination of alternative plan of the development pattern. It is hard to decide which plan is more effective at the present time.

## **2-5) Impacts**

The TADS proposed that the impact on the environment should be considered appropriately (mainly the influence of the reclamation project on the sea). However new large-scale reclamation has not been conducted, so that we do not think that direct consideration is required at this stage. And SLPA conducts the regular monitoring about the water quality in the area of harbor once a month, but the special problems have not occurred and have not been reported so far.

As above, the TADS can be considered to have contributed to the construction of the outline of the subsequent development of Colombo Port. On some problems which were pointed out in the Study, concrete measures and actions against them have been taken, so that we can say that the contents of the TADS have shown certain effectiveness.

## **(3) Efficiency**

The Technical Assistance for Development Studies are completed without special changes in scope, implementation period, implementation costs. SLPA says that the Japanese study team dispatched to the study have high level in the technicality and they are satisfied with the development program as the output of the study. They say that they had no trouble in the communication between them and the study completed in good relationship.

## **(4) Impacts**

### **4-1) Implementation Conditions of the Development plan study**

The contents of the TADS can be divided into two: hardware concerning the harbor facilities and machine, and software concerning the organization and system for the harbor management. Figure 6 shows the plans relating to hardware and software individually and the actual conditions at the present time.

< Figure 6: Contents of the TADS and actual conditions >

Contents	Items of the TADS	Actual Conditions
Hardware (Facilities and machine)	<p><b>[Long-term Maintenance Program: Target Year 2015]</b> To design the new port development program in consideration of the expectation of the future amount of cargo and the inspection of the site proposed for development (Development of outside of QEQ and north harbor)</p> <p><b>[Short-term Maintenance Program: Target Year 2005]</b> Development of terminal outside of QEQ Redevelopment of the existing quay (Bandaranaike) Expansion of container crane of JCT  Widening of the port entrance, dredging of north ship course, and safety measures of sailing Widening of port roads</p> <p><b>[the Urgent Maintenance Project]</b> Redevelopment and expansion of QEQ  Redevelopment of the north quay  Redevelopment of Bandaranaike quay  Dredging the north ship course</p>	<p>It was supported by AsDB whose plan was different (South Port Development Program) after that, and the industrialization of project is in preparation.</p> <p>The project is progressed in BOT system by the assistance of AsDB. The project is not executed.</p> <p>The project is progressing by Loan assistance (JBIC) The project is completed partly by Loan assistance (JBIC)</p> <p>The project is not executed.</p> <p>The project is not executed. (Assistance by AsDB) Same (Assistance by JBIC) Same (The project is not executed.) Same (Assistance by JBIC)</p>
Software (Organization and System)	<p>Improvement of the efficiency of cargo work and the management of harbor facilities Examination of the promotion of participation of the private enterprises Streamlining of the staffs and control of labour cost</p> <p>• Improvement of skills of the harbor worker</p>	<p>Technical assistance by the dispatch of JICA experts</p> <p>Promotion by the intervention of WB and AsDB. The project does not progress in spite of the advice from WB and AsDB. • The project is not executed.</p>

We can find that certain actions are executed under the assistance by Japanese Government (JICA and JBIC), WB, and AsDB except a part of items. On Colombo Port, Japanese Government have been major donor, but after they announced the structure reforms and adjustment of the harbor section whose principle is privatisation, the assistance by

international agencies such as WB and AsDB has become conspicuous. (The assistance stance of the both agency is written in “Durability.”)

Figure 7 shows the change of the operation performance of Colombo Port. In the indicator concerning the efficiency of cargo work, the berth share is reported to be 80 % in 1995. After that it was improved till 1998, but it dropped down to a large degree in 1999 and 2000. Because two cranes of fourteen gantry cranes <sup>6</sup> of JCT Terminal in all broke down and could not be used (they have been repaired), the share of the landing berth reduced, which leads to such conditions. The (average) berth waiting time was long, more than 10 hours in a feeder boat, and more than 6 hours in a main ship. But it was improved drastically after the year and the performance in 2000 was shortened more than half, which may be the effect of the dredging ship course program which was executed by JBIC in 1999. However the efficiency of cargo work of container crane (gantry crane) was 17-18 in main ship and 14 in feeder boat in 1995, and average 16 in whole ship in 2000, which shows no change. In transportation industry, it is 25-35 per hour generally, and as compared with it the rate of Colombo Port is still low. The number of the staffs of SLPA has increased, which shows the streamlining of the organization does not progress as scheduled <sup>7</sup>.

**< Figure 7: Performance indicators concerning the operation of Colombo Port >**

Indicator	The condition at the Development Plan Study	Conditions till now
Share of Berth	80% ( 1995 )	1996 1997 1998 1999 2000 81% 85% 82% 73% 62%
Average Berth Waiting Time	Main ship: 6.4 hours Feeder boat: 14.0 hours	Main ship: 2.5 hours (2000) Feeder boat: 4.6 hours (2000)
Efficiency of Cargo Work of Container Crane ( Only JCT )	Main ship: 17-18 containers /hour Feeder boat: 14 containers/hour	16 containers/hour in average
Number of SLPA Staffs	16,617 persons ( 1994 )	17,411persons ( 2000 )

Source) Data of SLPA

As above, the programs of great urgency in the proposed programs concerning hardware have been executed, and new development programs are in preparation of running a business subject to the privatisation. On the other hand, the programs concerning software have not

<sup>6</sup> A Gigantic crane whose height is about 100m and with which containers can be unloaded directly from the ship alongside the pier. Also the time to unload is short, and usually 30-40 TEU containers can be unloaded in an hour. Container Terminal is generally equipped with a transfer crane (it is used to move the containers in the yard, and it can pile 3-4 containers in the container yard), and a straddle carrier (it is used to move and arrange the containers in the yard, can make small adjustments, and can pile 2-3 containers.)

<sup>7</sup> They think that less than half of the present number is enough in the number of staffs. (By Report on Central Bank of Sri Lanka)



achieved the results. On organization, system, and human resource, even if WB and AsDB propose and advise on them, the progress of the projects requires the consent and execution of the partner country government. The maintenance of hardware by financial aid also requires the consent and others of the government, but it is accepted smoothly. Because software is related to “a person”, the circumstances are different.

#### 4-2) Contribution to acquisition of foreign currency

In Colombo Port, the service charge is handled in U.S. dollars, and it earns a good income, next to export of textile goods, travel industry, and remittance by guest workers on the acquisition of foreign currency in Sri Lanka. Figure 8 shows the change of the foreign currency reserves in whole Sri Lanka and the acquisition of foreign currency. The foreign currency reserves of the whole country have stagnated recently, while the acquisition of foreign currency in Colombo Port have changed stably, which shows that it functions as important source of obtaining foreign currency for Sri Lanka Government.

**< Figure 8: Acquisition of foreign currency in Colombo Port and foreign currency reserves in Sri Lanka (million U.S. dollar) >**

	1996	1997	1998	1999	2000
Acquisition of foreign currency in Colombo Port	117.5	136.5	143.9	136.8	139.8
Foreign currency reserves in Sri Lanka	1,930.5	1,996.4	1,950.0	1,569.1	976.4

Source) Acquisition of foreign currency in Colombo Port: SLPA data, Foreign currency reserves in Sri Lanka: AsDB

### (5) Sustainability

#### 5-1) Organization /System

In the harbor sector of Sri Lanka, the roles are divided as follows: the Government plans the policy and SLPA runs and manages ports including Colombo Port. SLPA is a government-financed government organization which was established under the Law of Ports Agency in 1979 (it was revised partially in 1984), and the organization is run with the special account. It doesn't receive the subsidies from the Government at all and they premise self-supporting accounting system. Main tasks are the maintenance of harbor/repair, supply of service such as cargo handling and pilot, and security/ regulation. The business plan and fiscal plan of SLPA, and the items such as human resources, employment, and procurement are all controlled by the Government (it was defined under the Law of Ports Agency), and SLPA has little room for discretion. WB and AsDB think that such system is the cause to block the efficiency improvement of the harbor management, and propose strongly restructuring of the sector including the revise of the Law of Ports Agency. (See the following column) In QEQ among the quays of Colombo Port, the redevelopment based on

BOT is in progress by SAGT, private consortium. They face the review of the harbor management in Sri Lanka including Colombo Port.

**< Proposal and assistance of WB and ASDB concerning the development of Colombo Port >**

WB started "Port Efficiency Improvement Project" in 1997, and conducted the study on the regulations, the system, and the management concerning whole harbor sections of Sri Lanka and Colombo Port. Consequently, though it proposed the revise of the Law of Ports Agency in the country, the major reform of organization, and the privatisation of JTC (The privatisation of QEQ by the assistance of AsDB had been decided), WB and Sri Lanka Government did not arrive at an agreement in the structural reforms such as laws and reform of organization. So the Project has suspended since 1999. WB says that it will not assist the development of Colombo Ports unless the proposed reform progresses, and on this point the attitude of WB is different from one of JICA/JBIC which assist the redevelopment of JCT based on the request from the Government and others positively.

On the other hand, AsDB takes two assistance approaches concerning QEQ. One is a commercial approach and it invests money in SAGT (South Asian Gateway Terminal), the company run by QEQ. The second is Official Development Assistance, and it supplies them with Funds of Technical Assistance (10million U.S. dollar) concerning the South Port Development Program, and executed the study and plan, and took the Harbor Management Efficiency Improvement Measure. After that, going through the design technology assistance, it changes into the development business promotion by BOT scheme. As the condition of assistance of BOT industrialization it declares the privatisation of JCT (dividing company) as well as WB. Like this, the assistance of WB and AsDB makes it a condition that the harbor sector is privatised, centering on the drastic reform of organization of SLPA. So Japanese Government assistance based on the requested matters is different form them.

Note) By the results of the interview s with WB and AsDB.

**5-2) Technology**

The executing agency, SLPA, says that besides Japan, the shipping advanced nations, Norway and Holland, provide short, or long-term training (including graduate courses), and they are in a relatively good environment where the staffs improve the technology. JUCA has provided them with 4 months overseas training (harbor engineering) every year till 2001, but the plan after 2002 will not be made. SLPA estimates the training system to be useful in order to obtain the advanced knowledge and technology and hopes that it will be held as ever.

**5-3) Finance**

Figure 9 shows the indicators relating to the finance of SLPA from 1995 to 1999. As far as we inspect the conditions in the said period, the income changes smoothly and the operating profit ratio is relatively stable, and consequently we find that the management of the harbor is conducted well. On the other hand, the current income was apt to be stable, but it fell into the red in 1999. This situation was caused by large amount of tax and special charge. They say that the Government does not show the clear criteria of levy, so the levy changes every year.

**< Figure 9: Financial Performance of SLPA ( million Rs. ) >**

Indicator	1996	1997	1998	1999
1. Business Income	8,446	10,310	13,417	15,088
2. Business Cost	5,394	6,882	7,403	8,756
3. Business Profit	3,052	3,428	6,014	6,332
4. Current Income (interest/after tax)	440	1,530	1,301	636
5. Gross Asset	34,550	47,908	56,678	60,844
6. Business Profit Ratio	36.1%	33.2%	44.8%	42.0%
7. Sales Profit Ratio	5.2%	14.8%	9.7%	-4.2%
8. Gross Asset Circulation	0.24	0.22	0.24	0.25
9. Gross Asset Profit Ratio	1.3%	3.2%	2.3%	-1.0%

Source) Data of SLPA

SLPA does not receive the financial aid such as subsidies from the national government directly, but in fact, it depends on Loan assistance which is borrowed through the Government about most of funds concerning the harbor maintenance. Japan Government has been the largest donor of the maintenance of the harbor sector in Sri Lanka (loan supply country), and WB and AsDB have not provided them with funds concerning hardware (facilities and machine). The South Port Development plan which is the most attractive now is said to require about 1.6 billion U.S. dollar in 1998 (trial calculation by AsDB), and it is estimated that the construction of container quays requires 1.0-1.2 billion U.S. dollar and the construction of breakwaters and dredging ship courses require about 6 hundred million U.S. dollar among it. The construction of container quays will be conducted as BOT Scheme and the breakwaters and dredging will be conducted as public investment by the government funds. However, it is hard that only WB and AsDB cover such large amount of funds, so it is supposable that Sri Lanka Government expects Japanese Government (JBIC) to request the aid of funds.

We think that Japanese Government faces the stage to review the strategic financial assistance after surveying not only Colombo Port but the whole harbor sector in Sri Lanka.

#### **(6) Other achievement**

The counterpart training which was conducted as part of the TADS was effective in improving the knowledge and skills of engineering project, civil engineering, electricity, and machine. They say that one of counterparts at that time is chief of Planning Technology Department now and the other studies in U.S. These shows that the TADS became motivation of personal training.

#### **(7) Conclusion**

After the TADS, the Harbor Sector in Sri Lanka changed from the traditional public management system to privatisation drastically, and now it is in the transitional period toward privatisation. The New Colombo Port Development was revised by the intervention of WB

and AsDB, and the output was created as the different one in appearance (The South Port Development Program by AsDB). From such prehistory, the master plan on TADS was not evaluated as high-ranking project of the Government, but the concept and main findings are common basically and the contents of the TADS are taken over in different form. In this meaning, we think that the effectiveness of the TADS is kept.

From the completion of the TADS to now, the urgent maintenance project by JBIC and the dispatch of experts by JICA have been conducted. These projects were assisted and conducted in the unstable period from the public management system to privatisation, but we estimate that they sufficiently contributed to the maintenance and improvement of the function of Colombo Port which has many staffs (apart from the necessity of personnel retrenchment) and which is the strong source of acquisition of foreign currency in Sri Lanka. Actually the assistance with such severe conditions as WB and AsDB provide may be reasonable approach, but we estimate that the assistance of Japanese Government is indispensable in the meaning of the connection in transition period and it was useful for Sri Lanka.

### 3 . Lesson Learnt

#### **Communication with other donors and international agencies, Reinforcement of information share:**

As loan, JBIC, WB, and AsDB hold the donor meeting in the financial assistance regularly. These information exchange and share should be conducted positively in the technical assistance. This is a master plan design project, and we estimate itself to have been conducted efficiently. However, after that WB and AsDB conducted the master plan design (on the premise of privatisation), and we worry about the influence on the whole efficiency. In short, from the viewpoint of Sri Lanka Government, the master plan was revised many times, so we wonder if they could not be conducted in one bundle and efficiently. To design of the master plan, they executed lots of hearing and others to donors concerned and international agencies, but we think that they do not only consider it as opinion reception, but they had better go ahead for a few steps and work together. And we think that it leads to the efficient and effective creation of output. Therefore the communication with other donors and international agencies and information exchange are effective without discrimination of financial assistance and technology assistance.

#### 4 . Suggestion

##### **Promotion of Structural Reforms Accepting Privatization:**

They say that Sri Lanka Government and SLPA are in conditions where they can not progress the privatisation of the harbor sector positively. Drastic personnel reduction and transfer of the existing harbor management project will impact on the present organization negatively to no small extent. However, in light of the global tide and the financial conditions of Sri Lanka Government, the privatisation is unavoidable. In Taiwan and Korea in addition to Singapore, large- scale harbor development plans are progressing, so this is no time for Colombo Port to flounder. The quick action relating to business investment, in shorts speedy decision making and execution are required in order to obtain the increasing demand timely. For that purpose, they have to tackle the structural reforms of the harbor sector, SLPA, which WB and AsDB impose conditions on seriously. The agencies concerned of Sri Lanka Government must realize it again and promote the reform with strong will. Otherwise Colombo Port would lose the opportunity to obtain the demand, and it would be still difficult to establish the position as a hub port in South Asia.

#### 5 . Annex

##### **[PDMe]**

Summary	Indicators and Plan/performances		External Conditions/Important Matters
	Indicators	Contents	
<p><u>Overall Goal</u></p> <p>1. To establish the position as a hub port in South Asia (Acquisition of the international competitive power in harbor facilities and management)</p>	<p><u>Indicators concerning the scale of harbor (the following)</u></p> <p>1.1 Change of the area of terminal</p> <p>1.2 Change of the number of incoming ship</p> <p>1.3 Change of the amount of container handling performance</p> <p>1.4 Change of possible amount of container handling</p> <p>1.5 Conventional cargo volume in Colombo Port</p>	<p>No data</p> <p>3,251 ships in 1994</p> <p>1.03 million TEU in 1995</p> <p>No data</p> <p>5,358 thousand ton in 1994</p>	<p>&lt;Relevant projects &gt;</p> <p>After the Technical Assistance for Development Studies, loan project "Colombo Urgent Improvement Project" was executed in 1999 and parts of the proposed contents were realized.</p> <p>Is the project to improve the scale progressing?</p> <p>How is the effectiveness and feasibility of the master plan?</p> <p>Do they make self-help efforts to further improve the efficiency?</p> <p>Is the operation organization and system of Colombo Port satisfactory? At the Technical</p>

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
NEW COLOMBO PORT DEVELOPMENT

	<p><u>Indicators concerning the improvement of the efficiency of cargo work/ the service in the harbor (the following)</u></p> <p>1.6 Change of share of berth (%)</p> <p>1.7 Average berth waiting time</p> <p>1.8 Efficiency of cargo work of container crane</p> <p>1.9 Efficiency of cargo work per ship</p> <p>1.10 Average staying time in yard of container</p>	<p>80 % both in JCT and QEQ in 1995</p> <p>14 hours in 1995</p> <p>(Data of 1995)</p> <p>JCT: 17-18 containers/h at main ship 14-15 containers/h at feeder boat</p> <p>QCT: 14-15 containers/h at main ship and feeder boat</p> <p>(Data of 1995)</p> <p>JCT: 25 containers /h at main ship 14 containers /h at feeder boat</p> <p>QCT: 14 containers/h at main ship 9 containers/h at feeder boat</p> <p>(Data of 1995)</p> <p>8.4 days at export container 4.8 days at import container 7.4 days at transshipment container 7 days on the average</p>	<p>Assistance for Development Studies, the following was pointed out:” The number of the staffs of SLPA is 16,617 in 1994 and it is enough. Compared with Singapore whose harbor scale is nearly equal, it is inefficient.” Do they wrestle with concrete projects such as personnel retrenchment or repression of employment cost?</p> <p>With the unrealized of the construction of new port in mind, how were the two inputs (TADS and Loan assistance) connected in the Loan assistance project? The details should be declared.</p> <p>Are there a policy and a plan in which a private sector takes part in the maintenance and operation of the harbor facilities? How is it?</p>
<p>2. Reinforcement and development as source of acquisition of foreign currency in container transit business</p>	<p>2.1 Amount of acquisition of foreign currency</p>	<p>No data</p>	
<p><u>Project Objectives</u></p> <p>1. The master plan concerning New Colombo Port was designed.</p>			<p>The master plan of harbor development should be positioned in public in the political measures of the Government, and they should wrestle with the maintenance of road and the laying of pipeline on the bottom of the sea which are behind the Plan comprehensively (the proposals of TADS)</p> <p>Additionally the contents concerning efficiency of cargo work, management of the harbor, the promotion of participation of private enterprises (the proposals of TADS)</p>
<p><u>Output</u></p>			

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
NEW COLOMBO PORT DEVELOPMENT

1. New Colombo Port Development	1.1 Long-term Maintenance Project (the target year is 2015)	<p>Estimate of amount of transit cargo in Colombo Port (under the estimate and study of the demand of containerised cargo and the harbor maintenance conditions in India, Pakistan, and Bangladesh)</p> <p>Expectation of each item of export/import cargo with the economic growth in Sri Lanka</p> <p>Observation of wave height and wave direction of open sea of Colombo Port</p> <p>Study on tide, water quality, soil, ecology, and residence conditions near the site proposed for the development</p> <p>Design and proposal of development plan and phased maintenance plan according to comparison and examination of the site proposed for a new port (two places: the outside of QEQ quay and the north side of the present port)</p> <p>To examine the relevance of the project by conducting economic analysis, financial analysis, and environment assessment relating to the Short-term Maintenance Project</p>	
	1.2 Short-term Maintenance Project (target year is 2005)	<p>Development of the terminal outside QCQ quay (840 million U.S.\$)</p> <p>Redevelopment of Bandaranaike quay (17 million U.S.\$)</p> <p>Widening of the harbor entrance (27 million U.S.\$)</p> <p>Dredging of north ship course (6 million U.S.\$)</p> <p>Widening of the port road between QEQ and JCT (18 million U.S.\$)</p> <p>Sailing safety measures (tag boat and maintenance of beacons) (33 million U.S.\$)</p> <p>Reinforcement of machine for cargo work in JCT ( Jaya Container Terminal )</p>	How is the maintenance progressing according to the Short-term Maintenance Project?
	1.3 Urgent Maintenance Project	<p>Expansion of QEQ No.6 berth</p> <p>Redevelopment of QEQ No.2 and No.3 berth</p> <p>Reinforcement of machine for cargo work in JCT</p> <p>Redevelopment of NP (North Pier)</p> <p>Redevelopment of BQ</p> <p>Dredging of north ship course</p> <p>Expansion of inland container depot</p> <p>Enrichment of tag boat</p>	<p>• Is the Urgent Maintenance Project realized? The relation between the Urgent Maintenance Program and Loan assistance Project in 1999, "Colombo Port Urgent Improvement Project."</p>

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
NEW COLOMBO PORT DEVELOPMENT

<p><u>Input</u> 1. New Colombo Port Development XXXXX yen ( 19XX ) For 14 months from 1995.07 to 1996.09</p>	<p>Estimate of amount of transit cargo</p>	<p>2.3-2.5 million TEU in 2005 3.8-6.7 million TEU in 2015</p>	<p>The current handling ability (in 1995) is 1.50 million TEU, but it is expected to reach 3.8-6.7 million TEU from 1999 to 2002. (New Colombo Port Development)</p>
	<p>1.2 Arrangement of problems of Colombo Port</p>	<p>Curved ship course to the port and narrow port entrance Lack of water depth of ship course and anchorage Unmaintained north ship course Uncontrolled incoming and outgoing ship Lack of the area of terminal of QEQ (Queen Elizabeth Quay) quay Low effectiveness of cargo work and others</p>	<p>• How do they wrestle with the problems in order to solve them? What are the results?</p>
	<p>1.3 Maintenance policy of Gol Port</p>	<p>Supplementary role of Colombo Port (transit port of containers) They handle mainly bulk cargo and traditional cargo.</p>	<p>• How are the development and maintenance conditions of Gol Port after that? How is the role divided between Gol Port and Colombo Port?</p>
	<p>1.4 Maintenance policy of a new port</p>	<p>To first develop the south side whose initial investment is small (11-14 hundred million U.S.\$) After the development of the south side, to develop the north side flexibly according to the increase of the demand</p>	<p>• How is the present plan?</p>
		<p>EIRR calculation in the Short-term Maintenance Project If high growth, 20.5% If middle growth, 18.7% If low growth, 11.5% On the premise of middle growth, the development scheme is supposed and FIRR is calculated. 4.2%-7.1%</p>	<p>• Is the cargo handling demand and other matters increasing as we estimated at first?</p>
	<p>1.9 Estimate of impact on environment</p>	<p>Change of tide and water quality appears near the reclaimed land, but it does not run to offing and neither changes the water quality in the port very much. The seashore and ocean waves do not change. There is no fear of pollution caused by dust which the container yard brings to urban traffic. They do not request to move historical architecture and illegal dwelling community in the north side area of the present harbor.</p>	<p>How is the present condition?</p>

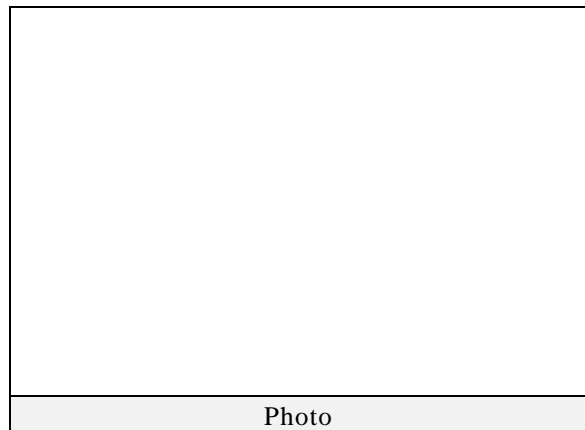


## PROGRAM FOR IMPROVEMENT OF REFUSE DISPOSAL MANAGEMENT IN COLOMBO METROPOLITAN AREA

### 1 . Program Summary and JICA's Cooperation



Site Map



Photo

#### (1) Program Background

In Colombo City and neighbouring municipalities in Sri Lanka, the amount of refuse was increasing year by year because of the sharp population inflow and urbanization. But the development of refuse collection and disposal system was late and refuse collection work was mainly conducted by small tractors, so the efficiency of collection and transport was extremely low. Consequently much refuse was not collected and was left behind on the road, which bred harmful insects and epidemics, and the sanitary conditions were too bad. Under such conditions, Sri Lanka Government considered the refuse disposal improvement in Colombo City and neighbouring municipalities to be the most important problem, and wanted to reinforce the refuse collection system and realize the efficient refuse collection and disposal. So the Government designed the refuse disposal improvement plan and asked Japanese Government for Grant Assistance concerning the procurement of machinery and materials for refuse collection.

#### (2) Program Objectives and Overall Goal

To reinforce the capacity and system of refuse collection, and improve the extremely bad sanitary conditions in Colombo City and neighbouring municipalities.

#### (3) Program Scope

The machinery and materials which are required to reinforce the capacity of refuse collection in Colombo City and neighbouring municipalities (vehicles for collecting refuse, machinery and materials for automobile repair shops, spare parts, and operation

guidance for repair of vehicles and machinery and materials), were supplied to Colombo City and neighbouring municipalities, one province and five cities (Western Province, Dehiwala City, Moratuwa City, Kotte City, Coronawa City, Maharagama City).

#### **(4) Program Component**

The program comprises of the following two Grant Assistance.

- The Project for Improvement of Refuse Disposal Management in Colombo (Grant Assistance, 1995: 983 million yen)
- The Project for Improvement of Refuse Disposal Management in Colombo Metropolitan Area (Grant Assistance, 1997: 528 million yen)

#### **(5) Executing Agency**

- Cooperation / Country Council / Local Autonomy / the Ministry of Homegrown Medicine (at present; Domestic Affairs /Country Council / the Ministry of Local Autonomy)
- Colombo City, Western Province, Dehiwala City, Moratuwa City, Kotte City, Coronawa City, Maharagama City

#### **(6) Present Status of the Program/Viewpoint for Evaluation**

The Program finished when “The Project for Improvement of Refuse Disposal Management in Colombo Metropolitan Area (GA)” completed in March of 1999. This is the ex post evaluation according to “JICA Program Evaluation Guideline (2001. 09) “.

## **2 . Evaluation Results**

### **(1) Relevance**

The program was executed according to the policy of Sri Lanka Government whose objective is to reinforce the worsening refuse collection system in Colombo City and neighbouring municipalities, and to realize the efficient refuse collection and disposal. In the country, the manufacturing industry and service business have developed steadily and the tendency of the development will continue in the future. In such conditions, the infrastructure of environment management, which controls the influence by the waste pollution relating to the industry especially on the environment, is not sufficient even now. At present, in “The Six Year Development Project (1999-2004)” of Sri Lanka Government, “to develop the environmental infrastructure of the refuse collection and refuse disposal, water and sewage, and drainage” is declared about the environment

management, and the government policy related to the refuse collection and disposal of the country is consistent. The relevance of the program objectives, which are to supply the vehicles for refuse collection and the related machinery and materials with Colombo City and neighbouring municipalities and to contribute to the improvement of the sanitary environment, is kept even now.

**(2) Effectiveness**

Here, the effectiveness will be investigated from the viewpoint of the efficiency of collection according to the information and data which were confirmed in the study. We consider that the efficiency of collection of each city has been improved generally. In neighbouring municipalities except Colombo City, the efficiency was extremely low because they collected refuse by using tractors before they were supplied machinery and materials, but after the supply of them, the efficiency has been increased. In the target urban area, they come to collect refuse by using supplied vehicles and machinery and materials, and they sufficiently take measures against the increase of refuse with the population growth.

**< Improvement of the efficiency of refuse collection by supplied vehicles and machinery and materials >**

	Improvement of the efficiency of collection
Colombo City	
Dehiwala city	
Moratuwa city	
Kotte city	
Cononawa city	
Maharagama city	

Source) Sri Lanka Country Program Evaluation Team(2002. 05)

Note)           = much improved   = improved  
                  = not improved   × = no change

According to the Program, the vehicles for collecting refuse are supplied and deployed. Consequently the refuse collection work which was mainly conducted by tractors before comes to be conducted by the vehicles for collecting refuse. The amount of collection per vehicle (m<sup>3</sup>/ton) and the number of transport to refuse disposal facilities have increased , and the capacity and efficiency of refuse collection have been improved drastically.

**(3) Efficiency**

In two Grant Assistance which the program comprises of, there were no change of

project range, no delay of process, no budget overrun and deficit individually, and they completed as scheduled. There was no special problem in the efficiency of implementation.

#### **(4) Impacts**

##### **4-1) Improvement of Sanitary Environment**

In the example of Colombo City, in addition to the reinforcement of the door-to-door collection, the city also improved the system relating to the refuse collection, such as the reduction of refuse collection points on the roadside, from 1,200 to 250. The reinforcement of the door-to-door collection reduces the situation that refuse is left on the roadside for a long time, which leads to the improvement of the sanitary environment on the roadside. By the way, most of the vehicles which were supplied and deployed under the program are compactor trucks. This compactor truck has the structure in which refuse is compressed and loaded in the compactor of the vehicle unlike the tractor which was widely used before. The refuse does not overflow, and not scatter, and the stink from the loaded refuse has reduced. So the residents appreciate it.

##### **4-2) Design of the Management Plan Relating to Refuse Collection and Disposal**

Before the vehicles and machinery and materials were supplied according to the program, tractors whose capacity and efficiency of refuse collection are low were mainly used in the refuse collection work, so the management plan relating to refuse collection and disposal was not designed positively. However, after the vehicles and machinery and materials were supplied, with the results of the field technology guidance conducted by JICA (management plan of refuse disposal, seminar of waste, and workshop of refuse collection and transport plan), the management plans of refuse collection and disposal came to be created in some cities depending on the local conditions, and they run the project according to the plan in fact. For example, the collection days of the refuse collection points are decided each refuse truck and the refuse collection work is shared according to it. And in a city, they divide the whole city into small zones, and make a trial calculation and estimate the amount of refuse which is collected in the zone. According to the results, they fix the allocation of refuse truck and refuse collector in details.

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

##### **5-1) The Maintenance of Supplied Vehicles and Machinery and Materials**

The interview results from the maintenance authorities (Colombo City and neighbouring cities) at this evaluation say that the maintenance conditions of supplied vehicles and machinery and materials are generally good except Kotte City (because they do not have a stock of spare parts of refuse truck, the conditions of the maintenance of vehicles and

machinery and materials are bad), and the vehicles and others operate and are used without special problems. On the maintenance budget, from the interview to mayors and administrative officers of the cities, we confirmed that the required minimum budget for refuse collection work was allotted and secured.

**< Conditions of maintenance of supplied vehicles and machinery and materials and budget of maintenance >**

	Conditions of maintenance	Budget of maintenance
Colombo City		
Dehiwala City		
Moratuwa City		
Kotte City	×	
Coronawa City		
Maharagawa City		

Source) Sri Lanka Country Program Evaluation Team  
(2002. 05)

Note) = very good, = good, = not good, × = bad

**5-2) Self-help Efforts by the Authority**

As mentioned in “Effectiveness”, though we found that the refuse trucks which had been supplied according to the program were useful, it is hard for the supplied refuse truck to go into and collect refuse in the areas where low income groups and many illegal occupants, called “Chanty”, live because the maintenance of the roads is insufficient and the width of roads is narrow generally in the areas. Against these problems, the administration takes actions of the conventional use of tractors and the distribution and installation of containers for refuse collection each area. And moreover they try to have the refuse collection and disposal system function totally, with compensating the matters which the collection service can not cover by conducting enlightenment movement concerning the refuse problem.

**5-3) Toward the Improvement of Sustainability ~ Development of Regional Final Disposal Site**

In Colombo City, the refuse of about 600 ton is collected per a day<sup>1)</sup>. About 80% of it, 480ton is raw garbage, and the rest, 20%, 120ton, is solid waste which is the target of final disposal. They planned to dispose of the solid waste which was collected in Colombo City and neighbouring municipalities at the regional final disposal site which would be built with the assistance of WB. However the construction project was

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<sup>1)</sup> Colombo City plans to dispose of raw refuse which accounts for about 80% (about 480 ton) of collected refuse of about 600ton /day in the recycle plant (disposal capacity: 600ton /day) which will be completed by the end of 2002 and reuse it. This recycle plant will be conducted by the participation of private enterprises under BOO (Built-Own-Operate) system. In five cities near Colombo City, there is an example of the practice of small-scale refuse recycle with NGO.

frustrated because of the technical and social reason, and the site is still incomplete. Under these conditions, each city can't help taking massed refuse for final disposal.<sup>2)</sup> The objective of the program is "to reinforce and improve efficiency the capacity of refuse collection and the system", and though the effectiveness was recognized, it is insufficient from the viewpoint of the establishment of the refuse disposal system in the whole target areas. The establishment of the more desired system requires the acquisition of the regional final disposal site, and it is necessary to complete it immediately.

In Western Province which has a role to supervise and guide the refuse collection work of Colombo City, Dehiwala City, Moratuwa City, Kotte City, Coronawa City, and Maharagama City where vehicles for refuse collection and related machinery and materials were supplied in the program, the exclusive department of solid waste disposal solely was planned to establish, but at the time of the 2<sup>nd</sup> field work of the evaluation (2002.05), it is not established yet.<sup>3)</sup> It is desirable that the department of solid waste disposal is established in Western Province and the refuse disposal system in each city is centralized to manage in the respect of connecting the refuse disposal of each city organically, providing the refuse disposal service efficiently and effectively from the viewpoint of the regional management.

#### **(6) Other achievement**

The program consists of Grant Assistance project, so that the technical assistance is not conducted.

#### **(7) Conclusion**

The objective of the program is to promote the capacity and efficiency of refuse collection and to contribute to the improvement of sanitary environment in Colombo City and neighbouring municipalities by the supply of the required vehicles and machinery and materials to reinforce the capacity of refuse collection (vehicles for refuse collection, machinery and materials for automobile repair shop, spare parts, and operation guide of vehicles and machinery and materials for repair), and it has been achieved certainly. In each city, the refuse collection comes to be conducted every day basically, and as far as we inspected the main roads visually, we did not find that the refuse was left on the roadside.

Though the supplied vehicles and machinery and materials are made use of without

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<sup>2)</sup> Though each city has final disposal site in the administrative section now, it is small and there is a limit to space. It does not function as a semipermanent disposal site.

<sup>3)</sup> Western Province Planning Agency which has control over solid waste disposal says that a bill to establish solid waste disposal agency as a formal agency have been approved in the assembly already and the budget is prepared, but the system such as staff assignment has not been established yet.

special problems, it is desirable to realize the development of the regional final disposal site and the management system, which is external condition of the program, to more reinforce the whole refuse disposal system.

### **3 . Lesson Learnt**

In the evaluation, there was no lesson learnt especially.

### **4 . Suggestion**

In this evaluation, there was no proposal especially.

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
PROGRAM FOR IMPROVEMENT OF REFUSE DISPOSAL MANAGEMENT  
IN COLOMBO METROPOLITAN AREA

**5 . Annex**

**[PDMe]**

Summary	Performance Indicators and Plan Value		External Conditions
	Indicators	Plan Value	
<p><u>Overall Goal</u></p> <p>To improve the environment sanitation of Colombo City and neighbouring municipalities.</p>	1.The number of patients with infectious diseases in Colombo City and neighbouring municipalities	No data	
<p><u>Program Objective</u></p> <p>To realize the efficient refuse disposal in Colombo City and neighbouring municipalities</p>	1.The annual amount of refuse collection in Colombo City and neighbouring municipalities	No data	
<p><u>Project Objective</u></p> <p>1.The Project for Improvement of Refuse Disposal Management in Colombo (GA) To reinforce the refuse collection system in Colombo City.</p> <p>2.The Project for Improvement of Refuse Disposal Management in Colombo Metropolitan Area (GA) To reinforce the refuse collection system in Colombo Metropolitan Area.</p>	<p>1-1.The number of vehicles for refuse collection</p> <p>1-2.The rate of operation of machinery and materials</p> <p>2-1.The number of vehicles for refuse collection</p> <p>2-2.The rate of operation of machinery and materials</p>	<p>No data</p> <p>No data</p>	
<p><u>Output</u></p> <p>1.The Project for Improvement of Refuse Disposal Management in Colombo (GA) (Machinery and materials)</p> <ul style="list-style-type: none"> <li>· Vehicles for refuse collection vehicle</li> <li>· A suite of machinery and materials for workshop</li> <li>· A set of spare parts (Others)</li> <li>· Operation manual of vehicle and workshop</li> <li>· Operation guidance of vehicle For 10 days</li> <li>· Operation guidance of machinery and machinery</li> </ul>	<p>1-1.Machinery and materials for refuse collection</p> <p>1-2.Technical guidance to staff</p>	<ul style="list-style-type: none"> <li>· Operation guidance of vehicle For 10 days (performance value) (Colombo City)</li> <li>· Operation guidance of machinery and materials of workshop for 3 weeks (performance value) ( Colombo City)</li> </ul>	<ul style="list-style-type: none"> <li>· Appropriate “management system,” “maintenance budget of machinery and materials,” and “training of staff” are required.</li> </ul>

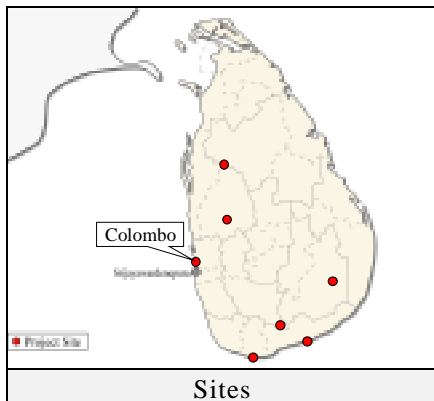


BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
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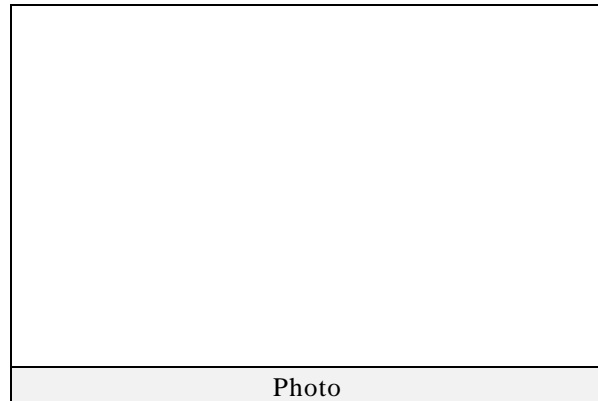
<p>and materials of workshop For 3 weeks</p> <p>2. The Project for Improvement of Refuse Disposal Management in Colombo Metropolitan Area (GA) (Machinery and materials)</p> <ul style="list-style-type: none"> <li>· Vehicles for refuse collection</li> <li>· A suite of machinery and materials for workshop</li> <li>· A set of spare parts (Others)</li> <li>· Operation manual of vehicle and workshop</li> <li>· Operation guidance of vehicle For 2 weeks</li> <li>· Operation guidance of machinery and materials of workshop For 2 weeks</li> </ul>	<p>1-3.The conditions of technology acquirement of staff</p> <p>2-1.Machinery and materials for refuse collection</p> <p>2-2.Technical guidance to staff</p> <p>2-3.The conditions of technology acquirement of staff</p>	<p>No data</p> <p>No data</p> <ul style="list-style-type: none"> <li>· Operation guidance of vehicle for 2 weeks (performance value) ( neighbouring municipalities)</li> <li>· Operation guidance of machinery and materials of workshop for 2 weeks (performance value)(neighbouring municipalities)</li> </ul> <p>No data</p>	
<p><u>Input</u></p> <p>1. The Project for Improvement of Refuse Disposal Management in Colombo (GA)</p> <ul style="list-style-type: none"> <li>·983 million yen (95) (Charge of Colombo City)</li> <li>·Construction of workshop</li> <li>· Storage warehouse for spare parts (in workshop)</li> <li>· Increase the number of operators, from 110 to 200</li> </ul> <p>2. The Project for Improvement of Refuse Disposal Management in Colombo Metropolitan Area (GA)</p> <ul style="list-style-type: none"> <li>·583million yen (97) (Charge of Western Province)</li> <li>· Maintenance of parts warehouse</li> <li>· Construction of Ratomanara transit station ( Charge of five cities )</li> <li>Dehiwala, Moratuwa, Kotte, Coronawa, Maharagama</li> <li>·Construction of workshop and garage</li> <li>·Improvement of final disposal site</li> </ul>			

## PROGRAM FOR IMPROVEMENT OF DRINKING WATER SUPPLY IN RURAL AREA

### 1 . Program Summary and JICA's Cooperation



Sites



Photo

#### (1) Program Background

Sri Lanka Government targets providing stably the whole nation with safe drinking water by 2000 in the plan for public investment. Concretely, it planed to build 7,500 wells for drinking water for seven years, from 1994 to 2000, in order to develop the supply facilities for drinking water in the whole country. However, the excavators for well which they possessed were too old and also were running short in quantity, so that they could expect to dig only about 5,000 wells at most by 2000 if the rate is kept. Under such conditions, Sri Lanka Government needed to obtain new excavators for deep well in order to renew the excavators which were necessary for executing the nationwide well digging project as scheduled.

#### (2) Program Objectives and Overall Goal

Not only to improve the capacity of providing stably the residents who live in the area where safe drinking water is not provided, especially in rural area, with sanitary water by building deep wells, but also to contribute to the improvement of access to safe water in distance and time.

#### (3) Program Scope

The machinery and materials for deep well (excavators, vehicles for operation support, hand pumps, and others) were supplied and deployed to five local offices of National Water Supply and Drainage Board (Center, Anuradhapura, Nurunegala, Moreragala, Enbiripitiya) and two local support centers (Matara, Hanbantuta) to more promote the construction of deep wells for drinking water in the whole country.

#### **(4) Program Component**

The program comprises of the following individual project.

- The Project for Improvement of Drinking Water Supply in Rural Area (GA, 1995: 823 million yen)

The following one expert (Water Supply Development Plan) was dispatched in the same period as technical assistance in the associated field though he was not involved in the program directly.

- Water Supply Development Plan  
(Dispatch of experts belonging to Notional Water Supply and Drainage Board 1994. 12-1997. 12)

#### **(5) Executing Agency**

Ministry of Housing & Urban Development, National Water Supply and Drainage Board

(At present, Ministry of Housing Plantation Infrastructure, National Water Supply and Drainage Board)

#### **(6) Present Status of the Program /Viewpoint for Evaluation**

The program finished when “The Project for Improvement of Drinking Water Supply in Rural Area” (GA) was completed by the end of fiscal 1996. Consequently, this evaluation is the ex post evaluation according to “JICA Program Evaluation Guideline (2001,09) “.

## **2 . Evaluation Results**

### **(1) Relevance**

The projective of the program is to provide stably the residents who live in the area where safe drinking water is not provided steadily with sanitary water, and the program was expected to support the achievement of the target concerning the drinking water supply of Sri Lanka at the executing time, to build 7,500 deep wells in the whole country. Also now in “Six Year Development Project (1999-2004)”, the phrase, “to support to satisfy the needs of safe drinking water in the undeveloped area” is included. The “Improvement of Drinking Water Supply in Rural Area Program” which contributed to the improvement of stable supply of safe drinking water in the rural area whose water supply ratio is only 57% by building deep wells is in accordance with the purport of national development plan even now, and the relevance of the program is approved.

**(2) Effectiveness**

In those days National Water Supply and Drainage Board possessed 15 machines for deep well, and with GA, 5 machines were supplied newly according to the program. And consequently the total number of the machines reached 20, and the capacity of promotion of deep well construction was improved by about 33% in machinery and materials.

To compare the annual average number of deep well construction before the supply of the machinery and materials and that after the supply, and to inspect the effectiveness in order to see the usefulness of excavators for deep well which were supplied according to “The Project for Improvement of Drinking Water Supply in Rural Area.” In the following table, the annual number of deep well construction was 662 for four years before the supply of the machinery and materials, but it was 612 for six years since 1996. The number reduces a little after the supply of the machinery and materials.

**< Comparison of the annual average number of deep well construction before the supply of machinery and materials with that after the supply >**

(Unit: well)

Calendar year	Before the supply of the machinery and materials				After the supply of the machinery and materials					
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Number of construction	723	669	684	571	712	427	541	665	583	741
Annual average number of construction	662 wells / year (Average for four years)				612wells / year (Average for six years)					

Source) Sri Lanka Country Program Evaluation Team ( 2002.05)

The construction of deep well started at the rainfall area which had a large population, high degree of location, and high efficiency in operation and cost in the water supply ratio and the success rate. Now in the intermediate area which lies between the rainfall areas and the dry areas, the construction of deep wells is completing, and from now in the dry area which has small population and low degree of location, the construction of deep wells is going to start. In the intermediate area where the construction of deep wells have already done, and in the dry area where the construction is going to start, many hours are required to find the places which are good for the construction of deep wells. They have to dig deeper, and even they dig wells, there is no water in many wells often. In this way, the efficiency of operation is apt to reduce. Moreover, the target area has small population and low degree of location and most of them are dispersed, so that the efficiency in them is lower than that in the rainfall area.

Even in such conditions, the annual average number of deep well construction is about 600, which is the same as the number before the supply of machinery. It is supposable that the number of rig with which real operation can be done would reduce drastically if the machinery and materials are not supplied according to the program, and we appreciate positively that the program kept the acapacity of digging deep wells.

### **(3) Efficiency**

The Grant Assistance project is completed as scheduled without special change of scope, delay of schedule, and excess over expenditure. There are no special problems on the efficiency of the implementation.

### **(4) Impacts**

Here we investigate the impacts of the project according to the results of beneficiary survey <sup>1)</sup> which was conducted at this study.

The impact which the beneficiary survey shows is summarized in the point of drastic reduction of time and expense which were spent on drawing water every day before the completion of deep wells. Especially in the dry area, the residents had to go distant water places on foot or by using the transport facilities such as three-wheelers before the completion of the deep wells. Sometimes even if they went all the way to distant water places, they could not get water because water places had dried up. The loss in time, mind and body, and money were heavy. Even in the rainfall area, though the residents has hand-cut wells unlike the dry areas, it is hard to get water from the hand-cut wells in the dry season. So they also had to go all the way to distant wells too like the residents in the dry area. The difficult environment of getting water has been improved drastically.

### **(5) Sustainability**

#### **5-1) Management of Supplied Machinery and Materials**

The supplied machinery and materials for deep well digging has been used for five years. Though some parts which are not purchased on the spot are difficult to get, the conditions of management are relatively good. It is reported that all machinery and materials for digging including the supplied ones operate without trouble. Also the digging technology, the maintenance of digging machinery, and training of excavators were conducted against the staffs and suppliers by National Water Supply and Drainage Board, and we recognize that there is no problem on the maintenance of the supplied

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<sup>1)</sup> The five survey areas are selected, with the advice by the executing agency, National Water Supply and Drainage Board; two areas form Gampaha District which is a rainfall area, two areas form Kurunegara District which is a dry area, and one area from Anuradhapura District.

machinery and materials.

#### **5-2) Maintenance of Deep Well**

The responsibility of the maintenance of the constructed deep wells lies with not Notional Water Supply and Drainage Board, but the local government (Pradeshiya Sabhas) to which the authority is transferred by the central government. In a bill of “National Policy on Water and Drainage in Rural Area,” the residents who use a well are encouraged to organize the water user association and the association to pay the construction and maintenance cost of water and drainage facilities with the local government. However in the results of the survey we find that some constructed wells are in bad conditions because the local government to which the authority is transferred by the central government is fragile in finance. Quite a few residents think that the responsibility of management of the deep well lies not on the residents but on the local government.

From the above two viewpoints, in “The Project for Improvement of Drinking Water Supply in Rural Area”, the sustainability in the supplied machinery and materials is approved, but it is hard to say that the sustainability in the maintenance of deep wells by the residents who are final beneficiary and the local government is sufficient.

#### **(6) Other achievement**

As the technical assistance concerning the program, an expert in the field of “Water Supply Development Plan,” was dispatched to National Water Supply and drainage Agency at the same time, and the work contents were the matters concerning the nationwide water supply field: the advice related to Water Supply Development Plan in Sri Lanka and Water Supply Implementation Plan, the adjustment of the assistance of water supply field by Japanese Government, and the advice to the design of 3<sup>rd</sup> Five Year Project Plan. Consequently it is difficult to evaluate the contribution on the program.

#### **(7) Conclusion**

We understand that the effects of the realization of stable supply of drinking water in rural areas are continuing for a while by the construction of deep wells by using the supplied machinery and materials for digging because the condition of the maintenance is good.

However, the role and responsibility between the local government which shoulders the maintenance and water user association which comprises of the residents are not defined, and it is hard to say that the quality in technology, organization, and finance which

relates to the maintenance is sufficient. So we are doubtful about the long-term sustainability. To assure the long-term sustainability, it is effective to create ownership of deep wells and to make a device of heightening the sense of responsibility to the maintenance by the positive participation of the local government and the residents.<sup>1</sup> In “Six Year Development Project (1999-2004)” by Sri Lanka Government, the promotion of “the participation of the local government in the maintenance of water supply system” is declared, but we think that it is necessary to co-opt the residents positively when the similar project is developed in the future.

### **3 . Lesson Learnt**

In the evaluation, there was no lesson learnt especially.

### **4 . Suggestion**

In the evaluation, there was no proposal especially.

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<sup>1</sup> As an example, there is “2<sup>nd</sup> Water Supply / Public Sanitation Project” which was conducted by Asian Development Bank. In the project, the training such as the maintenance of water service, the operation and management, the execution management, the information management system, the participation of the residents, and sanitary education was conducted to the staffs of National Water Supply and Drainage Board and the local government. At the execution stage of the pilot program, the residents participation approach was conducted to heighten the ownership of the final beneficiaries in cooperation with NGO. Also they heightened the awareness of the residents by conducting the campaign of the awareness improvement on water facilities and sanitary education. This program is worth consulting as a program of the type in which both hard phase and soft phase are provided.

BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
PROGRAM FOR IMPROVEMENT OF DRINKING WATER SUPPLY IN RURAL AREA

**5 . Annex**

**[PDMe]**

Summary	Performance Indicators and Plan Value		External Conditions
	Indicators	Plan Value	
<p><u>Overall Goal</u> To steadily supply safe water to the whole nation by 2000.</p>	<p>1.The diffusion rate of water supply in Sri Lanka 2.The rate of population who can use water facilities steadily. 3.The amount of safe water supply</p>	<p>100% by 2000  100% by 2000  No data</p>	
<p><u>Program Objective</u> To promote the construction of deep wells in the whole country.</p>	<p>1.The number of deep wells construction 2.The amount of water supply in the constructed wells</p>	<p>7500 wells for six years, from 1994-2000 No data</p>	
<p><u>Project Objective</u> 1.The Project for Improvement of Drinking Water Supply in Rural Area (GA) To replenish the excavators for well which are too old and running short in quantity, and to improve the maintenance.  2.Water Supply Development Plan (Dispatch of Experts/ Heihachiro Ishihara) The project progresses smoothly by the advice and adjustment in Steering Committee. 3.JOCV 6 persons</p>	<p>1-1.The working ratio of machinery and materials 1-2.The list of excavators for well which are possessed</p>	<p>No data  No data</p>	
<p><u>Output</u> 1. The Project for Improvement of Drinking Water Supply in Rural Area (GA) (Machinery and Materials) · 5 excavators with pump · 6 vehicles for operation support (truck)</p>	<p>1-1.The excavators for well 1-2.The acquisition conditions of technology of staffs</p>	<p>No data</p>	<p>· Appropriate “maintenance system,” · “budget for maintenance of facilities and</p>



BUILDING AND IMPROVING ECONOMIC AND SOCIAL INFRASTRUCTURE  
PROGRAM FOR IMPROVEMENT OF DRINKING WATER SUPPLY IN RURAL AREA

<ul style="list-style-type: none"> <li>· Instruments of water examination</li> <li>· 800 hand pumps and others</li> <li>· Operation manual of machinery and materials</li> <li>· Operation guidance of each machinery (for 9days, 52 persons)</li> </ul> <p>2. Water Supply Development Plan (Dispatch of experts/Heihachiro Ishihara)</p> <ul style="list-style-type: none"> <li>· To establish Steering Committee so that the aid project to the water supply field by Japanese Government progresses smoothly, and to hold Weekly&amp;Monthly Meeting</li> </ul> <p>3. JOCV 6 persons</p>	<p>2-1. The conditions of holding Steering Committee</p>	<p>No data</p>	<p>machinery and material,” and “training of staffs” are required.</p>
<p><u>Input</u></p> <p>1. The Project for Improvement of Drinking Water Supply in Rural Area (GA)</p> <ul style="list-style-type: none"> <li>· 823million yen (96)</li> </ul> <p>2. Water Supply Development Plan (Dispatch of experts/Heihachiro Ishihara)</p> <ul style="list-style-type: none"> <li>· Dispatch of experts for Water Supply Development Plan 94.12.20-97.12.19</li> </ul> <p>3. JOCV 6persons</p>			

# Development of Mining and Manufacturing Industries

## INSTITUTE OF COMPUTER TECHNOLOGY

### 1 . Program Summary and JICA's Cooperation



#### (1) Program Background

The number of main frame computers operated in Sri Lanka was rapidly increased after the year 1980 and amounted to 250 sets in 1988. It became critical to train a large number of software engineers, in both public and private sectors, to meet increasing demand for them. Sri Lankan Government planned to establish the Institute of Computer Technology (ICT) in the University of Colombo, to foster such software engineers.

#### (2) Program Objectives and Overall Goal

The objective of the program is to train computer software engineers (analyst programmers), by providing training at the ICT. The technical cooperation from Japan was designed so that the ICT can be effectively and efficiently operated by Sri Lankan staff by themselves.

The overall goal would be the development of IT industry in Sri Lanka.

#### (3) Program Scope

The training course program titled "Diploma in Computer Technology" will be systematically operated after the Japanese staff prepare the guideline for the curriculum of the course and both Sri Lanka and Japanese staff review it in detail.

#### (4) Program Component

The program consists of the following three projects.

- The Project for Establishment of Institute of Computer Technology, including the Follow-up (Project Type Technical Cooperation, April 1987 to March 1991)
- The After-care Technical Cooperation for the ICT Project (August 1995 to July 1996)
- The Third Country Training Programme (Phase-1: Structured System Analysis and Design Methodology, 1993 to 1997, Phase-2: Information Systems Engineering, 1998 to 2002 )

**(5) Executing Agency**

- University of Colombo

**(6) Present Status of the Program/Viewpoint for Evaluation**

The Project Type Technical Cooperation, a core project of the program, started in 1987 and continued for four years, including one-year Follow-up, after which After-care Project was conducted for one year from 1995. The Third Country Training Program introduced in 1993, on the other hand, has been held every year until now. As for evaluation, post-evaluation on the Project Type Cooperation was conducted in February 1991. This time in our evaluation, we focused on evaluation of effects/impacts and sustainability while referring to the previous evaluation results. The evaluation on After-care Project and Third Country Training has limitation because of the lack of reference data and materials.

A new Project Type Cooperation for human resources development for information technology, is scheduled to begin in June 2002. The project, with the ICT as executing agency, aims to contribute to provide the private sector with human resources with IT skills by transferring technology on web-based training.

**2 . Evaluation Results**

**(1) Relevance**

The overall goal of the program "Development of IT industry in Sri Lanka" and the program objective "Training of computer software engineers" are consistent with current policy of Sri Lankan Government, which attaches importance to information technology industry. The Government declared the year 1998 as year of information technology (IT) and has since promoted IT as priority area with importance. The IT industry is also identified as one of priority industries in "Master Plan for Industrial Development" prepared with JICA's assistance.

It was quite relevant that the Sri Lanka and Japanese Governments foresaw the importance and prospects of the IT industry and planned to develop human resources, at the time of late 1980s.

The ICT has been properly providing training to software engineers constantly as required at the time, although the ICT has shifted its focal point from software engineers for main frame computers to engineers for personal computers and networking, according to the evolution of computer technology.

**(2) Effectiveness**

Technology was smoothly transferred to counterparts through preparation of teaching materials for the training courses, trial lectures with those materials, and practice on computer operation. The counterparts deepened their knowledge of IT with practical experiences, and considerably improved their skills in giving training. In the first year training course, which started during the Project period, lectures and exercises were appropriately conducted, although the introduction of the course delayed due to the security situation.

The program objective "Training of computer software engineers" was satisfactorily achieved.

### **(3) Efficiency**

Input by the Japanese side was duly conducted as scheduled, in despatching experts, receiving trainees and providing equipment. Input by Sri Lankan side, such as providing buildings and facilities, allocating counterparts and supplying machines, was mostly conducted appropriately in accordance with the schedule. No financial problems were observed in project operation.

### **(4) Impacts**

The ICT has established itself as the most prestigious training institute of information technology, by expanding its activities which was initiated with the Project Type Cooperation. The ICT has been playing an important role in providing human resources to the private sector in the IT field, and functioning as consultant/think-tank for the Sri Lankan Government in promoting IT.

The ICT was awarded "Special Award for International Cooperation" by JICA in 1999, for its outstanding performance.

With the improvement of counterparts skills, the Third Country Training Programs, in the areas of structured system analysis, design methodology and information systems engineering, have been successfully conducted. The programs were positively evaluated by students and trainees.

Activities of the ICT at the time of our evaluation are as follows:

- 1) The ICT provides degree courses (full-time and part-time) and certificate courses. The ICT has a director, 14 lecturers, one engineer, three administrative staff and 11 other staff.
- 2) The full-time course, aiming to foster analysts and programmers at professional level, provides training for one year (40 weeks) with seven-hours-a-day, five-days-a-week classes. Students must be a Bachelor's degree holder of non-computer major as prerequisite. The part-time course, aiming to foster technicians capable of utilising IT at business operation, provides two year course. Prerequisite for the part-time course is the same as the full-time course. During the period 1991-2000, 224 students, full-time and part-time courses put together, successfully completed their degrees.
- 3) The certificate courses provide those who need IT skills at business with training on part-time basis for 6 months. Three courses, i) system analysis and designing, ii) IT application for development and iii) software development, are open to trainees.
- 4) From the year 2000 the ICT started External Degree Programme (EDP), with the background of rising demand of IT engineers/operators by the private sector. In the EDP the private institutions provide training following the curriculum developed by the ICT, after which University of Colombo awards the degrees depending on results of examination by the ICT. Certificate is awarded for trainees who completed the first year, diploma for those who completed the second year, and Bachelor of IT for those who completed the third year.
- 5) The research and development activities of the ICT include the development of Sinhalese and Tamil character codes, which were recognised as international standards in 1999. The ICT also participates in the "Regional Radio Programme in the Kotomale Region" supported by UNESCO, in which it is planned that news sources will be attained through internet and then distributed to

villagers through regional radio in the remote area like Kotomale region.

## **(5) Sustainability**

### **5-1) Institutional aspect**

The ICT has an effective operation and management system under the Director, Professor Samaranayake. The ICT is scheduled in 2002 to merge with the Department of Computer Science of the University, to form the School of Computing under the University. Because the two institutions have been jointly operating various activities since 1990, such as consulting services to the private sector, the merger will increase efficiency and strength of the functions.

### **5-2) Financial aspect**

The recent trend of balance sheet of the ICT shows that expenditure had always exceeded the revenue until 1998, but after 1999 the balance turned to be profit-making. The major reason behind this is the fact that revenue from tuition fee increased because of the expansion of training courses. However, subsidy from the Government, which accounts for more than 50% of the total revenue, tends to be decreasing after 1999. It is required to secure and increase the ICT's own financial resources in the near future.

### **5-3) Technical/personnel aspect**

The ICT has sufficient ability of leadership, planning and executing, so as to provide services autonomously, judging from its activities like training courses. On the other hand, however, it is pointed out that the number of staff is always less than required since the ICT is expanding its activities year by year. As IT engineers tend to prefer employment in the private sector where they are offered favourable payment, it is difficult for the ICT to recruit excellent personnel.

## **(6) Other achievement**

Good relationship was observed during the period of the Project Type Technical Cooperation between Japanese experts and counterparts, thanks to the efforts made by the both sides. As a result the project was completed smoothly and technology transfer was achieved as planned. Sri Lankan side commented that experts from the private sector or academia would be preferable rather than from the public sector.

## **(7) Conclusion**

The ICT, after it continuously received technical assistance through 1990s and improved its capacity and capability, is the most prestigious institution to provide human resources for IT industry, which is promoted with priority by the Government. Furthermore, the ICT functions as think-tank by providing consultancy for the governmental organisations to formulate IT policy measures. The roles played by the ICT have been/are tremendous in Sri Lankan IT development, especially when we consider the future prospects of the IT.

### **3. Lesson Learnt**

The ICT has played a significant role in the development of IT in Sri Lanka a while expanding its activities. However, it would be suggested that ICT, because it is subsidised by the Sri Lankan Government and supported by Japan, avoid unnecessary competition with the private sector institutions. The ICT should concentrate more on training for human resources with highly professional skills and research and development activities.

### **4 . Suggestion**

While it is doubtless that ICT has contributed much to the human resource development for IT in Sri Lanka, it is desirable in the new Project to start in June 2002, that the ICT focus on technical transfer in the area where the private sector has urgent demand and that at the same time the ICT differentiate itself from the private computer school and provide services which the private sector cannot afford.

It is pointed out that many of ICT graduate/trainees find employment at local European/American companies. This tendency is not surprising because most of IT companies operating in Sri Lanka have capital investment from Europeans and Americans. However, one of a few Japanese IT companies operating in Sri Lanka suggests that the ICT should focus on the technical area where Japan has advantages over others, such as development of embedded software oriented for machine manufactures, if the ICT is supported by Japan. This idea may be worth considering as "national interest" derived from ODA.

The Sri Lankan Government considers IT industry as the most prospective industry and offers various incentives for foreign investors to invest in the IT business. Moreover, Sri Lankan Government has requested Japanese Government for financial assistance in setting up "Techno-Park" as measure to promote IT industry. If the " Techno-Park" project is to be realised, it is expected that the ICT, jointly with the project, make contribution to amplifying the effects of IT development.

**5 . Annex**

**【PDM<sub>E</sub>】**

Summary	Indicators	Performances	External conditions
<u>Overall Goal</u> Development of IT industry in Sri Lanka	Turnover Value added Export	IT industry 1998: Rs.5,576 mil. IT industry 1998: Rs.2,500 mil. Computer software 2000 : US\$.58 mil. (Annual average growth 95-00; 40%)	Security situation not changed significantly.
<u>Program Objective</u> Training of computer software engineers (analyst programmers)	Number of graduates/trainees  Employment for graduates	224 degrees received in 1991-2000. 4000 trainees in various courses. Most graduates attained job in the private or public sector.	Graduates engaged in IT industry.
<u>Output</u> <ul style="list-style-type: none"> <li>• Training course conducted systematically</li> <li>• Counterparts' skills improved</li> <li>• Project operation strengthened</li> <li>• Facilities and equipment provided, set up, utilized and maintained properly.</li> </ul>	Number and frequency of training courses held Evaluation results of counterparts' skills Operation condition Conditions of facilities and equipment	Two courses conducted as planned (first year). Counterparts' skills improved as planned  Strengthened Facilities and equipment properly situated, operated and maintained.	Counterpart staff remaining in the Institute.
<u>Input</u> ( Japanese side ) <ul style="list-style-type: none"> <li>• 8 Long term experts ( 87-91 )</li> <li>• 3 Short term experts ( 88-90 )</li> <li>• 10 trainees received ( 87-90 )</li> <li>• Equipment: 429 million yen ( 87-91 in total )</li> <li>• Other costs: 2.07 million yen</li> </ul> ( Sri Lankan side ) <ul style="list-style-type: none"> <li>• Counterparts staff: 14 (87), 23 (88), 23 (89), 27 (90)</li> <li>• Costs Development Rs.48,960 ( 86-90 ) Current Rs.5,410 ( 87-91 )</li> </ul>			Facilities and equipment imported without difficulty.

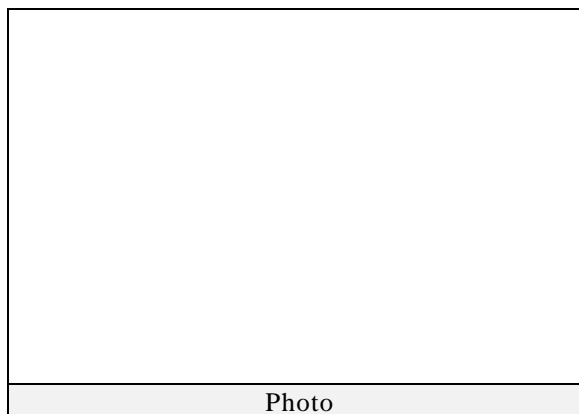


## INDUSTRIALIZATION AND INVESTMENT PROMOTION

### 1 . Program Summary and JICA's Cooperation



Site: Nation-wide



Photo

#### (1) Program Background

Two Japanese experts, one for 1991-94 and the other for 1994-96, were attached to the Ministry of Industrial Development for the purpose of assisting the Sri Lankan Government to promote foreign direct investment, as well as industrialization in general. In late 1990s, Sri Lanka, facing the changing economic environment, i.e. the prevailing free trade regime, intended to work out the policy and strategies for industrialization in the coming decade and reflect it to the economic policy.

The Sri Lanka Government requested JICA, along with the experts' recommendation to do so, to provide assistance for a Development Study "The Master Plan Study for Industrialization and Investment Promotion", which was conducted in 1999-2000 to formulate clear industrialization policy and strategies.<sup>1)</sup>

#### (2) Program Objectives and Overall Goal

The purpose of the program of "Industrialization and Investment Promotion" is to implement appropriate policy measures that were proposed by the Master Plan Study. Overall goal should be, as results of the implementation, the development of industries and investment promotion.

#### (3) Program Scope

The Master Plan Study was conducted in two phases during the period of 1991-2000, by

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<sup>1)</sup> JICA supported Development Study for promotion of industrialization in 1992, based of which a number of projects were implemented.

a Japanese team of consultants, in cooperation with the Ministry of Industrial Development (MID) staff members. In the Phase-One Study, seven priority industry sub-sectors were identified from 28 sub-sectors and IT industry. In the Phase-Two Study, overall strategies and targets for industrialization were formulated, apart from detailed analysis of seven sub-sectors identified in the Phase-One Study. Formulation of Master Plan invited the contribution by UNIDO, who was in charge of analysis of two sub-sectors out of seven.

The two experts, with the Director of the Investment Division of the MID as counterpart, served from 1991 to 1996.

#### **(4) Program Component**

The program consists of the following project and activity.

- Development Study "The Master Plan Study for Industrialization and Investment Promotion" (Phase-1: February to August 1999, Phase-2: October 1999 to July 2000)
- Long-term Expert on Investment Promotion (2 experts; June 1991 to June 1994 and August 1994 to August 1996)

#### **(5) Executing Agency**

Ministry of Industrial Development (at the time of Development Study)

#### **(6) Present Status of the Program/Viewpoint for Evaluation**

After completing the Development Study, two Follow-up studies were conducted. At present one JICA long-term expert is attached to the Ministry of Industry as industrial development advisor, who is expected to follow-up the implementation of the Master Plan. An expert on investment promotion, on the other hand, has not been dispatched since 1997.

Although evaluation methodology has not been established for Development Studies and individual experts, we used five criteria and PDM for evaluation, to be consistent with evaluation of other programs.

## **2 . Evaluation Results**

### **(1) Relevance**

Sri Lankan industries have consistently grown leading the economic growth of Sri Lanka

since 1977 when the nation changed its policy to free economy. However, because the nation's industrial structure has been dominated by textile industry, now Sri Lanka is struggling to deal with drastic changes in international environment where trade liberalization is rapidly proceeding. Under these circumstances, the government announced "New Industrial Strategy" in 1995 as a development strategy for Sri Lankan Industries. However the Strategy was insufficient as a guideline for industrial development due to its inadequate concreteness and specificity. With this situation as a backdrop, the technical assistance was implemented to design the Master Plan with target years as a comprehensive mid-term and long-term development plan. Therefore the relevance of the technical assistance was high.

Furthermore, export-oriented companies and cutting-edge companies in Sri Lanka, many of which are invested by foreign capitals, are playing a key role to develop the whole Sri Lankan industrial sector. Meanwhile, because of its unstable public security and insufficient infrastructures due to ethnic conflicts, foreign investment to Sri Lanka remains low comparing other Southeast Asian countries. Considering these circumstances, it was proper to dispatch experts in order to attract foreign capitals.

It is still a fundamental challenge for Sri Lankan industries how to change its structure from that dominated by textile industry to a structure constituted of various industries. Therefore the program of Industrialization and Investment Promotion still maintains its relevance.

## **(2) Effectiveness**

The purpose of the Development Study was to implement plans designed for industrialization and for the promotion of investment. Meanwhile, for consultants and C/P who implemented the Development Study, their main purpose was to prepare a report for the Study in adherence to TOR. Although they did not actively commit activities to implement plans which they proposed in their report (of course, they tackled to design highly practical plans), to understand the effectiveness of the Study and dispatched experts, knowing how Sri Lanka Government has adopted the proposals in the report is an important indication.

Because the designing of the Master Plan was completed in 2000, few projects proposed in this Plan have been realized by the present day. However, discussion within the government and Follow-Up Studies by JICA were carried out to realize the following two projects; "Construction of Techno Park" and "Establishment of Small & Medium Businesses Development Corporation". Furthermore, regarding the industrial complex for leather manufacturers proposed in the Master Plan (by UNIDO), the site has been already prepared and construction has started.

The Master Plan also proposed an organization reform for the then Ministry of Industrial Development (MoID in short). The present undersecretary of the Ministry designed an original organization reform plan in consideration of proposals from other ministries planning to implement the plan in June, 2002. As the reorganization and changes of executives has occurred in the Ministry with the change in administrations, the Ministry is now being changed to implement such bold systematic reform as hiring human resources from private sector for its chief level in its new system.

Furthermore, the Master Plan chose 7 highly prioritized categories of business for development, and proposed a development strategy for the each category. Currently, also considering the study by USAID, the Ministry of Industrial Policies (MoIP in short) established a task force for each of 15 prioritized categories of business including 7 businesses mentioned above (including not only industries but also tourism services and agroindustry) to design a strategic plan for the each business by June, 2002. Although Sri Lanka government did not adopt the original Master Plan itself, considering the Plan, the government takes the initiative to design its own development plan. We consider this situation as one of the achievements of technical assistance to C/P by implementing the Development Study.

The purpose to dispatch experts was to improve the environment for direct foreign investment. The experts can do little to improve macro-economic environment or public security. However, as some proposals made by the experts regarding investment policy and measures have been realized including the simplification of preferential treatments for investment and consistent priority of businesses to give preferential treatments, we consider that this purpose was highly achieved.

### **(3) Efficiency**

The inputs made by Japan were implemented in accordance with the original plan including the Development Study and the dispatch of experts. Also in Sri Lankan side, C/P was placed, and experts in the private sector and the academia participated to design the Master Plan in accordance with the original plan.

Because tasks were smoothly implemented, the period required to complete to design the Master Plan was comparably short (the period of Phase II was only about six months).

### **(4) Impacts**

The overall goal of this program was to industrialize Sri Lanka and to promote direct foreign investment. In the 1990s, Sri Lankan industries were leading players for the national economy, and the amount of direct foreign investments crept up although the amount was not stable due to the unsettled public security. Considering these

circumstances, it might be seen that this goal was achieved up to a point. However, concerning the contribution of the Development Study and dispatched experts, it is difficult to determine its degree by those situations. Because the Development Study was completed in 2000, it is impossible to consider that this Study was reflected on the growth rate of added value in industries from 2000 to 2001 (+7.5% in 2000, and -2.0% in 2001). Also the experts can usually contribute very little to improve macro-economical indexes.

However, concerning technology transfer made by the Development Study and the dispatched experts, their qualitative contribution is highly valued considering their distinctive effects. In the process to implement the Development Study, a working group was organized for each sub sector and for each studying field (including finance, organization, legal system and investment promotion) under a head office in which the staff of the MoID worked as C/P. Although some of those staff members were not so well-experienced at first, they gradually understood the fields in their charge and the planning procedure as they implemented the Study. Ultimately, C/P became to be able to conduct the presentation of the results of the Study. Also the various reports prepared by the dispatched experts (concerning the comparison of investment environments in Asian countries and the study on actual conditions of industrial complexes or other studies) is currently used by the staff of the MoIP helping to design its policies.

Furthermore, government officials, especially the then Minister of Industrial Development highly valued the Master Plan based on the Development Study planning to edit the Plan as the white paper of industries by Sri Lanka Government. However the white paper was not published because of the assassination of the Minister (he died by a suicide attack shortly after the completion of the Study).

## **(5) Sustainability**

### **5-1) Organizational Aspect**

With the reorganization of ministries, the then MoID at the time of designing the Master Plan changed its name as The Ministry of Enterprise Development, Industrial Policy & Investment Promotion (MoEDIPIP in short). And the Ministry of Industries (MoI in short) was newly established. The MoI was originally established to implement policies which are designed by the MoEDIPIP. However, because of the lack of human resources in the MoI, the MoEDIPIP also implements its policies as the MoID did before. Considering information that the MoI was established for the political reason, it is not certain how the two Ministries will take charge of those functions. And the two divided Ministries might inhibit the smooth designing and implementation of industrial policies.

As mentioned above, organizational reform is being promoted in the MoIP. Because the

present undersecretary of the Ministry used to work in the financial field, he insists to actively hire human resources from industries with contracts for certain periods. Therefore more private-sector oriented policies are expected to be designed and implemented.

#### **5-2) Aspect concerning techniques and human resources**

There are many staff members in the MoIP and other associated agencies who were trained in Japan as C/P for the Development Study and for dispatched experts, and who are now utilizing their knowledge and skilled to implement their tasks. Furthermore, as the results of that the staff members of the MoIP have been well experienced during designing the Master Plan, now they are taking advantage of their knowledge and skills to arrange task forces for the 15 categories of business.

#### **(6) Other achievement**

Concerning the results of technical assistance other than those mentioned above, a good relationship had been maintained between dispatched experts and consultants and C/P while they smoothly implemented their tasks. Meanwhile, the Development Study to design the Master Plan was implemented in conjunction with the technical assistance for Sri Lanka by UNIDO. However, although UNIDO and JICA held seminars and wrote a report together, their cooperation including discussion about their studies was not sufficiently made because it was difficult to arrange their schedules.

#### **(7) Conclusion**

Although the evaluation regarding the Development Study and dispatched experts is not easy because the procedure has not been established, we assessed that they yielded good results considering the effectiveness and the impacts of this program. And because there are few experiences of assistance to design a master plan for the whole industrial sector in a country, the experiences in Sri Lanka concerning this program will be a model for future development studies made in other countries.

However to industrialize Sri Lanka and to promote investment, it is required to focus on the following points concerning the results of the Development Study. First of all, although most private companies in Sri Lanka are middle or small companies, the analyses and proposals made in the Study for those companies were insufficient. Therefore further analyses and proposals should be made. Secondary, north-east Sri Lanka should be focused as well as other areas concerning the analyses and proposals for the policies regarding location of industries and industrial development in local areas. As for the former, a concrete Follow-Up Study was made to establish the Small & Medium Businesses Development Corporation. Regarding the latter, at the time when this program was implemented, the unstable public security in Sri Lanka limited JICA's

activities. However, in the current condition of public security that has been improved since the agreement on a cease-fire in February, 2002, further study should be actively made.

### **3 . Lesson Learnt**

In the process to implement the Development Study, C/P took a responsibility to proceed their tasks. As results, the Study achieved excellent outcomes. And C/P's accumulated knowledge and skills remain effective even after the completion of the Study.

### **4 . Suggestion**

Sri Lanka Government is now tackling to realize the projects proposed in the Master Plan. To support its effort, Japan should also appropriately follow up the implementation of the projects.

In Sri Lanka, a no-time-limit cease fire was agreed between the government and LTTE, an extremist group of Tamil separatists in February, 2002. And now the both sides are proceeding a peace negotiation. Although the negotiation might not succeed, Sri Lanka, where ethnic conflicts had continuously occurred since 1984, is currently standing at a turning point for its further economic and social development. Based on the experiences earned in the process to design the Master Plan, it must be effective to implement technical assistance for the industrial development in north-east Sri Lanka which has not been developed for security reasons.

If ethnic conflicts will not occur, foreign investment should increase. By utilizing experiences of Japan's technical assistance continuously made to promote investment, further proposals will be more convincing.

**5 . Annex**

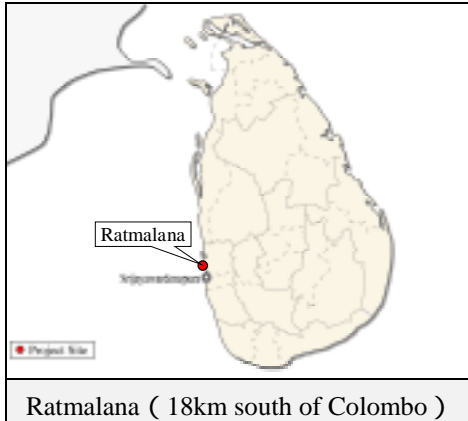
**【PDM<sub>E</sub>】**

Summary	Indicators	Performances	External conditions
<p><u>Overall Goal</u> Industrialisation and investment promotion in Sri Lanka</p>	<p>Industrial production Industrial value added Industrial export Industrial employment FDI projects in industry FDI value in industry</p>	<p>1990: Rs.125,460 mil 1999: Rs.349,635 mil 1990: Rs.51,943 mil 1999: Rs.169,414 mil 1991: Rs.41,489 mil 2000: Rs.325,931 mil 1990: 4510,303 1999: 492,326 1990:18 2000: 124 1990: Rs.3,121mil. 2000: Rs.31,614mil</p>	<p>Security situation not changed significantly.</p>
<p><u>Program Objective</u> 1.Development Study Master Plan implemented as planned 2.Expert Improvement in investment environment</p>	<p>Current status of the Master Plan Current status of investment environment</p>	<p>In 2002, two projects are under follow-up survey. Some of other proposal reflected in policy measures. Improvement observed from simplification of incentives, etc.</p>	<p>Policy measures and improvement of invest environment continuous</p>
<p><u>Output</u> 1. Development Study • Master Plan on industrialization and investment promotion completed • Strategy to promote priority industries formulated • Technical transfer to executing agencies carried out</p>	<p>Final report Final report Counterparts' activities</p>	<p>Completed in accordance with TOR. Completed in accordance with TOR. Counterparts' skills improved</p>	<p>Counterparts take action to implement Master Plan. Counterparts remain in the Government</p>
<p>2. Expert • Problems for industrialization and investment promotion clarified • Suggestions and recommendations presented • Services provided for current/potential investors</p>	<p>Experts' activities Experts' activities Experts' activities</p>	<p>Clarified to certain extent Presented Provided</p>	
<p><u>Input</u> 1. Development Study • JICA consultants: 16 • Counterpart personnel: 10 • UNIDO consultants/staff: 7 (UNIDO participated in conducting a Seminar and preparing the report) 2. Expert • 2 experts (1991-94 for 3 years, 1994-96 for 2 years)</p>			



## THE QUALITY IMPROVEMENT OF TEXTILE AND CLOTHING PRODUCTS

### 1 . Program Summary and JICA's Cooperation



#### (1) Program Background

Although the clothing industry is the largest export earner of Sri Lanka, it is required to strengthen its competitiveness in terms of both quality and cost, with global trend of trade liberalization faced by the industry. In the meantime, the textile industry which supplies materials and parts for the clothing industry, is heavily dependent on imports and yet to develop. For the development of the textile and clothing industries, the Project Type Technical Cooperation was conducted at Textile Training and Services Centre (TT&SC) and Clothing Industry Training Institute (CITI) for 5 years from 1996 to 2001. One JICA short-term expert on dyeing, who had been on service at TT&SC since 1995, joined to the Project when it commenced.

With the support of Japanese government, TT&SC and CITI started “Third Country Training Program on Quality Improvement of Apparel Industry”, inviting trainees from Asian and African countries. The course is planned to be held annually until 2004.

#### (2) Program Objectives and Overall Goal

Overall Goal: The quality of Sri Lankan fabrics and garments is improved and their competitiveness in the world market is strengthened.

Program Purpose: The advanced services, mainly training and testing services for Sri Lankan textile and clothing industries are systematically provided by both TT&SC and CITI in order to improve the quality of fabrics and garments.

#### (3) Program Scope

Various technologies on textile and clothing manufacturing are transferred to and developed in TT&SC and CITI through dispatch of Japanese experts, training of Sri Lankan counterparts in Japan and provision of the machinery and equipment. The Third Country Training Course has been held annually since 2000 with the duration of approximately four weeks.

#### **(4) Program Component**

The Program consists of the following three projects/activities:

- The Project on Quality Improvement of Textile and Clothing Products in Sri Lanka (Project Type Technical Cooperation, April 1996 to March 2001)
- Quality Improvement of Apparel products (Third Country Training Program, November 2001)
- Short Term Expert on Dyeing (Expert, July 1995 to March 1996) -Converted to an expert for the Project Type Technical Cooperation after completing the duty.

#### **(5) Executing Agency**

- Ministry of Industrial Development, Textile Training & Services Centre (TT&SC), and Clothing Industry Training Institute (CITI)

#### **(6) Present Status of the Program/Viewpoint for Evaluation**

Before the core project of the Program, "The Project on Quality Improvement of Textile and Clothing Products in Sri Lanka" was completed in March 2001, post-evaluation mission of the project visited Sri Lanka and submitted the draft-report of the evaluation in January 2001. Our evaluation, referring to this post-evaluation report, focus more on the role of the Program in the context of the development of textile and clothing industry in Sri Lanka as a whole. The activity of short-term expert was evaluated not as separate project but as part of the Project Type Technical Cooperation. The Third Country Training Program was evaluated from the view point of the technical improvement of Sri Lankan side, rather than the technical improvement of trainees from overseas.

As for the present situation of the Program, for the purpose of following-up the Project Type Technical Cooperation, two short-term experts on production management (for 3 weeks) and apparel technology (for 6 months) are attached to TT&SC in 2002.

## **2 . Evaluation Results**

### **(1) Relevance**

Overall Goal defined as "Quality of Sri Lankan fabrics and clothing products will be upgraded" is consistent with the national policy of the country which ranks the textile and clothing industry as fundamental. "New Industrialisation Strategy", announced by the Government in 1995, also identified the textile and clothing industry as one of industries to be promoted with priority.

For the development of textile and clothing industry, improvement of quality and productivity, especially of clothing products, is essential, before the abolition of import quota under the MFA in 2005. Therefore, Overall Goal and Program Objective meet the needs of the industry.

Needs for consulting services of weaving and dyeing and finishing industries decreased because of the

descent of these industries. However, now that the importance among textile and clothing industry in Sri Lanka was shifting to clothing, it was relevant to put priority of activities on the field of clothing.

## **(2) Effectiveness**

All of six outputs have been attained: i) project management system is enhanced; ii) machinery and equipment are provided, installed, used and maintained properly, iii) technical capability of counterparts are upgraded, iv) training courses and seminars are implemented systematically, v) Testing services are implemented systematically, and vi) Consultancy services are implemented systematically.

Several training courses were revised and some new courses were started through technology transfer activity of the Project. Testing of some new items became available by upgrading testing technology. Most of the private companies are satisfied with the serviced provided by TT&SC and CITI. In general the number of clients is increasing.

The improvement of technical capability of counterpart staff was proved through the Third Country Training Program.

Therefore, the Program objective was achieved.

## **(3) Efficiency**

Timely inputs by both Japanese and Sri Lankan sides enabled a smooth taking off of the Program to promote the achievement of the outputs. Provision of machinery and equipment of and technology transfer improved the content of training courses, quality of testing services and capability of counterparts, indicating the achievement of the expected outputs of the Program.

The inputs were implemented generally adequate in quality and timing aspects and efficiently converted to the outputs.

Supporting system in Japan and cooperation with other projects contributed to efficient implementation of the Program.

## **(4) Impacts**

The laboratory of TT&SC succeeded to register ISO 9002 in 1998, as the first textile testing organisation in Sri Lanka, which was widely reported in mass media. The laboratory was accredited with some companies in US and UK.

TT&SC and CITI successfully conducted the Third Country Training Program on quality improvement of apparel products since the technical and planning capability of counterparts were upgraded. Trainees were much satisfied with the training and the Training Program has brought about the basis for the future business linkage with textile and clothing industry of those countries which had sent trainees.

Attachment technology for garment production was introduced for the first time in Sri Lanka by the

Program. Trainees of the training courses applied the technology to their factories, resulting in the improvement of quality and productivity.

Most of the clients, who were surveyed either in Post-evaluation Mission in 2001 or in our survey, answer that each service contributes to improvement of quality and productivity.

Certificates issued by TT&SC and CITI help trainees to obtain employment. It is observed that the training courses contribute to the expansion of employment opportunity of women because clothing industry has a huge number of employment of female workers and 30% of trainees in TT&SC and CITI are female.

## **(5) Sustainability**

### **5-1) Institutional aspect**

TT&SC and CITI, as central organisations to provide technical assistance to textile and clothing industry, have been receiving extensive support by the Government and it was planned that the two institutions would be integrated into a single organisation because they had been practically functioning closely with each other. However, following the restructuring of Government Ministries associated with change of the Government in December 2001, the two institutions came to under the different Ministries (TT&SC under the Ministry of Industrial Policy, and CITI under Ministry of Education and Training). Although at the moment no difficulty in particular, are caused for this reason, there are some concerns about the future operation of the institutions, especially regarding their operation and management policies.

Customers are expected to utilise services of TT&SC and CITI hereafter, because of high reputation among customers and increasing needs for improvement of quality and productivity in the textile and clothing industry to survive the abolition of MFA in 2005.

### **5-2) Financial aspect**

Own income of TT&SC and CITI are growing year after year. In 2001 about 70% of expenditure were financed with own income and the coverage is estimated to rise to 78% in 2002. Various incentives are given to the staff to increase own revenue.

### **5-3) Technical/personnel aspect**

Counterparts have attained ability of teaching, planning and practicing sufficient enough to implement services, which were proved by the performance in Third Country Training Program.

Technology on production control, management and operation is expected to be upgraded since needs for it is increasing. Quick Response Cell, a newly established section designed to provide customers with tailor-made services by quickly responding to their needs, is now under trial operation. A short term JICA expert is, at the time of the evaluation, with CITI to give assistance to counterparts in this respect.

Maintenance and repair of machinery and equipment are performed adequately by counterparts and the system has been established for operation and maintenance after the period of the Project Type Technical

Cooperation.

Various incentives for staff, exemption of income tax, and favourable working conditions as compared to the private sector contribute to preventing job hopping of the staff.

### **( 6 ) Other achievement**

Good relationship was observed during the period of the Project Type Technical Cooperation between Japanese experts and counterparts, thanks to the efforts made by the both sides, although language barrier caused communication gap to some extent. As a result the project was completed smoothly and technology transfer was achieved as planned.

### **( 7 ) Conclusion**

The objective of the Project Type Technical Cooperation was achieved because with timely and effective inputs by both Japanese and Sri Lankan sides and their good relationship, services and operations of TT&SC and CITI were upgraded. Improvement of counterparts' skills was confirmed through the Third Country Training Program, where the fruits of the Project Type Technical Cooperation are expected to be disseminated to other countries.

However, it is essential to further strengthen and improve production control, productivity and total quality control system, in preparing for the abolition of import quota system of textile products under the MFA in 2005. The fact that TT&SC and CITI, activities of which have been inseparable from each other are currently under the different Ministries could be an obstacle for smooth administration and operation of the institutions.

## **3. Lesson Learnt**

In the Project Type Technical Cooperation, generation of own income of the executing agency enabled the smooth operation and maintenance activities, thus contributed to sustainability of the project. It is desirable, when designing the project, to urge recipient countries to include certain systems to generate self-income within the project

It is important that experts and counterparts jointly set the target of their activities and monitor the actual performances periodically in each phase of the project. In doing so, sustainable development of the project will be promoted by encouraging the counterparts to take initiatives of activities.

Textile and clothing industry, one of the biggest industries in Sri Lanka, is prone to the impact by the changes of global environment such as trade liberalisation and Government policies on industry and trade. It is more than necessary to carefully analyse global trend of the industry and international trade and policies of the recipient country, when conducting preparation study for the project. The possible impacts of the changes of environment on the project could be minimised by limiting the scope to the high-priority

area or by shortening the project period. In the case that environmental changes cause the significant effects on the industry, is desirable to respond to the situation with flexibility by revising the contents, scope and inputs of the project.

#### 4 . Suggestion

It is desirable to construct network with foreign institutions of the similar nature and to exchange information and human resources and conduct comparison tests, for the purpose to upgrading human resources, accumulate information, etc.

With the liberalisation and expansion of international trade, the demand for certification on testing and inspection will be increased. TT&SC and CITI will be required to have operation strategy based on the analysis of export trends.

Facing to the open competition after 2005, Sri Lankan textile and clothing industry needs to improve the total productivity control, including production technology and management system. Therefore, in order to meet the needs of the industry, TT&SC and CITI should strengthen and improve consulting services and research and development activities.

#### 5 . Annex

##### 【PDM<sub>E</sub>】

Summary	Indicators	Performances	External conditions
<b>Overall Goal</b> Quality of Sri Lankan fabrics and clothing products upgraded.	Value of apparel production Value of fabrics production Value of apparel export Value of fabrics export	1997: Rs.59,780 mil 2001: Rs.72,300 mil 1997 : Rs.6,926mil 2001: Rs.7,439 mil 1992: Rs.49,176 mil 2000: Rs.206,360 mil 1992: Rs.4,033 mil 2000: Rs.20,569 mil	International environment on textile industry not devastated significantly
<b>Program Objective</b> 1.Project Type Technical Cooperation • The technical services provided by TT&SC and CITI improved.	Number of Training courses held Survey on customer satisfaction	Carried out as planned Customers/trainees highly satisfied	Improved technology meets the demand of the private sector.
2.Third Country Training Program • Development of apparel industry in Asia and Africa	<i>Not for evaluation</i>	(Technical improvement of TT&SC and CITI confirmed through training)	

DEVELOPMENT OF MINING AND MANUFACTURING INDUSTRIES  
THE QUALITY IMPROVEMENT OF TEXTILE AND CLOTHING PRODUCTS

<p><u>Output</u></p> <p>1. Project Type Technical Cooperation</p> <ul style="list-style-type: none"> <li>• Project management strengthened.</li> <li>• Facilities and equipment provided, set up, utilized and maintained properly.</li> <li>• Counterparts' skills improved</li> <li>• Training course and seminars conducted systematically.</li> <li>• Consulting services provided systematically.</li> </ul>	<p>Financial statement</p> <p>Status of management</p> <p>Conditions of facilities and equipment</p> <p>Evaluation results of counterparts' skills</p> <p>Number and frequency of training courses and seminars held</p> <p>Revenue by the services</p>	<p>Own revenue increased year by year (70% plus of total revenue in 2001)</p> <p>Appropriate. Controlled by two different Ministries</p> <p>Facilities and equipment properly situated, operated and maintained.</p> <p>Counterparts' skills improved almost as planned</p> <p>65 training courses held in 2001 76 seminars held in 1996-2000.</p> <p>Decrease in TT&amp;SC, rapid increase in CITI.</p>	<p>The Government continues to support TT&amp;SC and CITI.</p>
<p>2. Third Country Training Program</p> <ul style="list-style-type: none"> <li>• Trainees understand quality control system of apparel industry</li> <li>• Trainees acquire the ability to introduce QC into their organisations.</li> <li>• Trainees improve their technical ability.</li> </ul>	<p>Results of performance examination of trainees</p> <p>Trainees' satisfaction with courses.</p>	<p>Good results observed.</p> <p>Highly satisfied.</p>	
<p><u>Input</u></p> <p>1. Project Type Technical Cooperation ( Japanese side )</p> <ul style="list-style-type: none"> <li>• Long term experts: 11 ( 95-01 )</li> <li>• Short term experts: 16 ( 95-01 )</li> <li>• Trainees received: 17 ( 95-01 )</li> <li>• Equipment granted: 216 million yen ( 95-01 )</li> <li>• Local cost shared: 2.07 million yen ( Sri Lankan side )</li> <li>• Counterpart staff: 29 ( 00 )</li> </ul>	<ul style="list-style-type: none"> <li>• Cost shared ( Estimate, Unit: Rupees million ) 11(96), 42(97), 20(98), 19(99), 22(00)</li> <li>2. Third Country Training Program <ul style="list-style-type: none"> <li>• Trainees: 16 ( 5 from Bangladesh, 3 from Nepal, 1 from Maldives, 1 from Myanmar, 6 from Sri Lanka )</li> </ul> </li> <li>3. Short term expert <ul style="list-style-type: none"> <li>• 1 expert for 6 months in 95-96.</li> </ul> </li> </ul>	<p>Provided machines and equipment imported without difficulty</p>	

## FOUNDRY TECHNOLOGY DEVELOPMENT

### 1 . Program Summary and JICA's Cooperation



#### (1) Program Background

The development of metal-working industry has been regarded as essential in order to activate industries in general and hence strengthen the social and economic infrastructure of Sri Lanka, since its introduction of market economy in 1977. Based on the JICA Development Study on “Development of Industrial Sector Development”, the Government of Sri Lanka submitted the project proposal on the Metal-working Industry Development Centre, including both electroplating and foundry. Considering the environmental issues in the field of electroplating, it was decided that Foundry Techniques Development Project would be started solely. With the preparation work by a short-term expert who was attached to the Industrial Development Board (IDB) for the 6 months’ period, the Project Type Cooperation “The Foundry Technology Development Project” was conducted from 1995 to 2000. Following the conclusion of the final evaluation of the Project conducted in 2000, the follow-up program with the duration of 2 years, started in 2001 to achieve the project purpose to full extent.

#### (2) Program Objectives and Overall Goal

Overall Goal: The foundry production is improved in terms of quality and quantity, thereby reducing dependence on imports.

Program objective: The technical know-how of engineers and technicians in the foundry industry is improved through training services concerning foundry technology by the IDB.

#### (3) Program Scope

Foundry technology is transferred to and developed in the IDB through dispatch of Japanese experts, training of Sri Lankan counterparts in Japan and provision of the machinery and equipment, under the Project Type Technical Cooperation. The technology is then disseminated to the private sector through training courses and seminars held by the IDB.



#### **(4) Program Component**

The Program consists of the following project and activity:

- The Foundry Technology Development Project (Project Type Technical Cooperation, December 1995 to November 2000)
- Short Term Expert on Foundry (February to August 1995)

#### **(5) Executing Agency**

Ministry of Industrial Development (MID), Industrial Development Board (IDB)

#### **(6) Present Status of the Program/Viewpoint for Evaluation**

Before the core project of the Program, "The Project on Quality Improvement of Textile and Clothing Products in Sri Lanka" was completed in November 2001, post-evaluation mission of the project visited Sri Lanka and submitted the draft-report of the evaluation in August 2000. Our evaluation, referring to this post-evaluation report, focus more on the role of the Program in the context of the development of foundry industry in Sri Lanka as a whole. The activity of short-term expert was evaluated not as separate project but as part of the Project Type Technical Cooperation.

To follow-up the Project Type Technical cooperation evaluated here, the implementation of "The Follow-up Programme of Japanese Technical Cooperation for the Foundry Technology Development Project" started in June 2001 for the duration of two years.

## **2 . Evaluation Results**

### **(1) Relevance**

The overall goal "Technical capability and production capacity of foundry industry in Sri Lanka is improved" is relevant to the policy of Sri Lankan Government to develop the foundry industry as a supporting industry of machine industry, which is one of priority industries in Industrialization Master Plan. The IDB is the one and only organisation in Sri Lanka that provides training courses to foster foundry engineers despite the fact there is severe shortage of human resources in the field.

The Program objective was relevant to the needs of the sector. The IDB as executing agency and also the project site for the Project Type Technical cooperation was appropriate since the role of the IDB, an established institution to provide guidance to small and medium scale industries, is best suited to the project objective.

### **(2) Effectiveness**

The technology transfer in the program was implemented almost smoothly and the capability of counterparts improved highly enough to produce products on their own without any assistance and to provide guidance to the trainees for producing basic foundry products.

However, since the period of the technology transfer was shorter than expected due to the fact that it took more than 2 years to install some machines, the counterparts are still not capable enough of playing a leading role to meet various technical requirements from the private foundry factories.

The counterparts have acquired ability to hold seminars and training courses, on their own, for trainees and participants from the private sector and most of trainees were satisfied with the services they received. However, technical consulting services by visiting factories or at the IDB, for which requests from the private sector have been increasing, are not provided sufficiently at the time of evaluation.

Therefore, Program objective "IDB is able to provide appropriate technical services to foundry industry" is not fully achieved yet.

### **(3) Efficiency**

The scale and the timing of cooperation, supporting system and linkage with other organisations were mostly appropriate and inputs were efficiently converted to outputs. This is mainly attributed to the capability of counterparts and JICA experts, who were well coordinated.

However, the efficiency would have been further increased if the expert on casting design had joined the Project at the earlier stage than actually did. Furthermore, the timing of technology transfer delayed because it took longer than planned to provide, install and operate large-scale machines.

### **(4) Impacts**

Since the IDB enhanced its capability on wooden patterns, moulding, melting and testing and inspection of foundry, it became able to provide training courses, seminars, testing services, and to certain extent, technical consultation. The IDB, during the period from 1997 to 2000, conducted 13 training courses, 6 seminars in Colombo and other cities, and testing services. It is noted that some trainees from the private sector requested more practical courses suited to their technology level be offered.

The IDB has attained its reputation as the almost sole institution with advanced production technology and facilities. It has made the foundry industrialists aware of environmental issues, as well.

In order to achieve the Overall Goal, further enhancement of technology level of the IDB is necessary to be able to provide appropriate consulting services to the private sector.

### **(5) Sustainability**

#### **5-1) Institutional aspect**

Managerial and operational system has been established to pursue and develop its activities. After the completion of Program, the IDB became under the purview of new Ministry of Industry from under the Ministry of Industrial Policy (ex-MID), the effects of which are not known at the time of our evaluation.

### **5-2) Financial aspect**

Budgets necessary for the implementation of the Program were financed by the MID. However, it is not certain, with the change of administrating Ministry, that the MID will secure the sufficient budget in the future. Under this circumstance the IDB is in a position to cut down the budget for all activities. The IDB is required to increase its own income and become financially independent as much as possible. For this purpose the IDB has already sought a potentially good resource of income by selling tailor-made products with high quality, which does not involve competition with the private sector.

### **5-3) Technical/personnel aspect**

Technology level of the IDB counterpart staff has reached the level at which they by themselves can maintain and develop the activities conducted during the period of Project Type Technical Cooperation. Between the end of the Project and February 2002, 37 training courses with 107 trainees and a seminar with 45 participants, were held. Between December 2001 and March 2002, 10 consulting services to factories were provided.

### **5-4) External factors**

Since the Free Trade Agreement concluded between Sri Lankan and Indian Governments in February 2000, foundry products from India have been imported to Sri Lanka without tariff. This has had a massive impact on Sri Lankan foundry factories of small and medium scale, even causing the serious concerns about the future of Sri Lankan foundry industry itself.

### **(6) Other achievement**

Good relationship was observed during the period of the Project Type Technical Cooperation between Japanese experts and counterparts, thanks to the efforts made by the both sides. As a result the project was completed smoothly and transfer of technology was carried out almost as planned. It is pointed out that the technology transfer was efficiently proceeded because of a good inter-relation among Japanese experts, many of whom were from the same organisation in Japan.

### **(7) Conclusion**

The Program was properly conducted and the target level of technology transfer was achieved in many fields at the end of the Program. However, due to the delay in the instalment of machinery, there was not sufficient time of technology transfer to counterparts, and hence the provision of consulting services to the private sector. Therefore, it is concluded that the Program objective was not fully achieved. To supplement what was not achieved in the Program, Follow-up Cooperation was started in 2001.

## **3. Lesson Learnt**

It is foreseen that the provision of training and technical consultation will be more and more important in order to support private sector in solving various technical problems, improving products quality, and developing new products with application of the fundamental production technology. Such fundamental

technology is identified as essential in "Master Plan for Industrialisation" formulated with JICA technical assistance. Thus it was agreed that the Follow-up Cooperation was required for this purpose. In the Follow-up Cooperation, which is on going, it is necessary to put priority on the sustainability of the Project, by helping counterparts take initiatives in vitalising their activities.

On the other hand, the environment surrounding Sri Lankan foundry industry is increasingly unfavourable. Foundry products from China such as low-priced kitchenware, with mass production backed by the lower labour cost, are pouring into Sri Lanka, while the Indian foundry product is also increasing its share since the introduction of bilateral Free Trade Agreement. Under the circumstances, small and medium industries tend to lose their business, unable to compete with import products. Actually, the manager of one of surveyed factory in our evaluation appears to have intention to lower the prices of their product by downgrading the quality, although they have attained at the IDB, skills and techniques to improve the quality. It could be possible then that Sri Lankan foundry industry as a whole declines even though the project may be successful, if the technical cooperation to the foundry industry is continued in the same manner as has been until now. It will be necessary to recommend Sri Lankan side to take certain bold measures, for example, identifying limited factories with good entrepreneurship and intensively supporting them with "package" system including financial assistance. Otherwise, the cooperation in the field of the foundry industry could come to nothing.

#### **4 . Suggestion**

Although the detail is not clear regarding the delay in installation of machinery at the initial stage of the Project Type Technical Cooperation, the delay in the customs clearance/formalities is alleged to be the major reason behind it. Though according to the agreement between the Sri Lankan and Japanese Governments, machinery and equipment for ODA are exempt from import tariff, under the system in Sri Lanka, the IDB as an executing agency had to pay for the tariff provisionally for the clearance, which caused the extensive delay. The system should be reconsidered since similar incidents are observed in other aid projects, affecting the performances of ODA activities.

It is expected in the Follow-up Cooperation that the IDB be more active in promoting improvement of foundry technology for the private sector by constructing the closer relationship with the private industrialists. The IDB counterparts, rather than Japanese experts, should take initiatives in strengthening the IDB's function and activities so as to provide services demanded by the private sector.

**5 . Annex**

**【PDM<sub>E</sub>】**

Summary	Indicators	Performances	External conditions
<p><u>Overall Goal</u> Technical capability and production capacity of foundry industry in Sri Lanka is improved.</p>	<p>Employment of trainees and seminar participants Assessment of technical capability of enterprises</p>	<p>Most of 79 trainees and 431 seminar participants are from the private sector. Not assessed yet.</p>	<p>International environment or import tariff on foundry products not changed significantly.</p>
<p><u>Program Objective</u> IDB is able to provide appropriate technical services to foundry industry</p>	<p>Technical level of trainees Level of satisfaction of enterprises with the services</p>	<p>Not assessed yet. Generally satisfied, although they need more consulting services.</p>	<p>IDB has good relation with the private sector</p>
<p><u>Output</u></p> <ul style="list-style-type: none"> <li>• Project operation unit is enhanced</li> <li>• Machinery and equipment related to foundry technology is provided, installed, operated and maintained properly.</li> <li>• Technical capability of Counterparts is upgraded.</li> <li>• Training courses related to foundry technology is implemented systematically.</li> <li>• New skills and technology in the foundry field are introduced to foundry industry through seminars and publications.</li> </ul>	<p>Number of staff, budget, capability of management staff Operation and maintenance condition of machinery and equipment  Achievement level of technology transfer Achievement level of "target products" produced by counterparts. Number of qualified counterparts Number of training courses  Number of seminars Number of publications</p>	<p>15 staff, including 8 counterparts allocated. Budget was sufficient. Effectively operated and maintained.  Mostly achieved  Highly achieved with some exceptions.  All 8 counterparts qualified. 13 courses with 79 trainees.  6 seminars with 431 participants A course guide and publication on testing and inspection, etc. published by IDB</p>	<p>Counterparts who attained the technology remain in the IDB.</p>
<p><u>Input</u></p> <p>1.Project Type Technical Cooperation ( Japanese side )</p> <ul style="list-style-type: none"> <li>• Long term experts: 15 ( 95-01 )</li> <li>• Shot term experts: 49 ( 94-01 )</li> <li>• Trainees received: 16 ( 95-00 )</li> <li>• Equipment granted: 359 million yen ( 96-01 )</li> </ul> <p>( Sri Lankan side )</p> <ul style="list-style-type: none"> <li>• Counterpart staff : 14</li> <li>• Rs.3. 1 million ( 96 ) / Rs.3.0 million ( 97 ) / Rs.4.0 million ( 98 ) / Rs.4.0 million ( 99 ) / Rs.4.0 million ( 00 ) / Rs.3.0 million ( 01 )</li> </ul> <p>2.Short Term Expert</p> <ul style="list-style-type: none"> <li>• 1 expert for 6 months in 95</li> </ul>			<p>Provided machines and equipment imported without difficulty</p>

Development of Agriculture,  
Forestry and Fisheries

## INTEGRATED AGRICULTURAL DEVELOPMENT DEMONSTRATION PROGRAM IN MAHAWELI AREA

### 1 . Program Summary and JICA's Cooperation



Location of the Program



Demonstration Farm

#### (1) Program Background

Since its inception in 1970, the Overall Mahaweli River Basin Development Program contributed much to the development of the country through increase of agricultural production and generation of hydropower. The Mahaweli Program provides over 36% of the nation's power generation and 22% of its rice production, thus contributed much to the achievement of rice self-sufficiency that was attained around 1987. For further development of agriculture and increase of farmers' income in the basin, it was considered necessary to improve the quality of rice and expand cultivation of export crops. Rice produced at that time was of low quality, containing pre-matured and broken grains and foreign materials such as stones, and non-traditional export crops (other than tea, coconut, and rubber) were not developed yet. Under such circumstance, the Government of Sri Lanka requested the Government of Japan to extend technical cooperation for the integrated agricultural development demonstration project in the Mahaweli area.

#### (2) Program Objectives and Overall Goal

For the purpose of increasing farmers' income in the Mahaweli area, an intensive farming system combining planting of high quality rice and suitable export crops is established and demonstrated.

#### (3) Program Scope

The program consists of development and demonstration of an intensive and consistent farming pattern and techniques suited to the area. For this purpose, a demonstration farm of 23 ha was established in Block-302 ( 673 ha) of System C equipped with irrigation facilities provided under the grant aid of JICA in 1982 - 84.

#### (4) Program Component

This program is comprised of the following projects: (i) 「 The Integrated Agricultural Development Demonstration in Mahaweli Areas 」 ( Project-Type Technical Cooperation: 1985- 1990) and (ii)

「Dispatch of Experts」 (3 persons: 1990-98/ Follow-up of Technical Cooperation).

**(5) Executing Agency**

- Mahaweli Economic Agency (MEA) of Mahaweli Development Authority (MASL)

**(6) Present Status of the Program/Viewpoint for Evaluation**

The technical cooperation was concluded in 1990 and the follow-up continued in succession from 1990 through 1998. Present evaluation places a focus on grasp of (i) activities after conclusion of the follow-up and (ii) sustainability from institutional viewpoint because the MASL is being restructured at present.

<b>2 . Evaluation Results</b>
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**(1) Relevance**

**1-1) Relevance to the Policy and Needs at the time of plan formulation**

In the mid-1980s when this program was launched, self-sufficiency of rice was being achieved and agricultural policy was shifting from increase of production only to increase of productivity and farmers' income through diversification of crops. This program, aiming at contribution to farmers' income through production of high quality rice and upland cash crops, was highly relevant to such policy. Meanwhile, implementation of major projects under the Mahaweli Development Program was nearly completed at that time, and in its agricultural development component, a stress was shifting from expansion of extent to quality improvement of products and enhancement of farmers' income level. In those days, quality of rice was very bad and upland cash crops were scarcely introduced, and improvement of such situation was of pressing need. From the objectives of this program, it is clear that the program met such need completely.

**1-2) Relevance to Current Policy and Needs**

The previous agricultural development policy, aiming at increase of productivity and farmers' income, is still attached a top priority even at present. The program is therefore still highly feasible even in view of the current situation.

**1-3) Soundness of the Program**

The scope of the technical cooperation (the Integrated Agricultural Demonstration in Mahaweli area) did not involve the extension of techniques to farmers. Since the technical cooperation was intended to contribute ultimately to increase of farmers' income, such component should have been included in the scope.

**(2) Effectiveness**

**2-1) Achievement of Objectives**

Under this program, suitable varieties of high quality rice were identified and farming and post-harvest techniques, including related irrigation method, were developed and demonstrated. Production techniques



were developed and demonstrated also for upland cash crops especially for onion. It is worth noting that techniques for production of onion seeds, that was hitherto considered very difficult in Sri Lanka, were developed under the program. Developed techniques for rice were applied to the rice seeds production at the Government Seeds Farm and contributed much to production of quality rice seeds. The techniques for upland cash crops (onion) were introduced not only in the Mahaweli area but also in other regions and pioneered onion production in Sri Lanka. Thus, techniques developed under the program contributed to the level-up of agricultural techniques in Sri Lanka. However, for the reasons enumerated below, it is difficult to conclude that the techniques were extended widely to farmers of the Mahaweli area.

## **2-2) Negative Factors**

(i) Activities under the program were confined to demonstration only and extension to farmers was not practised actively. (ii) The executing agency (MASL/MEA) was not familiar with this type of cooperation (project-type technical cooperation) and lacked awareness as “ executor “ ( so did not take initiatives for extension to farmers). (iii) In some cases, techniques were unpractical in farmers’ eyes and unsuited to local conditions.

## **(3) Efficiency**

### **3-1) Efficiency of Input**

By the grant aid of JICA (about JY 1 billion), the Pilot Demonstration Farm (673 ha) was constructed in 1983. Because implementation of the project-type technical cooperation was not presumed at that time, some irrelevancies took place about the facilities from the viewpoint of utilization as the centre for the technical cooperation. According to the project completion report (1990), the pilot farm was used as demonstration farm (23 ha) and seed production farm of the Government (254 ha), but the rest (396 ha) was distributed to immigrants. At present (2002), both demonstration and seed production activities have been stopped and the farms are rent out to immigrants.

Plant and equipments were donated during the technical cooperation under a model infrastructure scheme (JY 446 million). In monetary terms, the rice milling plant accounted for as high as 54% of the total amount with the rest distributed to agricultural machinery, vehicles and office implements and equipments. From the operation record of the rice mill plant, the capacity of the plant seems to have been rather overestimated.

### **3-2) Relation between Input and Output**

Operation of the rice milling plant was continued till 2001 but stopped at present on account of unavailability of spare parts. The operation remained always much below its capacity due mainly to short supply of materials (paddy). For an instance, milled production in 2001 was only 105 tons against the capacity of 1000 tons/year. On the other hand, main agricultural machinery ( tractor : 65 HP) was reported to be too big viewed from the plot size of existing paddy field of farmers.

### **3-3) Other Negative Factors**

While the restructuring of the MASL started actually in the later 1990s, movement toward the restructuring was initiated in the early 1990s under the advice of the World Bank and AsDB. It gave considerably

negative impact to implementation of the program through curtailment of annual budget allocation and reduction of staff deployment.

#### **(4) Impacts**

##### **4-1) Achievement of Overall Goal**

Due to lack of systematic extension of techniques to farmers, effects of the program were not extended widely to the whole Mahaweli area although there were some areas where planting of upland crops were increased partially. During the 1990s, prices of agricultural inputs such as fertilizers, agro-chemicals, agricultural machinery and implements were increased, but since prices of agricultural products hovered low, farmers' net income was not increased even though yields were increased somewhat. Eventually, farmers' income in the Mahaweli area remained around US\$ 920/year in real terms. It indicates that the goal of the program has hardly been achieved.

##### **4-2) Technical Impact**

Cultivation techniques of onion, particularly those concerning its seed production, developed under the program were a first successful case in Sri Lanka and it exerted pioneering influences over succeeding onion production in the country. On the other hand, the rice milling plant, introduced under the program, was of a most advanced type of those days and through demonstration, it gave impacts to the milling industry in Sri Lanka (Polonnaruwa, located in the Mahaweli area, is one of the major milling industrial areas in Sri Lanka) and contributed much to improvement and renovation of the industry. Owing to such improvement and renovation, quality of milled rice in the country has been improved substantially.

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

##### **5-1) Organization**

It was stipulated in the R/D that the demonstration farm should be converted to the seed farm after conclusion of the technical cooperation. In line with this, research and demonstration activities conducted at the demonstration farm were terminated upon completion of the follow-up activities in January 1998. It means that the organization, having taken charge of execution of the program, was dissolved virtually at that time. After that, the farm was used for seed production, but the scale of production was downsized from year to year, and at present (as of May 2002), most of the farm is leased out to farmers.

##### **5-2) Staffing**

With dissolution of the organization, the project staff (a farm manager, 4-agronomists, 4-machinery experts, 4-assistants, 1-mechanical engineer) were removed to other offices or resigned excluding a few maintenance staff.

##### **5-3) Facilities and Equipment**

The MASL has intention to use the facilities (the office building, ware houses, workshops, etc.) for the Farmers' Training Centre that is now planned as a component of the Mahaweli Upgrading Project (MUP: 1997-2003) financed by JBIC. According to the plan, most of the facilities are to be used but regarding the rice milling plant, it is not determined yet whether it is utilized or not.

#### **5-4) Succession of Transferred Techniques**

The MASL has not taken any special measures for succession of transferred techniques. As stated above, all of the counterparts who are recipients of transferred techniques were already removed to other offices or resigned. Because of the on-going drastic restructuring and downsizing, the MASL seems currently not in a mood to work out an institutional plan for this kind of research and technical development. Unless any preventing measures are taken, transferred techniques would be lost or disappeared without being succeeded and further developed.

#### **(6) Other achievement**

Transfer of knowledge and techniques was conducted as planned and scheduled. But, since right persons were not necessarily selected as counterparts, the output was less than expected. Besides, as evident from the stipulation of the R/D, the MASL seems to pay little attention to further development of the transferred techniques from the start of the project.

#### **(7) Conclusion**

The program was highly relevant to agricultural development policy of Sri Lanka and well met the needs of the country at that time. The objectives of the program (i.e., development and demonstration of techniques for high quality rice and upland cash crops) were almost achieved rather on schedule, so with respect to “effectiveness” and “efficiency”, the program showed rather satisfactory performance. As regards “impacts”, the final goal (improvement of farmers’ income) could not be achieved, but the program brought remarkable indirect benefits to the country such as renovation of the rice milling industry and introduction of seed production techniques of onion. Thus, the program is evaluated to be performed satisfactorily. Therefore, it is a regret that the project activities were not continued after termination of the follow-up in 1998.

### **3 . Lesson Learnt**

#### **Plan Formulation :**

There are the following problems: ( i ) Extension of techniques to farmers was not included in the scope of the technical cooperation. If it was presumed that such extension was handled separately by other agency of Sri Lanka, it should have been so mentioned in the R/D with specific stipulation on their obligations. (ii) More attention should have been paid to succession of the project activities after conclusion of the technical cooperation. In general, in case of agricultural techniques, continuous improvement is required for further development. So, it is in question that the R/D stipulated that after conclusion of the technical cooperation, all the facilities and equipments are to be handed over to the seeds production unit of the Government seed farm. (iii)The stipulation about the target of technical cooperation seems to be too broad and general. From the stipulation that the target is “to establish and demonstrate agricultural techniques”, it is difficult to assess precisely when the objectives are achieved. ( iv ) Concerning determination of scale of major plant and equipments (such as rice processing mill and

tractors), it is rather in question whether surveys were conducted adequately on local conditions.

### **Implementation :**

There are the following problems: (i) During implementation of the technical cooperation, systematic cooperation with other similar projects ( such as “ System C Irrigation Project ( JBIC: 1981-94), “Model Unit Program ( JBIC: 1990-94), “Mahaweli Upgrading Project (JBIC: 1997-2003), etc.) was not attempted actively. As the result, the initial scheme to promote cooperative activities was scarcely realized. ( ii ) A stress was placed on researches and demonstration, and transfer of techniques was treated rather lightly. (iii) In development of techniques, local conditions and environments surrounding farmers were not reflected adequately (in particular, farm mechanization techniques).

## **4 . Suggestion**

### **Succession and Further Development of Transferred Techniques :**

Agricultural techniques, developed for as long as thirteen years (from 1985 through 1998) under the technical cooperation of JICA, are now losing the way for further development due to closing of the research and demonstration activities at the Rathkinda Farm in 1998. Unless any preventing measures are taken, these precious techniques may be lost and disappear. In order to prevent occurrence of such situation, an appropriate preventing measures should be taken by the executing agency ( MASL/MEA) as soon as possible. As one of such measures, for an instance, utilization of the “ Farmers’ Training Plan “ that is now being formulated is conceivable. If the plan is attached one additional component that deals with “research and demonstration”, it will be possible to function as the successor of the project. Since the training centre is to be located at the Rathkinda farm using the facilities of the technical cooperation, this proposal is practical and will make the proposed training of farmers more effective.

**5 . Annex**

**[PDMe]**

Summary	Indicators	Performances	External conditions
<p><u>Overall Goal</u> Farmers' income in the Mahaweli area is increased and their economic conditions are improved.</p>	<ul style="list-style-type: none"> <li>• Farmers' income becomes higher than that before the program.</li> </ul>	<ul style="list-style-type: none"> <li>• Due to lack of the extension activities to farmers, techniques were scarcely extended to farmers and the effects of the program remained only partially although in some areas planting of upland crops ( such as onion) was increased.</li> <li>• In 1990s, prices of inputs ( such as fertilizers and agro-chemicals) were increased, whereas prices of outputs were kept low. Accordingly, farmers' net income was not increased not only in the Mahaweli area but also in all regions of Sri Lanka.</li> <li>• According to the agricultural census of the Mahaweli Authority, farmers' income in 1990s was about US\$ 920/year in average and took a rather decent trend in real terms.</li> </ul>	
<p><u>Program Objectives</u> An intensive farming pattern, consisting of a combination of high quality rice and suitable upland crops, is introduced to the Mahaweli area.</p>	<ul style="list-style-type: none"> <li>• Production of high quality rice is increased.</li> <li>• Production of suitable upland crops is increased.</li> </ul>	<ul style="list-style-type: none"> <li>• Developed techniques for high quality rice was applied to the seeds production in the Government Farm and contributed to production of good quality seeds. These seeds were exported to other regions in Sri Lanka ( such as Southern Province).</li> <li>• Developed techniques for upland crops ( especially onion) are also distributed to other regions and contributed to production of good quality seeds in Sri Lanka.</li> <li>• However, these techniques have scarcely been extended to farmers because the extension services were not included in the program.</li> </ul>	<p>Because of the Free Trade Policy adopted in the 1990s, agricultural products of cheaper prices are flowing into Sri Lanka from India with negative impacts to Sri Lankan agriculture ( especially regarding upland crops).</p>

DEVELOPMENT OF AGRICULTURE, FORESTRY AND FISHRIES  
INTEGRATED AGRICULTURAL DEVELOPMENT DEMONSTRATION PROGRAM IN MAHAWELI AREA

<p><b>Output</b></p> <p>Agricultural techniques suitable to Mahaweli area are established.</p>	<ul style="list-style-type: none"> <li>• Planting and post-harvest techniques for high quality rice production are developed.</li> <li>• Suitable upland crops are selected and production techniques are developed.</li> <li>• Water management method is established.</li> <li>• Techniques are transferred to counterparts.</li> </ul>	<ul style="list-style-type: none"> <li>• For both par-boiled and raw rice, suitable varieties are identified and planting and processing methods are developed.</li> <li>• As suitable upland crops, onion and vegetables are selected and production method is developed including seeds production of onion.</li> <li>• Transfer of techniques is not performed satisfactorily ( assignment of improper persons as counterparts, lack of motivation, etc.) .</li> </ul>	
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<u>Activities</u>	<u>Input</u>		
	[Japanese Side]	[Sri Lankan Side]	
<p>(1) Demonstration of consistent production techniques for high quality rice from planting through post-harvest.</p> <p>(2) Demonstration of production techniques for other crops than rice.</p> <p>(3) Demonstration of on-farm irrigation water management.</p> <p>(4) Technical guidance and advice to the Government Seed Farm in Unit-1.</p>	<p>(1) Long-term experts : 6 persons ( 1985-90 )</p> <p>(2) Short-term experts : 20 persons ( 1985-90 )</p> <p>(3) Dispatch of experts : 3 persons ( 1990-98 )</p> <p>(4) Donate Implement &amp; Others : JY 446 million*</p> <p>(5) Provision of Infra. : JY29 million</p> <p>(6) Local Cost Financing : JY60 million</p> <p>(7) overseas Training : 13 persons (35 mm)</p> <p>(Input of Japanese side amounts to JY900 million if cost of dispatch of survey missions is added to the above)</p> <p>* 54% is for rice milling plant.</p>	<p>(1) CP : 21 persons</p> <p>(2) Land • Facilities : Facilities constructed under the grant aid * ( 1983 ) were provided ( farm, office, guest houses, etc.)</p> <p>(3) Financial Input : About Rs 100 million</p> <p>* Pilot Demonstration Farm (673 ha) was constructed ( JY 1 billion ) .</p>	

DEVELOPMENT OF AGRICULTURE, FORESTRY AND FISHRIES  
INTEGRATED AGRICULTURAL DEVELOPMENT DEMONSTRATION PROGRAM IN MAHAWELI AREA

All Mahaweli Area

Year	Paddy			OFC		
	Extent	Production	Yield	Extent	Production	Yield
	(ha)	(ton)	(ton/ha)	(ha)	(ton)	(ton/ha)
1988	97,818	370,594	3.8	17,919	26,020	1.5
1989	92,062	370,709	4.0	6,685	15,114	2.3
1990	112,852	470,179	4.2	24,380	49,504	2.0
1991	119,189	486,711	4.1	25,396	55,752	2.2
1992	102,118	405,727	4.0	15,350	36,798	2.4
1993	122,084	545,727	4.5	23,628	57,935	2.5
1994	136,318	527,430	3.9	30,165	97,771	3.2
1995	137,824	588,291	4.3	30,302	78,537	2.6
1996	120,204	509,561	4.2	30,188	163,843	5.4
1997	120,620	568,029	4.7	25,809	206,071	8.0
1998	126,372	593,111	4.7	16,866	35,592	2.1
1999	139,917	661,294	4.7	22,584	156,420	6.9
2000	141,344	609,075	4.3	25,420	154,801	6.1
<b>Average</b>	<b>120,671</b>	<b>515,880</b>	<b>4.3</b>	<b>22,669</b>	<b>87,243</b>	<b>3.6</b>

System C Area

Year	Paddy			OFC		
	Extent	Production	Yield	Extent	Production	Yield
	(ha)	(ton)	(ton/ha)	(ha)	(ton)	(ton/ha)
1988	22,782	88,579	3.9	1,921	3,631	1.9
1989	24,737	94,912	3.8	574	2,378	4.1
1990	28,359	110,340	3.9	3,691	7,113	1.9
1991	30,640	116,849	3.8	4,073	8,134	2.0
1992	31,858	120,089	3.8	2,675	6,379	2.4
1993	38,378	165,177	4.3	3,119	6,071	1.9
1994	39,683	148,058	3.7	3,962	12,372	3.1
1995	40,297	161,288	4.0	5,190	19,448	3.7
1996	40,216	176,129	4.4	4,825	18,830	3.9
1997	40,189	188,832	4.7	4,826	24,061	5.0
1998	41,035	183,863	4.5	4,644	9,820	2.1
1999	41,003	205,564	5.0	1,355	9,056	6.7
2000	41,127	173,978	4.2	3,597	12,906	3.6
<b>Average</b>	<b>35,408</b>	<b>148,743</b>	<b>4.2</b>	<b>3,419</b>	<b>10,785</b>	<b>3.3</b>

(Source: Mahaweli Statistical Handbook 2000)

## NATIONAL PLANT QUARANTINE SERVICES (NPQS)

### 1 . Program Summary and JICA's Cooperation



#### (1) Program Background

The Government of Sri Lanka accorded a priority on foreign currency earning through expansion of export, and in line with it, paid effort to improvement of seeds and planting materials by use of imported materials. To facilitate such import, establishment of an effective plant quarantine system is a pre-requisite. On the other hand, Sri Lanka has a history of serious pests to major crops being introduced to the country with devastating consequences. Under such circumstance, the Government decided to improve and strengthen the plant quarantine services system by financial and technical cooperation of Japan putting a major stress on (i) establishment of an effective quarantine system, (ii) development of appropriate inspection and processing techniques and (iii) transfer of knowledge and techniques to the staff.

#### (2) Program Objectives and Overall Goal

The objectives of the program are to realize effective and efficient operation of the National Plant Quarantine Service ( NPQS) through improvement of the facilities and equipment and empowerment of the technical staff.

#### (3) Program Scope

This program is comprised of projects concerning the establishment and operation of the Centre of the NPQS that is located in the neighbourhood of the Colombo airport at Katunayake. Construction of the Centre and provision of the facilities and equipment were conducted in 1992/93 under the grant aid of JICA, and it was followed by the project-type technical cooperation from 1994 through 1999. Prior to the commencement of the technical cooperation, experts were dispatched in 1993/94 for the purpose of preparation.

#### (4) Program Component

- 「 Project for Establishment of National Quarantine Services 」 ( Grant aid、 1992/1993 )
- 「 National Quarantine Services Project 」 ( Technical cooperation、 1994-1999 )



- 「Dispatch of Experts」 (1993-1994)

**(5) Executing Agency**

- National Plant Quarantine Services, Department of Agriculture, Ministry of Agriculture and Lands

**(6) Present Status of the Program/Viewpoint for Evaluation**

Since conclusion of the technical cooperation in 1999, the Centre has been operated by the staff of NPQS under the Section of Seed Certification and Plant Protection, Department of Agriculture. The evaluation is conducted with the view to clarify (i) current activities with a stress on utilization of the facilities and equipment and (ii) outcome of the proposals and agreements made at conclusion of the technical cooperation (such as upgrading of the hierarchical position of the NPQS, preparation of rules and regulations relevant to plant protection and quarantine service, etc.).

**2 . Evaluation Results**

**(1) Relevance**

**1-1) Relevance at the Time of Plan Formulation**

Throughout the 1990s, development of agricultural production and increase of export of agricultural products were one of the important national policies of Sri Lanka, and in this connection, operation of efficient and effective plant quarantine services was required in particular with regard to import of seeds and planting materials and export of agricultural commodities. In addition, Sri Lanka had a history of serious damages to crops due to intrusion of pests. From these, it is clear that the program was highly relevant to the national policies at that time. Furthermore, in the early 1990s, there existed no well-equipped facilities to serve as the centre of quarantine activities and the technical level of the staff was much lower than required. As a result, there oftentimes occurred such situation that the operation capacity of the NPQS did not catch up with the imported or exported quantities of agricultural commodities. These instances show clearly that the need to implement the program was also very high.

**1-2) Relevance at Present**

The above development policies are continued in the 2000s, and more importance has been attached to the quarantine services under the progressing trend of trade liberalization. As such, the program is duly feasible in light of current situation, and its importance will increase as the enlarging trend of foreign trade.

**(2) Effectiveness**

**2-1) Achievement of Objectives**

Transfer of knowledge and techniques, regarding the three major fields (pathological inspection, entomological inspection and disinfections treatment), was performed almost as planned and scheduled, and operation of the NPQS by the staff of Sri Lanka has been gaining momentum (refer to the table of

operation indicators). However, because of several negative factors enumerated below, it is rather difficult to evaluate that the objectives were achieved satisfactorily.

## **2-2) Negative Factors**

- (1) There are the following problems regarding the equipment and apparatus : (i) a number of equipment and apparatus are not usable at present due to mal-functioning, out of order, unavailability of spares parts in the country (such as the ultra-low temperature freezer, X-ray radiators, high-speed centrifugal separators, etc. about 40 items in total), (ii) the Centre is not staffed with competent maintenance engineer, and (iii) the numbers of computers and vehicles are much less than required, and (iv) both hard and soft wares of computers become obsolete and old-fashioned.
- (2) Elevators were not installed in the main building, and it makes transport and movement of large scale and heavy equipment and apparatus between floors.
- (3) There are some fields in the transferred techniques (such as post entry quarantine inspection and pests identification) that are insufficient for ensuring smooth daily operation.
- (4) Number of competent technical staff is in short (out of 16 staff trained overseas, only 6 staff remain in the Centre and the others were retired or moved out to other offices by routine personnel rotation).
- (5) Hierarchically, the NPQS is still put under the Section of Seed Certification and Plant Control, and it tends to undergo restrictions in management of personnel and budgetary affairs.

## **(3) Efficiency**

### **3-1) Efficiency of Input**

Provision of facilities and equipment under the grant aid was performed as planned and scheduled. During the project-type technical cooperation, a lot of equipment and materials were donated additionally (with a total amount of JY 160 million), some of which were delayed in arrival due to time-consuming custom clearance in Sri Lanka and put hindrance in activities.

### **3-2) Relation between Input and Output**

There arise some problems as follows: (1) As a general impression, the facilities and equipment hardly seem to be utilized fully (e.g. there are some rooms in the main building that are not put in use); (2) Regarding the despatched experts, difficulty in communication is pointed out because of language barrier, and as another problem, transfer of techniques seems to have been in short concerning operation and maintenance of equipment and apparatus (the chance of overseas training was not provided to maintenance staff of the NPQS, while it was provided in case of the PGRC), and (3) during the technical cooperation, prompt and timely input of the allocated budget was difficult due to the hierarchical position of the NPQS (the competence of even the Director of the NPQS was very limited in this regard).

#### **(4) Impacts**

##### **4-1) Achievement of Program Goal**

Because the technical cooperation was completed only in 1999, it seems too early to evaluate the state of achievement of program goal. It is reported, however, that at both the airport and sea port of Colombo, the quarantine services are being sped-up and conducted more properly as a result of training of site inspectors by the NPQS.

##### **4-2) Conservation of Natural Environments**

Favourable impacts are being generated to conservation of natural environments through prevention of intrusion of harmful pests and insects. Two harmful insects have already been identified since 1999 .

##### **4-3) Other Favourable Impacts**

The program has aroused attention of both government officers and public to the matters of plant quarantine, and contributed much to the improvement of institutional matters regarding plant protection: the new plant protection act ( No.35 of 1999) was propagated in October 1999 and within its framework, related administration rules and regulations are currently being prepared by a joint operation of the CARP and NPQS.

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

##### **5-1) Organization**

The importance of the NPQS has already been duly recognized by the Government of Sri Lanka and hence, there is little doubt about their intent to sustain the NPQS. However, there is a problem about the hierarchical position of the NPQS in the government organization. To ensure efficient operation, the proposed upgrading of the NPQS ( from the subjective unit of the Seed Certification and Plant Protection Section to an independent unit under the Director of Agriculture) needs to be realized.

##### **5-2) Staffing**

The number of the NPQS staff is 89 persons including 16 persons at the airport, 11 persons at the seaport and 5 persons in Kandy. So far as the number is concerned, the NPQS is adequately staffed. However, as a many number of the counterpart staff during the technical cooperation have left the NPQS on account of retirement and routine personnel rotation, succession and further development of the transferred techniques becomes a current issue to the NPQS. Another issue is concerning the recruitment of competent maintenance engineer for the equipment and apparatus of the Centre. The present vacancy should be filled as soon as possible.

##### **5-3) Finance**

Chronic shortage of the budget allocation prevails in all offices of the Government. Like other offices, the NPQS is allocated only about 70% of the required, and it is further reduced during execution. As there is no prospective improvement in such situation, it is necessary for the NPQS to take a special countermeasure to cope with it, including such measure as creation of a Fund by use of the quarantine

inspection charges in line with the previous proposal at the conclusion of technical cooperation.

#### **5-4) Technical Aspect**

As stated already a considerable number of the equipment and apparatus have been out of order. Therefore, repairing and restoration of their function is of crucial need at present. For this purpose, it is necessary to establish a competent maintenance system within the Centre, and overseas training of maintenance staff needs to be tackled positively considering that most of the testing and treatment equipment are made in Japan.

#### **(6) Outcome of Technical Cooperation**

The completion report of the technical cooperation (1999) evaluated that transfer of techniques was carried out as planned and scheduled. The present survey reveals also that the executing agency's appreciation of the technical cooperation is very high, although shortcomings are pointed out in some fields (transfer of techniques concerning operation and maintenance of the equipment and apparatus).

#### **(7) Conclusion**

Of the five evaluation items, "relevance" is evaluated to be high, but regarding other three items, i.e., "effectiveness", "efficiency" and "sustainability", the performance is less than expected due mainly problems related to the facilities and equipment. It is therefore necessary to take a full-fledged action to improve the situation. As regards "impacts", favourable impacts are being brought forward in respect of daily quarantine services at the air and sea ports, natural environment conservation, preparation of related laws and regulations, enhancement of public interests on the quarantine services, etc. in spite of that only two years have elapsed since conclusion of the technical cooperation.

### **3 . Lesson Learnt**

#### **Facilities and Equipment :**

In planning a same type of project, care should be taken to the following: (i) consistency to prospective use (prevention of mismatch), (ii) transfer of sufficient knowledge and techniques on operation and maintenance of the facilities and equipment provided, (iii) overseas training of the staff in charge of maintenance, (iv) strengthening of the after sales services by suppliers (particularly, for highly specific facilities and equipment), (v) stable supply of spare parts and consumables and (vi) strict application of a rule to attach the operation and maintenance manuals in English.

#### **Relation between and Grant Aid and Technical Cooperation :**

In case of a grant aid project that presumes to be followed by technical cooperation, important matters (such as scale and lay out of the facilities, type and quantities of equipment) need to be determined through mutual consultation (as practised in implementation of the PGRC). For this purpose, strengthening of the inter-scheme cooperation system in JICA is desired.

### **Dispatch of Expert for Training :**

In technical cooperation like this program that includes training of a number of site officials ( inspectors), dispatch of a training expert needs to be considered. It is difficult for experts of other fields to handle such training on the side.

## **4 . Suggestion**

To improve management of the NPQS, the following measures should be taken as soon as possible by the executing agency:

### **Maintenance of Equipments :**

( i ) Taking a full inventory of all the facilities and equipment including putting priorities according to the urgency in repair and restoration, (ii) Strengthening of the equipment maintenance unit of the NPQS ( deployment of an adequate number of competent staff, thorough execution of regular maintenance, prompt response to irregular request of maintenance, systematic filing of logs and records, orderly keeping of all manuals and documents, etc. ), and (iii) securing of sufficient amount of the budget for these purposes.

### **Early Realization of Previous Proposals :**

Previous proposals at the conclusion of technical cooperation ( 1999) are as follows: (i) Upgrading of the NPQS ( from the unit of the Seed Certification and Plant Protection Section), (ii) Enlargement of the competence of the NPQS on execution of the annual budget, (iii) Establishment of a national-wide institutional system for plant quarantine management with the NPQS acting as its centre, (iv) Establishment of a “ Plant Quarantine Trust Fund” by use of quarantine and disinfections treatment charges to be increased.

### **Securing of Competent Technical Staff :**

Among the technical staff trained overseas (16 persons), only 6 persons remain in the NPQS, and it causes shortage of competent technical staff in the Centre. To improve such situation, action needs to be taken promptly including at least returning of the staffs that were shifted to other offices by routine personnel rotation.

**5 . Annex**

**[PDMe]**

Summary	Indicators	Performances	External conditions
<p><u>Overall Goal</u> Safe movement of agricultural products for import and export is ensured by way of appropriate pest risk management through effective PQ measures.</p>	<ul style="list-style-type: none"> <li>• Increase of import and export of agricultural products inspected by the NPQS.</li> </ul>	<p>Too early to evaluate, but</p> <ul style="list-style-type: none"> <li>• Site inspectors are applying the transferred techniques to their daily works.</li> <li>• Collaboration between sites and the Centre becomes more close and the services are being provided more properly and promptly.</li> </ul> <p>( External conditions need be improved to achieve the overall goal )</p>	<ul style="list-style-type: none"> <li>• Preparation of related rules and regulations.</li> <li>• Establishment of a nation-wide management system for plant protection.</li> <li>• Improvement of market system for import and export.</li> </ul>
<p><u>Program Objectives</u> Performance of the NPOS ( pathological inspection, entomological inspection, disinfections treatment) is carried out smoothly.</p>	<ul style="list-style-type: none"> <li>• The number of inspection and treatment increases.</li> <li>• The number of detected pests and harmful insects increases.</li> <li>• Collaborate activities with other institutes becomes active.</li> </ul>	<ul style="list-style-type: none"> <li>• The number increased steadily from 362 ( 1999) to 385 ( 2000) and to 462 ( 2001).</li> <li>• The number of rejections ( reflecting the upgrading effort of applicants) decreases 36 ( 1999) to 28 (2000) and to 10 (2001) .</li> <li>• After 1999, two kinds of harmful insects (Coconut mite, Pathenium weed) were detected and alerted to those concerned.</li> </ul> <p>( however, as a whole, the objectives are yet to be fully achieved )</p>	
<p><u>Output</u> The NPQS is improved physically and institutionally to the extent that it can be operated and managed by the staff of Sri Lanka.</p>	<ul style="list-style-type: none"> <li>• Necessary knowledge and techniques are established.</li> <li>• Related operation manuals are prepared.</li> <li>• Knowledge and techniques are transferred to the staff of the NPQS.</li> <li>• Training of site inspectors is carried out by the staff of the Centre.</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge and techniques are established and manuals are prepared as planned and scheduled.</li> <li>• Transfer of knowledge and techniques is conducted as scheduled , though there are some difference among the items.</li> <li>• Training of site inspectors delayed due to absence of relevant expert. It started in the later 1997 on the basis of curriculum and texts prepared by the staff of the NPQS.</li> </ul>	<p>As rules and regulations have yet to be prepared, there remain some part to be filled in the scope of training to site inspectors.</p>

Activities	Input		Pre-conditions :
	[Japanese Side]	[Sri Lankan Side]	
<p>(1) Improvement of techniques for pathological inspection (2) Improvement of techniques for entomological inspection. (3) Improvement of techniques for disinfections treatment (4) Training of the staff of the NPQS.</p>	<p>(1) Long-term experts : 6persons ( 1994-99 ) (2) Short-term expert : 24persons ( 1988-93 ) (3) Donate Implement &amp; Others : JY 163 million (4) Local Cost Financing : JY million (5) Overseas Training : 22 persons</p>	<p>(1)CP : 41 persons (2) Facilities&amp; Equipment : Those provided under the JICA grant aid (1992)* (3) Financial Input: Rs 5.44 million in total.  * A main building, out-door facilities, plant and equipments ( JY 2.2 billion)</p>	

< **Commodities Inspected by NPQS** >

**(A) Colombo Seaport**

**Export** (Unit: Mt)

Year	Tea	Rubber	Coconut	Vegetable*	Miscellaneous
1999	236,181	2,927	215,142	34,155	57,053
2000	268,292	2,422	219,676	7,709	36,251
2001	258,120	1,822	199,988	2,728	107,879

**Import** (Unit: Mt)

Year	Seed Potato	Vegetable Seeds	Fresh Fruits	Raw agricultural commodities	Miscellaneous
1999	1,575	172	13,238	2,398	1,506
2000	2,433	236	28,110	9,026	2,300
2001	7,756	208	25,251	-	4,336

**(B) Colombo Airport**

**Export** (Unit: Mt)

Year	Cut Flower & Foliage	Betel Leaves	Water Plants	Fruits	Vegetables
	(nos)	(nos)	(nos)	(Mt)	(Mt)
1999	449,903,682	1,354,720	4,475,106	79,039	123,054
2000	395,544,502	2,248,106	103,432,183	42,157	64,310
2001	165,034,041	2,316,521	102,546,523	46,123	17,263

**Import** (Unit: Mt)

Year	Fruit & Vegetable	Flower Bulb & Seeds	Rooted & Unrooted Plants	Cut Flowers	Vegetable Seeds
	(kg)	(kg)	(nos)	(nos)	(kg)
1999	5,471	4,105	1,621,206	21,093	38,259
2000	2,134	50	452,360	45,560	10,431
2001	2,387	2,561	654,870	54,357	23,546

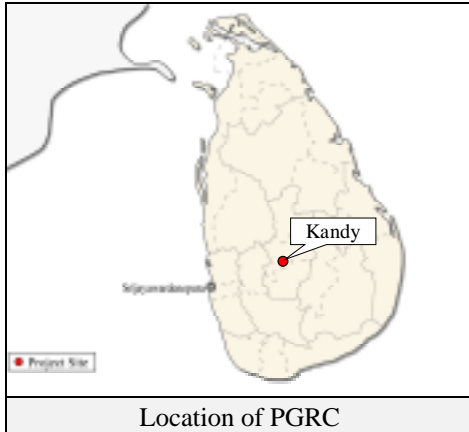
**(C) Commodities Rejected as the Result of Inspection**

Year	Commodities	No. of Shipments	No. of bags, cartons	Total Weight
2000	Garlic	3	6,948	69
	Betel Nut	2	723	48
	Big Onion	4	19,500	487
	Coriander	1	360	9
2001	Miscellaneous	19	12	178
	Prohibited Materials	39	21	-

Source: NPQS 2002/4

## PLANT GENETIC RESOURCES CENTER ( PGRC)

### 1 . Program Summary and JICA's Cooperation



Location of PGRC



Front View of PGRC

#### (1) Program Background

Conservation of plant genetic resources was a long-felt need of the country. There was a concern about the loss and disappearance of valuable species, especially with regard to paddy, grain legumes and root crops. On the other hand, the need of conservation was keenly felt in connection to the seed breeding that commenced in the 1960s and contributed to the rice self-sufficiency achieved around 1987. Under the succeeding agricultural development policy, further improvement and development of seeds and planting materials, not only for rice but also for other useful crops, are still accorded a priority. Under such circumstance, the Government decided to establish the system and facility for conservation of plant genetic resources under the financial and technical cooperation of Japan.

#### (2) Program Objectives and Overall Goal

The objectives of the program are to contribute to improvement of seeds and planting materials and development of new crop varieties through collection, evaluation, conservation and multiplication of valuable plant genetic resources that would be lost or disappeared otherwise.

#### (3) Program Scope

This program includes all JICA projects dealing with the establishment and operation of the Plant Genetic Resources Centre (PGRC), which is located at Peradenia in the vicinity of Kandy within the Research Complex of Department of Agriculture (DOA).

#### (4) Program Component

The following projects are included in the program: (i) 「 Project of the Centre for Plant Genetic Resources 」 ( Project -Type Technical Cooperation : 1988-95 ) (ii) 「 Dispatch of Experts 」 ( 1996-2000 ) , (iii) 「 Third Country Training 」 ( 2000-03 ) . Dispatch of experts was made after termination of the project-type cooperation in order to supplement and reinforce the transferred techniques. The third



country training is a training program, jointly organized by PGRC and JICA that invites participants from neighbouring countries to be trained at the Centre. The program commenced in 2000 and is scheduled to be held each year till 2003. .

**(5) Executing Agency**

- Pant Genetic Resources Centre (PGRC), Department of Agriculture (DOA), Ministry of Agricultural Development & Research (MOAR)

**(6) Present Status of the Program/Viewpoint for Evaluation**

The project-type technical cooperation was terminated in 1995. In succession, the Follow-UP (F/U) by JICA continued till 2000 by dispatched two experts. Independent operation of the PGRC by their own staff commenced in 2001. In the present evaluation, a stress is placed on grasp of (i) the current state of activities and (ii) outcome of proposals and advices that were mutually agreed when the technical cooperation was terminated.

<b>2 . Evaluation Results</b>
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**(1) Relevance**

**1-1) Relevance to the Policy and Needs at the Time of Plan Formulation**

Increase of agricultural productivity was, and still is, accorded a top priority in agricultural development policy in Sri Lanka. In line with it, improvement and development of seeds and planting materials has been attached great importance. This program, aiming at supplying genetic resources to seeds breeding, was highly relevant to such policy. Besides, till the end of 1980s when the program launched, there existed no facility to conserve plant genetic resources and rare and precious resources had been lost and disappeared. In this sense, implementation of the program was seriously needed.

**1-2) Relevance to the Current Policy and Needs**

The above agricultural development policy is still adopted and more importance is attached to increase of agricultural productivity under the “ Free Trade Treaty “ enacted in the later 1990s. It means that the program is highly feasible even viewed from current policy and needs

**(2) Effectiveness**

**2-1) Achievement of Objectives**

As of 2002, the PGRC is operated smoothly as planned and scheduled. Indicators (such as the progress of collection, evaluation, conservation, multiplication, etc. of genetic resources) show that performance of the PGRC is right on the track and expanding year by year (refer to the table attached). It means that the objectives of the program have been achieved.

## **2-2) Positive Factors to Achieve the Objectives**

Positive factors are enumerated as follows: (i) Assignment of Leaders: Right persons were assigned as leaders in both Japanese and Sri Lankan sides. The leader of Japanese side had long experience of work in Sri Lanka (dated back to the 1970s) and was well familiar with local conditions. His involvement in the program spanned over whole period of implementation from the start of the Grant Aid to the end of the F/U. The leader of Sri Lankan side (currently, Director General of DOA) pushed forward strongly implementation of the program (it cannot be overlooked that both were on very close terms since 1970s). (ii) Maintenance of Equipment: The maintenance unit of the PGRC is rather well staffed and furnished, and the technical level of its staff is rather high (one of them received overseas training in Japan). (iii) Utilization of Facilities and Equipment: Facilities and equipments provided under the Grant Aid were utilized effectively. In addition, a number of implements and spare parts donated during the technical cooperation contributed much to success of transfer of techniques.

## **(3) Efficiency**

### **3-1) Efficiency of Input**

(i) Provision of Facilities and Equipment: Facilities and equipment were provided almost on schedule. During construction of the facilities (buildings), work was suspended oftentimes due to civil disturbance (September 1988 – March 1990) caused by the Sinhali Extremists, but owing to the efforts of all concerned, it did not influence the completion time. (ii) Dispatch of experts: The project-type technical cooperation spanned over eleven years (including despatch of individual experts of four years). It seems to be rather too long from viewpoint of efficiency even if such external conditions such as interruption of works due to civil strife is considered.

### **3-2) Relation between Input and Output**

(1) Facilities, Equipment and Material: Most of the facilities, equipment and materials provided under the grant aid and technical cooperation are utilized effectively as planned and scheduled with exception of a few equipment that are inoperative due to difficulty to get spare parts. (2) Input of Experts: Input of experts was made in line with the original manning schedule. From the outcome of transfer of knowledge and techniques, the input seems to have been done effectively.

## **(4) Impacts**

### **4-1) Achievement of Overall Goal**

Overall goal is being achieved. The PGRC commenced supply of germplasms to the seed breeding institutes of DOA, and some of them were utilized already to develop new seeds (especially, of paddy), which are being put in practical use of farmers.

### **4-2) Third Country Training**

The third country training was conducted at PGRC in three times (2000, 2001, 2002) with duration of about one month for each. Four to five Asian countries participated and each country despatched one or two trainees. According to the evaluation of the trainees, the training was highly satisfactory to them.

#### **4-3) Impacts to Natural Environments**

Loss of rare and precious plant resources is being prevented by the activities of PGRC. It is reported that by the establishment of PGRC, loss has already been stopped so far as those concerned with main foodstuff.

#### **4-4) Other Effects**

(1) In addition to cooperation for improving crop varieties, the PGRC is providing data and information, especially concerning effective use of genetic resources, to a number of breeding institutes and experimental stations, thereby giving impacts to improvement of the bases of breeding activities in Sri Lanka, (2) both internationally and domestically, PGRC is giving favourable and important impacts to academic and educational societies through exchange of genetic resources with international institutes, communication and cooperation with institutes and universities in Sri Lanka, education of students, etc.

### **(5) Sustainability**

#### **5-1) Organization**

The Government of Sri Lanka is well aware of the importance of PGRC and their sense of ownership is very high. However, in 1998 after termination of the technical cooperation, PGRC was placed under the Seed Certification & Plant Protection Section, and since then has been undergoing many restrictions in personnel affairs and budgetary allocations. At present, DOA is considering to upgrade the position of PGRC to the direct belonging to the Directorate General of Agriculture.

#### **5-2) Staffing**

The PGRC is provided with an adequate number of technical staff that increased steadily from 28 persons (1988-1993) to 30 persons (1994-1995) and 42 persons (1996-2000). However, there is a concern about the transfer of competent staff to other offices. Some staff, trained in Japan, was moved out on routine rotation, and it caused problems in operation of the PGRC. Including filling up of the positions of these competent staff, training and transfer of knowledge and techniques to new staff are current issues of PGRC.

#### **5-3) Financial Aspect**

Like other offices of the Government of Sri Lanka, the PGRC is confronted with chronic shortage of annual budget allocation. About 85-90% of annual allocation is spent for such routine expenditure as salary and wage and office running expenses and little remains for research and field works. To cope with such situation, the Government is now considering to allocate some of the KR- Fund (US\$11 million in total) to PGRC. If it is realized, financial difficulty will be removed for several years to come.

#### **5-4) Technical Aspect**

Since knowledge and techniques were transferred satisfactorily, there remains little to be added or improved so far as the transferred techniques are concerned. However regarding the equipments, there are several issues to be addressed from the view point of sustainability: (i) Most of the equipment have already been used for about ten years, including such equipment as the cold storage facilities that have

been operated throughout 24 hours. Besides, there are several equipments that are not operated due to deterioration or lack of spare parts, and some equipment (such as computers) become old-fashioned. Since these equipments are vital to operation of the PGRC, special efforts need to be paid by the Government to improve the situation. Assistance from Japanese side is also desirable through such means as monitoring and provision of information on suppliers of spare parts and equipments to be replaced or renewed. (ii) Some equipment (such as vehicles) was transferred from the PGRC to other offices thereby hindering the activities of the PGRC. They need to be returned to the PGRC in line with the conditions of grant aid agreement. (iii) The PGRC is requesting to install long-term ultra-cold storage facilities (with a temperature of - 15 to - 20 degrees centigrade) in view of current level of international standards. This request needs to be considered positively because it is a long-standing issue from the time of technical cooperation.

### **(6) Output of Technical Cooperation**

Knowledge and techniques were duly transferred to counterparts as planned, and its outcome is much appreciated by the executing agency (Ministry of Agriculture and Research).

### **(7) Conclusion**

Performance of this program is satisfactory regarding the four major evaluation items ( relevance, effectiveness, efficiency, impact). However, similar to other programs, the sustainability is in question particularly regarding the financial aspect. In this sense, utilization of the KR-II Fund should be realized as proposed.

## **3 . Lesson Learnt**

### **Dispatch of Experts :**

Success of this program is due largely to that a suitable person was appointed as leader of experts, and that he stayed with the program in succession from the very beginning of plan formulation through completion of the follow-up.

### **Facilities and Equipment :**

Effective use of facilities and equipment owes much to the following: (i) design of facilities and selection of equipment were done properly , ( ii ) during the project-type technical cooperation, an equipment specialist was despatched as short-term expert to transfer techniques on operation and maintenance of equipment, ( iii ) technical staff of the PGRC in charge of equipment received overseas training in Japan, (iv) Dispatched experts supplied spare parts continuously during both project-type technical cooperation and the follow-up period.

### **Close Relation between the Grant Aid and Technical Cooperation :**

Leader of the experts for technical cooperation took part in the planning of facilities and selection of the equipment from the very beginning of the Grant Aid project.

#### 4 . Suggestion

##### **Early Realization of the Reorganization ( Raising the position of PGRC in administration hierarchy) :**

Restoration of the competence over personnel and budgetary affairs is of crucial need for PGRC. In this context, the reorganization plan ,which proposes to upgrade the position of PGRC from the lower unit of the Seeds Certification and Plant Protection Section to the direct control of Directorate General of Agriculture, needs to be realized promptly.

##### **Continuous Employment of Competent Technical Staff :**

In order to operate the PGRC smoothly, it is necessary for the PGRC to secure experienced and competent technical staff continuously. In this sense, personnel changes need to be done carefully so as not to interrupt or hinder the operation of the PGRC. If any adverse effects are foreseen, changes should be avoided even if routine management procedure so requests. Return of staff, moved out from the PGRC, should also be considered.

##### **Improvement of Breeding Institutes :**

Breeding institutes in Sri Lanka have much to be improved with respect to facilities, equipment, staffing, techniques, etc. To make the output of PGRC more effective, improvement of these institutes is necessary.

**5 . Annex**

**[PDMe]**

Summary	Indicators	Performances	External conditions
<p><u>Overall Goal</u> Improvement of crop seeds and planting materials is promoted in Sri Lanka</p>	<ul style="list-style-type: none"> <li>Plant resources conserved at PGRC are applied to improvement of seeds and planting materials</li> </ul>	<p>PGRC commenced supplying of conserved plant resources (germplasm) to breeding institutes of MOA (DOA). By use of them, new and improved varieties of seeds have been brought up mainly for paddy.</p>	<p>The seed-breeding sector in Sri Lanka is far behind the PGRC in respect of facilities, equipment and staffing. Its improvement is highly needed in order to utilize the output of the PGRC effectively.</p>
<p><u>Program Objectives</u> The system of PGRC for conservation of valuable genetic resources is operated smoothly.</p>	<ul style="list-style-type: none"> <li>Quantity of plant genetic resources handled by PGRC is increased.</li> <li>Cooperation with other institutes ( such as seed breeding) is increased and conducted smoothly.</li> </ul>	<ul style="list-style-type: none"> <li>Quantity of conserved germplasms increased steadily from 5,587 in 1993 to 10,118 in 2001.</li> <li>Quantity of distributed resources to other institutes increased form 1,035 in 1993 to 5,174 in 2001.</li> <li>Visitors ( students and school pupils) increased from 4,101 in 1992 to 14,264 in 2001;</li> <li>Joint-survey and research with RRDI, FCRDI, etc. were conducted frequently.</li> </ul>	
<p><u>Output</u> PGRC staff acquires basic knowledge and techniques to an extent that PGRC can be managed and operated by themselves.</p>	<ul style="list-style-type: none"> <li>Techniques are developed and established for operation of PGRC.</li> <li>A processing and management system of data and information is built up.</li> <li>An exchange system of data and experimental materials with relevant institutions in and outside of the country is built-up.</li> <li>Knowledge and techniques concerning the above items are transferred to PGRC staff for ready use by them.</li> </ul>	<ul style="list-style-type: none"> <li>Basic techniques ( collection • evaluation • conservation • multiplication ) were established as planned including building-up of the data compilation system for conserved plant resources.</li> <li>The exchange system of data and materials was built up with institutes in Sri Lanka, but the system with foreign countries has not been built up yet ( on the mid-way of building).</li> <li>The Third Country Training was conducted at PGRC in success in three times ( 2000,2001 and 2002).</li> <li>By project-type technical cooperation ( 7 years including FU of 2 years), basis for self-management was formed, and by dispatch of experts ( 4years : 1995-2000 ) , the basis was further supplemented and strengthened.</li> </ul>	<p>Survey and collection was hardly performed for the north and southwestern part of the country (about 40% of national land area) due to the Tamil-extremist activities.</p>

Activities	Input	
	[Japanese Side]	[Sri Lankan Side]

DEVELOPMENT OF AGRICULTURE, FORESTRY AND FISHERIES  
PLANT GENETIC RESOURCES CENTER (PGRC)

Regarding genetic resources: (1) Survey and Collection (2) Classification and Evaluation (3) Conservation and Multiplication (4) Data Processing and Management (5) Training of Staff	(1) Long-term Experts : 6 persons ( 1988-95 ) * (2) Short-term Experts : 10 persons ( 1988-93 ) (3) Dispatch of Experts : 2 persons ( 1995-00 ) ** (4) Donate Implements : JY 160 million (5) Local Cost Financing : Rs 55 million (7) Overseas Training : 17 persons ( in addition, 3 persons were studied in University of Tokyo, Kyoto and Kobe under the scholarship of Ministry of Education of Japan ) * Including FU of 2 years ** Conservation : 1995-97 Evaluation : 1998-2000	(1) CP : 49 persons ( including T/L and office staff ) (2) Facilities and Equipment: Those of Grant Aid ( 1987 ) * were provided. (3) Financial Input : Rs12.8 million (1989-95)  * Main building ( Administration · Research · Experiment Units ) 、 Annexed Outdoor Facilities and Equipment (about JY 2 billion)	
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**< Performance of PGRC >**

(Unit: nos of samples excluding visitors)

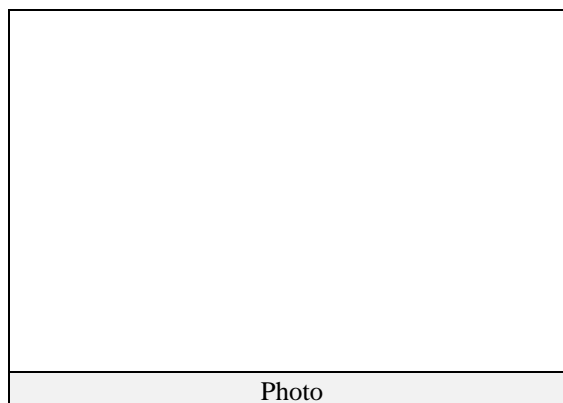
Year	Conserved		Evaluated		Multiplied		Distributed		Visitors (persons)	
	Yearly	Accumulated	Yearly	Accumulated	Yearly	Accumulated	Yearly	Accumulated	Yearly	Accumulated
1989	435	435					165	165		
1990	632	1,067					182	347		
1991	1,379	2,446					122	469		
1992	2,981	5,427					116	585	4,101	4,101
1993	160	5,587	1,023	1,023	1,934	1,934	375	960	4,513	8,614
1994	2,654	8,241	460	1,483	523	2,457	579	1,539	4,899	13,513
1995	330	8,571	591	2,074	393	2,850	294	1,833	5,762	19,275
1996	139	8,710	257	2,331	339	3,189	571	2,404	10,371	29,646
1997	169	8,879	401	2,732	535	3,724	500	2,904	12,944	42,590
1998	139	9,018	443	3,175	530	4,254	353	3,257	7,288	49,878
1999	280	9,298	502	3,677	653	4,907	679	3,936	14,264	64,142
2000	484	9,782			703		545			
<b>2001</b>	<b>336</b>	<b>10,118</b>			<b>604</b>		<b>931</b>			

Target of Collection    25,000  
 — Achieved:            12,108  
 (as of the end of 1999)

Source: [1] 「Takahashi Report」 (before 1999)  
 [2] PGRC ( in and after 2000)

## THE INTEGRATED RURAL DEVELOPMENT PROGRAM FOR GAMPAHA DISTRICT

### 1 . Program Summary and JICA's Cooperation



#### (1) Program Background

The Integrated Rural Development Program (IRDP) is a nation-wide program to rectify the imbalance of economy in rural areas. It was started in 1979 and spread over the whole country in district-wise. Gampaha District is located adjacent to the north of Colombo and 57% of its land area is used for agriculture, mainly for production of paddy and traditional cash-crop of coconut. Although agriculture is major economic activities in the district, its productivity is low and both economic and living condition of rural people are less developed than the surrounding area. To improve such situation, the Government of Sri Lanka requested the Government of Japan to extend its assistance for development studies, and in response to it, the Master Plan was prepared by JICA in 1987 with a development strategy proposing (i) increase of agricultural production through intensification of land use, (ii) improvement of rural infrastructure and (iii) training of people who are involved in implementation of the IRDP. This program (IRDP for Gampaha) was implemented in line with this strategy.

#### (2) Program Objectives and Overall Goal

The program is aimed at promotion of the Integrated Rural Development Program (IRDP) in Gampaha District through increase of agricultural production and improvement of rural infrastructure.

#### (3) Program Scope

The program is comprised of the following projects: (i) 「Integrated Rural Development Project in Gampaha」 (Grant Aid First Stage) : provision of facilities and equipment for the agricultural production improvement model scheme of the IRDP、(ii) 「Integrated Rural Development Project in Gampaha」 (Grant Aid Second Stage) : construction of bridges at 18 locations over the district and provision of road maintenance equipment and materials、(iii) 「The Agricultural Extension Improvement Project in Gampaha (Project-type Technical Cooperation)」 : improvement of cropping patterns in coconuts plantations and improvement of extension method to farmers. These projects are formulated



within the framework of the above-mentioned master plan and implemented in order to achieve the targets of the IRDP for Gampaha.

**(4) Program Component**

- 「 Integrated Rural Development Project 」 ( Grant Aid First Stage : 1989/1990 )
- 「 Integrated Rural Development Project 」 ( Grant Aid Second Stage : 1993/1994 )
- 「 The Agricultural Extension Improvement Project in Gampaha 」 ( Project-type Technical Cooperation : 1994-99 )

**(5) Executing Agency**

- Ministry of Finance, Planning, Ethnic Affairs and Implementation ( Regional Development Division)
- Agricultural Department of Western Province
- Road Development Authority of Western Province (PRDA)

**(6) Present Status of the Program/Viewpoint for Evaluation**

Upon completion of the project-type technical cooperation in 1999, the project office (the Gampaha IRDP office) was closed, and the activities of the project office such as agricultural extension services and support of the farmers' production groups have been succeeded by the Agricultural Department of Western Province. The present evaluation is conducted with a focus upon grasp of (i) current state of the activities under management of Western Province and (ii) the situation of the farmers' production groups

<b>2 . Evaluation Results</b>
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**(1) Relevance**

**1-1) Relevance to Policies at the Time of Plan Formulation**

This program was implemented as part of the nation-wide IRDP that was promoted by the Government from 1977 through 1997 throughout the country. From this, It is self-evident that the program was highly relevant to the then national policy. On the other hand, as stated in the background of the program, the rural area of the Gampaha District was much less developed than the surrounding area and there existed a wide imbalance in economic and living conditions. It means that there was a crucial need to implement the program.

**1-2) Relevance to Current Policies**

The nation-wide IRDP has been succeeded by the Regional Economic Advancement Program (REAP) since 1997. However, as there is not so much difference in their basic concept, the program (the IRDP for Gampaha) is still relevant to current development policy.

## **(2) Effectiveness**

### **2-1) 「 Integrated Rural Development Project 」 ( Grant Aid: First Stage )**

The project was implemented as planned. The facilities and equipment have been utilized for the Agricultural Production Improvement Model Scheme that involved various components (such as development of minor export crops, improvement of training system of farmers, exhibition of model irrigation infrastructure, support services to farmers, etc.) within the framework of the IRDP for Gampaha. According to the executing offices of these components, the scheme is still ongoing in line with the initial concept, and the facilities and equipment, provided under the project, contributed much to its progress.

### **2-2) 「 Integrated Rural Development Project 」 ( Grant Aid: First Stage )**

All the bridges were constructed as planned, and have been contributing much to improvement of living conditions of rural people through upgrading of the road system of Gampaha District. The plant and equipment for road maintenance were also provided as planned, and have been utilized for improvement of maintenance works of the PRDA. As a whole, the project achieved its objectives substantially.

### **2-3) 「 The Agricultural Extension Improvement Project in Gampaha 」 ( Project-type Technical Cooperation )**

The project was implemented as planned and transfer of knowledge and techniques was conducted almost as scheduled. Main outputs were (i) selection of suitable intercrops to coconut plantations and development of planting techniques, (ii) introduction of new extension method ( the “ bottom-up” method), (iii) training of extension officers ( AIs) and (iv) organization of farmers ( setting-up of farmers production groups), Through these outputs, the project contributed much to the effective utilization of land of coconut plantations and diversification of crops. Thus, the objectives of the project were almost achieved.

## **(3) Efficiency**

### **3-1) Efficiency of Input**

(i) 「 Integrated Rural Development Project 」 Grant Aid: First Stage : The facilities and equipment required for the Agricultural Production Improvement Scheme were provided as planned and scheduled without any serious troubles to be noted. (ii) 「 Integrated Rural Development Project 」 ( Grant Aid Second Stage): The bridges were constructed over the district and the plant and equipment, needed for maintenance of road in the district, were provided as scheduled. As a whole, the efficiency is satisfactory. (iii) 「 The Agricultural Extension Improvement Project in Gampaha 」 ( Project-type Technical Cooperation): The project was implemented from 1994 through 1999 with input of 12 long-term experts and 12 short-term experts. With exception of minor troubles due to absence of the water management expert (caused by delay in despatching a successor), the experts were mobilized as scheduled and techniques were transferred as scheduled.

### **3-2) Relation between Input and Output**

Counterpart persons: Many of them were high-ranked officials and available for the project only on a part-time basis. Besides, as fluency in English was prioritised in assignment, old and senior officers were

apt to be appointed.

Equipment ( provided under the first stage grant aid): Some of agricultural machineries were not operated effectively ( two-wheeled tractors) because of unavailability of spare parts due to insufficient supply system, Besides, there were some machineries (such as combine harvesters and paddy transplanters) that were hardly suited to the local conditions of Sri Lanka. Currently (2002), the useful life of many machineries is expiring and the workability decreased considerably.

### **3-3) Other Factors**

The efficiency was affected adversely by the following two factors: (i) at the inception of the technical cooperation, much time was wasted to determine the agricultural extension method to be established under the project because the Sri Lankan side was not familiar with the “ bottom-up “ method proposed by the Japanese side. It took about two years to settle this matter. (ii) also at the inception of the technical cooperation, vegetables were considered as main intercrops of coconut plantations. However, later, it was found that they were not unsuitable as intercrops due to the sunshade effect of coconut trees. Again, a lot of time was needed to select fruits ( banana) finally as suitable intercrops.

## **(4) Impacts**

### **4-1) Achievement of Program Goal**

The Goal of the program is to attain the increase of farmers' income and improvement of their living environments. In recently years, planting of intercrops has been increasing in Gampaha . Major intercrops are fruits (especially, banana) and their planting area increased from 4,800 ha (1995) to 6,600 ha (1999). Abreast with it, the intercropping intensity in coconut plantations increased from 6.5% (1995) to 9% (1999) (refer to the table attached hereunder). Although all of these increases are not necessarily attributable to the effect of the program, according to the DOA of Western Province, the program has contributed considerably. In spite of such improvement in agricultural activities, farmers' income in Gampaha has scarcely increased due mainly to price hike of agricultural inputs and low prices of productions. On the other hand, living conditions have improved remarkably owing to the construction of bridges over the district and upgrading of road maintenance by the provided plant and equipment. From these instances, as a whole, the program goal has been achieved to some extent.

### **4-2) Impact to Agricultural Extension**

Impacts to agricultural extension services are as follows: (i) the “ bottom-up “ extension method introduced under the technical cooperation is a new attempt in Sri Lanka in a sense that it is based on the incentives of farmers. If its applicability to the conditions of Sri Lanka is demonstrated by the project, it will be extended to other regions and bring about considerable renovating effect in the extension system of the country. (ii) under the prevailing extension system in Sri Lanka, one officer ( AI) is in charge of so many as about 6,000 farmers in an average that it is hardly possible to provide satisfactory services to each of farmers. On the contrary, in case of the extension to groups, introduced under the project, the extension efficiency is increased drastically as many farmers are able to receive the services all together. Thus, the project will also contribute much to improving the extension efficiency.

#### **4-3) Impact to WID**

Motivation of women to take part in social activities has been enhanced through participation to the farmers' production groups,. Out of thirteen production groups organized, one group consists of only women members. In addition, there are some groups in which women are acting as leader or secretaries taking initiatives in the group activities.

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

##### **5-1) Organization**

Upon completion of the technical cooperation (1999), the Gampaha IRDP Office was closed and its activities were handed over to the Agricultural Extension Improvement Centre ( AEIC), belonging to the Department of Agriculture of Western Province.

##### **5-2) Staffing**

The number of permanent staff of the AEIC is 11 persons consisting of 1 chief, 3 extension officers and 7 assistants. In addition, there are about 30 technicians and farm labourers. More than a half of the counterpart persons during technical cooperation have left office on account of retirement and personnel rotation. As filling the vacancy is not granted under the budgetary constraint, the number of technical and extension officer has decreased almost by a half. Meanwhile, the number of all extension officers (Agricultural Inspectors: AI) in Gampaha District is 39 persons and all of them have already received training at the AEIC.

##### **5-3) Finance**

According to the completion report of technical cooperation (1999), Western Province was to allocate Rs 1.13 million as the budget for maintaining project activities from June through December 1999. However, actually allocated amount remained around Rs. 0.8 million. Since then, the allocation increased to Rs 2 million in 2000, and to Rs 3.3 million in 2001, but reportedly it still accounts for about 70% of the required.

##### **5-4) Technical Matters**

As the transfer of knowledge and techniques was performed almost as planned, there scarcely remain problems regarding technical sustainability. Crop planting tests and trials are being continued at the " upland crops model farm" of the AEIC and the meteorological observation is kept going in the same compound with the record being reported continuously to the Central Weather Bureau of Sri Lanka. Training at the AEIC was conducted more actively than before. Trainees are individual farmers, farmers' groups, government staff, students, etc. and the number increased from 715 persons (1999), to 1,019 persons (2000) and 1,040 persons ( 2001). However, guidance to the farmers' production groups becomes rather inactive, and visit of AIs to farmers decreased from once a week to 2 or 3 times a month. Meanwhile, as regards the agricultural equipments provided under the grant aid, it is reported that the number of inoperative equipments is increasing due to insufficient maintenance and difficulty in obtaining spare parts.

### **5-5) Farmers' Production Groups**

At present (2002) there are 13 groups with 113 members. Compared with the state at conclusion of the technical cooperation (1999), the number of groups has not changed but members decreased slightly (by 10 members). According to the survey by the Agricultural Office of Gampha District (September 2001), the performance of groups are evaluated to be “very good” (41%), “good” (32%), “bad or poor” (18%). Against expectation, the number of groups has not increased and performance has not improved so much. In general, their activities remain rather stagnant due mainly to decrease of support by the provincial government in both finance and provision of agricultural inputs.

### **(6) Transfer of Techniques**

As a whole, transfer of techniques was conducted satisfactorily. A current issue is how to develop them further. This matter needs to be addressed seriously by the DOA of Western Province.

### **(7) Conclusion**

This program was part of the nation-wide IRDP that was promoted over twenty years under assistance of a number of donors. From this, it is self-evident that the program was highly relevant to the development policy. As regards the “effectiveness” (achievement of the objectives) and “efficiency”, the program as a whole has brought about almost satisfactory results although the degree of satisfaction differs between projects. For instance, the Grant Aid Second Stage surpassed the other two projects in both achievement of the objectives and efficiency. On the other hand, the “sustainability” involves problems especially with regard to the “farmers’ production groups. Supporting services to them seem to have been weakened due mainly to the budgetary constraint. As a result, after conclusion of the program, no new groups have been organized and the activities of the existing 13 groups are stagnant. To improve such situation and gain momentum for further development, the support by Western Province needs to be strengthened.

## **3 . Lesson Learnt**

### **Survey Prior to Commencement :**

Because of the initial setbacks such as the change of intercropping (from vegetables to fruits) and the delay in decision of the extension method (regarding the “bottom-up-method”), it took about two years for the technical cooperation to start its activities in a full swing. Such delay could have been avoided if the pre-survey was carried out thoroughly and concurrence of Sri Lanka side was obtained beforehand at least on such basic strategic matters.

### **“Techno Guide” :**

Agricultural extension services in Sri Lanka are conducted on the basis of the “Techno Guide” that is a sort of official guidelines issued by the Department of Agriculture (DOA). Any agricultural techniques developed under a project cannot be put on the official line of extension unless it is approved officially by the DOA and put in the techno guide. Since no action was taken in this regard for the techniques

developed under the program, it remained only as an internal technical resource without being officially propagated to outside of the project area. Taking such action is a job of counterparts but experts should also be aware of the importance of such technical administration matter because negligence of it ( it was also the case with the “ Mahaweli” program) is considered to be one of the negative factors against extension of techniques to outside of the project confines.

**Beneficiaries’ Participation :**

Main component of this program is to set up and manage farmers’ production groups. Therefore, including development of agricultural techniques, every program activities should have been conducted on the concept of “ Beneficiaries’ Participation “.

**Follow-Up, After-Care :**

Neither “ Follow-Up” nor “After-Care” was considered necessary when the technical cooperation was concluded. However, because such activities as “ agricultural extension” and “ setting-up and management of farmers’ production groups” generally take a long build-up time, the time available for technical cooperation ( five years at best, in case of this program, it was shortened virtually to three years due to the initial setback ) seems to be rather too short. In this sense, in order to make the cooperation really effective, continuation of JICA’ cooperation in some appropriate form is desirable.

<b>4 . Suggestion</b>
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**Support to “ Farmers’ Production Groups” :**

Western Province should strengthen the supporting services to the “Farmers’ Production Groups”. The services include: (i) guidance to the existing groups concerning organization management and farming practices, (ii) support to new groups including financial assistance during the inception period, and (iii) periodical monitoring of their activities, etc. To carry out these services effectively, an officer in charge should be posted in the provincial office.

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**5 . Annex**

**[PDMe]**

Summary	Indicators	Performances	External conditions
<p><u>Overall Goal</u> In Gampaha district , farmers' income is increased and their living environments are improved through implementation of the program.</p>	<ul style="list-style-type: none"> <li>• Farmers' income becomes more than that before the program.</li> <li>• Their living conditions become better than those before the program.</li> </ul>	<ul style="list-style-type: none"> <li>• Throughout 1990s, prices of agricultural inputs were increased, whereas prices of agricultural products remained low and stagnant. As the result, farmers' income was scarcely increased.</li> <li>• Living conditions were improved considerably due to construction of many bridges under the program. Main merits are (1) time-saving in daily traffic and transport activities, (2) shorter access to markets, especially for agricultural products, (3) increase of job-opportunities ( easier access to the adjacent Industrial Zone).</li> </ul>	<ul style="list-style-type: none"> <li>• Because of the Free Trade Policy adopted in the later-1990s, agricultural products of cheaper prices are flowing into the country from neighbouring countries ( such as India) with negative impacts to Sri Lankan agriculture.</li> </ul>
<p><u>Program Objectives</u> Progress of the IRDP for Gampaha is accelerated.</p>	<ul style="list-style-type: none"> <li>• Intercrops in coconut plantations are diversified.</li> <li>• The cropping intensity is increased.</li> <li>• Road conditions and network are upgraded.</li> </ul>	<ul style="list-style-type: none"> <li>• Planting of fruits ( such as banana) in Gampaha has increased steadily ( 1995: 4,800 ha/ 1999: 6,600 ha ) .</li> <li>• In accordance with it, intercropping intensity of coconut plantations is increased from 6.5% (1995) to 9% (1999) Although such increase is not necessarily due to the program, a considerable part of it is considered attributable to the program.</li> <li>• Road conditions are upgraded greatly ( realization of all-weather traffic, provision of well-equipped maintenance workshops, etc. )</li> </ul>	

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<p><u>Output</u></p> <p>(1) Intercropping techniques for coconut plantations are improved.</p> <p>(2) Extension method is improved.</p> <p>(3) Road conditions are improved.</p>	<ul style="list-style-type: none"> <li>• Suitable intercrops are selected and cultivation method is established.</li> <li>• Production Groups are organized by farmers and introduced inter-cropping in their plantations.</li> <li>• Technical level of Extension Officers is improved.</li> <li>• Bridges are constructed at 18 locations.</li> </ul>	<ul style="list-style-type: none"> <li>• As suitable intercrops, fruits ( represented by banana) were selected and necessary planting method is established. In addition, its high profitability is verified in the trial farm.</li> <li>• The “ Bottom-up Extension Method” (putting an emphasis on farmers’ incentives) is developed and transferred to CP and Extension Officers.</li> <li>• Thirteen (13) farmers’ production groups ( 126 members in total) were organized by the time when the project was completed ( June, 1996)and commenced operation.</li> <li>• On the other hand, bridges were constructed at 18 locations scattered over the Gampaha district and machinery and equipment, provided under the project, were utilized at the Central Work Shop of the Road Authority of Western Province ( located at Asgilia).</li> </ul> <p>( Note: As of 2002, the number of farmers’ production groups is still kept at 13 against the expectation that it will increase )</p>	<p><u>Negative Factors for Farmers’ Production Groups</u></p> <ul style="list-style-type: none"> <li>• The IRDP Gampaha Office was closed on completion of the project, and its activities, including guidance and assistance to farmers’ groups , were handed over to the Agricultural Department of Western Province.</li> <li>• Due mainly to the financial constraints, the guidance and assistance by the Province have been decreased.</li> </ul>
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<u>Activities</u>	<u>Input</u>		<u>Pre-conditions :</u>
	[Japanese Side]	[Sri Lankan Side]	
<p><u>[Agricultural Extension Improvement Project]</u> ( 1994-99: Proj-type Technical Cooperation :</p> <p>(1) Improvement of intercropping patterns in the coconut plantations</p> <p>(2) Improvement of extension method</p> <p>(3) Development and preparation of training materials</p> <p>(4) Execution of training (extension officers, village officers, farmers)</p>	<p>(1) Long-term expert : 12 persons ( 1994-99 )</p> <p>(2) Short-term expert : 12 persons ( 1994-99 )</p> <p>(3) Donate Implement &amp; Others : JY 107 million</p> <p>(4) Local Cost Financing : 41 million</p> <p>(5) Overseas Training : 22 persons</p>	<p>(1) CP : 15 persons</p> <p>(2) Facilities &amp; Equipment : Facilities and Equipment of the Ambepussa Training Center, provided under the JICA grant aid under the IRDP (Stage 1), were provided.</p> <p>(3) Financial Input : Rs 27.5 million</p>	<ul style="list-style-type: none"> <li>• Project operation committee is established.</li> <li>• Lecture hall and dormitory are built/renovated.</li> <li>• Farmers in the project area do not oppose the project.</li> </ul>
<p><u>[Integrated Rural Development Project : Stage-I]</u> ( 1990-91: Grant Aid )</p>	<p>1<sup>st</sup> Stage : JY 996 million</p> <p>2<sup>nd</sup> Stage : JY 1075 million</p>	<p>Facilities and equipment necessary for the Agricultural Production Improvement Model Project.</p>	
<p><u>[Integrated Rural Development Project : Stage-II]</u> ( 1994-95: Grant Aid )</p>	<p>1<sup>st</sup> Stage : JY 1196 million</p> <p>2<sup>nd</sup> Stage : JY 553 million</p>	<ul style="list-style-type: none"> <li>• Bridges ( at 18 locations)</li> <li>• Construction Machinery and Equipment for repair and maintenance of road.</li> </ul>	