

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF INDUSTRIES, SCIENCE AND TECHNOLOGY
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

STUDY ON INDUSTRIAL SECTOR DEVELOPMENT

FINAL REPORT

VOLUME IV

DEVELOPMENT PLAN OF INDUSTRIAL ESTATES

March 1993

NIPPON KOEI CO., LTD.

UNICO INTERNATIONAL CORP.

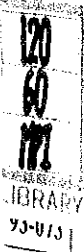
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Final Report

Volume I	Summary
Volume II	Export and Investment Promotion
Volume III	Metalworking Industry
Volume IV	Development Plan of Industrial Estates

VOLUME IV DEVELOPMENT PLAN OF INDUSTRIAL ESTATES

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ABBREVIATIONS

ADB	: Asia Development Bank
BEPZ	: Biyagama Export Processing Zone
BOD	: Biochemical Oxygen Demand
BOI	: Board of Investment (formerly GCEC)
CEA	: Central Environment Authority
CEB	: Ceylon Electricity Board
CISIR	: Ceylon Institute of Scientific and Industrial Research
CITC	: Clothing Industry Training Institute
DFCC	: Development Finance Corporation of Ceylon
EDB	: Sri Lanka Export Development Board
EIRR	: Economic Internal Rate of Return
EPZ	: Export Processing Zone
FIRR	: Financial Internal Rate of Return
GCEC	: Greater Colombo Economic Commission
GDP	: Gross Domestic Product
GIEs	: General Industrial Estates
IDB	: Industrial Development Board
JETRO	: Japan External Trade Organization
JICA	: Japan International Cooperation Agency
KEPZ	: Katunayake Export Processing Zone
Koggala EPZ	: Koggala Export Processing Zone
MIST	: Ministry of Industries, Science and Technology
NDB	: National Development Bank
NGO	: Non Government Organization
NIEs	: Newly Industrialized Economies
OCC	: Opportunity Cost of Capital
SAARC	: South Asian Association for Regional Cooperation
S.S.	: Suspended Solid
SLSI	: Sri Lanka Standard Institution
SLT	: Sri Lanka Telecom
UDA	: Urban Development Authority
UNIDO	: United Nations Industrial Development Organization
WID	: Women In Development

1. BACKGROUND OF INDUSTRIAL DEVELOPMENT

1.1 Basic Policy for Industrial Development

Import substitution policy had long been applied in industrial development in Sri Lanka, and foreign investment had been restricted by this policy in order to foster domestic industries. Although this development policy was changed in 1977, Sri Lanka had not succeeded yet in modernizing industrial development. It was in 1989 that a new foreign investment law was enacted and the government started privatization of public enterprises.

The Ministry of Industries, Science and Technology (MIST) of Sri Lanka, which was in charge of formulating industrial development policies of the country, worked out "A Strategy for Industrialization in Sri Lanka" in 1989. These strategies for industrialization include:

- To adopt prudent macro-economic policies in order to stabilize the economy;
- To grant special incentives for investment and exports;
- To promote greater savings, both domestic and foreign;
- To encourage foreign investment with a view to increase capital inflows, acquire technology, and achieve market access;
- To promote privatization of public enterprises;
- To promote export-oriented industries;
- To establish a linkage between large investors/industries and small producers;
- To promote more research and training of human resources;
- To remove administrative barriers by eliminating the need for entrepreneurs to seek administrative clearances such as import licenses and permits.

Based on the above strategies, the following two measures are envisaged for accelerated industrial development:

- To promote export-oriented industries by attracting foreign investment
- To attain higher productivity by privatizing public enterprises

1.2 Industrial Production and Employment

1) Gross Domestic Product (GDP)

According to the latest publications by the Central Bank of Sri Lanka, the manufacturing sector accounted for 17.7% of total GDP in 1991. If compared with 14.4% in 1982 and 16.2% in 1987, the sectoral contribution has been steadily increasing. The sectoral GDP increased at an average annual rate of 6.6% in 1982-87 and 6.3% in 1987-91 (Refer to Table 1-1). However, if compared with the average industrial sector's contribution to the national economy for ASEAN countries (about 25%), the contribution of the manufacturing sector is still low in Sri Lanka (Refer to Table 1-2).

Gross output of industrial production reached Rs100,225 million in 1991, of which about 61% was produced in the food and beverage sub-sector (31) and textile, apparel, and leather sub-sector (32). The fabricated metal products, machinery, and transport equipment sub-sector (38) accounted for 5.1% of total of industrial production (Refer to Table 1-3).

2) Value Added

According to the Annual Survey of Industries by the Department of Census and Statistics, value added in the manufacturing sector amounted to about Rs29,000 million in 1990. The value added in sub-sector 31 (food and beverage) accounted for 51% of total value added, while sub-sector 32 (textile and apparel) contributed 23% of total value added (Refer to Table 1-4).

3) Industrial Structure

The industrial structure in Sri Lanka has not been well developed and largely depends on the local material type industries (such as food and beverage) and the textile and apparel industries (Refer to Figure 1-1). Basic material type industries (such as non-metallic mineral products and basic metal products) have not been developed, due mainly to the relatively small domestic market. High processing type industries (such as fabricated metal products, machinery and equipment) have also been lagging.

4) Export of Manufactured Goods

Exports of the manufacturing sector increased from Rs22,700 million in 1988 to Rs50,700 million in 1991. Export of textiles and apparel (32) was quite substantial, accounting for nearly 66% of the total export value in the industrial sector (Refer to Table 1-5). According to the National Export Development Plan 1990-94 prepared by Sri Lanka

Export Development Board (EDB), the export of textiles and apparel is expected to further increase, with a contribution to growth estimated at 24.5%. Other industries that are expected to contribute to the projected export growth significantly are gems and jewellery (25%), rubber-based products (4.6%), and tea products (4.6%) (Refer to Table 1-6 and Figure 1-2).

5) Employment

Employment in the manufacturing sector reached approximately 244,000 or 14.1% of total employment in 1990, according to the Labour Force survey by the Department of Census and Statistics. Sub-sectors 31 and 32 represented about 68% of the total sectoral employment (Refer to Table 1-7).

2. PREVIOUS INVESTMENT IN INDUSTRIAL ESTATES

2.1 Trend of Foreign Investment

The number of enterprises approved by the Board of Investment (BOI) for foreign investment was 40~50 a year in 1978-1980, 10~20 in 1981-1986 and 24~37 in 1987-1991. The total number of foreign investors approved by BOI reached 374 in August 1991.

The number of enterprises contracted with BOI accounted for about 60% of the approved enterprises. The total number of enterprises contracted with BOI was 219 in August 1991.

2.2 BOI Export Processing Zones

Three (3) Export Processing Zones (EPZs) of BOI have been developed with a view to promote foreign investments and exports. The EPZs are as follows:

- Katunayake Export Processing Zone (KEPZ)
- Biyagama Export Processing Zone (BEPZ)
- Koggala Export Processing Zone (Koggala EPZ)

1) KEPZ

KEPZ is located adjacent to Colombo International Airport, approximately 26 km north of Colombo. KEPZ has a total development area of 192 ha (factory lot area of 105 ha) and 72 enterprises were in operation as of July 1992. KEPZ was developed in three stages. All the industrial lots in the first and second stages have been rented out, and only a few industrial lots in the third stage have remained vacant. Approximately 49,000 workers were employed by KEPZ factories in 1991. The industrial categories of the KEPZ enterprises are: (Refer to Table 2-1, Table 2-2, and Table 2-3).

Apparel industry:	45
Gems and jewellery industry:	7
Electric products industry:	4
Others:	16

2) BEPZ

BEPZ, located approximately 24 km east of Colombo, is the second EPZ in Sri Lanka. BEPZ has a gross area of 150 ha and a factory lot area of 72 ha. About 30 enterprises

were in operation as of July 1992. Apparel industry enterprises (14) are predominant (Refer to Table 2-1, Table 2-2, and Table 2-3).

3) Koggala EPZ

Koggala EPZ, which is located approximately 130 km south of Colombo, is the third EPZ with a total planned area of 92 ha (planned factory lot area of 47 ha). By July 1992, 9 enterprises were in operation, of which 8 were in the apparel industry (Refer to Table 2-1, Table 2-2, and Table 2-3).

2.3 IDB General Industrial Estates

General Industrial Estates (GIEs) have been developed by Industrial Development Board (IDB) in six (6) districts to promote medium and small scaled industries and the (Refer to figure 2-1). Local enterprises are predominant and the development areas are smaller (8-26 ha for each industrial estate). GIEs are outlined below:

No.	Name	Outline			No. of Rental Factory Units	No of Factory Lot Plots	Total No. of Factories
		District	Commencement	Extent (ha)			
1.	EKALA	Gampaha	1962	25	44	23	67
2.	PALLEKELLE	Kandy	1969	21	38	-	38
3.	ATCHUVELY	Jaffna	1969	26	37	26	63
4.	HORANA	Kalutara	1978	11	-	69	69
5.	PANNALA	Kurunegala	1979	8	-	32	32
6.	LUNUWILA	Puttalam	1981	11	-	97	97

2.4 Industrial Estates by Private Initiative

In 1992, Lanka Industrial Estates Ltd. (LINDE) was established by the Development Finance Corporation of Ceylon (DFCC, with about 51% participation) and the Ministry of Industries, Science and Technology (MIST, with about 49% participation). LINDE acquired land from the former fertilizer plant at Sapugaskanda (about 50 ha), and started layout and preparatory works for the industrial estate development (net area of 31 ha).

3. ROLE OF NEW INDUSTRIAL ESTATES

3.1 Prospective Role of New Industrial Estates

New industrial estates will play various roles quite different from the existing Export Processing Zones (EPZs) developed by BOI. The prospective roles are discussed and summarized below.

- 1) EPZs developed by BOI offer land equipped with infrastructure in industrial locations. The available land with adequate infrastructure are rather limited in Sri Lanka, and, thus, industries should be collectively located in the industrial estates to be developed. New industrial estates, which are designed to have complete utilities and facilities and which will provide high grade industrial lands for foreign and domestic industrial investors, are to be collectively located. Further, international standard facilities and reasonable land prices would make the new industrial estate competitive with industrial estates in neighboring countries.
- 2) New industrial estates will encourage local investors, as well as foreign investors, to accelerate industrial development in Sri Lanka. Contrary to EPZs, new industrial estates are active in encouraging local investors. Well-equipped industrial estates and reasonably priced factory land and buildings, will encourage Sri Lankan enterprises to expand and modernize industrial activities and eventually increase production.
- 3) New industrial estates will decentralize industries from the Colombo area where over population, wage escalation, environmental deterioration, etc. are observed. New industrial estates are expected to work as a device for decentralization, and a boost for economic and social development of the area surrounding Colombo.
- 4) New industrial estates will encourage new types of industries, such as non-labor intensive but high value added type. Restructuring and balanced growth of industries in Sri Lanka could be expected as a result of the introduction of new types of industries in the new industrial estates.

3.2 New Industrial Estates and EPZ

By comparing the functions of the new industrial estates and EPZs developed by BOI their roles can be clarified further. The new industrial estates and EPZ are similar in terms of

the scale of the site and utilities and facilities to be equipped. They have, however, different objectives for development, target industries, prospective investors, etc. The functions and role of the new industrial estates and EPZs are summarized below.

	New Industrial Estates	Export Processing Zones
1 Objective of development	<ul style="list-style-type: none"> - Fostering of export oriented industry - Fostering and reinforcing Sri Lankan industry and structure 	<ul style="list-style-type: none"> - Improvement of unemployment condition
2 Target industry	<ul style="list-style-type: none"> - High value added type - Local material oriented industries (Strong linkage with domestic industry) - Relocation, decentralization and renewal of existing industries 	<ul style="list-style-type: none"> - Labor intensive industries - Export processing industries
3 Prospective investors	<ul style="list-style-type: none"> - Foreign investors as well as domestic investors 	<ul style="list-style-type: none"> - Foreign investors
4 Scale of extent	<ul style="list-style-type: none"> - 50 ~ 200 ha 	<ul style="list-style-type: none"> - 50 ~ 200 ha
5 Others /1	<ul style="list-style-type: none"> - Factory could be designated as a bonded building independently 	<ul style="list-style-type: none"> - All sites are designated as bonded area

Remark: /1 Since factories built in New Industrial Estates can be designated as being in the bonded area according to BOI regulation, it is therefore, possible for many factories to receive privileges of the bonded area.

3.3 Potential Industrial Zones

Landuse zoning around the Greater Colombo Area has not been prepared yet by the authorities concerned. However, it is conceivable that industrial zones would be developed, in the future, along the major highway routes to be extended around the Greater Colombo Area. New industrial estates could be developed in such potential industrial zones.

For instance, with the development of the Colombo-Katunayake highway, industrial zones could be developed around the Ekala interchange and around the Katunayake airport. In the event that this highway is extended to the north, towards Chilaw, some industrial areas could be developed in a larger scale along the highway.

With the development of the outer circular road around Colombo, industrial estates would also be located on the outer side of the circular road (Refer to Figure 3-1).

Another consideration when locating industrial estates is to find urban centres that could be integrated into the major transportation networks. Industrial estate development, in such a case, would be promoted in a small to medium scale in line with the regional development around such urban centres.

4. PRESENT CONDITION OF ALTERNATIVE ESTATE SITES

For the development of new industrial estates, it has been agreed by MIST and JICA that the following three (3) alternative estate sites should be studied:

- a) Atherfield estate, near Avissawella
- b) Martin estate, near Chilaw
- c) Sirigampola estate, north of Negombo

In addition to the above three (3) sites, the following two (2) alternative estate sites have been additionally studied by JICA Study Team:

- d) Ekala estate, midway of Colombo-Katunayake highway
- e) Katana estate, east of Negombo

Physical conditions in and around these sites, as well as social and economic characteristics around the sites, are summarized below.

4.1 Atherfield Estate

Location:

The estate is located near the town of Avissawella (Colombo District), approximately 57 km east of Colombo as shown in Figure 4-1.

Access:

The road A4 is the principal access to Avissawella. The road, however, is narrow and congested in urban areas and it takes 1.5 to 2 hours to reach the site from Colombo. The alignment and width of the road A4 is being improved under the financial cooperation by the Asian Development Bank (ADB) (1991-94). A railroad with narrow gauge connects Colombo station and Avissawella station.

Area and Land Tenure:

The site has a gross area of about 168 ha, and it is owned by the State. Land acquisition is not a problem at Atherfield.

Topography:

The land is very undulated, with a difference in elevation of over 80 m, ranging from EL. 20 m to EL. 100 m.

Land Use:

The land is currently being used as a rubber plantation (approx. 124 ha) and tea plantation (11 ha). About 20 houses exist in the area. Total value of the existing agricultural land and houses is estimated to be Rs 56.7 million.

Population in Nearest Town:

Avissawella has a population of about 20,870, of which about 8,800 are economically active. About 77 % of the town's households (4,170) are Sinhalese and 22 % are Indian Tamils.

Socio-cultural Facilities:

There are four junior high schools and two senior high schools in the town. There is also a hospital adjacent to the proposed estate site. In and around the town, there exists 19 temples and churches.

Water Supply:

Water will be made available from the Kelani river running along the northern corner of the estate. The minimum discharge in the past 10 years was about 13 m³/s (1.3 million m³/day) near the estate. According to the water sampling and analysis conducted in the course of this study, water quality at a possible intake site was found to be satisfactory for industrial use by means of water treatment.

Sewerage:

Sewage treatment facilities are required as the Kelani river is used for water supply at Ambatale, located downstream from the estate site. A sewage treatment plant with a high grade treatment method will be required.

Power Supply:

A 132 kV transmission line is in operation. CEB has planned to construct a new substation (132 kV/33 kV, 30 MVA) at Kosgama 9 km from Avisawella by 1994. The new substation is designed to have enough capacity so that the proposed industrial estate can be fed by a 33 kV sub-transmission line, to be constructed from the new substation.

Telecommunications:

At Avissawella, a secondary exchange station is connected with the Colombo exchange station by a 2 GHz microwave transmission system. The telephone

limited to 393 as of the end June 1992 and 187 customers were registered as waiting. Atherfield site will be connected with this secondary exchange station.

4.2 Martin Estate

Location:

The estate is located to the north of Chilaw (Puttalam District), approximately 80 km north of Colombo as shown in Figure 4-1.

Access:

The road A3 is the principal access to Chilaw and the estate site. The existing road is narrow and congested in many parts, and it takes 2 to 2.5 hours to reach the site from Colombo. The travel time will be shortened after the Colombo-Katunayake highway is completed (scheduled for 1998).

Area and Land Tenure:

The site has a gross area of about 165 ha. As the land is owned by the State, land acquisition is not a problem.

Topography:

A major part of the land is located on the right bank of the Deduru Oya river. The land is generally flat though a topographic map is unavailable. It is, however, noted that the land is subject to periodic floods, and measures should be taken for flood protection at the proposed site.

Land Use:

The land is used mainly for coconut plantation (about 136 ha) and for paddy field (2.1 ha). About 35 houses and properties exist in the area.

Population in Nearest Town:

Chilaw has a population of about 24,200 persons, of which about 14,200 are economically active. About 84 % of the town's households (5,620) are Sinhalese and 8 % are Sri Lanka Tamils.

Socio-cultural Facilities:

There are five junior high schools and two senior high schools in and around Chilaw. There is also a hospital (409 beds) and five clinics in the town.

Water Supply:

Water is available from the nearby Deduru Oya river, and the discharge is found to be sufficient. However, the river is affected by sea water intrusion near the estate site. According to water quality analysis of samples taken at the end of March 1992 (dry season), chlorides and conductivity were excessively high. The water intake site should be located at a site about 5 km upstream from the estate.

Sewerage:

Natural purification of sewerage in the river is not feasible due to the close proximity to the Deduru Oya estuary. The fishing industry near Chilaw is also active. Martin estate should, therefore, be equipped with a high grade sewerage treatment system.

Power Supply:

Two 33 kV lines are running along the estate. However, the available capacity of these lines is insufficient, and a new 33 kV sub-transmission line should be installed (about 20 km in length from the New Chilaw substation or 45 km in length from Puttalam substation).

Telecommunications:

There is a secondary exchange station in Chilaw connected with Colombo by a 400 MHz UHF radio transmission system with a capacity of 1,750 lines. Presently, there are 1,300 lines connected and about 830 customers are registered as waiting. It is noted, however, that an augmentation project is under study, and it is scheduled for completion in 1994. If the project is realized as scheduled, the new exchange station will have sufficient capacity for the industrial estate.

4.3 Sirigampola Estate

Location:

The estate is located about 24 km north of Negombo, or approximately 60 km north of Colombo as shown in Figure 4-1.

Access:

The road A3 is the principal access to the estate. From road A3, the site is about 2.2 km to the east and a new access road is required in view of the condition of the existing access road of nearly 6 km in length. It takes about 1.5 to 1.75 hours from Colombo. The travel time will be shortened after the Colombo-Katunayake highway is completed.

Colombo. The travel time will be shortened after the Colombo-Katunayake highway is completed.

Area and Land Tenure:

The site has a gross area of about 245 ha. The land is totally owned by a farmers' trust, and it has been informed that acquisition of this land will be difficult.

Topography:

The land is generally flat with some depressions, though a topographic map is unavailable.

Land Use:

The land is currently used for coconut plantation (185 ha), forest (45 ha), and paddy field (5 ha).

Population in Nearest Town:

Negombo, located about 24 km from the site, is the major town nearest to Sirigampola. Negombo has a population of about 139,000. About 73 % of total households (27,340) are Sinhalese, 16.5 % are Moor, and 9 % are Sri Lanka Tamils.

Socio-cultural Facilities:

There are 27 junior high schools and six senior high schools, as well as three vocational training centres in Negombo. There is also a hospital (452 beds) and three dispensaries in the town.

Water Supply:

The Maha Oya river will be the main water source for Sirigampola, as groundwater availability is limited (it is reported to be about 900 m³/day). Discharge of the Maha Oya river has not been verified, though water quantity is sufficient for water supply to the Sirigampola industrial estate. It is necessary to install a conduit pipe of 15 km in length to supply the Maha Oya water to Sirigampola.

Sewerage:

Agricultural plantations and paddy fields are scattered around the proposed estate, and only a creek is running along the estate. Sewage discharged from the industrial estate should, therefore, be disposed by an appropriate sewage treatment plant at the estate.

Power Supply:

CEB has planned to construct a new 33 kV sub-transmission line from the Bolawatta substation to Chilaw to reinforce the power supply in Chilaw. This sub-transmission line will cross the proposed site. Power supply to the Sirigampola site could be fed from this sub-transmission line.

Telecommunications:

The secondary exchange station at Negombo, connected with Colombo by 2 GHz microwave transmission system, will be a source of telecommunications. The exchanger in Negombo has a capacity of 5,782 lines, and presently 3,657 lines are in use. It is reported that there are about 3,000 waiting customers and, thus, there will be a shortage of connections to the industrial estate in the future. The capacity of Negombo exchange station should, therefore, be expanded for the implementation of the Sirigampola industrial estate.

4.4 Ekala Estate

Location:

The estate is located to the east of the proposed Colombo-Katunayake highway (near the Ekala interchange), or approximately 15 km north of Colombo as shown in Figure 4-1.

Access:

Colombo-Katunayake highway, scheduled to be completed by 1998, will be the principal access to the estate site. The Ekala interchange is designed to give direct access to the estate. Consequently, the travel time will be about 10 minutes from the estate to Colombo via the highway.

Area and Land Tenure:

The site has a gross area of about 182 ha. A major part of the land is owned by the private sector, though a limited area is owned by the state.

Topography:

Land is generally flat and currently used for paddy field. Marshyland extends to the west of the proposed site, functioning as a retention pond. Land filling is necessary in order to develop the Ekala industrial estate. Due attention should be paid to flood retarding when designing an artificial retention pond, or river improvement plan.

Water Supply:

The Dandugam Oya river, in the north corner of the estate, is available. The quantity and quality of available water, however, should be further investigated.

Sewerage:

In view of the existence of a densely populated area to the west of the estate, a sewage treatment system with a high grade treatment process should be constructed in the Ekala industrial estate.

Power Supply:

Power for the proposed site will be supplied from the Kotugoda 132 kV grid substation, located 1.5 km from the site.

Telecommunications:

Gampaha exchange station will be utilised for the proposed site.

4.5 Katana Estate

Location:

The estate is located about 4 km east of Negombo, or about 4 km north of Katunayake airport, as shown in Figure 4-1.

Access:

The site is accessible either via Negombo (about 30 km from Colombo) or via the road near the northeastern end of the airport runway. In the event that the Colombo-Katunayake highway is constructed (scheduled for 1998), the site will have good access to the airport and Colombo port.

Area and Land Tenure:

The site has a gross area of about 59 ha. The land is state owned (formerly, JEDB land of 30 ha in the Kaludiyawala area and 29 ha in the Lambrock area), and land acquisition is not a problem.

Topography:

The land is generally flat with some depressions along the stream, called Kimbulapitiya Oya. Paddy fields exist in the depressions, and some land filling will be required.

Land Use:

The land is currently used for coconut plantation and forest (about 44 ha) and paddy field (about 15 ha). About 10 houses and properties exist in the area.

Population in Nearest Town:

Negombo, located about 4 km from the site, is the major town nearest to Katana. Negombo has a population of about 139,000. About 73 % of total households are Sinhalese, 16.5 % are Moor, and 9 % are Sri Lanka Tamils.

Socio-cultural Facilities:

In Negombo, there are 6 senior high schools and 27 junior high schools, as well as 3 vocational training centres. There is also a hospital and 3 dispensaries in the town.

Water Supply:

Water in the Negombo area is supplied from the Kodunnawa intake located on the Maha Oya river. Kodunnawa is about 8 km north of the Katana estate. A relatively small volume of water is also available from Kimbulapitiya Oya running through the estate, as well as from groundwater aquifers.

Sewerage:

Water is drained to Kimbulapitiya Oya which runs along the southeast corner of the estate. In the downstream, it runs thorough marshy land and populated areas. A sewage treatment system should be constructed when developing the industrial estate.

Power Supply:

Electric power is supplied from a grid substation (10 MVA) in Negombo (about 4 km from the estate), as well as from the Bolawatta grid substation (30 MVA) and Kotugoda 132 kV grid substation near Ekala.

Telecommunications:

The estate site could be connected to either the Negombo switching station or Katunayake switching station of Sri Lanka Telecom.

5. INVESTMENT DEMAND

5.1 Methodology of Investment Demand Survey

1) Objectives

The demand of potential investors has been surveyed and evaluated for the three (3) alternative estate sites originally contemplated by MIST and JICA, i.e. Atherfield site, Martin site, and Sirigampola site. The main objectives of the investment demand survey are summarized as follows:

- (1) To study and evaluate the degree of interest of potential investors in Sri Lanka and overseas with regard to the proposed export-oriented industrial estates,
- (2) To assess the prerequisites of the investors which should be met before locating their facilities in the estates,
- (3) To assess the industrial categories of the interested firms and their scale of investment, and
- (4) To assess the relative preferences of the investors for the alternative estates sites.

2) Potential Investors to be Surveyed

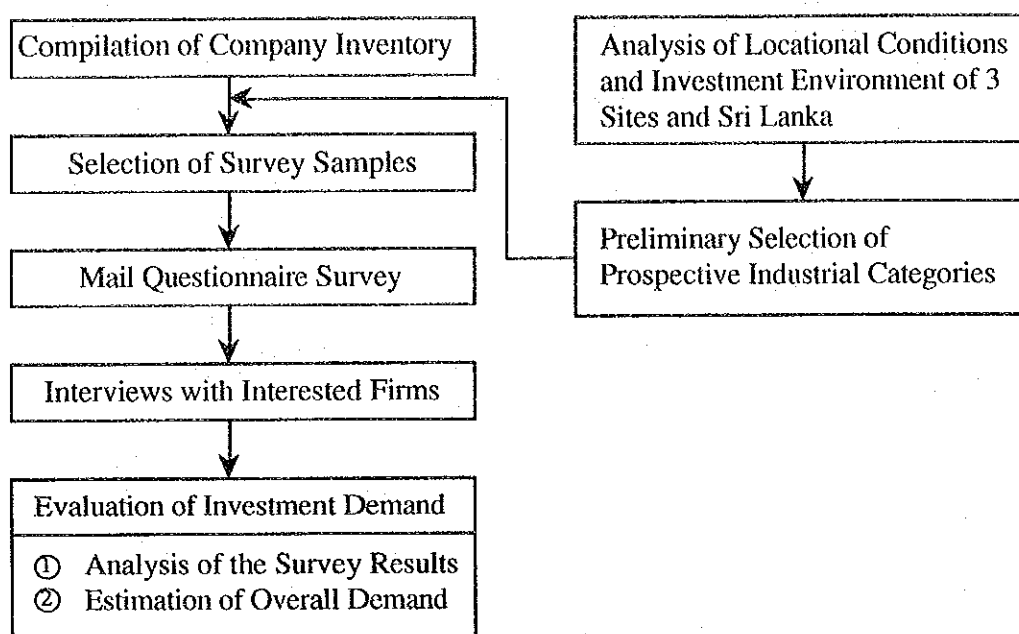
The investment demand survey has been carried out on the following potential investors/enterprises:

- (1) Sri Lanka enterprises
- (2) Japanese enterprises
- (3) Foreign enterprises other than Japanese

3) Methodology

- (1) Work flow and methodology of survey:

The work flow of the investment demand survey and its evaluation is illustrated below.



In regard to the survey in Sri Lanka, direct interviews were conducted, instead of mail questionnaire surveys, after considering the low response to the mail questionnaires among the Sri Lankan enterprises.

In regard to the survey in Japan, mail questionnaires were sent to selected firms, and interviews were conducted with enterprises who responded positively.

(2) Preliminary selection of prospective industrial categories:

Prospective industrial categories were preliminarily selected for the purpose of the investment demand survey. Categories were adopted on the basis of the "International Standard Industrial Classification of All Economic Activities (2 digits / 3 digits)."

Selection was made, by giving priority to the following types of industries:

- a) Labor-intensive type
- b) Export-oriented type
- c) Local resources utilisation type
- d) Low pollution type
- e) Low water use type
- f) Low energy use type

Preliminarily selected categories of industries are shown in Table 5-1.

5.2 Investment Demand of Sri Lanka Enterprises

1) Selection of Samples

As the overall JICA study comprises the following 3 sub-sectors, the investment demand survey in Sri Lanka was conducted in these sub-sectors:

- a) Export and Investment Promotion Sub-sector
- b) Metalworking Industry Sub-sector
- c) Industrial Estate Sub-sector

Export and Investment Promotion Sub-sector

In this sub-sector, the following 3 categories have been selected for in-depth study:

- a) Garment/apparel
- b) Gems/jewellery
- c) Rubber-based products

Samples for the investment demand survey have been selected from the following company lists through discussions with MIST and the Export Development Board (EDB):

- a) List of export-oriented enterprises prepared by EDB
- b) Companies currently located in EPZs

Metalworking Industry Sub-sector

Samples have been selected from the company inventory of MIST taking into account the following criteria:

- a) To select firms located in the Colombo area, considering the concentration of the metalworking industry in this area,
- b) To select a foundry industry, considering its importance as a basic industry and its close link with other industries, machinery in particular,
- c) To include state enterprises and BOI approved enterprises, as well as private enterprises, considering the current composition of the enterprises in the foundry industry.

Industrial Estate Sub-sector

In this sub-sector, samples have been selected from the preliminarily selected categories other than those selected in the other 2 sub-sectors, by referring to the following lists:

- a) BOI approved company list
- b) Inventories of industries registered at MIST and EDB

Total number of the samples selected in the 3 sub-sectors is summarized below.

Sector/Category	Number of Samples
Export/Investment Promotion	
Garment/apparel	99
Gem/jewellery	57
Rubber-based products	49
(Sub Total)	(205)
Metalworking	70
Industrial Estate	287
Total	562

2) Results of Investment Demand Survey

Out of the 562 interviewed firms, 66 firms (11.7 %) showed an interest in locating their factories in the proposed industrial estates.

The number of interested firms by type/category of industry is summarized below.

Type/Category	Number of Samples (1)	Number Interested (2)	Ratio (%) (2)+(1)
Garment/apparel	99	16	16.2
Gem/jewellery	57	2	3.5
Rubber-based products	49	13	26.5
Metalworking products	70	8	11.4
Other prospective categories	287	27	9.4
Total	562	66	11.7

The number of interested firms by alternative sites and by industrial categories is shown below:

Type/Category	Atherfield	Martin	Sirigampola	Total
Garment/Apparel	12	4	2	18 (16)
Gem/jewellery	2	0	0	2 (2)
Rubber products	11	3	0	14 (13)
Metal working products	5	4	2	11 (8)
Other prospective categories	15	12	1	28 (27)
Total	45	23	5	73 (66)

N.B. Plural answers. Figures in parentheses signify the net number of firms.

As seen above, the interview survey revealed that the highest degree of interest was at Atherfield. Atherfield site is supported by potential investors in the garment, gem, and rubber-based products industries.

The reasons for the preference in location among the 66 interested firms are given in Table 5-2. For instance, Atherfield site has been preferred for the following reasons:

- a) Cheap labor force in the region
- b) Availability of local resources
- c) Relative closeness to Colombo port

3) Evaluation of Investment Demand of Sri Lanka Enterprises

On the basis of the sampling ratios in each category of industry, an overall demand of Sri Lanka enterprises for the industrial estates has been estimated and summarized below.

Type	Sampling Ratio	Atherfield	Martin	Sirigampola	Total
Garment/apparel	0.22	55	18	9	82
Gem/jewellery	0.23	9	0	0	9
Rubber-based products	0.45	24	7	0	31
Metalworking products	0.70	7	6	3	16
Other prospective categories	0.13	115	100	15	230
Total	0.22	210	131	27	368

N.B. Assuming multiple answers.

As seen above, Atherfield and Martin sites have an adequate number of potential investors, if compared with the estimated number of factory lots, i.e., about 60. In the case of

Sirigampola site, however, the investment demand seems to be below the supply of the factory lots.

All the industry types show strong orientation towards exports (about 60~100 %), as seen in Table 5-3. Particularly in the garment/apparel industry and gem/jewellery industry, all the interested firms consider that their major market is overseas. In general, North America (USA and Canada), Japan and Europe are considered to be the major markets. In the metalworking industry and other categories (machinery, chemicals, plastics, sport and musical instruments), Asia and Middle East markets are also considered important.

A majority of the interested firms are willing to form joint ventures with foreign partners, as seen in Table 5-4. This tendency is stronger in the case of gem/jewellery industries, garment/apparel industries and some other categories of industries. As foreign partners, Japanese enterprises have been preferred in most respective categories of industries.

5.3 Investment Demand of Japanese Enterprises

1) Selection of Samples

In order to assess the degree of interest of the Japanese investors in the export-oriented industrial estates to be constructed in Sri Lanka, a mail questionnaire survey was been carried out. Two thousands (2,000) firms were selected from the following inventories:

- (1) Potential Investors Overseas, JETRO, 1992
- (2) List of firms who attended the Investment Seminar in Japan held by the Sri Lankan Embassy in 1991
- (3) Toyo Keizai, List of Japanese Firms with Direct Investment Experiences Overseas, 1992
- (4) Company Data Base as of 1992, Shoko Research Centre

Subsequent to the mail questionnaire survey, an interview survey was conducted to confirm the degree of interest and the requirements of the enterprises who made positive responses to the mail questionnaire survey.

2) Results of Investment Demand Survey

The results of the investment demand survey in Japan are shown in Table 5-5. Out of 2,000 enterprises, 282 firms replied, of which 279 were effective, with a response rate of 14 %. Out of 279 enterprises, none marked to be "Ready to start investment", while 33 firms

or 1.65 % of the total sample. Among the industrial categories, pottery, plastics, rubber-based products, and leather products showed relatively strong interest.

For the above 33 enterprises, an interview survey was conducted to confirm the degree of interest in investing in the planned industrial estates. Results of interview survey are summarized below.

Degree of Interest	Definition	Number of Firms
A	- Likely to invest	1
B	- Depending on the recovery of the economy of Japan	7
C	- Subject to detailed study - After investing in higher priority countries - Possible to invest in the long run	25
	Total	33

The "A" firm contemplates producing educational toys in the industrial estates.

All of the 33 firms expect to export their products to Japan or to the third countries. Out of these enterprises, 26 firms (about 79 %) contemplated investing their own capital, of which about a half expect to team up with Sri Lanka investors.

3) Evaluation of Investment Demand of Japanese Enterprises

On the basis of the ratios of samples to the total number of enterprises listed in the original inventory, the overall investment demand in Japan has been preliminarily estimated as tabulated below.

Category	Estimated Number of Interested Firms
Food	43
Apparel/textile	75
Leather products	1
Chemical	2
Other chemical	3
Rubber products	2
Plastic products	2
Pottery/ceramics	64
Iron and steel	1
Machinery	4
Electrical machinery	30
Transport machinery	1
Other manufacturing	26
Others	2
Total	256

As seen in the above table, the interested firms are estimated to reach around 250 in total. Taking into account the number of "A" ranked firms (accounting for only 3 to 4 % of the total interested), however, the interest of the Japanese enterprises in investing in industrial estates in Sri Lanka is not judged to be substantially high. However, it is noted that the period when the questionnaire survey was conducted corresponded to a time when the Japanese economy was experiencing a recession and private investment reduced sharply. The investment demand of the Japanese enterprises, therefore, can be expected to recover with a recovery of the Japanese economy after several years when the industrial estate will start operation.

5.4 Investment Demand of Other Foreign Investors

1) Basis of Investment Demand

The investment demands of other foreign enterprises have been estimated on the basis of the following:

- (1) Past records of the BOI approved direct investments made by foreign enterprises other than Japanese enterprises, and their ratios compared with those of the Japanese enterprises.

- (2) Investment demand of the Japanese enterprises estimated through questionnaire survey.

2) BOI Approved Foreign Investors

The number of BOI approved direct foreign investments other than the Japanese is shown in Table 5-6 by category and by source of capital.

As seen in Table 5-6, investments from NIEs and European countries are predominant. 67 projects (36.8 % of the total) are from NIEs and 58 projects (31.9 %) are from European countries as of July 1992. Japanese investments totalled 17 (9.3 %) and other foreign investments 24 (13.2 %), while non-foreign investments (100 % Sri Lanka capital) totalled 16 (8.8 %). Category-wise, apparel was dominant among foreign investments with 64 projects (38.6 %), being followed by gem/jewellery with 13 projects.

3) Estimated Investment Demand

The investment demand of foreign enterprises other than the Japanese has been estimated and summarized below.

ISIC	Category	NIEs	Europe/USA	Total
3220	Apparel	6	5	11
3560	Plastic	3	2	5
381	Fabricated Metal	1	1	2
383	Machinery	3	9	12
390	Other Manufacturing (toy, etc.)	24	24	48
Total		37	41	78

5.5 Potential Investment Demand

It is evaluated that the investment demand in Sri Lanka is sufficiently high in promoting the development of industrial estates. Investment demand by the Japanese enterprises has been evaluated to be relatively low, due partly to the recent recession in Japan. It is presumed, however, that the investment demand in Japan would be enhanced after the recession is over in the near future. Investments from NIEs countries and USA/Europe are expected at a higher rate than investments from Japan. The potential demand for investment is evaluated to be sufficient in regard to the development of small to medium scale industrial estates in Sri Lanka.

6. BASIC PLAN OF NEW INDUSTRIAL ESTATES

6.1 Selection of Industrial Category

The five alternative new industrial estate sites selected have been respectively characterized in terms of transportation conditions, water resource conditions, labor force availability, environmental conditions, and so on. Consequently, in accordance with the characteristics at each site, suitable industries should be intentionally located in order to preserve the environment and to extract the maximum effectiveness of the development.

Characteristics and suitable industries for each site have been studied and they are summarized as follows:

Atherfield

(Characteristics)

- Cheaper labor force
- Adequately available water sources
- Near the sources of industrial materials (rubber, gem, lumber, structural clay, etc.)
- Water polluting industry such as plating and chemical industries should be prohibited in order not to contaminate the Kelani river.
- Demand of the local investors is relatively high

(Recommendable type of industry)

- Labor intensive type (garment and apparel, gem and jewellery, light industry such as toy)
- Resources - oriented type (rubber-based product, gem and jewellery)

Martin

(Characteristics)

- Limited labor force
- Adequate water supply
- Tannery and leather products are planned to be established under UNIDO cooperation

(Recommendable type of industry)

- Tannery, leather products, plating, dyeing, chemical products
- Water consumed type

Sirigampola

(Characteristics)

- Limited labor force
- Limited water supply
- Better accessibility to the international airport

(Recommendable type of industry)

- High value added industry (machinery)

Ekala

(Characteristics)

- Limited water supply
- Best accessibility to the international port and airport via highway
- Due attention should be paid to the environmental aspects considering the dense populated area in the vicinity.
- Environmentally sensitive, polluting industries are unacceptable.

(Recommendable type of industry)

- High value added industry (machinery, fabricated metal industry)
- Attractive for foreign investors (gem and jewelry, toy, sports goods, etc.)

Katana

(Characteristics)

- Limited water supply
- Best accessibility to the international airport and Colombo port via highway
- Due attention should be paid to environmental aspects

(Recommendable type of industry)

- High value added industry (machinery, equipment)
- Metalworking industry

Recommended types of industries to be located in each alternative site for the new industrial estates are summarized below.

	Atherfield	Martin	Sirigampola	Ekala	Katana
1 Food	O	O			
2 Apparel/garment	O	O(dyeing)			
3 Tannery/leather		O			
4 Rubber products	O				
5 Chemical products		O			
6 Fabricated metal products		O(plating)		O	O
7 Machinery			O	O	O
8 Gem and jewellery	O			O	
9 Light industry (toy, sports goods, etc.)	O			O	

6.2 Industrial Location of New Industrial Estates

As a result of analysis on investors' demand as described in Chapter 5, the location of industries in each alternative site for the new industrial estates has been studied respectively.

In Atherfield site, apparel, rubber-based products, gems/jewellery and light industries such as toys are expected to be dominant, with a factory area of 40 ~ 80 ha. In Martin site, the factory lot demand is expected to be 55 ~ 85 ha in which leather products and chemical products will be principally invested, subject to further environmental assessment to be executed on there industrial location. Machinery, on the other hand, will occupy a large area as expected in Ekala as well as in Sirigampola site. Factory lot area is expected to be 23 ~ 46 ha and 60 ~ 116 ha for Sirigampola and Ekala site, respectively. In Katana site, machinery and fabricated metal industries will be located in the factory area of 35 ~ 65 ha.

ISIC	Atherfield		Martin		Sirigampola		Ekala		Katana	
	No of investors	Factory Area(ha)	No of investors	Factory Area(ha)	No of investor	Factory Area(ha)	No of investors	Factory Area(ha)	No of investors	Factory Area(ha)
1 Food	21	1.5~3.0	1	10.0	-	-	-	-	-	-
2 Textile, Apparel	21	15.0~25.0	3	3.0~6.0	-	-	-	-	-	-
3 Leather	-	-	31	24.5~31.0	-	-	-	-	-	-
4 Rubber products	11	10.3~20.5	2	2.0~4.0	-	-	-	-	-	-
5 Chemical products	-	-	15	12.7~23.5	-	-	-	-	-	-
6 Fabricated metal	-	-	5	5.5~10.5	-	-	5	2.5~5.0	10	8.0~15.5
7 Machinery	-	-	-	-	23	23.0~46.0	28	28.0~51.0	28	28.0~51.0
8 Gems	14	8.0~16.0	-	-	-	-	14	8.0~16.0	-	-
9 Light industry (toy, etc.)	12	6.0~12.0	-	-	-	-	28	22.0~44.0	-	-
10 Others	2	2.0~4.0	1	0.3~0.8	-	-	-	-	-	-
Total	62	42.8~80.0	58	58.0~85.3	23	23.0~46.0	75	60.5~116.0	38	36.0~66.5

6.3 Land Use Plan

Land use plans for the development of new industrial estates at the five alternative sites have been designed as shown in Figures D-1~D-5 in Appendix D to cope with the investors' demand, as well as in the light of the topographical and other physical conditions at each site.

The factory lot areas are 71.6 ha at Atherfield, 83.9 ha at Martin, 34.5 ha at Sirigampola, 93.4 ha at Ekala, and 44 ha at Katana, as tabulated below. Details of area configuration by land use is presented in Tables D-1 ~ D-5 in Appendix-D.

(Unit : ha)

	Atherfield	Martin		Sirigampola	Ekala	Katana
		(Total)	(1st Phase)			
1 Factory lot	71.6	83.9	(28.5)	34.5	93.4	44.0
2 Residential area	3.8	6.6	(0.0)	6.7	21.0	-
3 Road	7.7	7.5	(3.0)	4.2	11.8	4.1
4 Utility /1	3.5	16.2	(10.3)	8.2	6.7	1.7
5 Facility /2	7.5	7.3	(3.1)	13.4	15.2	4.0
6 Others /3	73.5	15.1	(1.0)	177.8	34.4	5.2
Total	167.6	136.6	(45.9)	244.8	182.5	59.0

Remarks: /1 Utility-- Water purification plant, Sewage treatment plant, Electric sub-station, Telecommunication centre, Solid waste disposal site.

/2 Facility-- Industrial park centre, Training centre, Park

/3 Others-- Reserved area for future expansion, Buffer green, Retention pond, etc.

6.4 Land Grading

Earthworks to grade the land are necessary for each alternative site, except for Sirigampola site. Earthworks volume for land grading is estimated and summarized below.

Site	Cut (million m ³)	Fill (million m ³)
1 Atherfield	1.8	1.7
2 Martin	-	1.2
3 Sirigampola	-	-
4 Ekala	-	2.0
5 Katana	0.2	0.2

Atherfield site requires a large cut due to the undulated topography. Cut volume and fill volume are designed to balance at this site in order to prevent earth transportation from outside the area.

Filling work is necessary at Martin site, Ekala site, and Katana site, in order to prevent flooding. No earthworks except for land clearing are necessary at Sirigampola site.

6.5 Road Plan

The volume of traffic generated from the new industrial estates is estimated in terms of cargo traffic, commuter traffic, and business traffic as shown below.

(Unit: Vehicles/day)

	Atherfield	Martin	Sirigampola	Ekala	Katana
1. Cargo traffic	800	900	400	1,000	490
2. Bus (for commuter)	500	200	100	300	80
3. Private car (for commuter)	600	700	250	800	350
4. Private car (for business)	400	200	50	200	90
Total	2,300	2,000	800	2,300	1,010

The following types of roads are planned to be constructed in the new industrial estates:

- (1) Access road (Access between the existing inter-city roads and the industrial estate)
- (2) Boulevard (Main road located in the central area of the industrial estate)
- (3) Main road
- (4) Sub-main road

6.6 Facility Plan

In the new industrial estates, the following facilities are planned to be constructed to upgrade the attractiveness of industrial estate not only for investors but also for factory workers. These facilities are to be realized, in view of the serious competition expected from various industrial estates in neighboring countries, to attract international enterprises.

1) Industrial Estate Center

Total floor area and site area of the industrial estate centre are designed to be approximately 2,450 m² and 1.0 ha, respectively. The industrial estate centre will facilitate the following functions:

- Operation and maintenance of industrial estates
- Promotion of investment
- Business activity assistance
- Others

2) Training Center

The training centre is expected to function as vocational training centre, as well as research and development institute. A recruitment service, vocational training, computer business service, etc. will be extended to investors in the industrial estate. Site area and floor area of the training centre are assumed as follows:

Site area : 1.2 ~ 3.8 ha

Total floor area : 6,000 m²

3) Park

More than 3 % of the total area of the industrial estate is planned to be allocated as park land, in view of aesthetic aspects and amenities. Not only investors but also factory workers will enjoy the facilities of the park.

6.7 Employment and Production

Employment opportunities to be created by the establishment of the industrial estates, as well as gross production and value added expected at each site, has been preliminarily estimated.

1) Employment

Large number of employment opportunities are expected to be generated in Atherfield (approx. 20,000 employees), due to labor intensive industries to be located there. On the other hand, Martin and Ekala site will require less employment due to a relatively large number of non-labor intensive industries in the factory lot area. Sirigampola site expects to generate the least number of jobs due to smaller investment demand. The number of employees to be generated at each site is shown in Table 6-1.

2) Gross Production Output

Gross production at the five alternative sites is estimated to amount to Rs 17 billion (at 1990 prices). The estimated output will be Rs 5.0 billion at Atherfield, 3.0 billion at Martin, 1.8 billion at Sirigampola, 5.2 billion at Ekala, and 2.2 billion at Katana, as shown in Table 6-1.

3) Value added

Value added is estimated to be Rs 1.5 billion at Atherfield, 1.2 billion at Martin, 0.8 billion at Sirigampola, 1.7 billion at Ekala and 1.0 billion at Katana. The total amount for the five alternative sites, i.e. Rs 6.2 billion, will account for 20 % of total value added in the manufacturing sector in Sri Lanka (Rs 29.0 billion) in 1990.

7. PHYSICAL PLAN OF NEW INDUSTRIAL ESTATES

7.1 Atherfield Estate

1) Water Supply System

The demand for maximum daily water supply is estimated to be 11,200 m³/day, and the planned volume of water supply is 1,550 m³/hour (Refer to Tables E-1-4 and E-1-5 in Appendix-E).

The intake facilities will be located on the left bank of the Kelani river just downstream from the confluence with the Sithawaka river. Water will be pumped and conveyed by steel pipes (300 mm in diameter) to the purification plant to be located 60 m above the intake site. The capacity of the purification facilities (rapid-sand filtration treatment method) will be 11,200 m³/day which is equivalent to the maximum daily water supply volume. A distribution tank (6,600 m³ in capacity) will be constructed on a mountain side in the estate. The proposed water supply system at Atherfield is shown in Figure E-1-4 in Appendix E.

2) Sewerage System

Design volume of sewage water will be 11,200 m³/day. The quality of influent will be 305 mg/l (3,417 kg/day) in BOD and 620 mg/l (6,942 kg/day) in SS. A gravity system will be used for the sewer lines; however, pumping facilities will be required due to topographic conditions. An oxidation ditch method will be selected for the treatment system. The minimum size sewer line will be 250 mm in diameter. The pipe materials will be P.V.C. (250 mm and 300 mm) and reinforced concrete (300 mm). The effluent will be treated in accordance with the national standards, with the allowable limit of 30 mg/l for both BOD and SS concentrations, and discharged into the Kelani river. The proposed sewerage system is shown in Figure E-2-1 in Appendix E.

3) Drainage System

Estimates of runoff discharge have been made by means of a rational formula. For calculation of velocity, Manning's formula was adopted. From the view point of easy and economic construction, a U-drain will be constructed, after taking into account the topography of the planned roads which are relatively steep. The proposed drainage system is shown in Figure E-3-1 in Appendix E.

4) Power Supply System

The demand for power supply is estimated to be 25 MW at Atherfield site (Refer to Table F-4 in Appendix-F).

CEB has planned to construct a new 33 kV sub-transmission line between the new Avissawella substation and Karawanella, crossing the proposed estate site. However, the capacity of this line will be insufficient for the industrial estate. Another 33 kV sub-transmission line from the grid substation is recommended to be constructed to supply stable power to the industrial estate. A switching station will also be required to be constructed to receive power in the estate. 33 kV overhead distribution line is designed to distribute the power to the consumer. The proposed power supply system is shown in Figure F-5 in Appendix F.

5) Telecommunications System

The Demand for telecommunications is estimated to be 1,800 lines for Atherfield site (Refer to Table F-7 in Appendix-F).

Judging from the telecommunications demand, the telecommunications system will be arranged by installing small switching stations (PABX) in the estate which will be connected with the nearest Sri Lanka Telecom (SLT) telephone switching station in Avissawella. The trunk line to the SLT's switching station is to be made of optical fiber cable.

7.2 Martin Estate

1) Water Supply System

The demand for maximum daily water supply is estimated to be 16,400 m³/day, and the planned volume of water supply is 2,220 m³/hour (Refer to Tables E-1-4 and E-1-5 in Appendix-E).

The intake facilities will be constructed in the vicinity of Bangadeniya, approximately 5 km upstream on the Deduru river. A steel pipe of 500 mm in diameter will be used to convey river water to the purification plant in the proposed estate. Capacity of the purification plant will be 16,400 m³/day. A rapid sand filtration treatment system will be used. For the distribution of water to the industries, a water tower with a capacity of 400 m³ will be constructed in the centre of the estate. The proposed water supply system at Martin is shown in Figure E-1-6 in Appendix E.

2) Sewerage System

The design volume of sewage water for the sewage treatment plant will be 16,400 m³/day. Quality of influent will be 510 mg/l (5,778 kg/day) in BOD and 716 mg/l (8,110 kg/day) in SS. Pipe reticulations on this estate will be divided into two groups; western part and eastern part. The sewage treatment plant in the western part will be constructed under assistance from UNIDO, and the eastern part will be designed for construction at a later stage. The treatment method of the eastern part will be oxidation ditch system. The effluent will be treated in accordance with the national standards with the allowable limit of 30 mg/l for both BOD and SS concentrations, and discharged into the Deduru river. The proposed sewerage system at Martin is shown in Figure E-2-2 in Appendix E.

3) Drainage System

In view of the flat topography on Martin estate, reinforced concrete drainage pipes will be adopted. The pipes will range from 400 mm to 1,350 mm in diameter. Flap gates will be installed to protect the estate from backwater intrusion. The proposed drainage system is shown in Figure E-3-2 in Appendix E.

4) Power Supply System

The demand for power supply is estimated to be 21 MW at Martin site (Refer to Table F-4 in Appendix-F).

The existing 2 lines of 33 kV distribution lines are insufficient to supply the required power to the industrial estate. A new 33 kV sub-transmission line is recommended to be constructed from the Chilaw grid substation, which is scheduled for construction in 1994. A 33 kV switching station and overhead distribution line is designed to distribute electric power in Martin estate. The proposed power supply system at Martin is shown in Figure F-6 in Appendix F.

5) Telecommunications System

The demand for telecommunications is estimated to be 1,000 lines at Martin site (Refer to Table F-7 in Appendix-F).

Judging from the telecommunications demand, the telecommunications system is proposed to be arranged by installing a small switching station (PABX) in the industrial estate

which will be connected with the nearest SLT telephone switching station in Chilaw. The trunk line to the SLT's switching station is to be made of optical fiber cable.

7.3 Sirigampola Estate

1) Water Supply System

The demand for maximum daily water supply is estimated to be 2,200 m³/day, and the planned volume of water supply is 370 m³/hour (Refer Tables E-1-4 and E-1-5 in Appendix-E).

The intake facilities will be located in Kodunnawa, where a rockfill weir for water intake to the existing Negombo treatment plant is constructed. Steel pipes (300 mm in diameter) will be installed to convey water for 15,000 m from the Maha river to the estate. The capacity of the purification plant will be 2,200 m³/day. Water will be distributed from the water tower which will have a capacity of 100 m³. Due to instability of water supply from the Maha river in drought periods, a ground-type reservation tank (1,300 m³ in capacity) will be constructed to reserve water from the Maha river. Likewise, additional groundwater pumping will be additionally envisaged at Sirigampola. The proposed water supply system is shown in Figure E-1-8 in Appendix E.

2) Sewerage System

The design volume of sewage water for the sewage treatment plant will be 2,200 m³/day. The quality of influent will be 57 mg/l (100 kg/day) in BOD and 147 mg/l (257 kg/day) in SS. The treatment method will be oxidation ditch system. Diameter of the pipes will range from 250 mm to 700 mm. The effluent will be treated in accordance with the national standards with the allowable limit of 30 mg/l for both BOD and SS concentrations, and discharged into the Gin river on the western side of the estate. The proposed sewerage system is shown in Figure E-2-3 in Appendix E.

3) Drainage System

In view of the relatively small area to be drained, U-drains at the upstream and reinforced concrete pipes downstream will be adopted. The Gin river on the western side of the estate will be the outfall for the drainage pipes. The proposed drainage system is shown in Figure E-3-3 in Appendix E.

4) Power Supply System

The demand for power supply is estimated to be 10.5 MW at Sirigampola site (Refer to Table F-4 in Appendix-F).

A new 33 kV sub-transmission line from the Bolawatta substation, under construction by CEB, to Chilaw is available for power supply to the industrial estate. Power supply to the proposed site can be tapped from this sub-transmission line at the site. The proposed power supply system is shown in Figure F-7 in Appendix F.

5) Telecommunications System

The demand for telecommunications is estimated to be 600 lines (Refer to Table F-7). Judging from the telecommunication demand, a telecommunications system is proposed to be arranged by installing a small switching station (PABX) in the industrial estate. The trunk line to the SLT's switching station is to be made of optical fiber cable.

7.4 Ekala Estate

1) Water Supply System

The demand for maximum daily water supply is estimated to be 6,800 m³/day, and the planned volume of water supply is 910 m³/hour.

Water resources will be mainly dependent on groundwater and partially on the Dandugam river and the Attalagalu river in the vicinity of the estate. Purification facilities will have a capacity of 6,800 m³/day. The treatment method will be rapid sand filtration. The distribution tank will have a capacity of 4,000 m³ for ground type and 300 m³ for tower type. The water supply system is shown in Figure E-1-9 in Appendix E.

2) Sewerage System

The design volume of sewage water is 6,800 m³/day. The quality of influent will be 58 mg/l (321 kg/day) in BOD and 189 mg/l (1,043 kg/day) in SS. Pipes will range from 250 mm to 800 mm in diameter. The proposed sewerage system is shown in Figure E-2-4 in Appendix E.

3) Drainage System

U-drains for small discharge upstream and reinforced concrete pipes downstream will be adopted. A part of the runoff will be discharged into the river on the northern side of the estate, and a part will be discharged into the flood protection ponds to be constructed in the estate. The proposed drainage system is shown in Figure E-3-4 in Appendix E. It is additionally noted that the improvement of Dandugam river and Attalagaln river downstream from the proposed estate will be required to improve drainability around the estate.

4) Power Supply System

The demand for power supply is estimated to be 27.5 MW at Ekala site (Refer to Table F-4 in Appendix-F).

Power supply to Ekala site will come from the Kotugoda 132 kV grid substation which is located 1.5 km from the estate. Kotugoda substation is integrated into the 220 kV transmission network. The proposed power supply system is shown in Figure F-8 in Appendix F.

5) Telecommunications System

The demand for telecommunications is estimated to be 1,600 lines (Refer to Table F-7). Judging from the telecommunications demand, the system for telecommunications is proposed to be arranged by installing a small switching station (PABX) in the industrial estate, which will be connected with the nearest switching station in Gampa. The trunk line to the SLT's switching station is to be made of optical fiber cable.

7.5 Katana Estate

1) Water Supply System

The demand for maximum daily water supply is estimated to be 2,500 m³/day, and the planned volume of water supply is 450 m³/hour (Refer to Tables E-1~4 and E-1-5 in Appendix-E).

Intake facilities will be located in the Maha river in the vicinity of Kodunnawa, where a rockfill weir for water intake to the existing Negombo treatment plant is constructed. Steel pipes (300 mm in diameter) will be installed to convey water for 10,000 m from the Maha river to the estate. A rapid-sand filtration purification method, with a capacity of

2,500 m³/day will be used. A water tower with a capacity of 100 m³ and ground-type reservation tank with a capacity of 1,300 m³ will be constructed for the distribution of water. Groundwater will be additionally envisaged at Katana. The proposed water supply system is shown in Figure E-1-10 of Appendix E.

2) Sewerage System

Design volume of sewage will be 2,500 m³/day and quality of influent will be 13 mg/l (33 kg/day) in BOD and 388 mg/l (970 kg/day) in SS. Sewage will be treated by oxidation ditch system in accordance with the national standards with the allowable limit of 30 mg/l for SS concentrations. The effluent after treatment will be discharged into the Kimbulapitiya river. The proposed sewerage system is shown in Figure E-2-5 of Appendix E.

3) Drainage System

U-drains will be adopted considering of the relatively small area to be drained. A retention pond will be required in order to avoid flooding downstream on the Kimbulapitiya river. The proposed drainage system at Katana site is shown in Figure E-3-5 of Appendix E.

4) Power Supply System

Power supply to Katana site will be made from the Kotugoda 132 kV grid substation located 12 km from the estate. The proposed power supply system is shown in Figure F-9 of Appendix F.

5) Telecommunication System

Judging from the telecommunications demand, the system for telecommunications is proposed to be arranged by installing a small switching station (PABX) in the industrial estate, which will be connected with the nearest Negombo switching station. The trunk line to the SLT's switching station is to be connected by optical fiber cable.

8. ENVIRONMENTAL PROTECTION

8.1 Prevention of Water Pollution

Wastewater from Atherfield estate is planned to be discharged into the Kelani river after treatment. On the Kelani river downstream, there exists a water intake and purification plant at Ambatale where potable water for Colombo city is supplied from this purification plant. Therefore, water pollution type industries should not be invited to Atherfield estate. The quality of sewerage water treated at the estate, as well as the water of the Kelani river downstream, should be continuously monitored by Atherfield estate and CEA.

At Martin site, people fish and reside in and around the Deduru river estuary, where treated sewer is planned to be discharged. In Martin estate, tanneries, leather product factories, and metal plating factories are planned to be located. In the event that poisonous heavy metals such as Cu, Ni, Zn, and Cr are to be used in the estate, they should be totally eliminated through sewerage treatment in the estate. Detailed environmental assessment should be additionally conducted in locating the pollution type industries. In any case, it is recommended that periodical monitoring be executed on the contamination of fish and shellfish in this area. The change of the aquatic biosphere over a long period of time is also conceivable, and it is recommended that periodical investigation on individual groups of aquatic biosphere be carried out at the same time.

Sirigampola site is comparatively located in the proximity of coastal wetland which are ecologically quite important for bio-diversity and naturally purifying the environment. Further, there is no perennial river flow around the proposed estate, except for creeks. Consequently, disposal of the treated sewerage water should be carefully managed, and monitoring of water discharge around the estate should be continuously executed by the estate. When monitoring it will be useful to refer to the records on the environment in the marshlands of the Negombo Lagoon which have been compiled by BOI.

Ekala estate is located in marshland between two rivers; the Dandugam river and Attalagalu river. Water drained from the estate and water treated at the sewerage plant in the estate will be partly discharged into the rivers which debouch into the Negombo Lagoon located about 5 km to the west. Consequently, continuous monitoring of water quality of the discharged wastewater and water of the rivers running into the Negombo Lagoon should be executed. The environmental assessment of the Lagoon compiled by BOI should be referred to before executing the monitoring.

Katana estate is located along the stream, called the Kimbulapitiya Oya, which flows down into the Negombo Lagoon. Disposal of effluent treated at the sewage treatment plant in the estate should therefore be managed carefully and monitored constantly by the estate. Guidance for prevention of water pollution in these areas is provided by the Environmental Department of BOI, and it should be strictly followed by industries and the estate.

As a whole, if wastewater is properly treated by the proposed treatment facilities, the effluent of treated water will not cause water quality degradation. However, continuous monitoring of the quality of treated wastewater from the industrial estates should be executed in order to protect the environment from water pollution.

8.2 Prevention of Air Pollution

In the five estate sites, there has been no recognition of the existence of any air pollution. When implementing the industrial estate, some incinerators for solid waste disposal are planned to be provided in the estates. These incinerators could be a source of air pollution. Judging from the type of industries to be located in each industrial estate, there will be no implication that the factories located in the estate would cause air pollution, such as SO_x, NO_x, SPN, Carbon monoxide, and other poisonous gases, at such a level not well cause a serious environmental problem.

In the case of Atherfield estate, it is planned to locate such manufacturing industries as garment and apparel, rubber-based products, jewellery, and toys. In Martin estate, leather products, footwear, chemical industry product and rubber-based products will be located in the estate. All the combustible waste will be incinerated. After incineration, the remaining ash and incombustible waste will be transported to the adjacent final disposal area for sanitary filling. The final disposal area should be located in such a place that it will not cause any problems, such as offensive odor, flies, and other insects. In the case of Atherfield, the area required for final disposal would be around 1.0 ha. The bottom furnace of the disposal area should be made impervious by laying vinyl sheets or other materials so that any seepage from the filling and contamination of groundwater could be protected. At the same time, drainage pipes or some kind of drainage system should be provided to drain any seepage water. The NERD Center, which is supervised by MIST, has a record of manufacturing incinerators with a capacity of 2 tons/day at KEPZ. The NERD Center is to supply another incinerator equipped with a device which is capable of eliminating SPN emitted from burning waste rubber and waste plastic. The incinerator, in any case, should be located in the light of the wind direction, in order to prevent any adverse effects to the inhabitants within and outside the estate.

8.3 Solid Waste Disposal

Volume of solid waste to be generated from each industrial estate has been estimated and summarized below.

	(unit: t/day)	
	<u>Combustible</u>	<u>Incombustible</u>
Atherfield	9.4	6.1
Martin	25.0	8.9
Sirigampola	5.9	10.7
Ekala	18.3	18.9
Katana	7.5	13.6

Segregated collection of combustible waste and incombustible waste is strongly recommended. Each industry should follow this segregated collection method. Desirably, recyclable waste such as waste from garment and textile factories will further be segregated.

Two methods of solid waste disposal have been comparatively studied in each alternative site. The first method is to have both combustible and incombustible waste collected and transported into a service area within the industrial estate and then the collected waste will be transported to a final disposal area located outside the industrial estate. The second method is to have both an incinerator and a final disposal area within the industrial estate. As a result of the comparative study, it is recommended to adopt the second method for the following reasons; firstly it will be less influential to inhabitants who reside near the estate sites, and secondly, it may cause some problems if all recyclable waste has to be transported out of the estate for reprocessing and sales.

9. COST ESTIMATE AND DEVELOPMENT SCHEDULE

9.1 Cost Estimate

Construction cost of the industrial estates has been estimated on the basis of the preliminary design, as well as the construction plan and schedule proposed. The construction cost has been estimated by segregating it into the foreign currency component and the local currency component. Major conditions applied for the cost estimate are summarized below.

- a) Construction cost will cover preparatory works, main works, land acquisition, administration expenses, engineering service and contingencies.
- b) Cost of the main works will cover labor, materials, construction equipment, and contractor's indirect costs (including overhead expenses, profit).
 - Labor cost is estimated on the basis of eight (8) working hours per day.
 - Most construction materials will be supplied from the local market. The imported material cost is estimated on the basis of C.I.F. price and inland transportation cost.
 - Construction equipment and plant will be owned by the contractor. The foreign currency portion includes the costs of depreciation, spare parts and consumables for equipment, while the local component includes the costs for mechanics and laborers.
- c) All required land and right-of-way should be acquired by MIST.
- d) The estimate is based on labor, materials, and equipment prices as of June 1992. The exchange rate applied in the estimate is US Dollar 1.0 =Rs 42.2 = J Yen 129.

Additionally, it is noted that the cost has been estimated on the basis of the following assumptions:

- 1) Land Acquisition: The cost for land acquisition is estimated to be Rs20,000,000 for Atherfield estate, Rs10,000,000 for Martin estate, and Rs37,000,000 for Katana estate.
- 2) Administration Expenses: Administration expenses for project management and

supervision of implementation is estimated to be 3% of the direct construction cost.

- 3) **Engineering Service Expense:** Engineering service for detailed design and construction supervision is estimated to be 8% of the direct construction cost.
- 4) **Taxation:** Taxes (business turnover tax, custom duty, income tax, corporation tax, surcharge, wealth tax, and exercise tax) are distributed to the unit price or lump sum of each work item of the direct construction cost.
- 5) **Contingency:** Physical contingency is estimated at 10 % of the direct construction cost, land acquisition, administration expenses and engineering service expenses. Price contingency is estimated on the basis of price escalation at the rate of 5 % per annum for both foreign and local components.

Based on the conditions and assumptions as explained above, the construction costs for each industrial estate have been estimated as shown in Table 9-1 and as summarized below.

(Rs. 10⁶)

Description	Atherfield	Martin (I)	Martin (II)	Sirigamp.	Ekala	Katana
1) Preparatory works	7.4	4.7	5.6	13.9	7.7	5.6
2) Main works	652.2	369.9	454.2	431.6	1,019.3	281.2
3) Land acquisition	20.0	3.4	6.6	-	-	37.3
4) Administration exp.	19.8	11.2	13.8	13.4	30.8	8.6
5) Engineering services	52.8	30.0	36.8	35.6	82.2	22.9
6) Physical contingency	75.2	41.9	51.7	49.5	114.0	35.6
7) Price Contingency	135.6	65.5	258.3	881.6	225.7	60.1
Total	963.0	526.6	827.0	1,425.6	1,479.7	451.3

The annual disbursement of the estimated cost is shown in Table 9-2, and Table G-2 in Appendix G.

9.2 Construction Plan

Working conditions and construction work schedule have been elaborated in the following manner:

1) Working Conditions

The working conditions for construction planning have been assumed as follows:

- (a) **Workable day and hour:** Estimate of workable days and hours has a close relation to labor regulations, weather, handling of materials, etc. As a result of a survey and study on such conditions, one work shift of eight (8) working hours per day has been applied.
- (b) **Weather conditions:** Working days are estimated by deducting Sundays, national holidays, and suspension days caused by bad weather. A suspension day means the time when work is stopped due to rains.
- (c) **Swell factor:** The volume of soil will be changed when it is moved, hauled and compacted. It is classified into three conditions, i.e., natural, loose, and compacted. The soil in the natural condition is the soil in its original position. The soil in the loose condition is the soil after its excavation and hauling. The compacted soil is the soil which has been subject to compaction.
- (d) **Hourly production rate of construction equipment:** Hourly production rates of major equipment are estimated on the basis of conventional construction methods and formula considering the site conditions.

2) Construction Work Schedule

- (a) **Pre-construction programme:** Pre-construction programme consists of financial arrangements, selection of consultants, selection of contractors and land acquisition. After finalizing a financial agreement between the Government and a financial agency, it is scheduled that the selection of consultant will be concluded within a period of six (6) months.
- (b) **Mobilization:** Mobilization and temporary works will be completed within three (3) months after commencement of works.
- (c) **Construction time schedule:** Construction of each industrial estate is scheduled to be completed in eighteen (18) months.


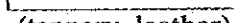
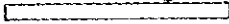

9.3 Development Schedule

All the alternative estate sites cannot be developed at one time, and a schedule for implementation should be worked out. It is considered appropriate that Atherfield and Katana sites will be simultaneously developed in the first stage in order to attract foreign and local investors and to allocate different types of industries to each site appropriately. Factory operation in these sites will be tentatively scheduled to commence around 1996 and fully occupied by 1999. (Refer to implementation schedule shown in Figure G-1 and Appendix G).

In addition, the western part of Martin site, where tannery and leather products industries are scheduled to be located, will be developed in the first stage in view of the sewage treatment plant to be constructed by funds provided by UNIDO, subject to further environmental assessment to be executed on the industrial location. The rest of the eastern site of Martin site will be developed in the future.

Sirigampola site and Ekala site are considered to be difficult to implement in the foreseeable future, due mainly to the difficulty in land acquisition.

A recommendable development schedule is summarized as follows:

	Short-term (1995-2000)	Middle-term (2000-2010)
1 Atherfield	1996 open 	
2 Martin	1st Stage  (tannery, leather)	2nd Stage 
3 Katana	1996 open 	

Detailed development schedule for each site is shown in Figure G-1 in Appendix-G.

10. INSTITUTIONAL AND PROMOTIONAL ARRANGEMENTS

10.1 Implementation Agency

For the development of Atherfield, Martin, and/or Katana industrial estates, it is conceivable that the agency for implementation will be either i) public (MIST), ii) mixed (MIST and private), or iii) private. From the viewpoint of investment demand, both foreign and domestic as discussed in Chapter 5, as well as in the light of financial viability as evaluated in Chapter 11, it appears to be difficult to implement these industrial estates from private funds and initiatives. The implementation agency should therefore be either public or mixed.

When considering the organisation of the implementation agency, the following factors will be taken into account:

- a) Industrial estates will be implemented with a government-to-government loan on concessional terms, based on the financial viability of the project. In such cases, the implementation agency should be public or mixed with a public share majority.
- b) The Sri Lankan government is promoting privatization, and MIST does not intend to enlarge its function to implement the estate development projects. MIST hopes that the private sector will participate in implementing the project.

With the above factors in view, it is proposed that the implementation agency will be a public corporation to be organized by MIST (majority) and the private sector.

As a participant from the private sector, it is conceivable, as an alternative, to invite Lanka Industrial Estates Ltd. (LINDE) to take part in the implementation agency. LINDE (DFCC's share of 51% and MIST's share of 49%) has been organized for such purposes. In such a case, the total share of MIST, both direct and indirect, will be increased substantially and the land and major facilities will remain as properties of MIST.

10.2 Management Agency

In the event that the implementation agency is either public or mixed, the agency for management of the industrial estates should be contracted to the private sector in order to operate and manage them efficiently.

LINDE will be a candidate for subcontractor or management agency for the proposed industrial estates. LINDE has recently initiated the development of the Sapugaskanda industrial estate (Refer to Chapter 2.4) and is capable of mobilizing experts and staff experienced in EPZs development in the past.

It is provisionally envisaged that the management agency will be organized in the following manner:

Divisions/Sections	Duties
1. Administration	• General and personnel affairs
2. Engineering	• Technical work
3. Environmental Control	<ul style="list-style-type: none"> • Maintenance work excluding power and telecommunication facilities which are dealt with by CEB and SLT, respectively • Control of goods and materials • Monitoring of effluents • Conservation of environmental quality in and around the industrial estate
4. User-service and Promotion	<ul style="list-style-type: none"> • One-stop service for investors • Information desk • Sales promotion • Screening of applicants
5. Finance	<ul style="list-style-type: none"> • Accounting • Budgeting • Payments
6. Auditing	• Internal auditing
7. Security	• Keeping security
8. Fire Fighting	• Fire fighting

10.3 Promotional Activities

The management agency will be responsible for promotion of investments in the industrial estates. For the promotional activities, however, the management agency should obtain thorough cooperation of BOI, as well as MIST.

For the investors in the industrial estates, it is prerequisite as promotional measures that they can enjoy all currently available incentives to the maximum extent (for instance, tax

holidays for 15 years) and that the foreign exchange controls are liberalized to the maximum extent for the export-oriented industries.

For investment promotion by the management agency, one-stop services should be made available to the investors in the estates, including services for customs clearance. The User-service and Promotion Division of the management agency will be responsible for provision of the one-stop services.

As promotional activities, it is proposed to take various measures, including:

- a) To prepare brochures and publicity materials, showing the investment climate, incentives, available facilities and utilities, available supporting services, conditions for lease of available factory lots, etc.
- b) To conduct promotion through direct visits to local enterprises, including enterprises that indicated interest in investment during the interview survey of this study.
- c) To request Embassies to distribute brochures and explain the investment climate to various enterprise associations, as well as chambers of commerce and industry in various countries.
- d) To despatch investment promotion missions and hold investment seminars, together with BOI, in the countries of potential investors.
- e) To make use of cooperation schemes available through UNIDO (IPS) and other organizations for investment promotion in industrialized countries.
- f) To invite investment advisors, from the countries of potential investors.

It is also suggested that to a high powered standing committee for investment promotion in the industrial estates be set up, with representatives from BOI, MIST, DFCC, and other authorities concerned. The standing committee will not only support promotional activities by the management agency, but it will also assist the management agency in resolving any problems encountered during the management of the industrial estates.

11. FINANCIAL ANALYSIS AND EVALUATION

Following the development schedule shown in Chapter 9.3, financial analysis has been conducted for Atherfield, Martin, and Katana estates. Sirigampola and Ekala estates have not been analyzed at this moment, because these sites are considered to be difficult to be implemented in the foreseeable future due to difficulty in land acquisition.

11.1 Methodology of Evaluation

1) Major Indices

The financial viability of the project has been examined on the basis of the following two indices:

- (a) Financial internal rate of return (FIRR)
- (b) Repayability

2) Assumptions

(1) Rent

The new industrial estate will earn revenue from the lease of industrial and residential land. Rent is assumed to be \$3/m²/year on the basis of a comparison with the rent of other EPZs in potentially competitive Asian countries. Major EPZs and industrial estates and their rent per unit area in these countries are summarized as follows:

Country	EPZ/GIE	Lease of Factory Lot (\$/m ² /year)	Remarks
1. Philippines	Bataan	2.02	April, 1992
	Baguio City	3.17	
	Mactan	2.83	
2. Thailand	Laem-Chabang	1.43	June, 1990
	3. India		
	Santa Cruz	0.63	1991
	Cochin	1.88	1991
4. Pakistan			
	Lite-Landhi	5.08	April, 1990
	Sind	6.09	

Source: - Industrial Estate in the World, Japan External Trade Organisation, Mar. 1990
 - General View of the Economy of Thailand, Japanese Chamber of Commerce in Bangkok
 - Export Processing Zone Authority, Philippines

(2) Occupancy rate

Based on experience of other EPZs in Sri Lanka, as well as development of industrial estates having compatible conditions in other countries, the new industrial estates are assumed to be leased out in the following manner:

	(Accumulated occupancy rate: %)			
	Atherfield	Martin (I)	Martin (II)	Katana
Occupancy starts (3rd year of construction)	50	60	50	50
Second year	80	90	80	80
Third year	100	100	100	100

(3) Promotion and maintenance costs

The cost for promotion of each proposed industrial estate is assumed to be US\$200,000 equivalent. The maintenance cost for the industrial estate is assumed to be covered by the maintenance fee, which will be collected separately from tenants.

(4) Cash flow

The project cash flow as a basis of FIRR has been calculated at June 1992 prices. At the same time, the cash flow table with price escalation has been worked out to check the repayability of loans. Escalation is assumed to be 5% per annum for both locally procured and imported equipment and materials.

(5) Opportunity cost of capital

The opportunity cost of capital (OCC) in Sri Lanka is assumed to be 10% as a result of discussions with the Development Finance Corporation of Ceylon (DFCC) and the National Development Bank (NDB).

(6) Project financing

The construction cost is assumed to be financed in the following manner:

a) Paid-up capital:

The paid-up capital will be disbursed to cover the following payments:

- (i) Local currency portion of the construction cost
- (ii) Promotion cost during the construction period

(iii) Interest on loans during the construction period

b) Loan:

A foreign currency portion of the construction cost will be financed by a soft loan from foreign sources under the following terms and conditions:

Interest rate : 2.5% p.a.
 Repayment period : 30 years
 Grace period : 8 to 10 years

11.2 Results of Financial Analysis

1) FIRR

(1) FIRR

Constant FIRRs for the alternative sites have been calculated and summarized below (Refer to Tables 11-1 to 11-3):

Site	FIRR
Atherfield	8.9%
Martin	8.2%
Katana	9.4%

FIRRs are slightly below the opportunity cost of capital. It is considered essential that a soft loan from foreign sources be secured for the implementation of the project.

(2) Sensitivity analysis

FIRR is most affected by variations in rent and construction cost. The effect of the changes in these two factors on FIRRs is calculated as follows:

	Base case 3\$/m ² /year	Rent \$2/m ² /year	Rent \$4/m ² /year	Construction cost 10% less	Construction cost 20% less
Atherfield	8.9	5.2	12.1	10.0	11.3
Martin	8.2	4.4	11.3	9.3	10.5
Katana	9.4	5.6	12.5	10.5	11.7

(FIRR: %)

FIRR for Atherfield estate and Katana estate can exceed 10% in the event that the construction cost is reduced by 10%. For this reduction of cost, it might be possible to consider that the construction costs of power supply, communication facilities and access road would be incurred outside the project budget by the respective authorities concerned.

On the other hand, a 20% reduction of construction cost is required for Martin industrial estate so that it will become financially sound. For cost reduction, power supply and telecommunication facilities as well as some of water supply facilities (e.g., water purification plant) are to be executed outside the project budget by the respective authorities concerned.

2) Repayment capacity

As shown in Tables 11-4 to 11-6, Atherfield, Martin, and Katana estates will be managed to generate a surplus in the initial years of operation. Thus the proposed implementation of the industrial estates are considered to be financially viable in terms of their capacity to repay the debt.

12. ECONOMIC EVALUATION

12.1 Methodology of Evaluation

The "Enclave approach", which is frequently used in the economic evaluation of industrial estates (EPZ projects in particular), has been adopted for this Project. In this approach, the project site, which is an export-oriented industrial estate in this study, is treated as an economic unit independent of the country, and money flow or payments from the enclave to the country are considered as economic benefit from the viewpoint of the national economy.

12.2 Estimate of Economic Cost and Benefit

1) Economic Cost

In view of the transfer payments (indirect taxes, subsidies, etc.) and the distortion caused by import duties and export subsidies, 85 % of the financial cost is considered to be economic cost of the Project.

2) Foreign Exchange Rate

In Sri Lanka, a floating system is currently adopted for the foreign exchange, reflecting the market rate. The official exchange rate is, therefore, adopted in the economic evaluation.

3) Economic Benefits

The economic benefits to accrue from the Project will cover the following:

- a) Payment by foreign firms to Sri Lanka employees.
- b) Lease payment for the factory lots by foreign firms.

Besides the above benefits, the following can also be considered as economic benefit but they are difficult to quantify at this stage and are not included in the calculation of the benefits:

- a) Payment by foreign firms for purchasing raw materials and intermediate goods from Sri Lanka.
- b) Payment by foreign firms for utility charges.

12.3 Results of Economic Evaluation

1) Economic Internal Rate of Return (EIRR)

EIRR has been calculated in accordance with the cash flow shown in Tables 12-1 to 12-3, and as summarized below.

Site	EIRR (%)
Atherfield	35.9
Martin	13.2
Katana	23.0

For the proposed industrial estate sites, EIRR is beyond 10 %, or opportunity cost of capital in Sri Lanka, and, thus, the Projects are considered to be economically feasible.

2) Sensitivity Analysis

Sensitivity has been checked with regard to leasing at lower price and increasing construction costs as summarized below.

Site	Base Case	Leasing Price	Construction Cost
		2 \$/m ² /y	10% increase
Atherfield	35.9	35.1	33.6
Martin	13.2	11.7	12.0
Katana	23.0	21.1	21.4

In all cases, EIRR exceeds 10 %, indicating low susceptibility of the Project to the changes in economic costs and benefits.

13. NATURAL AND SOCIAL ENVIRONMENTAL EVALUATION

13.1 Natural Environment

The five alternative estate areas are not located within areas designated as National Parks or National Environment Conservation Areas (natural reserves, sanctuaries, forest reserves, etc.), and they are all categorized as non-forested area. Atherfield is located inland and the surrounding area is mostly covered with rubber and tea plantations. There are some moist deciduous forests scattered in the surrounding areas located some distance away from Atherfield. On the other hand, there are some lagoons and marshlands in coastal areas, like Negombo Lagoon located about 3 km west of Katana and 20 km south of Sirigampola, and Mathurajawela marshland located some 5 km west of Ekala. Especially in Mathurajawela marshland, there is an extensive distribution of mangrove forests.

Impacts on the natural environment due to construction of the industrial estates are discussed below.

1) Impact by Construction Works

The five alternative estate sites are not located in the National Environment Conservation Areas, and they are located some distance away from residential areas. Judging from the ecological conditions in and around the alternative sites, there are no specific endangered animals or plants living on the sites that should be protected in constructing the industrial estate.

Construction works may cause contamination of river water from sedimentation if cutting and filling are drained into rivers and streams. When executing earthworks along the river side, therefore, attention should be paid to prevent erosion and landslides. Special attention should be paid when reclaiming marshland on Ekala site because water if contaminated, will be drained to Mathurajawela where mangrove forests exist. Before the implementation of Ekala industrial estate, it is recommended to carry out further assessment of environment impacts around the proposed site.

Impacts such as air pollution, noise pollution, and vibration caused by the use of construction equipment and machinery are conceivable. These impacts may be caused during the construction period, as well as at the time of hauling equipment and machinery to and from the construction sites. However, since the residential areas are located away from the construction sites, the impact of air pollution, noise pollution, and vibration by construction work can be considered as negligible.

2) Impact by Operation of Industries

Wastewater and solid waste from the industrial factories have been designed to be treated by proper facilities to such a standard so as to satisfy all the requirements stipulated under the criteria for effluent and regulations for environment protection. Further, in the case of the Atherfield estate, no water pollution type industries should be invited. To prevent any illegal disposal of dangerous materials, it is considered as essential and effective to set up periodical monitoring systems and continue monitoring of the quality of wastewater and solid waste.

It is also noted that contamination of soil and groundwater may be caused if wastewater and solid waste are improperly disposed of around the factories. The monitoring systems should include a thorough guidance so that wastewater and solid waste are properly disposed of at the proposed sewerage treatment plant and incinerator.

With respect to offensive odor due to solid waste disposal, proper operation and management of the proposed incinerator and sanitary-filling at the final disposal area are indispensable. Offensive odor can be mitigated by proper management of these facilities. In the selection of the location of the incinerator and other disposal facilities, as well as in locating factories susceptible to create offensive odor, the direction of sea wind, land wind and seasonal wind should be taken into consideration especially in the coastal zone as in the case of Martin estate.

13.2 Social Environment

An interview survey was conducted with respect to the social environment on the alternative estate sites. The major findings are summarized in Table 13-1 and discussed below.

1) Factors related to Income

The average annual income in Avissawella (near Atherfield estate) and Negombo (near Katana and Sirigampola estates) is lower than the national average. Through establishment of the industrial estates, opportunities for employment will increase, and it is expected that the annual income in these areas would be substantially improved.

2) Factors related to Labor

The average unemployment rate in Sri Lanka is reported to be as high as 15.9 %. According to the interview survey, the unemployment rate was much higher in the principal

urban areas near the proposed alternative estate sites. For instance, the unemployment rate was 43.4 % in Avissawella, 24.23 % in Negombo and 16.6 % in Chilaw. Particularly, creation of employment opportunity is imminently required in Avissawella (near Atherfield).

It is preliminary estimated that the employment opportunities created by establishing the industrial estates will reach 20,000 persons in Atherfield, 9,000 persons in Martin, 3,600 persons in Sirigampola, 12,000 persons in Ekala, and 4,700 persons in Katana. Consequently, the employment situation in Avissawella, Negombo and Chilaw would be greatly improved through implementation of the industrial estates.

3) Other Factors

Other social environment factors related to the establishment of industrial estates are discussed below.

a) Inflow of Labor

Judging from the estimated number of employment opportunities created by the estate and the available labor force in the urban areas nearby, there could be a shortage of laborers, and workers may have to be recruited from outside. In this context, a residential area in and around the estates and recreational facilities would be required and they have been envisaged in the proposed land use plan and facility plan. In addition, it would be desirable that the investors and management agency of the estate jointly set up a counseling system for the workers in the estates.

b) Women in Development

Through introduction of labor-intensive types of industries in the proposed industrial estates, it is predicted that a substantial number of women workers will be employed in the estates. Creation of employment opportunities will be welcomed, but it should be emphasized that the laws and regulation applicable to work hours and other working conditions for women workers should be strictly observed by factories under the guidance of the estate management agency.

It is desirable that the factories in the estates have dormitories for women workers in accordance with their requirements. Construction of the dormitories will be favorable for both factories and women workers in maintaining comfortable working conditions in the estates. It is for this reason that some areas have been designed for residential use in the estates. Women workers who reside in areas outside the proper residential areas would be exposed to danger, particularly at night when they return home after public transportation services cease. In this context, it

is desirable that the estate management agency coordinate with the factories to provide transportation facilities such as bus services for workers who reside in outside areas.

14. OVERALL EVALUATION AND RECOMMENDATIONS

1) Overall Evaluation

From a technical point of view, no particular difficulty exists in the implementation of the proposed industrial estates. In terms of economic feasibility, benefits are large enough to justify their implementation. Environment and social conditions will be preserved if the Project is implemented according to the laws and regulations applied in the country, as well as the plans and recommendations given in this Study.

Financial viability will not be substantially high due to the relatively high unit cost of construction and the relatively low leasing price set to be competitive with other industrial estates and EPZs in neighboring countries. It is essential, therefore, that a soft loan be taken out so that the Project will be financially viable.

2) Industrial Estate Development by Type of Industries

The proposed industrial estates have locational advantages and disadvantages which vary according to the types and categories of the industry to be located. Therefore, industries should be encouraged to locate in the most suitable site. In Atherfield estate, industries in the categories of garment/apparel, gems/jewellery, rubber-based products and some light industries will be invited. In Katana estate, on the other hand, electronic industry, fabricated metal and machinery industries will be invited. It is recommended that Atherfield estate and Katana estate be implemented in the first stage, securing an external loan on concessional terms. Implementation of Martin estate will be programmed in accordance with the UNIDO cooperation envisaged at this estate, as far as the environmental conditions are permissible.

3) Assurance of Cost Recovery

Factory lots in the existing EPZs and industrial estates have been leased to enterprises at a low rate by means of government subsidies, however, this has meant that the cost of construction, operation and maintenance of the estates has not been recovered by incomes from the lease. In line with the established government policy for privatization and in view of the lease rates in neighboring countries, it is desirable that the lease rate will gradually be raised so that the cost incurred can be recovered.

4) Investment Incentives and Improvement of their Application

The investment incentives which are currently applicable to foreign investors are quite competitive if compared with those in neighboring countries. It is recommended that the incentives be kept at the current level, that their application be maximized and that the formalities be expedited and simplified. For instance, maximum period of tax holidays should be granted to the investors in the industrial estates.

5) Strengthening and Diversification of Industrial Structures

The foreign investors currently located in Sri Lanka are predominantly of labor intensive type, most of them belonging to the apparel industry. They mainly employ young female workers and labor supply and demand for these workers is tight in the areas of Katunayake EPZ. To strengthen the industrial structure in Sri Lanka, it is recommended that diversified industries be introduced to the industrial estates, including:

- Resource based industries
- High value-added type industries
- Industrial relocation type industries
- Basic industries

6) Reinforcement of Infrastructure Facilities

The development level of infrastructures in Sri Lanka still remains relatively low, particularly power, telecommunications, and transport facilities. In order to accelerate the investment by foreign and local enterprises, it is essential to upgrade these facilities. Without improvement in these infrastructures, the accelerated development of the industrial sector would not be attainable in Sri Lanka

7) Publicity of Investment Climate

The majority of the Japanese investors selected for the mail questionnaire and interview survey did not have sufficient information and knowledge about the investment climate in Sri Lanka. Dissemination of this information is prerequisite to attract foreign investors. It is recommended that the investment promotion activities be further strengthened, and that the investment in the industrial estates be promoted as a part of the overall promotional activities.

8) Alleviation of Adverse Effects

Measures should be taken to alleviate all the adverse effects which might be caused by the implementation of the industrial estates. With regard to the natural environment, appropriate facilities should be constructed and operated according to the law and regulations applicable in Sri Lanka so that all the effluents and emissions from the industrial estates meet the regulations. Particularly, water polluting type industries should not be invited to Atherfield industrial estate to prevent pollution of the Kelani river. Likewise, location of leather and other industries in Martin estate should be additionally studied with respect to their environmental constraints. In any case, the effluent standards currently applied by CEA should be strictly observed and the quality of the effluents should be periodically monitored in operating the industrial estates.

9) Role of Regional Development

Among the proposed sites, Atherfield is located inland and away from the centres for national development. Local resources are available around the proposed estate and the estate development should be so planned that it will assume the role of stimulating the regional economy through industrial linkage between the manufacturing industries in the estate and the primary industry around the estate. Generation of employment will also have a great impact on the economic development of the region. It is partly attributable to these impacts that Artherfield estate has been recommended for first stage implementation.

Tables

Table 1-1 Gross Domestic Product
(at 1982 constant price)

Sector	1982	1987	1988	1989	1990	1991	Rs. Million, (%)	
							Average 1982-87	Rate 1989-91
1. Agriculture	24,964 (26.4)	27,409	27,984	27,666	30,011	30,869 (22.8)	(1.9)	(3.0)
2. Mining & Quarry	2,238 (2.4)	3,112	3,392	3,576	3,901	3,511 (2.6)	(6.8)	(3.1)
3. Manufacturing	13,601 (14.4)	18,748	19,622	20,488	22,427	23,979 (17.7)	(6.6)	(6.3)
3.1 Export Processing	2,846	3,340	3,273	3,257	3,530	3,328		
3.2 Factory Industry	8,777	13,113	14,030	15,500	17,085	18,708		
3.3 Small Industry	773	910	918	935	968	1,065		
3.4 Others	1,205	1,385	1,401	796	844	878		
4. Construction	7,959 (8.4)	8,338	8,463	8,514	8,761	8,963 (6.6)	(0.9)	(1.8)
5. Elect. Gas, Water	1,089 (1.2)	1,448	1,499	1,526	1,681	1,812 (1.3)	(5.9)	(5.8)
6. Transport, Communi.	10,666 (11.3)	13,538	13,619	13,883	14,410	15,260 (11.3)	(4.9)	(3.0)
7. Wholesale, R. Trade	19,694 (20.8)	24,496	25,164	25,588	26,497	28,423 (21.0)	(4.5)	(3.8)
8. Banking, Insurance	3,715 (3.9)	5,490	5,819	6,168	6,556	6,989 (5.2)	(8.1)	(6.2)
9. Dwellings	3,250 (3.4)	3,550	3,603	3,650	3,705	3,760 (2.8)	(1.8)	(1.4)
10. Public admin.	2,899 (3.0)	5,435	5,462	6,140	6,335	6,469 (4.8)	(13.4)	(4.5)
11. Services	4,604 (4.8)	4,358	4,423	4,530	4,940	5,354 (3.9)	(1.1)	(5.3)
Total GDP	94,679 (100.0)	115,922	119,050	121,729	129,224	135,389 (100.0)	(4.1)	(4.0)

Source : Central Bank of Sri Lanka

Table 1-2 Manufacturing Sector in GDP (Sri Lanka and ASEAN)

Country	%	Year	Source
Sri Lanka	17.7	1991	Central Bank of Sri Lanka
Indonesia	18.5	1988	Statistical Yearbook of Indonesia 198
Malaysia	26.6	1990	Ministry of Finance, Malaysia
Philippines	25.0	1989	1990 Philippine Statistical Yearbook
Singapore	29.1	1990	Department of Statistics
Thailand	25.4	1989	Manthly Economic Indication-1990

Table 1-3 Value of Industrial Production in Sri Lanka

(Rs. Million)

Category	1982	1987	1988	1989	1990	1991	
31. Food, Beverages	5,246	12,962	14,675	18,458	21,955	26,943	(26.9)
32. Textile, apparel, leather	3,863	15,428	18,166	22,073	27,930	34,611	(34.5)
33. Wood, wood products	361	677	640	667	721	802	(0.8)
34. Paper, paper products	725	1,372	1,492	1,456	1,880	2,214	(2.2)
35. Chemicals, petro, plastic	13,099	13,477	13,681	12,041	21,215	20,455	(20.4)
36. Non-metallic	1,370	2,156	2,267	6,007	7,554	8,416	(8.4)
37. Basic Metal	262	307	487	792	1,006	1,319	(1.3)
38. Fab. metal product, equip.	904	2,006	2,477	3,182	4,199	5,093	(5.1)
39. Other manufacturing	74	155	178	231	296	373	(0.4)
TOTAL	25,904	48,540	54,063	64,907	86,756	100,226	(100.0)

Source : Central Bank of Sri Lanka

Table 1-4 Value Added in Manufacturing Sector in Sri Lanka

(Rs. Million)

Category	1988		1989		1990	
	Rs. M.	(%)	Rs. M.	(%)	Rs. M.	(%)
31. Food, Beverages	11,861	(53.0)	12,785	(51.5)	14,790	(51.0)
32. Textile, apparel, leather	3,970	(17.7)	4,940	(19.9)	6,778	(23.4)
33. Wood, wood products	418	(1.9)	288	(1.2)	218	(0.8)
34. Paper, paper products	704	(3.1)	1,012	(4.1)	645	(2.2)
35. Chemicals, petro, plastic	2,757	(12.3)	2,449	(9.9)	2,686	(9.3)
36. Non-metallic	1,200	(5.4)	1,505	(6.1)	1,640	(5.7)
37. Basic Metal	118	(0.5)	211	(0.8)	213	(1.7)
38. Fab. metal product, equip.	982	(4.4)	840	(3.3)	1,508	(5.2)
39. Other manufacturing	368	(1.7)	786	(3.2)	530	(1.8)
TOTAL	22,378	(100.0)	24,816	(100.0)	29,008	(100.0)

Source : Annual Survey of Industries, 1990, DCS

Table 1-5 Export Value of Selected Manufacturing Industries

Category	(Rs. Million)				
	1988	1989	1990	1991	(%)
1. Food, Beverages	1,025	1,000	1,270	1,471	(2.9)
2. Textile, apparel	14,260	17,631	25,163	33,261	(65.6)
3. Chemical products	683	964	1,041	1,151	(2.3)
4. Petroleum products	2,265	2,242	3,974	3,289	(6.5)
5. Leather, rubber, wood & Ceramics	2,191	2,529	3,863	5,807	(11.4)
6. Machinery, applicances	509	705	2,379	2,650	(5.2)
7. Jewellery, diamonds	1,740	3,399	3,812	3,006	(5.9)
8. Others	1	0	8	101	(0.2)
TOTAL	22,674	28,470	41,510	50,736	(100.0)

Source : Central Bank of Sri Lanka

Table 1-6 Projected Growth and Composition of Exports in the Second National Export Development Plan 1990-1994

(Unit: Millions Rs. at 1989 prices)

	Export values		Shares		Average annual growth rates	Contribution ratios to the growth (1989-1992)
	1989	1994	1989	1994		
Traditional exports	19,564	22,319	29.2	21.4	2.7	7.4
Tea	13,665	15,374	20.4	14.7	2.4	4.6
Rubber	3,111	3,451	4.6	3.3	2.1	0.9
Coconut	2,788	3,494	4.2	3.3	4.6	1.9
(Desiccated coconut)	1,023	1,402	1.5	1.3	6.5	1.0
(Other kernel products)	687	1,085	1.0	1.0	9.6	1.1
(Fibre, yarn, twine)	870	754	1.3	0.7	△ 2.8	△ 0.3
(Fibre finished goods)	50	95	0.1	0.1	13.8	0.1
(Shell charcoal)	158	158	0.2	0.1	0.0	0.0
Non-traditional exports	35,511	67,597	53.1	64.8	13.7	85.8
Other agricultural crops	2,318	3,645	3.5	3.5	9.5	3.6
Fisheries	835	1,425	1.2	1.4	11.3	1.6
Gems & jewellery	5,623	14,964	8.4	14.3	21.6	25.0
Textiles & garments	17,335	26,629	25.9	25.5	9.0	24.8
Garments	16,882	26,061	25.2	25.0	9.1	24.5
to U.S.A.	11,641	15,676	17.4	15.0	6.0	10.8
to EC	3,822	6,038	5.7	5.8	9.6	5.9
to Japan	225	1,684	0.3	1.6	49.5	3.9
Other manufactures	5,536	13,525	8.3	13.0	19.6	21.4
Food, beverages & tobacco	491	1,029	0.7	1.0	16.0	1.4
Leather products	476	1,023	0.7	1.0	16.9	1.5
Wood & wood products	307	667	0.5	0.6	16.8	1.0
Basic metal products	691	1,136	1.0	1.1	10.5	1.2
Ceramic products	458	1,029	0.7	1.0	17.6	1.5
Other minerals	504	777	0.8	0.7	9.1	0.7
Electronics & parts	50	376	0.1	0.4	50.0	0.9
Rubber-based products	739	2,445	1.1	2.3	27.0	4.6
Chemicals & plastics	897	1,956	1.3	1.9	16.9	2.8
Light engineering	403	1,014	0.6	1.0	20.3	1.6
Petroleum products	2,110	2,110	3.2	2.0	0.0	0.0
Total trad. & non-trad. (including others & re-exports)	55,075	89,916	82.3	86.2	10.3	93.1
Services	11,829	14,392	17.7	13.8	4.0	6.9
Total exports	66,904	104,308	100.0	100.0	9.3	100.0

Source: Sri Lanka Export Development Board, National Export Development Plan 1990-1994 Vol.I, Nov. 1990

Table 1-7 Employment in Manufacturing Sector

Category	1988		1989		1990	
	1,000 prs.	(%)	1,000 prs.	(%)	1,000 prs.	(%)
31. Food, Beverages	52.0	(24.5)	45.8	(51.5)	57.6	(23.6)
32. Textile, apparel, leather	85.8	(40.4)	96.2	(19.9)	107.6	(44.1)
33. Wood, wood products	9.0	(4.2)	7.8	(1.2)	6.7	(2.7)
34. Paper, paper products	9.5	(4.5)	11.6	(4.1)	12.3	(5.1)
35. Chemicals, petro, plastic	21.3	(10.0)	16.5	(9.9)	17.7	(7.3)
36. Non-metallic	18.9	(8.9)	20.8	(6.1)	20.3	(8.3)
37. Basic Metal	1.7	(0.8)	2.0	(0.8)	2.0	(0.8)
38. Fab. metal product, equip.	10.5	(5.0)	13.2	(3.3)	14.0	(5.8)
39. Other manufacturing	3.9	(1.7)	5.3	(3.2)	5.6	(2.3)
TOTAL	212.6	(100.0)	219.2	(100.0)	243.8	(100.0)

Source : Annual Survey of Industries, 1990, DCS

Table 2-1 Land Use operated by EPZs operated by BOI

	KEPZ		BEPZ		Koggala EPZ	
	ha	%	ha	%	ha	%
1. Factory lot	105.0	54.7	72.0	48.0	47	51.1
2. Road	10.0	5.2	6.4	4.3		
3. Park	2.0	1.0	8.0	5.3		
4. Administrative facility	3.0	1.6			32	34.8
5. Utility	7.0	3.6	12.5	8.3		
6. Reserve	65.0	33.8	51.1	34.0		
7. Service Area	-	-	-	-	13	14.1
Total	192.0	100.0	150.0	100.0	92	100.0

Source: BOI

Table 2-2. Number of Enterprises and Employees in Existing EPZs

(June, 1991)

	Enterprise	Employee
KEPZ	71	49,075
BEPZ	29	15,953
Koggala EPZ	7	917

Source: KEPZ administration office

Table 2-3 Number of BOI Enterprises by Industrial Category

(July, 1992)

(a) KEPZ

Category	Japan	Europe/USA	NIES /1	Others	Sri Lanka	Total
Food						0
Apparel	1	15	19	3	7	45
Wood Products				1		1
Chemical Products		1	1			2
Fabricated	1	1	2			4
Metal Products						0
Jewelley	2	4	1			7
Tobacco		1				1
Ceramics/Mineral						0
Toys						0
Electric Products	1	3				4
Others	1	3	2		1	7
Service					1	1
Total	6	28	25	4	9	72

(b) BEPZ

Category	Japan	Europe/USA	NIES /1	Others	Sri Lanka	Total
Food			1			1
Apparel	1	1	7	5		14
Wood Products						0
Chemical Products						0
Fabricated		1				1
Metal Products						0
Jewelley						0
Tobacco		1				1
Ceramics/Mineral		1			1	2
Toys			1			1
Electric Products			1			1
Others	2	1	6			9
Service						0
Total	3	5	16	5	1	30

(c) Koggala EPZ

Category	Japan	Europe/USA	NIES /1	Others	Sri Lanka	Total
Food						0
Apparel	1	3	4			8
Wood Products						0
Chemical Products						0
Fabricated						0
Metal Products						0
Jewelley						0
Tobacco						0
Ceramics/Mineral						0
Toys		1				1
Electric Products						0
Others						0
Service						0
Total	1	4	4	0	0	9

Remark: /1 Korea, Hongkong, Taiwan, Singapore
Source: BOI

Table 5-1 Preliminary Selected Categories for Industrial Estates

ISIC	Classification	ISIC	Classification
311	Food manufacturing	355	Rubber products
313	Beverage industries	356	Plastic products
314	Tabacco	361	Pottery, china
321/322	Textile/apparel	369	Glass & glass products
323	Leather products	371	Iron & steel
324	Footwear	372	Non-ferrous metal
331	Wood & cork	381	Fabricated metal
332	Furniture	382	Machinery
341	Paper	383	Electrical machinery
342	Printing	384	Transport equipment
351	Chemicals	385	Professional equipment
352	Other chemical	390	Jewellery, Musical instruments,
353	Petroleum refineries	-	Sporting goods, Not classified
354	Miscellaneous products		

Table 5-2 Reasons for Preference in Selecting Estate Site

	Atherfield		Martin		Sirigampola		Total	
	Nos.	(%)	Nos.	(%)	Nos.	(%)	Nos.	(%)
Closeness to CMB Port	23	(31.9)	18	(42.9)	3	(42.9)	44	(36.4)
Closeness to Kat. Airport	8	(11.1)	14	(33.3)	3	(42.8)	25	(20.7)
Cheap Labour	25	(34.8)	6	(14.3)	1	(14.3)	32	(26.4)
Local Resources	15	(20.8)	4	(9.5)	-	-	19	(15.7)
Others	1	(1.4)	-	-	-	-	1	(0.8)
Total	72	(100.0)	42	(100.0)	7	(100.0)	121	(100.0)

Note: Plural answers by 66 interested enterprises

Table 5-3 Export Orientation of Interested Firms

Type	Atherfield		Martin		Sirigampola		Total	
	Number of Firms	%	Number of Firms	%	Number of Firms	%	Number of Firms	%
Garment/Apparel	12	100.0	4	100.0	2	100.0	18	100.0
Gem/Jewellery	2	100.0	0	-	0	-	2	100.0
Rubber products	8	72.7	2	66.7	0	-	10	71.4
Metal working	4	80.0	3	75.0	1	50.0	8	72.7
Others	13	86.7	4	30.8	2	100.0	19	63.3
Total	39	86.7	13	54.2	5	83.3	57	76.0

Table 5-4 Joint Venture Orientation of Interested Firms

Type	Atherfield		Martin		Sirigampola		Total	
	Number of Firms	%	Number of Firms	%	Number of Firms	%	Number of Firms	%
Garment/Apparel	9	75.0	2	50.0	2	100.0	13	72.2
Gem/Jewellery	2	100.0	0	-	0	-	2	100.0
Rubber products	8	72.7	1	33.3	0	-	9	64.3
Metal working	4	80.0	2	50.0	0	0.0	6	54.5
Others	12	80.0	9	69.2	2	100.0	23	76.7
Total	35	77.8	14	58.3	4	66.7	53	70.7

Table 5-5 Results of Investment Demand Survey of Japanese Enterprises

Classification	Number of Samples		Number Collected			Number Effectively Collected			Interest in NEW Industrial Estate						
	Numbers	A (%)	Numbers	A (%)	B (%)	Numbers	A (%)	B (%)	Willingness to Investment			Worth Studying			
									Numbers	A (%)	C (%)	Numbers	A (%)	C (%)	
1. Manufacturing Industry															
Food manufacturing	213	11	17	6	8	17	6	8	0	0	0	1	3	6	
Beverage industries	3	0	3	1	100	3	1	100	0	0	0	0	0	0	
Tabacco	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Textile	119	6	9	3	8	9	3	8	0	0	0	1	3	11	
Leather products	5	0	3	1	60	3	1	60	0	0	0	1	3	33	
Footwear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Wood & cork	14	1	1	0	7	1	0	7	0	0	0	0	0	0	
Furniture	2	0	2	1	100	2	1	100	0	0	0	0	0	0	
Paper	20	1	1	0	5	1	0	5	0	0	0	0	0	0	
Printing	7	0	1	0	14	1	0	14	0	0	0	0	0	0	
Chemicals	44	2	13	5	30	12	4	27	0	0	0	2	6	17	
Other chemicals	126	6	14	5	11	14	5	11	0	0	0	3	9	21	
Petroleum refineries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Miscellaneous products	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rubber products	51	3	6	2	12	6	3	12	0	0	0	2	6	33	
Plastic products	4	0	4	1	100	4	1	100	0	0	0	2	6	50	
Pottery, china ware	20	1	3	1	15	3	1	15	0	0	0	2	6	67	
Glass & glass products	47	2	5	2	11	5	2	11	0	0	0	0	0	0	
Other non-metal mineral	7	0	6	2	86	6	2	86	0	0	0	0	0	0	
Iron & steel	46	2	9	3	20	9	3	20	0	0	0	1	3	11	
Non-ferrous metal	30	2	4	1	13	3	1	10	0	0	0	0	0	0	
Structural products	9	0	1	0	11	1	0	11	0	0	0	0	0	0	
Machinery	190	10	44	16	23	44	16	23	0	0	0	4	12	9	
Electrical machinery	355	18	38	13	11	37	13	10	0	0	0	5	15	14	
Transport equipment	139	7	35	12	25	35	12	25	0	0	0	1	3	3	
Professional equipment	26	1	0	0	0	0	0	0	0	0	0	0	0	0	
Other manufacturing	361	18	44	16	12	44	16	12	0	0	0	6	18	14	
2. Mining	56	3	2	1	4	2	1	4	0	0	0	0	0	0	
3. Agriculture and forestry, marine products industry	47	2	1	0	2	1	0	2	0	0	0	0	0	0	
4. Information and software industry	49	2	6	2	12	6	2	12	0	0	0	0	0	0	
5. Others	10	1	10	4	100	10	4	100	0	0	0	2	6	20	
Total	2000	100	282	100	14	279	100	14	0	0	0	33	100	12	

A: % of the total of the column
 B: % of Number of samples
 C: % of Number of effective responses

Table 5-6 Number of BOI Approved Firms by Category

ISIC	Japan	NIES	Europe	Other	Foreign	Exclusively	Total	
						Sri Lanka	Number of Firms	%
1110	0	0	4	0	0	0	4	2.2
1120	1	0	1	0	0	0	2	1.1
3111	0	1	1	0	0	0	2	1.1
3140	0	0	2	0	0	0	2	1.1
3211	0	2	0	1	0	0	3	1.6
3212	0	2	0	4	1	1	7	3.8
3219	0	1	0	0	0	0	1	0.5
3220	4	29	19	12	8	8	72	39.6
3233	0	3	1	1	0	0	5	2.7
3240	0	1	0	0	0	0	1	0.5
3319	0	0	1	1	1	0	2	1.1
3420	1	1	2	0	0	0	4	2.2
3529	0	1	0	0	0	0	1	0.5
3551	0	0	1	0	0	0	1	0.5
3560	0	3	2	0	0	0	5	2.7
3599	0	1	0	0	0	0	1	0.5
3610	1	2	0	0	0	0	3	1.6
3699	0	1	2	0	0	1	4	2.2
3811	1	1	0	0	0	0	2	1.1
3819	1	1	3	1	0	0	6	3.3
3831	0	0	2	0	0	0	2	1.1
3832	0	0	1	0	0	0	1	0.5
3839	2	2	3	1	0	0	8	4.4
3843	1	0	0	0	0	0	1	0.5
3844	1	0	0	0	0	0	1	0.5
3901	1	1	8	3	1	1	14	7.7
3902	0	1	0	0	0	0	1	0.5
3903	1	1	4	0	0	3	9	4.9
3909	2	9	0	0	0	0	11	6
9100	0	3	1	0	0	2	6	3.3
Total	17	67	58	24	16	16	182	-
%	9.3	36.8	31.9	13.2	8.8	-	-	100

Table 6-1 Development Frame of New Industrial Estates

Item	1 Atherfield	2 Martin	3 Sirigampola	4 Ekala	5 Katana	Total
1 Development Area (ha)						
1) Gross	167.6	136.6	245	182.5	59.0	790.5
2) Factory lot	71.6	83.9	34.5	93.4	44.0	327.4
2 Number of Factories	62	58	23	75	38	256
3 Number of Employees	20,000	9,000	3,600	12,000	4,700	49,300
4 Gross Output (Rs million at 1990 prices)	5,000	2,970	1,790	5,160	2,160	17,080
5 Value Added (Rs million at 1990 prices)	1,450	1,190	820	1,750	970	6,180
6 Water Demand (m ³ /day)	11,200	16,400	2,200	6,800	2,500	39,100
7 Electric Demand (MW)	25.0	21.0	10.5	27.5	11.0	95.0
9 Telephone Demand (lines)	1,800	1,000	600	1,600	600	5,600
10 Traffic (Vehicles per day)	2,300	2,000	800	2,300	1,010	8,410
11 Population in Residential Area	3,800	5,300	4,100	13,000	0	26,200

Table 9-1 Estimated Construction Cost

Description	Amount (Rs. 10 ³)					
	Atherfield Estate	Martin Estate (Phase I)	Martin Estate (Phase II)	Sirigampola Estate	Ekala Estate	Katana Estate
I. Preparatory Works	7,359	4,659	5,591	13,857	7,687	5,592
II. Main Works						
II.1 Road Works	123,303	43,866	68,005	62,141	173,933	69,121
II.2 Earthworks	194,439	60,746	99,294	3,889	262,403	22,904
II.3 Drainage System	6,085	40,328	117,632	99,919	157,164	31,225
II.4 Water Supply System	142,860	140,306	32,342	109,924	128,648	63,525
II.5 Sewerage System	72,282	7,695	58,125	25,320	61,591	20,090
II.6 Solid Waste Disposal	6,795	6,116	10,873	4,077	12,928	4,726
II.7 Power Supply Telecommunication	50,758	58,555	12,744	47,895	53,353	45,935
II.8 Administration Building	17,319	8,082	6,927	15,009	17,318	16,693
II.9 Residential Area	19,728	0	34,079	39,071	110,706	0
II.10 Other Facility	18,669	4,201	14,227	24,433	41,259	6,932
Sub total of Item I + II	659,596	374,554	459,839	445,535	1,026,990	286,743
III. Land Compensation	20,000	3,400	6,600	0	0	37,347
IV. Administration Expense	19,787	11,237	13,795	13,366	30,810	8,602
V. Engineering Services Expense	52,766	29,964	36,787	35,643	82,159	22,939
Sub total of Item I ~ V	752,149	419,155	517,021	494,544	1,139,958	355,631
VI. Physical Contingency	75,215	41,916	51,702	49,455	113,996	35,563
Sub total of Item I ~ VI	827,368	461,071	568,723	544,000	1,253,954	391,194
VII. Price Contingency	135,598	65,537	258,305	881,598	225,747	60,132
GRAND TOTAL	962,967	526,607	827,028	1,425,598	1,479,701	451,326
Note:	Project Administration Cost	:	3% of Item (I + II)			
	Engineering Service Expense	:	8% of Item (I + II)			
	Physical Contingency	:	10% of Item (I to V)			
	Price Contingency	:	5% per Annum			

Table 9-2 Construction Cost Disbursement Schedule

<u>Atherfield Estate</u>			(Unit: 10 ³)
Year	Foreign Currency (J.Yen)	Local Currency (Rs.)	Total Equiv. (Rs.)
1993	19,932	5,213	11,731
1994	343,492	66,354	178,677
1995	1,032,149	113,318	450,832
1996	739,453	79,928	321,727
Total	2,135,026 (73%)	264,813 (27%)	962,967 (100%)

<u>Martin Estate, Phase (I)</u>			
Year	Foreign Currency (J.Yen)	Local Currency (Rs.)	Total Equiv. (Rs.)
1993	10,907	4,273	7,840
1994	267,741	39,150	126,700
1995	866,467	108,732	392,067
Total	1,145,115 (71%)	152,155 (29%)	526,607 (100%)

<u>Martin Estate, Phase (II)</u>			
Year	Foreign Currency (J.Yen)	Local Currency (Rs.)	Total Equiv. (Rs.)
1998	32,026	14,031	24,503
1999	604,635	87,524	285,240
2000	1,095,184	155,620	517,285
Total	1,731,845 (69%)	257,175 (31%)	827,028 (100%)

<u>Sirigampola Estate</u>			
Year	Foreign Currency (J.Yen)	Local Currency (Rs.)	Total Equiv. (Rs.)
2010	28,714	8,751	18,141
2011	659,627	102,571	318,268
2012	2,328,329	327,825	1,089,189
Total	3,016,670 (69%)	439,147 (31%)	1,425,598 (100%)

<u>Ekala Estate</u>			
Year	Foreign Currency (J.Yen)	Local Currency (Rs.)	Total Equiv. (Rs.)
1993	29,744	8,540	18,267
1994	279,139	39,259	130,537
1995	1,234,753	160,802	564,567
1996	1,681,644	216,433	766,330
Total	3,225,280 (71%)	425,034 (29%)	1,479,701 (100%)

<u>Katana Estate</u>			
Year	Foreign Currency (J.Yen)	Local Currency (Rs.)	Total Equiv. (Rs.)
1993	8,145	45,457	48,122
1994	138,819	19,196	64,608
1995	442,887	54,387	199,267
1996	313,959	36,623	139,329
Total	903,810 (66%)	155,663 (34%)	451,326 (100%)

Table 10-1 Division of Responsibilities and Cost Sharing

	Construction				Maintenance/Operation			
	Execution		Cost Sharing		Execution		Cost Sharing	
	IE Co.	Other	IE Co.	Other	IE Co.	Other	IE Co.	Other
	agency		agency		agency		agency	
1. Land acquisition	MIST/Min. of Plantation Industries							
2. Road								
- Roads in EPZ (main, sub, others)	0	-	0	-	0	-	0	-
- Access road	-	0	0	-	0	-	0	-
3. Water supply facility								
(conduit pipe, distribution tank, pipe)	0	-	0	-	0	-	0	-
4. Sewerage (sewage treatment plant, sewer)	0	-	0	-	0	-	0	-
5. Drainage	0	-	0	-	0	-	0	-
6. Solid waste disposal	0	-	0	-	0	-	0	-
7. Electric facility (substation, electric line)	0	-	0	-	0	-	0	-
8. Telecommunication facility	0	-	0	-	0	-	0	-
9. Administrative facility								
- Office, etc.	0	-	0	-	0	-	0	-
- Fire station	-	0	0	-	-	0	-	0
- Post office	-	0	0	-	-	0	-	0
10. Service facility								
- Bank, restaurant, etc.	-	0	-	0	-	0	-	0
- Clinic, etc.	0	-	0	-	-	0	-	0
- Gasoline station	-	0	-	0	-	0	-	0
- Bus terminal	-	0	-	0	-	0	-	0
11. Others (park, sports facility, fence)	0	-	0	-	0	-	0	-

Table 11-1 Financial Cost and Benefit Flow
(Atherfield Estate)

	(at 1992 constant price)				
	Construction Cost (US\$1,000)	Promotion Cost (US\$1,000)	Cost Total (US\$1,000)	Income (US\$1,000)	Balance (US\$1,000)
1992	0	0	0	0	0
1993	265	50	315	0	-315
1994	3,840	50	3,890	0	-3,890
1995	9,229	50	9,279	0	-9,279
1996	6,272	50	6,322	0	-6,322
1997	0	0	0	1,131	1,131
1998	0	0	0	1,810	1,810
1999	0	0	0	2,262	2,262
2000	0	0	0	2,262	2,262
2001	0	0	0	2,262	2,262
2002	0	0	0	2,262	2,262
2003	0	0	0	2,262	2,262
2004	0	0	0	2,262	2,262
2005	0	0	0	2,262	2,262
2006	0	0	0	2,262	2,262
2007	0	0	0	2,262	2,262
2008	0	0	0	2,262	2,262
2009	0	0	0	2,262	2,262
2010	0	0	0	2,262	2,262
2011	0	0	0	2,262	2,262
2012	0	0	0	2,262	2,262
2013	0	0	0	2,262	2,262
2014	0	0	0	2,262	2,262
2015	0	0	0	2,262	2,262
2016	0	0	0	2,262	2,262
2017	0	0	0	2,262	2,262
2018	0	0	0	2,262	2,262
2019	0	0	0	2,262	2,262
2020	0	0	0	2,262	2,262
2021	0	0	0	2,262	2,262
2022	0	0	0	2,262	2,262
2023	0	0	0	2,262	2,262
				FIRR=	8.90%

Table 11-2 Financial Cost and Benefit Flow
(Martin Estate)

	(at 1992 constant price)				
	Construction Cost (US\$1,000)	Promotion Cost (US\$1,000)	Cost Total (US\$1,000)	Income (US\$1,000)	Balance (US\$1,000)
1992	0	0	0	0	0
1993	177	70	247	0	-247
1994	2,723	70	2,793	0	-2,793
1995	8,026	60	8,086	0	-8,086
1996	0	0	0	513	513
1997	0	0	0	770	770
1998	433	70	503	855	352
1999	4,804	70	4,874	855	-4,019
2000	8,240	60	8,300	855	-7,445
2001	0	0	0	1,785	1,785
2002	0	0	0	2,343	2,343
2003	0	0	0	2,715	2,715
2004	0	0	0	2,715	2,715
2005	0	0	0	2,715	2,715
2006	0	0	0	2,715	2,715
2007	0	0	0	2,715	2,715
2008	0	0	0	2,715	2,715
2009	0	0	0	2,715	2,715
2010	0	0	0	2,715	2,715
2011	0	0	0	2,715	2,715
2012	0	0	0	2,715	2,715
2013	0	0	0	2,715	2,715
2014	0	0	0	2,715	2,715
2015	0	0	0	2,715	2,715
2016	0	0	0	2,715	2,715
2017	0	0	0	2,715	2,715
2018	0	0	0	2,715	2,715
2019	0	0	0	2,715	2,715
2020	0	0	0	2,715	2,715
2021	0	0	0	2,715	2,715
2022	0	0	0	2,715	2,715
2023	0	0	0	2,715	2,715
				FIRR=	8.17%

Table 11-3 Financial Cost and Benefit Flow
(Katana Estate)

	(at 1992 constant price)				
	Construction Cost (US\$1,000)	Promotion Cost (US\$1,000)	Cost Total (US\$1,000)	Income (US\$1,000)	Balance (US\$1,000)
1992	0	0	0	0	0
1993	1,140	50	1,190	0	-1,190
1994	1,531	50	1,581	0	-1,581
1995	4,722	50	4,772	0	-4,772
1996	3,302	50	3,352	0	-3,352
1997	0	0	0	660	660
1998	0	0	0	1,060	1,060
1999	0	0	0	1,320	1,320
2000	0	0	0	1,320	1,320
2001	0	0	0	1,320	1,320
2002	0	0	0	1,320	1,320
2003	0	0	0	1,320	1,320
2004	0	0	0	1,320	1,320
2005	0	0	0	1,320	1,320
2006	0	0	0	1,320	1,320
2007	0	0	0	1,320	1,320
2008	0	0	0	1,320	1,320
2009	0	0	0	1,320	1,320
2010	0	0	0	1,320	1,320
2011	0	0	0	1,320	1,320
2012	0	0	0	1,320	1,320
2013	0	0	0	1,320	1,320
2014	0	0	0	1,320	1,320
2015	0	0	0	1,320	1,320
2016	0	0	0	1,320	1,320
2017	0	0	0	1,320	1,320
2018	0	0	0	1,320	1,320
2019	0	0	0	1,320	1,320
2020	0	0	0	1,320	1,320
2021	0	0	0	1,320	1,320
2022	0	0	0	1,320	1,320
2023	0	0	0	1,320	1,320
2024	0	0	0	1,320	1,320
				FIRR=	9.36%

Table 11-4 Cashflow (Atherfield)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Rent: (1)	0	0	0	0	1,443	2,425	3,183	3,342	3,509	3,685	3,869	4,062	4,265	4,479	4,703
Construction Cost (F.C.): (2)	-154	-2,663	-8,002	-5,732	1,443	2,425	3,183	3,342	3,509	3,685	3,869	4,062	4,265	4,479	4,703
Balance : (1) - (2)	-154	-2,663	-8,002	-5,732	1,443	2,425	3,183	3,342	3,509	3,685	3,869	4,062	4,265	4,479	4,703
Loan Rending (Inflow)															
Balance	-154	-2,663	-8,002	-5,732	1,443	2,425	3,183	3,342	3,509	3,685	3,869	4,062	4,265	4,479	4,703
Disbursement: (3)	154	2,663	8,002	5,732											
Repayment (Outflow)															
Principal: (4)				-668	-668	-668	-668	-668	-668	-668	-668	-668	-668	-668	-668
Interest: (5)				434	-418	-401	-384	-367	-351	-334	-317	-301	-284	-267	-251
Net Cashflow : Total of (1) to (5)	0	0	0	0	341	1,339	2,114	2,290	2,474	2,666	2,867	3,077	3,296	3,527	3,768
Cumulative Cashflow	0	0	0	0	341	1,680	3,794	6,084	8,558	11,224	14,091	17,168	20,464	23,991	27,759
Note: Interest during construction on a local currency portion of the construction cost and sales promotion cost will be covered by equity finance.															
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	4,938	5,185	5,444	5,716	6,002	6,302	6,617	6,948	7,295	7,660	8,043	8,445	8,867	9,311	9,776
	4,938	5,185	5,444	5,716	6,002	6,302	6,617	6,948	7,295	7,660	8,043	8,445	8,867	9,311	9,776
	4,938	5,185	5,444	5,716	6,002	6,302	6,617	6,948	7,295	7,660	8,043	8,445	8,867	9,311	9,776
	-668	-668	-668	-668	-668	-668	-668	-668	-668	-668	-668	-668	-668	-668	-668
	-251	-234	-217	-201	-184	-167	-150	-134	-117	-100	-84	-67	-50	-33	-17
	4,019	4,283	4,559	4,847	5,150	5,467	5,799	6,146	6,510	6,892	7,291	7,710	8,149	8,610	9,091
	31,778	36,061	40,620	45,467	50,617	56,084	61,883	68,029	74,539	81,431	88,722	96,432	104,581	113,191	122,282

Table 11-5 Cashflow (Martin)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Rent: (1)	0	0	0	624	983	1,146	1,203	1,263	2,769	3,817	4,644	4,876	5,120	5,376	5,644
Construction Cost (F.C.): (2)	-85	-2,076	-6,717	0	0	-248	-4,687	-8,489							
Balance: (1) - (2)	-85	-2,076	-6,717	624	983	898	-3,484	-7,226	2,769	3,817	4,644	4,876	5,120	5,376	5,644
Loan Rending (Inflow)															
Balance	-85	-2,076	-6,717	624	983	898	-3,484	-7,226	2,769	3,817	4,644	4,876	5,120	5,376	5,644
Disbursement: (3)	85	2,076	6,717	0	0	0	3,484	7,226							
Repayment (Outflow)															
Principal: (4)									-915	-915	-915	-915	-915	-915	-915
Interest: (5)									-503	-480	-457	-434	-412	-389	-366
Net Cashflow: Total of (1) to (5)	0	0	0	624	983	898	0	0	1,351	2,422	3,272	3,527	3,793	4,072	4,363
Cumulative Cashflow	0	0	0	624	1,607	2,505	2,505	2,505	3,856	6,278	9,550	13,077	16,870	20,942	25,305
Note: Interest during construction on a local currency portion of the construction cost and sales promotion cost will be covered by equity finance.															
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	5,927	6,223	6,534	6,861	7,204	7,564	7,942	8,339	8,756	9,194	9,654	10,136	10,643	11,175	11,734
	5,927	6,223	6,534	6,861	7,204	7,564	7,942	8,339	8,756	9,194	9,654	10,136	10,643	11,175	11,734
	5,927	6,223	6,534	6,861	7,204	7,564	7,942	8,339	8,756	9,194	9,654	10,136	10,643	11,175	11,734
	-915	-915	-915	-915	-915	-915	-915	-915	-915	-915	-915	-915	-915	-915	-915
	-343	-320	-297	-274	-252	-229	-206	-183	-160	-137	-114	-91	-69	-46	-23
	4,669	4,988	5,322	5,672	6,037	6,420	6,821	7,241	7,681	8,142	8,625	9,130	9,659	10,214	10,796
	29,974	34,962	40,284	45,956	51,993	58,413	65,234	72,475	80,156	88,298	96,923	106,053	115,712	125,926	136,722

Table 11-6 Cashflow (Katana)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Rent : (1)	0	0	0	0	842	1,415	1,857	1,950	2,048	2,150	2,258	2,371	2,489	2,614	2,744
Construction Cost (F.C.): (2)	-63	-1,076	-3,434	-2,433											
Balance : (1) - (2)	-63	-1,076	-3,434	-2,433	842	1,415	1,857	1,950	2,048	2,150	2,258	2,371	2,489	2,614	2,744
Loan Rending (Inflow)															
Balance	-63	-1,076	-3,434	-2,433	842	1,415	1,857	1,950	2,048	2,150	2,258	2,371	2,489	2,614	2,744
Disbursement: (3)	63	1,076	3,434	2,433											
Repayment (Outflow)															
Principal: (4)					-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269
Interest: (5)					-175	-168	-162	-155	-148	-141	-135	-128	-121	-115	-108
Net Cashflow : Total of (1) to (5)	0	0	0	0	398	978	1,426	1,526	1,631	1,740	1,854	1,974	2,099	2,230	2,367
Cumulative Cashflow	0	0	0	0	398	1,376	2,802	4,328	5,959	7,699	9,553	11,527	13,626	15,856	18,223
Note: Interest during construction on a local currency portion of the construction cost and sales promotion cost will be covered by equity finance.															
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	2,881	3,025	3,177	3,336	3,502	3,677	3,861	4,054	4,257	4,470	4,693	4,928	5,175	5,433	5,705
	2,881	3,025	3,177	3,336	3,502	3,677	3,861	4,054	4,257	4,470	4,693	4,928	5,175	5,433	5,705
	2,881	3,025	3,177	3,336	3,502	3,677	3,861	4,054	4,257	4,470	4,693	4,928	5,175	5,433	5,705
	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269
	-101	-94	-88	-81	-74	-67	-61	-54	-47	-40	-34	-27	-20	-13	-7
	2,511	2,662	2,820	2,986	3,159	3,341	3,531	3,731	3,941	4,161	4,390	4,632	4,886	5,151	5,429
	20,734	23,396	26,216	29,202	32,361	35,702	39,233	42,964	46,905	51,066	55,456	60,088	64,974	70,125	75,554

Table 12-1 Economic Cost and Benefit Flow
(Atherfield)

	(at 1992 constant price)				
	Construction Cost (US\$1,000)	Promotion Cost (US\$1,000)	Cost Total (US\$1,000)	Benefit (US\$1,000)	Balance (US\$1,000)
1992	0	0	0	0	0
1993	225	43	267	0	-267
1994	3,264	43	3,307	0	-3,307
1995	7,845	43	7,887	0	-7,887
1996	5,331	43	5,374	0	-5,374
1997	0	0	0	4,952	4,952
1998	0	0	0	7,924	7,924
1999	0	0	0	9,905	9,905
2000	0	0	0	9,905	9,905
2001	0	0	0	9,905	9,905
2002	0	0	0	9,905	9,905
2003	0	0	0	9,905	9,905
2004	0	0	0	9,905	9,905
2005	0	0	0	9,905	9,905
2006	0	0	0	9,905	9,905
2007	0	0	0	9,905	9,905
2008	0	0	0	9,905	9,905
2009	0	0	0	9,905	9,905
2010	0	0	0	9,905	9,905
2011	0	0	0	9,905	9,905
2012	0	0	0	9,905	9,905
2013	0	0	0	9,905	9,905
2014	0	0	0	9,905	9,905
2015	0	0	0	9,905	9,905
2016	0	0	0	9,905	9,905
2017	0	0	0	9,905	9,905
2018	0	0	0	9,905	9,905
2019	0	0	0	9,905	9,905
2020	0	0	0	9,905	9,905
2021	0	0	0	9,905	9,905
2022	0	0	0	9,905	9,905
2023	0	0	0	9,905	9,905
				EIRR=	35.90%

Table 12-2 Economic Cost and Benefit Flow
(Martin Estate)

	(at 1992 constant price)				
	Construction Cost	Promotion Cost	Total Cost	Benefit	Balance
	(US\$1,000)	(US\$1,000)	(US\$1,000)	(US\$1,000)	(US\$1,000)
1992	0	0	0	0	0
1993	150	60	210	0	-210
1994	2,315	60	2,375	0	-2,375
1995	6,822	51	6,873	0	-6,873
1996	0	0	0	576	576
1997	0	0	0	864	864
1998	368	60	428	1,896	1,468
1999	4,084	60	4,143	2,463	-1,680
2000	7,004	51	7,055	2,840	-4,215
2001	0	0	0	2,840	2,840
2002	0	0	0	2,840	2,840
2003	0	0	0	2,840	2,840
2004	0	0	0	2,840	2,840
2005	0	0	0	2,840	2,840
2006	0	0	0	2,840	2,840
2007	0	0	0	2,840	2,840
2008	0	0	0	2,840	2,840
2009	0	0	0	2,840	2,840
2010	0	0	0	2,840	2,840
2011	0	0	0	2,840	2,840
2012	0	0	0	2,840	2,840
2013	0	0	0	2,840	2,840
2014	0	0	0	2,840	2,840
2015	0	0	0	2,840	2,840
2016	0	0	0	2,840	2,840
2017	0	0	0	2,840	2,840
2018	0	0	0	2,840	2,840
2019	0	0	0	2,840	2,840
2020	0	0	0	2,840	2,840
2021	0	0	0	2,840	2,840
2022	0	0	0	2,840	2,840
2023	0	0	0	2,840	2,840
				EIRR=	13.18%

Table 12-3 Economic Cost and Benefit Flow
(Katana Estate)

(at 1992 constant price)					
	Construction Cost (US\$1,000)	Promotion Cost (US\$1,000)	Total Cost (US\$1,000)	Benefit (US\$1,000)	Balance (US\$1,000)
1992	0	0	0	0	0
1993	969	43	1,012	0	-1,012
1994	1,301	43	1,344	0	-1,344
1995	4,014	43	4,057	0	-4,057
1996	2,807	43	2,850	0	-2,850
1997	0	0	0	1,545	1,545
1998	0	0	0	2,475	2,475
1999	0	0	0	3,090	3,090
2000	0	0	0	3,090	3,090
2001	0	0	0	3,090	3,090
2002	0	0	0	3,090	3,090
2003	0	0	0	3,090	3,090
2004	0	0	0	3,090	3,090
2005	0	0	0	3,090	3,090
2006	0	0	0	3,090	3,090
2007	0	0	0	3,090	3,090
2008	0	0	0	3,090	3,090
2009	0	0	0	3,090	3,090
2010	0	0	0	3,090	3,090
2011	0	0	0	3,090	3,090
2012	0	0	0	3,090	3,090
2013	0	0	0	3,090	3,090
2014	0	0	0	3,090	3,090
2015	0	0	0	3,090	3,090
2016	0	0	0	3,090	3,090
2017	0	0	0	3,090	3,090
2018	0	0	0	3,090	3,090
2019	0	0	0	3,090	3,090
2020	0	0	0	3,090	3,090
2021	0	0	0	3,090	3,090
2022	0	0	0	3,090	3,090
2023	0	0	0	3,090	3,090
2024	0	0	0	3,090	3,090
				EIRR=	22.96%

Table 13-1 Results of Interview Survey

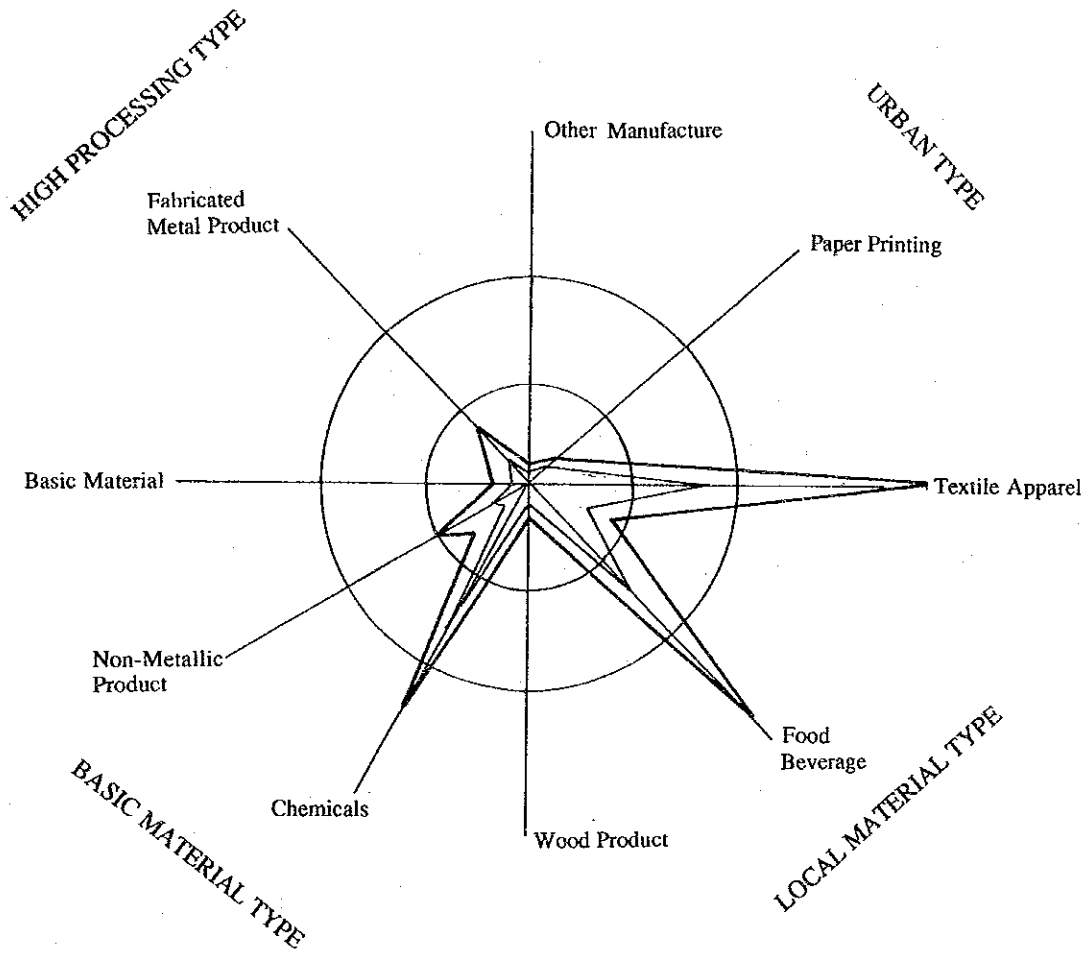
	Site			Remarks
	Atherfield	St. Martin	Sirigrampola	
1. Location				
(1) Distance from Colomo	Approx. 57 km to the east	Approx. 80 km to the north	Approx. 55 km to the north	
(2) Distance from the Airport	Approx. 45 km to the Southeast	Approx. 5- km to the north	Approx. 25 km to the north	
(3) Project Area	167.6 ha	136.6 ha	244.8 ha (for the 1st stage)	
2. Nearest Major Town	Avissawella	Chilaw	Negomobo	
(1) Area	19.4 km ²	4.9 km ²	240 km ²	
(2) Population	20,870	24,163	139,102	
a. Employed	4,984	6,773	62,500	
b. Unemployed	3,801	1,350	20,000	
c. Unemployment Rate	43.3 %	16.6 %	24.2 %	
(3) Average Number of People in a Family	4.6	-	3.2	
(4) Monthly Basic Salary				
a. Agricultural Estate Workers	Rs. 1,320	NA	NA	
b. Factory Workers				
i) Unskilled Workers	Rs. 1,100	NA	Rs. 900	
ii) Skilled Workers	Rs. 1,430	NA	Rs. 1,600	
iii) Manager Class	Rs. 2,500	NA	Rs. 3,500	
(5) Annual Income /1				
a. Family Income		US\$ 429 - 571	US\$ 571	
b. Income per capita /2	US\$ 348	NA	US\$ 178	
(6) Population per Bed of Medical Facilities	57	60	248	
(7) Population per Market				
a. Agricultural Products	3,478	24,163	15,600	
b. Fish Market	10,435	24,163	28,000	
c. Industrial Products	725	24,163	70,000	
(8) Number of Students per Teacher	35	32	31	
(9) Population per Police Official	149	97	NA	
(10) Population per Communication Facilities				
a. Post Office	6,957	24,163	8,000	
b. Telegram Office	10,435	24,163	8,000	
c. Telephone Office	6,957	24,163	8,000	
d. Public Telephone	NA	NA	NA	
e. Agency Post Office		NA	15,000	
(11) Daily Transportation Used				
a. Railway	1.5 %	1.6 %	1.9 %	
b. Bus	93.0 %	96.7 %	97.9 %	
c. Taxi including (three-wheel taxi)	5.5 %	1.7 %	0.2 %	
3. Site				
(1) Land Tenure	State Owned	State Owned	Private (Hindu Religious Trust)	
(2) Wildlife Conservation Area	not included	not included	not included	
(3) Land Use				
a. Housing Lots	15.4 %	2.4 %	0.7 %	
b. Agricultural Land	84.6 %	97.6 %	78.6 %	
c. Others	0.0 %	0.0 %	20.7 %	
(4) Land Acquisition	easy	easy	(mostly forest) difficult	

Remarks: /1 US\$ 1.00 = Rs42.00

/2 GNP per capita: US\$420 (1998) (Source : Human Development Report 1991, UNDP)

Figures

INDUSTRIAL STRUCTURE IN SRILANKA



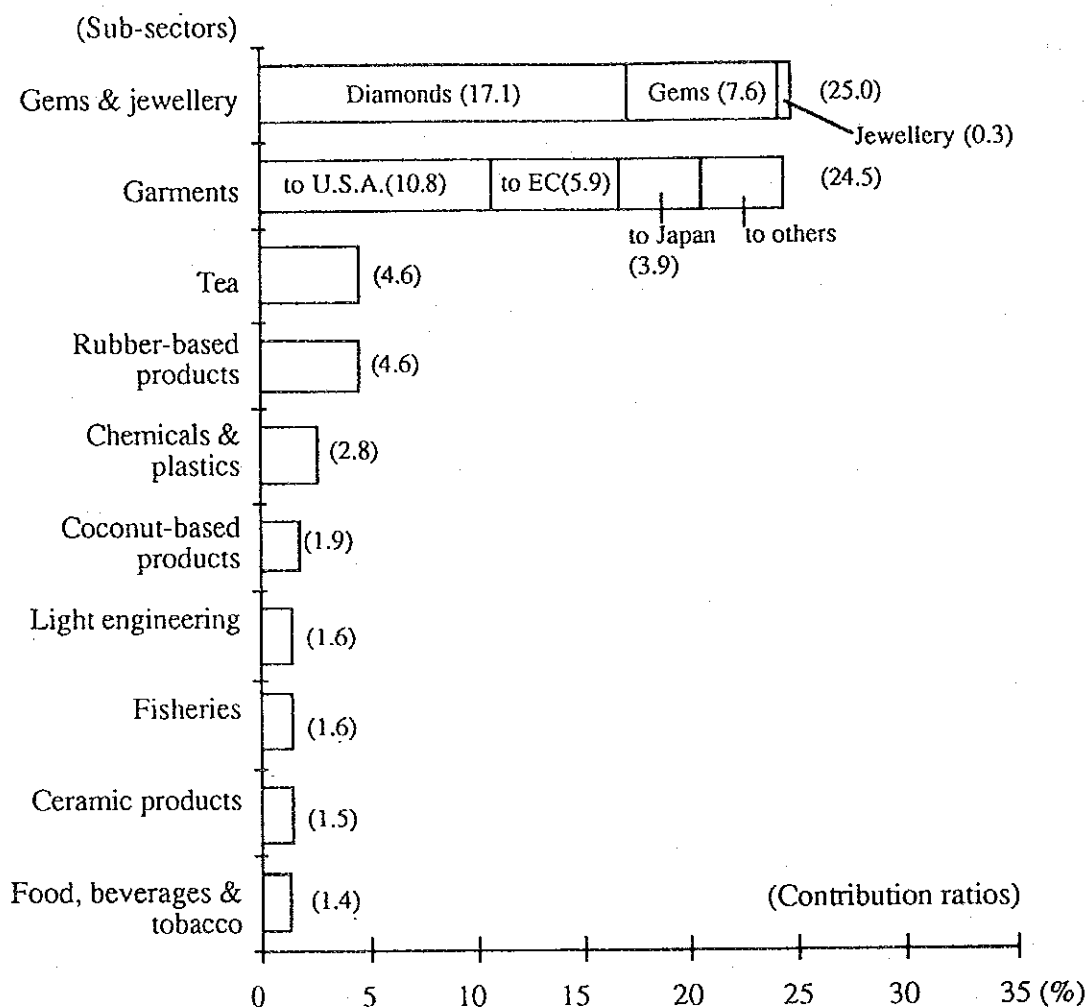
Remark: Data of 1987 (inside) and 1991 (outside)

THE STUDY ON INDUSTRIAL SECTOR DEVELOPMENT
IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF INDUSTRY, SCIENCE AND TECHNOLOGY

Figure 1-1
Industrial Structure in Sri Lanka

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

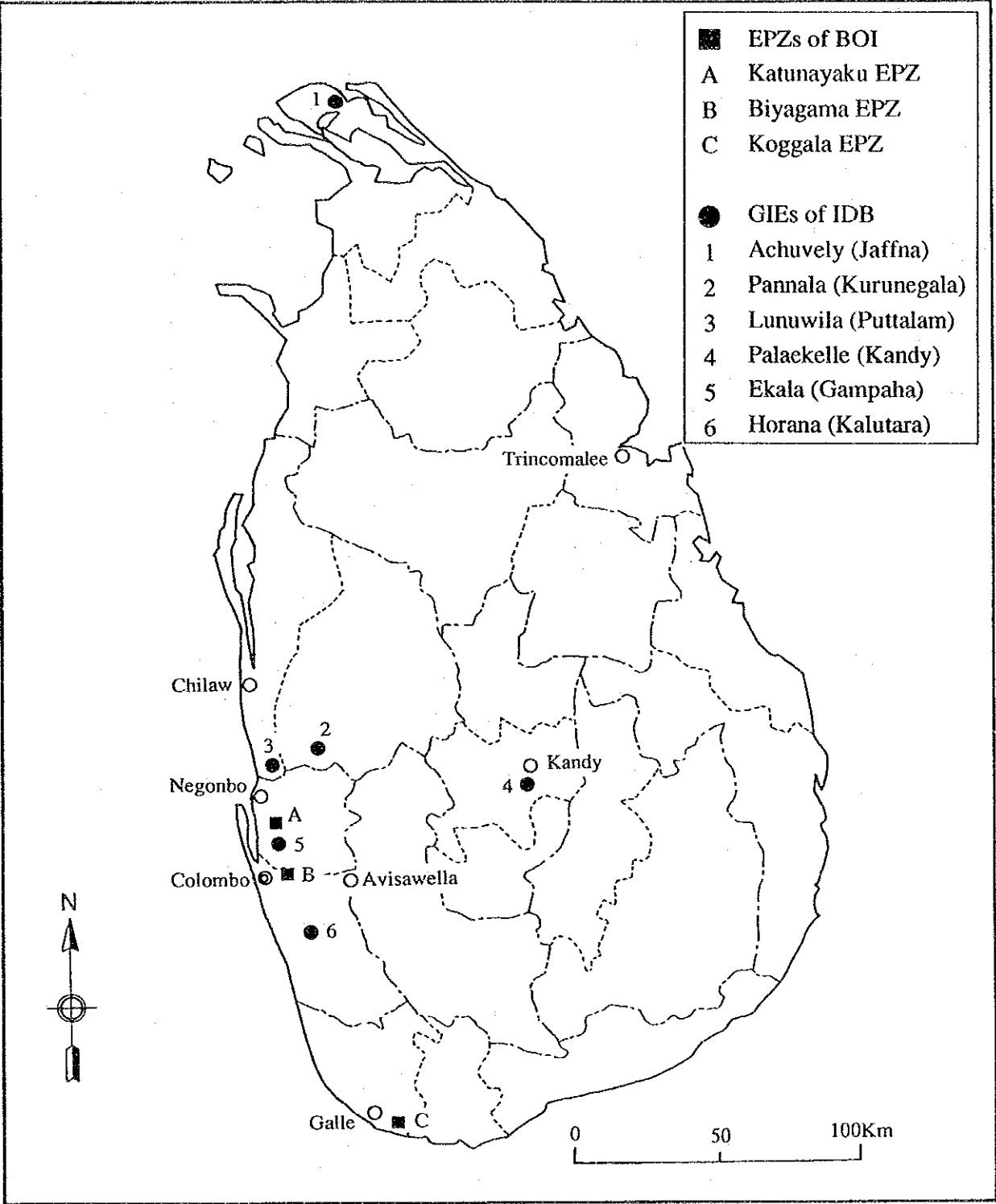
Contribution Ratios by Major Sub-sectors to the Projected Growth of Total Exports in the Second National Export Development Plan 1990-1994



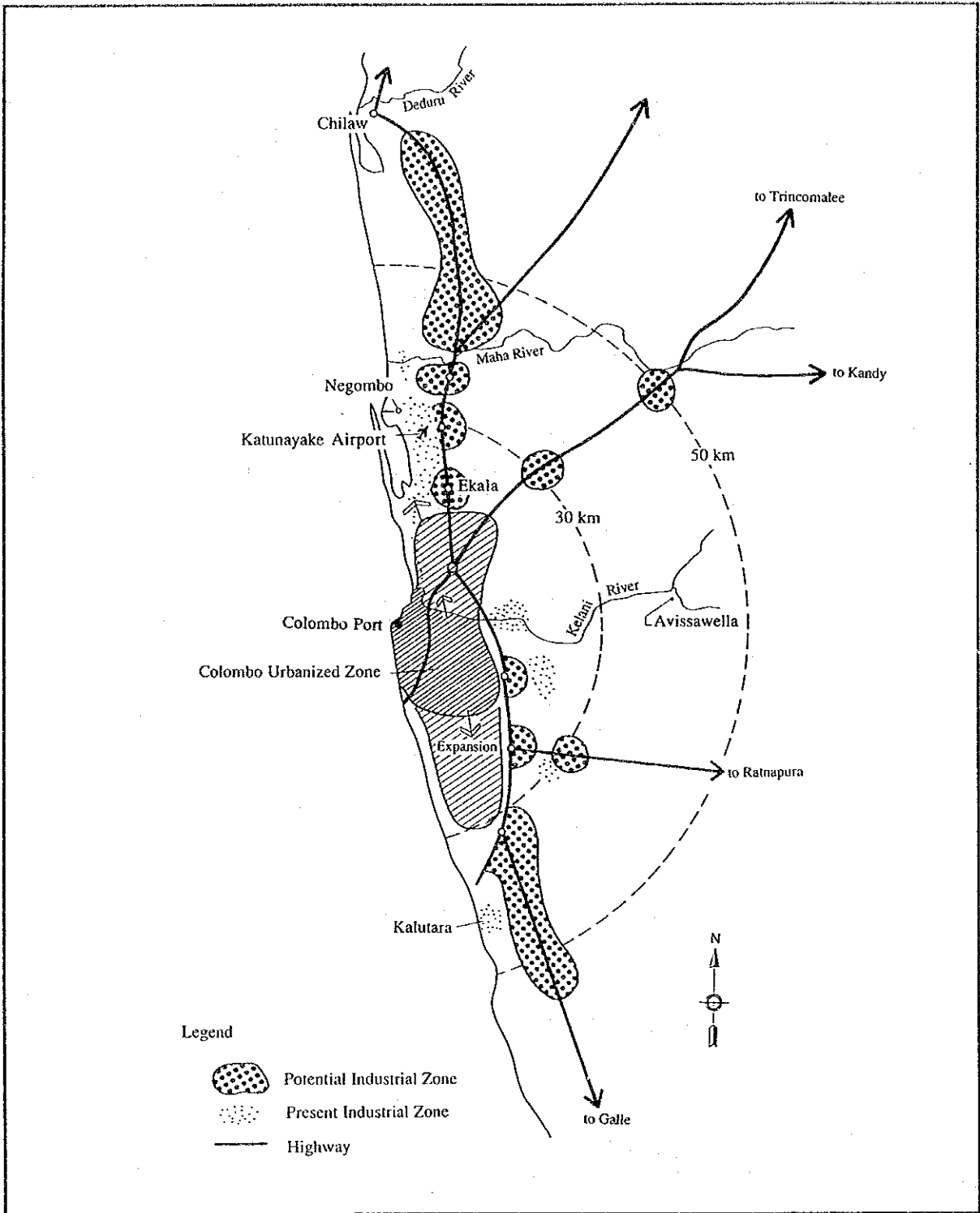
THE STUDY ON INDUSTRIAL SECTOR DEVELOPMENT
IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
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Figure 1-2
Contribution Ratios by Major
Sub-sectors to Exports

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)



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THE STUDY ON INDUSTRIAL SECTOR DEVELOPMENT IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
Figure 2-1 EPZs of BOI & GIEs of IDB
Nippon Koei Co., Ltd. in association with Unico International Corporation and Japan External Trade Organization (JETRO)

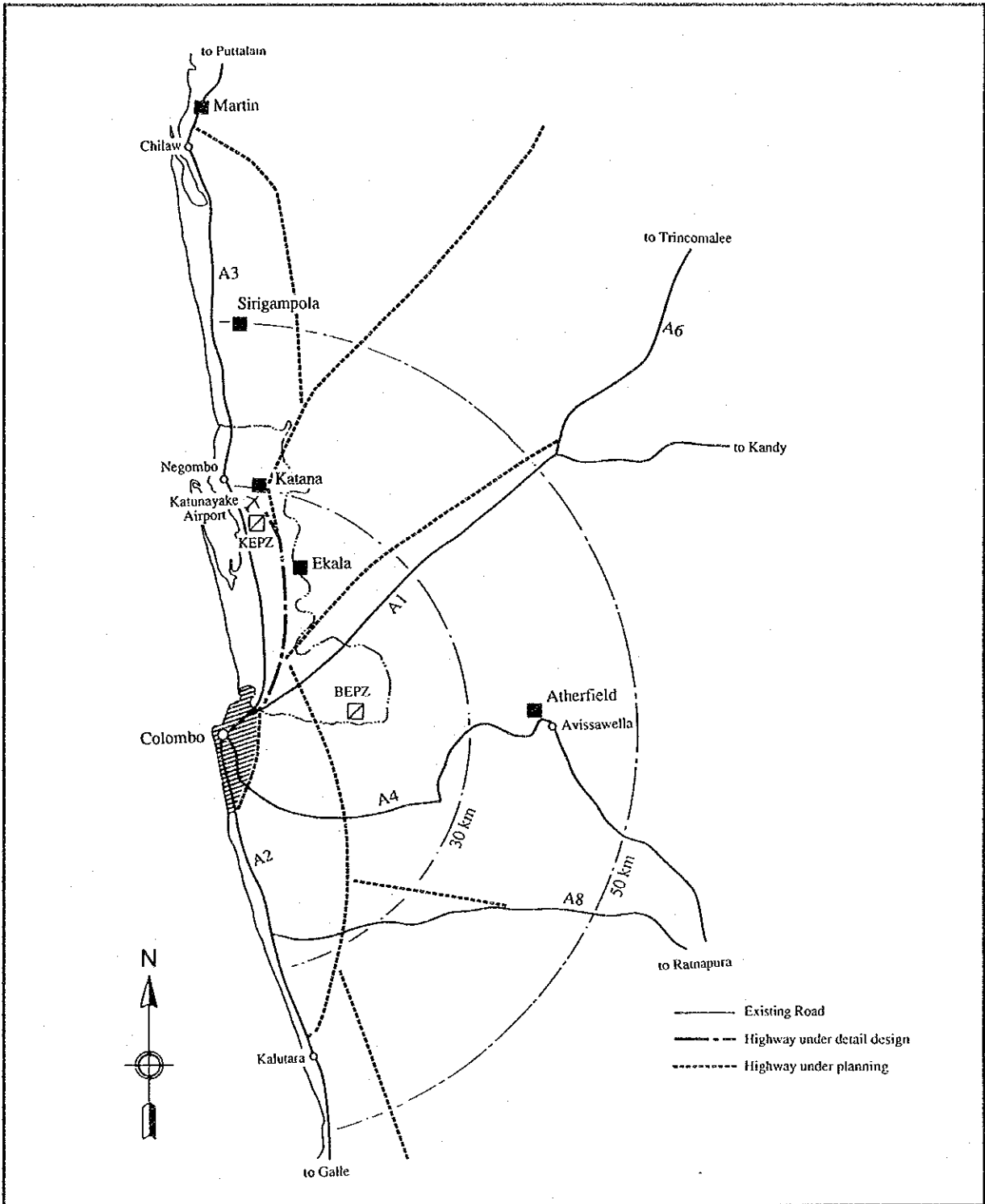


JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
 MINISTRY OF INDUSTRY, SCIENCE AND TECHNOLOGY
 THE STUDY ON INDUSTRIAL SECTOR DEVELOPMENT
 IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

Figure 3-1

Potential Industrial Zone

Nippon Koei Co., Ltd. in association with
 Unico International Corporation and Japan External Trade Organization (JETRO)



JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	
MINISTRY OF INDUSTRY, SCIENCE AND TECHNOLOGY	
THE STUDY ON INDUSTRIAL SECTOR DEVELOPMENT IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA	
Figure 4-1	
Location of New Industrial Estates	
Nippon Koci Co., Ltd. in association with Unico International Corporation and Japan External Trade Organization (JETRO)	

