JAPANESE GOVERNMENT
[redacted]
REPUBLIC OF INDONESIA

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR MULTIPLICATION AND DISTRIBUTION OF HIGH QUALITY SOYBEAN SEED IN THE REPUBLIC OF INDONESIA

March 1995

[redacted] CO., LTD.
and
[redacted] INSPECTION CO., LTD.

Preface

In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct a basic design study on the Project for Multiplication and Distribution of High Quality Soybean Seed and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Republic of Indonesia a study team headed by Mr. Yoshiaki Kano, Agricultural Technical Cooperation Division, Agricultural Development Cooperation Department, JICA and constituted by members of Sozosha Co., Ltd. and Overseas Merchandise Inspection Co., Ltd. (OMIC) from 24th October to 22nd November, 1994.

The team held discussions with the officials concerned of the Government of Indonesia and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Indonesia in order to discuss a draft report, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the teams.

31st March, 1995

Kimio Fujita
President
Japan International Cooperation Agency

March, 1995

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

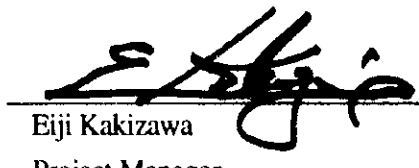
We are pleased to submit to you the basic design study report on the Project for the Multiplication and Distribution of High Quality Soybean Seed in the Republic of Indonesia.

This study was conducted by consortium consisted by Sozosha Co., Ltd., and Overseas Merchandise Inspection Co., Ltd. (OMIC) under a contract to JICA, during the period from 11th Oct. 1994 to 31st March 1995. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Indonesia and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

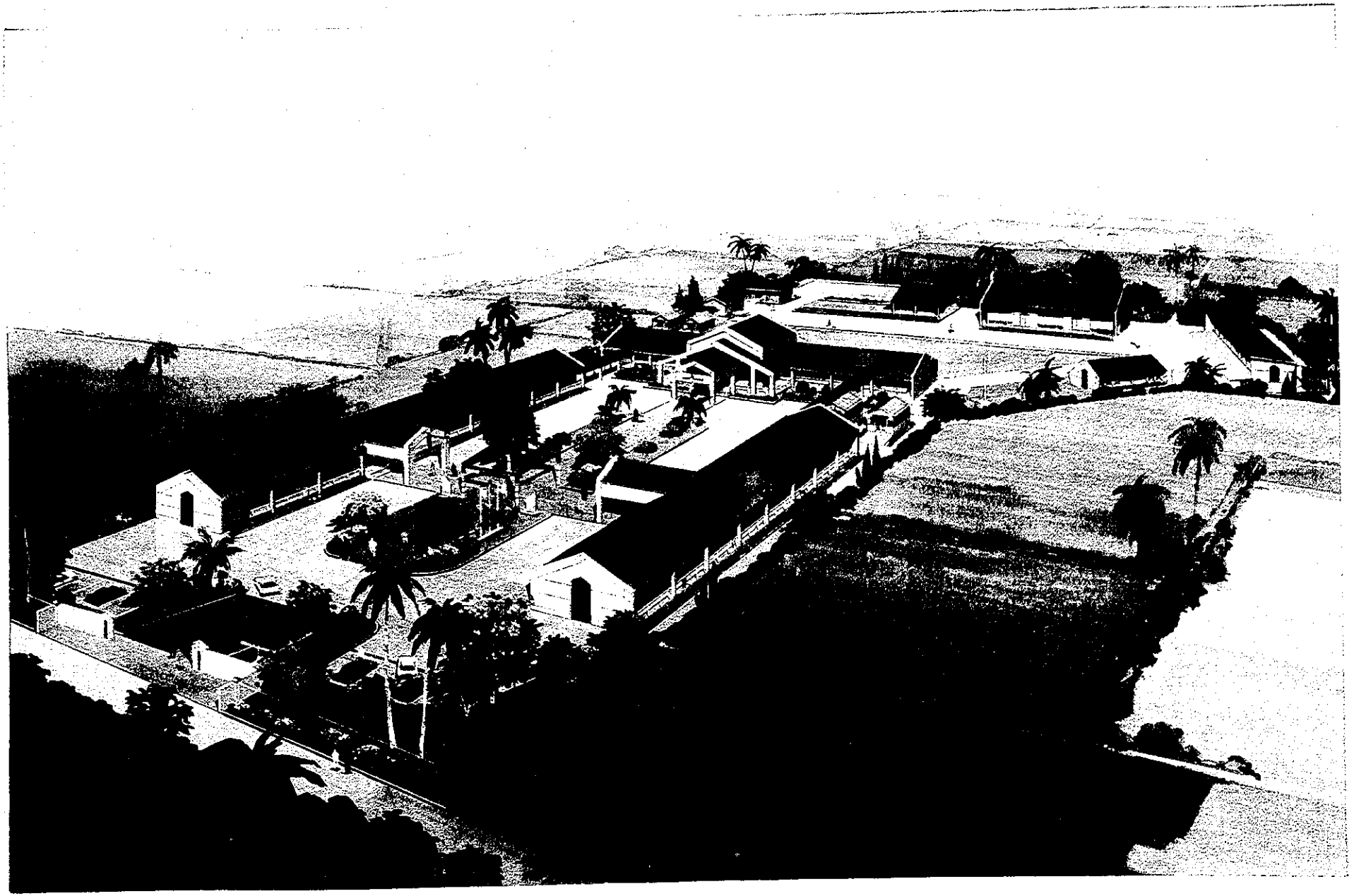
We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs, and Ministry of Agriculture. We would also like to express our gratitude to the officials concerned of Food Crops and Horticulture, Ministry of Agriculture, JICA Indonesia Office, and Embassy of Japan in Indonesia for their cooperation and assistance throughout our field survey.

Finally, we hope that this report will contribute to the further promotion of the project.

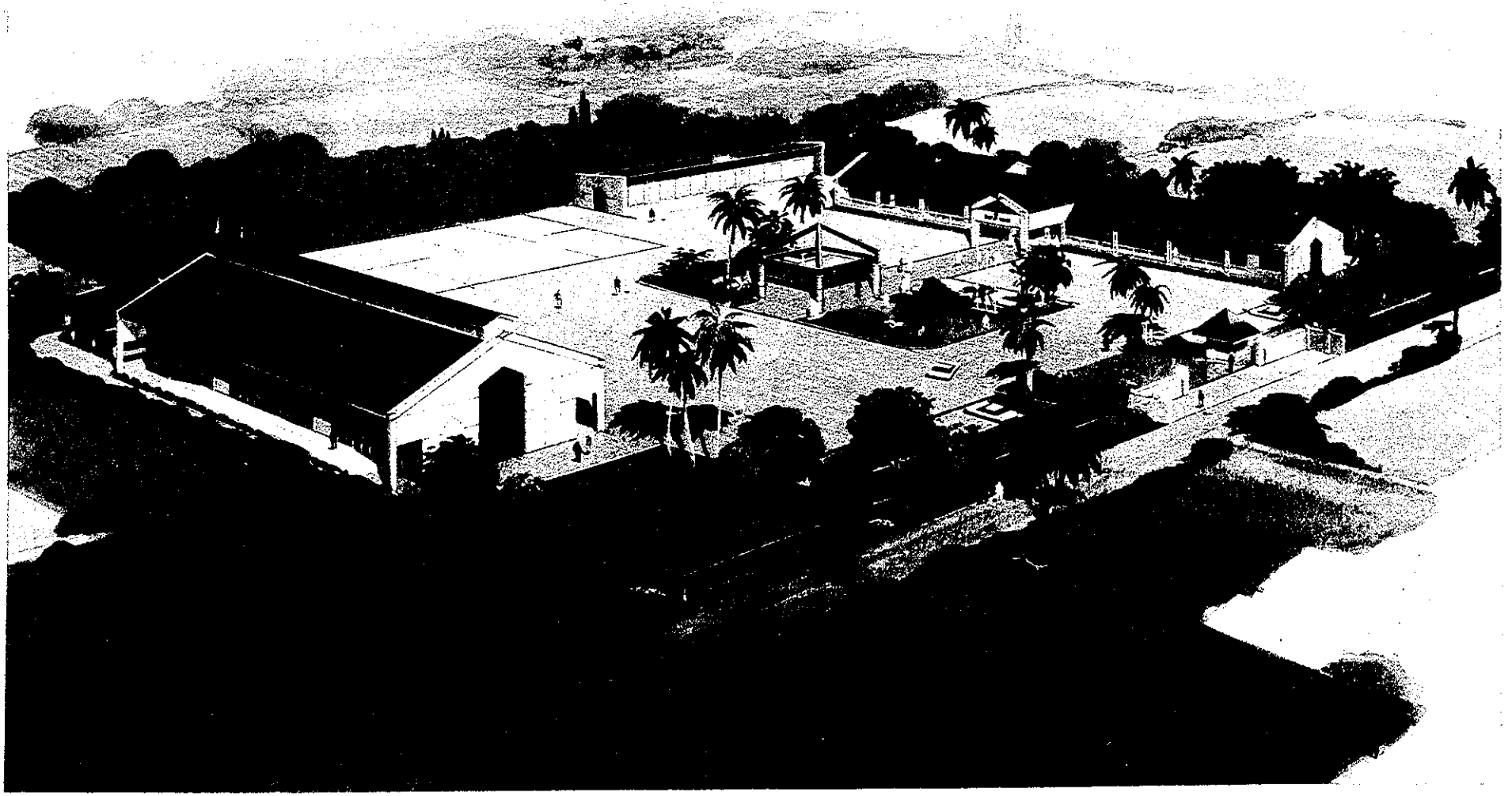
Very truly yours,



Eiji Kakizawa
Project Manager
Basic Design Study Team on
The Project for Multiplication and
Distribution of High Quality Soybean Seed
Sozosha Co., Ltd.

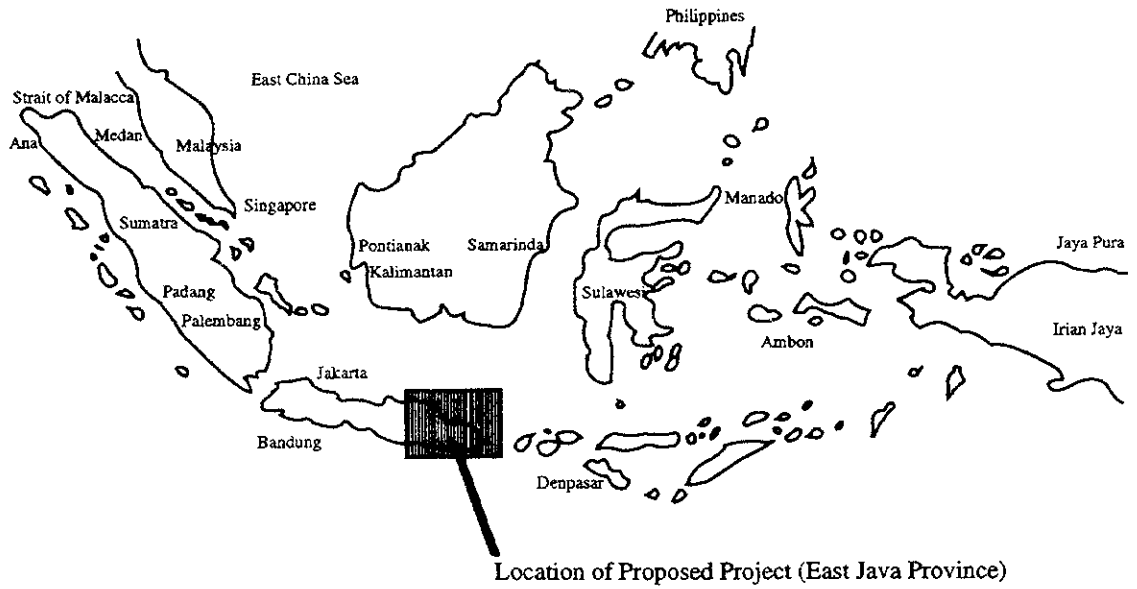


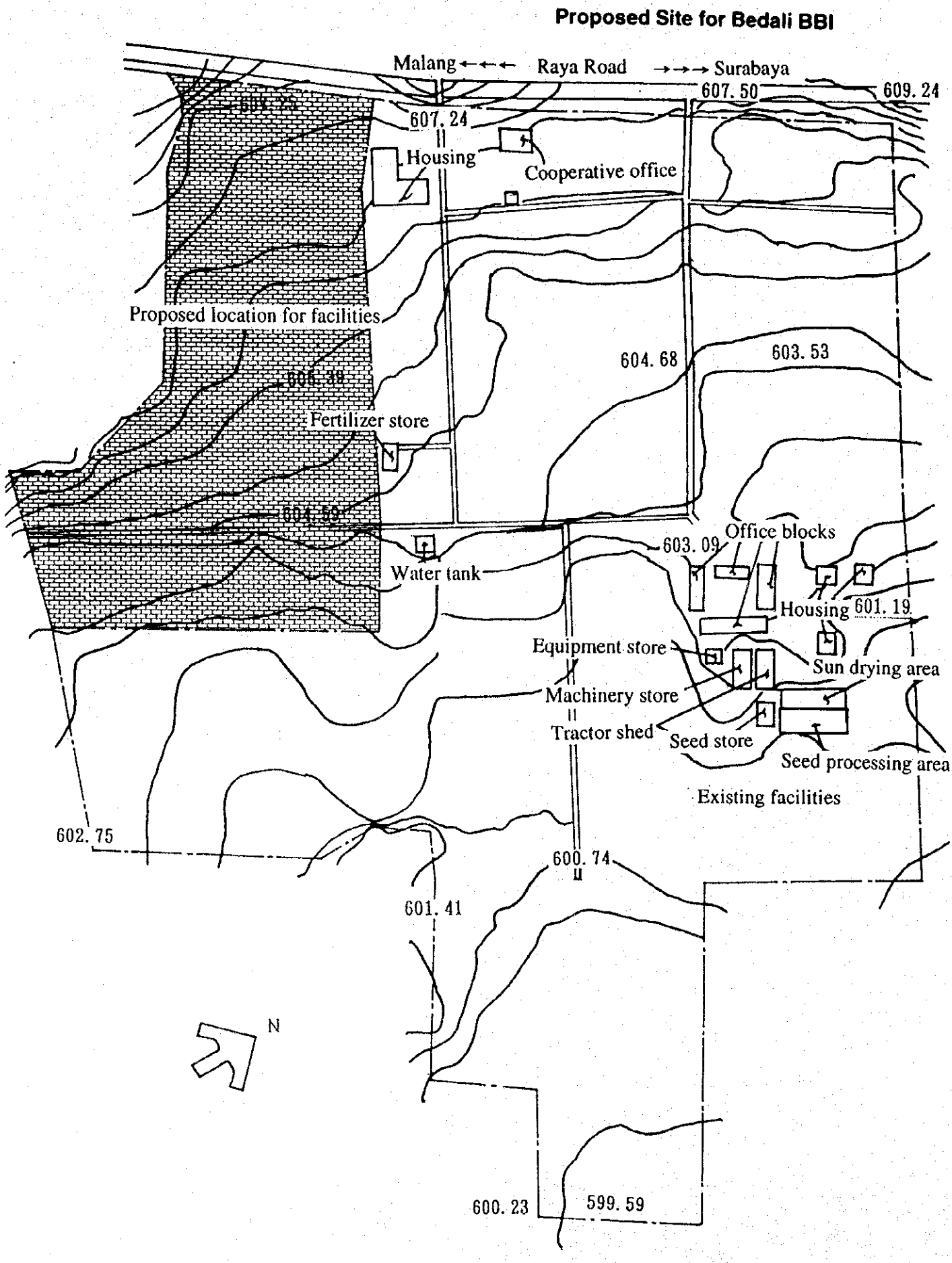
PERSPECTIVE BBI



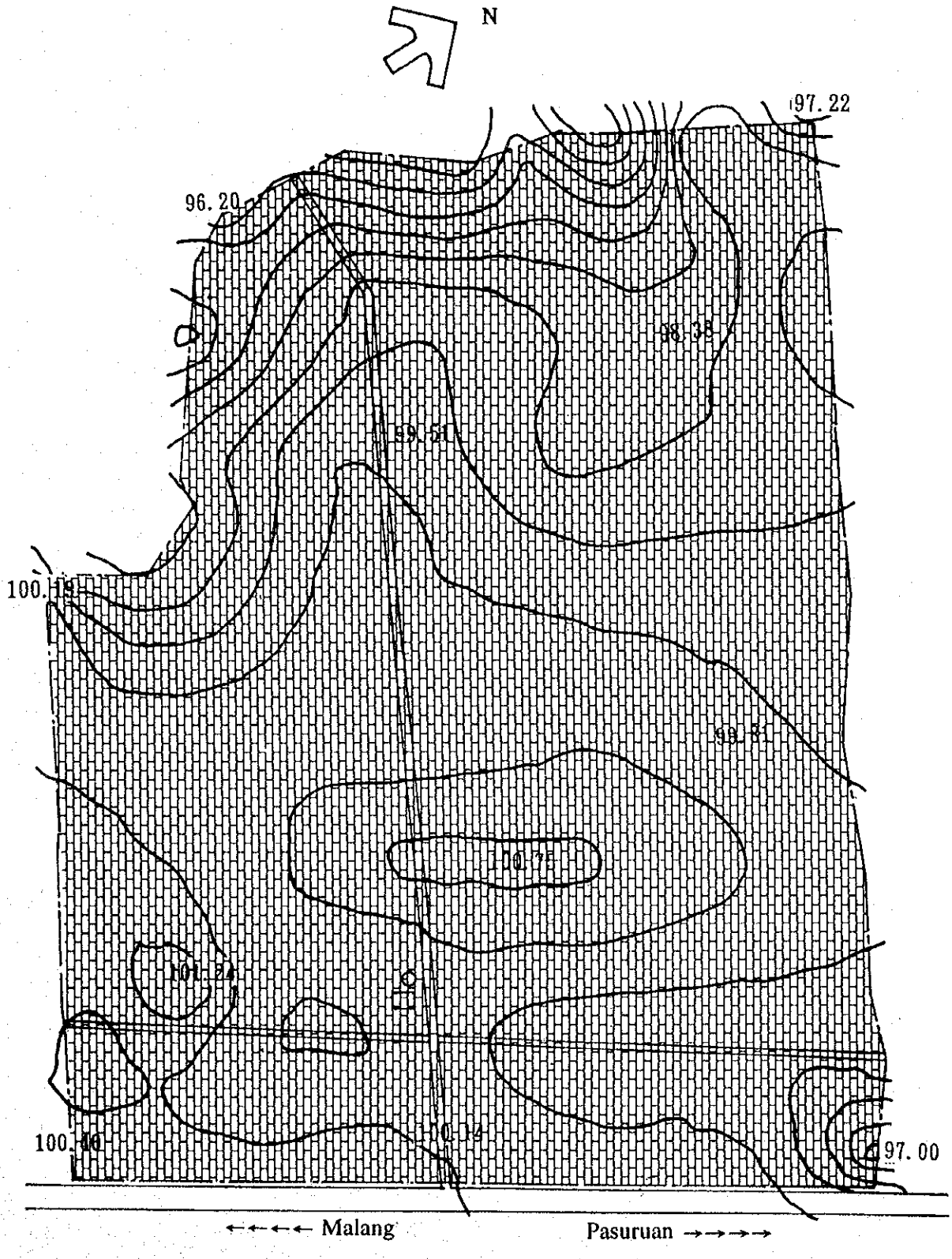
PERSPECTIVE BBU

Map of Indonesia




Proposed Site for Bedali BBI
Malang ← ← ← Raya Road → → → Surabaya
607. 50
609. 24
607. 24
Housing
Cooperative office
Proposed location for facilities
604. 68
603. 53
606. 39
Fertilizer store
604. 59
603. 09
Office blocks
Water tank
Housing
601. 19
Equipment store
Sun drying area
Machinery store
Tractor shed
Seed store
Seed processing area
Existing facilities
602. 75
600. 74
601. 41
N
600. 23
599. 59

Proposed Site for Lebaksari BBU



SUMMARY

Summary

Stretching some 5,100 km from Sabang in Sumatera in the west to Merauke in Irian Jaya in the east, the Republic of Indonesia is the world's largest archipelago nation. It is located from 6 degrees north to 11 degrees south and from 14 to 95 degrees east. Some 3,500 of Indonesia's islands are inhabited and the country's population is around 179 million (the 4th largest in the world).

Indonesia's main industry is agriculture and employs around half of its working population. Having instituted a system for self sufficiency in rice production in 1984, the Indonesian Government is planning to stabilize and increase the production of the major staple, soy beans, and potatoes. In order to this, it has made a request to the Japanese Government to carry out a survey on the development of a setup for the multiplication and distribution of high quality seeds. In response to the request, the Japan International Cooperation Agency (JICA) dispatched a Master Plan Study team which submitted a report in December 1987 entitled Report on the Implementation of a Plan to Advance the Production of Major Crops. Under this plan, the Indonesian Government has formulated the Project for the Multiplication and Distribution of High Quality Soybean Seeds and this forms the basis of its request to the Japanese Government for grant aid cooperation for the construction and the supply of equipment required for its implementation as well as project-type technical cooperation.

In response to this request, the Government of Japan dispatched the Preliminary Survey Team on Technical Cooperation in October 1993 and personnel to carry out a long-term study on technical cooperation for the project in January 1994 in order to carry out the survey necessary for the project-type technical cooperation.

On the basis of the process, JICA dispatched the Basic Design Study Team to Indonesia. The team was in Indonesia between October 24 and November 22, 1994 for the purpose of carrying out the basic design connected with the construction of facilities and procurement of equipment needed for the project.

As well as doing the necessary survey work and collecting information, the study team had meetings and exchanges of ideas with representatives of the Indonesian Government. After the team's return to Japan, the results of the study were analyzed and based on this, the basic designs for the facilities, equipment and maintenance plan have been drawn up. A team was dispatched to Indonesia for the period from February 22 to March 2, 1995 to explain the contents of the draft final report for the project to persons concerned in the Indonesian Government and to check its details.

In this project, as it accounts for 40% of Indonesia's total production of soybeans, East Java has been adopted as a model area for the provision of facilities for a foundation seed farm, stock seed farm, seed control and certification service and the equipment for these facilities through grant aid. Under it, this area will be a model case in Indonesia.

A summary of the results of the survey based on the above objectives and project content appears in the table below.

Summary of the Content of the Indonesian Government's Request and Results of Discussions (main items)

Category	Content of Indonesian Government's Request	Results of discussions during basic design study	Remarks
a. Food Crops and Horticulture Agency, Ministry of Agriculture (Jakarta)			
Building	Air-conditioned seed store Offices	Out of project scope	No direct connection with project activities
Equipment	Office equipment Audiovisual equipment vehicles	Out of project scope	No direct connection with project activities
b. BBI, BBU			
Building 1 for Foundation seed farm Production (BBI)	Office blocks, meeting rooms	Offices (meeting rooms, laboratories)	Required for independent inspections
	Seed processing room	Seed processing room	Required for seed processing
		Drying yard with roof	Required for natural drying of seeds
	Seed store (ambient temperature)	Seed store (ambient temperature)	
	Air-conditioned seed store	Out of project scope	Ambient temperature store satisfies project objectives
	Machine repair block	Out of project scope	Facility to be provided within vehicle garage
	Net house, greenhouse, garage	Net house, garage Green house: out of scope	Not required for local climate
	Equipment store	Agricultural equipment store, agricultural implement/fertilizer store, agrochemical store, fuel room	Clarification of required facilities
	Guest house	Out of project scope	Accommodation facilities exist nearby
	Housing	Out of project scope	Does not match grant aid objectives
	Irrigation facilities	Making well and installing water tanks only	
Building 2 for Training (BBI)	Lecture hall, offices, exhibition rooms	Building containing lecture rooms, exhibition rooms, lecture hall office: out of scope	Offices in Building 1 will serve this purpose
	Dining room	dining room including kitchen	
	Guest house	Out of project scope	Accommodation facilities exist nearby
	Dormitory	Out of project scope	Does not match grant aid objectives
Building 3 for Seed inspection (BBI) (BPSB Ⅲ, Malang)	Offices	Offices, meeting rooms	
	Seed inspection room	Seed inspection room	
	Seed store	Out of project scope	
	Net house	Net house	
Building 4 Stock seed production (BBU)	Offices	Extra laboratory	Required for independent inspections
	Seed processing room	Seed processing room	Required for seed processing
	Equipment store	Agricultural equipment store fertilizer store, agrochemicals store	Clarification of required facilities
	Seed store (ambient temp., aircon.)	Aircon. store: out of scope	Ambient temp. store satisfies project objectives

	Guest house	Out of project scope	Accommodation facilities exist nearby
	Drying yard	Drying yard	With roof (rainy season measure)
Equipment (BBI, BBU, BPSB Ⅲ)	Seed production equipment	Tractor, sprayer, etc.	
	Seed processing equipment	Separator, dryer, thresher, etc.	
	Testing equipment	Moisture meter, germination test equipment, etc.	
	Data processing equipment	Personal computer	
	Vehicles	car motorcycle, tools	
	Office equipment	Out of project scope	
	General training equipment	Out of project scope	
	Furniture and fittings for accommodation facilities	Out of project scope	

A summary of the results of the survey based on the above objectives and project content appears in the table below.

Buildings

A. Bedali Central Seed Farm (BBI)		
1.	BBI main building (850 m²)	Director's office, meeting rooms, offices, chief expert's room, experts' room, laboratory room, etc.
2.	BBI-related buildings	2 net houses, ambient temperature seed store, moisture adjustment room, drying floor, agricultural machinery room, agricultural equipment room, chemical store, garage, equipment store, fuel store, generator room, electrical room, pump room, power supply room
3.	BBI training block (840 m²)	Lecture hall, lecture rooms, lecturers' rooms, dining room, etc.
4.	BPSB Ⅲ (Malang) (Seed Control and Certification Service) (760 m²)	
	BPSB main building	Director's room, meeting rooms, inspection rooms, etc.
	BPSB-related buildings	2 net houses
B. Lebaksari Main Seed Farm (BBU)		
1.	BBUmain building (850 m²)	Director's room, meeting rooms, offices, laboratory rooms, experts' room, dining room, etc.
2.	BBU-related buildings	Moisture adjustment room, ambient temperature seed store, agricultural machinery room, agricultural equipment room, garage, equipment room, storeroom, fuel store, generator room, electrical room, pump room, power supply room

Equipment

A. Bedali Central Seed Farm (BBI)	
1. Seed production equipment	Tractor, plow, power sprayer, etc.
2. Seed processing equipment	Thresher, gravity separator, dryer, scale, etc.
3. Seed inspection equipment	Moisture meter, analytical balance, thermohygrometer, divider, etc.
4. Data processing equipment	Personal computer
5. Vehicles	Jeep, pick-up truck, etc.
B. Lebaksari Main Seed Farm (BBU)	
1. Seed production equipment	Tractor, plow, power sprayer, etc.
2. Seed processing equipment	Thresher, gravity separator, dryer, scale, etc.
3. Seed inspection equipment	Moisture meter
4. Vehicles	Pick-up truck, motorcycle
C. BPSB Ⅲ (Malang)	
1. Seed inspection equipment	Moisture meter, analytical balance, thermohygrometer, divider, autoclave, incubator, stereo microscope, distilled water apparatus, pH meter, etc.
2. Data processing equipment	Personal computer
D. BPSB Ⅲ (Surabaya)	
1. Seed inspection equipment	Analytical balance, autoclave, Phase contrast microscope, etc.
2. Vehicles	Jeep, motorcycle

The cost of the works for the part of this project to be borne by the Indonesian Government (including basic infrastructure, maintenance cost and excluding personnel cost) is 887,300,000 Rp.

The annual maintenance and management costs (excluding personnel expenses) for the facilities and equipment are estimated at 175,183,000 Rp. If the project is carried out under grant aid cooperation from Japan, six-and-a-half months will be required for the detailed design including tendering and 12 months for the construction works.

The problems concerning soybean production in Indonesia include:

(1) production techniques for high quality seeds are still at a low level;
(2) the germination rate is low due to the lack of seed storage facilities;
(3) the seed certification techniques and systems for each stage of the production of foundation, stock and extension seeds are inadequate due to insufficient facilities and equipment for seed certification;
(4) lack of a setup for instruction on the multiplication and distribution of high quality seeds.

In order to improve the situation, though the provision of facilities and equipment, the proposed project aims to establish an integrated system as a model case for the production of foundation, stock and extension seeds as well as the training of personnel in certification, and

the instruction of others. In the future, the benefits of this project will be felt in other areas and also be contributing to the improvement of the soybean production system in Indonesia. Additionally, the project is expected to become more effective and efficient through the technical cooperation which is scheduled to follow.

In view of the following points, the project is deemed to be appropriate for Grant Aid;

(1) the project aims to benefit Indonesians, including farmers;
(2) as it's objective is to enhance the multiplication and distribution of high quality seed for soybeans, which are a major source of protein, the project will directly cater to the urgent need for raising the standard of living;
(3) the recipient country already has the organization for implementing the project;
(4) the project can be maintained and managed using Indonesia's own financial, human and technical resources;
(5) the project is expected to contribute to the attainment of goals established under Indonesia's medium and long-term development plan;
(6) there are no special difficulties concerning the execution of the project under Japan's Grant Aid system.

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CHAPTER 1 BACKGROUND OF THE PROJECT

Chapter 1 Background of the Project

1-1 Background of the Project

In 1991, 53.8% of Indonesia's employed were engaged in agriculture and agriculture accounted for 21.8% of her GDP and 11% of her exports. In the Indonesian Government's fifth 5-year plan (1988/89 - 1993/94), great importance was placed on the development of agriculture and the main focus of agricultural policy was on the diversification of food crops and stable supplies for the major ones.

Since the achievement of self sufficiency for rice in 1984, Indonesian Government has been placing emphasis on the diversification of food crops and the development of secondary food crops to cope with increases in its population. Among such secondary food crops, potatoes have been receiving attention as a source of carbohydrate and soybeans as a source of protein.

For the production of these crops, high quality seeds are imported from various foreign countries. However, as the setups for the multiplication and distribution of these high quality seeds are lacking, they are not distributed to the ordinary farmer properly.

In order to increase the production of secondary food crops, the Indonesian Government made a request to the Government of Japan to carry out a development survey on how their production could be enhanced. In response to the request, the Japanese Government carried out a development survey in 1987 and drew up a master plan for the establishment of setups for the multiplication and distribution of high quality seeds.

In Indonesia, the problem surrounding the production of soybeans is the short life of seeds due to insufficiencies in storage techniques and facilities making them difficult to obtain by farmers engaged in ordinary cultivation. Though the area under cultivation has been expanded to increase soybean production, farmers are still using edible soybeans as seeds for cultivation. In addition to this, in recent years, domestic soybean production has been unable to keep pace with demand due to rapidly increasing consumption (1992/1989 increase in soybean demand: 137%; increase in production for same years: 128%). As the result, imports are running at an annual level of 500,000 - 600,000 tons. For these reasons, there is an urgent need to provide a new setup for soybean production.

To solve current problems by increasing the production of high quality seed in accordance with the Master Plan, the Indonesian Government has drawn up "The Plan for Multiplication and Distribution of High Quality Soybean Seed" and for its implementation has requested grant aid cooperation and project-type technical cooperation from the Government of

Japan. The objectives of the request are, ① treating East Java Province as a model case, as it accounts for 40% of Indonesia's total soybean production, ② using grant aid, to provide foundation seed farm, stock seed farm, seed processing center and Seed Control and Certification Service facilities and the equipment for them and through project-type technical cooperation, ③ strengthen technologies for seed production increases, inspection, processing and distribution to provide setups for the multiplication and ④ distribution of high quality soybean seed in Indonesia in order to make it a model case in this respect.

1-2 Outline of the Request and Main Components

The outline and main components of the request for grant aid cooperation and project-type technical assistance for the Indonesian Government's Project For Multiplication and Distribution Of High Quality Soybean Seed as confirmed by the survey team are as follows:

[1] Objectives of the project

The purpose of the project is through the construction of facilities and procurement of equipment under grant aid cooperation and then project-type technical assistance, to establish a setup which will provide a model for the multiplication and distribution of high quality soybean seed, comprising:

(1) Activities for the multiplication of high quality soybean seed
(2) Activities for upgrading seed processing techniques
(3) Activities for the provision of a seed inspection setup
(4) Activities for the establishment of a seed distribution setup

The Indonesian Government's request to Japan is for the provision of the facilities and equipment required for these activities through grant aid cooperation.

[2] Project implementing authority: Directorate General of Food Crops and Horticulture, Ministry of Agriculture

[3] Organizations receiving the requested facilities and equipment

① Central seed farm : facilities (BBI offices, training area, BPSB Ⅲ Malang branch), equipment
(BBI = foundation seed farm) Bedali Village, Malang District,East Java Province

② Main seed farm : facilities (BBU offices), equipment
(BBU = stock seed farm) Lebaksari Village, Pakusan District,East Java Province

③ BPSB Ⅲ: equipment
(BPSB Ⅲ = Provincial Seed Control and Certification Service)Surabaya City, Surabaya District

[4] Main components of facilities and equipment

4-1 Facilities:

① BBI main building, BBI related facilities

② BBI training block

③ BPSB main building, BPSB related facilities

④ BBU main building, BBU related facilities

4-2 Equipment:

① Seed production equipment

② Seed processing equipment

③ Seed inspection equipment

④ Data processing equipment

⑤ Vehicles

1-3 Details of Aid from Other Donor Countries or International Organizations

The following gives details of grant aid from other donor countries or international organizations related to this project:

[1] Grant aid received from international organizations and countries other than Japan

① World Bank (1981 - 89)

On 8th December, 1989, US$15,000,000 of funding was approved. The funding ceased on 30th June, 1989. The purpose of this funding was to support Indonesian Government policies for food crops, especially for the promotion of those with growth prospects; namely:

a) the development and diffusion of high yield varieties of paddy rice

b) the development of varieties and high-yield strains resistant to insect pests

c) increasing the production of secondary food crops

d) improvement and expansion of the physical infrastructure (irrigation development) and support services (data, research)

With the promotion of these policies in mind, the World Bank carried out the Seed I project (1971 - 78) and the Seed II project. Seed I was carried out at a time when the Indonesian Government was rapidly increasing the area of high yield crop varieties under cultivation but this was when public projects for the provision of facilities for the production and distribution of improved seeds and enhancing the setups for them were only at the initial stage. Under Seed II, which was for the purpose of supplying basic infrastructure for public seed production and distribution programs, the following tasks were set:

a) Make organizations operate more efficiently and effectively at the national level

b) Expand physical infrastructure in areas other than Java

c) Create growth in the private sector seed industry
d) Diversify the seed production base

As it was designed to satisfy the development needs at the time from the above viewpoints, Seed II was a logical follow on Seed I.
On the basis of the above high level objectives, the Indonesian Government set the following goals to increase domestic production of food crops and raise the income of the average farm.

a) Raise the quality, reliability and effectiveness of paddy rice and secondary food crops
b) Strengthen the National Seeds Corporation (NSC), PT. Pertani, Seed Control and Certification Service (BPSB), selected cooperative associations and provincial seed farms (PSF)
c) Give incentives to large scale private sector seed production industry

Some of the conditions of the economic calculations for the project are:

1) An SPC operation rate of 80% starting in 1995
2) A 5% increase in production costs for NSC and PT. Pertani (Seed I)
3) No increase in production costs for NSC and PT. Pertani from 1990 (Seed II)

The planned economic rate of internal profit for Seed I and Seed II was 39% but on their completion the rates were 20.3% and 24.6%, respectively. Some reasons for drops in levels were as follows:

1) Low production volume of seed
2) Tremendous drop in the production of high priced Palawija seeds

Thus, the total seed guarantee for PSF was around 16,500 t, 60% of the planned amount, and the amount produced by PT. Pertani 1,800 t or 13% of the planned level. Further, the production of Palawija seeds was only about 6% of the planned level. And, the difficulties in allocating operating budgets properly meant that the improvement of facilities at 40 PSFs did not have much impact.

② Food and Agriculture Organization of the United Nations (FAO)
Grant aid to increase soybean production (1982 - 1986)
This was a technical cooperation project in which the FAO introduced intensive soybeancultivation methods at 17 model farms in the Pasuruan district, 12 in the Lumajang district, 15 in the Jember district and 10 in the Banyuwangi district. Farmers were the target of the technical cooperation.

③ Taiwan

Project to spread soybean production (1985 - 1989)

This project involved 13 experts from Taiwan. Its objective was to spread soybean production at the farm level. The areas of the project were Jombang, Pacitan and Manenep in East Java Province.

④ USAID

Secondary food crop development project (1983 - 1988)

This project was implemented in the 3 provinces of East Java, Lampung and South Sulawesi and its objective was for the Directorate General of Food Crops and Horticulture to increase production and improve marketing systems for maize, soybeans, peanuts, cassava and other secondary food crops.

⑤ EC

Pilot project for the intensive production of soybeans and other food crops (1978 -)

This project was carried out in Muarabungo, Jambi Province. Its objective was to develop efficient agricultural systems in introduction areas, develop effective soil conservation and new land cultivation techniques, check the suitability of crop rotation systems and cultivation standards and organize channels for the dissemination of information on them to the farming communities in the areas concerned.

⑥ Netherlands

Malang Food Crop Research Project (1980 - 1990)

This was a donation and technical cooperation project whose objective was to enhance agricultural research skills in order to increase the production of food crops other than rice.

⑦ CEC (China)

Project on Palawija Seed Production and Markets (1992 - 1996)

This project was commenced with the objectives of increasing the production of seeds for the secondary food crops of soybeans, maize, green beans and peanuts in the five provinces of Aceh, North Sumatra, West Java, East Java and Nusatenggara and expanding markets for them. Its ultimate target is the production of 200 tons of soybean seeds from the five provinces.

[2] Grant aid received from Japan

① Official Development Assistance (ODA)

Japan started ODA for Indonesia in 1966 after President Suharto came to power. This was during the period that Japan was giving Indonesia war reparations (a total of ¥80,390 million was given over 12 years beginning in 1958, when an agreement on reparations was put into effect).

(a) The first cases of loan assistance were payments through the Japan Import-Export Bank in the form of commodity loans given in 1966 and 1967 to provide assistance for the national economy and repayment of foreign debt and then finance and rescheduling for debt relief between 1967 and 1971. In the years from 1968 onwards, with the commodity loans given by the Overseas Economic Cooperation Fund (OECF) and project assistance, the focus changed to the provision of economic and social infrastructure. Another example of loan assistance is the rice deferred payment exports enacted by the Ministry of Agriculture, Forestry and Fisheries' Food Agency between 1970 and 1983.

(b) Technical cooperation has been mainly through the Japan International Cooperation Agency (JICA). This has happened since Indonesia joined the Colombo Plan (an international consultative organization with the objective of promoting economic and social development in countries in Asia and the Pacific area in order to raise standards of living in them, mainly through technical cooperation) and has taken the form of development studies, the acceptance of trainees, dispatching experts and donating equipment. Grant aid cooperation started with commodity aid in 1967. From 1969, there has been food grant aid, grant aid for cultural activities started in 1977, and there has been grant aid for increasing food production since 1978.

② Grant aid

Grant aid is implemented in the main by the Ministry of Foreign Affairs but since the revision of part of the International Cooperation Agency Law in April 1978, JICA has been responsible for General Grant Aid and Grant Aid for Fisheries (since 1984, this has included Grant Aid for Increasing Food Production).

Between 1968 and 1989, grant aid cooperation to Indonesia totaled ¥105 billion (on Exchange of Note basis, not including reparations). In recent years it has been at an annual level of ¥7 - 8 billion.

Areas targeted have spanned a broad range and include agriculture, healthcare and educational projects. In their selection, with the focus being on the most effective use of the grant aid, emphasis has been placed on projects linked to technical cooperation.

CHAPTER 2 OUTLINE OF THE PROJECT

Chapter 2 Outline of the Project

2-1 Objectives of the Project

The objectives of the project are to make an integrated system for the production of soybeans in Indonesia utilizing foundation seed farms, stock seed farms and extension seed, make a model for each stage and reflect the results in soybean production.

2-2 Study and Examination on the Request

[1] Facilities

a. Directorate General of Food Crops and Horticulture Headquarters, Ministry of Agriculture, Jakarta

Though new facilities and equipment were strongly requested, in accordance with the original Japanese policy for the project, i.e. that of a making a foundation seed farm-stock seed farm-extension seed model setup, grant aid cooperation was seen to be unnecessary for the facilities here so they were treated as being outside the scope of the project.

b. Bedali Central Seed Farm (foundation seed farm: BBI)

b-1. Accommodation facilities for trainees and guest house

① Assuming local cost support from Japan or other countries, only a low operation rate can be expected of the training facilities requested by the Indonesian authorities when the project-type technical cooperation is over.

② There is still capacity at the training center operated by the Ministry of Agriculture in Malang District.

③ It is possible to secure hotel or other accommodation in the Malang area.

b-2. Field facilities (irrigation facilities)

In consideration of the results of the well boring survey, the water supply for the dry season will comprise wells and reservoirs. Fields will not be made uniform by adjusting their boundaries.

b-3. Storage facilities

The planning for normal temperature and air-conditioned stores is to be done once their maintenance and management costs have been estimated. The air-conditioned store was requested because of the BBI director's concern about germination rates. However, the air-conditioned store is considered to be out of the scope with the following reasons:

① In view of the results of soybean seed moisture content and storage tests recently carried out in Indonesia, it was considered that , if the moisture content were low,

there would be no reduction in the germination rate if seeds were stored for 6 months at normal temperatures.

② The O/M cost for the air-conditioned store would be 1,000,000 RP/month.

c. Main Seed Farm (BBU: stock seed farm)

c-1. Choosing the candidate areas

Based on their examination of the existing Gujang BBU and the fourth farming field of Bedali BBI located in Lebaksari, the survey team decided on the fourth farming field in Lebaksari as the location of the main seed farm (BBU) for this project for the following reasons:

① Technical cooperation is possible for both areas

② Gujang BBU mainly produces rice seeds and the soil at Lebaksari is more suitable for soybean production.

③ There has been a strong request from the Indonesian authorities to make Lebaksari the site for the project.

④ It is planned to purchase land at Lebaksari and preparations for the organization and personnel assignment have been made.

c-2. Items subject to grant aid

Buildings, facilities (drying floor, etc.), equipment necessary for independent inspections in stock seed production will be provided. There will be no provisions for the field area in BBU (including irrigation and drainage channels)

d. Seed Processing Center (SPC)

The findings of the examination on the San Hyang Seri Pasuruan SPC and discussions held with San Hyang Seri's head office personels and members of the Ministry of Agriculture were that as a site had not been secured for building of the Pasran SPC, technical cooperation was necessary. However, if seed processing facilities were expanded, it would be difficult to operate them profitably (comment by San Hyang Seri's president) and there were no particular problems with the existing facilities or equipment. For these reasons, the SPC is not considered for grant aid. (The Indonesian authorities suggested a site owned by another public corporation, PT. Pertani, but this was deemed unsuitable in view of the fact that PT. Pertani now only has an office in Pasuruan and is not actually processing or selling any seeds.)

e. Seed Control and Certification Service III (BPSB III)

e-1. BPSB III, Surabaya

Grant aid will only be extended to the procurment for equipment. Equipment will be procured for the inspection of soybean seeds (not for other food crop seeds). The equipment requested for examination for insect pests has basically been omitted.

e-2. BPSB III, Malang Branch

Regarding the BPSB III branch to be planed on the Bedali BBI site, grant aid is extended for the buildings, related facilities and the minimum amount of equipment, conditional on its legal status, personnel plan and budget being clarified.

[2] Equipment

The equipment requested by the Indonesian Government is on the whole deemed to be that necessary for the multiplication of high quality soybean seed which is an objective of this project. However, as the equipment types and quantities are in accordance with the Indonesian Government's standard list, it will be able to cater for a wide range of activities. In the current study, the equipment was examined to ensure that it would fit in with the project content and scale for each facility.

In this examination, the equipment requested, that whose purpose was directly compatible with the objectives of this project was subjected to a strict selection procedure. Equipment for which instruction on maintenance is thought to be necessary and that for which further examination of its purpose and effectiveness would be required will be reconsidered at the stage that it is deemed necessary during the project-type technical cooperation scheduled to follow this project. Regarding high-tech equipment for analysis and inspections on seeds (including electron microscopes used to detect viruses), a study was carried out to determine its necessity and the level of technology in Indonesia in order to formulate the most suitable equipment plan. As the result of the examination, such equipment was deemed not to have attained a technological level that would contribute to the multiplication of seeds so it was considered to be out of the scope of this project.

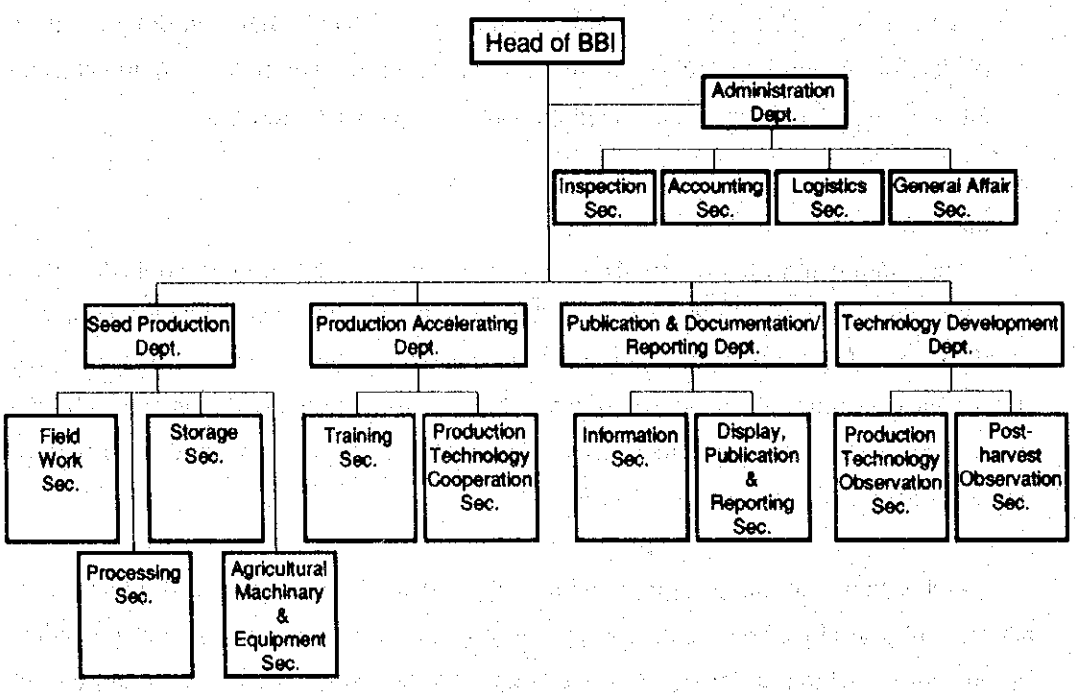
2-3 Project Description

2-3-1 Operational Structure and Execution Setup

The operational structure required for this project is as follows:

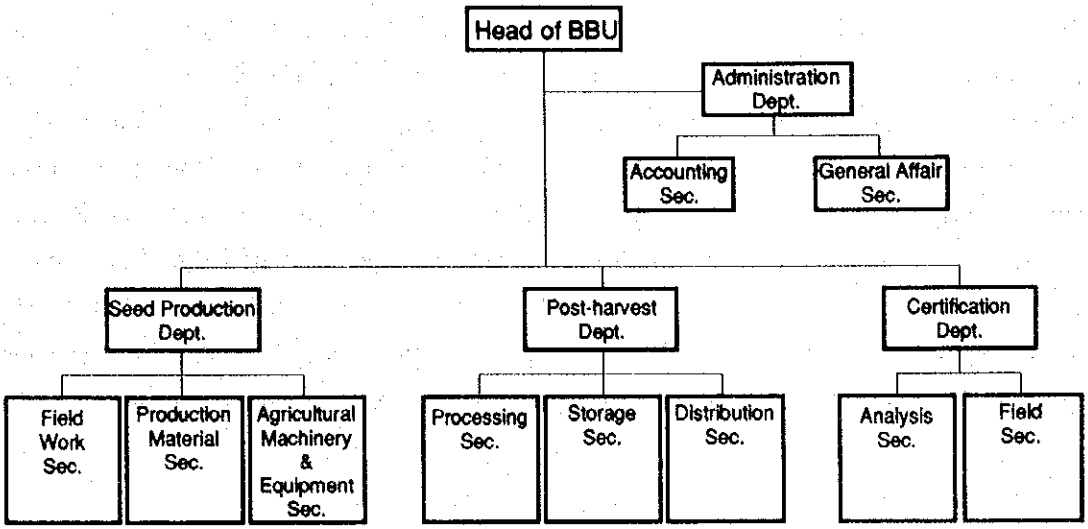
1. BBI (Central Seed Farm)

Organization chart



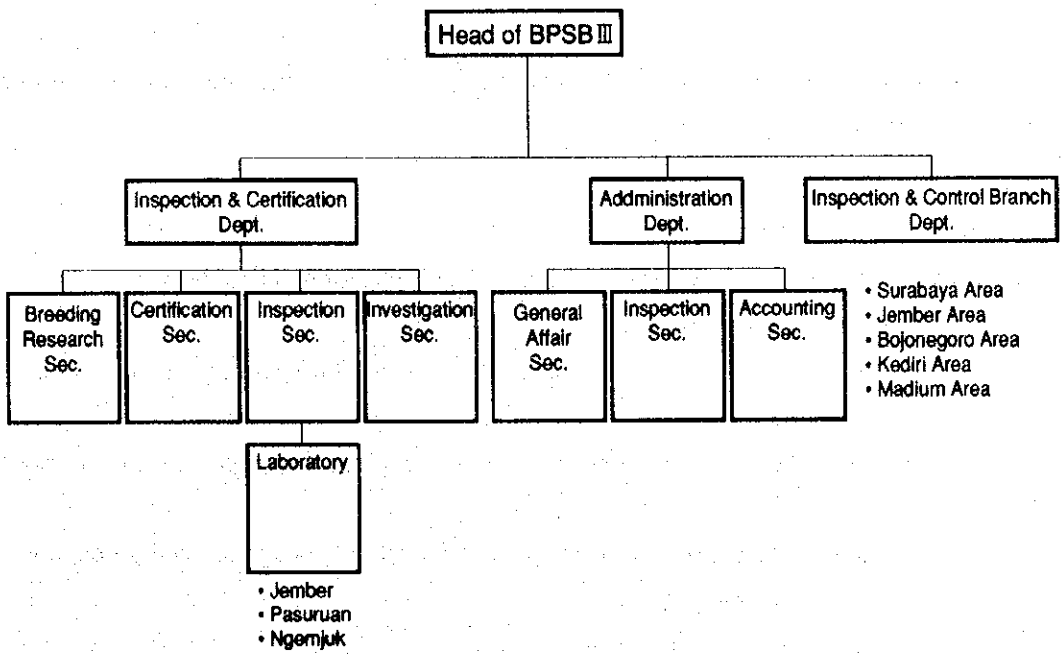
2. BBU (Main Seed Farm)

Organization chart



3. BPSB Ⅲ (East Java)

Organization chart



There should be no problems obtaining budgets or personnel for the Bedali Central Seed Farm whose existing organization will be shifted in the current project. A new organization is planned for the new facilities to be provided for the Lebaksari Main Seed Farm. As these facilities will be managed by the Bedali Central Seed Farm as a model farm, the director will be in charge of both. The number of personnel necessary for the Lebaksari Main Seed Farm is twenty-seven. This number is not excessive so it should be possible to secure enough people and budget for this facility. Further, in pace with the planned move of the major part of soybean inspection work currently being carried out in Surabaya to the BPSB Ⅲ, Malang Branch, part of the organization will also be moved. Together with the BPSB Ⅲ, Surabaya, there will be no change to the size of the overall BPSB Ⅲ operation, so it should be possible to secure personnel and budget as for the current operation. In consideration of the foregoing, the plans for the organization and personnel required for this project are very attainable.

2-3-2 Plan of Operation

The objective of this project is to increase the production of high quality soybean seed in Indonesia by improving the current situation. This includes the following:

① Upgrading techniques for the production of high quality seed
② Enhance seed storage method by preventing drops in germination rates, etc.
③ Improve seed inspection techniques and the systems
④ Train farmers on the use of high quality seed

In order to achieve the above goals, under this project, the following activities will be carried out at individual organizations.

(1) Bedali Central Seed Farm

Activites:
- Produce foundation seed through the multiplication of breeder seed
- Supply foundation seed to stock seed farms
- Train stock seed farm staff and seed production farm workers in cultivation techniques
- Carry out training to increase awareness of high quality seed among the persons concerned
- Provide a place for the exchange of technical knowledge on seed production between persons concerned
- Upgrade seed production techniques

(2) Lebaksari Main Seed Farm

Activites: • Produce stock seed through the multiplication of foundation seed
• Supply stock seed to seed production farms and seed processing center
• Train seed production farms on cultivation techniques

(3) BPSB Ⅲ, Malang Branch

Activites: • Inspect/certify seed quality and seed farms
• Carry out training on improving seed quality
• Carry out seed inspection and analysis related research

(4) BPSB Ⅲ, Surabaya

Activites: • Hold training sessions for all BPSB Ⅲ Branch together
• Inspect/certify seed quality and seed farms
• Issuing certificates
• Carry out training on improving seed quality
• Carry out seed inspection and analysis related research

2-3-3 Project Site Conditions

[1] Natural conditions

① Geology and Topography

Eastern Java forms one part of the volcanic belt running east-west. In this region, volcanic activity started in the mid-tertiary period and increased in the quaternary period. The topographic features in the project area are the Malang plateau and basin, which are representative of the east Java region, the Arjino, Welirang and Kelud volcanoes in the northwest and west, the Bromo and Sumeru volcanoes in the east and the Rusto plateau in the south. It is within the upper Brantas basin.

The project site may be described as a gently sloping area at the foot of a mountain.

② Climatic conditions

The average temperature is 26.7° C and the difference between maximum and minimum temperatures is not very great. There are many sunlight hours in the dry season from April to October but fewer in the rainy season from November to March. The relative humidity tends to be high in the rainy season. The average pure emission number is 264.65 (Cal/cm2) and the average transpiration coefficient Ep (mm) is 141.9 mm.

The rainfall is highest in the rainy season months between October and April but it drops off a bit in January. There is about 300 mm of rainfall in the dry season between May and September.

The water balance, something which greatly affects the cultivation of food crops, has the following special characteristics: 1) there is a weak and a strong dry season; 2) there are large fluctuations in it from year to year; 3) no clear division can be made between the rainy and dry seasons: it varies from year to year. Irrigation is required under such water balance conditions.

③ Soil conditions

a. Soil profile

A soil test was performed at two locations at the project site to determine the soil profile. The parent material of the soil at them both was basic volcanic deposits. The soil profile was similar at both locations. In the surface layers, the AP layer was soft and the layer with humus is clayey silt. These are the layers that are under cultivation at the present time. The B layer was very compacted and had a hardness of 80 - 120 kg/cm^2. The C_1 and C_2 layers at both test locations were very soft and consist of dark redy brown, clayeysilt. Having a hardness of 8 - 24 kg/cm^2, this soil has extremely good physical properties.

b. Physical and chemical properties of the soil

The moisture content of the surface layers at both locations was 31.6%. This high moisture content is thought to be the result of irrigation near the sampling points. The moisture content of 10 - 30 cm B layer was 11 - 12% which was lower than that for the C_1 and C_2 layers. The pH showed the surface layers to be slightly acidic and going towards the lower layers it approached neutrality. The available phosphate (Olsen P_2O_5) measured 53 - 82.9 mg in the surface layers. This high value is thought to be due to residual phosphate in the facilities.

The exchangeable base value for Ca was 17 ml/100 g for all layers while those recorded for Mg, K and Na were normal for a volcanic soil. The exchangeable base volume was 20 - 32 and the basic saturation percentage (BS) became less going downwards. This is because the surface layers are fertilized.

Looking at the soil from the sampling points, it seems that the top 10 cm of the surface layer (AP layer) have been used for crop cultivation up to the present time.

[2] Infrastructure conditions

① Electricity

(a) BBI

a. Branch of electrisity

The existing facilities at the project site are offices, drying facilities and housing. 1 ϕ 110 V 2 kVA and 3ϕ 220 V 0.6 kVA low voltage power is currently supplied to these buildings. Furher, there is 3ϕ 220 V low voltage power to the existing building on the south side. The power supply planned in the current project is possible even without removing the existing supply facilities.

b. Others

Organization in charge: PLN (Perusahaan Listrik Negara)

Electrical cables: In the area along the trunk road on the west side of the project site (5 m inside fence) there is a 3 ϕ 3 W 20 kV cable.

Power supply: High voltage (3 ϕ3 W 20 kV 50 Hz) or low voltage (3 ϕ 4 w 380/ 220 kV 50 Hz) power may be supplied. In the contract anything up to 197 kVA is low voltage and anything above that high volt age. Voltage fluctuations are within a range of ± 10%. Around 3 months will be necessary for the PLN power supply works.

Relocation of electricity poles: The electricity poles carrying electricity cables in the project site may be moved sideways but not beside the trunk road on its west side. The movement of electricity poles will have to be paid for.

Power outages: Spontaneous power outages of between 5 minutes and 2 hours occur about twice a month while the power is stopped for about 6 hours around twice a year for electrical works.

(b) BBU

a. PLN (Pasuruan)

Organization in charge: PLN (Perusahaan Listrik Negara)

Electrical cables: Along the road towards Bngil, which is about 2 km to the north-west of the project site there is a 3 ϕ 3 W 20 kV cable.

Power supply: Low voltage (3 ϕ4 W 380/220 kV 50 Hz) power may be supplied. In the contract, power may be supplied in the range 82.5 kVA to 200 kVA by mounting transformers on special poles. However, if the power is less than 82.5 kVA, low voltage power may be supplied from the pole mounted transformer about 500 m away. Around 4 months will be necessary for the PLN power supply works.

Power outages: There are power cuts of 5 minutes to 4 hours around 3 times a month

② Water supply

(a) BBI

a. Existing supply

The existing facilities at the project site are offices, drying facilities and housing. These buildings are supplied with water from a 25 ϕ branch pipe from the 75 ϕ water main along the trunk road through a meter at each of them.

b. Others

Organization in charge: PAM

Water main: There is a 75 ϕ water main pipe along the trunk road in the project site. A new branch pipe will be installed on the water main. The water pressure is assumed to be 6 kgf/cm^2. The installed length of the branch pipe from the water main will be around 300 m. The water supply work at PAM will require about a month.

(b) BBU

a. Existing wells

As the existing source of water, there are shallow wells (7 - 10 m deep), near the road at the front of the project site. There is no water main nearby so neighboring villages also use shallow wells for their source of water. Water is available from these wells all year round.

b. Water supply planned for project buildings

The existing shallow wells cannot be used because they are in the areas planned for the buildings and the work yard. Therefore new shallow wells of around the same depth as the existing ones, or slightly deeper than them (10 - 12 m), will be provided to supply water to the project buildings.

③ Sewage

(a) BBI

a. Existing drainage facilities

There is no sewer main in the vicinity of the project site. The sewage and general drainage is treated in a septic tank and then permeates into the ground in the site. For storm sewage, there are only drainage ditches at the north side of the project site. At other parts, water is assumed to drain away naturally.

b. Treatment of project building drainage

The sewage and general drainage from the project buildings will be treated in a septic tank and then allowed to permeate into the ground through pipes. The volume of storm sewage from the area of the project buildings will be computed and it will be allowed to permeate into the ground using permeation tanks, etc.

(b) BBU

a. Existing drainage facilities

There is no sewer main in the vicinity of the project site. As there are no drainage ditches, storm sewage drains into the ground naturally.

b. Treatment of project building drainage

The sewage and general drainage from the project buildings will be treated in a septic tank and then allowed to permeate into the ground through pipes. The volume of storm sewage from the area of the project buildings will be computed and it will be allowed to permeate into the ground using permeation tanks, etc.

④ Telephones

(a) BBI

a. Existing telephone lines

The existing facilities at the project site are offices, drying facilities and housing. There is currently one telephone circuit (can be used for fax) coming into the office from the telephone lines along the trunk road. (west side. The installation of telephone lines for buildings in this project can be carried out without removing the existing installation.)

b. Others

Organization in charge: TELKOM(PT. Telekomunikasi Indonesia)

Telephone line: There are telephone lines at trunk road on the west side of the project site, on the opposite side of the road. It is possible to take 5 telephone circuits from them, It will take TELKOM about a month to do the installation work once the applicaton for installation has been made and the installation fee paid.

(b) BBU

Organization in charge: TELKOM(PT. Telekomunikasi Indonesia)

Telephone lines: There are telephone lines at the trunk road towards Pupwosari about 6 km away from the project site in a southeasterly direction. It will be possible to take two telephone circuits from them. However, as there are no telephone lines in the vicinity of the project site, a commitment charge of 100,000 RP per month per telephone circuit will be added until the time that TELKOM has installed trunk telephone lines in the vicinity of the project site. About 2 months will be required for TELKOM's installation work.

2-3-4 Outline of Facilities and Equipment

[1] Facilities

facilities and equipment

Facility	Area	Remarks
[BBI]		
1. BBI main building	850 m²	• 2 Laboratories
2. Net house	64 m²	• 2 Unit
3. Natural temperature seed store	64 m²	• 1 Unit
4. Moisture adjustment room	450 m²	
5. Drying floor with roof	——	• roof
6. Agricultural equipment store/garage building	270 m²	
7. Fuel store	12 m²	
8. Electrical/generator room	60 m²	
9. Pump room	20 m²	
10. Power supply room	16 m²	
Subtotal	1,806 m²	
[BPSB]		
1. BPSB main building	760 m²	• 3 Laboratories
2. Net house	64 m²	• 2 Unit
Subtotal	824 m²	
[Training center]	840 m²	• Auditorium • Lecture room • Canteen
Subtotal	840 m²	

To be continued.

[BBU]		
1. BBU main building	850 m²	• 1 Laboratory
2. Natural temperature seed store	100 m²	• 1 Unit
3. Moisture adjustment room	720 m²	
4. Agricultural equipment store/garage building	240 m²	
5. Fuel store	12 m²	
6. Electrical/generator room	50 m²	
7. Pump room	13 m²	
8. Drying floor with roof	——	• roof
9. Power supply room	16 m²	
Subtotal	2,001 m²	
Total	5,471 m²	

[2] Equipment

① Seed production equipment

Purpose : to perform the agricultural work, insect control and cultivation management necessary for seed production.

Main equipment : tractor, plow, soybean harvester, power sprayer hand sprayer, bush cutter, etc.

② Seed processing equipment

Purpose : to perform threshing, cleaning, separation, drying, etc. for the soybean seed.

Main equipment : thresher, cleaner, gravity separator, dryer, packager, scale, etc.

③ Seed inspection equipment

Purpose : to carry out germination rate, moisture and purity tests and basic research on seed health.

Main equipment : incubator, autoclave, distilled water apparatus, biological microscope, stereo microscope, moisture meter, divider, pH meter, etc.

④ Data processing equipment

Purpose : to issue seed inspection certificates and processing inspection data; preparing statistical data on seed production and training materials.

Main equipment : personal computer

⑤ Vehicles

Purpose : to collect samples and to perform field inspections, producer education,transporting trainers.

Main equipment : jeep, pick-up truck, microbus, etc.

⑥ Climatologic Instrument

Purpose : to measure the climatological conditions at the seed production fields.

Main equipment : thermohygrometer, wind direction and speed recorder, rain gauge, instrument screen, etc.

As the quality of the following locally manufactured equipment is deemed to be compatible with the objectives of the project, it will be procured in Indonesia in consideration of convenience with respect to maintenance.

Hand tractor
Data processing equipment
Vehicles (jeep, pick-up truck, etc.)

2-3-5 Operation And Maintenance Plan

After this project has been completed, the maintenance setup, procedures and expenses will be as outlined below.

[1] Maintenance setup and procedures (buildings and facilities)

To ensure that the facilities function properly and can be operated for a long period of time, it is essential to have a full-time maintenance staff. And, in the personnel assignment plan for the center, it is necessary to establish a support setup and procedures for it in accordance with the following points.

① Enable personnel to gain practical experience in the maintenance of the facilities

Decide on personnel for the maintenance of the center's facilities and equipment, and train them on the following points:

a. Get building and equipment technicians to participate in construction meetings, equipment manual orientation meetings and seed inspections during the construction of the center in order to build up their practical experience

b. Make persons in charge aware of the failures which could occur in the building and equipment systems after the facilities have been completed and train them on how to deal with such failures.

c. Ensure personnel have a good understanding of daily maintenance and inspections and train them on how to deal with problems.

d. Ensure personnel have a clear understanding of the inspection and work procedures in equipment operation manuals (received from contractors) so that they make no errors in carrying them out.

e. During the period of the construction works, have discussions with the consultant to establish a setup for dealing with problems.

f. The appropriateness of the maintenance will depend greatly on having a clear understanding of the design aims and design conditions based on the design drawings. Therefore, throughout the period of the works, efforts will be made to gain a good understanding of the design details.

② Procuring expendable supplies

a. All expendable supplies and spare parts for electrical equipment, water supply, drainage and sanitary equipment will be procured in Indonesia. Consequently, during the period of the construction works, a chart will be prepared showing part numbers, agent addresses and names of responsible persons at them. Setups for contacting agents when items are required and checking their quantities will also be established.

b. After the facilities have been completed, warranties, expendable supplies and parts lists will be filed so that they can be used during their operation.

[2] Equipment maintenance setup and procedures

Accessory lists, specifications sheets, operation manuals, parts lists and repair manuals for the equipment to be procured for this project will be collectively controlled at each of the facilities. Copies of each will be distributed to the sections in the facilities having the equipment for use in daily maintenance by persons in charge of the equipment. Spare parts and accessory equipment will be kept at each of the sections and records of part replacement, parts supplied and repairs will be kept. Each facility will be responsible for the control of its expendable supplies and work out their usage and replenishment details in accordance with the stock available for the equipment in order to reflect this in an annual operating budget plan.

Though the persons in charge will carry out daily maintenance on equipment, the technicians actually using it will also be required to do this. Technicians have to be proficient at using the equipment in order to avoid errors in operation and carry out maintenance properly in accordance with maintenance manuals. Sufficient manuals will be prepared for the operation and maintenance of equipment for this project and thorough instruction will be given when they are handed over to technicians in order to raise their skill level.

Among the equipment for this project, the tractor for agricultural work and the equipment for seed processing have relatively high replacement costs. As the tractor will be working in harsh natural conditions, it is assumed that large scale repairs or replacement will be after around 8 years, at the earliest. A replacement period of around 10 years is

assumed for the equipment for seed processing. It is therefore considered that the requirement for large expenditure for equipment repairs or replacement will be 8 years after the project has been completed, at the earliest.

[3] Maintenance costs

The maintenance costs for the facilities and equipment after this project has been completed are outlined below.

① Building repair costs 10,586,600 RP

a. Building-related costs (glass replacement, painting, roof and tile repairs, etc.)

BBI (including BPSB Ⅲ Malang)

Labor costs (including materials): 4,900 RP/man day × 80 man days/yr
= 392,000 RP

BBU

Labor costs (including materials): 4,900 RP/man day × 50 man days/yr
= 245,000 RP

b. Expenses for replacing lighting tubes and bulbs (once per year)

BBI (including BPSB)

Tube and bulb changing expenses (including labor):

Fl 40 w 4,600 RP/tube × 950 tubes	= 4,370,000 RP
Mercury lamps 4,600 RP/lamp × 45 lamps	= 205,000 RP
Incandescent lights 1,200 RP/bulb × 2 bulbs	= 2,400 RP

BBU

Tube and bulb changing expenses (including labor):

Fl 40 w 4,600 RP/tube × 500 tubes	= 2,300,000 RP
Mercury lamps 4,600 RP/lamp × 15 lamps	= 69,000 RP
Incandescent lights 1,200 RP/bulb × 1 bulb	= 1,200 RP

c. Sewage treatment (cleaning septic tank: once per year)

BBI (including BPSB Ⅲ Malang)

Vacuum truck expenses: 75,000 RP/truck (20 m^2) × 4 trucks = 300,000 RP

BBU

Vacuum truck expenses: 75,000 RP/truck (6 m^2) × 1 trucks = 150,000 RP

d. Air conditioners (replenish gas: once per year)

BBI (including BPSB)

Gas replenishment expenses (including labor)

150,000 RP/set × 12 sets = 1,800,000 RP

BBU

Gas replenishment expenses (including labor)

150,000 RP/set × 5 sets = 750,000 RP

② Utility charges = 87,482,400 RP

a. Electricity charges (basic charge, usage charge [working time: 8:00 - 16:00])

BBI (including BPSB Ⅲ Malang)

Basic charge: (contract power 200 KVA):

4,580 RP/KVA × 200 KVA/month × 12 months = 10,992,000 RP

Usage charge (operation rate = 0.6):

130.5 RP/KWh × 200 KVA × 0.6 × 8 hr/dy × 25 dy/mth × 12 mths =37,584,000 RP

BBU

Basic charge: (contract power 85 kVA):

8,500 RP/KVA × 85 KVA/month × 12 month = 8,670,000 RP

Usage charge (operation rate = 0.6):

188.5 RP/KWh × 85 KVA × 0.6 × 8 hr/dy × 25 dy/mth × 12 mths = 23,072,400 RP

b. Water charges (usage charge [working time: 8:00 - 16:00])

BBI (including BPSB)

4,500 RP/m^2 × 40m^2/dy × 25 dy × 12 mths = 5,400,000 RP

c. Well charges (electric charge)

BBI (including BPSB)

10,000 RP/mth × 12 mths = 120,000 RP

BBU

10,000 RP/mth × 12 mths = 120,000 RP

d. Gas charges (LPG: 50 kg/2 mths, including labor)

BBI (including BPSB)

44,000 RP × 10 bottles × 6 changes/yr = 2,640,000 RP

BBU

44,000 RP × 6 bottles × 6 changes/yr = 1,584,000 RP

③ Telecommunications charges = 41,257,500 RP

a. Telephone charges (usage charges)

BBI (including BPSB)

Local calls: 110 RP/3 min × 50 calls/dy × 25 dy/mth × 12 mths = 4,950,000 RP

Trunk calls (Jakarta):

1,650 RP/min × 5 min/call × 10call/dy × 25 dy/mth × 12 mths = 24,750,000 RP

BBU

Local calls: 110 RP/3 min × 30calls/dy × 25 dy/mth × 12 mths = 2,970,000 RP

Trunk calls (Jakarta):

825 RP/min × 5 min/call × 5calls/dy × 25 dy × 12 mths = 6,187,500 RP

Consignment charges: 100,000 RP/line × 2 lines × 12 mths = 2,400,000 RP

④ Equipment operating expenses 46,443,000 RP

a. Vehicle expenses (gasoline)

BBI

Jeep: 1 unit × 200 km/dy ÷ 5 km/l = 40 l/dy

Light truck: 1 unit × 100 km/dy ÷ 8 km/l = 12.5 l/dy

Motorcycle: 5 units × 150 km/dy ÷ 20 km/l = 37.5 l/dy

Total: 90 l/dy × 25 dy/mth

= 2.250 l/mth × 700 RP/l × 12 mth = 18,900,000 RP

BPSB

Jeep: 1 unit × 200 km/dy ÷ 5 km/l = 40 l/dy

Motorcycle: 6 units × 150 km/dy ÷ 20 km/l = 45 l/dy

Total: 85 l/dy × 25 dy/mth

= 2,150 l/mth × 700 RP/l × 12 mth = 17,850,000 RP

BBU

Light truck: 1 unit × 100 km/dy ÷ 8 km/l	= 12.5 l/dy
Motorcycle: 3 units × 200 km/dy ÷ 20 km/l	= 30 l/dy
Total: 42.5 l/dy × 25 dy/mth	
= 1,062.5 l/mth × 700 RP/l × 12 mth	= 8,925,000 RP

b. Drying expenses (light oil)

BBI

2 units × 5 l/hr × 4 hrs/dy × 16 dys/period × 400 RP/l	= 256,000 RP

BBU

4 units × 5 l/hr × 4 hrs/dy × 16 dys/period × 400 RP/l	= 512,000 RP

2-4 Technical Cooperation

The EC is providing aid cooperation at Muarabungo in Jambi province with the objective of developing the efficient agricultural systems and of extending the related data to the formers.

In aid cooperation from China, the five provinces of Aceh, North Sumatra, West Jaya, East Jaya, and Satengara are being targeted with the objectives of expanding and improving markets and increasing seed production.

As such cooperation is mainly for the diffusion of agricultural systems and improving markets, there will be no overlap from that of Japan.

In the project-type technical cooperation which Japan has planned to follow this project, R/D will have been done by March 1996 and experts dispatched by October of the same year.

CHAPTER 3 BASIC DESIGN

Chapter 3 Basic Design

3-1 Design Policy

The facilities, buildings, and equipment proposed in the Project will be designed based on the following policies while taking into account such factors as the construction period and the special characteristics of the Project as well as the environmental and social conditions of Indonesia, the construction and procurement conditions, the implementing agency's ability to maintain and manage the facilities and equipment, and the system of Japan's grant aid:

① The plan shall be appropriate to the environmental conditions of the Malang and Pasuruan area such as the average temperature, maximum monthly rainfall, and average humidity.

② Planning that the construction work will be carried out by local labors, the work shall be appropriate to the skill level of such laborers.

③ The construction materials shall be procured from local manufacturers as much as possible and must be available at reasonable prices in sufficient quantities.

④ The maintenance of the facilities and equipment shall be designed in such a way that they can be sufficiently maintained with the technical capabilities of the local people.

⑤ The facilities and equipment shall require as little maintenance work as possible to minimize the maintenance and management cost.

⑥ Assuming that the Project will be executed through grant aid of the Government of Japan, it shall be so designed that the construction work will be completed within a single fiscal year.

⑦ Numbers and sizes of necessary rooms shall be determined based on the numbers of staff and trainees and the organizational structure while taking into account future changes.

Based on the above design policies, the Project shall adopt the following numerical criteria:

[1] Policies concerning environmental conditions

① The average temperatures of 26.7°C in BBI Bedali and BBU Lebaksari shall be used.

② The one fourth of the average rainfall during the rainy season of 200 mm per a month (approximately for one week) shall be used as the maximum rainfall per day.

③ The average humidity of 77% shall be used as the humidity condition.

④ No conditions shall be specified for strong winds as no typhoons strike the area, where the average wind velocity is between two and seven meters per second throughout the year.

⑤ Since the area falls under Zone Ⅲ, a seismic coefficient of 0.05 shall be used as the seismic condition.

⑥ Lightening conductors shall be installed only in such constantly used facilities as Administrative Building, Training Building, and Drying Adjustment Room to avoid lightening damage.

Based on the above polices and numerical conditions, the design shall incorporate specific ideas listed below:

① The buildings shall have long eaves to block direct sunlight.

② Corridors shall be built on both sides of each building.

③ Ample ventilation shall be provided through windows, wainscots, and ceiling plenums to such important rooms as offices and laboratories.

④ To counter heavy rainfall, a simple large-roof method with no valleys shall be used, and the rainwater shall drop directly to the ground from the edges of the eaves.

⑤ A berm shall be installed abound the footings of each building to prevent rainwater from splashing into the building.

⑥ The high-floor method shall be used to cope with high humidity, and thermal insulation shall be installed in ceiling plenums in addition to ③.

[2] Policies concerning social conditions

① In principle, the proposed facility shall be used strictly for the normal operations of the facility and shall not be made available to community events.

② As the crime situation of the area is not necessarily under control, such security measures as building a gate, fence, and guard house around the facility as well as installing security lamps and alarms on windows of each building shall be taken.

③ As the Project site is located on a main road and can be reached either on foot or by bus by the commuters, no special considerations to other means of transportation shall be given.

[3] Policies concerning regulations and design standards

① The design shall comply with the Building Construction Code and related regulations of Indonesia.

② The Project shall follow necessary procedures associated with the construction work including the submission of applications for design approval and various inspections.

③ The above procedures shall be handled in consultation with the Ministry of Public Works of Indonesia.

[4] Policies concerning construction work

① In principle, the Project shall procure construction materials and equipment that are made or can be procured locally.

② For major construction work, local construction methods shall be used instead of special construction methods that are beyond the technical capabilities of local technicians.

③ The construction schedule and the employment and allocation of manpower shall be designed in accordance with the construction period while taking into account the work efficiency of local laborers.