

JAPAN INTERNATIONAL COOPERATION AGENCY
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF AGRICULTURAL DEVELOPMENT AND RESEARCH

SUPPLEMENTARY BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR THE ESTABLISHMENT
OF
THE NATIONAL PLANT QUARANTINE SERVICES
IN
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

OCTOBER, 1992

YAMASHITA SEKKEI INC.

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YAMASHITA SEKKEI INC.

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PREFACE

In response to a request of the Government of the Democratic Socialist Republic of Sri Lanka, the Government of Japan decided to conduct a Supplementary Basic Design Study on the Project for the Establishment of the National Plant Quarantine Services and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Sri Lanka a study team headed by Mr. Sannosuke Tsuchiya, Director for International Plant Quarantine Affairs, Plant Protection Division, Agricultural Production Bureau, the Ministry of Agriculture, Forestry and Fisheries from June 14 to July 2, 1992.

The team exchanged views with the officials concerned of the Government of Sri Lanka and conducted a field survey. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

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

October, 1992



Kensuke Yanagiya

President

Japan International Cooperation Agency

October, 1992

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

We are pleased to submit the Supplementary Basic Design Study Report on the Project for the Establishment of the National Plant Quarantine Services in the Democratic Socialist Republic of Sri Lanka.

This study has been made by Yamashita Sekkei Inc., based on a contract with JICA, from June 10 to October 9, 1992. Throughout the study, we have taken into full consideration of the present situation in Sri Lanka, and have planned the most appropriate project in the scheme of Japan's grant aid.

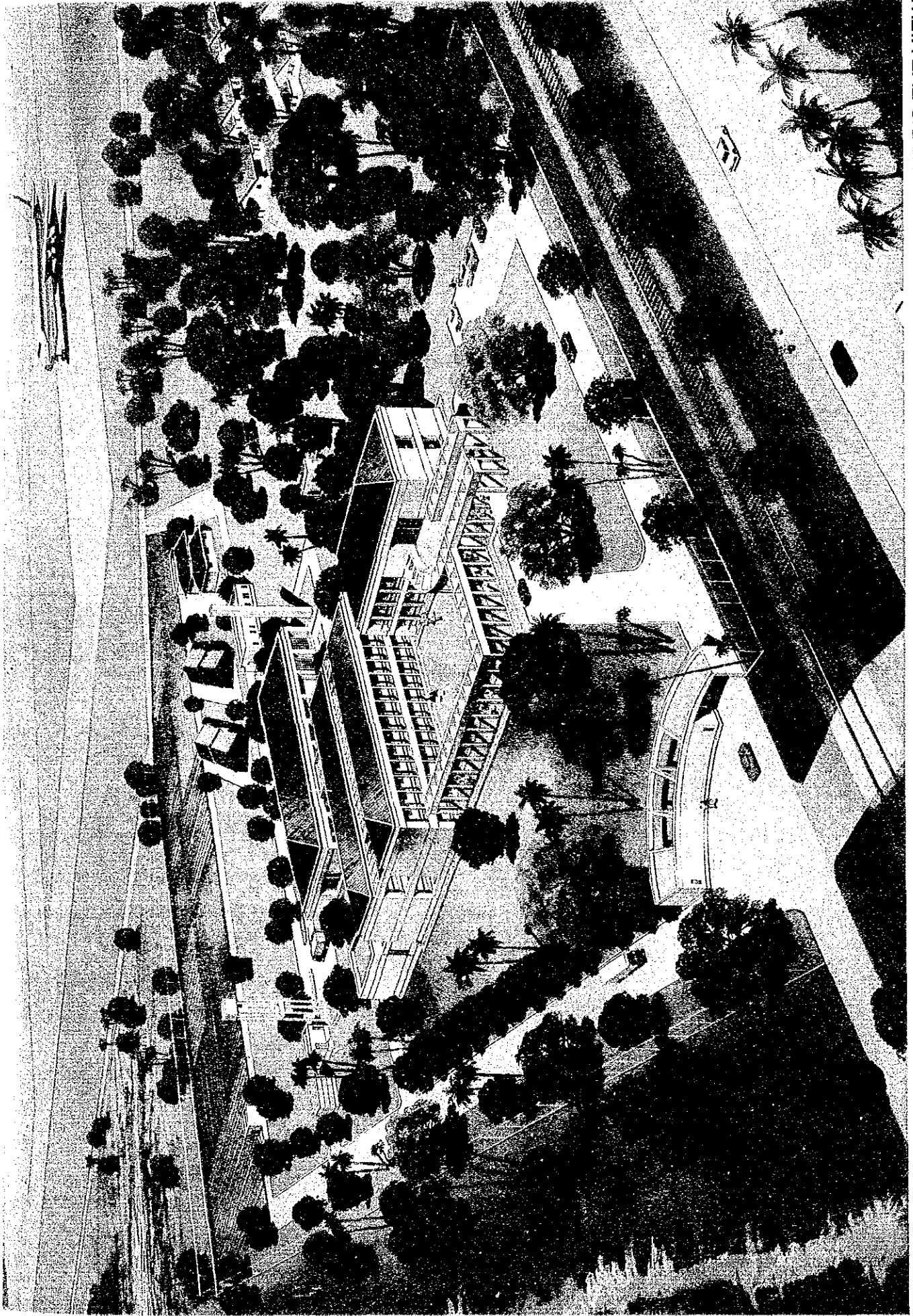
We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs, Ministry of Agriculture, Forestry and Fisheries and Embassy of Sri Lanka in Japan. We also wish to express our deep gratitude to the officials concerned of the Department of Agriculture, Ministry of Agricultural Development and Research, JICA Sri Lanka Office, Embassy of Japan in Sri Lanka for their close cooperation and assistance during our study.

At last, we hope that this report will be effectively used for the promotion of the project.

Very truly yours,

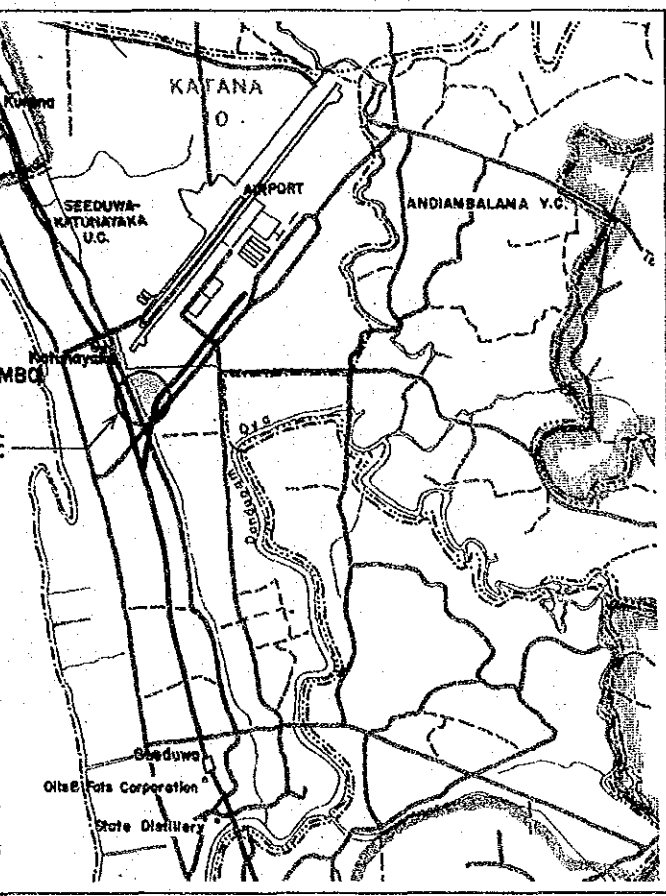
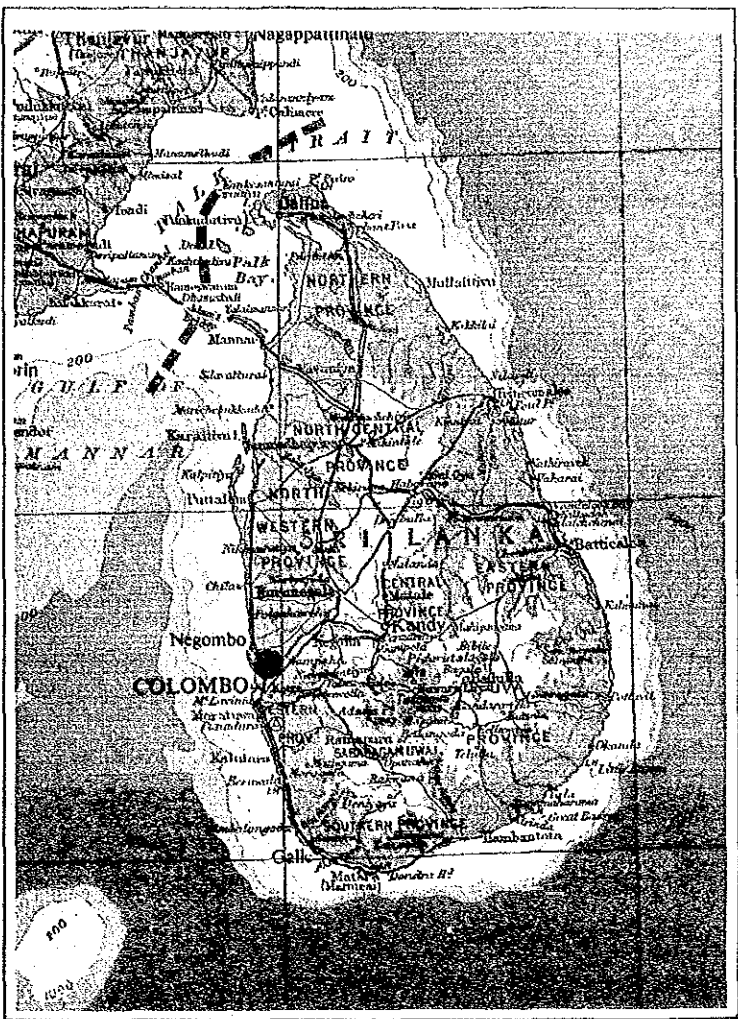
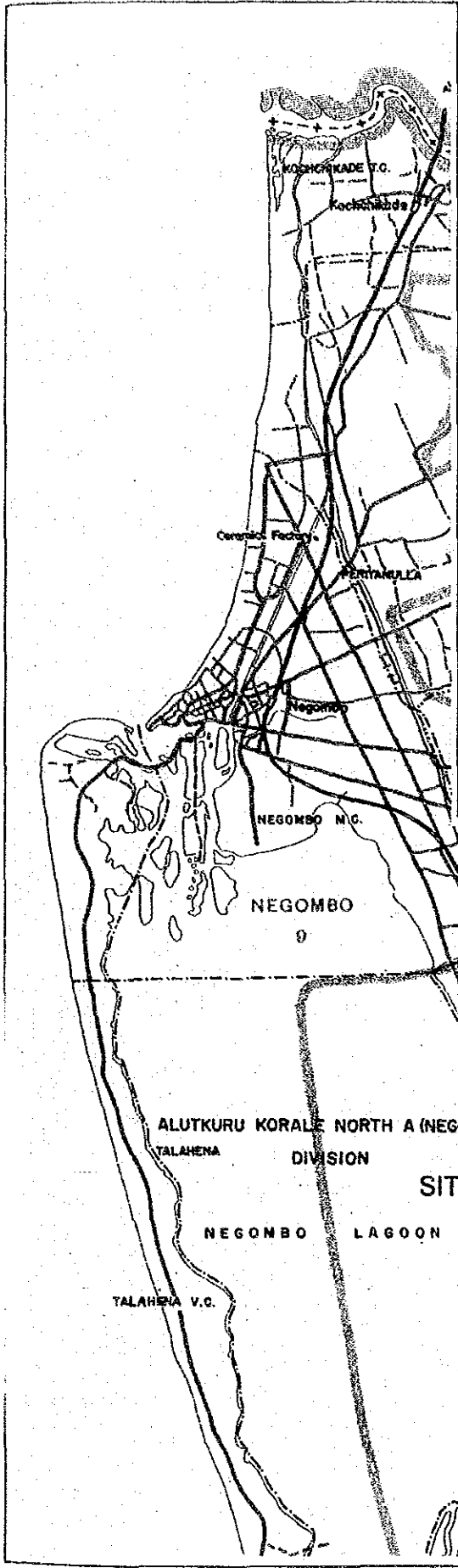


Project Manager, Takanori Tanaka
Supplementary basic design study team on
the Project for the Establishment of
the National Plant Quarantine Services
Yamashita Sekkei Inc.



THE NATIONAL PLANT QUARANTINE SERVICES

BIRD'S EYE VIEW



SITE LOCATION MAP



PROPOSED CONSTRUCTION SITE

SUMMARY

SUMMARY

The Government of Sri Lanka has been implementing various policy measures aiming at promoting the further growth of agriculture, which has been playing a pivotal role in Sri Lanka's economy. More specifically, the Government of Sri Lanka has been implementing agricultural development policy measures aiming at the liberalization of agriculture through a review of the country's import tariff system and removal of price controls, the diversification of agricultural production moving away from only rice-cultivation-centered agricultural production to high value agricultural production, and the improvement and expansion of the country's agricultural infrastructure. Regarding export and import of agricultural products, great emphasis is placed on the liberalization of agricultural products trade and the diversification of agricultural production.

The country's trade volume of agricultural products has been on the rise in recent years reflecting the smooth progress of its government's agricultural policy measures. The main imported agricultural products are food crops for domestic consumption, plants for cultivation such as seed potatoes and vegetables, plants imported for testing and research purposes for development of new varieties of superb quality. On the other hand, the country's main export agricultural products include the major export agricultural products such as tea, rubber and coconuts, and the minor agricultural products such as vegetables, fruits, flowering plants and spices. In order to promote the further growth in the country's agricultural products trade, however, it is imperative to ensure smooth plant quarantine operations in the country. The import of agricultural products is always accompanied with dangers of invasion of new pests and

subsequent damages these pests may cause to the country's agricultural production. If the export volume of agricultural products is to be increased, it is necessary to efficiently implement export plant quarantine, including export plant treatment. In order to stabilize the country's agricultural production and expand its exports of agricultural products, therefore, it is of vital importance to improve the quality of the country's plant quarantine system.

In Sri Lanka, plant quarantine services are conducted under the control of the Seed Certification and Plant Protection Division of the Department of Agriculture, the Ministry of Agricultural Development and Research. Colombo Seaport and Katunayake Airport plant quarantine stations, both of which are operating under the supervision of a deputy director of the Department of Agriculture's Seed Certification and Plant Protection Division as an implementing organization of the country's plant quarantine administration, are responsible for primary plant quarantine, and the plant quarantine section at Peradeniya for precise inspections. It can be said that Sri Lanka has a viable plant quarantine system, but the system lacks a central plant quarantine facility. The existing plant quarantine facilities' equipment is not sufficient in terms of both quality and quantity. For this reason, one of the major problems facing the country's present plant quarantine system is the lack of sufficient plant quarantine facilities and equipment. The country's current export volume of agricultural products exceeds its existing plant quarantine services' capacity.

Under such circumstances, the Government of Sri Lanka formulated a project to construct a plant quarantine facility into which the three main functions of plant quarantine services -- namely, the administration,

precision inspection and plant quarantine/treatment functions -- are to be integrated and improve the equipment installed in Colombo Seaport and Katunayake Airport plant quarantine stations for the purpose of making it possible to conduct plant quarantine services effectively and efficiently, and requested the Government of Japan for grant aid in the implementation of this project.

In response to this request of the Government of Sri Lanka, the Government of Japan decided to conduct a basic design study on the project, and the Japan International Cooperation Agency (JICA) dispatched a basic design study team to Sri Lanka from October 18 to December 1, 1989 to conduct a survey to confirm the contents of the request and to examine the basic concept for the projected facilities and equipment as well as the necessity and appropriateness of the project. After the dispatch of an additional study team to Sri Lanka from May 19 to May 31, 1990 for the changed project site survey, the basic design of the projected facilities and the selection of necessary items of equipment were conducted based on the results of the analysis of data and information collected through the above-mentioned surveys. The draft final report was prepared and explained in Sri Lanka from July 21 to August 1, 1990. After the minor modifications, the previous basic design study report was submitted to the Government of Sri Lanka.

Consequently, the Government of Sri Lanka requested a technical cooperation for the project. In response to this request, the Government of Japan made an adjustment in contents and schedule both of grant aid program and technical cooperation program toward the effective implementation of both programs, and confirmed to conduct a supplementary basic design study for grant aid program. Then JICA sent a supplementary basic design study team to Sri Lanka from June 14 to July 2, 1992 to study

the consistency of the contents of the previous basic design with the requested technical cooperation program, the Sri Lanka's project implementing organization and the status of the preparatory work for the implementation of the project. After return to Japan, the supplementary basic design study team prepared this supplementary basic design study report after modifying some of the contents of the previous basic design study report and re-designing the original facility and equipment plans.

The Department of Agriculture of the Ministry of Agricultural Development and Research of Sri Lanka is the implementing organization for the project. After the completion of the project, the National Plant Quarantine Services will operate as an independent plant quarantine organization, although it will operate formally under the control of the Department of Agriculture's Seed Certification and Plant Protection Division.

The National Plant Quarantine Services is to act as the country's central plant quarantine organization. It will have three major functions -- namely, the administration, precision inspection and plant quarantine operation functions. As the plant quarantine administration facility, it will be responsible for operational control, personnel management and research. As the precision inspection facility, it will conduct precise inspections of imported agricultural products. Its inspection division will consist of pathological inspection section, entomological inspection section and treatment technology section. As the plant quarantine operation facility, it will conduct primary plant quarantine inspections of export and import agricultural products. Its plant quarantine operations will include treatment of certain quantities of agricultural products exported via Katunayake Airport. The National Plant Quarantine Services is to start with a staff of 46. The estimated annual cost of the

maintenance and management of its facilities and equipment, excluding the personnel expenses, is 2,530,000 Rs. The planned number of its staff members has been approved after its review conducted in accordance with the World Bank's "Recommendations on Reduction of the Government's Size".

The facilities and equipment required for fulfilling the above-mentioned functions are as outlined below.

- Project site:

Katunayake, Gampaha District (at west end of premises of Katunayake Airport with an area of approximately 8 ha)

- Floor area of facilities:

Main Building	approx 4,055 m ²
Outdoor Facilities	approx 1,425 m ²
Total	approx 5,480 m ²

- Structure and stories:

Reinforced concrete, two (2) stories

● Facilities and Equipment

Division/Section		Facilities	Equipment
Administration Division		Director's Rm, Administration Office, Training Rm, Library, Printing Rm, Quarantine Operation Rm	Personal computer, Video camera set, Video Television set, Copying machine, Duplicating machine
Inspection Technology Division	Pathological Inspection Section	Pathological Inspection Rm	Safety cabinet, Fume hood, Microscope, Microtome, Autoclave, Plant growth cabinet
		Virological Inspection Rm	Safety cabinet, Controlled environmental chamber, ELISA set, High speed centrifuge, Deep freezer
		Tissue Culture Rm	Safety cabinet, stereoscopic microscope, Plant growth cabinet, Fume hood, Phytochrome testing equipment
		Isolated Field, Net House	Autoclave, Steam generator
	Entomological Inspection Section	Entomological Inspection Rm, Insectarium	Soft X-ray apparatus, Biological microscope, Sterilizer
		Nematological Inspection Rm	Stereoscopic microscope, Sterilizer, Biological microscope
		Fruit Fly Mass Production Rm, Feed Storage	Insect breeding cage, Sterilizer
	Treatment Technology Section	Fumigation Rm, Fumigation Testing Rm, Cold Storage	Fumigation equipment (30m ³), Fumigation equipment (6m ³ , vacuum type), Prefabricated cold room, Fumigation container, Gas chromatograph
		Treatment Rm, Treatment Inspection Rm	Vapor heat treatment equipment, Low temperature treatment equipment
	Common Facilities	Instrumental Analysis Rm, Balance Rm	Water still, Fume hood, Spectrophotometer (IR), Spectrophotometer (UV-vis)
Common Preparation Rm, Chemical Storage		Water still, Ice maker, Deep freezer	
Quarantine Operation Division		Inspection Rm, Cargo terminal	Typewriter, Illuminated magnifier
Katunayake Airport			Microscope, Copying machine, Motorbike
Colombo Seaport			Microscope, Sterilizer, halides gas detector, Motorbike, Pick-up truck

When this project is implemented with grant aid from the Government of Japan, it will be reasonable to complete the entire project in two phases; building works in one phase of 12 months and equipment works in two phases

(first phase of 12 months and second phase of 9 months), in the light of the scale of the facilities.

When implemented, this project will help reinforce Sri Lanka's plant quarantine system as well as streamline the plant quarantine operations in the country. As a result, it will become possible to prevent the invasion of pests/pathogens with which imported agricultural products, seeds and seedlings are contaminated, which in turn will result in stabilized agricultural production in the country. In addition, the implementation of this project will lead to improvements in the country's treatment technology and export of agricultural products, which in turn will contribute to the promotion of the export of agricultural products as well as to the acquisition of foreign currencies.

As this project is expected to have far-reaching positive effects on Sri Lanka's agriculture and at the same time to contribute to the sound economic development of the country, it is considered reasonable to implement the project with grant aid from the Government of Japan.

It is desirable that a project-type technical cooperation program be implemented by the Government of Japan to improve plant quarantine technology in Sri Lanka. It will be necessary, on the other hand, for the Government of Sri Lanka to work out and implement proper personnel assignment, to make sufficient budgetary appropriations for the maintenance and management of the facilities and equipment, and to maintain the precision and reliability of plant quarantine at a high level, in order to enhance the expected effects of this project.

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3. Member List of Concerning Party in Sri Lanka
4. Minutes of Discussions

CHAPTER 1 INTRODUCTION

CHAPTER 1 INTRODUCTION

The Government of Sri Lanka requested the Government of Japan to provide grant aid for the construction of new plant quarantine facilities and the reinforcement of the equipment installed in the existing facilities at the seaport and airport plant quarantine stations, with the aim of improving and strengthening the abilities of the plant quarantine services in Sri Lanka.

In response to the request from the Government of Sri Lanka, the Government of Japan decided to conduct a basic design study on the Project for the Establishment of the National Plant Quarantine Services, and the Japan International Cooperation Agency (JICA) dispatched a basic design study team headed by Mr. Takushi Obata, Director General, Yokohama Plant Protection Station, Ministry of Agriculture, Forestry and Fisheries, from October 28 to December 1, 1989. The basic design study team discussed and examined the contents of the request and the background of the project, and conducted surveys concerning the feasibility of grant aid from the Government of Japan for the implementation of this project.

As the project site had been changed, JICA conducted an additional survey of the project site from May 19 to May 31, 1990. After their return to Japan, the basic design of the facilities and the selection of necessary items of equipment were made according to the results of the analysis of the survey findings, and a draft final report was prepared. From July 21 to August 1, 1990, JICA dispatched a basic design study team headed by Mr. Toshio Morita, Director, Research Division, Yokohama Plant Protection Station, Ministry of Agriculture, Forestry and Fisheries, to Sri Lanka and explained the draft final report. Then, a basic design study report

presenting the results of the above-mentioned survey and analysis was submitted in August 1990.

Consequently, the Government of Sri Lanka requested technical cooperation under this project from the Government of Japan. In response to this request, the Government of Japan made an adjustment in contents and schedule of both programs of grant aid and technical cooperation toward their effective implementation, and confirmed to realize the grant aid program.

The Government of Japan, however, found it necessary to re-examine on the project implementation condition and project cost under the consideration that two years had passed since the previous basic design study was made, and decided to conduct a supplementary basic design study. Then JICA sent a supplementary basic design study team headed by Mr. Sannosuke Tsuchiya, Director for International Plant Quarantine Affairs, Plant Protection Division, Agricultural Production Bureau, Ministry of Agriculture, Forestry and Fisheries, to Sri Lanka from June 14 to July 2, 1992. The supplementary basic design study team carried out the following survey concerning the progress of the preparatory work by the Sri Lankan side, the implementation organization of the project and the consistency of the contents of the basic design presented in the previous basic design study report with the proposed technical cooperation program.

1. Confirmation of the implementation of the project, including the organization, personnel and budget
2. Re-examination of the functions and activities of the existing plant quarantine stations

3. Confirmation of the consistency of the basic design with the contents of the request for technical cooperation
4. Review and confirmation of the contents of the basic design presented in the previous basic design study report.
5. Re-investigation of the situation of the project site and the construction industry in Sri Lanka

After return to Japan, the supplementary basic design study team modified the contents of the basic design presented in the previous basic design study report on the basis of the results of the supplementary basic design study and prepared a draft report on the results of the modification. The draft report was sent to the Government of Sri Lanka for confirmation of its contents. This supplementary basic design study report presents the results of the above-mentioned survey and analysis.

A member list of the supplementary basic design study team, the survey schedule, the member list of concerning party of Sri Lanka and the minutes of the discussions are attached the end of this report.

CHAPTER 2 BACKGROUND OF THE PROJECT

CHAPTER 2 BACKGROUND OF THE PROJECT

2-1 Agriculture in Sri Lanka

2-1-1 Present State of Agriculture in Sri Lanka

(1) Position of Agriculture in Sri Lanka's National Economy

Since ancient times, Sri Lanka's economy has developed with its agricultural sector as a key element. As shown in Table 2-1, agriculture is among the largest sectors of Sri Lanka's national economy, in terms of employed population, gross domestic product and export volume.

Table 2-1 Position of Agriculture in Sri Lanka's National Economy

Item	Total Amount	Industry		
		No. 1 (%)	No. 2 (%)	No. 3 (%)
1. Employed Population	5,963,700 (person)	Agriculture (47.8%)	Service (16.4%)	Industry (14.6%)
2. Gross Domestic Product	135,389 (Million Rs)	Service (50.3%)	Agriculture (22.8%)	Industry (17.7%)
3. Export Volume	84,376.3 (Million Rs)	Industry (60.1%)	Agriculture (31.5%)	Mining (2.8%)

(Source: Central Bank of Sri Lanka 1992)

(2) Present State of Major Agricultural Products

The Government of Sri Lanka considers the growth of agriculture is essential to the country's economic development, and it centers its agricultural policy on three points; on the establishment of self-sufficiency in food crops for domestic consumption, such as rice, sugar and pulses; on the increased production of such major export agricultural products as tea, rubber and coconuts; and on the expansion in exports of "minor agricultural products," such as spices, fruits, vegetables and flowering plants, which have potentially large export markets.

The present state of these major agricultural products are as described below.

1) Food Crops for Domestic Consumption

Rice, the staple food of the Sri Lankan people, has the largest output of all Sri Lankan agricultural products. Its annual production varies to some extent from one year to another, but in recent years it has averaged 2 million tons to 2.5 million tons. In 1991, rice production amounted to 2.39 million tons. On the other hand, however, the country is about 90 percent self-sufficient in rice. In 1991, 190,000 tons of rice were imported, which accounted for about 10 percent of the country's total import volume of agricultural products for the year. Thus, rice is till one of the country's most important import agricultural products.

In 1991, sugar production amounted to 66,440 tons, a 16 percent increase over the previous year. However, domestic sugar consumption is on the increase. In 1991, 450,000 tons of sugar were imported, which made up 30 percent of the country's total import volume of agricultural products for the year.

2) Major Export Agricultural Products

Tea, rubber and coconuts are the country's major export agricultural products. In 1991, tea exports totaled 17,868 million Rs, rubber exports 2,641 million Rs, and coconuts exports 2,619 million Rs. In other words, the combined total exports of these three major export agricultural products represented 27.4 percent of the country's total exports for the year of 84,376 million Rs.

3) Minor Agricultural Products

The Government of Sri Lanka designated those agricultural products which are not included in the category of "major export agricultural products" but which have potentially large export markets as "minor agricultural products," and has been promoting the expansion in production and diversification of these agricultural products. Among the "minor agricultural products" are spices, fruits, vegetables and flowering plants. In 1991, exports of the "minor agricultural products" totaled 3,409 million Rs, or 4 percent of the country's total exports for the year. It is hoped that production and exports of these agricultural products, which are produced mainly by small-scale farmers, will be expanded from the standpoint of Sri Lanka's economic and social stability.

2-1-2 Exports and Imports of Agricultural Products

The Government of Sri Lanka designated each year during the ten-year period from 1992 through 2001 as "Year of Export" and has been implementing export promotion policy measures in various sectors of the Sri Lankan economy. In the agricultural sector, expansion in exports of agricultural products, diversification of agricultural production, and improvement in agricultural productivity and quality of agricultural products are given the top priorities in the sector's policy. In recent years, the country has been stepping up its economic relations with other countries, and as a result, its trade of agricultural products are now on the rise. The present state, and the future outlook for the country's exports and imports of agricultural products are examined below.

(1) Imports of Agricultural Products

In 1991, Sri Lanka's total imports stood at 126,643 million Rs (US\$2,237 million). Table 2-2 shows a breakdown of the country's total imports for the year. The pattern of the country's imports of agricultural products is characterized by the predominance of such food crops as rice, wheat and sugar. Although Sri Lanka is an agricultural country, it has not yet achieved adequate self-sufficiency in certain agricultural products. Imports of these agricultural products are still indispensable to the country.

Table 2-2 Total Imports 1991

Category	Import Volume		
	in Million Rs	in Million SDR	%
1. Consumer Goods	32,357	571.6	25.6
2. Intermediate Goods	64,265	1,135.2	50.7
3. Investment Goods	29,792	526.3	23.5
4. Unclassified	229	4.0	0.2
Total	126,643	2,237.1	100.0

Rice	1,589	28.1	1.3
Wheat	3,303	58.3	2.6
Sugar	5,139	90.8	4.1

(Source: Central Bank of Sri Lanka 1992)

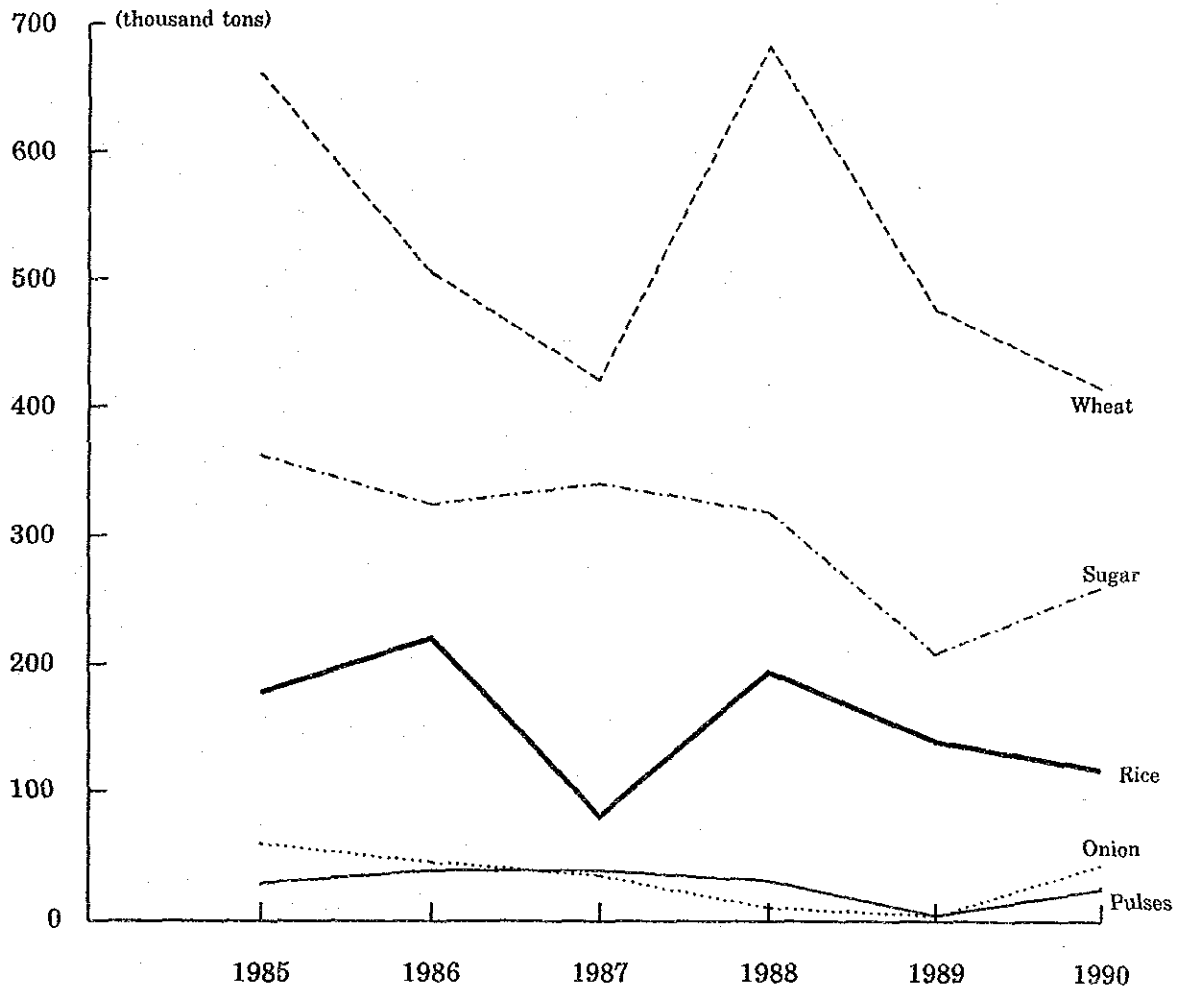
Sri Lanka's imports of agricultural products, including food crops, are divided broadly into the following three categories.

1. Food crops
2. Plants for cultivation
3. Plants for testing and research purposes

The present state of the imports of these agricultural products are follows.

1) Food Crops

At present, Sri Lanka is dependent on imports for supplies of food crops for domestic consumption, such as rice, pulses, onions and chilies.



(Source: Agricultural Statistics 1992)

Fig. 2-1 Imports of Food Crops

The Government of Sri Lanka is implementing policy measures to promote the production of these food crops, as well as various agricultural

development programs aimed at curbing further increase in import of these agricultural products by increasing their domestic production and diversifying agricultural production to include other export agricultural products. It is expected that these policy measures will serve to drastically decrease imports of food crops in the future. For the time being, however, imports of these food crops will either stay at the present level or increase a bit.

2) Imports of Plants for Cultivation

In Sri Lanka, domestic production of seeds of rice, potatoes and other vegetables cannot meet domestic demand, and considerable quantity of such seeds are imported. In the case of seed potatoes, for example, of about 6,000 tons, which are the annual requirements, 2,000 tons are imported. Furthermore, as a result of the recent diversification of agricultural production, there has been an increase in introduction of new vegetable and fruit seeds from abroad.

3) Imports of Plants for Testing and Research Purposes

The Government of Sri Lanka is promoting agricultural development policy measures to introduce high-quality seeds, saplings and germ plasma from abroad and develop new varieties of superb quality, for the purposes of improving the country's self-sufficiency in agricultural products. Rubber, coconuts, sugar cane and rice, among others, are the most important plants for testing and research purposes. Various public institutions specializing in the testing and research of plants are engaged in the testing and research of these plants. At the same time, private producers are also experimenting with the cultivation of new varieties for the purposes of increasing the production of vegetables and fruits and diversifying agricultural

production. At present, these plants for testing and research purposes are imported in very limited quantities. But it is very likely that unknown pests/fungi will invade the country through their import because they are imported from so many countries and inhabiting situations of pests/fungi differ from one country to another.

Sri Lanka's imports of plants are on the increase. It is expected, therefore, that the workload of the country's plant quarantine services will increase in keeping up with the increase in plant imports.

(2) Exports of Agricultural Products

In Sri Lanka, exports of agricultural products are the second largest after exports of industrial products. Three major export agricultural products, namely, tea, rubber and coconuts account for the greater part of the country's total exports of agricultural products. However, it is urgently necessary to expand exports of new agricultural products in addition to them, namely "minor agricultural products," in order to expand the country's total exports of agricultural products.

1) Major Export Agricultural Products

Tea accounted for 67.3 percent, rubber 10.1 percent, and coconuts 9.0 percent of the country's exports of agricultural products in 1991. In other words, these three "major export agricultural products" made up about 90 percent of the total exports of agricultural products. As shown in Fig. 2-2, however, export value of these agricultural products has recently leveled off at a low level. It is to be hoped that production of these products will be increased from the standpoint of acquisition of foreign currencies.

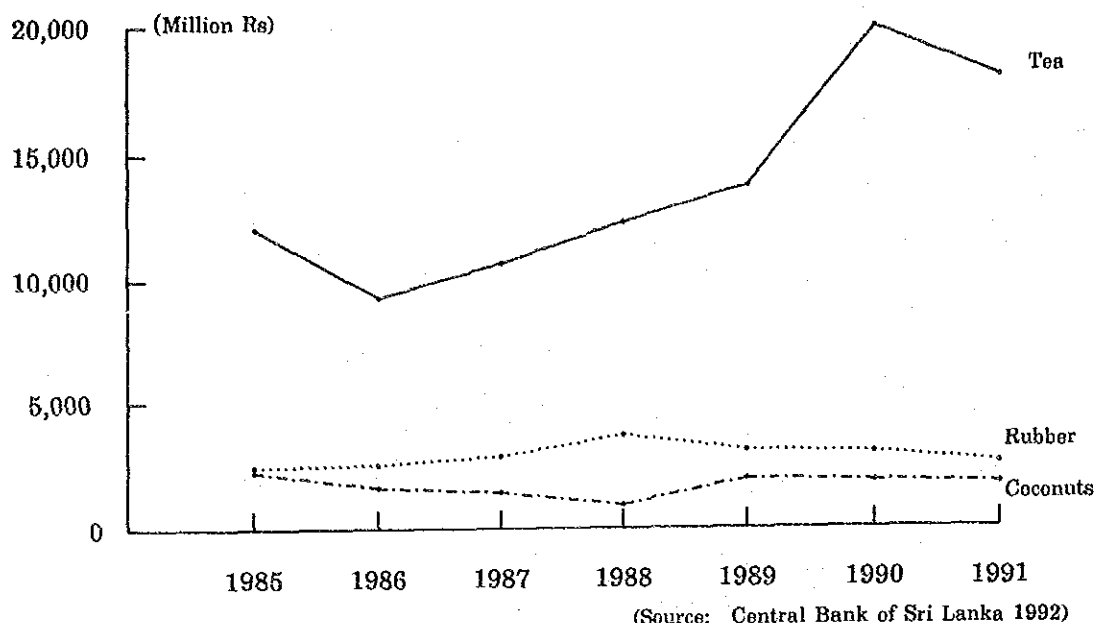


Fig. 2-2 Export Value of Major Export Agricultural Products

2) Minor Agricultural Products

To date, "minor agricultural products" have represented only about 10 percent of the country's total export value of agricultural products. The Government of Sri Lanka is implementing policy measures to promote the production of these "minor agricultural products" and to expand their exports through their increased production. The percentage of export value of the "minor agricultural products" and trends in export value of these products are as shown in Fig. 2-3 and Fig.2-4.

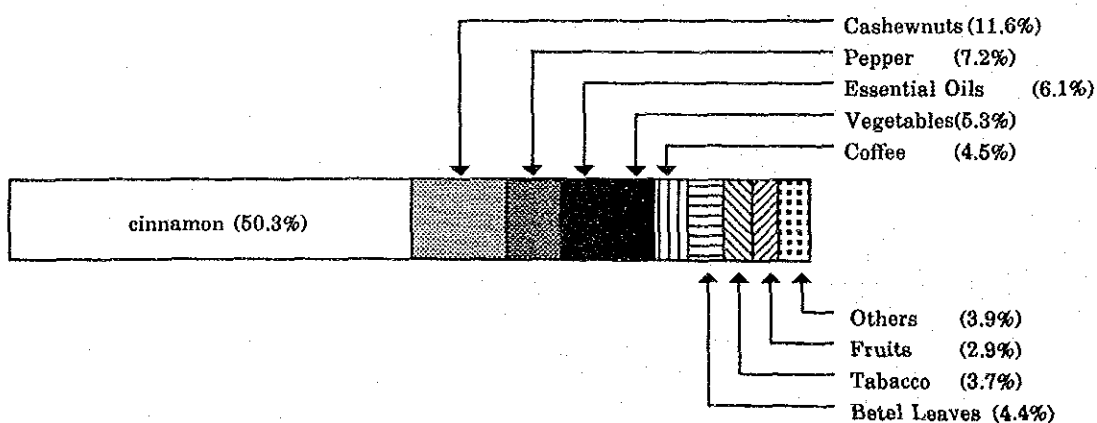
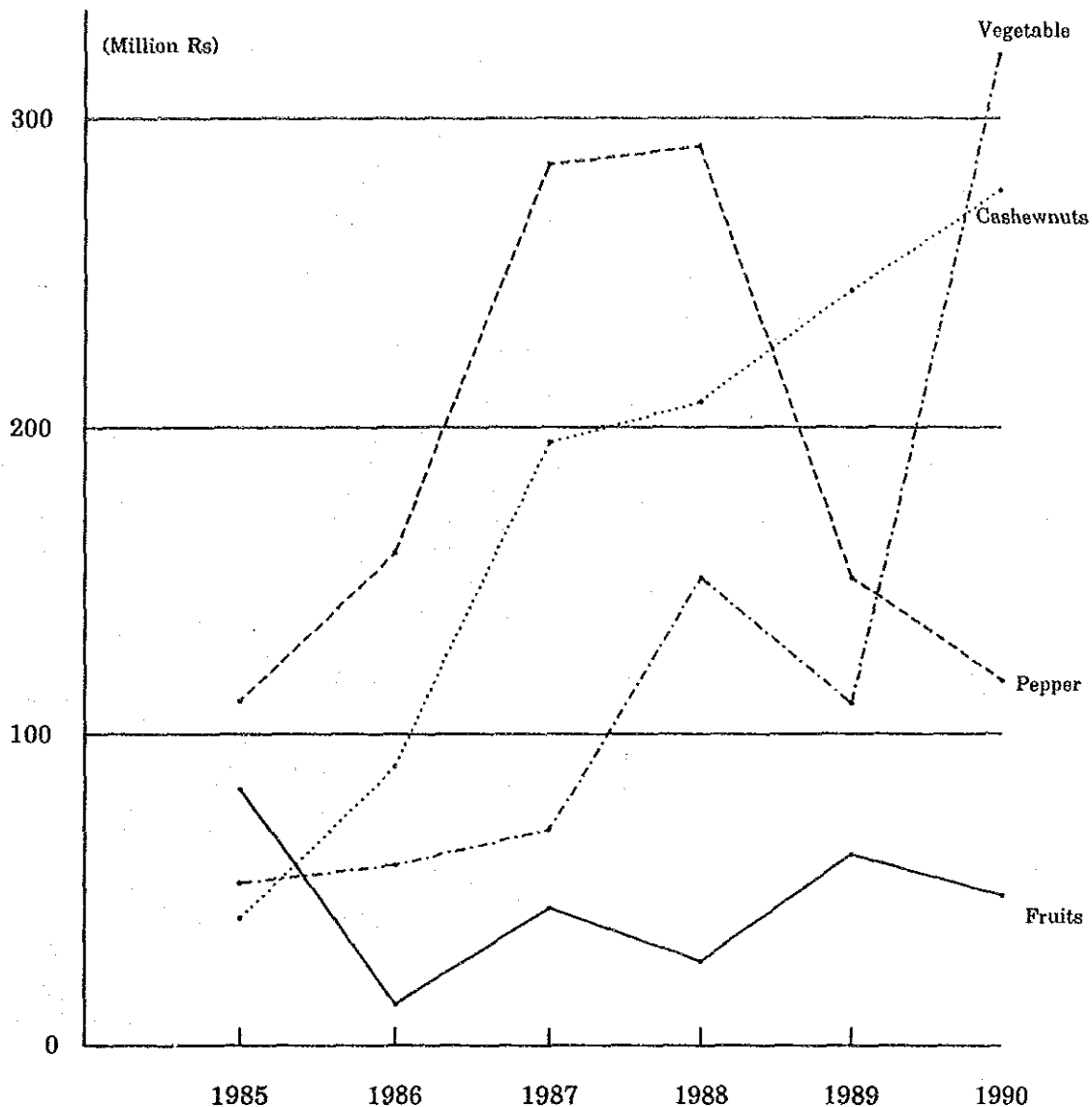


Fig. 2-3 Minor Agricultural Products

(Source: Agricultural Statistic 1992)



(Source: Central Bank of Sri Lanka 1992)

Fig. 2-4 Trends in Export Value of Agricultural Products

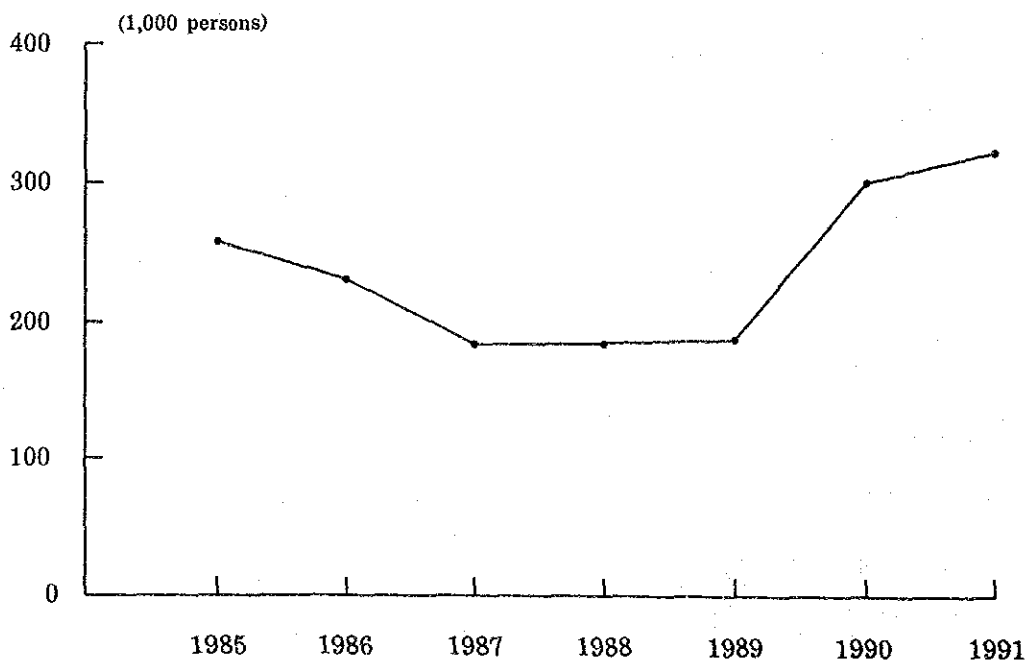
The Government of Sri Lanka is promoting the production and export of "minor agricultural products" and all the other agricultural products. It is taking preferential measures, including tax incentives in terms of incomes and plant/equipment investment, for producers of export agricultural products. It is expected, therefore, that the country's export volume of agricultural products will show an upward trend in the future reflecting these measures by the central government.

(3) Exports and Imports of Plants Which Reflects the Acceleration of Economic Growth

The Government of Sri Lanka has actively been implementing economic policy measures, such as attraction of foreign tourists and incentives for foreign businesses operating in the country, as part of its policy to promote the acquisition of foreign currencies. As a result, there have been significant increases in the number of Sri Lankan people going abroad and the number of foreigners visiting Sri Lanka, as well as in the incoming sea-borne freight. In keeping with this trend, plant exports and imports are also on the increase.

1) Increases in the Number of Travelers Utilizing Air Transportation

Most of the travelers entering or leaving Sri Lanka use the Katunayake Airport. As shown in Fig. 2-5, the number of travelers who use the airport is on the increase.



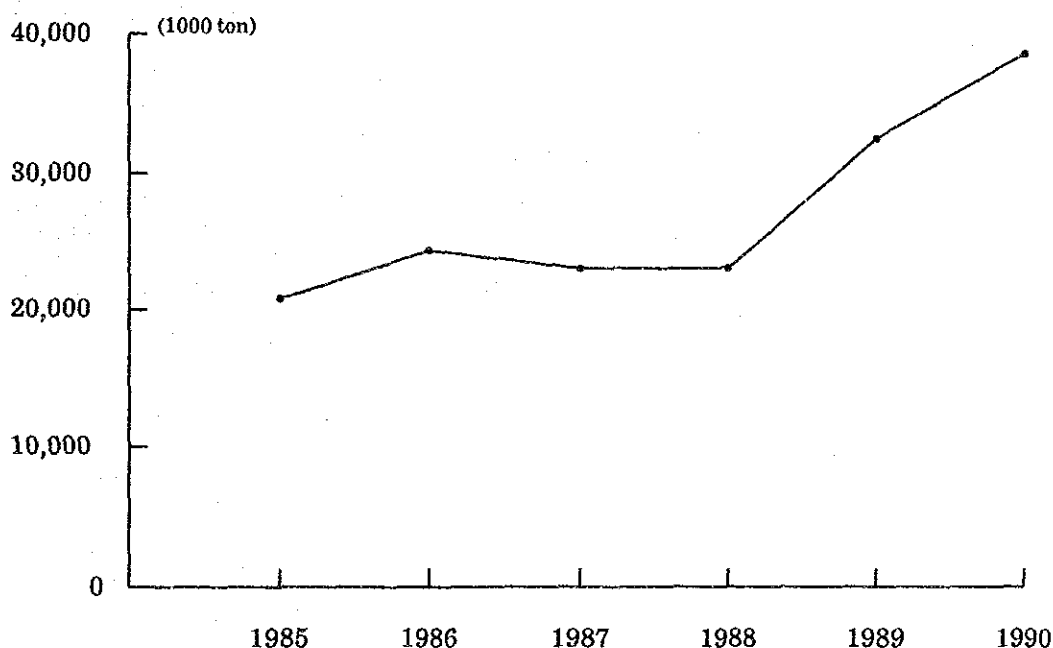
(Source: Ceylon Tourist Board 1992)

Fig. 2-5 Trends in the Number of Travelers Entering Sri Lanka

The number of plants and plant products brought to Sri Lanka is increasing in keeping with the increase in the number of travelers entering Sri Lanka. The daily number of plant quarantine inspections (mostly of fruits airlifted from India and Thailand) conducted at the airport is about 100.

2) Increases in the Sea-borne Freight

As shown in Fig. 2-6, there have been increases in the incoming sea-borne freight handled at Colombo Seaport and other seaports, in keeping with the uptrend of Sri Lanka's economy.



(Source: Statistical Pocket Book 1991)

Fig. 2-6 Trends in the Incoming Sea-borne Freight

In 1990, a total of 2,605 cargo boats entered Colombo Seaport, and a total of 242 cargo boats to other seaports. Main facilities of Colombo Seaport are now under repair, and it is expected that there will be sharp increases in the sea-borne freight, including export and import plants, handled at the seaport.

As the above review of the present state of exports and imports of plants in Sri Lanka clearly indicates, it is expected that there will be a further increase in the quantity of plants and plant products that enter or leave Sri Lanka, although quantity of individual plants and plant products will vary depending on type of plant/plant product and means of transportation. This implies possible increases in the plant quarantine workload in the country. It is essential, therefore, to establish a plant quarantine system capable of effectively and quickly coping with such increases in the plant quarantine workload.

2-2 Plant Quarantine Services

In recent years, plant export and import volumes have been increasing from year to year reflecting the steady growth of Sri Lanka's economy and the Government of Sri Lanka's export promotion policy, and they are expected to continue increasing. The increase in plant imports, in particular, implies a greater danger of pests' invasion of the country. To ensure a stable growth of the country's agricultural sector, it is necessary to strengthen the plant quarantine services itself. In order to increase exports of agricultural products, on the other hand, it is imperative to improve the country's export quarantine system, including the disinfestation procedure.

Here the present state of the country's plant quarantine services, especially the plant quarantine organizations and facilities, is examined with specific reference to the country's legal system.

2-2-1 Laws and Regulations for Plant Quarantine

Laws and regulations which form the basis for plant quarantine services in Sri Lanka are divided broadly into domestic laws and regulations, the central government's notifications and the international conventions to which Sri Lanka is a signatory.

(1) Plant Protection Ordinance

The law that forms the legal basis for plant quarantine in the country is the Plant Protection Ordinance No.10, 1924, which was enacted in 1924. This basic law provides for the legal authority concerning plant protection operations, including plant quarantine. Government ordinances and notifications which stipulate the details of plant protection are

issued in accordance with the provisions of the law. It should be added that the law was revised in 1950, 1954 and 1981.

(2) Legislative Enactments of Sri Lanka, 1956, Vol. 12, Chapter 447

The Legislative Enactments of Sri Lanka, 1956, Vol. 12, Chapter 447 stipulates the details of the plant protection organizations and their legal authority in accordance with the provisions of the aforementioned Plant Protection Ordinance No.1, 1924.

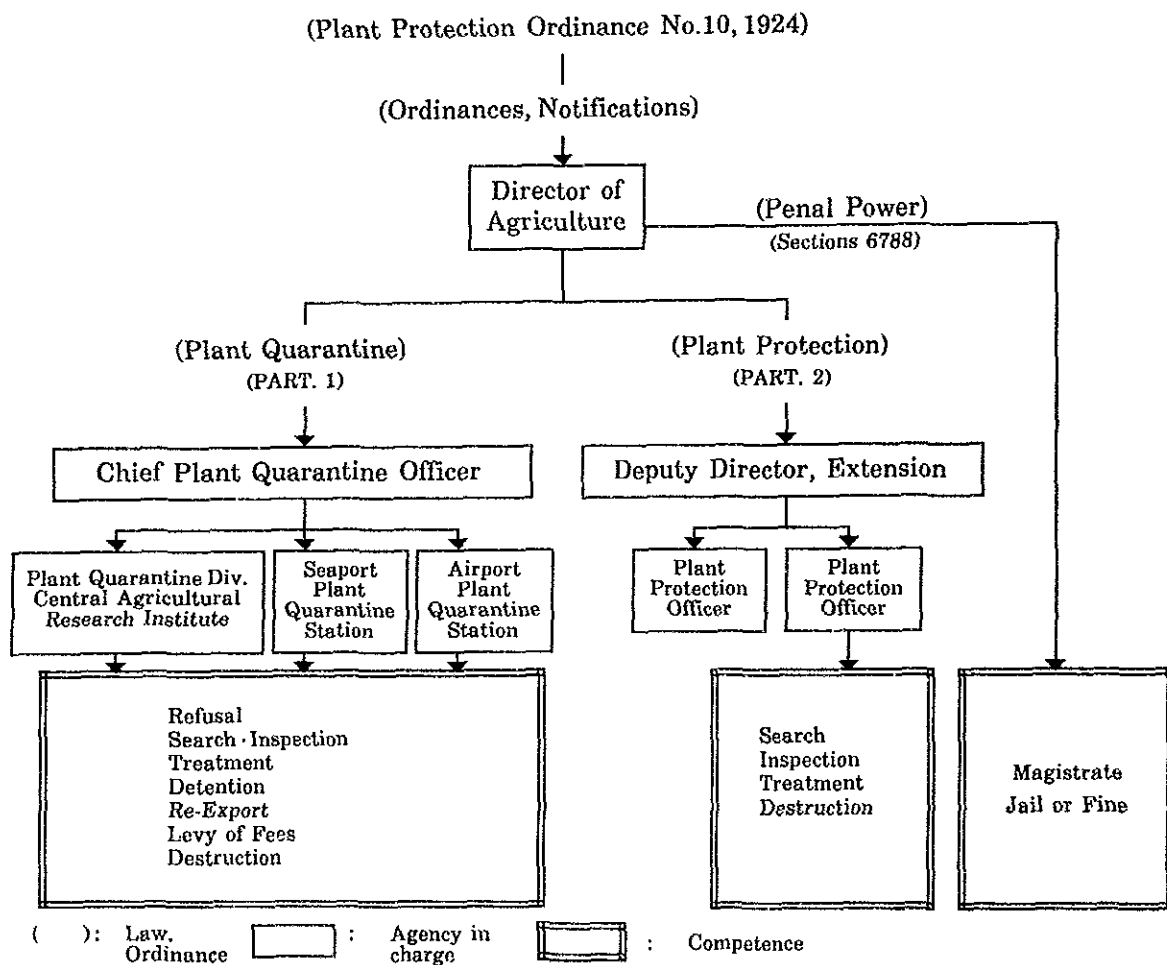


Fig. 2-7 Legal Authority under Plant Protection Ordinance

This enactment consists of two parts, with Part 1 stipulating the competent authorities, contents of services, method of services, and penal standards and procedures in the area of plant quarantine and Part 2

stipulating the same in the area of plant protection. Matters involved in plant quarantine, such as plant quarantine forms, products of which importation is banned, quarantine charges, qualifications of quarantine facilities and procedures for revising the laws, are stipulated in accordance with the provisions of this enactment.

The following table shows the quarantine charge structure developed pursuant to this enactment.

Table 2-3 Quarantine Charge Structure

Service	Charge
1. Treatment of packages less than 0.5m ³ in volume	10 Rs/package
2. Treatment of packages more than 0.5m ³ in volume	25 Rs/m ³
3. Holding of plants in post-entry quarantine	1 Rs/plant · month
4. Issue of quarantine certificate for goods for export	10 Rs/certificate

Regarding the authority concerning plant protection and quarantine, which is stipulated in the above-mentioned enactment, the plant protection organization of the Department of Agriculture of the Ministry of Agricultural Development and Research has already been altered in a manner that is inconsistent with the provision of the enactment. As shown in Fig. 2-7, for example, the Plant Quarantine Division of the Central Agricultural Research Institute has been integrated into the Seed Certification and Plant Protection Division of the Department of Agriculture. It should also be noted that the quarantine charges as shown in Table 2-3 are too low in comparison with current prices of commodities. In light of these circumstances, the Department of Agriculture is now in the midst of revising the enactment on the basis of a review of the department's plant quarantine organization and the current quarantine charge structure.

(3) Other Relate Laws and Regulations

Although not directly related to the Plant Quarantine Ordinance, various laws were enacted in fields related to plant quarantine. Neither the plant quarantine inspectors nor the plant protection inspectors are entitled to exercise their authority stipulated in these laws, but they may sometimes be involved in matters related to the plant quarantine/protection through the work to identify pests/pathogens and the export/import quarantine of agricultural products. The following laws are considered to directly affect their activities.

- Fauna & Flora Protection Act.
- Endangered Species Act.
- Wild Life Act.
- Environment Protection Act.

Those plant quarantine inspectors who conduct quarantine inspections at airports and seaports are required to have a thorough knowledge of not only the laws applicable to plant quarantine but also these laws.

(4) International Conventions

Sri Lanka is a signatory to international conventions that stipulate international or regional cooperation in the area of plant protection. Major international conventions to which the country is a signatory are outlined below.

1) International Plant Protection Convention (IPPC)

This is an international convention aimed at establishing a system for international cooperation concerning laws and regulations, technologies and procedures for the prevention of pests' and pathogens' invasion in the signatory countries. It stipulates the methods of export and import of plants to be employed by the signatory

countries. In the case of export and import of plants between the signatory countries, for instance, plants and their containers/packages must be inspected in the exporting country and a certificate of inspection as specified in the annex to the convention, which is issued by the competent authorities of the exporting country, must be attached to the plants exported. Sri Lanka became a signatory to this convention in 1952.

2) Asia and Pacific Plant Protection Commission (APPPC)

This international convention stipulates measures to be taken by the signatory countries concerning pests/pathogens peculiar to the Asian and Pacific region. It also defines pests/pathogens which could be particularly hazardous in the region (e.g. *Microcyclus ulei*) and gives guidelines on preventive measures, applicable plant quarantine methods and legal measures. Sri Lanka became a signatory to this convention in 1956.

2-2-2 Plant Quarantine Organization

(1) Administrative Organization

In Sri Lanka, plant quarantine services are carried out under the control of the Department of Agriculture of the Ministry of Agricultural Development and Research. More specifically, the Plant Quarantine Section is operating under the supervision of the Seed Certification and Plant Protection Division, which is under the direct control of the Department of Agriculture. All plant quarantine-related organizations are operating within this administrative organizational framework. Under this administrative setup, the head of the Plant Quarantine Section

concurrently serves as the Chief Plant Quarantine Officer. The figure below gives a graphic representation of the above-mentioned administrative organization for plant quarantine.

When a National Plant Quarantine Services is established under this project, its organization will include the Plant Quarantine Section. In this case, the Kandy Plant Quarantine Station, which was formerly the Plant Quarantine Division of the Central Agricultural Research Institute, will be dissolved, and the head of the Plant Quarantine Division concurrently serving as the Chief Plant Quarantine Officer will be transferred to the newly established National Plant Quarantine Services.

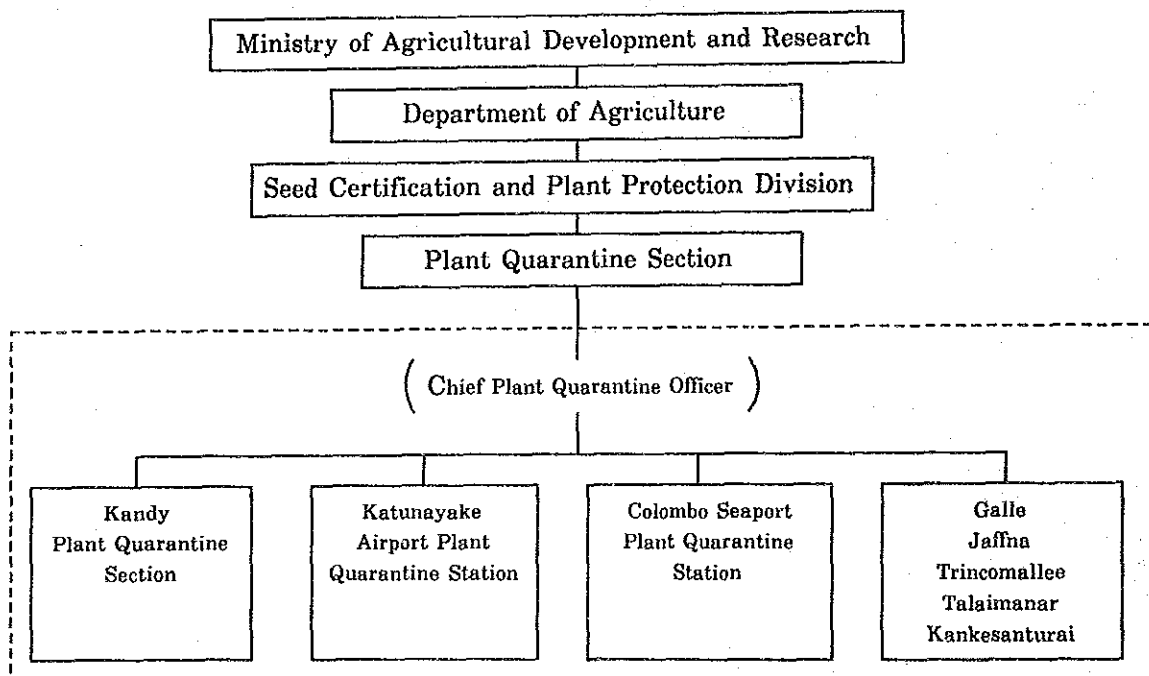


Fig. 2-8 Administrative Organization for Plant Quarantine

Both the plant quarantine station at Katunayake Airport which more than 90 percent of the travelers leaving or entering Sri Lanka use and the one at Colombo Seaport where 90 percent of the export and import cargos are handled are offering 24-hour plant quarantine services by the plant quarantine officers. The other seaports are offering a shipboard

quarantine service by the Department of Agriculture's domestic plant protection officers or agricultural advisors.

Fig. 2-9 shows the locations of the above-mentioned plant quarantine organizations.

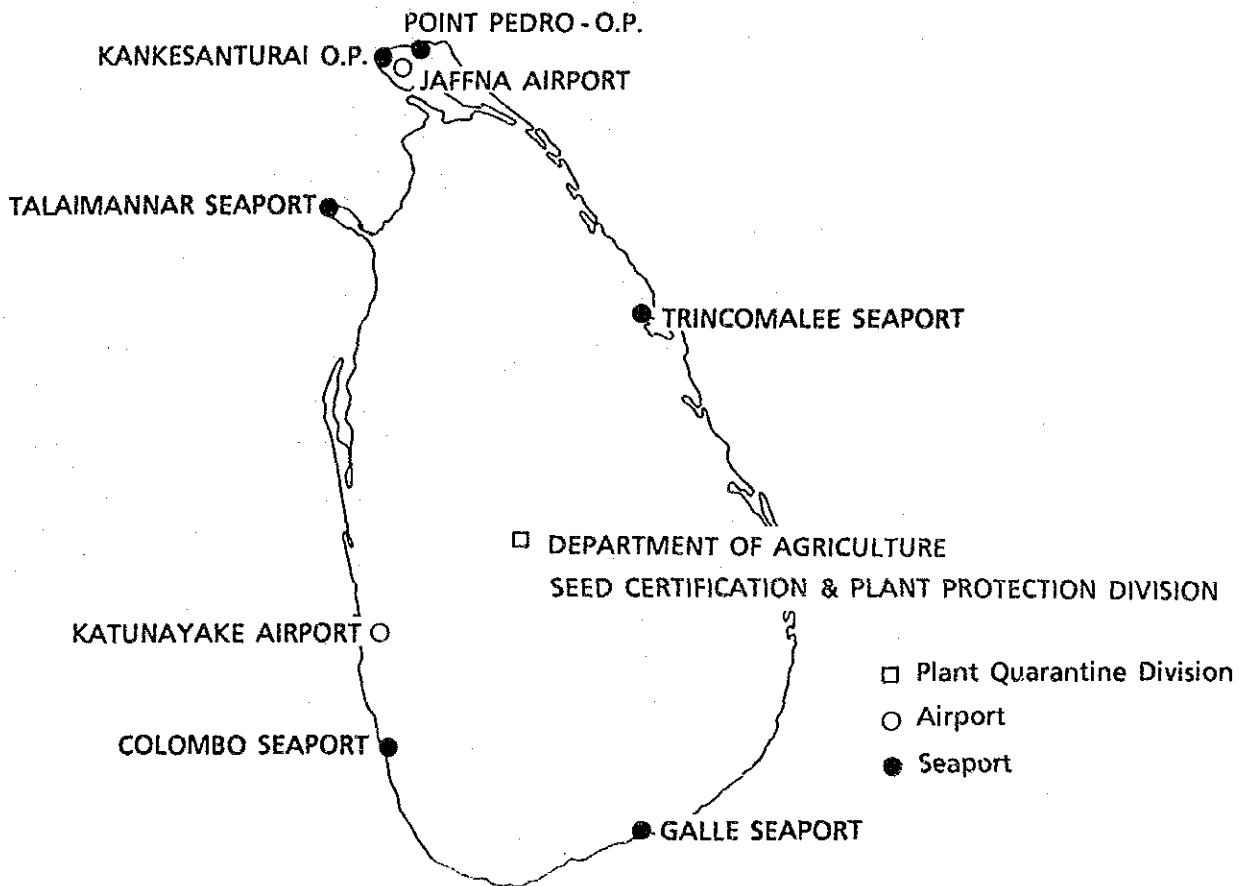


Fig. 2-9 Locations of Seaports and Airports

(2) Seed Certification and Plant Protection Division of Department of Agriculture

Seed Certification and Plant Protection Division of the Department of Agriculture was established as a result of the modification of the department's organization in May 1991. All the plant protection-related

services that had been carried out at various divisions and sections of the department were integrated into the organization of the newly established division. And the Central Agricultural Research Institute's Plant Quarantine Division came under the supervision of the Seed Certification and Plant Protection Division.

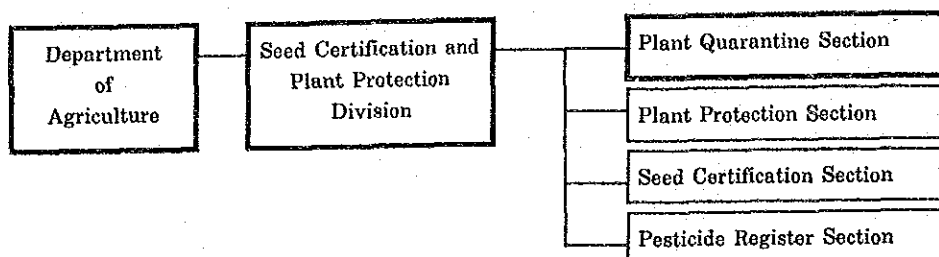


Fig. 2-10 Organization of Seed Certification and Plant Protection Division

When the National Plant Quarantine Services is established under this project, most of the personnel and functions of the Plant Quarantine Division of the Central Agricultural Research Institute, which is now operating under the supervision of the Seed Certification and Plant Protection Division of the Department of Agriculture, will be integrated into the organization of the National Plant Quarantine Services.

At present, the above-mentioned plant quarantine division is responsible mainly for precision inspections, including post-entry cultivation inspection, of germ plasm imported from foreign countries. This division only conducts inspections of germ plasm which has high quarantine risks or high commercial value. It is operating within the organizational framework as shown in Fig. 2-12. But the head of the division, who is concurrently serving as the Chief Plant Quarantine Officer, and his staff are to form the nucleus of the personnel of the National Plant Quarantine Services.

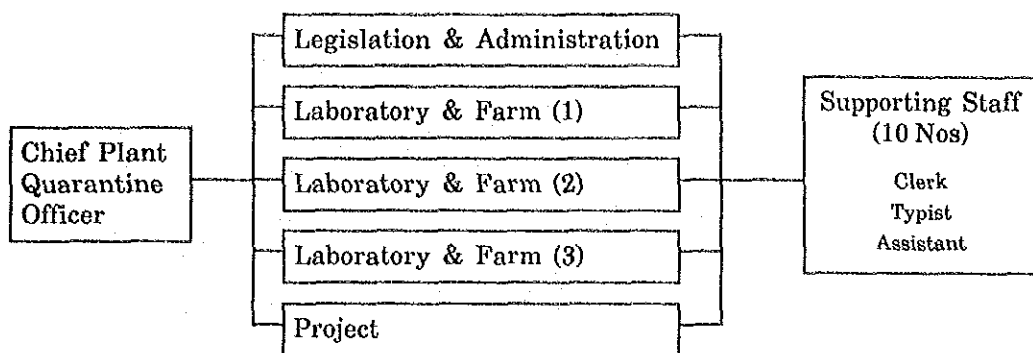


Fig. 2-11 Organization of Plant Quarantine Division

(3) Katunayake Airport Plant Quarantine Station

1) Organization and Activities

The Katunayake Airport is the country's largest airport, where more than 90 percent of the annual total number of travelers and 3 percent of the annual total cargo volume pass. In 1991, about 300,000 travelers passed the airport. At present, the daily number of plant quarantine inspections carried out at the airport's plant quarantine station exceeds 100. In recent years, there have been significant increases in exports and imports of plants which are subject to plant quarantine. In 1991, 45,450,000 pieces of export flowering plants, 282,000kg of export fruits and vegetables, 696,000 pieces of import fruits and 40,000 kg of import seeds were quarantined.

In addition to the routine quarantine service, the plant quarantine station provides a primary quarantine service for plants passing through the airport on around-the-clock basis. It is also responsible for field inspections of export flowering plants in districts within a radius of 50 km of the airport.

Currently, this plant quarantine station has a staff number of 17, and is carrying out its activities with the following organization.

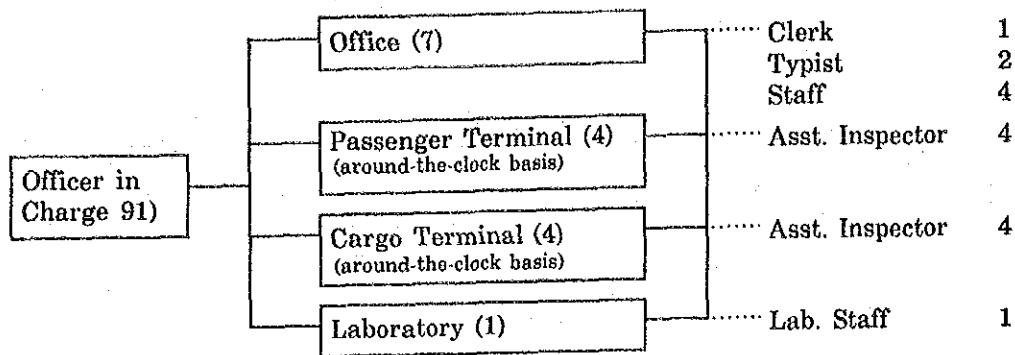


Fig. 2-12 Organization of Katunayake Airport Plant Quarantine Station

2) Facilities and Equipment

The facilities and equipment belonging to this station are as summarized below.

Table 2-4 Facilities and Equipment of Katunayake Airport Plant Quarantine Station

Category	Facilities - Equipment		Remarks
	Name	Area - Nos	
Cargo Terminal	Director's Rm Inspector's Rm Admin. Office (Headquarter)		
Passenger Terminal	Reception Counter Inspector's Rm	2 Nos.	
Inspection Section	Laboratory (1) Laboratory (2) Office Inspector's Office		
Equipment	Microscope (1) Microscope (2) Balance Balance (Lever type) Autoclave Refrigerator Filter Dry Heat Sterilizer Incubator Fumigation Chamber Motorcycle	1 1 1 1 1 1 1 1 1 1 1	Binocular type Monocular type Portable (out of order)

It is considered that it is impossible to carry out the precise inspection with the equipment shown in the table. In actuality, import-banned articles and those which are considered likely to contain very hazardous pests/pathogens are transported to the Plant Quarantine Division of the

Central Agricultural Research Institute for precise inspection, after reporting to the Director of the Department of Agriculture.

(4) Colombo Seaport Plant Quarantine Station

1) Organization and Activities

About 90 percent of the total ship cargo volume is handled at the Colombo Seaport Plant Quarantine Station. In 1990, 676m³ of plants were quarantined at this seaport, of which about 90 percent were export and about 10 percent were import. Fumigation treatment is conducted mostly for export plants and plant products. In 1990, 676m³ of plants were fumigated. The fumigation warehouse of this station is not used very often. In most cases, the station's quarantine inspectors are dispatched to private fumigation facilities for verification of fumigation treatment. Upon request, inspection and confirmation of treatment of export plants and plant products are conducted and the certificate of plant quarantine or plant treatment is issued. In this case, the following fees are charged in accordance with the plant quarantine rules of the Department of Agriculture. The export/import plant quarantine of postal packages is also carried out at seaport plant quarantine stations.

Table 2-5 Quarantine Fee

Service	Fees
Inspection	130Rs/time
Issuance of Certificate	10Rs/time
Treatment	25Rs/m ³
Treatment (cyanide)	200Rs/0.5kg

Colombo Seaport Plant Quarantine Station has a staff of eight (8) and

is carrying out its activities with the following organization as shown in Fig.2-13.

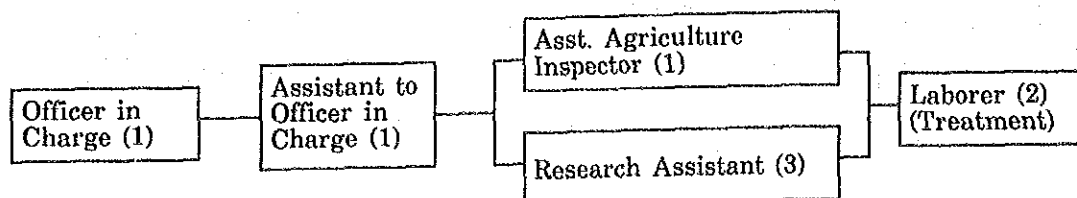


Fig.2-13 Organization of Colombo Seaport Plant Quarantine Station

2) Facilities and Equipment

This seaport plant quarantine station has the following facilities and equipment.

Table 2-6 Facilities and Equipment of Colombo Seaport Plant Quarantine Station

Category	Facility, Equipment		Remarks
	Name	Area - Nos	
Quarantine Building	Director's Rm Admin. Office Inspection Rm Staff Rm	Total 120 m ²	
Fumigation Building	Fumigation Rm(1) Fumigation Rm(2) Fumigation Rm(3) Fumigation Rm(4)	12,500 cuf 12,500 cuf 8,000 cuf 1,500 cuf 800 cuf	Large size Fumigation Rm (One Rm type) Small size Fumigation Rm(2 Rms) Fumigation Chamber (2 Nos.)
Equipment	Microscope (1) Microscope (2) Gas Detector Gas Density Measurement Equipment Mimeograph Motorcycle	1 1 2 1 1 1	Binocular type Monocular type

The warehouse of this station has three large-size fumigation rooms. But they are seldom used because they are too old and are very likely to cause gas leaks. Only two small-size fumigation rooms and two fumigation chambers are used for fumigation by means of methyl bromide and hydrocyanic acid.

The work to repair the main facilities of Colombo Seaport, which is

scheduled to be completed in 2001, is now under way. It is expected that there will be a dramatic increase in the cargo handling workload at the seaport after the completion of the repair work. While the office of the plant quarantine station is to be integrated into the facilities of the new building to be constructed as part of the repair work, however, the disinfestation facilities, including the fumigation facilities, are not included in the repair project.

As outlined above, the facilities and equipment owned by the Katunayake Airport Quarantine Station and the Colombo Seaport Plant Quarantine Station, are insufficient and superannuated. Therefore, the facilities and equipment of these stations does not meet the increasing volume of quarantine demands. And it is desirable to improve the facilities as well as equipment.

2-3 Outline of the Related Projects

2-3-1 Mahaweli Development Project

(1) Outline of the Project

The Mahaweli Development Project is aimed at promoting agricultural development in the Mahaweli River Valley by making effective use of the water of the Mahaweli River, the largest river in Sri Lanka. The four pillars of the project are as listed below.

1. Development and irrigation of arable land with an area of 360,000 ha
2. Implementation of a total of 15 multifaceted infrastructure construction projects
3. Generation and supply of 500MW electric power
4. Attraction of 500,000 settlers

This project started in 1970 as a 30 year project with a loan from the World Bank, but afterwards it was modified so that it might be completed in a shorter time. At present, the project is being implemented mainly by the Mahaweli Authority of Sri Lanka under the supervision of the Ministry of Mahaweli Development. Japan, the United States, Canada, Sweden and Germany are also providing financial assistance for the project.

So far, 75,512 households (346,000 persons) have settled in the project area. These settlers are provided with land and water for irrigation. The area of the irrigated land is 78,000 ha of the existing arable land and 54,000 ha of the new arable land, 132,000 ha in total. As a result, planting of rice, which is the staple food of the Sri Lankan people, is well under way, and the rice crop is on the increase. At present, the project area accounts for 17 percent of the country's total rice

production. At the same time, cash crops such as peppers and onions are also being planted in increasing quantities. The average monthly income of the farmers living and working in the project area is 3,000 Rs, which is about twice as large as that for farmers in the other areas. Power production in the project area is also on the rise. In 1989, the project area represented 51.5 percent of the country's total power production. The remarkable increase in power production in the project area has contributed to reductions in consumption of thermal power electricity.

The Mahaweli Development Project has thus been achieving significant successes especially in the areas of food production and power generation. Furthermore, various policy measures to increase the production and export of agricultural products have been implemented as part of this project.

(2) Production of Export-oriented Agricultural Products

1) Incentives for Production of Export-oriented Agricultural Products

Under the Mahaweli Development Project, the following equipment investment and tax incentives are provided to those farmers and enterprises active in the project area who are producing export agricultural products.

- Eligible farmers and enterprises:

those farmers and enterprises who are exporting more than 70 percent of their agricultural products

- Eligible agricultural products:

Fruit: table grapes, mangoes, papayas, pineapples, berries, bananas, etc.

Vegetable: melons, okras, aubergines, corn, beans, onions, gherkins, etc.

Others: cashew nuts, tobacco, coconut oil, armies, jojobas

• Main incentives

1. Income tax exemptions for a five-year period during which farmers or enterprises make profits
2. Exemptions from taxes on import of plants for use in planting
3. Special loans provided by the Asian Development Bank and other financial institutions
4. Exemptions from import taxes on automobiles (applicable to the first unit only)

It should be noted that the above-mentioned incentives are not applicable to such conventional export agricultural products as tea, coconuts and rubber. In other words, the Government of Sri Lanka is promoting the production of new export agricultural products through the Mahaweli Development Project in expectation of future increases in the country's foreign-currency holdings through exports of these agricultural products.

2) Export Agricultural Products

As part of the Mahaweli Development Project, the Mahaweli Authority of Sri Lanka is promoting the development of methods of cultivation of those agricultural products which have great growth potential as export agricultural products, is conducting market research on such agricultural products, and is giving guidance to growers of these agricultural products in the form of publication of the results of its research work. The general condition of such agricultural products is as described below.

① Mangoes

Sri Lanka ranks among the world's 20 largest mango producing countries. Judging from their output and quality, much can be expected from mangoes as export fruits with great growth potential. They are exported mainly to Britain, France and Germany. On the other hand, however, mangoes are vulnerable to pests such as weevils and fruit flies, as well as to fungi that cause anthracnose. For this reason, many mango importing countries require that mango exporting countries should have export mangoes treated prior to their shipment. Full-scale production of export mangoes in Sri Lanka is premised on the development of viable treatment technologies.

② Pineapples

Pineapples are produced in all parts of the country. They are produced in large quantities and are consumed mainly within the country. According to a Mahaweli Authority of Sri Lanka report, the cost of production of pineapples in the Mahaweli area ranges from US\$0.15 to US\$0.20 per kilogram, which is considered competitive in international markets. It is also reported that the country's pineapples growers can expect a profit of US\$12,000 per ha. It should be noted, however, that in Sri Lanka pineapples have to be delivered to the market within two weeks after their harvesting.

③ Table Grapes

Table grapes are the Mahaweli area's most important export fruits. In the area, table grape production has reached a level of 30 tons/ha thanks to the advanced irrigation facilities set up there. The cost of table grape production is US\$0.80/Kg. It is reported that when exports of table grapes to Europe and Japan will result in a net

profit of US\$1.75/kg, or US\$50,000/ha. Table grapes are usually delivered to the market within 90 days after their harvesting on condition that they are transported properly. Technically, it is possible to export large quantities of table grapes to almost all parts of the world by sea. At present, table grapes are exported mainly to the Middle East. It is pointed out, however, that the development of viable treatment technologies is an essential prerequisite for the expansion in their exports.

④ Okras

Okras can be harvested two months after seeds are planted. The crop of okras is estimated at about 15 tons/ha. Okras grown in the Mahaweli area are mostly export okras. In view of the fact that okra growers of the Mediterranean and the West Indies sometimes ship their okras in summer, the Mahaweli Authority of Sri Lanka is encouraging local okra growers to produce okras in winter and export them mainly to Britain. Okras are vulnerable to nematodes, although they are not to common pests. It is therefore important to pay particular attention to soil control. Although the country's present production of okras stays at a low level, it is expected to grow substantially in the future because of the ease of the control of their production.

As exemplified by export agricultural products whose production is promoted in the Mahaweli Development Project, treatment technologies are of vital importance if these fresh vegetables and fruits are to be exported on a full scale. In this connection, it is expected that the development of treatment technologies for export agricultural products as a result of the completion of the projected plant quarantine facilities will result in better results of the Mahaweli Development Project.

2-3-2 Diversified Agricultural Research Project (DARP)

(1) Outline of the Project

The Diversified Agricultural Research Project (DARP) is being implemented jointly by the Government of Sri Lanka and the United States Agency for International Development (USAID). The Department of Agriculture of the Ministry of Agricultural Development and Research of Sri Lanka is also concerned with this project. The main objectives of this project are to increase Sri Lankan farmers' income and employment and to enhance the nutritional standard of the people. The project is being implemented in the areas of development research, technical cooperation, dissemination of agriculture-related information and distribution of seeds. The contents of the project in each of these areas and their relationship with plant quarantine operations in the country are as described below.

(2) Contents of the Project and Their Relationship with Plant Quarantine Operation

1) Development and Research

Development and research programs, including the development of new varieties and methods of cultivation, are being implemented with the aim of diversifying agricultural production in the country. In one of such programs, for example, a total of 35 new agricultural products are to be developed and their cultivation is to be promoted. Thus far, as many as 19 varieties have been developed for 10 new agricultural products, and technical guidance on their cultivation is being given to farmers. It is reported that 1,323 germ plasmas have been imported for the development of the 35 new agricultural products in accordance with the regulations on plant quarantine. Since it is expected that new varieties will be introduced in increasing numbers

in the future, it is essential that plant quarantine should be carried out properly and smoothly.

2) Technical Cooperation and Training

In implementing the project, it is important to train competent persons in related agricultural technologies. By 1989, many long-term experts (162 man months) and short-term experts (154 man months) had been sent to Sri Lanka to train and educate the Department of Agriculture's staff members and local farmers. In the case of the department's senior staff members, 352 of them had received training as scholarship students under the project. Since the project is closely related to the introduction of new varieties and the export of agricultural products, training programs under the project include plant quarantine-related subjects. The projected plant quarantine facilities is to be provided with research facilities, and therefore it will be able to support part of the education/training programs under the Diversified Agricultural Research Project.

3) Dissemination of agriculture-related information

This activity is aimed at disseminating information on domestic and overseas markets for agricultural products, new cultivation techniques conducive to the increase and diversification of agricultural production and thereby increasing farmers' incomes. One of the noteworthy results of this activity is an increase by about 37 percent in pepper, onion, pulse and grain acreage between 1985 and 1988. This activity by the USAID is also aimed at promoting the production of export-oriented agricultural products. In this connection, the improvement of the country's export plant quarantine, as well as the

systems for their treatment and transportation, is an indispensable condition for the smooth exportation of such agricultural products.

4) Distribution of Seeds

Through this activity, research and development for the production and distribution of seeds is carried out for the purpose of providing high-quality seeds necessary for the production of vegetables and grain to farmers at reasonable prices. As part of this activity, pest-free seeds are imported from foreign countries. In this connection, it is important to carry out accurate precision inspections of imported seeds.

To sum up, the Diversified Agricultural Research Project by the USAID is aimed at introducing high-quality seeds from abroad, distributing them to farmers for their production of agricultural products, and thereby promoting the domestic consumption as well as the export of agricultural products. It can be said, therefore, that the expected effects of this project for the establishment of plant quarantine facilities will be greater if the country's plant quarantine system is improved.

CHAPTER 3 OUTLINE OF THE PREVIOUS BASIC DESIGN

CHAPTER 3 OUTLINE OF THE PREVIOUS BASIC DESIGN

3-1 Project Implementing System

3-1-1 Project Implementing Organization

The Department of Agriculture of the Ministry of Agricultural Development and Research is the implementing organization of the project. After completion, the National Plant Quarantine Services will belong to the Research Division, a division of the Department of Agriculture, and will operate on an equal basis with the Central Agricultural Research Institute, the Plant Genetic Resources Center and other related institutions.

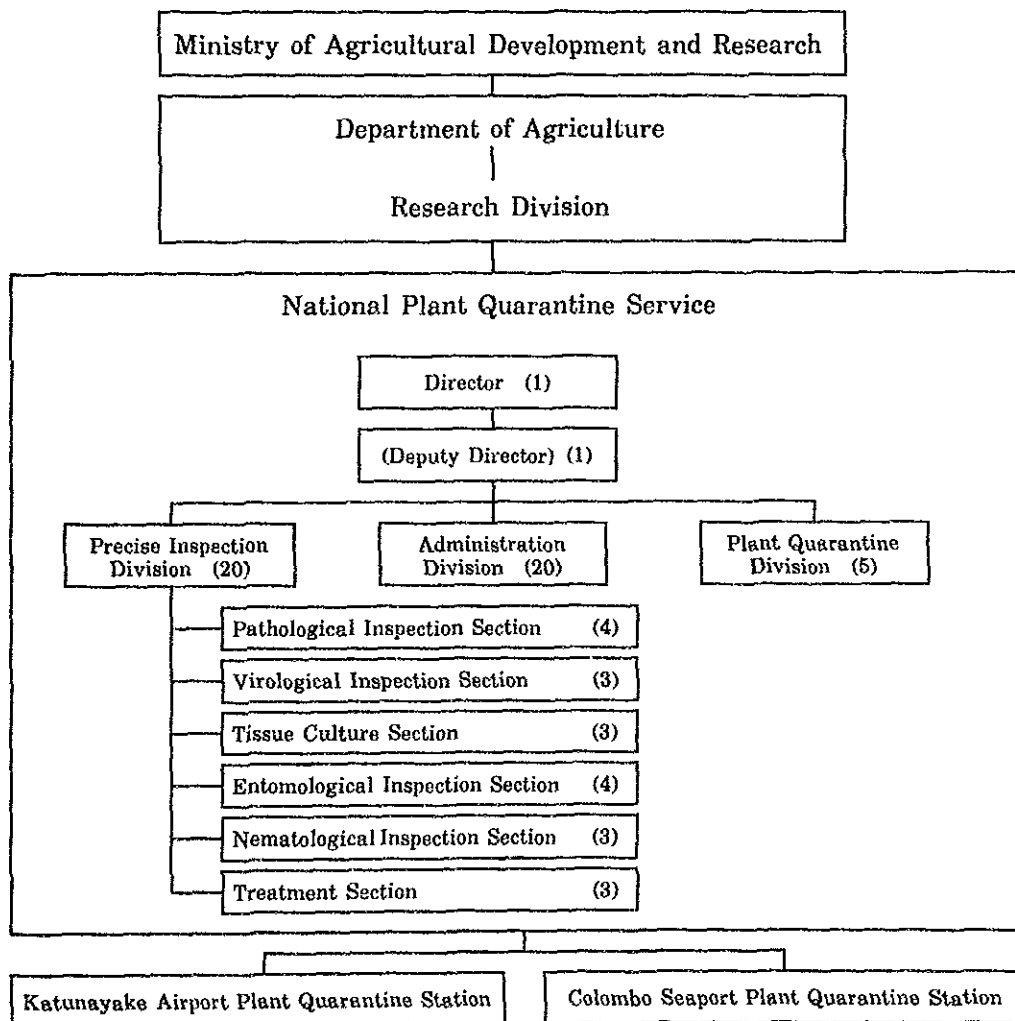


Fig. 3-1 Operation/Management Organization

The National Plant Quarantine Services is to start operations with a staff of 46; 26 technical staff members and 20 clerical staff members.

Table 3-1 Personnel Plan

Division/Section		Position	Qualification	No.	Total
(Director's Rm)		Director	DR	1	1
		Deputy Director/Head of Entomology	DR	(1)	
Precise Inspection Division	Pathological Inspection Section	Head (Bacteriology)	MS	1	4
		Fungus Expert	MS	1	
		Asst. Inspector	AL	1	
		Assistant	OL	1	
	Virological Inspection Section	Head (Virology)	DR/MS	1	3
		Asst. Inspector	AL	1	
Assistant		OL	1		
Tissue Culture Section	Head (Horticulture)	MS	1	3	
	Asst. Inspector	AL	1		
	Assistant	OL	1		
Entomological Inspection Section	Head (Entomology)	DR/MS	1	4	
	Inspect Expert	MS	1		
	Asst. Inspector	AL	1		
	Assistant	OL	1		
Nematological Inspection Section	Head (Hematology)	MS	1	3	
	Asst. Inspector	AL	1		
	Assistant	OL	1		
Treatment Section	Head (Physicochemistry)	MS	1	3	
	Asst. Inspector	AL	1		
	Assistant	OL	1		
Plant Quarantine Division		Manager/Head of Pathology Inspector	DR/MS	(1) 5	5
Administration Division		Manager		1	20
		Clark		3	
		Assistant		2	
		Typist		2	
		Telephone Operator		1	
		Receptionist		1	
		Equipment Maintenance		1	
		Facility Maintenance		1	
		Driver		4	
		Guard		4	
Total					46

3-1-2 Service Plan

The National Plant Quarantine Services are to provide following three types of services.

1. Centralized administration of plant quarantine operations in the country

2. Precise inspection of plants exported and imported
3. Quarantine of plants exported and imported

The service plan of each type of services are as follows.

(1) Centralized Administration

This facilities are to engage in the following activities as an organization responsible for centralized administration of plant quarantine services in Sri Lanka.

1) Plant quarantine management

The organization will manage plant quarantine services across the country under the control of the Ministry of Agricultural Development and Research, and the Department of Agriculture. It will also keep in contact with domestic organizations responsible for control of agricultural chemicals and seeds, as well as foreign or international plant quarantine organizations.

2) Personnel management

It will be responsible for personnel management for plant quarantine-related organizations, including nine (9) seaport and airport plant quarantine stations. It will also be responsible for organizing programs for educating and training quarantine inspectors. Although no concrete training programs for quarantine inspectors have been presented by the Sri Lankan side, it is expected that training programs for beginners and middle and advanced courses for approximately five trainees at one time will be implemented by utilizing the equipment to be installed at the precise inspection division of the planned facilities. In these training programs, on-

the-job training will be given with the division staff acting as instructors.

3) Research and survey

It will compile various statistical data on plant quarantine and also collect and sort out related data and information available at home and abroad. Establishing a legal system related to plant quarantine is also one of the important activities.

(2) Precise Inspection of Plants Exported and Imported

This service is offered in the following six specific fields.

1) Pathological inspection

Pathogenic germs and bacteria are separated from plants and cultured for the identification of the causes of plant diseases in the following ways.

- ① Microscopic observation
- ② Antiserum inspection
- ③ Electrophoretic inspection
- ④ Bacteriophage inspection

2) Virological inspection

Symptoms of plants with diseases are observed to determine viruses or viroids. At the same time, viruses are made to proliferate and purified in order to determine the types of viruses.

- ① Inoculation inspection
(sap inoculation, grafting inoculation, vector inoculation)

- ② Antiserum inspection
(ELISA method and other methods)
- ③ Electrophoretic inspection
- ④ Inspection of physico-chemical characters of viruses

3) Entomological inspection

Identification and classification of insects, mites and small animals are conducted in the following ways.

- ① Morphology examination (Preparation of specimens and their verification)
- ② Physiological and ecological examination

4) Nematological inspection

Identification and classification of nematodes will be conducted in the following ways.

- ① Separation of nematodes from samples and microscopic examination of specimens.

Baermann method, sieve method, mixer method, centrifuge method, Fenwick method, extraction method and other methods are used for separation of specimens.

- ② Examination of infestation with inoculation

5) Research of treatment technology

It is necessary to treat any consignment which was found to be contaminated by pests as a result of inspection. Research for

technologies of two type of plant treatment, chemical treatment and physical treatment, will be conducted.

① Chemical treatment

Fumigation is the most common method of chemical treatment. The treatment effect varies according to various fumigating conditions. It is necessary, therefore, to research into the following aspects of fumigation technology.

- Confirmation of disinfestation effect of fumigation

Amount of chemicals used, fumigating time, temperature, diffusion and permeation of gas, gas absorption and separation, and pests' resistance to gas in various stages.

- Confirmation of impediments to plant fumigation

Amount of chemicals used, fumigating time, impediments caused by differences in temperature, impediments caused by differences in plant's physiological conditions.

② Physical treatment

There are a number of methods of physical treatment, namely, high-temperature (dry heat, wet heat and hot water) method, low-temperature method, immersion method, pulverization method, selection method, radioactive treatment method, etc. It is necessary to examine each method in terms of its disinfestation effect and any impediments caused on various types of plants.

6) Tissue culture (including isolated cultivation)

① Inactivation treatment of virus on plants

② Management of cultivation of tissues under tissue cultured

plants

- ③ Management of cultivation of test plants
- ④ Management of plants for isolated inspection cultivation
- ⑥ Other items related to management of plant cultivation

(3) Export and Import Plant Quarantine

While seaport and airport plant quarantine stations are responsible for primary inspection of plants exported and imported, plant quarantine and issuance of phytosanitary certificates, the following services will be conducted by the planned plant quarantine facilities.

1. Post-entry quarantine of imported plants
2. Treatment of small-quantity air cargoes and issuance of phytosanitary certificates
3. Incineration of plants which were found illegally imported and accumulated at the airport plant quarantine station
4. Inspection of growing plants for export (excluding areas covered by seaport plant quarantine stations)
5. Inspection of export plants brought and issuance of phytosanitary certificates

3-2 Facility/Equipment Plan

3-2-1 Facility Plan

(1) Layout Plan

The project site, a swampland with an area of approximately 8 ha, is situated at the western end of the premises of Katunayake Airport. Prior to the start of the project, the ground level of the swampland will be raised. At the front, the project site borders a trunk road leading to the centre of the city of Colombo, and in the rear, it borders an open space near the airport's runway.

The organization of the planned facilities will be divided broadly into four blocks, namely, an administration block, a plant inspection block, a plant quarantine/treatment block and an outdoor block. The first three blocks, which are to constitute the main building, will be located near the trunk road, and the outdoor block will be located near the airport's runway.

(2) Scale of the Project

The scale of each room is to be determined according to the equipment installation plan (e.g. plant inspection rooms) or the number of staff members to occupy it (e.g. office rooms and inspector's rooms). The planned scale of each block is as shown in the following table.

Table 3-2 Scale of the Project

Block	Rooms	Floor Area (m ²)
Administration Block	Director's Rm, Deputy Director's Rm, Secretary's Rm, Admi. office, Library, Printing Rm, Meeting Rm, Expert's Rm, Entrance Hall	857
Plant Inspection Block	<ul style="list-style-type: none"> ① Pathological Inspection: Pathological Inspection Rm, Staff Rm ② Virological Inspection: Virological Inspection Rm, Purification Rm, Staff Rm ③ Tissue Culture: Tissue Culture Rm, Inactivation Rm, Preparation Rm, Staff Rm ④ Entomological Inspection: Entomological Inspection Rm, Insectarium, Preparation Rm, Staff Rm ⑤ Nematological Inspection: Nematological Inspection Rm, Staff Rm ⑥ Treatment: Treatment Rm, Instrumental Analysis Rm, Balance Rm, Chemical Storage, Material Storage, Cold Material Storage, Staff Rm ⑦ Common Common Preparation Rm, Specimen Rm, Dark Rm 	2,772
Plant Quarantine /Treatment Block	<ul style="list-style-type: none"> ① Plant quarantine: Quarantine Inspection Rm, Reception, Staff Rm ② Treatment: Treatment Rm, Fumigation Rm, Vapor Heat Treatment Rm, Fumigation/Biotron Rm, Preparation Rm, Storage ③ Isolated Field: Workshop, Rabbit Shed 	896
Outdoor Facilities Block	<ul style="list-style-type: none"> ① Isolated Field: Glasshouse, Net House, Soil Sterilization House, Compost Shed ② Water Supply & Drainage, Electricity: Pump House, Drainage Treatment, Electric Rm ③ Others: Garage, Guard House 	1,415
Total	Main Building : 4,525 m ² Outdoor Facilities : 1,415 m ²	5,940

(3) Structural and Utility Plan

1) Structural Plan

- Structural System : reinforced concrete rigid frame structure
- Materials:
 - Concrete Ready-mixed concrete
Fc=210kg/cm²
 - Reinforced bars under 16mmØ – SD30A Ft=3,000kg/cm²
over 19mmØ – SD35 Ft=3,000kg/cm²
 - Structural steel SS41

2) Electrical Plan

- Power supply system : received power --- 3-phase 3-wire 50Hz
11kV
low-voltage power --- 3-phase 4-wire 50Hz
400-230V
generator & IVR
- Socket outlet : BS-standards, 15A 3 poles
- Lighting fixture : fluorescent lamp
- Telephone : exchanger (10 trunk lines, 60 extensions)
- Others : public address system, fire alarm system,
lightning protection system

3) Air-conditioning/Ventilation Plan

- Air-condition : air-cooled separate type air-conditioner
- Ventilation : ceiling fan in each room
mechanical ventilations for toilet or
pantry

4) Water supply and Sanitary Plan

- Water supply system : 2 deep wells with water treatment device

- Drainage system : sewerage treatment facility,
neutralization tank for lab waste water
- Others : LP-gas, Fire extinguishing system

3-2-2 Equipment Plan

(1) Basic Policy

The equipment plan was formulated based on the following basic policy after consultations with the Sri Lankan government bodies concerned. In developing the basic policy, due consideration was given to the fact that this project is aimed at improving the operational and technical aspects of the country's plant quarantine which is closely related to the expansion of the country's agricultural product trade.

1. To procure equipment required to implement plant quarantine operations efficiently and properly and to develop quarantine technologies that suit the actual situation of plant quarantine in the country
2. To select those items of equipment which do not consume much energy and those which are easy to maintain and manage
3. To have those items of equipment for common use shared as much as possible
4. To procure those items of equipment which are needed at the existing seaport/airport plant quarantine stations taking into account these facilities' functional links with the projected facility.

(2) Main Equipment

- Pathological Inspection Rm
Safety cabinet, Fume hood, Plant growth cabinet, Biological

microscope w/camera, Fluorescent microscope, Freezing microtome, Microtome knife sharpener, Profile projector, Seed separator

- Virological Inspection Rm
Safety cabinet, Deep freezer, Spectrophotometer (US-vis.), Freeze dryer, Fume food, Controlled environmental chamber, Densitometer, ELISA set (Microplate reader, etc.)
- Purification Rm
Ultra centrifuge, High speed centrifuge, Filtration Appa., Magnetic stirrer, Historon
- Tissue Culture Rm
Plant growth cabinet, Phytochrome testing equipment, Shaking incubator
- Tissue Culture Preparation Rm
Fume food, Autoclave, Homogenizer, PH meter, Sterilizer
- Inactivation Rm
Heat inactivation apparatus, Safety cabinet
- Entomological Inspection Rm
Soft X-ray apparatus, Stereoscopic microscope, Insect collecting implement, Spider mite sweeping collector, Incubator, Sterilizer
- Insectarium
Biotron, Insect breeding cage
- Nematological Inspection Rm
Biological Microscope w/camera, Microscope w/DIC attachment, Aseptic box, Nematode separator, Test sieve set for namatode
- Treatment Rm
Fume food, Deep freezer, Biological microscope w/camera
- Instrumental Analysis Rm
Gas chromatograph w/FID, Spectrophotometer (IR-vis), Spectrophotometer (UV-vis), Refractometer, Fruit hardness tester

- Fumigation / Biotron Rm
Fumigation test system, Gaschromatograph w/FID, Prefabricated low temp & humid Room, Halide detector, Gas mask
- Cold Material Storage
Prefabricated cold Rm
- General Preparation Rm
Water still, Icemaker, Ultrasonic cleaner, Oven, Vaccum cleaner
- Dark Rm
Equipment for Dark Rm (Minochromatic enlarger, etc.), Lab sink
- Administration Rm
Personal computer, Copying machine, Type writer, Fax machine
- Treatment Rm
Vapor heat treatment equipment (1 m³), Vaccumfumigation chamber (6 m³), Fumigation equipment for Methlbromide, Balance (100kg)
- Workshop
Hand tractor w/attachment, Sprayer, Motorized mist blower, Wood work tool set, Tool set, Gradening tool set
- Soil Sterilization Shed
Autoclave (large type), Steam generator
- Garage
Pickup truck, Vehicle (Van)
- Incinerator
Incinerator
- Colombo Seaport Quarantine Station
Pickup truck, Oven, Water still, Fax machine, Sieves, Type writer, Copying machine, Balance (100kg), Biological microscope

3-2-3 Maintenance and Management Plan

Shown below is a breakdown of the estimated annual maintenance and management expenses for the project.

1. Personnel expenses	1,010,000 RS
2. Facility operating expenses	890,000 RS
Electricity charges	822,000 Rs
Telephone charges	37,000 Rs
LP gas charges	13,500 Rs
Fuel expenses	18,000 Rs
3. Facility maintenance expenses	960,000 Rs
Facility maintenance expenses	260,000 Rs
Utility equipment maintenance expenses	360,000 Rs
Quarantine equipment maintenance expenses	340,000 Rs
<hr/>	
Total	2,860,000 Rs

The estimated annual maintenance expenses of 2,860,000 Rs account for only 0.6 percent of the Department of Agriculture's budget for fiscal 1989, and therefor it is considered relatively easy to make budgetary appropriations for this project.

3-2-4 Construction Plan

(1) Construction Work Criteria

1) Project Implementing System

This project is to be implemented by the Department of Agriculture of the Ministry of Agricultural Development and Research, and the actual

coordination work is to be carried out by the Central Agricultural Research Institute, which is operating under the control of the Department of Agriculture.

2) Consultant

In accordance with the provisions of the Exchange of Notes, consultant agreement is to be concluded between a Japanese consultant firm and the Department of Agriculture.

3) Contractors

A contractor is to be appointed for each of the construction work and the equipment work. Both contractors are to be selected from among qualified Japanese contractors through a public tender.

(2) Project Implementation Schedule

When the Exchange of Notes on the implementation of this project is concluded between the governments of Japan and Sri Lanka, the projected facilities and equipment are to be supplied under the following schedule.

1. Detail design 3 months
(from the date of conclusion of the consultant agreement to the date of approval of the detail drawings, specifications and tender documents)
2. Tender 2 months
(from the date of announcement of the tender to the date of conclusion of the construction contract)

3. Construction work/equipment work 12 months
(from the date of start of the construction work to the date of
delivery of the facilities/equipment)

(3) Estimated Project Cost borne by Sri Lanka Side

The total estimated cost borne by the Government of Sri Lanka will be
19,910,000 Rs.

The contents of the previous basic design will be modified reflecting the
result of this supplementary basic design study.

CHAPTER 4 OUTLINE OF THE SUPPLEMENTARY BASIC DESIGN

CHAPTER 4 OUTLINE OF THE SUPPLEMENTARY BASIC DESIGN

4-1 Objectives of the Project

This project is aimed at ensuring the effective and efficient implementation of plant quarantine in Sri Lanka through the improvement of its plant quarantine system as well as of plant quarantine/treatment technologies, in order to cope with both quantitative and qualitative growth in the export and import of agricultural products. This project is expected to contribute to the protection of agricultural production from the disasters caused by pests/pathogens, and also contribute to the expansion and diversification of agricultural production as well as to the increase in exports through the improvement of self-efficiency in food stuff.

In conducting the supplementary basic design study special attention was paid to this project's contribution to the expansion in Sri Lanka's exports of agricultural products. For this reason, the development and application of technologies for the safe and effective treatment of agricultural products was chosen as one of the main objectives of this project.

Under this project, the National Plant Quarantine Services provided with all necessary facilities and equipment will be constructed on the premises of Katunayake Airport and the quarantine equipment installed in the existing plant quarantine stations at Colombo Seaport and Katunayake Airport will be improved.

4-2 Examination of the Previous Basic Design

In this supplementary basic design study, the details of the basic design presented in the previous basic design study report are to be modified after the following factors are examined.

4-2-1 Examination of the Appropriateness and Necessity of the Project

(1) Import of Agricultural Products

In the previous basic design study report, one of the main objectives of this project was to improve plant quarantine system in Sri Lanka to ensure the safe import of agricultural products. The necessity of an effective and efficient plant quarantine services was stressed on the grounds that it was important to import food crops, plants for cultivation and new varieties. In this supplementary basic design study, the importance of plant quarantine services, in relation to the import of agricultural products and the following matters, was confirmed.

1) Revision of the Plant Import Ordinance

In December 1991, the Plant Import Ordinance was revised by the Department of Agriculture. The revision of the ordinance was aimed at protecting the country's agricultural production and natural environment against invasion of pests/pathogens by more clearly defining the conditions for the imports of seeds and plants, whose imports have been increasing remarkably in recent year. The revised ordinance concerns mainly ① the conditions for the import of seeds of vegetables whose import is permitted, ② plants whose import is banned, and ③ plants whose import is permissible if specific conditions are met. It also specified pests/pathogens against whose

import special precautions should be taken. In order to ensure the effective enforcement of this ordinance, it is necessary to expand and improve the country's import plant quarantine services as well as to improve the plant quarantine facilities for the treatment of the import plants.

2) Promotion of the production of non-traditional agricultural products

The Government of Sri Lanka designated such agricultural products, other than tea, coconuts and rubber, which are not the country's traditional agricultural products but whose exports are expected to increase substantially in the future as "non-traditional agricultural products," and has already formulated various policy measures to promote their production. In order to expand exports of non-traditional agricultural products, these agricultural products must be competitive in terms of quality and pricing in overseas markets. To this end, it is necessary to introduce new varieties which excel in quality, productivity and tolerance against pests/pathogens, however, it is essential to conduct precise inspections using scientific methods of quarantine, since the introduction of new varieties is inevitably accompanied with a possibility of introduction of exotic pests/pathogens.

(2) Export of Agricultural Products

The Government of Sri Lanka designated each year during the ten-year period from 1992 to 2001 as "Year of Export" and has been actively implementing export promotion policy measures in various sectors of industry. In the agricultural sector, various policy measures to expand exports of agricultural products, including investment and tax incentives for producers of export agricultural products, have been implemented, as

exemplified by the Mahaweli Development Project. Viable plant quarantine services are indispensable in promoting the export of agricultural products reflecting such export promotion policies. Thus, the need to implement this project has become even stronger in conjunction with the following factors in particular.

1) Development and practical use of treatment technologies

In the previous basic design presented in the August 1990, technological development was one of the main themes in the area of treatment. In light of the Government of Sri Lanka's ongoing export promotion policy measures, however, the treatment equipment to be supplied under this project should be selected giving due consideration not only to technological development in the area of treatment but also to the scope of its practical use. In other words, it is appropriate to select such items of equipment as is capable of treating plants and plant products in accordance with the exporting countries' technical requirements, particularly in the case of agricultural products which are exported in certain quantities.

2) Improvement of export plant quarantine operations

At present, plants and plant products exported via Katunayake Airport undergo a plant quarantine inspection at the airport's cargo terminal. However, the cargo terminal, with its current capacity, is unable to cope with the rapid increase in the quantity of airborne goods handled at the airport. Furthermore, export plants and plant products are delivered to the cargo terminal together with other airborne goods, making it difficult to conduct export plant quarantine inspections smoothly there. The country's plant quarantine service system is being modified with a view to having the plant quarantine services for the export plants and plant products via Katunayake Airport conducted

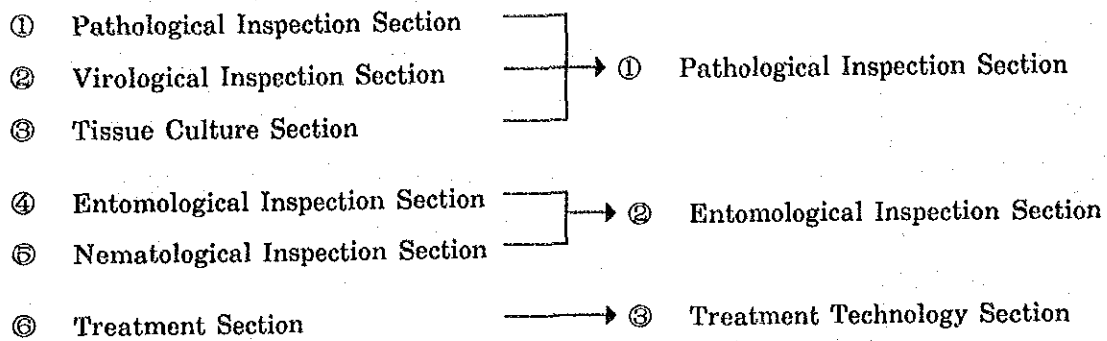
at the projected National Plant Quarantine Services when this project is implemented. In other words, under this project, all export plants and plant products via airport will be delivered first to the National Plant Quarantine Services, where they will undergo a plant quarantine inspection and at the same will be treated if necessary. Given the prospect of further increases in exports of agricultural products, it is urgently necessary to improve the quality of the export plant quarantine services in implementing this project.

4-2-2 Examination of the Project Implementation Plan

(1) Organization and Functions

In the previous basic design, the projected facility's organization was divided into 3 divisions, namely, the administration division, the plant inspection division and the plant quarantine division, and the plant inspection division was further divided into six inspection sections. In this supplementary basic design study, however, the proposed organization was re-examined for the purposes of increasing the efficiency of the export plant quarantine operations and reducing the number of engineers in charge. Final adjustments are to be made in accordance with the following guidelines.

1. In the "Administration Division", more emphasis should be placed on this division's planning coordination and training functions.
2. The name of the "Plant Inspection Division" should be changed to the "Inspection Technology Division" and its six sections should be combined into three.



3. The name of the "Plant Quarantine Division" should be changed to the "Quarantine Operation Division" and more emphasis should be placed on its export and import plant quarantine services

(2) Personnel

The National Plant Quarantine Services is to start with a staff of 46 as proposed in the previous basic design. However, the following modifications should be made in the personnel plan in keeping with the re-examination of the organization and functions.

1. Two (2) technical staff members should be added to the staff of the Administration Division, which consisted of clerical staff members only in the previous basic design. This arrangement will result in an improvement in this division's planning coordination and training operations.
2. The projected facility's organization should be streamlined by combining the Inspection Technology Division's six (6) sections into three (3). The number of this division's technical staff members should be reduced by three (3) to be 17 in total.
3. To deal with the possible increase in the export plant quarantine workload after the completion of the projected facility, the number of

the Inspection Operation Division's inspection officers should be increased by one (1) being 6 in total.

The planned size of the staff of the projected facility (46 staff members in total; 26 technical staff members and 20 clerical staff members) has been judged to be appropriate as a result of its review conducted in accordance with the World Bank's "Recommendations on Reduction of the Government's Size". In May 1992, those senior technical staff members of the Department of Agriculture who are expected to be promoted and the technical staff members newly recruited by the Department were interviewed, and as a result, it has been decided to assign twelve (12) of them to the projected facility.

It can be concluded, therefore, that there will be no problem with the assignment of the 46 staff members.

(3) Budgetary Allocation

In implementing this project, it is necessary to make necessary budgetary allocations for the work to be carried out by the Government of Sri Lanka and the maintenance and management of the projected facilities and equipment. In the previous basic design, the cost for the work to be carried out by the Government of Sri Lanka was estimated at 19,910,000 Rs and that for the maintenance and management of the projected facility and equipment at 2,860,000 Rs/year. These budgetary allocations are to be made when a formal agreement on this project is reached between the governments of Japan and Sri Lanka. However, the following budgetary preparation has already been made in advance of the start of this project.

1. Budgetary allocations for the work to be carried out by the Government of Sri Lanka are cited in "PUBLIC INVESTMENT 1991-1995" by the

Department of National Planning. A total of 824 million Rs is scheduled to be invested in this project between 1991 and 1995.

2. The Ministry of Agricultural Development and Research has decided to make budgetary allocations for the site preparation for this project from 1990 to 1992. A sum of 10 million Rs has already been paid out.
3. Basic agreement has been reached with the other government ministries and agencies concerned on the facility/equipment maintenance and management costs, including the personnel expenses for the 46 staff members, on the basis of the details of the previous basic design.
4. At present, the Government of Sri Lanka is considering a raise in charges for public services and distribution of profits from the raised public utility charges, and its work to revise the related laws and regulations is under way. Under such an arrangement, it will be possible to earn incomes such as plant quarantine fees when the projected facility starts operations, and such incomes can be allocations for the operation of the projected facility and equipment.

In view of what is said above, it can be concluded that the budget for this project will be secured relatively easily.

4-2-3 Examination of the Project Site

The project site is located at the western end of the premises of Katunayake Airport with an area of about 8 ha. The most part of the project site, which used to be swampland, has been prepared for this project. The ground level of the project site is lower by about 1.5 meters than that of the road running in front of the project site and is higher by 1 meter than that of the residential area in the surrounding

area. The removal of the residents who had lived in and around the project site has already been completed.

Thus, the project site is judged to be appropriate in terms of location and land area. It is necessary, however, to take note of the following factors

1. The soil used for the site preparation work is mountain sand and is therefore not suited for planting. It is necessary to put top soil on the projected isolated field or the garden of the projected building.
2. The project site borders a housing complex on the west. In order to ensure the safety of the plants grown on the isolated field, it is necessary to build a wire net fence around the field.
3. The access from the road to the project site has to cross the railroad track connecting the airport and the city of Colombo. It is necessary to apply to the municipal authorities for permission to have the access cross the railroad track.

The project site, which is owned by Airport Corporation, was prepared and is to be leased by the Ministry of Agricultural Development and Research. For this reason, Airport Corporation prepared the project site at the request of the ministry, which has paid for the site preparation work.

4-2-4 Examination of the Facilities and Equipment

(1) Facilities

In light of the modifications to organization and functions of the National Plant Quarantine Services, which were proposed in this supplementary basic design study, it is considered reasonable to design

the projected facilities to consist of the blocks of the Administration Division, the Inspection Technology Division and the Quarantine Operation Division and outdoor facilities attached to them. It is necessary, however, to make the following modifications to the contents of the previous basic design, in light of the proposed improvement of the treatment operations and the integration of the inspection sections.

1) Administration Division

① Training room

In the previous basic design, the training room were intended for the use of the inspectors and quarantine officers, and the training programs were mainly in-service training programs for a limited number of trainees. In this supplementary basic design study, however, the scope of the training programs have been expanded to include exporters and importers of agricultural products as trainees, and the number of trainees in a training program has been increased to 40. So the layout of the training room should be modified accordingly, so that not only the instructors but also the trainees will find it easy to utilize the room.

② Quarantine operation room

A quarantine operation room should be constructed as a room for the use of the technical staff in charge of operational control and research. This room should be designed as a place for preparing, sorting out and keeping relevant data, as well as for officers' meetings and individual operations.

2) Inspection Technology Division

This division's six (6) inspection sections are to be combined into three (3). As a result of the organizational integration, it will be

possible to avoid overlap between common facilities and items of equipment and consequently to reduce the scale of each room.

① Pathological inspection section

For the purpose of preventing mutual contamination of the inspection rooms, this inspection section should consist of a pathological inspection room, a virological inspection room and a tissue culture room.

② Entomological inspection section

This inspection section should consist of an entomological inspection room and a nematological inspection room. The "fruit fly mass production room" to be attached to the entomological inspection room should be located separate from the entomological inspection room, since it is expected to be used frequently as a result of the improvement of the treatment activities.

③ Treatment technology section

Such rooms as a treatment room and a cold storage are previously included in the facilities of an inspection division. In this supplementary basic design, however, such rooms should be included in the facilities of the Quarantine Operation Division so that the related facilities may be utilized efficiently in consort.

④ Inspection officers' rooms

In keeping with the integration of the six (6) inspection sections into three (3), the six (6) staff rooms should also be integrated into three (3).