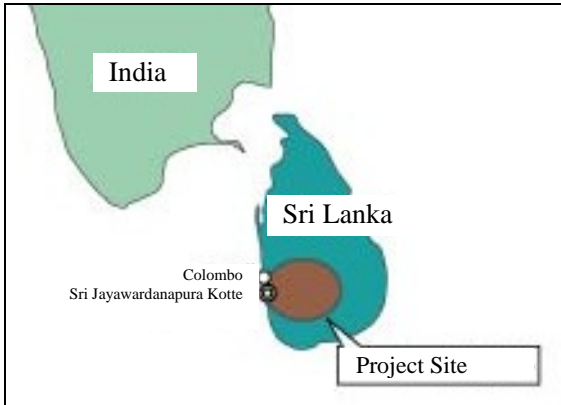


Sri Lanka

The Regional Telecommunications Development Project

Field Survey: July-August 2003

1. Project Profile and Japan's ODA Loan



Project Area



Switching Equipment at Kandy Switching Station of Sri Lanka Telecom

1.1. Background

In Sri Lanka, the telephone density as of 1991 was as low as 0.7 per 100 persons, and more than 60% of the switching equipment's capacity was concentrated in the Colombo Metro Area (the telephone density in the Colombo Metro Area was 3.45 per 100 persons while the average rate in the project area was 0.3 per 100 persons). In remote areas, it took more than five years on average from application to telephone installation. The telecommunications environment in remote areas was insufficient in terms of both quality and volume compared to the Colombo Metro Area.

The project area includes six major local cities in Sri Lanka: Kandy, Matale, Hatton, Nawalapitiya, Kalutara, and Panadura. Each of these cities plays an important role in the economic and industrial activities of Sri Lanka, either as a base for tourism or a production site of high quality tea, which is the country's main export product. Therefore, the improvement of the communications environment was necessary.

Under these circumstances, the Sri Lankan government developed the Telecommunications Master Plan (1991-2005) with the financial support of the Asian Development Bank. In recognition of the need to improve and expand the capacity of equipment of various kinds, including local and long-distance switching units, long-distance transmission lines and subscriber lines, the executing agency Sri Lanka Telecom (SLT) was planning to carry out a telecommunications network expansion project in line with the Master Plan with the support of the World Bank, ODA loan (Telecommunication Network Expansion Project in Colombo Metro Area (II)) and suppliers' credit scheme.

For the Master Plan, the Sri Lankan government conducted a feasibility study for six major local regions, including Kandy, where the improvement and expansion of telecommunications equipment was important and urgent, and recognized that the telecommunications service needed to be improved as quickly as possible in order to meet the demand for telephone service by 2000.

1.2. Objectives

The objectives of this project were to improve and expand telephone switching facilities and outside facilities in six remote regions, including Kandy, the rapidly growing third-largest city in Sri Lanka, that fall far behind the Colombo Metro Area in the construction of telephone networks in order to meet the demand for telephone service in 2000 as well as to help revitalize local economies by promoting tourism in these regions.

1.3. Output

This project was to expand telecommunications facilities, such as switching equipment, transmission equipments, outside equipments (subscriber cables), station buildings and electric power equipments, in six remote regions in Sri Lanka: Kandy, Matale, Hatton, Nawalapitiya, Kalutara and Panadura.

The loan covered full amount of the foreign currency portion and part of the local currency portion of the project cost. Specifically, the loan was intended to cover the procurement of materials, machinery and services necessary for civil engineering and construction work, procurement of equipment, and consulting services.

1.4. Borrower/Executing Agency

Government of the Democratic Socialist Republic of Sri Lanka/Sri Lanka Telecom (SLT)

※ The executing agency Sri Lanka Telecom, the former Telecommunications Department, was separated from Ministry of Mass Communications and established as a self-supporting accounting public corporation in September 1991. It was incorporated in September 1996 as part of the privatization policy of the government. The present name is Sri Lanka Telecom Limited (SLTL).

1.5. Outline of Loan Agreement

Loan Amount/ Loan Disbursed Amount	10,112 million yen/ 9,530 million yen
Exchange of Notes/ Loan Agreement	June 1993/ August 1993
Terms and Conditions	
-Interest Rate	2.6%
-Repayment Period (Grace Period)	30 years (10 years)
-Procurement	General untied
Final Disbursement Date	December 2001

2. Results and Evaluation

2.1. Relevance

Table 1 shows the demand for telephone service in six cities estimated at the project appraisal. A sharp increase in demand by 2000 was forecast in all of the cities, which was total growth of 70% from 1993 to 2000. This project was based on the Telecommunications Master Plan mentioned in “1.1 Background” and in this regard was consistent with high-level government policy. Therefore, the project was relevant at the time of the appraisal.

The relevance of the project plan at present is as follows. The project area was expanded from six to 13 regions. A comparison between the capacity of switching units after project's completion and the demand for telephone service in 2003 shows that the switching unit capacity is insufficient to meet the demand (Table 2). The executing agency Sri Lanka Telecom Limited (SLTL) revises the estimated demand for telephone service every year by taking into account the number of waitlisted applicants and market research results. According to the adjusted estimate, an increase in demand is expected in 2004 and onward, and therefore, expansion of the communications infrastructure is necessary (Table 3). Also, the current national communications policy of Sri Lanka set a target of providing telephone service to all regions and all people (universal access policy) in addition to liberalizing the communications market. In this respect, the project is consistent with government policy. Therefore, the project plan has remained relevant today.

Table 1: Estimated Demand in the Project Area

(Unit: lines)

Region	Switching unit Capacity (June 1992)	Estimated Demand for Telephone Service				Construction and Renewal Planned for the Project
		1993	1994	1995	2000	
Kandy	14,268	16,796	17,949	19,180	28,431	19,616
Matale	1,233	2,801	2,993	3,198	4,741	3,760
Nawalapitiya	746	796	849	908	1,346	616
Hatton	2,224	2,248	2,401	2,566	3,804	2,160
Kalutara	2,697	4,952	5,293	5,655	8,383	6,960
Panadura	3,370	4,040	4,319	4,615	6,841	4,848
Total	24,538	31,633	33,804	36,122	53,546	37,960

(Source): JBIC appraisal document

Table 2: Comparison of Switching Unit Capacity and Demand for Telephone Service in the Project Area

(Unit: lines)

Switching Station	Capacity after the Project Completion (A)	Demand for Telephone Service (2003) (B)	Difference (B) – (A)
1) Kandy	74,991	78,720	3,729
2) Matale	20,006	22,493	2,487
3) Nawalapitiya	2,560	3,755	1,195
4) Hatton	5,248	6,475	1,227
5) Kalutara	41,002	50,734	9,732
6) Panadura	19,488	24,125	4,637
7) Badulla	14,715	18,331	3,616
8) Bandarawela	9,578	13,017	3,439
9) Chilaw	23,060	29,150	6,090
10) Kegalle	21,582	27,075	5,493
11) Kurunegala	39,382	66,427	27,045
12) Nuwala Eliya	8,712	8,985	273
13) Ratnapura	20,219	24,503	4,284
Total	300,543	373,790	73,247

(Source) SLTL

Table 3: Estimated Demand for Telephone Service in the Project Area (2004~2015)
(Unit: lines)

Item	2004	2005	2006	2007	2008	2009	2010	2015
Project Area	394,220	419,975	445,730	471,485	497,238	522,994	548,749	677,522
Entire Sri Lanka	1,194,251	1,272,273	1,350,295	1,428,317	1,506,339	1,584,361	1,662,383	2,052,493

(Source) SLTL

2.2. Efficiency

2.2.1. Output

The project aimed to expand switching facilities, transmission facilities, outside facilities and others. As for switching facilities, an increase in telephone line capacity by a total of 41,160 lines at six switching stations (Kandy, Matale, Hatton, Nawalapitiya, Kalutara and Panadura) was initially planned.

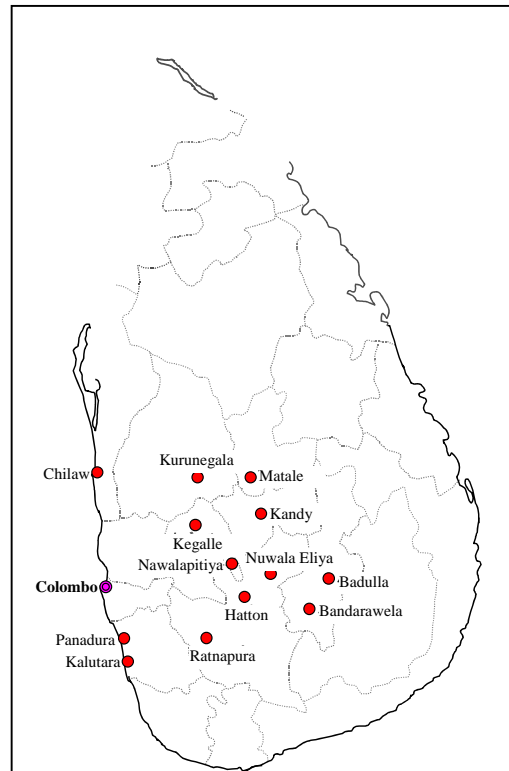
However, as the liberalization of the communications sector triggered a remarkable increase in the demand for telephone service, the output was increased at Kandy, Matale and Kalutara, creating a total of 62,950 lines.

SLTL proposed using the funds for the project to improve facilities in the regions (the service areas of seven switching stations) not covered by its 150K Project (aiming to add 150,000 lines by mainly improving outside facilities in remote areas nationwide), which was approved by JBIC. As a result, at seven switching stations of Badulla, Bandarawela, Chilaw, Kegalle, Kurunegala, Nuwala Eliya and Ratnapura, 81,760 lines were added and transmission and outside facilities were expanded.

Regarding the three switching stations in Nawalapitiya, Hatton and Panadura, expansion of switching facilities were excluded from the project and other facilities such as transmission facilities were covered by the loan, because the project area overlapped with the target areas of the World Bank project and the suppliers' credit scheme by South Korea implemented at the same time as this project.

Thus, concerning the expansion of switching facilities under the project, the telephone line capacity was increased by 144,710 lines at 10 switching stations (Kandy, Matale, Kalutara, Badulla, Bandarawela, Chilaw, Kegalle, Kurunegala, Nuwala Eliya and Ratnapura) against the originally planned 41,160 lines at six switching stations (Kandy, Matale, Nawalapitiya, Hatton,

Fig. 1: Project Area



Kalutala and Panadura).

The transmission, outside and electric power facilities were also modified and expanded in accordance with the change in output relating to the expansion of switching facilities and the revision of the demand plan (the output is summarized in the Comparison of Original and Actual Scope at the end of this report).

2.2.2. Project Period

The initially planned project period was 52 months from August 1993 to December 1997 (from the Loan Agreement to the installation and testing of equipment), but the actual period took 97 months from August 1993 to September 2001 (same as above). The delay in completion resulted from the extension of the whole project period due to the substantial increase in output as stated above. However, the initially planned output was completed as originally scheduled.

2.2.3. Project Cost

The total cost was initially planned to be 11,896 million yen (=4,264 million Rs) (loan portion: 10,112 million yen), but the project was completed for 10,701 million yen (=7,246 million Rs) (loan portion: 9,530 million yen).

The project cost was within the original planned amount in spite of outputs addition because 1) technological innovation has pushed down the market price of switching units and made it possible to purchase materials and machinery at lower prices than estimated based on the previous projects costs; and 2) there was competitive bidding, etc.

2.3. Effectiveness

2.3.1. Telephone main lines in operation (utilization rate) and the number of waiting applicants

The utilization rate at the project area was 81.1% on average in 1995, a year after the appraisal, and the figure declined considerably in 1996 and 1997. After that, it recovered to reach 75.8% in 2002 (Table 4). The reason for the decline in the utilization ratio in 2002 from the 1995 level is that, although installed capacity has substantially increased following the capacity expansion of switching units under the project, the increase in subscriber lines has not corresponded to the increase in the installed capacity of switching units due to insufficient infrastructure, such as transmission lines connecting the switching station and subscribers and branch lines.²

The number of waitlisted applicants at the 13 target switching stations has been increasing each year (Table 5). SLTL says that the low telephone density in Sri Lanka means that every time the service area is expanded, potential demand rises so that subscription applications were increased.

The fact that the number of subscriber lines is increasing substantially indicates a great need for telephone service. Therefore, the utilization rate is expected to increase as the number of waitlisted applicants goes down due to improvements to infrastructure.

² The utilization ratio will not reach to 100% generally because switching stations need to have a reserve capacity to deal with temporary increases in communications traffic volume.

Table 4: Utilization Rate

(Unit: lines)

Switching Station		Appraisal (1994)	(1995)	(1996)	(1997)	(1998)	(1999)	(2000)	Comple tion (2001)	2 nd Year (2002)
1) Kandy	Installed capacity	n.a.	11,919	17,932	25,560	31,232	40,778	71,358	72,119	74,523
	Subscriber lines	8,421	9,082	9,685	12,664	27,142	36,425	43,612	48,115	51,964
	%	—	76.2	54.0	49.5	86.9	89.3	61.1	66.7	69.7
2) Matale	Installed capacity	n.a.	2,810	3,057	5,682	10,486	13,441	18,530	18,562	20,006
	Subscriber lines	2,121	2,416	2,980	4,581	8,645	10,678	12,268	13,256	14,141
	%	—	86.0	97.5	80.6	82.4	79.4	66.2	71.4	70.7
3) Nawalapitiya	Installed capacity	n.a.	420	612	768	896	2,543	2,432	2,432	2,560
	Subscriber lines	329	327	348	395	612	1,629	1,907	2,027	2,047
	%	—	77.9	56.9	51.4	68.3	64.1	78.4	83.3	80.0
4) Hatton	Installed capacity	n.a.	966	1,514	2,202	2,560	4,480	4,736	4,864	5,248
	Subscriber lines	803	817	850	1,020	1,815	2,923	3,522	3,964	4,322
	%	—	84.6	56.1	46.3	70.9	65.2	74.4	81.5	82.4
5) Kalutara	Installed capacity	n.a.	6,596	17,729	19,661	21,023	40,268	41,603	41,836	40,917
	Subscriber lines	4,562	5,780	7,561	12,288	17,858	29,906	25,788	28,747	32,743
	%	—	87.6	42.6	62.5	84.9	74.3	62.0	68.7	80.0
6) Panadura	Installed capacity	—	—	—	—	—	—	n.a.	n.a.	19,488
	Subscriber lines	—	—	—	—	—	—	15,743	16,974	17,592
	%	—	—	—	—	—	—	n.a.	n.a.	90.3
7) Badulla	Installed capacity	n.a.	3,752	4,497	6,576	9,197	10,665	10,778	14,079	14,115
	Subscriber lines	3,208	3,570	4,252	5,316	8,513	9,682	9,944	10,066	10,442
	%	—	95.1	94.6	80.8	92.6	90.8	92.3	71.5	74.0
8) Bandarawela	Installed capacity	n.a.	2,428	2,440	3,898	6,230	6,976	7,136	9,534	9,530
	Subscriber lines	1,815	1,999	2,221	2,456	4,769	6,234	6,600	7,471	8,401
	%	—	82.3	91.0	63.0	76.5	89.4	92.5	78.4	88.2
9) Chilaw	Installed capacity	n.a.	2,924	2,724	8,460	8,656	17,480	17,800	23,060	23,060
	Subscriber lines	1,771	2,534	2,722	4,647	8,463	11,041	11,595	14,249	16,060
	%	—	86.7	99.9	54.9	97.8	63.2	65.1	61.8	69.6
10) Kegalle	Installed capacity	n.a.	3,492	3,596	6,368	9,974	13,867	16,330	21,598	20,654
	Subscriber lines	1,947	2,331	2,726	5,362	8,150	11,260	12,195	13,653	14,743
	%	—	66.8	75.8	84.2	81.7	81.2	74.7	63.2	71.4
11) Kurunegala	Installed capacity	n.a.	4,884	5,008	15,006	15,868	27,043	27,853	43,478	39,382
	Subscriber lines	3,793	4,163	4,595	7,516	14,626	19,879	22,718	26,389	32,614
	%	—	85.2	91.8	50.1	92.2	73.5	81.6	60.7	82.8
12) Nuwala Eliya	Installed capacity	n.a.	2,932	2,756	2,904	4,900	5,308	5,348	8,730	8,716
	Subscriber lines	1,860	2,203	2,394	2,461	3,968	4,528	4,677	5,274	5,668
	%	—	75.1	86.9	84.7	81.0	85.3	87.5	60.4	65.0
13) Ratnapura	Installed capacity	n.a.	3,894	3,894	9,617	9,410	12,568	15,124	20,395	n.a.
	Subscriber lines	2,634	2,887	3,173	3,460	5,788	9,303	11,154	13,592	14,906
	%	—	74.1	81.5	36.0	61.5	74.0	73.8	66.6	n.a.
1)-13) Average	%	—	81.1	66.2	58.3	84.6	78.5	69.4	66.6	75.8
Entire Sri Lanka	Installed capacity	n.a.	271,250	340,643	428,447	541,082	766,295	854,932	932,766	976,998
	Subscriber lines	180,729	205,963	254,523	315,865	460,468	579,202	650,488	704,095	764,407
	%	—	75.9	74.7	73.7	85.1	75.6	76.1	75.5	78.2

(Source) SLTL

(Note 1) Panadura Switching Station started operating in 2000. Before 2000, it was included in the service area of Kalutara Switching Station.

(Note 2) Capacity expansion of the switching unit under the project was not carried out in Nawalapitiya, Hatton and Panadura.

(Note 3) The data for Entire Sri Lanka is for SLT's service only. Services by other companies are not included.

(Note 4) The utilization rate is usually expressed as the percentage of main lines in operation against the installed capacity of the switching unit. However, as the data on main lines in operation were not available this time, it is expressed as the percentage of subscriber lines against the switching capacity.

(Note 5) Assuming that "increase in telephone lines brought about by the project = increase in subscriber lines = the number of beneficiary households," the number of beneficiary households is estimated at 144,710. Assuming there are 4 persons per household, the number of beneficiaries is approximately 600,000.

Table 5: Number of Waitlisted Applicants

(Unit: lines)

Switching Stations	Appraisal (1994)	(1995)	(1996)	(1997)	(1998)	(1999)	(2000)	Completion (2001)	2 nd Year (2002)
Project Area	46,144	54,785	76,828	90,820	106,332	94,981	104,126	116,068	134,978
Entire Sri Lanka	186,245	227,198	274,991	286,369	315,157	262,844	269,457	275,276	328,061

(Source) SLTL

(Note 1) The data for Entire Sri Lanka is for SLT's service only. Services by other companies are not included.

2.3.2. Call Completion Rate³

The average call completion rate in the project area was only 47.1% in 2002, although it had improved by 14.4% since 1996, and then decreased to 43.5% in 2003 (Table 6). SLTL mentioned the following three background factors: 1) as shown in Table 10, in spite of the rapid spread of mobile phones, the infrastructure for mobile phones, including the system connecting mobile phones to fixed phones, has not been developed and therefore telephone calls is often cut off in the middle of the conversation or disconnected outside the service area; 2) failure in transmission lines connecting switching stations; and 3) failure in the connection to the international direct dialing (IDD) service. According to an analysis by SLTL, about 20% of the decline in the call completion rate is attributable to factor 3).

Table 6: Call Completion Rate

(Unit: %)

Switching Station	Appraisal (1994)	(1995)	(1996)	(1997)	(1998)	(1999)	(2000)	Completion (2001)	2 nd Year (2002)	3 rd Year (2003*)
1) Kandy	n.a.	n.a.	81.0	97.0	45.9	32.0	38.3	n.a.	43.3	44.2
2) Matale	n.a.	n.a.	17.0	28.0	66.2	34.3	38.4	n.a.	45.2	42.1
3) Nawalapitiya	n.a.	n.a.	n.a.	28.0	22.8	35.8	n.a.	n.a.	49.7	48.7
4) Hatton	n.a.	n.a.	n.a.	n.a.	30.6	42.2	40.1	n.a.	46.5	44.2
5) Kalutara	n.a.	n.a.	27.5	20.5	35.0	39.8	42.1	n.a.	48.0	46.7
6) Panadura	—	—	—	—	33.0	42.4	44.5	n.a.	59.6	50.2
7) Badulla	n.a.	n.a.	27.1	30.2	37.1	39.8	38.7	n.a.	43.4	38.9
8) Bandarawela	n.a.	n.a.	31.1	26.8	59.2	36.3	37.8	n.a.	44.7	41.8
9) Chilaw	n.a.	n.a.	n.a.	n.a.	18.7	n.a.	n.a.	n.a.	44.7	42.0
10) Kegalle	n.a.	n.a.	27.5	38.8	36.5	35.4	39.1	n.a.	47.5	42.4
11) Kurunegala	n.a.	n.a.	20.0	n.a.	42.4	33.4	37.0	n.a.	45.1	39.3
12) Nuwala Eliya	n.a.	n.a.	30.8	28.0	31.9	40.6	38.4	n.a.	47.0	44.2
13) Ratnapura	n.a.	n.a.	32.2	33.8	36.0	40.2	40.3	n.a.	48.0	40.7
1) -13) Average	n.a.	n.a.	32.7	36.8	38.1	37.7	39.5	n.a.	47.1	43.5
Entire Sri Lanka	n.a.	n.a.	29.4	32.9	49.5	37.0	42.7	n.a.	45.2	44.2

(Source) SLTL

(Note 1) * The data for 2003 is for January-June only.

(Note 2) The data for Entire Sri Lanka is for SLT's service only. Services by other companies are not included.

³ The ratio of successfully completed calls to the total number of attempted calls.

2.3.3. Fault rate and the faults cleared by next working day

The average fault rate in the project area had increased to 9.4% in 2003 in spite of a slight decline of 0.8% from 2000 to 2002. By region, the fault rate had declined from 2000 before project completion to 2003 after completion at eight switching stations of Kandy, Nawalapitiya, Hatton, Badarawela, Chilaw, Kurunegala, Nuwala Eliya and Ratnapura, while at the remaining five switching stations the fault rate had increased (Table 7).

The average fault clearance rate by next working day in the project area, which had improved by 6% in 2002 from 2000, decreased in 2003 to by 4% from the previous year to 81% (Table 8). By region, the rate has been increasing at eight switching stations in Kandy, Matale, Nawalapitiya, Kalutara, Badulla, Badarawela, Kegalle and Nuwala Eliya, while it has remained unchanged or decreased at the remaining five stations.

Since many of the switching units, transmission facilities and outside facilities of the 13 target switching stations, include existing facilities in addition to those improved under the project, and there is not sufficient data, it is difficult to determine to what extent the project directly affected to the movement of the fault rate and the rate of fault clearance by next working day.

Table 7: Fault Rate⁴

(Unit: %)

Switching Station	(2000)	Completion (2001)	2 nd Year (2002)	3 rd Year (2003*)
1) Kandy	7.8	7.3	6.6	4.8
2) Matale	5.8	5.4	5.6	11.5
3) Nawalapitiya	8.0	6.2	6.5	6.7
4) Hatton	4.2	3.9	3.6	3.2
5) Kalutara	7.2	6.1	8.1	11.8
6) Panadura	—	6.6	7.2	12.3
7) Badulla	7.2	8.7	6.7	8.1
8) Bandarawela	5.2	6.6	4.7	4.2
9) Chilaw	8.7	9.2	7.8	8.5
10) Kegalle	9.5	10.9	8.3	17.3
11) Kurunegala	12.0	17.6	12.9	10.5
12) Nuwala Eliya	10.2	13.3	7.5	6.4
13) Ratnapura	17.3	16.7	15.3	16.8
1) -13) Average	8.6	9.1	7.8	9.4
Entire Sri Lanka	7.9	7.4	7.3	8.6

(Source) SLTL

(Note 1)* The data for 2003 is for January-June only.

(Note 2) The data for Entire Sri Lanka is for SLT's service only. Services by other companies are not included.

(Note 3) Data for 1999 and before is not available at SLTL.

Table 8: Rate of Fault Clearance within Following Working Day

(Unit: %)

Switching Station	(2000)	Completion (2001)	2 nd Year (2002)	3 rd Year (2003*)
1) Kandy	76	84	91	93
2) Matale	75	87	78	80
3) Nawalapitiya	78	88	85	81
4) Hatton	87	96	94	85
5) Kalutara	76	87	83	86
6) Panadura	—	86	88	67
7) Badulla	71	78	85	90
8) Bandarawela	87	92	97	97
9) Chilaw	78	76	70	77
10) Kegalle	84	91	96	94
11) Kurunegala	77	68	69	58
12) Nuwala Eliya	83	92	99	100
13) Ratnapura	72	81	76	45
1) -13) Average	79	85	85	81
Entire Sri Lanka	83	86	83	73

2.3.4. Traffic volume

The call traffic volume (total volume of long-distance and international traffic) in 2002 was 59,591 thousand call seconds on average in the project area, a 52% increase from 1999. This increase is mostly attributable to an almost twofold increase in subscriber lines at the 13 target switching stations from 110,349 lines in 1998 to 225,643 lines in 2002. By region, the traffic

⁴ The ratio of faults per 100 calls per year

volume has increased at all of the switching stations except for Kegalle. Particularly there were sharp increase was observed at Kandy and Hatton (Table 9).

Table 9: Traffic Volume (long-distance and international calls)

(Unit: thousand call seconds)

Switching Station	(1998)	(1999)	(2000)	Completion (2001)	2 nd Year (2002)
1) Kandy	n.a.	13,581	14,742	16,635	25,363
2) Matale	n.a.	1,953	2,004	2,409	2,500
3) Nawalapitiya	n.a.	312	339	352	368
4) Hatton	n.a.	614	674	805	1,944
5) Kalutara	4,498	5,139	5,594	6,670	6,925
6) Panadura	1,520	1,434	2,016	1,993	2,025
7) Badulla	n.a.	2,041	2,290	2,326	2,754
8) Bandarawela	n.a.	1,676	2,180	2,183	2,245
9) Chilaw	1,369	1,371	1,751	1,626	1,815
10) Kegalle	1,249	3,056	3,280	2,976	2,823
11) Kurunegala	3,584	4,137	4,328	1,286	5,856
12) Nuwala Eliya	n.a.	1,053	1,473	1,285	2,027
13) Ratnapura	2,657	2,698	3,012	3,339	2,946
1) -13) Average	n.a.	39,065	43,683	43,885	59,591
Entire Sri Lanka	n.a.	327,695	371,318	401,651	451,782

(Source) SLTL

(Note 1) The data for Entire Sri Lanka is for SLT's service only. Services by other companies are not included.

(Note 2) The above traffic volume is the total of long-distance and international traffic volume. No statistical data on the local traffic volume is available at SLTL.

(Note 3) Data for 1997 and before is not available at SLTL.

2.3.5. Recalculation of FIRR

The project's financial internal rate of return (FIRR) was 13.8% at the appraisal time. In this survey, the FIRR was recalculated at 21.0% on the corrected calculation assumptions at the appraisal (excluding depreciation costs and interest expense from the costs and not allowing for inflation). This increase is due to a more than threefold increase in the telephone lines from the appraisal, which led to an increase in benefits, such as the income from telephone charges. The corrected assumptions for calculation are as follows.

(Assumptions for Calculation)

Project life: 20 years

Benefits: income from line connection fees and telephone charges of telephone lines increased under the project

Costs: maintenance and management costs for this project and increased portion under the project

2.4. Impact

2.4.1. Impact on the communications sector in Sri Lanka

Table 10 shows statistics on the communications sector in Sri Lanka. In 2002, the number of subscriber lines in the service areas of 13 switching stations covered by the project was 225,643, accounting for about 25% of the total of 883,108 fixed telephone subscriber lines in Sri Lanka. This shows the project plays a major role in the development of the entire communications sector in Sri Lanka.

Table 10: Statistics on the Communications Sector in Sri Lanka

	1998	1999	2000	2001	2002	2003*
A. No. of subscribers (lines)						
A-1. Fixed telephones (wired)	455,598	580,199	653,144	708,200	768,620	783,428
(wireless)	67,931	88,914	114,267	118,995	114,488	114,372
Subtotal	523,529	669,113	767,411	827,195	883,108	897,800
A-2. Mobile telephones	174,202	256,655	430,202	667,662	931,580	1,034,276
Total of fixed and mobile	697,731	925,768	1,197,613	1,494,857	1,814,688	1,932,076
B. Telephone density (%)						
B-1. Fixed telephones	2.8%	3.5%	4.0%	4.4%	4.7%	4.7%
B-2. Mobile telephones	0.9%	1.3%	2.2%	3.6%	4.9%	5.4%
Total of fixed and mobile	3.7%	4.8%	6.2%	8.0%	9.6%	10.1%
C. Others						
C-1. Data communications (No. of subscribers)	18,984	25,535	40,497	62,159	73,468	73,880
C-2. Public telephones (No. of telephones)	4,761	5,779	8,222	6,801	6,728	6,679
C-3. Radio Paging (No. of subscribers)	10,511	10,300	7,009	6,178	3,541	3,541
C-4. Trunk Mobile Radio	-	-	-	504	579	579

(Source) Telecommunications Regulatory Committee of Sri Lanka (TRCL)

(Note 1) * Data for 2003 is for the first quarter only.

2.4.2. Impact on promotion of tourism and revitalization of local economic activities

This project was expected to have an impact on promotion of tourism and revitalization of local economic activities in the project area. However, sufficient data were not available in this survey.

2.4.3. Environmental and social impact

In this project, land acquisition was conducted in each region in order to secure sites to install remote switching units. However, as the acquired sites were as small as 16m² each and basically vacant lots were used, relocation of local residents was not necessary. No particular negative social impact has been reported.

2.4.4. Case study

In this survey, a case study was conducted in order to examine this project's impact on residents of the project area and their views of the telephone service (Table 11). We selected six out of 13 switching stations covered by the project based on the geographical conditions (Fig.2) and then randomly selected existing and new subscribers from each switching station's telephone subscriber lists. The survey was conducted in the form of an interview using a previously prepared questionnaire. The interviewees were composed of two groups: households and businesses. Among 409 respondents, 63% (259 respondents) were households (existing subscribers: 32%; new subscribers: 68%) and 37% (150 respondents) were businesses (existing subscribers: 39%; new subscribers: 61).

Table 11: Switching Stations and Subscribers Targeted for the Case Study

(Unit: persons)

Switching Station	Households		Businesses		Total
	Existing Subscribers	New Subscribers	Existing Subscribers	New Subscribers	
1. Kandy	22	28	21	24	95
2. Mantale	14	37	6	8	65
3. Panadura	12	42	7	8	69
4. Badulla	12	21	13	7	53
5. Kurunegala	12	32	3	25	72
6. Chilaw	11	16	9	19	55
Total	83	176	59	91	409
	259		150		

(1) Means and frequency of communication

Before telephones were installed, respondents' major means of communication were public telephone (31%), neighbor's telephone (23.1%) and letter (17.4%). More than two years have passed since telephones were installed among over 70% of general households and businesses. Of the respondents, 72% rely on SLT's fixed telephones as the only means of communication, while the remaining respondents use other means of communication such as mobile telephones.

With regard to telephone use frequency, although it is hard to compare before and after simply, only 1.2% of households made six or more telephone calls a day before the installation of telephones, while 10.2% of households make 11 or more telephone calls a day since installation. As for businesses, only 9.8% made 11 or more telephone calls a day before telephone installation, while 47.3% make 21 or more telephone calls a day since the telephone installation.

These results indicate that with the increase in opportunities to use the telephone since telephone installation, the frequency of telephone use has increased both in households and businesses and telephone has become the main means of communication.

Table 12: Frequency of Telephone Use

(Unit: %)

Item	Before the installation of telephones							After the installation of telephones			
	0 call	1 call	2~5 calls	6 calls and more	—	—	Total	Up to 10 calls	11~20 calls	21 calls and more	Total
Households	5.2	68.1	25.5	1.2	—	—	100	89.8	8.3	1.9	100
Businesses	0 call	1~5 calls	6~10 calls	11~20 calls	21 calls and more	Not known	Total	Up to 20 calls	21~30 calls	31 calls and more	Total
	4.5	43.6	12.0	3.8	6.0	30.1	100	52.7	21.9	25.4	100

(2) Purposes and impact of telephone use

Among households, 52% use the telephone for communication with family members and friends, 31% for emergency calls, 8% for business purposes, and 3% for the Internet. Among businesses, 54% use the telephone for business activities and trading, 20% for emergency calls, 12% for facsimile transmissions, and 4% for the Internet.

As for the impact of the installation of telephones, respondents from households mentioned as positive impacts: increased communication among family members (42%), enhanced safety of the household (20%), easier information acquisition (17%) and improved access to health and medical facilities such as hospitals. Businesses also recognize positive impacts of the installation of telephone service such as increase in income (16%), increase in customers (17%),

improved customer service (16%) and expansion of business ties (13%).

Negative impacts such as long conversations on the telephone and higher costs were also pointed out, although the number of respondents who gave these answers was small.

Multiple answers were allowed about the purposes and impact of telephone use.

(3) Quality of telephone service by SLTL

More than 80% of households and businesses said there was no particular problem with procedures for subscription.

With regard to the quality of telephone calls, 87% of respondents have never experienced “no call tone,” while 91% have never experienced disconnection of the telephone line. In addition, 99% find no problem in telephone connection and 93% are satisfied with sound quality. The results are different in this respect from those stated in “2.3.2. Call completion rate” (Table 6).

Regarding the telephone bill, 11% of respondents said there have been some problems after the receipt of the bill, while 89% said there was no problem. Many respondents complained that they have to stand in lines to pay their bills and it takes a long time. The narrow payment counter of SLTL seems to be one of the reasons for the delay.

(4) Customer satisfaction with SLTL

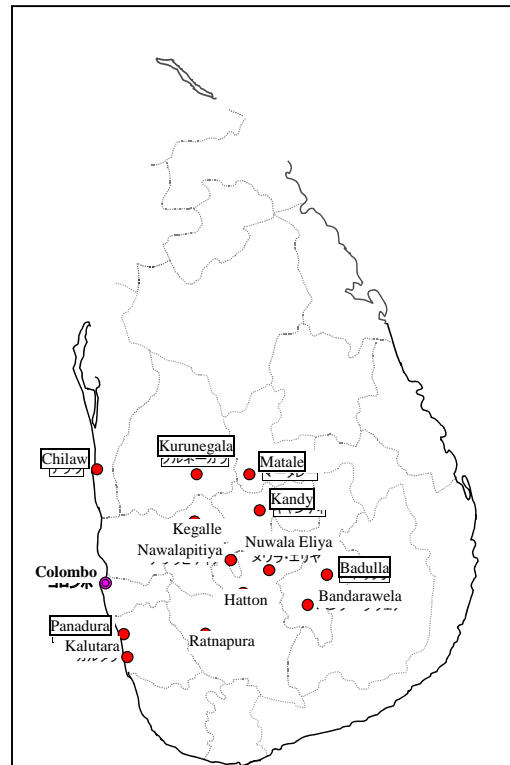
As for SLTL’s service in general, 88% said they were satisfied, while 12% were not satisfied. Reasons for the dissatisfaction include high telephone charges (42%), poor maintenance (34%), and telephone network failure (17%), as well as poor access to the Internet, billing errors, and inadequate customer service.

In the survey, respondents made a number of proposals to SLTL, such as giving discounts on a large amount of telephone charges, itemized billing, displaying the billing amount on metering equipments, improving maintenance, expanding service areas, introducing new model telephones and cordless telephones, raising customer service, increasing the number of Teleshops (customer service windows) and introducing ADSL services.

(5) Summary of the case study results

The case study results show that the installation of telephone service has various social and economic impacts on subscribers. Positive impacts recognized by households include increased communication among family members, improved security and safety, improved access to information and health and medical services. Businesses also recognize positive impacts such as an increase in sales, expansion of trading and improved customer service. The newly incurred expense of telephone charges is not a heavy burden for households and businesses considering

Fig.2: Case Study Target Area



(Note) The target area is the service areas of the boxed switching stations.

the convenience and benefits brought by telephone service. Although some subscribers are dissatisfied with the telephone charges, the current rates are thought to be within an affordable range.

Also, there is no serious problem with the sound and voice quality of telephones. Most subscribers are satisfied with the service of SLTL and recognize an improvement in service due to privatization. On the other hand, SLTL needs to continue its efforts to solve technical problems such as the failure of the telephone network pointed out by some respondents. However, it should be noted that this is not the problem of SLTL alone, but is closely connected with the unstable power supply system in Sri Lanka that often causes long-lasting outages in rural areas in particular. In addition, further improvement is necessary, such as the improvement of customer service at Teleshops (customer service windows) and the introduction of a billing system in which telephone charges are shown on the meter like electricity and water meters.

2.5. Sustainability

2.5.1. Operation and maintenance status

The executing agency Sri Lanka Telecom Limited (SLTL) was converted from a public corporation to a private limited company in September 1996. At present, 49.5% of all issued stocks are owned by the government of Sri Lanka, 35.2% are owned by NTT Communications Corporation (NTT Com), and 15.3% are owned by general investors.

For five years from 1998 to 2002, NTT Com (NTT at the time of the agreement) participated in the management under the management agreement between NTT Com and SLTL and was involved in marketing basis improvement, strategy development, technological assistance in network designing, etc. and improvement of operational and financial performance. In this process, the Japanese-style safety and quality management system and productivity improvement system, such as the “5S movement⁵” and “KAIZEN,” were introduced and practiced at each work place. The major factor behind the success of a series of management reforms was that NTT Com not only made investments but also sent several Japanese directors, including the CEO, who took the lead in the management of SLTL after it was privatized.

Operation and maintenance of the project facilities are carried out by specific departments of the regional office to which each switching station belongs (for example, Maintenance and Rehabilitation Department is in charge of network maintenance and Cable Development Department is responsible for installation of new telephone lines, etc.). SLTL is currently promoting reorganization of the maintenance structure by establishing Outside Plant Maintenance Centres (OPMC) in order to use the personnel and machinery involved in the maintenance of the outside facilities more effectively. As of August 2003, OMPCs have been established in four places in the country including Colombo and Kalutara. Other measures have also been implemented to improve customer service such as the opening of Teleshop customer service windows (one-stop service stations), establishing the common number 121 for receiving fault reports, and improving billing and collection activities. Therefore, the current SLTL’s operation and maintenance structure poses no problem to project facilities.

⁵ “5S” means “putting in order (seiri)” “tidying up (seiton)” “cleaning (seisou)” “keeping neat (seiketsu)” and “disciplining (shitsuke),” each begins with “s” in Japanese. These activities were originally promoted by the manufacturing sector for the purpose of improving safety and the quality of products. Now they are practiced by other sectors as well.

2.5.2. Financial status

As for earning performance, the sales amount for FY2002 was 25,383 million Rs, which was a 48.5% rise from 1998 due to the increase in subscribers. The operating profit margin, which declined from 29.3% in FY1998 to 25.4% in FY2000 due to the higher depreciation costs resulting from large-scale capital investment, recovered to 31.3% in FY2002 as a result of the control of capital investment, sales increases and the reduction of operating costs. Interest expense (non-operating expense) temporarily rose because a large part of the capital investment fund was procured through interest-bearing liabilities. However, as the company's performance was good and interest-bearing liabilities were reduced by the controlled capital investment, interest expense has also been reduced. As a result, the net income for FY2002 was 2,685 million Rs, the largest amount since 1998.

With respect to the financial situation, the increase in fixed assets slowed down in spite of active capital investment up to FY2000 because capital investment was reduced after 2000. In addition to capital investment, the recognition of deferred tax assets associated with the adoption of tax-benefit accounting contributed to the substantial increase in fixed assets in FY2000. The liabilities, which peaked in FY1999, decreased in FY2000 to 38,681 million Rs because the demand for funds declined as the capital investment was reduced. Thanks to the recognition of deferred tax assets and the reduction of liabilities, the equity ratio has improved from 31.7% in 1999 to 50.0% in 2002.

Therefore, there is no problem concerning the financial sustainability of the executing agency SLTL.

Table 13: Consolidated Profit and Loss Statement

(Unit: million Rs)

Item	1998	1999	2000	2001	2002
Operating Income	17,082	18,281	19,605	22,060	25,383
Operating Expenses	12,071	13,220	14,621	15,746	17,430
Operating Profit	5,011	5,061	4,984	6,314	7,953
Non-operating Income	349	577	446	889	631
Non-operating Expense	1,899	3,313	4,516	3,585	3,377
Income before Taxes	3,461	2,325	914	3,618	5,207
Corporate Taxes	1,260	1,056	693	1,515	2,522
Net Income	2,201	1,269	221	2,103	2,685

(Source) SLTL Annual Report

Table 14: Consolidated Balance Sheet

(Unit: million Rs)

Item	1998	1999	2000	2001	2002
Fixed Assets	48,630	59,891	70,284	66,401	61,505
Current Assets	11,138	11,162	12,213	13,772	15,963
Total Assets	59,768	71,053	82,497	80,173	77,468
Long-term Liabilities	28,258	37,540	34,621	31,072	25,914
Current Liabilities	9,743	10,928	12,134	12,144	12,767
Total Liabilities	38,001	48,468	46,755	43,216	38,681
Shareholders' Equity	21,767	22,585	35,742	36,957	38,787
Total Liabilities and Shareholders' Equity	59,768	71,053	82,497	80,173	77,468

(Source) SLTL Annual Report

3. Feedback

3.1. Lessons Learned

None

3.2. Recommendations

None

Comparison of Original and Actual Scope

Item	Plan	Actual
1) Output		
(1) Switching equipment		
a. Outside and long-distance switching units	3,200 lines	Cancelled (changed to local switching units)
b. Local switching units	37,960 lines	144,710 lines
	Total: 41,160 (6 switching stations)	Total: 144,710 lines (10 switching stations)
(2) Transmission equipment		
a. Digital microwave transmission routes	3 sections (3 hops)	3 sections (3 hops)
b. Fiber-optic transmission routes	27 sections	47 sections
c. 2Mbit/s PCM cable	1 section	Changed (New) fiber-optic cable transmission system: 15 sections
(3) Outside equipment (subscriber cables)		
a. Metallic cables	24,100 pairs	43,400 pairs
b. Subscriber fiber-optic system	23,790	54,020
c. Metallic cables (secondary)	59,300 pairs	159,440 pairs
(4) Station buildings		
a. Construction	14 stations	3 stations
b. Reconstruction	6 stations	6 stations
(5) Electric power equipment		
a. Commercial power supply receivers	19 stations	54 stations
b. Rectifiers	21 stations	69 stations
c. Batteries	22 stations	54 stations
		(New) Power generators: 5 units
(6) Consulting service	217.5 M/M	312 M/M
2) Project Period		
(1) L/A signing	Aug. 1993	Aug. 1993
(2) Procurement of materials and machinery	Apr. 1994 - Dec. 1994	Oct. 1996 - Aug. 1999
(3) Civil engineering works	Apr. 1994 - Jun. 1997	Apr. 1998 - Aug. 2001
(4) Installation and testing of machinery	Jan. 1995 - Dec. 1997	Sep. 1998 - Sep. 2001
(5) Consulting service	Jan. 1994 - Jul. 1997	May 1996 - Mar. 2001
3) Project Cost		
Foreign currency	8,826 million yen	7,971 million yen
Local currency	3,070 million yen (1,100 million Rs)	2,730 million yen (1,848 million Rs)
Total	11,896 million yen	10,701 million yen
ODA loan portion	10,112 million yen	9,530 million yen
Exchange rate	1 Rupee = 2.79 yen (February 1993)	1 Rupee = 1.477yen (2000)

Third Party Evaluator's Opinion on The Regional Telecommunications Development Project

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Relevance

At the time of Appraisal and Ex-post evaluation the project found to be relevant to both Government and beneficiary needs. The relevance of the Project at present is discussed under following sub-headings.

Beneficiary's Vision

To make Sri Lanka the telecommunications hub of South Asia. Sri Lanka is moving towards a fully liberalized telecommunications market environment. Sri Lanka Telecom is looking forward to using this opportunity to grow and to provide state-of-the-art services. Therefore, project is in line with the vision of the beneficiary.

Beneficiary Needs and Priorities

After privatization, SLT gave priority to adding new connections, upgrading its network, installing an efficient financial system, and creating a customer friendly work culture. The project has addressed the first two objectives of SLT. Thus, the project is highly relevant to the beneficiary needs and priorities.

Government Policy

The following two policy statements form the backbone of telecommunications policy adopted by the present government. It is within the scope of the Telecommunications Master Plan (1991-2005).

1. Monopoly agreements will be discouraged and network building institutions will be encouraged to have a separate Cable Port/ Landing Point in Sri Lanka to serve the entire island as Sri Lanka is located very close to Global Fibre Cable Network which runs across the Indian Ocean.
2. Suitable action will be taken to support the development of telecommunications technology at all regional centers, other urban centres, and in community based rural centres. Particular emphasis will be given to the establishment of Multipurpose Tele Centres at these locations.

The Government's policy of creating competition has resulted in major improvements in this sector. The project is in line with the Government policy of promoting telecommunication access in the regions and other urban centres (outside Colombo Metropolitan Region).

Government Priority

Even though developing telecommunications was a top priority at the time of Appraisal of the project, presently Government places a very high emphasis on development of Information Technology under the Communications sector. Nevertheless, this shift does not have a major impact on the relevance of the project.

Conclusions

An efficient and effective telecommunications network contributes to encourage investments and this stimulates economic growth.

It enhances productivity of scarces resources. The Government policy of developing the periphery is reflected in its Telecommunications Master Plan as well. Thus, the project objectives are consistent with the present Government policy. In addition, it is in line with the beneficiary requirement of adding new connections and upgrading its network to provide state-of-the-art services to its customers.

Sustainability

The project sustainability was found to be positive at the ex-post evaluation stage. The sustainability as at today is analyzed using the following criteria.

Institutional Aspects

Sri Lanka Telecom (SLT) was the country's first telecommunications company and it is the successor to the former government owned Telecommunications Department. It has a long history, tradition, a pool of technical know-how, institutional infrastructure such as training

facilities and the human resources. In addition, a strong organizational culture is found in the SLT due to its monopolistic history in the Sri Lankan telecommunications sector. It transformed itself from a lethargic state entity to a dynamic service provider within a short period of time. This was done by upgrading its communications infrastructure, strengthening its marketing skills and strategy, installing new financial systems and controls, and making best use of its human resources.

SLT has benefited immensely from its alliance with NTT. NTT has provided strategic advice, trained SLT employees and helped the Company develop its marketing infrastructure and strategy. NTT expertise has also facilitated the development of SLT's networks, service platforms, information technology and its operating and financial controls and systems. The above analysis shows that SLT has a very strong organizational capacity and culture.

Shareholders

In 1996 SLT was incorporated as a public limited liability company and in 1997 NTT Communications Corporation invested US\$ 225 million to take a 35% stake in SLT. In 2002 SLT went ahead with its Initial Public Offering (IPO) where the Government of Sri Lanka, the majority shareholder, divested a 12% stake in the company. Consequent to this IPO the Government now owns 49.5% Of SLT, NTT Communications Corporation owns 35.2%, and the public owns the balance 15.3%. SLT became the largest listed company in the Colombo Stock Exchange with this IPO. This shows the investor confidence in the SLT. SLT is in a very strong position having the Government, an international telecom company and the public as its shareholders.

The above analysis shows very clearly that institutional sustainability of SLT is extremely high.

Market and Services

SLT leads the telecommunications industry with 87% of the fixed line network. In 2002 SLT acquired Mobitel, one of the leading mobile operators in the country, in which it previously had a 40% stake.

SLT provides a range of services to domestic and corporate subscribers including domestic and international voice, internet services, data services, domestic and international leased circuits, frame relay services, ISDN, ADSL, satellite up-link services and maritime transmission.

With the diverse spectrum of services covering almost all aspects of communications, the competitors cannot easily challenge SLT's position in the market. Therefore, the probability of sustaining the existing markets by SLT is extremely high.

Operation and Maintenance Capacity

The service quality of SLT improved remarkably after privatization. Improvements in faults clearance, the call completion ratio etc., are proof of the service quality of the organization. Thus, it can be expected that the operation and maintenance of project facilities would be carried out by SLT with due diligence.

Financial Stability

For the year ended 31st December 2003 SLT had revenue of LKR 24,477 million and generated a net profit of LKR 2,383 million. The revenue and net profit of year 2002 was LKR 25,383 million, and LKR 2,685 million respectively. The comparison shows a declining financial performance by SLT over the years. However, there is no real threat to the financial sustainability of the executing agency.

Conclusions

The sustainability of the project benefits continues unabated. It was found that SLT has the capacity and financial stability to sustain the project benefits for a long time to come.