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SRI LANKA

Technical report: Promotion of foreign and private investment with the objective of establishing suitable joint venture projects in Sri Lanka *

Prepared for the Government of Sri Lanka
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of M. Sikander Khan,
industrial information specialist

Backstopping officer: U. Loeser, Feasibility Studies Branch

United Nations Industrial Development Organization
Vienna

* This document has not been edited.

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ABSTRACT

The mission to Sri Lanka was undertaken by the consultant during August and September, 1988. The consultant was based at the FIAC, Ministry of Finance and Planning, Colombo. The duties of the consultant at the FIAC were to train two local staff, assist the staff members of the Facilitation Centre in their daily activities, and prepare four sectoral studies.

The following four sectors and subsectors were chosen as prototype modules for the sectoral studies: 1_/ Fisheries and marine sector (selected subsector: Shrimp processing industry); 2_/ Manufacture and assembly of electronic parts and components; 3_/ Specialized services (selected subsector: computer software development); and 4_/ Mineral resources based industry (selected subsector: glass and glassware).

The consultant's findings indicate that all the four subsectors show high growth potential, and should be promoted on a joint venture basis. The foreign joint venture partner is expected to provide technology, know-how and access to export markets. In the case of glassware the entire project is viable based on the present domestic demand, thus this subsector can also be promoted on the policy of import substitution.

Finally, it is advised that FIAC, with the assistance of among others UNIDO, try to more actively inform the potential investors of Japan, the NIEs, Europe, and the U.S., of the considerable comparative advantage which Sri Lanka offers to foreign investors, as compared to other developing countries currently attracting FDI.

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PREFACE AND ACKNOWLEDGMENTS

The present study could not have been carried out without the cooperation of others. The author wishes to express his gratitude to the Government of Sri Lanka, the UNDP office, and the various enterprises, and others, who generously contributed their time and expertise for discussions, and who provided me with much needed information and material.

While I am entirely responsible for the mission's report, I received an exceptional amount of assistance from the staff members of the FIAC (Foreign Investment Advisory Committee), Ministry of Finance and Planning, Colombo, Sri Lanka. A special word of thanks to Mr. K. Fernando, Acting Director; Mr. B. Fernando, Deputy Director; Mr. M. Susiriwardena, Deputy Director; Ms. S. Sathkumara, Deputy Director; Mr. S. Gunatilake, Deputy Director; and Mr. L. Siriwardena, Deputy Director, FIAC. The assistance provided by Mr. J. B. Gorski, UNIDO/SIDFA is also fully acknowledged.

EXPLANATORY NOTES

The value of Sri Lankan Rupee (Rs) in relation to the United States dollar was:

US $ 1 = Rs 32.40 (September 1988)

Dollars ($) refer to United States dollars.

A comma (,) is used to distinguish thousands and millions.

A full stop (.) is used to indicate decimals.

Metric tons (MT) have been used throughout.

SL refers to Sri Lanka.

Korea refers to the Republic of Korea.

PRC refers to the People's Republic of China.

Taiwan refers to Taiwan Province of China.

Aquaculture refers to: Activity which is performed in brackish coastal areas, irrigation reservoirs, canals, natural and man-made ponds, tanks, cages, pens and lagoons. It involves propagating and raising aquatic organisms under human control and manipulating at least one stage in their life cycle before harvesting.

The following abbreviations and contractions have been used in this report:

ECONOMIC AND TECHNICAL ABBREVIATIONS

CAD	Computer aided design
CAE	Computer aided engineering
CAM	Computer aided manufacturing
CCCN	Tariff Nomenclature of the Customs Cooperation Council (Sri Lanka)
CKD	Completely knock-down
COMFAR	Computer Model for Feasibility Analysis and Reporting
ECDC	Economic Cooperation among Developing countries
EEZs	Extended Economic Zones. The jurisdiction of waters up to 200 miles from shore placed in the hands of individual coastal nations.
EPZ	Export processing zone
FA	Factory automation
FDI	Foreign direct investment
FMS	Flexible manufacturing system
GDP	Gross domestic product
GNP	Gross national product
ISIC	International Standard Industrial Classification (of all economic activities)
IT	Information technology
MB	Megabyte
Mn	Million
MNC's	Multinational corporations
MVA	Manufacturing value added
NIEs	Newly industrializing economies
NTB's	Non-tariff barriers
OA	Office automation
ODA	Official development assistance
OEM	Original equipment manufacturer
PC	Personal computer
QDC	High quality, on-time delivery, and low cost
R & D	Research and development
ROI	Rate of return on investment
SITC	Standard International Trade Classification
SKD	Semi knock-down
SME	Small and medium-sized enterprise
TCDC	Technical Cooperation among Developing Countries
TNC's	Transnational corporations
VA	Value added

ORGANIZATIONAL ABBREVIATIONS

ADB	Asian Development Bank, Manila
APDC	Asian Pacific Development Centre
ASEAN	Association of Southeast Asian Nations, Jakarta
BA	British Airways
CINTEC	Computer and Information Technology Council, Colombo
COCOM	Coordinating Committee for Exports to Communist Areas, Paris
DANIDA	Danish International Development Agency, Copenhagen
DFC	Development Finance Corporation, Colombo
DFCC	Development Finance Corporation of Ceylon, Colombo
EC	European Communities, Brussels
EDB	Export Development Board, Colombo
EFTA	European Free Trade Association, Geneva
ESCAP	Economic and Social Commission for Asia and the Pacific, Bangkok
FAO	Food and Agriculture Organization of the United Nations, Rome
FIAC	Foreign Investment Advisory Committee, Colombo
FINIDA	Department of International Development Cooperation, Helsinki
GCEC	Greater Colombo Economic Commission, Colombo
HP	Hewlett Packard, U.S.A.
IBM	International Business Machines, U.S. A.
ICT	Institute of Computer Technology, Colombo
IDB	Industrial Development Board, Colombo
ILO	International Labor Organization, Geneva
ITC	International Trade Centre, Geneva
JETRO	Japan External Trade Organization, Tokyo
JICA	Japan International Cooperation Agency, Tokyo
MITI	Ministry of International Trade and Industry, Tokyo
NARA	National Aquatic Resources Agency, Colombo
NDB	National Development Bank, Colombo
NEC	Nippon Electric Company, Tokyo
NFC	National Finance Corporation, Tokyo
NIBM	National Institute of Business Management, Colombo

OECD	Organization for Economic Cooperation and Development, Paris
OECF	Overseas Economic Cooperation Fund, Tokyo
SAARC	South Asian Association for Regional Co-operation (Member States are: Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka)
SBFC	Small Business Finance Corporation, Tokyo
SIDA	Swedish International Development Authority, Stockholm
UNDP	United Nations Development Programme, New York
UNESCO	United Nations Education and Scientific Organization, Paris
UNIDO	United Nations Industrial Development Organization, Vienna

EXECUTIVE SUMMARY

The mission to Sri Lanka was under taken by the consultant during August and September, 1988. The consultant was based at the FIAC, Ministry of Finance and Planning, Colombo. The duties of the consultant were to: 1_/ train two local counterparts to undertake sectoral studies; 2_/ assist and identify types and magnitude of information dissemination services rendered by the Facilitation Centre for potential investors; and 3_/ organize methodologies, procedures, and formats for conducting sectoral studies, and initiate four sectoral studies as prototype modules. The following four sectors and subsectors were chosen for the sectoral studies: 1_/ fisheries and marine sector (selected subsector: Shrimp processing industry); 2_/ Manufacture and assembly of electronic parts and components; 3_/ Specialized services (selected subsector: computer software development); and 4_/ Mineral resource-based industry (selected subsector: glass and glassware).

The four sectoral studies indicated the following:

1_/ Shrimp processing industry

At present, the world demand for shrimp exceeds supply. Sri Lanka has very high potential for developing the shrimp aquaculture, due to, among others, suitable water temperatures and salinity for farming shrimps. It is estimated that from the present shrimp production level of 4,461 MT (wet form), the production can be increased to 28,000 MT (or at least 18,000 MT in processed form). If this amount is totally exported then the estimated foreign exchange earnings at current prevailing world market prices would be approximately U.S. $ 212 million.

The pond technology and hatchery know-how has to be imported, and the R & D (research and development) in this sector has to be considerably intensified. The potential for foreign exchange earnings and increased employment are enormous. Moreover, the possible profitability, or ROI (rate of return on investment), is also considered to be substantial. The shrimp feed production, and shrimp exported in consumer packs through foreign joint venture partners show considerable export potential as well. Finally, high potential for the re-export of shell fish (shrimp, and lobsters) also exists.

2 / Manufacture and assembly of electronic parts and components

Sri Lanka's potential for attracting high-tech investment in the manufacture and assembly of electronic parts and components is high due to the ready availability of a large semi-skilled and skilled labor force at relatively low wage rates. The joint ventures in the first hand should be carried out with Japanese and NIEs investors who are at present facing problems in terms of their appreciating currencies, rising wages, and scarcity of labor. The Japanese FDI during the past three years has sky-rocketed in the NIEs, and in ASEAN countries.

Sri Lanka offers highly attractive incentives to foreign investors, and Sri Lanka has a considerable comparative advantage compared to other Asian developing countries attracting FDI, especially in terms of ROI. These factors should be more actively highlighted in the promotional brochures of FIAC. The employment generation and technology transfer opportunities, and potential foreign exchange earnings for Sri Lanka are considered to be substantial.

3 / Computer software development

The computer software development sector also shows considerable export potential, mainly for specialized applications. In the OECD countries, both developing software and re-writing computer programs for specific customers has become exorbitantly expensive, especially in the light of the scarcity of computer specialists.

In Sri Lanka a large number of universities and institutes are offering computer technology courses of high quality. The number of trained systems programmers, data processors, and specialist service engineers in Sri Lanka is rapidly increasing, and if this sector is promoted actively, then foreign exchange earnings, technology transfers, and employment generation should grow considerably. The most appropriate alternative for promoting this sector is via foreign joint venture partners providing know-how and access to foreign markets.

4 / Manufacture of glass and glassware

Despite the availability of a large number of mineral resources such as silica sand of high quality, (and available at a low price), Sri Lanka still continues to import most of its glass and glassware products. The glassware sector can be developed on the basis of the present domestic demand, i.e. on the basis of import substitution. However, the technology needs to be imported from outside. The foreign exchange savings, and employment opportunities are quite high in this sector.

Regarding glass bottles manufacture, an additional plant would require that over 50% of the output be exported, preferably to SAARC countries. Similar conditions exist for sheet glass manufacture. Finally, due to cheap and abundant labor, and the availability of most of the necessary raw materials, the scope for the export of ornamental glass also exists. This venture has to be promoted with a foreign joint venture partner providing know-how, and access to export markets.

The consultant recommended the following:

* The FIAC's Facilitation Centre activities could easily be more closely coordinated with those of the EDB (Export Development Board), since this cooperation is expected to expedite the necessary information distribution and assistance to potential foreign investors.

* An investment promotion office should be established, at least in Japan, in order to increase Japanese FDI to Sri Lanka. In this respect, FIAC can cooperate with GCEC, and EDB.

* A technology park or a science park should be established in order to promote joint ventures in the fields of the manufacture and assembly of electronic parts and components, and in computer software development. The existence of a science park would be expected to considerably increase the joint venture projects in the field of electronics.

* The Sri Lankan Patent Law, which gives complete protection to foreign investors for both the product and process, should be highlighted in the FIAC brochures.

* It is recommended that FIAC should publish a booklet containing the comparative industrial factor costs of Sri Lanka with those of several other Asian countries. Assistance in achieving this should be sought from UNIDO, UNDP, ESCAP, and the ITC.

* The FIAC's computer facilities need further expansion. A mini-computer or a mainframe with a minimum capacity of 80 megabytes (memory) would substantially increase the efficiency of FIAC. Funding in this respect could be requested from UNIDO/UNDP.

* The promotional material, including the video tapes prepared by FIAC, should feature more of the success stories of the joint ventures, in particular in the field of electronic parts and components. Moreover, access to COMFAR should be given to both Sri Lankan and foreign investors. In this respect further training should be requested from UNIDO.

* Finally, a mission to study the investment incentives offered by some of the successful Asian countries which have attracted huge amounts of FDI be undertaken. Cooperation in this respect should be sought from UNIDO, and UNDP.

1 INTRODUCTION

1.1 Composition of the mission

The field mission to Sri Lanka was undertaken by:

Dr. M. Sikander Khan
UNIDO/FIAC Consultant
Industrial Information Specialist

1.2 Schedule of the mission

Sri Lanka was visited from August 7 to October 1, 1988.

1.3 Objective of the mission and background information

The purpose of the project was:

* The promotion of foreign, private investment with the objective of establishing suitable joint venture projects in Sri Lanka.

The duties of the consultant were as follows:

a_/ To prepare guidelines for sectoral studies on the industries which offer better investment potential;

b_/ To train two local staff to undertake similar studies covering a comprehensive range of industries with growth potential;

c_/ To organize methodologies, procedures, and formats for conducting sectoral studies;

d_/ To initiate 4 sectoral studies as prototype modules:

1_/ Fisheries and marine sector
2_/ Specialised services, i.e. data entry, computer software
3_/ Light engineering sector
4_/ Mineral resources based industry.

e_/ To identify types and magnitude of information dissemination service rendered by the Facilitation Centre of FIAC for potential investors;

f_/ To provide appropriate and efficient day-to-day service for visitors to the Facilitatio Centre, reply to queries from abroad, and provide adminis rative support staff to facilitate the activity;

g_/ To train local staff to continue the successful implementation of the above activity.

1.4 The consultant's programme

The consultant was based at the FIAC, Ministry of Finance and Planning, and had regular discussions with officials of this Ministry and with officials of the following institutions:

* Export Development Board (EDB)
* Industrial Development Board (IDB)
* Greater Colombo Economic Commission (GCEC)
* Ministry of Fisheries
* Computer and Information Technology Council (CINTEC)
* University of Colombo
* Department of Registry of Patents & Trade Marks
* United Nations Development Programme (UNDP)

Several private manufacturing enterprises and consulting companies in and around Colombo were visited. A list of officials interviewed by the consultant during the mission are given in Annex 1.

Reference material was obtained from among others:

* Ministry of Finance and Planning; Ministry of Fisheries; Central Bank of Sri Lanka; Ministry of Industries and Scientific Affairs; Ministry of Plan Implementation; Department of Census and Statistics; People's Bank; GCEC; EDB; IDB; CINTEC; The Ceylon Chamber of Commerce; Coopers & Lybrand; University of Colombo; Arthur D. Little International, Inc.; ADB; FAO; UNDP; and UNIDO.

1.5 Activities of the consultant

The activities of the consultant at FIAC can be divided into three parts (see point 1.3. Duties of the consultant):

a_/ Training of local staff;
b_/ Preparation of the sectoral studies; and
c_/ Work related to the Facilitation Centre of FIAC.

1.5.1 Training of local staff

Two counterparts were assigned to the consultant for training purposes by FIAC, Ministry of Finance and Planning.

* Ms. S. Sathkumara, Deputy Director
* Mr. S. Gunatilake, Deputy Director

Daily discussions were held with the counterparts regarding the sectoral studies. The following aspects of the sectoral studies were discussed:

* Preparation of guidelines for sectoral studies on the industries with highest growth potential, and which offer better investment potential.

* Methodologies, procedures, and formats for conducting sectoral studies.

* Identification of 4 sectoral studies as prototype modules. The subsectors were selected in close collaboration with among others the two counterparts.

The discussions were not only confined to the counterparts, but included several other staff members of FIAC. The counterparts provided complete assistance during the consultant's stay at the FIAC. The draft report has been discussed with the staff members of the FIAC.

Finally, some ad. hoc. assignments involved were:

* Installation and discussions around COMFAR (Computer Model for Feasibility Analysis and Reporting), and various other issues involving the expansion of computer usage at FIAC.

* At the request of the Export Development Board (EDB), a lecture was given, entitled, "Strategies for attracting foreign direct investment (FDI), and exports in the field of electronic parts and components, and computer software." The lecture was attended by the Executive Director, and members of the EDB Board, all the members of Sri Lankan Electronic Manufacturers Association, and Professor Samaranayke, Head, Computer Information Technology, University of Colombo, and CINTEC. The lecture was delivered on September 9, 1988. A paper prepared by the consultant was also distributed to the participants.

* The consultant had detailed discussions on how to attract Japanese FDI to Sri Lanka with Deputy Director Mr. Luxman Siriwardena, prior to his departure for Japan. Some samples of electronic components manufactured by Esjay Electronics Ltd., were collected by the consultant during the field visit, and forwarded to Mr. Siriwardena as reference material to be shown to prospective investors and Importers Associations in Japan.

* The consultant had discussions with the counterparts regarding the double taxation treaty between Japan and Sri Lanka.

1.5.2 Preparation of the sectoral studies

The assumptions while preparing the sectoral studies were that the chosen sectors should be suitable for joint ventures between Sri Lankan, and (preferably small and medium-size) foreign enterprises.

Moreover, throughout the study, a comparison will be made between the competitive advantage of SL in attracting foreign investment, and that of the PRC (People's Republic of China), Asian NIEs (Newly Industrializing Economies: South Korea, Hong Kong, Singapore, and Taiwan), ASEAN (The Association of Southeast Asian Nations: countries of interest: 1. Thailand, 2. The Philippines, 3. Malaysia, and 4. Indonesia), Pakistan, India, Bangladesh, and Mauritius.

After thorough discussions and in consensus with the Acting Director of FIAC, the following 4 sectors and subsectors were chosen as prototype modules for the sectoral studies:

1_/ Fisheries and marine sector (selected subsector: shrimp processing industry);
2_/ Manufacturing and assembly of electronic parts and components;
3_/ Specialised services (selected subsector: computer software development); and
4_/ Mineral resources based industry (selected subsector: glass and glassware).

The rationale behind choosing the sectors and subsectors mentioned above were:

SHRIMP PROCESSING INDUSTRY

* At present world demand for shrimp exceeds supply. This shortage of supply is expected to remain at least for a decade or two.

* High potential for developing especially the shrimp aquaculture in SL (both marine and fresh water), due to, among others, suitable water temperatures, and salinity for farming shrimp.

* Relative ease in obtaining pond technology and hatchery know-how on the world market.

* High rate of return on investment (ROI)

MANUFACTURING AND ASSEMBLY OF ELECTRONIC PARTS AND COMPONENTS

The main reason for choosing this sector is the appreciation of the Japanese Yen, West German DM, and Swiss Franc. Wages are also rising in most of the OECD countries, and at the same time labor is getting scarcer. Furthermore, with the appreciation of the Japanese Yen by over 50% since September 1985, the Japanese FDI (foreign direct investment) in East and Southeast Asian countries has sky rocketed, especially by small and medium-sized Japanese enterprises (subcontractors, etc.). Some of the East and Southeast Asian countries are at present themselves facing similar problems, such as currency appreciation, high wages, and scarce labor. Thus, Sri Lanka's potential to attract such high-tech investment (requiring large semi-skilled and skilled labor at relatively low wage rates) is rather high.

COMPUTER SOFTWARE DEVELOPMENT

The computer software development potential is high in SL, especially due to the large number of universities and institutes offering computer technology courses.

MANUFACTURE OF GLASS AND GLASSWARE

A large number of mineral resources are available in Sri Lanka. Regarding glass and glassware, most of the sheet glass, over 25% of the yearly demand for bottles and jars, and most of the other glassware products are imported. However, about 80% of the raw materials such as silica sand for glassware manufacture is available in abundance in Sri Lanka. Thus, this is another potential sector for joint venture.

METHODOLOGIES, PROCEDURES, AND FORMATS FOR CONDUCTING THE 4 SECTORAL STUDIES

The following steps were taken for carrying out the sectoral studies:

1_/ Selection of suitable sectors on the basis of
    a_/ export potential; and
    b_/ import substitution

2_/ Secondary data sources.

While collecting data (quantitative and qualitative) the following factors were given priority:

* Production
* Import
* Export
* Consumption
* Price/cost
* Type of technology
* Policies and strategies
* Prospects, problems and constraints

Attention was paid not only to the domestic Sri Lankan situation, but also to the worldwide situation.

Internal sources: Mainly FIAC project files, investment promotional material, and various other published material by the Ministry of Finance and Planning.

External sources:

Local:

* Industrial data published by the Department of Census and Statistics; Central Bank of Sri Lanka; published material issued by various Ministries; newspapers, and journals.

* Consulting companies: such as Cooper & Lybrand

Foreign published sources:

* Yearbooks published by various international organizations, such as UNIDO, FAO, etc. International publications, such as the Economist Intelligence Unit reports, Far Eastern Economic Review reports, etc.

3_/ Primary data sources

Reliance on secondary sources for preparing a sectoral study is not possible, mainly due to bias, insufficient data, and various other drawbacks. Also, the published data is generally rather old and out-dated. Therefore, in order to observe the real situation, the consultant visited several manufacturers in each of the 4 sectors studied, and got acquainted with the present industrial situation in SL. The prospects, problems and constraints within the 4 sectors were thoroughly examined.

Research institutes, universities, consulting companies, and experts within the four sectors were also contacted and interviewed by the consultant.

Note: No attempt has been made to calculate the exact profitability figures for each sector and subsector, since exact profitability (ROI) figures can only be calculated after carrying out market and technical feasibility studies. The manufacturers which were visited by the consultant during the mission were highly secretive in disclosing their profitability figures. However, very rough profitability figures are indicated under each sectoral study. The same arguments hold for foreign exchange earnings and savings, and employment generation.

The 4 sectoral studies are presented in detail at the end of this mission report.

1.5.3 Work related with the Facilitation Centre of FIAC

During the consultant's stay at the FIAC, all the project files dealing with the above mentioned four sectors and subsectors were reviewed. The number of files was about 50. The FIAC draft booklet on Industrial Factor Cost (to be published in October 1988) was thoroughly reviewed by the consultant and suggestions for improvement were given to the author. The computer facilities, and the information dissemination services rendered by the Facilitation Centre were found to be effective and satisfactory. However, room for further improvements still exists.

Some discussions with potential investors also took place. Advice on investment issues was also provided to FIAC staff members whenever it was requested.

1.6 Recommendations

1_/ The Facilitation Centre activities could easily be more closely coordinated with the EDB. Generally, a joint venture enterprise is expected to export a certain portion of its output, and close cooperation with EDB would expedite the flow of necessary information and assistance to potential investors.

2_/ In order to increase FDI into Sri Lanka, especially in the field of the manufacturing and assembly of electronic parts and components, it is a must to establish an Investment Promotion Office at least in Japan. This activity should be carried cut in close collaboration with GCEC, and EDB. In this respect assistance could be requested from UNIDO/UNDP.

3_/ In order to promote joint ventures in high-tech fields, such as the manufacturing of electronic parts and components, and computer software, there is an urgent need to establish a "Science park", or "Technology park", similar to the ones existing in the developed countries such as Ireland, Sweden, U.K., France, and in the NIEs (Singapore and Taiwan). During my interviews with Japanese investors in Japan, one of the important considerations taken into account when establishing plants for the manufacture of electronic parts and components was the existence of science parks (as in Singapore and Taiwan).

4_/ The Sri Lankan "Patent Law" should also be more highlighted in the FIAC brochures, especially for investors in the field of electronic parts and components. The "Patent Law" covers both the product and process. This type of favorable patent protection is given to foreign investors by only a few developing countries.

5_/ An excellent booklet on Sri Lanka's Industrial Factor Costs is expected to be published by FIAC during early October. The next step should be to publish a booklet comparing the industrial factor costs of SL with several other Asian countries, such as India, Singapore, Taiwan, Thailand, Indonesia, the Philippines, the PRC, Korea, and Japan. This booklet should be prepared in the first hand for Japanese investors (preferably in the Japanese language), and other Asian investors. The booklet can be prepared in collaboration with the GCEC. Assistance should be also acquired from UNIDO, UNDP, ESCAP, and the ITC.

6_/ At FIAC, PC's (personal computers) are used for maintaining information on FIAC approved projects, investment promotion activities, and feasibility studies. At present, the total computer capacity is limited to only 30 MB (megabyte) on hard disk. The computers are slow and unable to cope effectively with the daily activities of FIAC. Therefore, the computer facilities need further expansion. A mainframe or a minicomputer with a minimum capacity of 80 MB (memory) will substantially increase the effectiveness of FIAC, e.g. in project evaluation, efficient day-to-day service for visitors, in replying to queries from abroad, and in the other administrative work of the FIAC. Funding can be requested from UNIDO/UNDP.

7_/ A separate room for visitors with audio/video facilities be established. The video films should feature more of the success stories of the joint ventures (in particular), in the field of electronic parts and components. The video tape can be prepared in collaboration with the EDB/GCEC. Moreover, access to COMFAR (latest version) should be given to both Sri Lankan and foreign investors, so that sensitivity analysis, ROI, and payback periods on investment can be calculated accurately within a short period of time.

8_/ Finally, a mission to some of the successful Asian countries which have attracted huge amounts of FDI be undertaken by FIAC. The suitable countries for studying (market intelligence) what investment incentives are being offered are: Thailand, Singapore, Malaysia, and Taiwan. For studying the technology parks/science parks, Singapore and Taiwan should be visited. The field visits will facilitate the preparation of a more comprehensive strategy for attracting FDI to Sri Lanka. In this respect also, cooperation should be sought from UNIDO and UNDP.

2 THE SRI LANKAN ECONOMY

2.1 Economic outlook

The Sri Lankan economy has been growing during the past years at a rate of at least 4 per cent annually 1_/, however in 1987 the growth rate fell down to about 1.5%, mainly due to external factors such as the decline of commodity prices, and the internal factors such as the ethnic disturbances (see Table 2.1).

The SL economy is still very much dependent on agricultural production, such as tea, rubber, and coconut. In 1987, agricultural exports accounted for 42% of the total exports. However, industrial production and exports are gradually increasing.

The share of the manufacturing sector in the GDP during 1982 - 1987 has been around 15%. However, the manufacturing sector has been growing during the same period at around 6.2% annually. Moreover, in 1987 the manufacturing sector's real growth rate was 7.5% as against the 1.5% growth of GDP.

Regarding the subsectoral share in total industrial output, the three product groups: food, beverages, and tobacco; textile, wearing apparel, and leather; and chemicals, petroleum, coal, rubber and plastics accounted for 87% of the industrial output in 1987. The share of engineering based industries remained relatively small.

According to the estimates made by the National Planning Division, Ministry of Finance and Planning, the GDP growth in real terms during the period 1988 - 1992 will be 5.3% per annum. The assumptions behind these estimates are among others that there will be an abatement of terrorist activities in SL.

1_/ The data sources for this chapter, among others, include the Central Bank of Sri Lanka; Department of Census and Statistics, Ministry of Plan Implementation; and the Ministry of Finance and Planning.

TABLE 2.1 BASIC ECONOMIC INDICATORS - SRI LANKA

	1986	1987
* AREA: 64,453.6 sq. km.		
* LITERACY RATE (1987): CA. 87%		
* POPULATION (mid-year estimates; Mn)	16.10	16.40
EXCHANGE RATE (Rs./U.S.$)	28.02	29.44
NATIONAL INCOME		
* Rate of growth of GDP % (in real terms)	4.30	1.50
* GNP (Rs. Mn)	159,852	173,395
* Per capita GNP (current prices) U.S.$	354	360
* Exports as a % of GDP	18.9	20.5
* Imports as a % of GDP	30.8	31.0
* Inflation (%, average, estimate)	10	>10
* Sectoral growth rates (%)		
-Agriculture, forestry & fishing	2.6	-5.8
-Mining & quarrying	5.2	19.0
-Manufacturing	8.4	7.5
INDUSTRIAL PRODUCTION		
* Value of production (Rs. Mn.)	41,453	48,540
-Food, beverages, and tobacco	12,129	12,962
-Textile and leather	12,088	15,428
-Wood and wood products	632	677
-Paper and paper products	1,289	1,372
-Chemicals and chemical products	11,088	13,477
-Non-metallic mineral products	2,053	2,156
-Basic metal products	281	307
-Fabricated metal products; machinery and transport equipment	1,757	2,006
-Manufactured products n.e.s.	136	155
VALUE OF IMPORTS (c.i.f., Rs. Mn)	54,559	60,517
* Consumer goods (rice, flour, sugar..)	12,256	13,804
* Intermediate goods (fertilizer, petroleum..)	28,618	34,619
* Investment goods	10,556	11,332
* Unclassified	3,129	762

(con't.)

(con't.)	1986	1987
VALUE OF EXPORTS (f.o.b., Rs. Mn)	34,072	41,133
* Agricultural exports	15,764	17,437
-Tea	9,253	10,654
-Rubber	2,627	2,929
-Coconut	2,389	2,140
-Minor agricultural products	1,500	1,714
* Industrial exports	15,878	20,004
-Textile and garments	9,629	12,897
-Petroleum products	2,358	2,592
-Other industrial products	3,891	4,515
* Mineral exports	1,182	1,759
-Gems	755	1,447
-Other	427	311
Balance of trade	-20,487	-19,384
FOREIGN ASSISTANCE (Rs. Mn)		
*Foreign loans and grants	12,789	
-Foreign loans	9,036	
-Foreign grants	3,753	
Private remittances from abroad (Rs.Mn)	9,142	

Source: Central Bank of Sri Lanka, Annual report 1986, and 1987, Colombo, 1987 and 1988.

2.2 International trade and FDI

Table 2.2 show that SL in 1987 had a trade deficit with all the major trading partners except for West Germany and the U.S. Sri Lanka is heavily dependent on imported technology and industrial raw materials. A well designed technology development strategy is lacking in SL. Moreover, limited R & D is carried out in both the private and public sectors. Due to these factors Sri Lanka's trade deficit is rather high.

SL recognizes the vulnerability of dependence on the narrow home market. Therefore, a dual strategy of giving equal priority to export industries, and import substitution is considered to be the most successful. Promotion of foreign investment is given high priority, by providing excellent fiscal incentives. However, SL still lacks sufficient numbers of promotional and financing agencies for foreign investors.

Table 2.2 Sri Lanka's major trading partner (Rs. Mn)

Country	1986		1987	
	Import	Export	Import	Export
Japan	8,934	1,813	8,958	1,951
U.S.	3,816	8,480	3,359	10,434
U.K.	2,882	1,893	4,135	2,159
West Germany	2,405	2,306	2,650	2,946
P. R. of China	2,418	477	1,876	478
U.A.E.	2,864	422	2,548	635
India	2,222	331	2,460	182
NIEs				
Hong Kong	2,396	294	3,823	543
Korea (South)	1,965	59	2,320	150
Singapore	2,011	785	2,948	908
Taiwan	2,669	35	3,123	93

Source: Sri Lanka Custom Office, Colombo, 1987, and 1988.

FDI is playing a key role in Sri Lanka's manufacturing sector. It provides employment, foreign exchange, technology, upgrades the competitiveness in terms of price and quality of manufactured products, and access to foreign markets.

Foreign investment in the FIAC and GCEC areas showed significant improvement in 1987, despite the disturbances. During 1987, seventy seven projects with an envisaged investment of Rs. 1.3 billion were approved by FIAC.

3. PROMOTION OF FDI VIA JOINT VENTURES

FDI can be promoted with a number of measures. FIAC is promoting FDI with the objective of establishing suitable joint venture projects. The joint venture alternative is considered to be one of the best alternatives for promoting FDI. This alternative also requires tedious work, for e.g. in locating suitable joint venture partners, both local and foreign; and screening of applications, etc. The joint venture alternative is further complicated due to the differences in the perspective of the investor and the host country.

3.1 Sri Lankan perspectives

The FIAC criteria for approving joint venture project proposals are:

* Employment generation
* Scope for technology transfer
* Export potential/access to export markets/foreign exchange earnings
* Import substitution
* Obtain modern marketing and management know-how

The various incentives offered to foreign investors by FIAC are more or less similar to those offered by countries such as Thailand, Singapore, and Taiwan, which have been highly successful in attracting FDI. Some differences do exist, for example, corporate taxes are relatively higher in Sri Lanka, and several companies mentioned the delays in implementing the joint venture projects due to red tape at various Ministries and financial institutions.

3.2 Foreign investor's perspectives

The joint venture's foreign partner's perspective is different due to the nature of his responsibility:

* equity contribution of capital or in kind
* management responsibility
* administrative/production responsibility
* responsibility for adaptation of technology
* responsibility for final product
* infrastructure dependency
* buyback undertakings
* component deliveries
* end customer contacts for service
* training, etc.

As can be seen, the Sri Lankan and foreign investor's perspectives are quite different. The restrictive Sri Lankan policy on payment of initial fees, technical fees, and royalties, makes the profitability of a venture of utmost concern for a foreign investor. Therefore, in order to attract FDI the targeted sectors should offer profitable opportunities to foreign investors.

A detailed comparative analysis regarding Sri Lankan and other countries' abilities in and strategies for attracting FDI, are presented in sectoral study II : Manufacture and assembly of electronic parts and components.

4 SECTORAL STUDY I :

STRATEGIES FOR DEVELOPING THE SHRIMP PROCESSING SECTOR IN SRI LANKA

4.1 Introduction

This report deals with strategies for developing the shrimp processing sector of Sri Lanka. The methodologies for carrying out the sectoral studies are mentioned separately in the mission report. The report presents in detail the present global situation in the shrimp processing industry. Worldwide shrimp production, import and export data are also presented. Finally, forecasts on shrimp production, consumption, import, and export are also made.

A large amount of data and information has been obtained from the Foreign Investment Advisory Committee (FIAC), Ministry of Finance and Planning; Export Development Board (EDB); Ministry of Fisheries; Sri Lanka Customs Office; FAO; Infofish; and several other organizations, and shrimp processors and exporters.

4.2 Aim and purpose of the study

In terms of foreign exchange earnings and employment opportunities, the development of the shrimp sector is vital for Sri Lanka. The present study concentrates on the development possibilities for the shrimp processing industry through joint ventures. The main aim is to identify the necessary areas for joint ventures for both the Sri Lankan and foreign investors within the shrimp processing sector.

4.3 Sri Lanka's fishery industry

Sri Lanka declared the EEZ (Exclusive Economic Zone) in 1978. This gave Sri Lanka a sovereignty over 230,000 square kilometers of the Indian Ocean. Sri Lanka has a large artisanal fishery sector and a relatively large domestic market. Data regarding Sri Lanka's fishery sector and trade is given in Tables 4.1 and 4.2. As can be seen from these tables, production and imports are increasing, whereas exports show a decline.

Table 4.1: Sri Lanka's fishery sector (current prices)

('000 MT)	1970	1980	1986	1987
Production:				
* Coastal	86.6	165.3	144.3	149.3
* Off-shore and deep sea	2.4	2.2	3.4	4.3
* Inland	8.3	20.3	35.4	36.5
Total production	97.3	187.8	183.1	190.1
* Contribution to GDP (%)			2.06	2.08
* Contribution to the agriculture sector (%)			8.92	9.12
* Employment in the fishery sector				75,000 *

Source: Ministry of Fisheries, Colombo
MT = Metric tons
* = Provisional

Table 4.2: Trade in the fishery sector

	1980		1986		1987	
	'000 MT	Mn Rs.	'000 MT	Mn Rs.	'000 MT	Mn Rs.
* Imports	22.4	298	32.4	633	38.1	768
* Exports	2.4	250	3.4	624	2.4	593

Source: Ministry of Fisheries, Colombo; and Sri Lanka Customs, 1988.
Mn = Million

Fish contributes over 55% of the Sri Lankan supply of protein from animal sources. Thus, the Government of Sri Lanka has accorded very high priority to the development of the fishery industry. Regarding fish exports, shrimp 1/ represented about 60% of the total exports in the fishery sector in 1987.

1/ "Shrimp" refers to prawn also. In SL about ten shrimp species have been recorded. About five species of penaeid shrimp make a significant contribution to this fishery.

5 THE SHRIMP SECTOR - WORLDWIDE SITUATION

5.1 Introduction

Shrimp can be obtained from the following sources:

* Cultured marine shrimp: Taiwan is considered a leader; Fetching high prices on the world market.
* Wild shrimp: India is considered a leader; Fetching high prices on the world market.
* Inland fresh water shrimp: Thailand is considered a leader; High demand, but fetching low prices on the world market.

5.2 World production and trade in shrimp

The world demand for shrimp exceeds supply. The market can be characterized as a seller's market. The shrimp sector worldwide has been showing steady growth.

Tables 5.1 to 5.4 show the estimated world aquaculture production, shrimp landings of major producing countries, shrimp imports, and exports.

Table 5.1 shows that world shrimp landings are rapidly increasing, notably of cultured marine shrimps. In 1980, the cultured shrimp share in total world production was 5%, and by 1987, this share had increased to 16%. The total world production of shrimp in 1987 was about 2.2 million MT (see Table 5.2). Previously all the shrimp landings were from the wild. However, due to the high costs of catching wild shrimp, shrimp farming is rapidly increasing in warm water shrimp fishery countries, in particular due to high rate of return on investment (ROI).

The Sri Lanka coastal waters are considered to have one of the most suitable temperatures and salinity for farming shrimp. Further, Sri Lanka does not suffer to the same degree from cyclones (including typhoons) which are common problems in Taiwan, Japan, South Korea, the PRC, etc.

Table 5.1: Estimates on shrimp aquaculture production (in 1000 MT; wet form; mainly brackish water; fresh water production is less than 1% of the total production)

Country	1980	1986	1987p	1990x
* P.R. China	2.0	70.0	80.0	100.0
* Taiwan	5.0	65.0	75.0	80.0
* Indonesia	28.0	48.0	55.0	65.0
* Ecuador	9.2	36.2	38.0	45.0
* Thailand	10.0	16.0	18.0	25.0
* Bangladesh	7.0	13.5	14.5	20.0
* India	12.0	14.0	14.0	20.0
* Philippines	1.5	9.0	9.6	20.0
* Vietnam	4.0	7.0	7.0	10.0
* Peru	1.0	3.7	4.0	6.0
* Japan	1.6	2.0	7.0	2.0
* Panama	0.4	1.8	1.9	5.0
* Others	7.8	18.8	21.0	46.0
Total	90.0	305.0	340.0	444.0
Share in total shrimp production (%)	5	14	16	19

Source: INFOFISH, Shrimp 1988, conference programme, Kuala Lumpur, Malaysia, and FAO, Yearbook: Fishing statistics catches, and landings/ Commodities - 1986, Volume 62 and 63, Rome 1988.
(p) = Preliminary; (x) = Extrapolation

Table 5.2: Shrimp landings by 15 major producing countries (in 1000 MT; including freshwater shrimp catch and aquaculture production (brackish water))

Country	1980	1986	1987p
* PRC	218	300e	315
* India	250	215	220
* USA	162	183	170
* Indonesia	141	160	165
* Thailand	137	133	135
* Taiwan	81	120e	140
* Philippines	34	85	90
* Mexico	77	73	75
* Malaysia	84	73	70
* Brazil	58	69e	69
* Greenland	36	64	75
* Japan	56	61e	60
* Norway	45	57	40
* Vietnam	41	56	55
* Ecuador	17	53	60
* Others	323	442	450
Total	1,760	2,144	2,189
Marine	1,655	2,000	2,015

Source: INFOFISH, op. cit., and FAO, op. cit.
e = estimate

Table 5.3: Shrimp imports (in 1000 MT; processed form) *

Country	1981	1985	1986	Growth rates 1985/1986 (%)
* Japan	163.0	183.5	213.8	17
* USA	101.0	163.3	181.5	11
* EC	138.6	184.8	216.4	17
* Others	64.1	103.3	117.3	14
Total	466.7	634.8	729.0	15

Source: INFOFISH, ibid.
* Exports/imports are normally in frozen form (processed form: PAD/PND style), i.e. the recovery weight is about 65% to 68% of the wet form (ex-pond).

PAD: Peeled and de-headed
PND: Peeled and not de-headed

Table 5.4: Shrimp exports (in 1000 MT; processed form)

Country	1981	1985	1986
* India	52.9	60.3	55.2
* Taiwan	11.1	35.4	53.3
* Denmark	22.3	35.1	52.1
* Greenland	22.1	34.2	43.2
* Thailand	22.6	32.2	36.8
* Mexico	35.2	32.5	35.5
* PRC	24.0	22.0	35.0
* Indonesia	24.6	29.8	32.7
* Ecuador	12.1	20.3	28.3
* Hong Kong	12.7	19.2	24.0e
* Others	181.5	241.7	232.7
Total	421.1	562.7	624.8

Source: INFOFISH, op. cit.

5.3 World consumption of shrimp

Figure 5.1 show, that the U.S. is the largest consumer of shrimp, followed by Japan and the EC/EFTA countries. In the case of EC/EFTA, the consumption figures are based mainly on net imports. It is known that several of the EC/EFTA countries have substantial numbers of trawlers for shrimp catching, and some of these countries are also exporting certain amounts of their shrimp catches. Thus, the consumption figures for EC/EFTA as indicated in Figure 5.1 should be considered as the minimum amount of shrimp consumed by these countries.

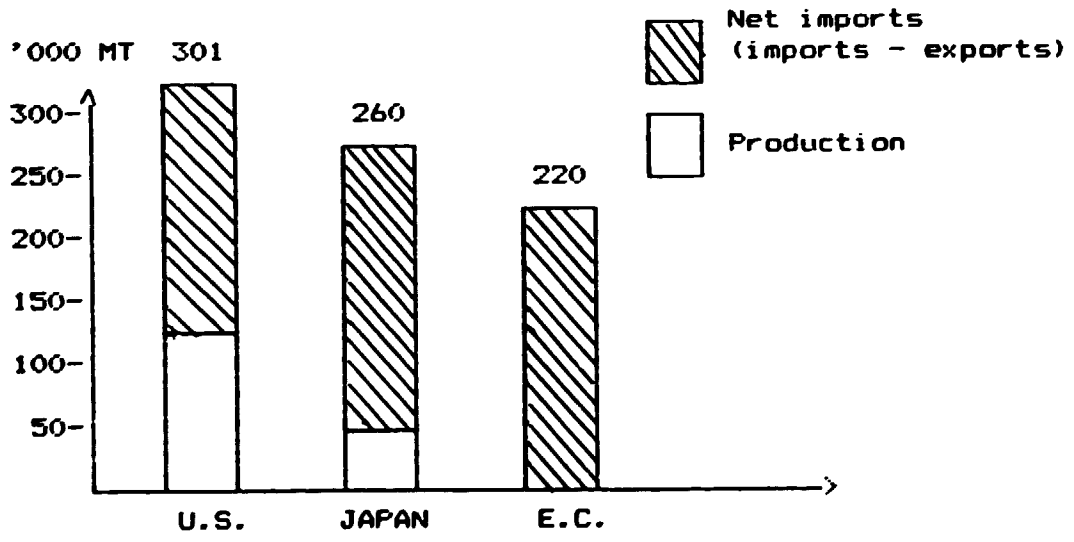

Figure 5.1 Major shrimp consumers - 1986
(in processed form)

5.4 World demand and supply of shrimp

5.4.1 Forecasts on demand and supply

The forecasts on shrimp production made by INFOFISH and FAO in 1982 indicated that Asia's production of cultured shrimp in 1987 would be around 150,000 MT. The actual production figures for 1987 were about 300,000 MT (see Table 5.1). The 1987 forecasts indicated that Asia's cultured shrimp production by the year 2000 should be approximately 800,000 MT (source: INFOFISH). The underlaying assumption is that the PRC (People's Republic of China) will substantially increase its shrimp production during the next 5 to 10 years. The PRC is obtaining technology and know-how from Japan, and also indirectly from Taiwan via Hong Kong. Several joint ventures have been also established, among others, between Chinese and Japanese companies.

Japan and the U.S. are the world largest consumers of shrimp, and they together account for over 60% of the world demand. The other large consumers are the Western European countries. Table 5.5 indicates that by 1990, Japan, the U.S. and Western Europe will require at least an additional 75,000 MT of imported shrimps (processed form; or 115,000 MT wet form).

These projected growth rates are very conservative, and deal mainly with imports. The actual growth rates are expected to be much higher, and thus the worldwide demand for shrimp is expected to far exceed the supply. This is especially due to short falls in the shrimp production in Taiwan. Moreover, contrary to expectations, the PRC has not until now increased its shrimp exports substantially.

Table 5.5: Projected imports of shrimp (processed form)

MARKET (OECD)	CONSUMPTION ('000 MT) 1986	PROJECTED GROWTH RATE/year %	ADDITIONAL IMPORTS IN 1990 ('000 MT)
* Japan	>260	2	> 22
* The U.S.	>300	2	> 25
* Western Europe (EC/EFTA)	>220	3	> 28
Total	>780		> 75

Source: Own estimates (based on trend analysis, and EDB reports)

6 THE SHRIMP SECTOR IN SRI LANKA

6.1 Introduction

The shrimp sector is very rapidly expanding in Sri Lanka. In the past shrimp was consumed in the domestic market, however, during the last few years most of the production is exported to Japan, the U.S., and the E.C., where they fetch substantially higher prices.

The major shrimp fishery areas in Sri Lanka are located in Negombo, Chilaw, Batticaloa, Jaffna, and the "mullaitivu" districts. In the past, over 50% of the total fish production, and most of the shrimp catches came from the Northern and Eastern coasts of Sri Lanka. Due to the present ethnic disturbances the fish and shrimp catches at present from these areas are negligible. Now shrimp fishery is only possible on the Western coast and to a limited extent on the Southern coast.

6.2 Production and trade in the shrimp processing sector

Tables 6.1 and 6.2 show Sri Lanka's shrimp production, imports and exports. As can be seen in Table 6.2 shrimp exports have considerably declined during the period 1986 to 1987.

Table 6.1: Shrimp production in Sri Lanka
(as caught/ complete shrimps; quantity in MT)

	1980	1986	1987
Total (wet form)	5,000	4,311	4,461

Source: Ministry of Fisheries, Colombo, 1988.

In 1984, SL had a peak export of 2,610 MT of shrimps. The present production of cultured marine shrimp is estimated to be less than 500 MT (1987; processed form), but it is increasing rapidly.

6.3 Present situation in the shrimp processing sector

6.3.1 Aquaculture production

Sri Lanka has about 644,000 acres of water bodies of which 344,000 acres are fresh water and the remaining 300,000 acres are brackish water. However, less than 100,000 acres of brackish water may be considered potentially suitable for cultured marine shrimps.

Table 6.2: Sri Lanka's trade in shrimp

C.C.C.N.	(Rs. Mn.)	1986 IMPORT	1986 EXPORT	1987 IMPORT	1987 EXPORT
03	Fish, crustaceans and Molluscs	633	624	768	593
03.03A	Crustaceans and molluscs, fresh prawns or shrimp	--	19	--	5
03.03B	- do - chilled/frozen	--	409	--	334
	- do - salted/dried	1.5	1.3	0.4	--
	Metric tons (shrimps/prawns)				
03.03A	..fresh prawns/shrimps	--	93.2	--	18.7
03.03B	..chilled/frozen (processed form)		1,880	--	1,253
--	..salted/dried	30.5	10.3	4	--

Source: Sri Lanka customs, Colombo, 1988
All the figures have been rounded upwards
-- Negligible or zero
C.C.C.N. = Tariff Nomenclature of the Customs Cooperation Council

Shrimp culture/farming

Three types of shrimp farming systems are used.

1. Extensive grown-out system: These ponds use no supplementary feeding or fertilization. Yields are less than 500 kg/hectare/harvest, and the stocking densities of larvae are in the region of 5,000 to 20,000 post-larvae per hectare.

2. Semi-intensive system: These ponds require shrimp feed, and water is exchanged by way of pumping. The stocking densities of post-larvae are from 40,000 to 80,000 per hectare. Yields are about 1,000 kg/hectare/harvest.

3. Intensive system: This system originated in Japan and Taiwan. In this system the stocking densities of post-larvae is 100,000 to 200,000 per hectare, and water exchange rates are very high. This system also requires high protein feeds. Yields are in the range of 2,000 to 5,000 kg/hectare/harvest. However, higher yield figures have been recorded, notably in Japan and Taiwan.

Aquaculture is a recent phenomenon in Sri Lanka. Shrimp farming started in Sri Lanka only in 1985. At present four large companies have ponds for cultured marine shrimps (see Table 6.3 below).

Table 6.3: Sri Lankan companies carrying out cultured shrimp activities

COMPANY	OWNERSHIP (%)		AREA
	JOINT VENTURE	LOCAL	Acre/hectare
o Andriesz Mariculture (Intensive system)		100 *	128/52
o Lever Aquaproducts (Intensive system)	With Unilever U.K. FIAC approved project*		280/114
o Carsons Ltd., (Semi-intensive system)	Joint venture (U.K.), FIAC approved project		500/203
o Aquatic products (Semi-intensive system)		100	125/51
o Few small holders		100	75/30
Total area under production			1,108/450
Total land allocated for shrimp production			2,000/810
Grand total			3,108/1,260

Source: Information collected through personal interviews, and cross-checked in FIAC project files.
* Including own hatcheries

6.3.2 Fresh water shrimp

The fresh water experimental shrimp project in Mahaweli System B, which started in October 1987, has yielded promising results. However, the price fetched internationally is far lower as compared to the cultured or wild/marine shrimps, i.e. less than U.S.$ 10/kg (ex-pond price). At present Thailand is one of the world's biggest suppliers of fresh water shrimp.

6.3.3 Shrimp processors and exporters

In 1983, there were 13 processors and exporters of shrimp in Sri Lanka. At present, the processing (freezing and wholesale packing), and exporting are undertaken mainly by the following six companies all of which are 100% locally owned:

- o Andriesz Mariculture
- o Agromarine
- o Ceylon Shrimps
- o Lanka Marine
- o Sea & Land
- o Sirimic

Andriesz Mariculture (100% local) is the largest shrimp exporting company in Sri Lanka. This company in 1987 exported over 422 tons of frozen shrimp (Rs. Mn. 100; or 33% of Sri Lanka's total shrimp exports). About 80% of the exported shrimp were wild, and the remaining cultured. In 1988 the cultured shrimp share in total production is expected to reach at least 25%.

Presently, the wild shrimp are harvested only in very limited quantities, due to the disturbances in the Northern and Eastern part of Sri Lanka. Andriesz is nevertheless able to catch limited amounts of wild shrimp in Jaffna area, but their processing plant is under-utilized.

As soon as fishing is again permitted in the Northern and Southern coasts, which are rich in shrimp, the total production is expected to more than double from the present level of less than 4,000 MT (wet form).

The Sri Lankan shrimp are exported mainly head-less (tail-on). However, the demand is growing for:

* cooked and peeled;
* head on; and
* canned shrimp (mainly in demand in Europe and the U.S.)

Regarding canned shrimp, one company (namely Safcol Lanka- a joint venture with a Thai company; a FIAC approved project) is carrying out this activity only occasionally. The problem faced by this company is the lack of sufficient quantities of shrimp.

At present, the hatcheries and the local availability of fry/post-larvae is considered to be satisfactory in SL. Lever Aquaproducts is also exporting fry to Pakistan. The feeding of the young shrimp requires minute artemia shrimp, and rotifer zooplanktons. In Sri Lanka, rotifer zooplanktons are locally available, whereas minute artemia shrimp is imported primarily from Taiwan, which is exorbitantly expensive. The feed share in terms of the total cost of shrimp production is calculated to be approximately 3/5 (holds for intensive system). Thus, imported feed considerably reduces the profitability of the shrimp farming.

6.3.4 Price, quality, and competition

Price

Japan is one of the major buyers of shrimp on the world market, and the price of shrimp is largely determined by the Japanese buyers. Shrimp prices fluctuate greatly, practically on a weekly and monthly basis. Sri lankan shrimp are purchased by buyers from Japan, the U.S., and Europe.

The ex-pond (marine) export price per kg of Sri lankan cultured tiger shrimp (depending on weight and size) varies from U.S.$ 10 to $ 22. Similarly, wild shrimp fetch the same export price. The fresh water shrimp fetch a much lower export price, i.e. from U.S. $ 8 to 10 1_/.

Quality and competition

Quality-wise, Sri Lankan shrimp - generally "Tiger shrimp" - are considered to be one of the best available on the world market. Quality controls are also rigid. The main Sri Lankan competitors for tiger shrimp are from: Indonesia, Malaysia, the Philippines, Taiwan, and Thailand. Regarding profitability, all the companies interviewed indicated that their ventures were profitable, despite the high costs of imported feed. However, they declined to provide any exact figures on their profitability.

6.3.5 Problems and constraints

Concerning intensive and extensive shrimp farming, the suitable land for shrimp farming is limited in Sri Lanka at present due to a variety of reasons, such as a lack of sufficient amounts of brackish water, and large number of fishermen competing in limited areas, especially due to ethnic disturbances in the East and North of Sri Lanka. Therefore, intensive farming is carried out, which also leads to certain problems, such as low productivity per pond, and a complete absence of modern pond engineering or technology. The lack of research is another major constraint.

NARA (The National Aquatic Resources Agency) within the Ministry of Fisheries, is at present not carrying out any significant research dealing with shrimp culture, due to lack of resources.

1_/ Source: EDB, FAO, Liver Aquaproducts, and Andreisz.

The importance of Aquaculture research can be noticed from the following example. Due to diseases in the shrimp ponds in Taiwan, the annual shrimp production of Taiwan is expected to be less than 40,000 tons in 1988, i.e. a 50% decline in production as compared to 1987 levels (see Table 5.1).

7 PROSPECTS FOR SHRIMP PRODUCTION IN SRI LANKA

Good climatic conditions, suitable water temperature, ready access to warm clean water, flat terrain with appropriate soil characteristics, excellent quality and type of shrimp, and shrimp status as a high value product, all makes the development prospects in this sector of utmost importance for Sri Lanka.

Requirements for developing the shrimp sector

* Suitably graded land
* Nursery ponds
* Grown out ponds
* Hatcheries
* Handling and processing facilities (chilling and freezing storage, quality control, packaging, trawlers, repair and maintainence, etc.)
* Training (in hatchery and grown out techniques)
* Research (disease control, productivity, etc.)

7.1 Wild shrimp availability

* North: Year round shrimps (peak season for shrimp catching : October to February)
* East and West: Seasonal, approximately 3 months/year
* South: Negligible

Estimates: An increase from the present production level of less than 4,000 MT to at least 8,000 MT (wet form) with existing facilities. The estimates are only valid if shrimp catching is permitted in the Eastern and Northern coastal areas. In export weight, the quantity will be over 5,000 MT (processed form).

7.2 Cultured shrimp availability

7.2.1 Brackish water shrimp

Taiwan's shrimp productivity per pond is considered to be one of the world's highest. Andriesz initially obtained assistance for one year from a Taiwanese expatriate, and at present has reached a production level of 4,652 kg (wet form)/half hectare pond (per crop) through intensive farming. This is one of the world highest productivity record per pond. Andriesz expects to produce 260 MT of cultured marine shrimps for exports by 1989 (on 55 ponds of half hectare each).

The Government of Sri Lanka has tentative plans to allocate 50,000 acres (20,250 hectare; brackish/fresh water) for shrimp production. However, estimates for suitable land available for cultured shrimps varies from a minimum of 10,000 acres (4,050 hectare) to 25,000 acres (10,125 hectare), mainly on the West Coast 1/. If conservative estimates of 15,000 acres (6,075 hectare) are considered realistic and using the average farmed productivity figures of 3,000 kg/hectare (intensive system), then the estimated production will be about 18,225 MT (wet form). In terms of export weight the quantity will be 11,866 MT.

7.2.2 Fresh water shrimp

As mentioned earlier, fresh water shrimp production is only in the experimental stage. Rough estimates indicate that by 1995, at least 2,000 MT (processed form) of fresh water shrimp should be able to be harvested in cultured ponds (mainly in Mahaweli area). 50% of the expected harvest is estimated to be consumed in the domestic market, and the other half used for exports.

7.3 Estimated shrimp production in Sri Lanka for exports

Using the present average ex-pond price of U.S.$ 12/kg for average size wild and cultured marine shrimp, and U.S.$ 8/kg for fresh water shrimp, will give an estimated export sales value of U.S.$ 212 million in foreign exchange (see Table 7.1). It is assumed that practically all the wild, and cultured marine shrimp will be exported, whereas about 50% of the fresh water shrimp will be consumed in the domestic market.

1/ Estimates are based on information provided by the Ministry of Fisheries, EDB, Lever Aquaproducts, and Andriesz.

Table 7.1: Estimated shrimp production for exports by 1995

	'000 MT (processed form)	Price/kg (average) $	Revenue (Mn $) (current price)
* Wild shrimps	5	12	60
* Cultured shrimp:			
o Brackish water	12	12	144
o Fresh water	1	8	8
Total	18		212

Attempts have not been made to calculate the cost of imported inputs such as trawlers, machinery and equipment, shrimp feed, and know-how. However, in spite of the high amount of the imported inputs, the net foreign exchange earnings are estimated to be substantial.

7.4 Shrimp processing development policy and strategy

While formulating the shrimp processing development policies and strategies, the following goals should be taken into account:

* increased production
* the improvement of processing facilities
* increased exports (and foreign exchange earnings)
* the improvement of productivity and reduce operating costs

In order to implement the shrimp processing development policies and strategies, assistance through joint ventures is considered to be most appropriate. The advantages of joint venture alternatives are:

* The productivity for cultured shrimp can be increased, and the production costs can be substantially reduced with the assistance of a well-established shrimp producer from abroad. At present, due to the high price of imported shrimp feed, the Sri Lankan shrimp production costs are higher than similar types found for example, in Taiwan and Thailand. Thus, the ROI in this sector is lower in Sri Lanka.

* The joint venture partner will be able to provide technology in fishery civil engineering for the construction of culture tanks and ponds.

* The joint venture partner can be of assistance in upgrading the shrimp catching trawlers.

* Finally, the joint venture partner will be able to provide management and marketing know-how (including transportation/distribution, i.e. investments in cold chain and cold store facilities (including refrigerated trucks, and packing materials).

Most of the technology and know-how can be obtained at reasonable cost from Taiwan, since Taiwan has mastered in particular the pond construction technology beyond imagination.

In the case of fresh water shrimp, Thailand is a suitable source candidate for technology transfer. For wild shrimp, Indian joint venture partners could be ideal.

Research on shrimp culture is entirely lacking in SL, in particular in shrimp farming and hatcheries (e.g. prevention of diseases in hatcheries and ponds). Collaboration on joint coordinated shrimp research work should be acquired from interested parties, especially from Japan or Taiwan.

Finally, Indian, Thai, and Taiwanese expertise can be acquired within the ECDC/TCDC framework through UNIDO/UNDP/ADB/FAO.

7.5 Estimated costs and benefits, and suitable joint venture partners

Three factors have to be taken into consideration when cultured shrimp expansion plans are made, namely:

- o Technology
- o Scale, and
- o Cost factor

Some of the pre-feasibility and feasibility studies carried out by potential investors indicate an estimated capital cost of setting up of a cultured shrimp facility of 500 acres (203 hectares) at around U.S.$ 5 million. The payback period is calculated to be approximately 2 to 3 years (source: FIAC project files).

This size of a project would require approximately 100 skilled, semi- and unskilled workers. The shrimp feed, plant and machinery, hatchery and pond know-how would have to be imported, at least in the initial stages. As mentioned earlier, a joint venture with a foreign partner is the most suitable alternative for such a project.

The viable area for a cultured shrimp unit is considered to be 100 acres (40 hectares; includes breeding, feeding and hatchary). In order to reach an estimated production level of 18,000 MT (processed form) by 1995, the productivity level per pond has to be considerably increased. As mentioned earlier, the Japanese and Taiwanese are in an excellent position to transfer their pond engineering and hatchery know-how. Therefore, efforts should be made to either purchase technology from these countries or undertake joint ventures with suitable partners. The foreign links or access to world markets is not of utmost importance initially, especially for wholesale exports, since Sri Lankan shrimps are considered to be one of the world best (high quality and large size), and are fetching high prices on the world market. The processing facilities are sufficient, since at present only 47% of the processing capacity is utilized. However, at a later stage additional processing capacity would have to be installed, and investment in cold storage, refrigerated trucks, and trawlers would be necessary.

Labor (skilled and unskilled) is available in abundance, and at a relatively competitive wage rate as compared to major competitors from Taiwan, Japan, Thailand, Indonesia, etc. Finally, the present fisheries' infrastructure for shrimps catches, and exports are sufficient. However, at a later stage investments are required in particular in the marine engineering workshops.

8 RECOMMENDATIONS

8.1 Areas for joint ventures

Regarding, joint ventures, three areas seems promising, namely, shrimp feed production, value added in the shrimp processing sector, and re-export.

8.1.1 Shrimp feed production

All the machinery for the shrimp feed (minute artemia) has to be imported. The plant is viable only on a three shift basis. Since the Sri Lankan demand at present is low, the plant will only be viable in the near future with a joint venture partner providing access to the export market for the shrimp feed. Suitable feed export markets are Pakistan, Bangladesh, India, and several East and Southeast Asian countries. The suitable joint venture partner can also be from the Asian region.

8.1.2 Value added in the shrimp processing sector

Instead of exporting frozen shrimps in wholesale packing, the shrimps can be exported in consumer packs (cooked/peeled and salted) directly to the super markets. By this way, the local value added can be substantially increased. Europe is a big market, in particular the Scandinavian market, where the per capita shrimp consumption is one of the highest in Europe. A suitable joint venture partner from this area can provide both the technology and the access to these export markets.

8.1.3 Re-exports

At present, the shrimp processing facilities which are up to internationally accepted standards are not fully utilized in Sri Lanka. Andriesz in 1987 re-exported 12 MT of processed shrimps to Holland. Therefore, high potential for re-exports of shell fish (shrimp, and lobsters) also exists. Contacts should be taken in this respect with the Japanese, American and European companies involved in shrimp trawling in the Indian Ocean.

Finally, it is recommended that technology and know-how should be (preferably) acquired from the countries which are accustomed to tropical warm water shrimps.

8.2 Other recommendations

Other suitable sectors which show considerable potential are:

* Exploitation of tuna resources.
* Lobsters
* Ornamental fish
* Boat building
* Assembly of marine engines
* Manufacture of fishing nets and gear

Pre-feasibility studies regarding these sectors are available with the EDB.

9 SECTORAL STUDY II:

STRATEGIES FOR DEVELOPING THE MANUFACTURING AND ASSEMBLING OF ELECTRONIC PARTS AND COMPONENTS SECTOR IN SRI LANKA

9.1 Introduction

This report deals with some strategies for attracting investment in the field of the manufacture and assembly of electronic parts and components. The methodologies for carrying out the sectoral studies are mentioned separately in the mission report.

A large quantity of data and information has been obtained from the Foreign Investment Advisory Committee (FIAC), Ministry of Finance and Planning; CINTEC (Computer Information Technology Council); University of Colombo; Export Development Board (EDB); Department of Registry of Patents & Trade Marks; and several other organizations, and from manufacturers' and assemblers of electronic parts and components themselves.

9.2 Aim and purpose of the study

At present SL has a comparative advantage in terms of the cost and availability of skilled, semi- and unskilled labor, as over most Asian countries in attracting especially Japanese FDI in the field of the manufacture and assembly of electronic parts and components. This study explores the possibilities for SL to attract Japanese low, medium, and high-tech electronic parts and components assembly and manufacture through joint ventures.

10 PRESENT SITUATION IN THE MANUFACTURING AND ASSEMBLING OF ELECTRONIC PARTS AND COMPONENTS

10.1 Introduction

Table 10.1 show that, in 1987, SL imported electronic parts and components (including spare parts) worth about Rs 300 million. The exports during the same year were negligible (excluding buyback, and re-exports).

Table 10.1 Sri Lanka's trade in machinery and electrical products (Rs. Mn)

C.C.C.N.		1986 Import	1986 Export	1987 Import	1987 Export
84/85	Machinery and mechanical appliances - electrical equipment, parts thereof.	7,725	213	8,407	190
-do-	- do - Re-exports		590		218
84.52	Calculating machines	37	-	37	-
84.53/54	Automatic data processing machines, etc.	220	2	240	1
84.55	Spare parts, etc. (incl. electronics)	75	-	100	-
85.15	Color television receivers, monocrome TV receivers, etc.	300	-	250	-

Source: Sri Lanka Customs, 1988.

10.2 Manufacture and assembly of electronic parts and components

Despite the low cost of manufacturing, and an abundance of skilled, semi- and unskilled labor, only a limited amount of manufacturing and assembly of electronic parts and components is being carried out in Sri Lanka.

Recently, FIAC has approved several projects in this field. Several projects are under negotiation and/or are in the implementation stage. The foreign joint venture partners are mainly from Asia, i.e. Hong Kong, Japan, Korea, Singapore, and Taiwan. The technology levels are low to medium, but a large amount of equipment used in the manufacturing and assembly can be classified as high-tech. A brief list of some of the successful ventures are mentioned below (see Table 10.2):

Table 10.2 Successful ventures in the field of manufacturing and assembling of electronic parts and components

Company	Joint venture partner	Exports (%)	Export market	Type of product
* Bartleet & Lanka Savor Co.,Ltd.	Sri Lankan and Japanese	100 buy-back	Mainly Japan	Electronic cartridges & tonearms; magnetic disks
* Baumann Electronic Co., Ltd.	Sri Lankan & Swiss	100	Europe	Electronic test equipment
* Esjay Electronics Ltd.	Sri Lankan	100	U.S.	Radio communication parts & components

Source: FIAC files, personal and telephone interviews with manufacturers.

The most successful joint venture in this sector thus far has been the Bartleet & Lanka Savor Co., Ltd. A brief description of the results of the factory visit are presented below.

This FIAC - approved venture went into operation this year. The Japanese partner is a medium-size subcontracting company serving large-size well-known Japanese electronic equipment manufacturers. Their assembly plant for magnetic heads for computers is located in Colombo, and the entire production is exported in the form of buyback to Japan. The number of employees is about 340. Some of the employees have received training in Japan. The management found that the labor was easily trainable.

According to the Japanese managers, the productivity and quality levels, after a couple of months of operation, have reached the same levels as in the NIEs, and at the same time the production costs in Sri Lanka are substantially lower than in any other Asian country. Moreover, the rejection rate is considerably lower and this is considered highly satisfactory. Regarding profitability and payback period, the management declined to provide any hard figures. However, the entire project is classified as a success, the payback period is estimated by the consultant to be not more than one year.

Some of the reasons given by the Japanese managers of this company for establishing the joint venture in Sri Lanka were as follows:

* a suitable local joint venture partner was found
* attractive incentives (e.g. tax holiday; duty free import of machinery and equipment, and raw materials; easy repatriation of profits and dividends, etc.) were provided
* low wages, and an abundance of skilled and semi-skilled labor were the norm
* excellent infrastructure
* geographical location of Sri Lanka was considered to be advantageous

10.3 Identifying a suitable strategy for attracting FDI into Sri Lanka in the field of manufacturing and assembling of electronic parts and components

Sri Lanka has the possibility to attract FDI in the field of electronics from the Western European countries, the U.S., Japan, and the East and Southeast Asian NIEs. However, according to the consultant, the U.S. (due to the great physical distance from SL), and European countries (which generally trade among themselves, i.e. over 80% of their trade), might not offer high potential for FDI in this field for SL. However, these countries should not be entirely neglected, especially West-Germany, Switzerland, and the Netherlands, which are incurring high production costs due to rising wages and the appreciation of their respective currencies. In this report, the emphasis has been placed on Japanese FDI and to some extent on that of the Asian NIEs. Moreover, Japan's trade with the developing countries is substantially higher as compared to the other OECD countries, i.e. about 40% of the total trade in 1987. Several other reasons for this choice are described below.

11 THE NEED FOR ATTRACTING JAPANESE FDI

11.1 General information on Japanese FDI

With the fifty percent appreciation of the ¥ within two years (by 1987), Japanese manufacturers were rapidly transferring low to medium-tech production facilities to the East and Southeast Asian countries, in particular to ASEAN (Association of Southeast Asian Nations), and the Asian NIEs. At the same time, with increasing trade surpluses, tariff barriers and NTB's (non- tariff barriers), Japanese FDI (foreign direct investment) was also sky rocketing there 1/.

1/ This section draws heavily from: Khan, S., Success and failure of Japanese companies' export ventures in high-tech industries - A comparative study of Japanese and European companies' export marketing and investment strategies in ASEAN, the NIEs and the People's Republic of China, Almqvist & Wiksell International, Stockholm, October, 1988.

Due to the factors mentioned above, the Japanese companies are rapidly increasing their manufacturing flexibility and automation (FMS (flexible manufacturing system), Mechatronics, CAD (computer aided design), CAM (computer aided manufacturing), CAE (computer aided engineering), FA (factory automation), OA (office automation), etc.), and they have been able to lower their production costs and break-even points (QDC concept: high quality, on-time delivery, and low cost) for capacity utilization to levels unimaginable to their competitors.

Japan ran a trade balance surplus of $ 94.3 billion in FY 1987 (1987/1988). The Japanese companies, and MITI/JETRO consider the ¥ appreciation as severe a problem as the two oil crises.

Due to the reasons mentioned above, Japanese FDI has shown a remarkable increase over the past few years: from $ 12.2 billion in FY 1985, to $ 22.3 billion in 1986. The FDI during FY 1987 was $ 33.4 billion (see Figure 11.1). Over 24% of the total FDI went into the manufacturing sector. The East and Southeast Asian countries are doing their utmost to attract Japanese FDI, especially since it provides them with technology, employment, foreign exchange earnings, and helps reduce trade frictions with Japan.

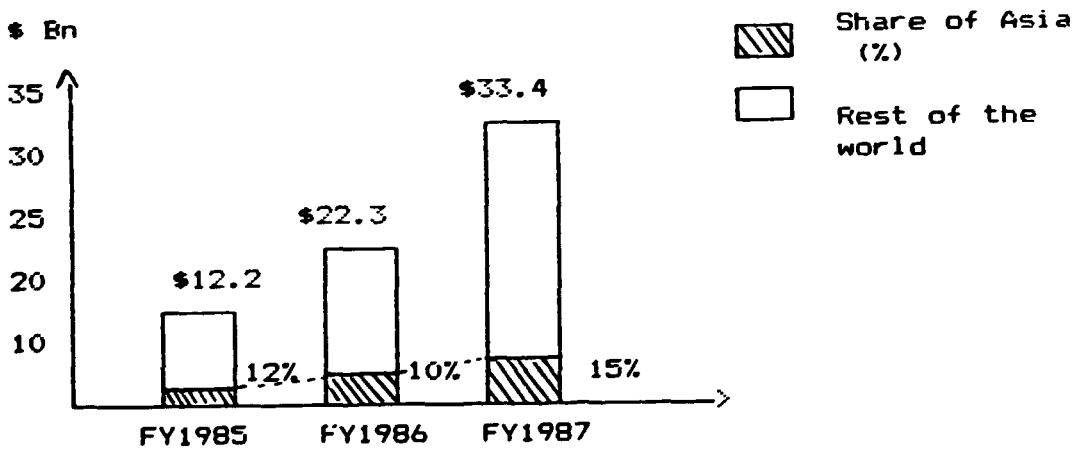

Figure 11.1 Japanese foreign direct investment (FDI) (Source: Ministry of Finance, Tokyo, 1988)

According to MITI, the electronics industry will be the fastest growing industry even into the next century. At present Japanese companies have primarily invested in the manufacturing sector in the NIEs, and ASEAN. The Japanese investors are facing a number of problems, in particular in the NIEs. A recent industrial survey carried out by MITI in East and Southeast Asia indicated the following 1_/:

- o Low morale of employees and shortages of skilled workers, in Korea and Taiwan
- o Higher costs of manufacturing than anticipated
- o Cultural nationalism, anti-Japanese attitudes, or ill feelings towards foreign capital, particularly in Korea, Taiwan, and Malaysia
- o Utility problems
- o High defect rates and improper quality controls
- o Frequent job-hopping by local employees: money wasted on long training in Japan and elsewhere
- o Lack of proper patent laws

11.2 Japanese official development assistance (ODA)

In 1980 the Japanese ODA was $ 3.3 billion and by 1986/1987 it had reached $ 5.6 billion, making it the second largest contributor in absolute terms in the world after the U.S. It is also forecasted that Japan's ODA around 1989 will exceed $ 9 billion and will become the largest in the world. Sri Lanka receives a considerable amount of ODA from Japan. It is recommended that some part of this ODA be ear-marked for training purposes in the field of electronics.

11.3 Japanese financial institutions promoting FDI in the developing countries

11.3.1 The role of the Overseas Economic Cooperation Fund (OECF)

OECF is one of the largest governmental financial institutions in the world. The concessional loans provided by the OECF to developing countries account for over 40% of Japan's ODA. Loan commitments to foreign governments by OECF for FY 1986 was $ 3.7 billion. Asia received over 77% ($ 2.9 billion) of the loans.

Japan is now recycling over $ 20 billion in new and completely untied funds during the periods 1987/88 and 1989/1990 through MDI (multilateral development institutes), the OECF, the Export/Import Bank of Japan, and the private sector.

1_/ Source: MITI, The case study of fade-out businesses in Asia, Tokyo, 1986, (in Japanese).

The OECF carries out several activities. The activities of interest for Sri Lanka are:

- o Loans to foreign governments
- o Loans to and equity investments in Japanese corporations
- o Loans to local corporations in developing countries

Regarding the softness of the loans, OECF provides loans to foreign governments for which the grant element equals or exceeds 25%. It is recommended that OECF should be approached and provided with the information regarding joint venture opportunities for Japanese investors in Sri Lanka.

11.3.2 The role of Export/Import Bank of Japan

The EX/IM Bank is a quasi-governmental/financial institution. The Bank has been playing a pivotal role in assisting Japanese exporters in obtaining medium and long term financing. During FY 1986 the Bank made credit commitments amounting to $ 7.1 billion. Credit commitments to East and Southeast Asia amounted to $ 3.2 billion in FY 1986, i.e. 45% of the total credit commitments. The EX/IM Bank should also be approached by FIAC for the purpose mentioned above.

11.3.3 Other institutions of interest

THE SMALL BUSINESS FINANCE CORPORATION OF JAPAN (SBFC)

The SBFC is one of the governmental financial institutions, which provides long-term, low interest capital to SME (small and medium-sized enterprises).

THE NATIONAL FINANCE CORPORATION (NFC)

The NFC lends to individuals and to certain types of businesses capitalized at less than ¥ 10 million ($ 81,000), and with fewer than 100 employees.

The NFC began offering, at the end of 1987, overseas investment-smoothing capital loans as an additional new incentive to SME (small and medium-sized enterprises). One of the important condition for receiving the loans is:

- o that SME reallocate production systems from the domestic to the export market....

THE SHOKO CHUKIN BANK (SCB)

The SCB assists service cooperatives formed by SME.

MITI

MITI permits special reserves as tax incentives which include:

o those for overseas investment in developing countries, 10% of investment; or 25% for economic cooperation projects.....

11.4 The role of small and medium-sized enterprises (SME) in the Japanese economy

While preparing a suitable joint venture strategy, it is important to put emphasis on the Japanese SME. Their importance is mentioned below.

The SME occupy a crucial place in the Japanese economy: in 1985/1986 they accounted for 99.5% of the incorporated businesses, 74.3% of all employees, 51% of industrial production, and 62% of commercial sales volume. The value added by SME was about 54.8% of the total VA in manufacturing. The SME fulfil an important function as suppliers and subcontractors for large corporations. Most of the SME in the manufacturing sector are concentrated in light industry and intermediate goods. Two-thirds of all SME are subcontractors to larger companies.

It is estimated that of Japan's total FDI, SME accounted for over 10% on a value basis, and over two-thirds of this investment went to East and Southeast Asia.

Similarly, the Japanese large companies' intermediate input ratio from the SME shows a considerably higher level compared to the rest of the OECD countries.

With the soaring value of ¥, large companies are urging the SME subcontractors to cut costs, take orders for smaller lots, etc. According to the consultant, the SME's have not been highly successful in reducing their production costs in the NIEs. The PRC is also not considered as a suitable alternative by the Japanese SME's due to the problems faced by foreign investors there. In the ASEAN countries, Thailand is considered to be the only suitable alternative for SME's, and during 1987/1988 the Japanese FDI has sky-rocketed there. Sri Lanka has a comparative advantage over Thailand in terms of low wages and abundance of a literate labor force. Moreover, the infrastructural facilities are also relatively superior to those in Thailand. A detailed comparative analysis is presented below.

11.5 Foreign investment climate - Comparative analysis - Sri Lanka as compared to other developing countries attracting FDI

Table 11.1 show that Sri Lanka is in a highly competitive position for attracting FDI. However, at present this potential has not been fully exploited. The countries which are offering somewhat similar incentives to foreign investors as SL are mainly from ASEAN, i.e. the Philippines, Thailand, and Indonesia. The NIEs at present are facing several problems, such as:

* scarcity of skilled and unskilled labor
* rising wages
* appreciation of currencies
* low priority given to low technology and assembly type operations

Since 1985, Japan has been facing similar problems to the ones faced by the NIEs. Thus, Japan has become a major investor (FDI) in East and Southeast Asian countries. Japanese FDI is now gradually moving into ASEAN, in particular to Thailand, as mentioned above.

Table 11.1 Comparative analysis - suitability for FDI (foreign investors perspective)

	FACTORS																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
NIEs																		
Hong Kong	H	H	M	H	H	H	H	H	H	H	L	H	L	H	H	L	H	M
Korea	M	M	M	M	M	M	M	M	L	M	M	H	L	H	H	L	H	H
Singapore	H	H	H	H	H	H	H	H	H	H	L	H	L	H	H	L	H	H
Taiwan	H	H	H	H	H	H	H	H	H	H	L	H	L	H	H	L	H	H
ASEAN																		
Brunei	N	N	N	N	N	N	N	N	N	N	N	M	L	L	M	L	M	H
Indonesia	M	M	M	M	M	M	M	M	M	M	H	M	H	M	L	M	L	M
Malaysia	H	H	M	H	H	H	H	H	H	H	M	M	M	M	M	M	M	M
Philippines	H	H	M	H	H	H	H	H	H	H	M	H	H	H	L	H	M	L
Thailand	H	H	M	H	H	H	H	H	H	H	M	M	H	M	M	M	M	M
PRC *	H	H	H	M	M	M	M	H	M	M	H	H	H	M	L	H	M	H
Sri Lanka	H	H	N	H	H	H	H	H	H	H	M	H	H	H	H	M	H	L
Bangladesh	M	L	N	M	M	M	M	H	M	H	H	L	H	L	L	H	L	L
India	M	H	M	H	M	M	M	M	L	M	H	L	H	H	L	H	L	M
Pakistan	M	M	N	H	M	M	M	H	M	M	H	L	M	H	L	H	L	L
Middle East	M	M	N	M	M	M	M	M	H	H	H	L	L	L	M	L	L	M
Mauritius	H	H	L	H	H	H	H	H	H	H	L	H	M	H	H	L	H	H

K E Y

H = High/or available in abundance; M = Medium; L = Low/ or of minor importance; N = None/or negligible

1 = Promotion of foreign investment
2 = Industrial estates and economic zones
3 = Science-based industrial parks
4 = Incentives to foreign investors
5 = Tax relief
6 = Investment allowances
7 = Accelerated depreciation incentives
8 = Tax exemption on interest on approved foreign loans
9 = Concessionary tax rates on royalties
10= Duty free import of equipment
11= Bureaucracy/red tape
12= Availability of literate labor force
13= Low cost labor force/low wages
14= Availability of skilled labor force/computer specialists /electronic engineers/technicians/management skills
15= Adequate infrastructure
16= Scarcity of energy
17= Labor productivity
18= Political stability

* The PRC is facing overwhelming problems in obtaining FDI in high-tech fields due to COCOM (Coordinating Committee for Exports to Communist Areas) restrictions. The PRC is one of the few countries in the world, where a joint venture must be handed over to a local partner after a certain period of time. Due to these factors, most of the investors are hesitant to establish joint ventures in the PRC.

Sri Lanka and Korea are the only two countries out of the list of countries mentioned in Table 11.3, which offer adequate protection for intellectual property (e.g. product patents). Some other countries, such as Hong Kong, Malaysia, and Singapore, also offer product patents locally, provided parties hold the product patent in the U.K. Most of the other developing countries offer only process patents, which makes it easy for competitors to manufacture similar products using different processes. Foreign investors generally hesitate to transfer technology or invest in such countries.

Finally, despite the ethnic disturbances, SL has considerable opportunities for attracting FDI from Japan and the NIEs.

11.6 Strategy for attracting Japanese and NIEs FDI to Sri Lanka in the field of electronic parts and components

11.6.1 Recommendations

The recommendations are as follows:

- o Priority should be given to Japanese SME's
- o A segmented strategy should be prepared on the basis of the following criteria:
  - * identify suitable subsectors for Japanese and NIEs FDI; e.g.
    - . semiconductors
    - . printed circuits
    - . telecommunication parts and components
    - . computer ------"----------
    - . audio/video ------"----------
    - . cassettes
    - . etc
- o Close contacts to be established with:
  - * JETRO
  - * OECF
  - * SBFC
  - * NFC
  - * Sogo Shosha (Japanese general trading companies)
  - * Manufacturers and importers associations, e.g.
    - o Electronic Industries Association of Japan
    - o Japan Electronic Industry Development Association
    - o Japan Small Business Corporation

- o Others
  - * MITI (Small and Medium Enterprise Agency)
  - * Consulting companies in electronics in Japan, Hong Kong, Korea, Singapore, and Taiwan
  - * Field trips to Singapore and Taiwan in order to study, "Science-based industrial parks/technology parks"
  - * Invite suitable SME to Sri Lanka (through JICA..)
  - * Feasibility study for establishing in Sri Lanka: Research dept. of universities (Computer Science, Electronics, etc.) in the EPZ (Export Processing Zones); and science-based industrial park (for detail discussions see Sectoral study III - Computer software development)
  - * Establishing an investment promotion office in Japan and West-Germany
  - * JICA and several other bilateral agencies such as SIDA (Swedish International Development Authority) can be useful tools for training in the field of electronics

  * JETRO (Japan External Trade Organization) can be useful for assisting in arranging exhibitions, fairs, market research, and contacts with importers trade associations in Japan
  * UNIDO's assistance should be obtained in formulating appropriate strategies and in arranging electronic investment promotion forums

- Finally, SL should also capitalize on:
  * Trade imbalance with Japan and the NIEs (see Table 2.2)
  * Common religion, and traditionally friendly ties with Japan and the NIEs
  * One of the highest literacy rate in the developing countries

12 SECTORAL STUDY III: STRATEGIES FOR DEVELOPING THE SPECIALIZED SERVICES SECTOR IN SRI LANKA

- COMPUTER SOFTWARE -

12.1 Introduction

This report deals with strategies for developing the specialized services sector of Sri Lanka. The methodologies for carrying out the sectoral studies are mentioned separately in the mission report. Within the specialized services sector, computer software development in SL shows considerable potential, and thus this subsector is chosen for the sectoral study.

A large number of data and information has been obtained from the Foreign Investment Advisory Committee (FIAC), Ministry of Finance and Planning; CINTEC (Computer Information Technology Council); University of Colombo; Export Development Board (EDB); and several other organizations, and computer software development companies.

12.2 Aim and purpose of the study

A large number of systems programmers, data processors, and specialist service engineers are readily available in SL. The study explores the possibilities for SL to export computer software for mainframes, mini-computers, and PC's in specialist applications, preferably through joint venture. Since this is a high-tech sector, and foreign exchange and employment opportunities are high, the development of the computer software is vital for SL. The main aim is to identify the necessary areas for joint ventures for both Sri Lankan and foreign investors.

13 PRESENT SITUATION IN THE COMPUTER SOFTWARE SECTOR

13.1 Worldwide situation

The computer software sector is highly competitive. In the multi-billion dollar computer industry, the share of hardware is constantly declining, whereas that of software is showing a rapid increase in value. It is estimated by the consultant that at present the software share in the total computer industry is about 70%.

In the OECD countries computer analysts and programmers are in high demand and most of these countries are facing shortages of computer programmers. The hourly wage rate for hiring a consultant in the field of computer software is from $ 100 to $ 500 (Swedish rate includes employers contribution).

Due to rapid advances in computer technology and the varying requirements of users, the demand for tailor-made or user-specified software is rapidly increasing. Moreover, the demand for re-writing software is also on the rise, since users are more often changing hardware.

14 POTENTIAL FOR SOFTWARE DEVELOPMENT IN SRI LANKA

14.1 Present situation

The potential for software development is quite high in SL, since the supporting infrastructure of the computer user base is increasing. The indigenous capabilities in computer programming show a rapid increase mainly due to a large number of computer technology courses being offered by a number of government and private institutes. Tables 14.1 and 14.2 list the number of institutes offering computer science courses, and the estimated number of computer professionals in SL.

Table 14.1 Institutes offering computer science courses in SL

		Number trained/ year
* Government institutes		
University (computer science)	1_/	
o Colombo		15
o Moratuwa		15
o Peradeniya		15
ICT (University of Colombo)	2_/	60
NIBM (National Institute of Business Management)		40
* Private institutes	3_/	
Approximately 50 private and vendor-oriented institutes, including the Arthur C. Clarke Centre offer computer science courses		300
Total diploma holders per year		445

Source: University of Colombo; CINTEC; EDB; Electronic Manufacturers Association; and Informatics Ltd.

1_/ The computer science courses have just started. The first batch is expected to graduate in 1990.

2_/ The Institute of Computer Technology (ICT) is funded under the Japanese Government Colombo Plan Technical Cooperation. The first batch is expected to graduate in mid-1989. The number of installed PC's are about 200. Most of the PC's, mainframes, microcomputers, super mini-computers, and printers are from Japan (NEC).

3_/ The private institutes are offering computer science courses which range from poor to excellent . The figures given are very rough, and give a minimum estimate.

The figures mentioned above do not include Sri Lankans attending computer science courses overseas. It is estimated that several hundred Sri Lankans are studying computer science at foreign universities and institutes. The consultant's estimate indicates that about 50 governmental and private training centres and institutes are turning out approximately 500 computer professionals annually. Moreover, it is estimated that at least 2,000 persons are enrolled in computer courses at any one time. It is rather difficult to provide any estimates on the quality of the SL computer professionals. However, the discussions with experts in this field indicates that the quality is rather good. Moreover, the teaching material used at the various institutes and universities in Sri Lanka is to a large extent comparable with the teaching material used in for example in Sweden. The hardware used for teaching and training is also of excellent quality and the latest models.

At all the universities in SL, courses in Pascal, Fortran, and Cobol are offered mainly to science graduates. The British Council provides assistance in computer science to all the universities. The University of Colombo is expected to offer a M.Sc. course in computer science with UNDP/UNESCO assistance towards the end of 1988.

As the Table 14.2 indicates the demand for computer professionals exceeds the supply. The gap between demand and supply is getting narrower with the rapid increase in computer training centres, and a large number of Sri Lankan's returning after completing computer training courses overseas. The figures mentioned in Table 14.2 should be used with caution, since these figures have been collected through the questionnaires mailed to the companies in 1985/1986.

Table 14.2 Estimated number of computer professionals vs number needed in Sri Lanka (1986)

	Estimated number	Number needed
* Junior programmer	500	500
* Programmer	500	2,000
* Program analyst	300	1,000
* Data processor	30	800 1_/
Total	1,330	4,300

Source: Estimates made on the basis of information provided by CINTEC

1_/ Number needed break-down is as follows:
Senior system analysts : 400
Systems analysts : 400

The CINTEC, is a governmental organization, providing advice in formulating, coordinating, and implementing policies in the computer field. According to CINTEC data base there were 130 mainframes in SL in 1986. The number of computer specialists were as follows:

* Programmers	:	385
* Analyst/programmers	:	236
* Senior systems analysts	:	22
* Managers (non EDP personnel)	:	59
Total		702

The rough estimates for 1988 indicate that there might be about 1,000 computer (mainframe) specialists in SL. The figures mentioned above do not include PC users. They are estimated to be several thousand. The Sri Lankan Computer Society has about 800 members.

According to CINTEC estimates, by the end of 1986 the number of computers installed in SL were as follows 1_/:

	Public	Private	Total
* Mainframes	71	58	129
* Microcomputers	421	240	667

The figures mentioned above do not take into account the large number of home and school users of computers. In SL, there are several computer vendors, representing most of the major computer manufacturers.

Regarding electric power supply in the cities, the interruptions are few and of very short periods. The current use of telecommunications for data transfer between computer systems is low.

1_/ Source: CINTEC, The impact of new technologies in government systems, report of the research project conducted for the Asian Pacific Development Centre (APDC), Colombo, October, 1986; People's Bank, Economic Review, Colombo, various issues, 1983 - 1988; and UNIDO, The list of project files, UNDP, Colombo, 1988.

14.2 Companies developing computer software in Sri Lanka

About 10 wholly locally-owned companies are developing computer software, mainly for the domestic market. The FIAC has approved a number of joint venture projects in this field. At present none has gone into full operation due to a number of reasons, such as weak foreign links, the foreign partner not showing a keen enough interest in developing the software, or too many qualified personnel having left the company and taken up foreign assignments abroad. The following projects have been approved by FIAC for undertaking computer software development. The status of these projects was as follows (see Table 14.3):

Table 14.3 Status of the FIAC approved projects in the computer software sector (as of September 1988)

Company	Foreign partner	Exports
1. A-Z Computer Services Ltd.	U.K.	Suspended temporarily
2. Eskaycee Computer Ltd.,	Hong Kong	Under negotiation
3. Rainford Computers Ltd.,	U.K.	None
4. Sithu Ruwana Ltd.,	U.S.	Under negotiation
5. TDM Organization Ltd.,	Singapore	Under negotiation

Source: FIAC files

One local company, namely Informatics Ltd., which is the sole representative for Nixdorf of West Germany, has been highly successful in exporting computer software. This company was established in 1983 by a Sri Lankan who was an ex-data processing manager of Philips, with several years' working experience in Europe.

Informatics Ltd., sells hardware and provides turn-key solutions to banks, manufacturers, and retailers. The company is solution-oriented with 120 employees. The total sales in 1987 were over Rs. 100 million. About 70 employees are computer professionals involved with software development. Informatics Ltd., is also assisting Nixdorf to modify and perfect its latest developed software packages before they are released into the world market.

The company is involved in not only selling the hardware and the software, but also in training and maintainence. The employee turnover is very low due to attractive salaries and opportunities for foreign assignments. About 25 employees of this company are stationed in the Philippines, the U.K., Singapore, Indonesia, Malaysia, West Germany, and the Middle East.

In 1987, Informatics Ltd. obtained the pioneering status for reliability and quality from the EDB. During the same year, computer software worth $ 500,000 was exported, largely to clients - hotels, banks, and shipping - in the Middle East, Asia, and Europe. Examples of on-going projects are: designing of software to handle distribution of petroleum products for ESSO; software for British Airways (BA) for warehousing and cargo at Heathrow Airport. The company considers itself highly successful, especially in terms of profitability (ROI).

The company is using the UNIX system and is highly competitive on the export market due to:

* the employees are easily trainable
* costs are kept low
* high productivity, and punctual in delivery
* relatively well developed infrastructure
  (telecommunication network)

Informatics is highly successful in re-writing programs for customers who are moving from 16 bit to 32 bit computers. In the west, re-writing programs or developing software is very costly. Nixdorf is also providing to Informatics Ltd., the most sophisticated and latest equipment for software development.

Japan is considered, together with the U.S., to be the leader in the computer hardware industry. However, Japan is far behind the U.S. in computer software development, mainly in the non-Kanji (Chinese characters) software. The Japanese companies are developing most of their software (non-Kanji) abroad, among others, in the U.S. Thus, if the Japanese companies are offered suitable packages for R & D in this sector (e.g. technology park/science based park), then the chances are considered high that potential for developing the software for the Japanese companies' hardware exists. At present, the Japanese companies are carrying out considerable amounts of Kanji related software development in the PRC, Taiwan, and Singapore.

In the GCEC area (Katunayaka and Biyagama) at present, no significant project in the field of computer software development or in the assembly of electronic parts and components is under operation.

14.3 Strategies for developing the computer software development sector in Sri Lanka - Recommendations -

There is a lot of scope for developing computer software for the export markets via joint ventures. The important markets which are rapidly computerizing are the Middle East and Asia. The joint venture partner could be also from this region. However, there is also a need to involve well-known Japanese, American, and European companies manufacturing computer hardware and developing software, especially in the training of Sri Lankan computer specialists, in marketing software products and services, and in providing foreign links. Moreover, efforts should be made to pouch the Sri Lankan's working in this field overseas. Similar methods have been successfully used, especially by Korea, Indonesia, Singapore, and Taiwan.

Despite the present shortage of computer specialists in SL, a large number of specialists can be recruited with minimal training, provided the computer software infrastructure is developed in SL. In order to promote joint ventures in high-tech fields, such as the development of computer software and manufacturing of electronic parts and components, there is an urgent need to establish a "Science park", or "Technology park", similar to ones existing in the developed countries such as in France, Ireland, Sweden, the U.K., and in the NIEs (Singapore and Taiwan). During my interviews with Japanese investors in Japan, one of the important reasons given for establishing plants for the manufacture of electronic parts and components was the existence of science parks in Singapore and Taiwan.

The science park would be able to facilitate technology transfer through training and R & D. The foreign investors would be able to obtain access to laboratories, qualified technicians, computer programmers, and researchers. The park would be an excellent place for developing among other things computer software (in software houses) 1_/. This type of a park should be established by FIAC, in close collaboration with GCEC, EDB, industrialists, consulting companies, universities (such as the University of Colombo, and the University of Moratuwa), development banks, multilateral institutions, such as UNIDO/UNESCO/ILO, and the World Bank.

1_/ The consultant himself is residing next to the Swedish science park located in Kista/Stockholm, where practically all the world-known computer manufacturers and software developers are located (e.g. IBM, Microsoft, Prime Computers, Texas instrument, HP (Hewlett Packard), Philips, Ericsson, etc.).

Recently, a joint venture project proposal for the establishment of a "Technology park" has been submitted by the Arthur C. Clarke Centre for Modern Technology. The project proposal is excellent and is under negotiation with the FIAC. In the project proposal a consortium is proposed consisting of the following members, each contributing Rs. 1 million, except the university which is associated as a goodwill partner.

* Arthur C. Clarke Centre
* FIAC
* EDB
* GCEC
* University of Moratuwa
* Employees Trust Fund
* NDB (National Development Bank)
* DFC (Development Finance Corporation)
* Capital Development and Investment Company Ltd.

Once the technology park goes into operation, the computer software exports of about $ 500,000 currently can be increased within three to four years to at least $ 5 million (by 1992). Exports of computer software would also make Sri Lanka self-reliant in computer skills. Moreover, the employment generation opportunities are high, since the computer software development sector is highly labor intensive, requiring thousands of man-hours for simple to complex software development.

Sri Lanka's main competitors in this field are India, Singapore, Taiwan, and the Philippines. In terms of price of user-specified or tailor-made software and services, it is only India which can offer competitive or similar prices to Sri Lanka. However, since the world market is expanding rapidly, room for Sri Lankan exporters who can provide reliable solutions and on-time delivery still exists.

Initially, software products should be developed for "mini's" and "mainframes" in specialist applications (tailor- made or customer-specified). This subsector is also one of the most profitable, with relatively low competition.

Finally, in developing the technology park and training computer specialists in developing advanced software, assistance should be sought from UNIDO/UNDP/UNESCO/ILO, and from the bilateral organizations, such as JICA and SIDA.

14.4 Other recommendations

Information technology (IT) is rapidly expanding across the globe. Japan alone accounts for over 20% of the printed information in the world. The information industry is highly labor intensive and costly in the OECD countries. Therefore, the data entry services also show considerable potential for SL.

Due to ethnic disturbances, and the sensitive nature of much of the information to be processed, the overseas specialized services agencies are reluctant to start a joint venture in SL or to subcontract some of the data entry work to local companies in SL. However, despite the problems, few companies (both local and joint-venture with a foreign partner) are successfully carrying out data entry work for foreign clients.

There is a need to market this sector in a well planned manner, since most of the data to be keyed can be easily transmitted via the telecommunication network, and the excellent distribution network of DHL (courier service) in SL.

15 SECTORAL STUDY IV: STRATEGIES FOR DEVELOPING THE GLASS AND GLASSWARE SECTOR IN SRI LANKA

15.1 Introduction

This report deals with some strategies for developing the glass and glassware sector in Sri Lanka. The methodologies for carrying out the sectoral studies are mentioned separately in the mission report.

A large amount of data and information has been obtained from the Foreign Investment Advisory Committee (FIAC), Ministry of Finance and Planning; Export Development Board (EDB); Ceylon Electricity Board; and some glass manufacturers and importers of glass and glassware.

15.2 Aim and purpose of the study

At present, Sri lanka is only manufacturing glass bottles, and limited quantities of glass mirrors from imported glass. Some glass and glassware of very low quality is also manufactured by cottage industry. The rest of the glass and glassware is entirely imported. However, Sri Lanka has in abundance and readily available several of the necessary raw materials. These are of high quality and are available at low cost. This study explores the possibilities for SL to establish an import-substitution and export-oriented glass and glassware industry, preferably through joint ventures.

The foreign exchange savings and earnings, and the employment opportunities are high, therefore the development of the glass and glassware sector is vital for SL. The main aim is to identify the necessary areas for joint ventures for both Sri Lankan and foreign investors.

16 PRESENT SITUATION IN THE GLASS AND GLASSWARE SECTOR

16.1 Worldwide situation

Glass and glassware are easy to manufacture, and the technology is well-known. Most of the patents in this sector have already expired. The OECD countries are using highly capital intensive technologies for producing high quality glass and glassware at low cost. In some of the glass subsectors, there is over-production, and a relatively low price. Several MNC's (multinational corporations) such as Pilkington dominate the OECD markets.

Similarly, the NIEs, the PRC, and several other Asian countries such as Indonesia, India, and Pakistan are also manufacturing glass and glassware, and exporting them all over the world at a relatively competitive price.

Some structural changes have been taking place in this sector. For example, the manufacture of ornamental glass, which is labor-intensive, has become exorbitant expensive due to the high labor costs and shortages of labor in the OECD countries. More and more ornamental glass of low and medium price is now being manufactured in several Asian countries.

16.2 Present situation in Sri Lanka

16.2.1 Domestic production, trade, and consumption

The Table 16.1 show that Sri Lanka imported glass and glassware products worth over Rs. 350 million in 1987. It is astonishing that practically all the domestic consumption of glass and glassware (except soft drinks glass bottles, jars, and some glass mirrors), such as glass sheets, glass tumblers, and table glassware has been imported into SL.

Regarding domestic production of glass and glassware, some low quality glassware is manufactured at the cottage industry level. The glass bottles and jars are manufactured by one large company, i.e. Ceylon glass company. This is an FIAC approved project. The Sri Lankan Government owns 18% of the shares, the DFCC (Development Finance Corporation of Ceylon) owns 32%, and the rest of the shares are owned by both the local and foreign private partners. The foreign joint venture partners are from Japan and the U.K., and they are highly passive in transferring technology. During the consultant's visit to the plant it was observed that the machinery and equipment was old and the electricity consumption was rather high. The company is showing a profit, but has not invested any large sums in modernizing or expanding the capacity of the plant. According to the consultant the reason is the import substitution protection of the 35% import duty given to Ceylon Glass Company, and the monopolistic status which the company enjoy in SL.

The number of employees is 750, and sales in 1987 were Rs. 150 million. During the same year about 40 million bottles and jars were manufactured. Total yearly domestic requirement of bottles and jars is estimated by the consultant to be over 50 million. The domestic demand of bottle exceeds the supply by 25% to 30%.

The company has two factories, namely in Nattandiya and Ratmalana. The Nattandiya factory is located next to the raw material source, i.e. silica sand, however, the distance of about 60 kilometers from Colombo, is not popular with the glass bottle buyers. The furnace has the capacity of 40 tons per day.

Table 16.1: Sri Lanka's trade in glassware (*)

C.C.C.N.		1986				1987			
		Import		Export		Import		Export	
		M.Tons	Rs.Mn	M.Tons	Rs.Mn	M.Tons	Rs.Mn	M.Tons	Rs.Mn
70	Total glassware		293.0		8.2		356.0		1.4
70.01	Waste glass, glass in the mass	0.8	.02			18.3	0.6		
70.03	Glass in balls, etc.	80.5	42.0			27.0	1.7		
70.04	Unworked cast /rolled glass	74.3	0.9	0.2	0.01	497.3	5.4	2.5	0.4
70.05	Unworked drawn or blown glass	3.3	0.3			78.0	1.1		
70.06/7	Cast rolled, drawn/blown glass (sheet glass)	8,824	85.3			9,984	93.4		
70.08	Safety glass, shaped/flat	100	13.8			110	15.3		
70.09	Rear view, glass mirrors (No. '000)	272	8.5			181	13.3		
70.10	Bottles, jars, carboys, etc. (No. Mn.)	10.4	31.2			12.1	43.6		
70.11	Glass envelopes - electrical lamps (No. Mn.)	6.4	7.6			9.8	12.9		
70.13A	Infant feeding bottles (No. Mn.)	.7	7.0			1.4	15.3		
70.13B1	Drinking glass (No. Mn.)	21.4	56.7			17.1	42.9		
70.13B2	Glassware, other (No. Mn.)	1.9	24.6			2.9	33.0		

Source: Customs Office Statistical Report, 1987 & 1988
* All figures have been rounded upwards
No.: Quantity in numbers
Mn : Million

The Ratmalana factory is located about 15 kilometers from Colombo and in the proximity of most of the users. This plant has a higher capacity, i.e. 60 tons per day, and some of the equipment is also rather newer. However, the yearly production losses are extremely high, i.e. about 22%. According to the company the losses are partly due to electric power interruptions of up to 4 or 5 times per month, and frequent voltage fluctuations, which leads to the closure of the furnace several times per month. Moreover, the furnace bricks are frequently damaged due to the stop and start of the operation.

Ceylon Glass Company has two standby generators. But the company has not yet installed a power conditioner or voltage stabilizer. Moreover, the company has no plans to switch over from the electric furnace to an oil-fired furnace.

As mentioned above, a limited amount of imported glass mirrors is being silvered and decorated locally by Asoka Glass Company Ltd. This company is one of the largest glass importers in SL. At present, the company is looking for a suitable joint venture partner and technology supplier for manufacturing glassware. A feasibility study is expected to be initiated very soon.

In Asia, the major glass and glassware manufacturers and exporters are (apart from Japan), the PRC, Hong Kong, Korea, Indonesia, India, Pakistan, the Philippines, and Thailand. In the Middle East limited amounts of glass and glassware are manufactured locally. Most of the domestic requirements there are met through imports.

Regarding world glass and glassware production, the statistical data can be obtained from the UN Industrial statistics yearbook. The ISIC (International Standard Industrial Classification of all Economic Activities) based codes are:

ISIC	COMMODITY NAME
362001A/B	Glass, drawn or blown, in rectangles, unworked
362004A	Glass, cast, rolled, drawn or blown
362007A	Toughened or laminated safety glass
362010A/B	Glass bottles and other containers of common glass

The international trade statistics can be obtained from the UN International trade yearbook. The SITC (Standard International Trade Classification, revision 2) codes are:

SITC	Commodity name	
6644	Glass surface-ground etc.	(Glass)
6651	Bottles etc. of glass	(Glassware)
6652	Household, hotel etc. glass	(--- " ---)

16.3 Prospects for glass and glassware production in Sri Lanka

16.3.1 Introduction

The demand for glass and glassware is constantly growing in SL. The potential for manufacturing various types of glass and glassware do exist, provided technology and access to foreign markets can be obtained, preferably via joint venture. This alternative will not require any government protection. Regarding raw materials used in the manufacture of glass and glassware, silica sand usage is 70% to 80%. Silica sand of about 98% purity is available in abundance and at a relatively cheap price at Nattandiya. Lime stone (at Jaffna or Puttalam), and feldspar (at Matale) are also readily and cheaply available. The remaining 20% of the raw materials have to be imported. The extraction of silica sand is not expected to create an environmental hazard.

In terms of total raw material cost, the imported raw materials share is calculated to be approximately 70%. The advantage of locating a production unit in SL is the high quality cheap silica sand, cheap and abundant labor force, and relatively good infrastructure. The only disadvantage is the expensive and unreliable electricity supply. It would be advisable to manufacture glass and glassware using oil furnaces.

16.3.2 Glass bottles manufacture

At present, at least 25% of the domestic requirements are met by imports. Ceylon Glass Company itself has been contacted by prospective investors from Pakistan, since the labor cost is relatively cheaper in SL, and the high quality Silica sand is also available at a low price as compared to Pakistan. Moreover, the company has also received export inquiries from the Maldives and Bangladesh. Ceylon Glass Company has not made any exports, due to the fear of loosing government protection. The company at present has no serious expansion plans. The domestic demand for glass bottles (including jars, etc.) is quite stable, despite the competition faced by Ceylon Glass from cans and plastic bottles manufacturers.

If suitable joint venture partners can be found in the Middle East, or within the SAARC member countries, then a plant with a minimum capacity of 30 million bottles per year is considered to be feasible, however, 50% of the output would have to be exported. The payback period for such an investment is estimated to be less than two years.

The plant mentioned above would not be viable in the Middle East, despite cheap oil, as all other components - including the labor force and raw material - would need to be imported.

16.3.3 Sheet glass manufacture

Sheet glass is imported into SL by several importers, from about 18 countries. In 1987, SL imported sheet glass worth over Rs. 93.4 million. There are several processes by which sheet glass can be manufactured. Some of the well known glass sheet manufacturing processes are:

* Fourcault process
* Pennvernon process
* LOF-Colburn process
* Pilkington float glass continuous process

All the manufacturing processes mentioned above are capital intensive, and minimum yearly production would far exceed domestic demand. On the export market the competition, both in price and quality, is severe. In order to maintain average quality, a furnace with a minimum capacity of 40 tons per day is required. The SL yearly demand for sheet glass is calculated to be about 10,000 MT. From the minimum yearly production of 15,000 MT, the balance of about 5,000 MT would have to be exported. In this alternative, the technology and access to foreign markets would have to be provided by a foreign joint venture partner. The domestic demand for sheet glass is not growing, since the construction sector is stagnant in SL. The sheet glass manufacturing process machinery cannot be used for manufacturing bottles and jars.

The markets of interest for glass sheets are the Middle East, and SAARC member countries. The joint venture partner would be from one of these countries in best case. However, technology has to be imported from the OECD countries, or from the PRC, or India. Finally, the payback period is calculated to be less than 2 years.

16.3.4 Glassware manufacture

In 1987, SL imported glass tumblers, bowls, plates, cups, vases, ash trays, etc., worth over Rs. 75 million. The demand for glassware is quite stable. Regarding domestic production, currently there are few productive and non-productive domestic glassware factories. The technology is primitive and the quality of glassware is very poor. All these glassware factories are using cullet (broken glass) as the main raw material.

The minimum size of the furnace is estimated to be at least 5 tons per day (with 80% efficiency). It is estimated that the yearly production would be about 15 million, or 30 to 40 thousand tumblers per day. The raw materials have to be of very high quality, including the silica sand. All machinery and equipment, and know-how has to be imported. However, in the early stages of operation, the plant would be quite sufficient to meet domestic demand. Later, when the quality has reached international standards, then exports could be considered.

The total production cost break-down is roughly calculated as follows:

30% for furnace oil
30% for local and imported raw materials
rest of the cost for labor and various other over-heads.

For a 5 ton per day furnace, about 500 gallons of oil per day is required. The price of silica sand at present is Rs. 1,000/ton, and soda ash costs about Rs. 5,000/ton. Most of the soda ash is imported from Kenya through ICI. The available silica sand requires some further processing, especially for table and ornamental glassware. It is envisaged that a magnetic separator would have to be installed, to remove the iron content. The iron content needs to be brought down to less than 0.02%. With some minor investment, the feeding bottles for infants could also be manufactured.

At an 80% rate of capacity utilization of a 5 tons/day furnace (or 1,200 tons/year of finished products by weight), the production cost of domestic produced glassware could be expected to be about 50% cheaper then imported glassware. The payback period would be expected to be about one to (maximum) two years. However, the exact payback period would have to be worked out in detail in the market and technical feasibility studies.

The demand for ornamental glass is high in the OECD countries, and thus exports of such articles in the middle price range, in particular to Japan, the U.S., and Western Europe, should be taken into consideration. The joint venture partner providing know-how and access to the export markets should be in the first hand sought from the OECD countries. The know-how (blowing, etc.) in manufacturing such ornamental glasses should be preferably obtained from Western Europe, and in particular from Scandinavia (Sweden, Denmark, or Finland). In this respect training assistance should be acquired from UNIDO, ILO, SIDA, JICA, DANIDA, FINIDA, and NORAD.

17 RECOMMENDATIONS

Since Sri Lanka is following a policy of import substitution, this sector, which is the most under-developed, should be given priority for development. The technology is easily available on the world market, and training in manufacturing high quality glass and glassware can also be easily obtained from both the industrialized and successful developing countries. Assistance in acquiring the technology and training should be requested from UNIDO, and other multilateral and bilateral organizations.

A joint venture partner providing technology and access to export markets is required for the production of:

* bottles, and jars
* sheet glass
* ornamental glass

If the above mentioned projects are to be implemented successfully, then 30% to 80% of the output will need to be exported. For the glassware production (glass tumblers, etc.) the current domestic demand is sufficient to make a plant with a capacity of 5 tons/day viable. Exports can be undertaken, once the quality level has reached international standards. In the glassware manufacture a joint venture partner is required mainly for providing the technology. Finally, all the above mentioned projects would be profitable within a year or two. However, in order to determine the precise ROI, there is a need to carry out market and technical feasibility studies. Efforts should also be made to improve electricity distribution with minimal voltage fluctuations and interruptions. This problem, not only, the glass and glassware industry, negatively affects, but also several other vital industrial sectors, including iron and steel, engineering, and petro-chemicals.

ANNEX 1: PERSONS CONTACTED DURING THE MISSION - SRI LANKA

Ministry of Finance & Planning

* Mr. K. Fernando, Acting Director, International Economic Co-operation Division, FIAC.
* Mr. B. Fernando, Deputy Director, -- " --
* Mr. S. Gunatilake, Deputy Director, -- " --
* Ms. S. Sathkumara, Deputy Director, -- " --
* Mr. L. Siriwardena, Deputy Director, -- " --
* Mr. M. Susiriwardane, Deputy Director, -- " --
* Mr. M. Takebayashi, Advisor (JICA), -- " --

Sri Lanka Export Development Board

* Ms. M. Panditteseker, Director - Product Management
* Mr. H. M. Ranasinghe, Deputy Director - -- " --
* Mr. P.C. De Silva, Deputy Director, ----- " ----
* Mr. G. Tillekeratne, Director - Projects
* Mr. P. Ponweera, Assistant Director - Electronics

Greater Colombo Economic Commission

* Mr. T. Cooray, Senior Manager - Appraisal

MINISTRY OF FISHERIES

* Mr. S. Wewelwala, Director, Development Division
* Mr. C. Fernando, Director, Programming & Planning Division

CINTEC/University of Colombo

* Professor V. K. Samaranayake, Head, Dept. of Statistics and Computer Science, and Board Member of CINTEC.

Industrial Development Board (IDB)

* Mr. S. Seneviratne, Chairman

Jagath Robotics Ltd.,

* Mr. J. R. Ranawaka, Managing Director

Department of Patents & Trade Marks

* Mr. K. Jayasinghe, Registrar

Informatics Ltd.

* Mr. G. Wickramasinghe, Managing Director
* Mr. K. Peries, Product marketing
* Dr. D. De Silva, Director, Operations

Coopers & Lybrand

Mr. C. W. Ranwala, Associate

Esjay Electronics Ltd.

* Mr. S. Samarakkody, Managing Director

Ceylon Glass Company Ltd.

* Mr. S. R. Gurusinghe, Production Manager

Asoka Glass Co. Ltd.

* Mr. M. Jinasena, Director

Lever Aquaproducts

* Mr. R. L. Fernando, Project director

Andriesz & Co., Ltd.

* Mr. P.M. Andriesz, Director
* Mr. M.S.D. Carwallio, Director

UNIDO

* Mr. J. B. Gorski, SIDFA
* Ms. C. Andersson, JPO

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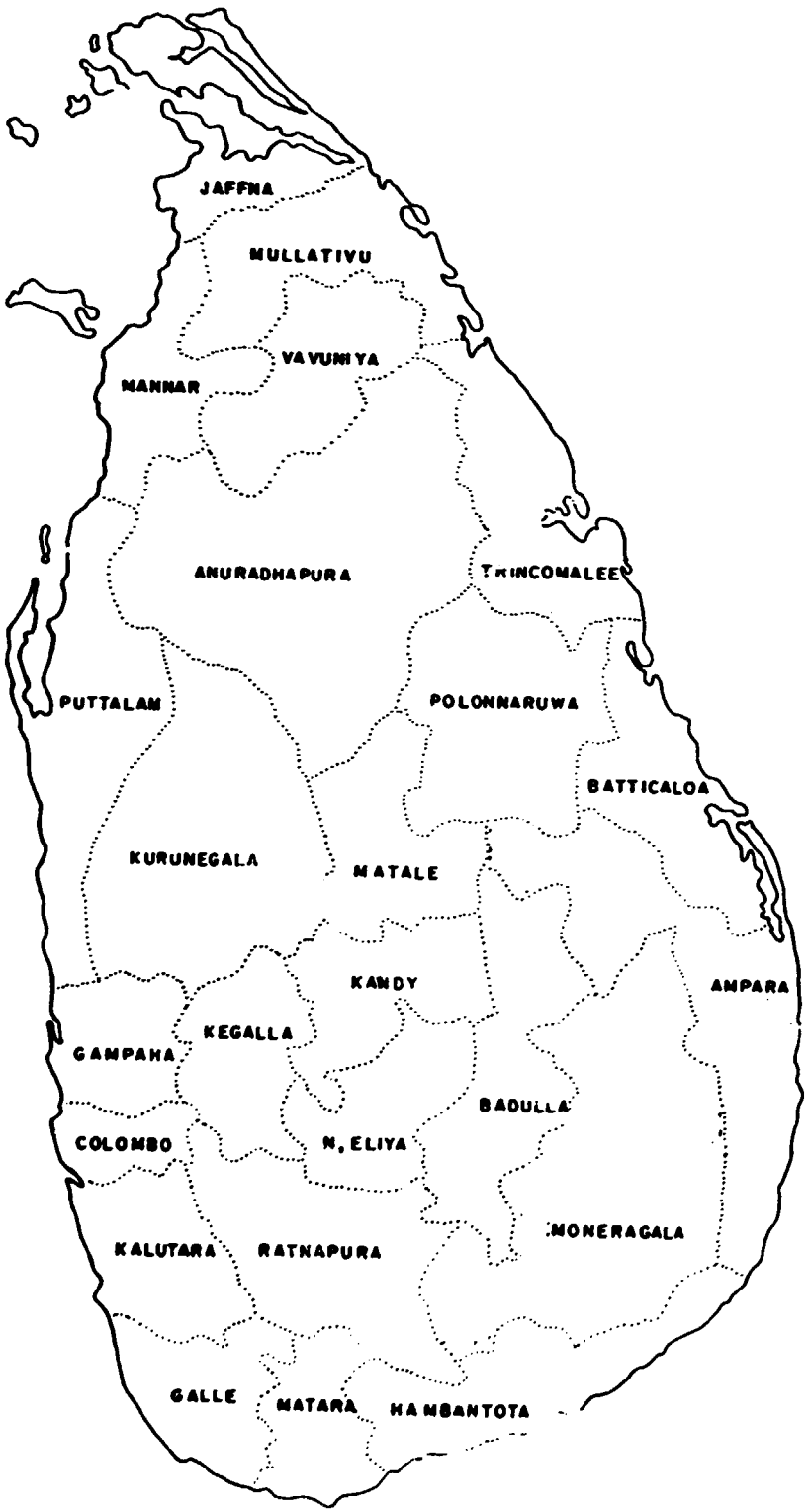
JAFFNA
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KALUTARA
RATNAPURA
GALLE
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HAMBANTOTA