

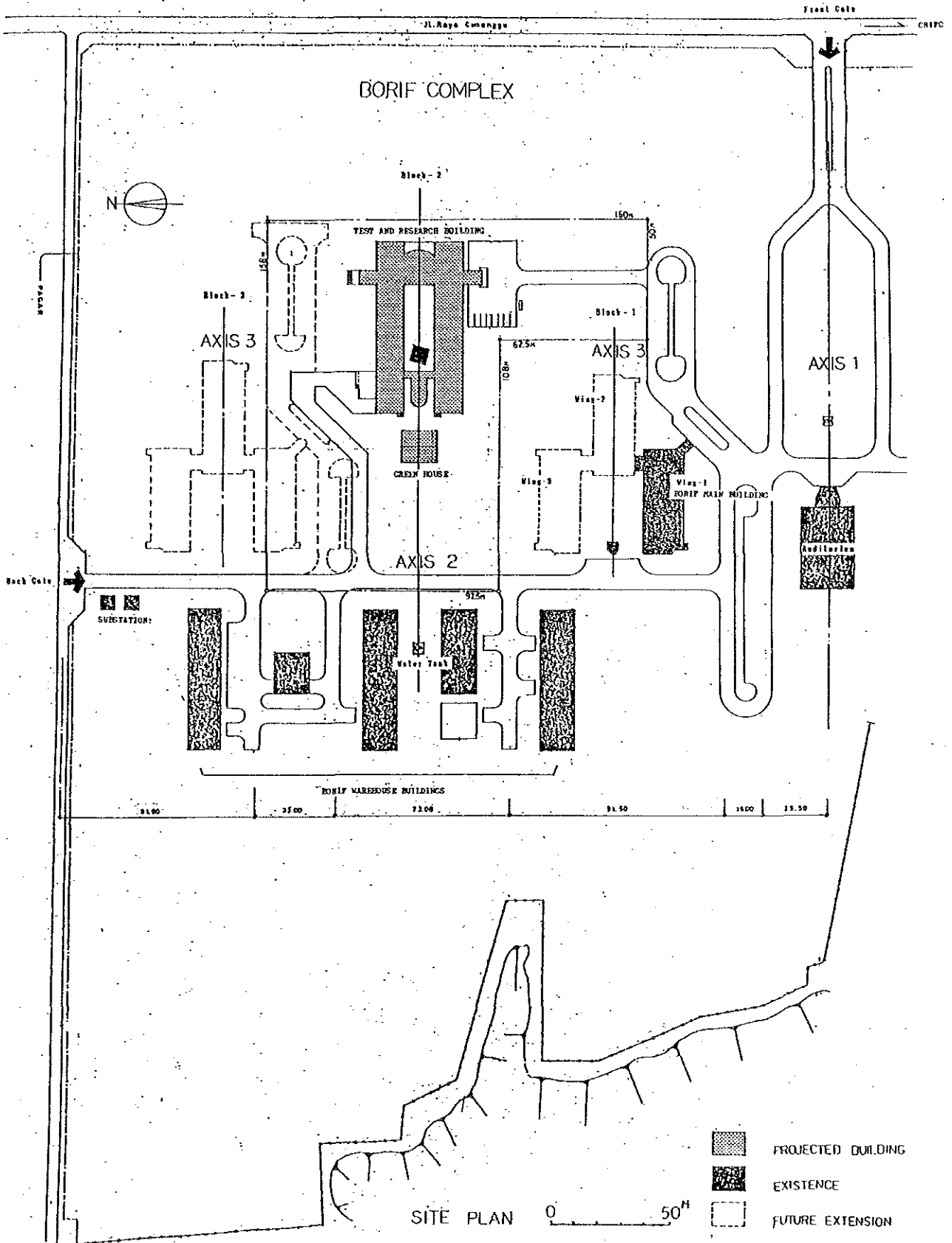
*2. Room members except ceilings will only use materials that reflect sounds. Materials with an acoustic effect have been selected to maintain quietness in the rooms.

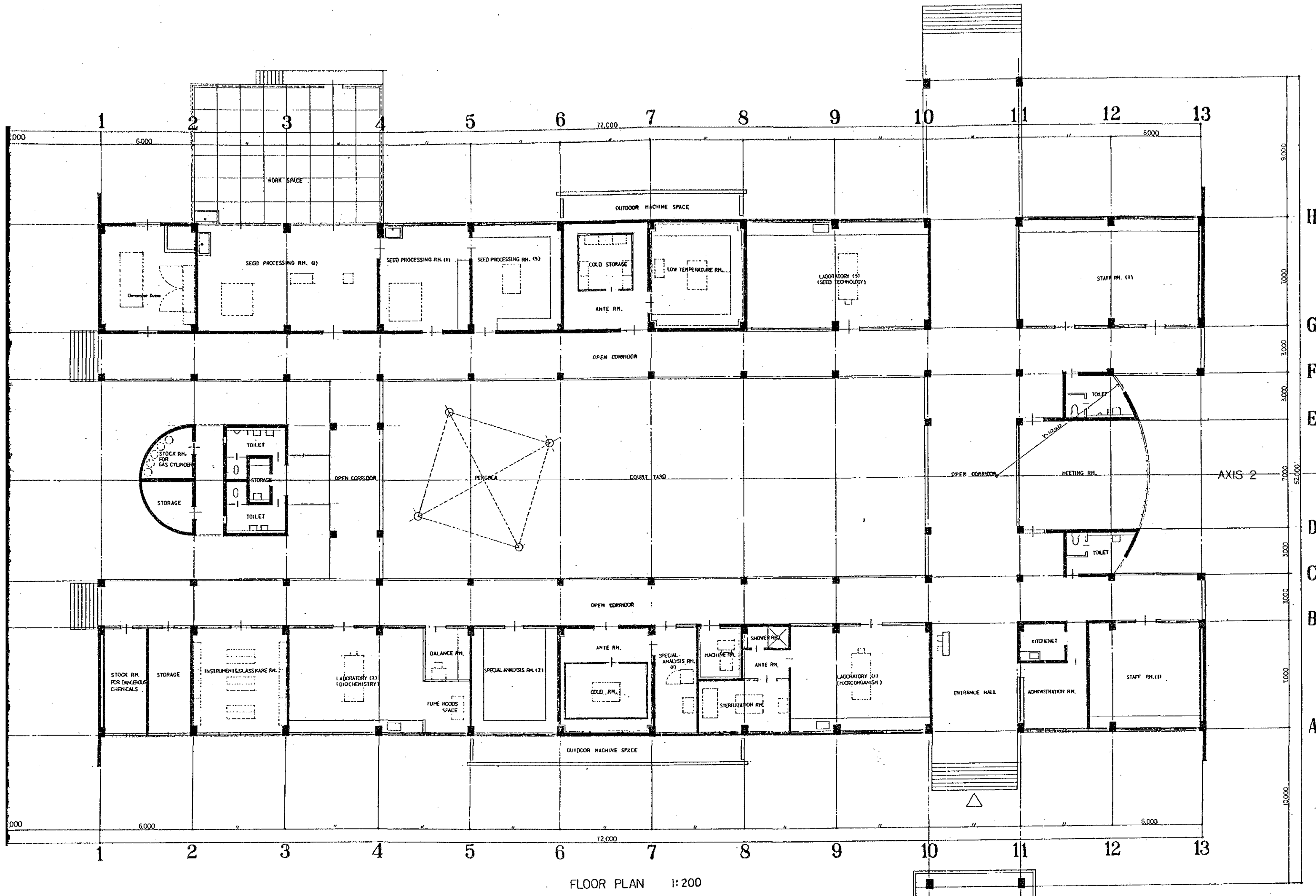
4-1-8 Equipment planning

The equipment was selected after fully defining the research to be conducted by the BORIF and after discussing with the representatives of the Indonesian implementing organization. Please refer to the attached equipment list regarding the details of the selected equipment.

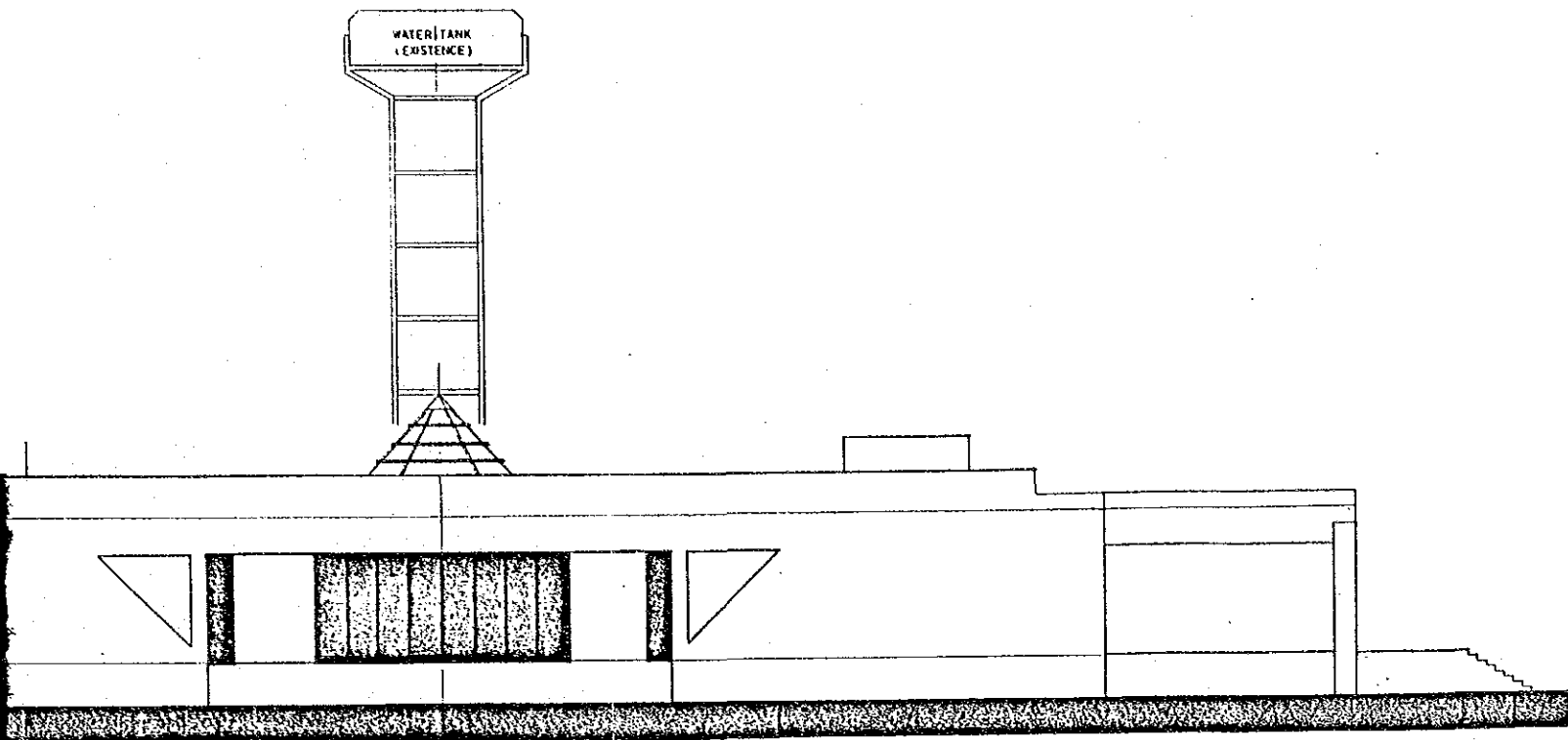
- (1) This facilities will be the core for pioneering research of Palawija crops in the Republic of Indonesia. The equipment will cover the following three sectors: Seed technology, biochemistry, and microorganisms.
- (2) A greenhouse will be installed during the process of research to conduct pot culture and tests, and low temperature stock chambers will be installed to preserve research seeds.
- (3) Sterilization chambers will be installed for research of bio-technology.
- (4) The equipment will be of an energy saving type and will have a simple mechanism to minimize the maintenance and running cost. Test equipment that can be shared will be shared as possible as it does not hamper research.
- (5) Research in the new buildings will have a close relationship with technical cooperation by Japan. The equipment models and specifications will be of a level that will allow the Indonesian researchers to fully utilize and maintain the equipment under the guidance by Japanese specialists.

4-2 Basic Design Drawings

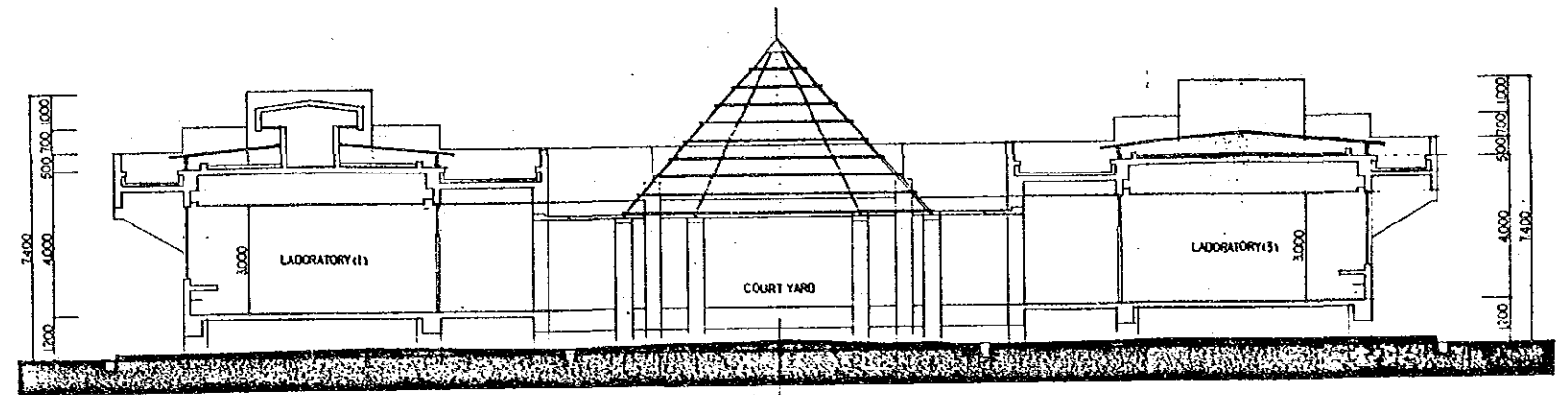




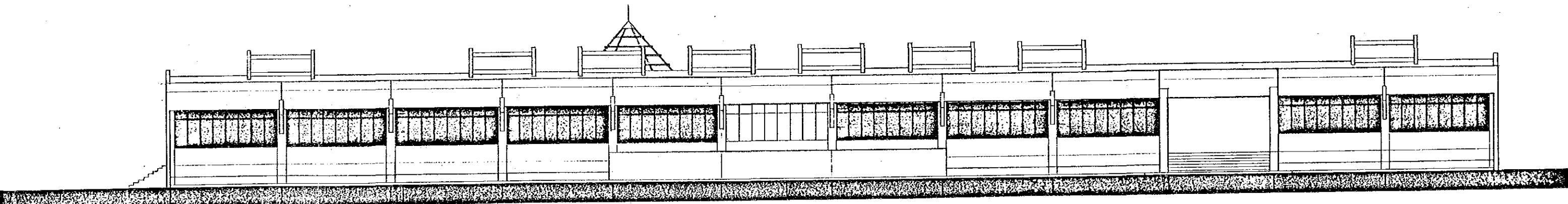
FLOOR PLAN 1:200



AXIS 2
EAST ELEVATION 1:200



AXIS 2
SECTION 1:200



SOUTH ELEVATION 1:200

4-3 List of Equipment

No.	Equipment	Quantity	Specification
	I Seed Technology Sector		
1	Dryer	1	Drying ratio 0.7 to 1.0%, batch type
2	Thresher	1	For soybeans, with elevator
3	Seed cleaner	1	For soybeans
4	Finish dryer for seeds	1	Capacity: 50 kg x 8 bags
5	Infrared moisture meter	1	Measuring range: 0 - 100% 387 x 194 x 345mm
6	Handy moisture meter	3	Measuring range: 6 - 30%
7	Automatic grain counter	1	Count indication: Digital, 5 unit. Count range: 0 to 99999
8	Constant-temperature and constant-humidity germination test oven	3	Temperature range: 20 to 85°C Humidity range: 20 to 95% RH. System: Direct humiditifying system
9	Top-pan balance	1	Electric type Capacity: 1200g Readability: 0.01g
10	Photosynthesis meter	1	Readability with measurement of transpiration Open type Range of air temperature 0 to 45°C Portable
11	Seed storage rack	5	900 x 600 x 1800
12	Laboratory table (Large)	1	3000 x 1200 x 800 Ceramic sink. With a faucet and trap

No.	Equipment	Quantity	Specification
13	Table (Medium)	2	1800 x 1200 x 800 Ceramic sink. With a faucet and trap
14	Chair for laboratory table	10	With casters
15	Cold storage	1	+5°C, ordinary humidifying
16	Side sink	1	
	II Biochemistry Sector		
1	Freeze dryer	1	Vacuum pump: 1 Flask: 120 ml, - 10 Ampoule: 50ml, - 10
2	Hot air dryer	1	Air temperature range: 40 - 300°C Capacity: 200 liter
3	Laboratory table (Large)	1	3000 x 1200 x 800 Ceramic sink. With a faucet and trap
4	Chair for laboratory	4	With casters
5	Cold room	1	+5°C, ordinary humidifying
6	Shelf for chemicals	1	1200 x 500 x 1800
7	Side sink	1	
8	Fume hood	1	With a ventilator fan, faucet, trap and gas cock
	III Shared Test Sector		
1	Atomic absorption spectro photometer	1	With a recorder and compressor
2	Hood for atomic absorption spectro photometer	1	

No.	Equipment	Quantity	Specification
3	Gas chromatograph	1	Detector: FID, TCD. Data processor Compressor
4	Crude protein analyzer	1	Decomposition accelerator Decomposition distillation bottle Compressor
5	Ultracentrifuge	1	85,000 rpm Angle rotor: 5 Switch rotor: 3
6	Centrifuge	1	With angle rotor: 3 Vertical rotor: 1 Survey rotor: 1
7	Deep freezer	1	-85°C, 300 liter
8	Chemical balance	1	Capacity: 20g, Readability: 0.001mg
9	Table for chemical balance	1	For semi-micro weighing
10	Chair for chemical balance table	1	
11	Laboratory table (Medium)	1	
12	Chair for laboratory table	2	
13	Liquid chromatograph	1	With UV-VIS detector, data processor
IV Microbiology Sector			
1	Auto still	1	Active carbon filter Membrane filter Ion exchange resin system
2	Autoclave	1	35 liter
3	Inverted system microscope	1	With a camera and halide lamp

No.	Equipment	Quantity	Specification
4	Table for Inverted system microscope	1	
5	Chair for inverted system microscope	1	
6	Rotary microtome	1	2 to 20um
7	Clean bench	1	Airflow horizontal type Efficiency: 99.99% (0.3um particles) or higher Air velocity: 0.2 to 0.45m/sec
8	Incubator	1	10 - 35°C 30,000 lux
9	Rotary shaker	1	0.5 - 5 rpm Test tube holder: 1 Conical flask holder: 2
10	Laboratory table (Large)	1	3000 x 1200 x 800 Ceramic sink, with a faucet and trap
11	Laboratory table (Medium)	1	3000 x 1200 x 800 Ceramic sink, with a faucet and trap
12	Chair for laboratory table	6	
13	Shelf for chemicals	1	
14	Side sink	1	
15	Shelf for tissue culture	1	
	V Glassware Sector		
1	Glassware	1 set	
2	Shelf for glassware	12	

4-4 Approximate Project Cost

Beside the Japanese Government portion, the cost to be undertaken by Indonesia is estimated as follows:

1) Value added tax (Indonesian portion of the buildings and equipment)	208,500,000 Rp
2) Ground leveling	1,242,500 Rp
3) Electric power supply to the building	21,000,000 Rp
4) One central-office telephone line	5,000,000 Rp
5) Building licence fee	3,500,000 Rp
6) Furniture and vegetation	10,000,000 Rp
7) Banking, etc.	6,000,000 Rp
Total	255,242,500 Rp

CHAPTER 5 EXECUTION PLAN

CHAPTER 5 EXECUTION PLAN

5-1 Project Execution Organization

(1) Project execution entity

The CRIFC will execute this project under the supervision of the AARD.

(2) Consultant

The consultant in Japan shall conclude a consultant agreement with the AARD, Ministry of Agriculture, the Government of Indonesia in accordance with the grant aid procedure of Japan immediately after the two governments conclude the Exchange of Note. Based on this agreement, the Japanese consultant shall undertake the following services:

o Execution plan stage

Preparation of design documents including execution design drawings, specifications, and other technical data.

o Tendering stage

Selection of contractors and cooperation service related to works contracts.

o Construction stage

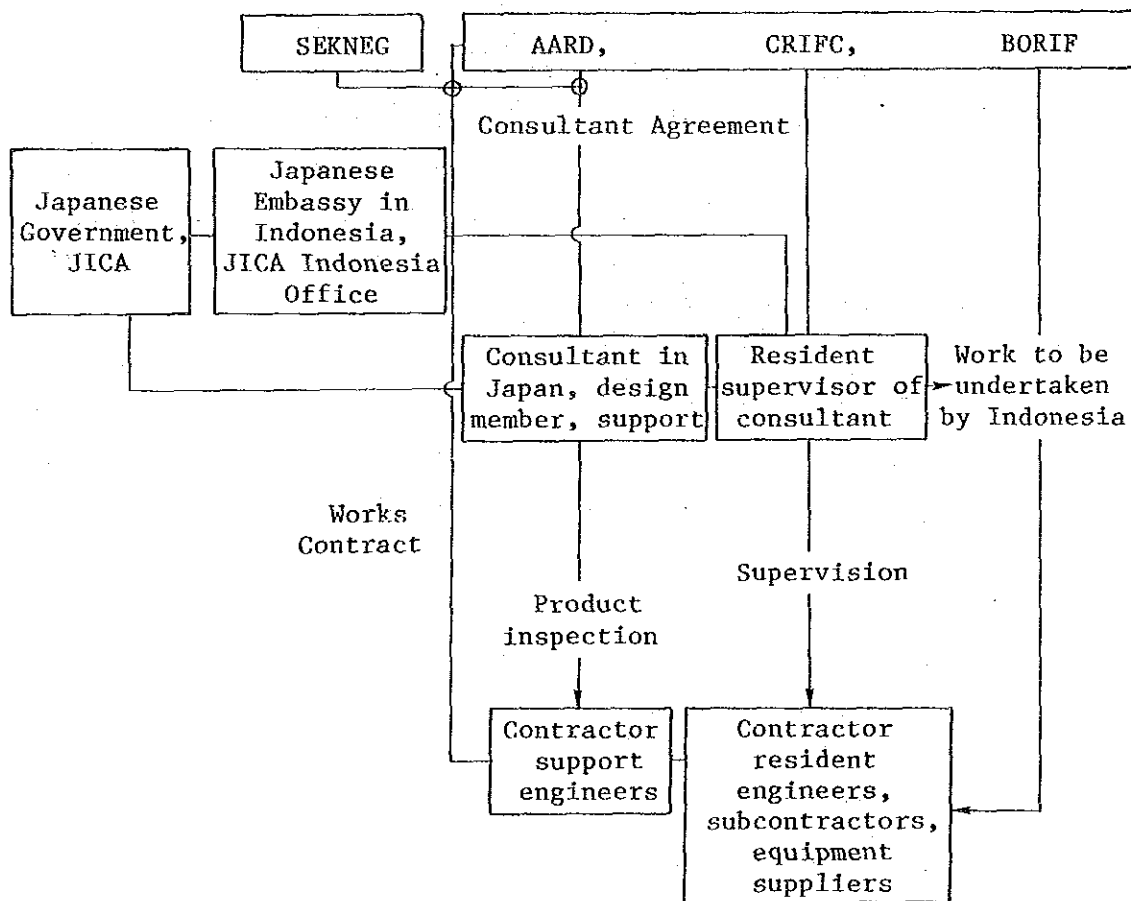
Supervision of construction

- Preparation of periodical reports
- Decision on building position and level

- o Approval of execution drawings
- o Inspection upon completion

(3) Contractor

The construction and equipment works shall be undertaken by Japanese contractors selected by tender which shall complete the works within the contract period.



5-2 Execution and Supervision Plan

5-2-1 Execution plan

After the Exchange of Note has been signed by the two governments, the AARD and the Japanese consultant will conclude the consultant agreement. The two parties will discuss and exchange views on the detailed design based on the basic design policies. The Indonesian Government shall finish leveling of the ground at the project site, which is defined as part of the works agreed to be undertaken by Indonesia, prior to the commencement of the works for this project. The details of electric power supply to the building, water supply, drainage and sewerage, telephone, and other works to be provided by Indonesia shall be confirmed.

The project site is located 2 km from the center of Bogor, presenting no difficulties in procuring or transporting materials. Construction firms and engineers in Bogor are capable of undertaking works, and labor can be procured by firms in Bogor. Bogor has the rainy season beginning October to March of the following year. A process chart should be prepared for exterior works and transportation of equipment from Japan taking this rainy season into consideration to set overall processes that will have no working delay or idling.

5-2-2 Supervision plan

To ensure smooth execution of this project, a vertical project team shall be formed at the time of the detailed design and of the works execution and supervision. The works execution supervisor to be selected shall have sufficient experience in site supervision and guidance and shall be able to precisely understand the field condition. This person shall have an ability to decide at each works stage. The main function of the works execution supervisor will be

to coordinate between the Indonesian government agency and works execution company, as well as strict adherence to the promised construction term, quality and performance supervision, and transfer to construction technology. The supervisor shall maintain close contact with the support organ in Japan and shall add short-term visiting engineers in other specialized fields in the works processes to ensure smooth execution of the works.

The works progress at the site, rainy season, and other factors should be taken into consideration to transport the research equipment to the project site and an appropriate carrying period shall be decided, including sending of short-term visiting engineers for equipment adjustment.

5-3 Equipment and Material Procurement Plan

5-3-1 Construction material procurement plan

The Government of Indonesia has formed a committee inside the SEKNEG to strongly promote the use of Indonesian products and labor. A large variety of construction materials are produced in Indonesia. The Indonesian manufacturers also produce architectural equipment of a high standard.

It is appropriate for this project to positively use Indonesian materials from the standpoint of maintenance and management.

Indonesian Product	Import from Japan
Cement and aggregate (sand and secondary concrete products) Reinforcing bars and light gauge section steel Timber Aluminum roofing Wooden fittings Metal fittings (Aluminum and steel) Glass Bricks Paints General interior finishing materials (floor, wall, and ceiling materials) Pipes and fittings Conduit pipes and cables Valves Air conditioning equipment Piping materials	none

Indonesian Product	Import from Japan
Special air conditioning equipment Pumps and accessories Generators Fans Panels Plug sockets, switches, etc.	none

5-3-2 Equipment procurement plan

The equipment to be used in this project will mainly be procured in Japan and will be shipped to Indonesia via sea. The plan for equipment carrying and installation shall be made based on manufacture, inspection, crating, transportation, carrying, installation, and acceptance in full coordination with the construction process. The test equipment shall be given periodic maintenance and checks so that no trouble will be caused to research. The equipment shall have special crating taking other effect into consideration.

Indonesian Product	Import from Japan
Center test tables and chairs Racks and cabinets Side sinks Chemical cabinets	Equipment except Indonesian Product

5-4 Itemize of Work

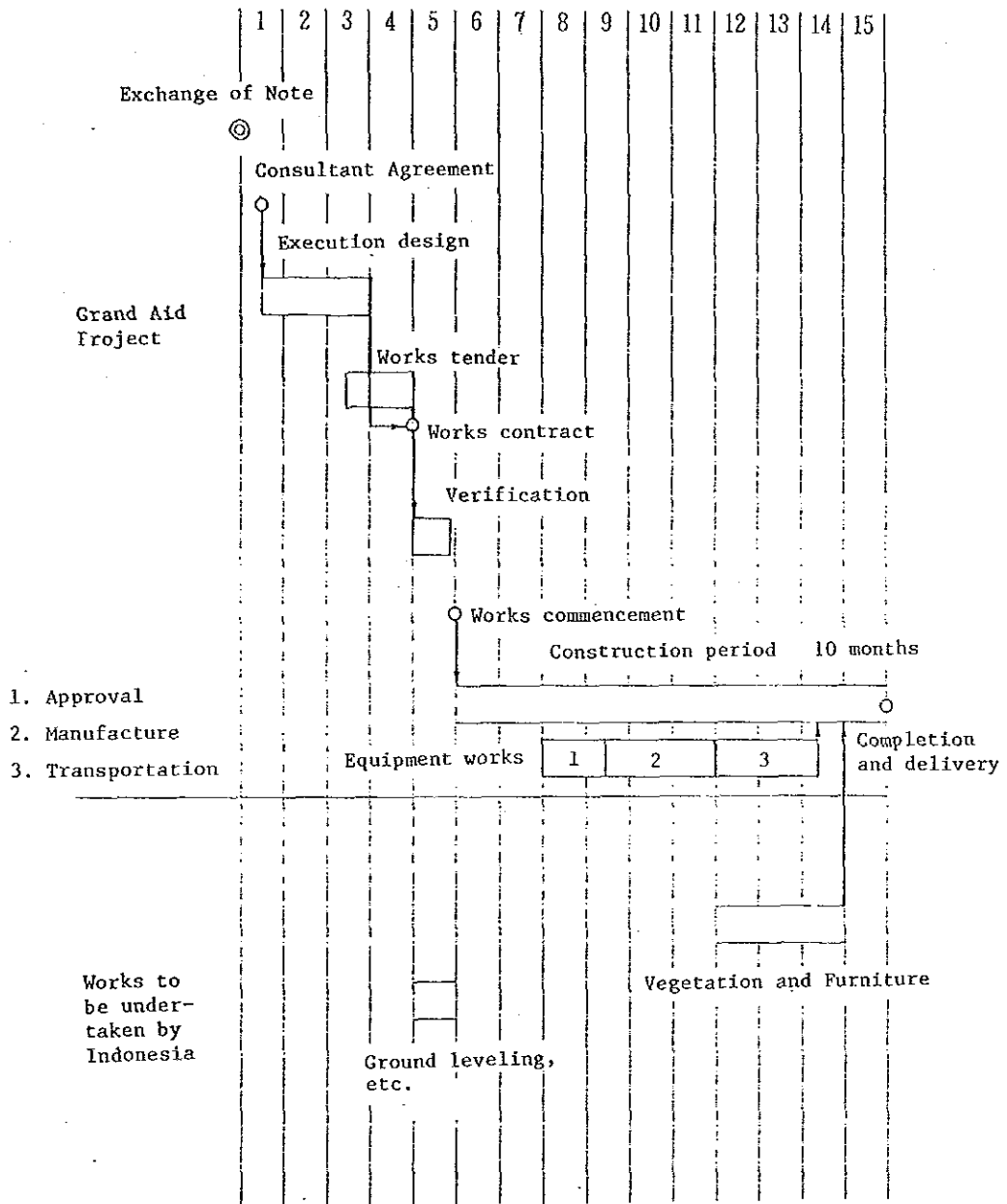
In accordance with the policy of the Government of Japan for grant aids, the supply scope for Japan is the construction of buildings and supply of equipment needed to strengthen pioneering research of Palawija crops. The study team has defined and obtained confirmation by the Indonesian Government regarding the itemize of work to be provided by Indonesia. The Minutes of Discussion dated October 9, 1986 itemize the supply scopes for the two countries as outlined below.

	Work borne by Japan	Work borne by Indonesia
1. Basic Works		
1) Ground preparation		o Ground leveling before commencing works
2) Water supply	o Piping inside the building	o Water supply from existing water supply facilities to the project site.
3) Water drainage	o Building of waste water processing facilities	o Extension of existing rainwater drainage line to a designated point inside the project site.
4) Electric power	o Power supply to the buildings to be built by Japan	o Supply line from the power receiving facility in the complex to a designated location inside the project site.
5) Telephone	o Construction and equipment after main terminal board	o Telephone circuit from central-office telephone line to main terminal board.

	Work borne by Japan	Work borne by Indonesia
2. Buildings	o Construction of buildings and incidental equipment works	o Building license application
3. Exteriors	o Construction of roads inside the project site	o Approach roads to the project site, vegetation, fences, gates, street lights.
4. Equipment	o Procurement of equipment	o Procurement of equipment other than that procured by Japan.
5. Furniture and furnishings		o Drapery, desks, chairs, and other furnishings.
6. Transportation of equipment and materials	o Ocean transportation cost	o Customs clearance and duty exemption upon landing.
7. Other services connected with implementation of this project		o Banking arrangement and incidental cost. o Grating of facilities of entry, exit, and stay by consultant and contractor staff and exemption of duties, domestic taxes, etc.
8. Value added tax		o Value added tax on facilities construction and transportation.

5-5 Execution Process

The schedule for the implementation of this project concerning buildings and equipment after signing the Exchange of Note between the two governments regarding the grant aid of the Japanese Government is as follows:



CHAPTER 6 OPERATION AND MAINTENANCE PLAN

CHAPTER 6 OPERATION AND MAINTENANCE PLAN

6-1 Operation and Maintenance Organization

The administrative sector of the BORIF shall provide operation and maintenance after the delivery of the facilities are completed.

6-1-1 Operation and Maintenance Organization

The building plan takes into consideration easiness of operation and maintenance work and less-frequent work by adopting the high-floor type. This makes pipe checks and future replacement easy, and deep eaves protect the exterior walls against severe natural conditions. Aluminum roofs assure good effects in preventing water leakage and on heat insulation.

Materials for the rooms have been selected taking into consideration test, research, and work to be performed. This assures a good environment for test and research rooms by cleaning and maintenance and check work performed daily. Damage and failures can be found early so that the performance of the buildings can be maintained for a long period of time.

Regarding the electric equipment, operation of the generator and voltage stabilizer permit preservation of samples and continued tests and research even if power failures occur and voltages drop. Operation of the air conditioning and ventilation equipment directly affect test and research results, as well as operation of the analytical equipment.

To maintain normal operation of the buildings and equipment, a detailed management instruction manual for periodic checks, etc. will be prepared to prevent accidents and failures, in addition to daily

checks. A maintenance and management structure shall be established to minimize effects on research and tests.

In order to accomplish this, it will be necessary for the BORIF administrative sector, researchers, and analysts to jointly perform equipment maintenance and checking work, to clean and tidy test rooms and laboratories, and to maintain cleanliness.

A operation and maintenance instruction manual will be prepared on the following principal items and will be submitted to the BORIF administrative sector when the buildings and equipment are delivered upon completion.

(1) Items related to building

- 1) Checking and repair of cracks on exterior walls.
- 2) Checking painting on steel members.
- 3) Checking aluminum roofs.
- 4) Checking roof waterproofing.
- 5) Fitting hardware adjustment.
- 6) Checking and cleaning ditches and manholes.
- 7) Cleaning surfaces of greenhouse glass.

(2) Items related to equipment

- I) Electrical installation
 - 1) Lighting outlets
 - 2) Distribution board and control panels
 - 3) Private power generation equipment (Generator)
 - 4) Voltage stabilizer
- II) Air conditioning and ventilation equipment
 - 1) Cleaning and replacing filters.
 - 2) Cleaning air blow outlets and suction inlets.
 - 3) Blowers and ventilators.

III) Water supply and drainage equipment and sanitary equipment

- 1) Water leakage and corrosion of pipes, etc.
- 2) Checking water drainage and infiltration equipment
- 3) Cleaning water receiving tanks (existing).

IV) Firefighting equipment

- 1) Fire extinguishers.
- 2) Outdoor hydrants.

6-1-2 Operation and maintenance of equipment

Equipment models that are easy to provide operation and maintenance based on the basic policies mentioned in paragraph 4-1-2 will be selected. Large analytical equipment, etc. will be selected only if trading companies, manufacturers, etc. of such equipment have agents in Indonesia with an established network for after sale services in order to provide sufficient after sale services in Indonesia.

The technical guidance to use, the equipment properly by the specialists sent from Japan under project type technical cooperation provided by Japan at present, will give the longevity of equipment, and BORIF already prepared, the maintenance such as exchange of parts, servicing and repairing of the equipment operationally and budgetary. Therefore the system of operation and maintenance of equipment in the facilities will present no problems.

A operation and maintenance instruction manual will be prepared on the following principal items and will be submitted to the BORIF administrative sector when the buildings and equipment are delivered upon completion.

- (1) Replacing active carbon filter of auto still (Every 3 to 4 months)
- (2) Replacing carbon brush of supercentrifuge for separation (Every 6 months)
- (3) Replacing membrane filter of auto still (Every 6 months)
- (4) Replacing oil in vacuum pump of freeze dryer (Every 1 to 1.5 years)
- (6) Checking and retightening gas pipe joints of gas chromatograph and atomic absorption photometer (Every 1 to 1.5 years)
- (7) Replacing ion exchange resins of auto still and cleaning scale in boilers (Every 1 to 1.5 years)

These frequencies differ depending on the operating cycles and durations of the equipment.

6-2 Operation and Maintenance Cost

The expense needed to operate the facilities under this project and operation and maintenance cost of it shall be defrayed by the BORIF budget. The annual operation and management cost of this project is estimated to be as follows based on the annual maintenance cost of the BORIF and data gathered by the study team:

Personnel cost	.....	6,900,000 Rp
Electricity	.....	16,080,000 Rp
Telephone	.....	3,600,000 Rp
Fuels	.....	1,300,000 Rp
Transportation	.....	540,000 Rp
Research and development	.....	87,360,000 Rp
Facility and equipment maintenance	.....	1,200,000 Rp
Other expense (10% of the foregoing items)	.....	11,698,000 Rp
Total		128,678,000 Rp

The personnel cost mentioned above is for 9 administrative staff members, and the personnel cost of researchers will be defrayed by the BORIF budget (refer to section 2-4).

The annual operation and maintenance cost of the facilities under this project represents approximately 1.8% of the total CRIFC budget.

CHAPTER 7 PROJECT EVALUATION

CHAPTER 7 PROJECT EVALUATION

The Government of Indonesia is implementing various measures to increase food production to attain self-sufficiency of food demand and supply. Thanks to the efforts made by the government and farmers, recently, demand and supply of rice, which is the staple food of Indonesia, has reached the level of self-sufficiency.

Nevertheless, the production of Palawija crops needed to improve the nutrition level of the Indonesian people and to diversify intake of nutrition such as protein and minerals, is not sufficient to meet the demand, and an increase in the production is strongly desired.

Several problems exist hampering increase in the production such as a shortage of certified seeds, economical disease and pest control measures, quantitative and qualitative losses that occur during the post-harvest process, review of the cropping system, and market function of products. These problems are the reasons why the production of Palawija crops does not increase in Indonesia. Much hope is placed on pioneering research of Palawija crops to solve these problems.

The implementation of this project, which is designed to build buildings and to provide equipment for pioneering research of Palawija crops and to increase the production of Palawija crops utilizing such buildings and equipment, can be evaluated as extremely opportune under this background.

1. Project Effects

This project will bring about the following effects to the republic of Indonesia.

(1) Direct effects

- 1) Contribution to research of Palawija crops of the Republic of Indonesia
 - a) Strengthening of test research functions
 - b) Improvements in test and research technology
- 2) Stronger interchanges with other research organizations regarding test and research methods

(2) Indirect effects

Research of Palawija crops by utilizing this buildings and equipment and contribution to an increase in the production of Palawija crops by such research results will bring about the following indirect effects to the national economy of the Republic of Indonesia:

1) Stable supply of foods

An increase in the production of Palawija crops will not only increase the income of farmers, but will also assure a supply of food to the people and to improve and diversify the nutrition level.

2) Improved trade balance

The increase in the production of Palawija crops will save foreign exchange spent in importing soybeans, etc. An increase in export of cassava chips and pellets, which are exported at present, is expected to earn more foreign currency for Indonesia.

2. Appropriateness of the Project

The CRIFC, which will implement this project, has the BORIF under its jurisdiction. The CRIFC has a large number of researchers and its research technology and volition are also high.

Nevertheless, the existing facilities and equipment are not adequate, and the CRIFC is unable to fully exhibit its ability.

The proposed buildings and equipment under this project are appropriate judging from the financial and technical levels of Indonesia, and there is no doubt that the buildings and equipment will be fully utilized. Japanese specialists are conducting cooperative research with Indonesian researchers in various research fields, and the effects can be expected to amplify.

The Government of Indonesia regards this project as a most preferential project and has taken steps to ensure the involvement of the CRIFC in this project under the supervision of the AARD. The Government of Indonesia has initiated actions to set up an organizational structure to operate, operate and maintain the project and to provide a budgetary appropriation.

Given these considerations and implemented in such circumstances, this project is expected to greatly contribute to the development of agriculture in Indonesia and to further cement the friendly relationship between Indonesia and Japan which is already sound and secure.

CHAPTER 8 CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 8 CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions

In view of the importance of agriculture to Indonesia, the Government of Indonesia is giving a high priority to the agricultural research and development sector, and this project falls into this category.

The contribution by research results of Palawija crops by this project to increase the production of Palawija crops will greatly enhance a stable supply of food for Indonesia and diversification of nutrition intake of the Indonesian people.

The Republic of Indonesia has already made preparations to execute and operate this project.

Under the circumstances, this project can be recognized as truly essential to the Republic of Indonesia and is suitable to apply the framework of the grant aid cooperation by Japan. It is considered desirable that this project be executed urgently.

2. Recommendations

The following is recommended to the Government of Indonesia so that the buildings and equipment by this project will effectively function and serve their purposes:

- (1) To form a joint steering committee within the BORIF to prepare an annual research plan for study that will use the facilities in order to effectively utilize the Palawija crop research buildings and equipment.

- (2) To conduct research after determining overall and mutually-cooperative research subjects and goals. These subjects cover various research sectors in order to analyze the complex and diverse problems of Palawija crops. In addition, research has also been conducted for individual research sectors, parallel with the construction of the facilities.
- (3) To adequately operate and maintain the buildings and equipment built and supplied as part of this project for continued utilization over as long a period of time as possible.
- (4) This project is also related to the technical cooperation now being enjoyed by the two countries and must progress as planned. For this reason also, appropriate budgetary measures by the Government of Indonesia are recommended.

CHAPTER 9 APPENDICES

CHAPTER 9 APPENDICES

- (1) Basic Design Study Team
 - (a) Minutes of Discussions
 - (b) Study Schedule
 - (c) Member of the Study Team

- (2) Basic Design Study (Draft) Team
 - (a) Minutes of Discussions on the Draft Final Report
 - (b) Study Schedule
 - (c) Member of the Study Team

- (3) List of Persons Visited

- (4) The Other Appendices
 - (a) The Organization Chart of AARD
 - (b) The SEKNEG Committee
 - (c) Table-1 The Production Cost of Food Crops
 - (d) Table-2 The Current Foreign Aid for CRIFC
 - (e) Meteorology in Bogor
(Meteorological data by month from MUARA)
 - (f) The Boring Data in the Existing Facilities

- (1) Basic Design Study Team
(a) Minutes of Discussions

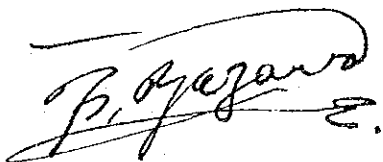
MINUTES OF DISCUSSIONS ON
THE CONSTRUCTION PROJECT OF FACILITIES FOR
STRENGTHENING OF PIONEERING RESEARCH FOR
PALAWIJA CROPS PRODUCTION
(ATA-378)
IN THE REPUBLIC OF INDONESIA

In response to the request of the Government of Indonesia, the Government of Japan decided to conduct a basic design study on the Construction Project of Facilities for Strengthening Pioneering Research for Palawija Crops Production (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Indonesia the Basic Design Study Team headed by Mr. Fumio YAZAWA, Chief Researcher, Tropical Agriculture Research Center, Ministry of Agriculture, Forestry and Fisheries (hereinafter referred to as "the Team"), from October 1 to October 21, 1986.

The Team had a series of discussions on the Project with the authorities concerned of the Government of the Republic of Indonesia and conducted a field survey in the Bogor area.

As a result of the study, both parties agreed to recommend to their respective Governments that the major points of understanding reached, between them, attached herewith, should be examined for the realization of the Project.

Jakarta, October 9, 1986




Mr. Fumio YAZAWA
Team Leader
Basic Design Study Team
Japan International
Cooperation Agency,
Japan



Dr. Ibrahim Manwan
Secretary
Agency for Agricultural
Research and Development
Ministry of Agriculture
Republic of Indonesia

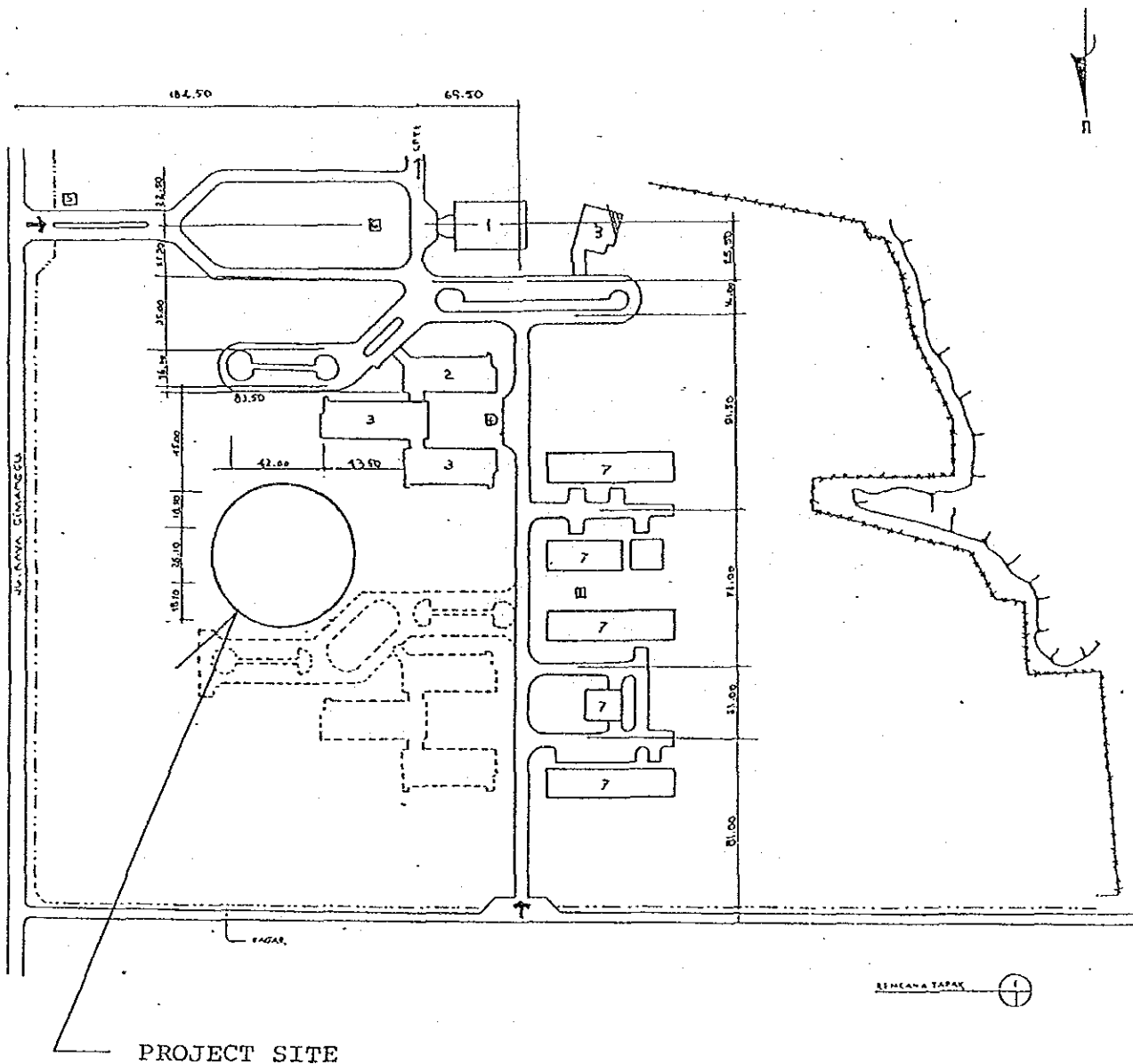
ATTACHMENT

1. The objective of the Project is to construct facilities for Strengthening of Pioneering Research for Palawija Crops Production aiming at developing appropriate technology for palawija crops (soybean, peanut, corn and sweet potato) production through pioneering research, thus contributing to the rapid progress of modern agricultural research for the development of Indonesia.
2. The Project is located at Bogor Research Institute for Food Crops (BORIF) Jalan Cimanggu 3, Bogor, Indonesia. (Site map is attached as Annex 1).
3. Central Research Institute for Food Crops (CRIFC) will execute the Project, under the supervision of the Agency for Agricultural Research and Development, Ministry of Agriculture.
4. The Project is to promote the Pioneering Research activities as follows:
 - (1) To improve seed quality
 - (a) Production techniques for high quality seeds
 - (b) Techniques for maintaining high quality and high viability of seeds
 - (c) Disease and pest management
 - (2) To improve palawija crops production techniques under diversified cultivation conditions.
 - (a) Improvement of crop adaptability and productivity
 - (b) Plant nutrition improvement technology
 - (3) To improve palawija crops production by biological techniques
 - (a) Utilization techniques of micro-organism agent including biological N-fixation technology
 - (b) Use of tissue culture
5. The Japanese Study Team will convey to the Government of Japan the desire of the Government of Indonesia that the former takes necessary measures to cooperate by providing the buildings and equipment listed in Annex II within the scope of Japanese economic cooperation programme in Grant Aid form.
6. The Indonesian side has understood Japan's Grant Aid System explained by the Team which includes a principle of use of a Japanese Consultant Firm and a General Contractor for the construction.
7. The Government of Republic Indonesia will take the necessary measures listed in Annex III on the condition that the Grant Aid would be extended to the Project.



ANNEX I

BORIF COMPLEX



PROJECT SITE

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ANNEX II

The buildings and equipment requested to be provided by the Government of Japan are the following:

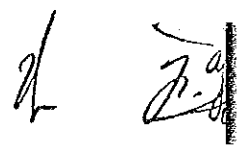
1. Buildings

- 1) Seed test laboratory with
 - Working table for germination test
 - Germination room
 - Room/space for racks
- 2) Observation room with benches
 - Sterilization rooms for
 - Microbiology
 - Tissue culture
- 3) Nitrogen fixation laboratory
- 4) Room with
 - Controlled temperature
 - Built in fluorescence
 - Automatic time clocks
- 5) Room for
 - Working collection of seeds
 - Low temperature and low humidity
- 6) Incubation room
- 7) Growth chamber room
- 8) Collection room for
 - Seed samples
 - Microbiology
- 9) Instrument rooms for
 - Fine instruments
 - Oven, centrifuge, etc.
- 10) Balance room
- 11) Workshop
- 12) Sample reception room with benches
 - Sample preparation room with benches
 - Kitchen with
 - Sand container
 - Sand mixing bunker
 - Waste sand bunker

- 13) Staff rooms
- 14) Meeting room
- 15) Washing area
Lead line to resist acids and alkalis, with hot and cold water
- 16) Store rooms for
 - Glassware and others
 - Chemicals
 - Gas cylinder (tank)
- 17) Glasshouse
- 18) Administration room
- 19) Electric power supply facilities
- 20) Water supply facilities
- 21) Others

2. Equipment

- 1) Microscope
- 2) Ventilating dryers
- 3) Clean benches
- 4) Automatic Gas Chromatography
- 5) Incubator
- 6) Nitrogen Auto Analyzer
- 7) Freezer
- 8) Refrigerator
- 9) Fume hood
- 10) Drying oven
- 11) Autoclave
- 12) Spectrophotometer
- 13) Ultra Centrifuge
- 14) Auto still



- 15) Moisture tester
- 16) Seed blower, seed counter, seed cleaner
- 17) Shaker for tissue culture
- 18) Microtome
- 19) Freeze dryer
- 20) Flame photometer
- 21) Cold storage
- 22) Cabinet for germination
- 23) Atomic absorption
- 24) Seed preparation apparatus
- 25) Balances
- 26) Others



ANNEX III

The facilities and services to be provided by the Government of the Republic of Indonesia are the following:

1. To secure the site for the Project;
2. To clear, level and reclaim the site prior to commencement of the construction;
3. To construct the access road to the site prior to commencement of the construction;
4. To undertake incidental out-door works such as gardening, fencing, gates and exterior lighting in and around the site;
5. To provide facilities for distribution of electricity, telephone, drainage and other incidental facilities to the Project site;
 - 1) Electricity distribution line to the site
 - 2) Drainage city main to the site
 - 3) Telephone trunk line to the main distribution panel of the building
 - 4) Furniture (tables, chairs and others), carpets, curtains, and others.
6. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement;
7. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation;
8. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Indonesia with respect to the supply of the products and services under the verified contract;
9. To ensure prompt unloading and customs clearance at ports of disembarkation in Indonesia and internal transportation therein of the products purchased under the Grant Aid;
10. To accord Japanese Nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into Indonesia and stay therein for the performance of their work;

11. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant Aid; and
12. To bear all the expenses including V.A.T. (Value Added Tax) other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.

Handwritten signature

(b) Study schedule

- October 1 (Wednesday) Flight Tokyo to Jakarta via JL721
Discussion with Deputy Director Sato of JICA
Indonesia Office on itinerary
- October 2 (Thursday)
- Morning: Courtesy visit to Director Endo and Deputy
Director Sato of JICA Indonesia Office, on
First Secretary Motoyama of Japanese Embassy,
and Mr. Rusnadi Ridwan of BAPPENAS (in charge
of agriculture and irrigation).
- Afternoon: Courtesy visit to Director Prof. Dr. Gunawan
Satari of AARD. Travel at Bogor.
- October 3 (Friday)
- Morning: Courtesy visit to Dr. Sridodo, Planning
Manager, CRIFC, and Director Dr. M.
Ismunadji, BORIF. Study of project site.
- Afternoon: Discussion among team members
- October 4 (Saturday)
- Morning: Overall meeting with staff of CRIFC and BORIF
and specialists sent by Japan (Team leader
Goto and 4 team members) at the CRIFC.
- Afternoon: Discussion among team members
- October 5 (Sunday) Discussion among team members, study of data,
and study of project site.

October 6 (Monday)

Morning: Separate discussions between CRIFC and BORIF staff and Japanese team of specialists sent to Indonesia at the CRIFC.

Afternoon: Tour of BORIF existing facilities and Bogor Agricultural University

October 7 (Tuesday)

Morning: Discussion with staff of the CRIFC and BORIF
Study of construction situation at Ministry of Public Works

Afternoon: Tour of Veterinary Drug Assay Laboratory (Gunung, Sindur) and Center for Development of Appropriate Agricultural Engineering Technology (SERPONG)
Travel to Jakarta

October 8 (Wednesday)

Morning: Discussion at the AARD regarding Minutes of Discussion (Members Yazawa, Niwa, and Komuro)
Study of construction situation

October 9 (Thursday)

Morning: Discussion at the AARD regarding Minutes of Discussion (Members Yazawa, Niwa, Sugi, and Komuro)

Afternoon: Signing of the Minutes of Discussion
Study of construction situation

October 10 (Friday)

Morning: Discussion among team members

Afternoon: Study of construction situation

October 11 (Saturday)

Morning: Reporting to JICA Indonesia office and to Japanese Embassy (Members Yazawa and Niwa)

Afternoon: Government team members departed Jakarta
Study of construction situation

October 12 (Sunday)

Travel to Bogor.
Study of construction situation

October 13 (Monday)

Morning: Discussion with researchers regarding construction and equipment at the BORIF.
Discussion with specialists sent from Japan regarding research subjects and equipment

Afternoon: Study of construction situation

October 14 (Tuesday)

Study of construction situation and gathering of data

October 15 (Wednesday)

Morning: Discussion at the BORIF regarding construction and equipment

Afternoon: Study of the project site. Study of construction situation. Gathering of data

October 16 (Thursday)

Morning: Study of the project site and construction situation. Final discussion at the BORIF. (Member Izumi traveled to Jakarta to study construction situation and to gather data.)

Afternoon: Gathering of data

October 17 (Friday)

Morning: Visit to Dr. Rohali Sani (in charge of consultants), SEKNEG (Members Sugi and Komuro) Study of construction situation (Izumi)

Afternoon: Tour of Center for Pests and Disease Forecasting Control (JATISARI) by member Suzuki.
Gathering of data.

October 18 (Saturday)

Morning: Gathering of data (Members Sugi, Komuro, and Suzuki)

Afternoon: Tour of Center for Development of Appropriate Agricultural Engineering Technology (SERPONG) by member Suzuki. Member Suzuki travels to Jakarta
Members Sugi and Komuro travel to Jakarta
Study of construction situation (Member Izumi)

October 19 (Sunday) Data gathering and sorting

October 20 (Monday) Gathering of data. Report of survey outline to Presentative Endo, Deputy Resident Presentative Sato, and Mr. Etsuro Kagai of JICA Indonesia Office and to First Secretary Motoyama of Japanese Embassy. Departure from Jakarta to Tokyo via JL722.

October 21 (Tuesday) Arrival in Japan

(c) Member of the Study Team

Mr. Fumio Yazawa	Team Leader Chief Researcher Tropical Agriculture Research Center Ministry of Agriculture, Forestry and Fisheries
Mr. Noriaki Niwa	Project Coordinator First Basic Design Study Division Grant Aid Planning & Survey Department Japan International Cooperation Agency
Mr. Shigehiko Sugi	Chief Architect Shigehiko Sugi & Architects Inc.
Mr. Hidekazu Komuro	Instrumental Technologist Shigehiko Sugi & Architects Inc.
Mr. Shinichi Izumi	Architect Shigehiko Sugi & Architects Inc.
Mr. Hiroshi Suzuki	Architect Shigehiko Sugi & Architects Inc.

(2) Basic Design Study (Draft) Team

(a) Minutes of Discussions on the Draft Final Report

MINUTES OF DISCUSSIONS

ON

THE DRAFT REPORT OF THE BASIC DESIGN STUDY

ON

THE CONSTRUCTION PROJECT OF FACILITIES FOR STRENGTHENING
OF PIONEERING RESEARCH FOR PALAWIJA CROPS PRODUCTION (ATA-378)

IN

THE REPUBLIC OF INDONESIA

In response to the request of the Government of the Republic of Indonesia for Grant Aid for the Construction Project of Facilities for Strengthening of Pioneering Research for Palawija Crops Production (hereinafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Republic of Indonesia the study team from October 1 to October 20, 1986.

As a result of the study, JICA prepared a Draft Report and dispatched a mission to explain and discuss it from January 19 to January 26, 1987.

The mission had a series of discussions on the Draft Report with the authorities concerned of the Government of the Republic of Indonesia.

Both sides have agreed to submit to their respective Governments that the major points of understanding reached between them attached herewith, should be examined for the realization of the Project.

Jakarta, January 26, 1987



Mr. Noriaki NIWA
Team Leader,
JICA Study Team



Dr. Ibrahim Manwan
Secretary
Agency for Agricultural
Research and Development
Ministry of Agriculture

ATTACHMENT

1. Both sides agreed to reconfirm the Minutes of Discussions which was mutually signed on October 9, 1986.
2. The Indonesian side agreed in principle to the basic design proposed in the Draft Report and appropriate alternations agreed by both sides during the discussions will be incorporated in the Final Report.
3. The Indonesian side will take the necessary responsibilities for the realization of the Project on conditions that the Japan's Grant Aid Program will be extended to the Project.
4. The Final Report (10 copies in English) will be submitted to Indonesian side in March 1987.

(b) Study schedule

January 19 (Monday) Flight to Jakarta via JL721
Discussion with Mr. Aiba of JICA Indonesia
Office and Mr. Okuda, Japanese specialists,
about deliveration on the schedule.

January 20 (Tuesday)

 Morning: Courtesy visit to JICA Indonesia Office
 First, Secrtary Suzuki of Japanese Embassy,
 and Mr. Ir. Sani, Mr. Ir. Koesmitro of SEKNEG

 Afternoon: Courtesy visit to AARD
 Discussion in JICA Indonesia Office
 Economic study

January 21 (Wednesday)

 Morning: Observation in the Indonesian Consultant
 Office

 Afternoon: Discussion with Dr. Rachman of BAPENASS
 Meeting among Japanese specialists team

January 22 (Thursday)

 Morning: Courtesy visit to Dr. Sridodo of CRIFC and
 Prof. Dr. Satari of AARD (in Bogor)

 Afternoon: Supplementary study of project site
 Discussion with Japanese specialists
 gathering the data in JICA Indonesia Office

January 23 (Friday)

Morning: Explanation of study report to CRIFC, BORIF
and discussion

Afternoon: Separate discussions with BORIF staff
Courtesy visit to JICA Indonesia Office

January 24 (Saturday)

Morning: Economic supplementary study

Afternoon: Report to Director Endo of JICA Indonesia
Office

January 25 (Sunday): Compiling data and information, etc.

January 26 (Monday): Discussion with Dr. Rachman of BAPPENAS
(Going together Dr. Sridodo)
Signing of the Minutes of Discussion
Jakarta → Tokyo by JL722

January 27 (Tuesday): Arrival in Japan

(c) Member of the Study (draft) Team

Mr. Noriaki Niwa Team Leader
First Basic Design Study Division
Grant Aid Planning & Survey Department
Japan International Cooperative Agency

Mr. Shigehiko Sugi Chief Architect
Shigehiko Sugi & Architects Inc.

Mr. Hidekazu Komuro Instrumental Technologist
Shigehiko Sugi & Architects Inc.

(3) List of Persons Visited

1) AARD

Prof. Dr. Gunawan Satari	Director General
Dr. Ibrahim Manwan	Secretary
Ms. Paransih Isbagio	International Cooperation Manager

2) CRIFC

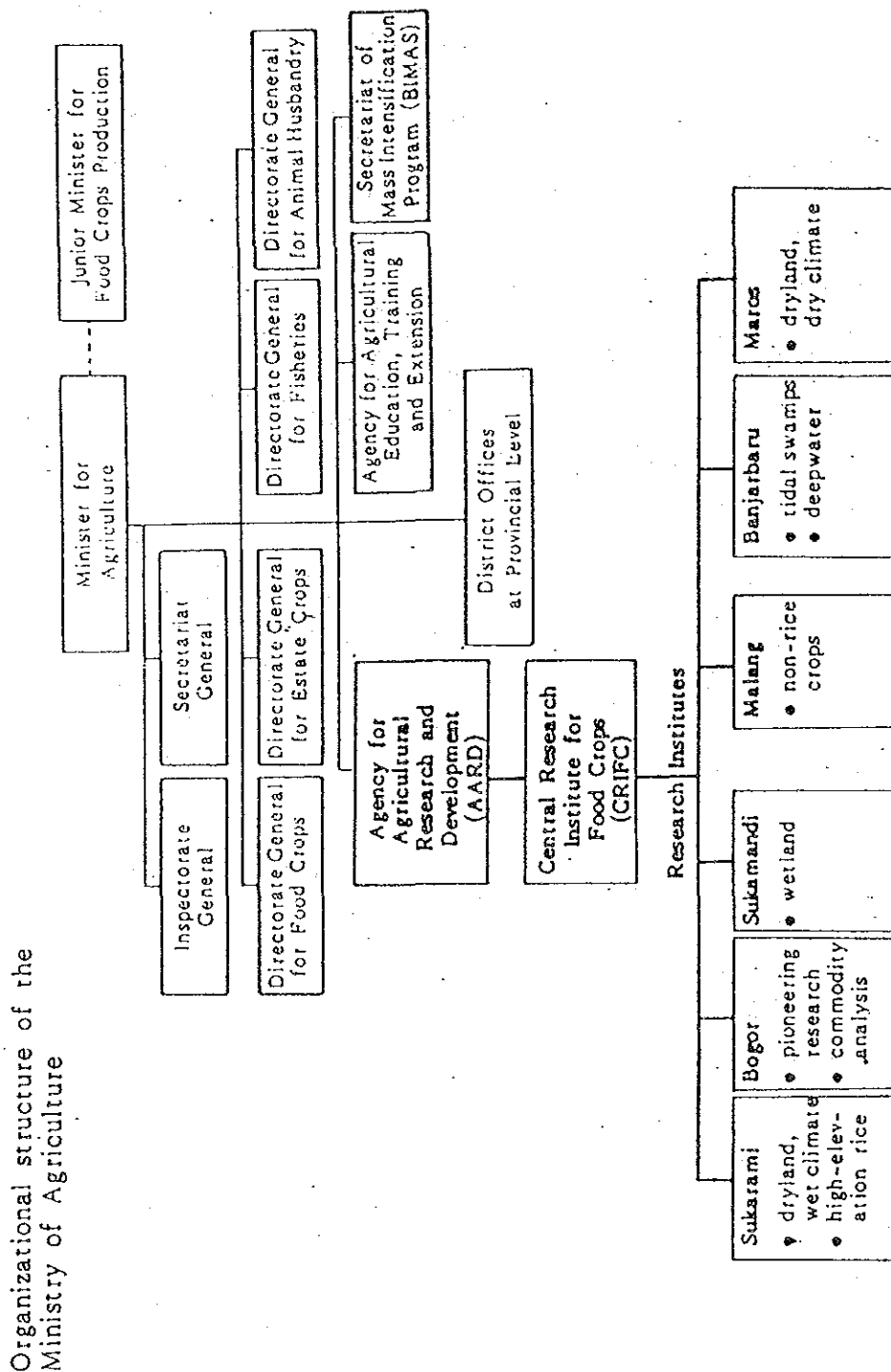
Dr. B.H. Siwi	Director
Dr. Sridodo	Planning Manager
Ir. Abdullah Prawirosamudro	Research Facility Manager
Mr. Luckman Nol Hakim	Research Communication
Mr. S.O. Manurung	Research Communication
Mr. M. Fatchurochim	

3) BORIF

Dr. M. Ismunadji	Director
Dr. Z. Harahap	Breeding Manager
Dr. Fathan Muhadjir	Plant Physiology Manager
Dr. D.M. Tantera	Plant Pathology Manager
Ir. Soetjipto Ph.	Agronomy Manager
Mr. M. Hatta Doeni	Administration Manager
Mr. Sadikin Somaatmadja	Palawija Coordinator
Mr. J. Soepriaman	Plant Physiology
Mr. A. Husni Malian	Economics
Mr. M. Tambunan	Project Leader
Mr. Suprpto Sumadi	Research Communication
Mr. Gayatri B.	Plant Breeding
Mr. Tateng Sutarman	Plant Breeding
Mr. Rasti Saraswati	Plant Physiology

(4) The Other Appendices

(a) The Organization Chart of AARD



(b) The SEKNEG Committee

TEAM TPP 10

No.	Name and Staffs	Position
1.	IR. SONI HARSONO IR. KOESMITRO - Djoko Sediono SH. - Ir. Yusana	- Assistant to Executive Chairman - Contract Document Checking
2.	IR. KUMHAL DJAMIL - Ir. Assianto - Ir. Firmansjah - Ir. Guyub Sagutra	- PERTAMINA - Sea Communication
3.	IR. HANDJOJO N. - Ir. Oyen - Drs. Loedy - Ir. Irwan Roswa	- All Construction Projects - Department of Public Works - Department of Transmigration - All matters relating to aircraft - Air Communication - All matters relating to industries for HANKAM (Defence & Security)
4.	IR. ROHALI SANI - Drs. Safril Mardjuki - Ir. Harimurti	- Consultants - Department of Health - Department of Education & Culture - Tourism, Post & Telecommunication - Department of Industry..
5.	IR. SANTOSO - Drs. Sulistiyo - Ir. Mu'thi Sarbini - Ir. Emir Tantom	- P. L. N. - Department of Mines and Energy - Department of Agriculture - Land Communication
6.	DRS. SUPRAPTO - Ir. Evac Mintaredja - Sumarwoto SH. - Drs. Moh. Hatta	- Project of the Non-Departmental Government Institutions - The report of data about approval/cost minimization - Computer (assisted by Ir. Ichyar Musa)
7.	IR. IZHAR AZIZ Head Bureau of Procurement	Procurement : For instance : Motor vehicles

PROCUREMENT CONTROL TEAM

Chairman : Mr. Soedharmono
(Minister/Secretary of State)

Vice Chairman : Mr. Ginandjar
(Junior Minister/Domestic Product
Promotion)

Mr. Saleh Afiff
(Vice Chairman of BAPPENAS)

Members : Mr. Arifin Siregar
(Governor of Bank Indonesia)

Mr. Jusuf Ramli
(Director General of Budget, Ministry
of Finance)

Mr. Eman Yogasara
(Director General of Basic Metal Industry,
Ministry of Industry)

Mr. S. Harsono
(Assistant to Ministry/Secretary of
State)

Mr. Mochtaruddin Siregar
(Deputy, Economic Affairs, BAPPENAS)

Secretary : Mr. K. Samil
(Secretary to Minister/Secretary of
State)

(c) Table-1 The Production Cost of Food Crops

The cost of Production for Food Crops in 1983

	Paddy	Maize	Soybean	Groundnuts	Cassava	Sweet Potatoes
Income	559,610	229,943	311,375	518,227	400,569	478,549
Total cost	162,029 28.95%	24,281 26.95%	92,747 29.79%	121,118 23.37%	51,344 12.82%	91,619 19.15%
1. Seed	9,198 5.7%	5,655 23.3%	19,879 21.4%	43,774 36.1%	5,046 9.8%	8,602 9.4%
2. Pesticide	3,924 2.4%	148 0.6%	4,883 5.3%	1,246 1.0%	68 0.1%	433 0.5%
3. Pertilizer	23,263 14.4%	1,228 5.1%	7,189 7.7%	10,815 8.9%	6,296 12.3%	10,014 10.9%
4. Hire	11,635 7.2%	586 2.4%	4,157 4.5%	3,195 2.6%	1,399 2.7%	5,471 6.0%
5. Irrigation	2,448 1.5%	-	906 1.0%	1,067 1.0%	72 0.2%	3,033 3.3%
6. Wages	98,086 60.5%	13,925 57.3%	49,170 53.0%	51,725 42.7%	31,593 61.5%	55,594 60.7%
7. Other cost	13,475 8.3%	2,739 11.3%	6,563 7.1%	9,296 7.7%	6,870 13.4%	8,472 9.2%

Central Bureau of Statistics

- Remarks: 1. The unit of above figure is Rupiah per hecter except figure with %.
2. The figure under column of total cost shows the ratio against income.
3. The figure under column of cost item show the ratio against the total cost.
4. Value of production shares, rent (of land) and imputed rent of own land does not include in the cost of production.
5. The Income means production value at farm gate.
6. The product of each crops is valued at term of:
- Paddy dry unhusked kernels
 - Maize dry shelled
 - Groundnuts "
 - Soybeans "
 - Cassava fresh roots
 - Sweet potatoes "

(d) Table-2 The Current Foreign Aid for CRIFC

<u>The Current Foreign Aid for CRIFC</u>					
<u>Project Title</u>	<u>Duration</u>	<u>Donor</u>	<u>Budget</u>	<u>Executing Agency</u>	<u>Objective</u>
Legume Cultivar Selection for Condition after lowland rice and Acid soil	1984 - 87	Canada	Ca.\$213,200	BORIF	To develop high yielding varieties of soybean, mungbean and peanut suitable for lowland rice and acid soil fields.
Farming System Development	1981 - 1988	FAO/UNDP	US\$1,310,000	"	To increase food availability and to improve the socio-economic conditions of the rural farmers by increasing agricultural production and income from integrated farming systems.
The strengthening of Pioneering Research for Palawija Crop Production Project	1986 - 1991	JAPAN	US\$5,053,000	"	To develop appropriate technology on palawija crop production in the fields of seed quality improvement and crop nutrition technology to increase palawija crop production.
Peanut Improvement in Indonesia	1985 - 1989	Australia	Aust.\$39,940	"	To conduct research on genetic adaptation and breeding crop agronomy and water use and plant pathology pathology
Phosphorus and Sulfur Efficiency in Tropical Cropping System	1985 - 1988	"	Aust.\$49,450	"	To study the dynamics of phosphorus and sulfur in upland and flooded cropping areas and to investigate the impact of their deficiencies on nutritional value of food products.
Pigeon Pea Improvement Phase II	1985 - 1988	"	Aust.\$25,000	"	To develop cultivar and production system, plant introduction, genetics, physiology and agronomy

<u>Project Title</u>	<u>Duration</u>	<u>Donor</u>	<u>Budget</u>	<u>Executing Agency</u>	<u>Objective</u>
Preliminary Studies on Bacterial Wilt in South East Asia	1985 - 1989	Australia	Aust.\$12,000	BORIF	To prepare a review of the economic importance, host range, distribution and control of bacterial wilt in Indonesia; to assess the present incidence and reason
Crop Livestock System Research	1985 - 1988	Canada	Ca.\$383,000	"	To develop effective research methodologies of cropping patterns, problem identification and solving in transmigration area
Food, Legume and Course Grain	1982 - 1987	FAO/UNDP	US\$754,000	"	To substantially increase production of food, legume and course grains in order to bridge the gap between growing demand and production.
Drying System for Farmer Group	1983 - 1986	ASEAN-EEC	US\$102,100	SURIF	To evaluate systems at artificial drying technics which are simple and sufficient, and in expensive for farmers to use.
Hybrid Rice Project of Inovative Scientific Research	1982 - 1986	USAID	US\$150,500	"	To improve research capabilities to produce hybrid rice seed in a quantity sufficient to supply farmers.
Improved Grains Legumes Production by Enhanced Nitrogen Fixation	1984 - 1988	USAID	US\$150,000	"	To improve technology application to sustain agricultural productivity; to select and multiply strains of rhizobium.
Strengthening the Malang Research Institute for Food Crops	1988 - 1986	Netherlands	US\$3,300,000	MARIF	To strengthen the institutional capabilities for agricultural research efforts aimed at increased food production and improved economic status of rural East Java.

(e) Meteorology in Bogol
(Meteorological data by month from MUARA)

TABLE 1. MEAN MONTHLY DATA OF
CLIMATIC CONDITIONS
AT MUARA.

Climatic element.	JAN.	FEB.	MARCH	APR	MAY	JUNE	JULY	AUG	SEP.	OCT	NOV	DEC.	ANN.	PERIOD
1. RAIN FALL														
a. Decade I	141	172	160	143	142	72	50	82	104	137	132	123	1508	1972-79.
b. Decade II	156	131	102	171	116	49	41	82	118	71	131	77	1245	1972-79.
c. Decade III.	150	70	162	187	143	85	85	136	137	151	84	133	1523	1972-79.
d. Monthly	447	373	424	501	401	206	176	300	359	359	397	333	4276	1972-79.
e. L T A	411	388	378	422	393	265	205	216	290	437	386	363	4154	1879-1941
f. Prob. 75%	307	288	280	316	292	185	138	147	208	328	287	268	3044	1879-1941
2. TEMPERATURE														
a. Max	28.4	29.0	29.4	30.5	30.6	30.5	30.6	30.8	30.9	31.0	30.7	30.0	30.2	1972-79.
b. Min	21.6	21.7	21.7	21.9	21.8	21.3	21.0	21.2	21.3	21.3	21.8	21.6	21.5	1972-79.
c. Mean	24.6	24.9	25.0	25.8	25.6	25.6	25.4	25.5	25.7	25.8	25.8	25.5	25.4	1972-79.
3. REL. HUMIDITY														
a. Highest	94	94	93	92	93	94	93	92	90	89	90	90	92	1972-79
b. Lowest	81	79	77	72	71	69	68	70	66	66	70	74	72	1972-79
c. Mean	87	85	85	82	81	83	81	82	81	82	83	84	83	1972-79
4. Solar Radiation.														
5. Sunshine	2.38	3.35	3.37	5.25	5.50	6.38	6.41	7.02	6.22	6.23	5.00	4.30	5.18	1972-79
6. Wind Speed	1.2	1.2	1.3	1.2	1.2	1.3	1.5	1.4	1.5	1.5	1.3	1.3	1.3	1972-79
7. Evaporation.	112	95	112	117	121	120	136	136	141	136	126	115	1467	1972-79
8. PET.	50	67	81	89	90	90	102	102	108	102	96	78	1083	1972-79

MUARA

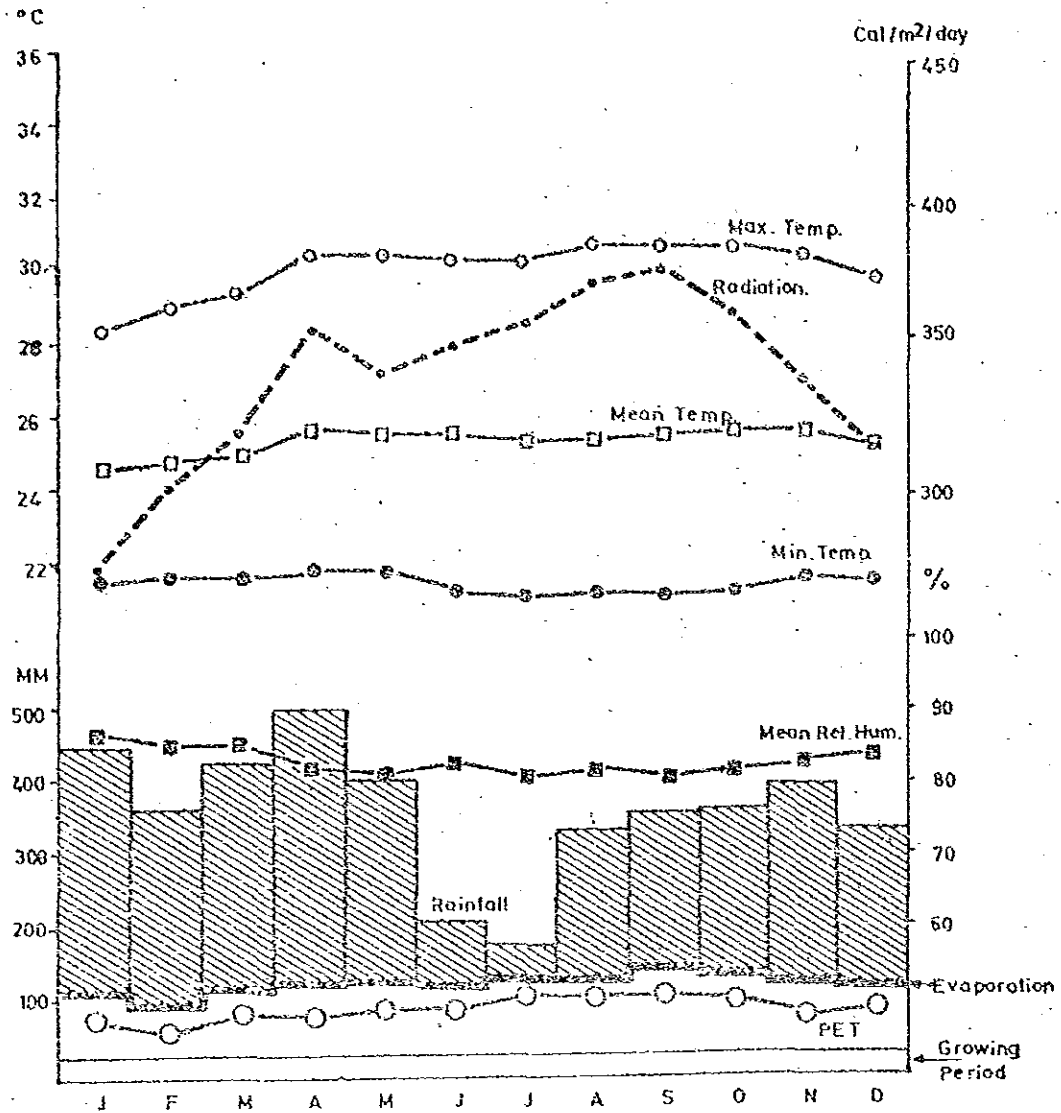
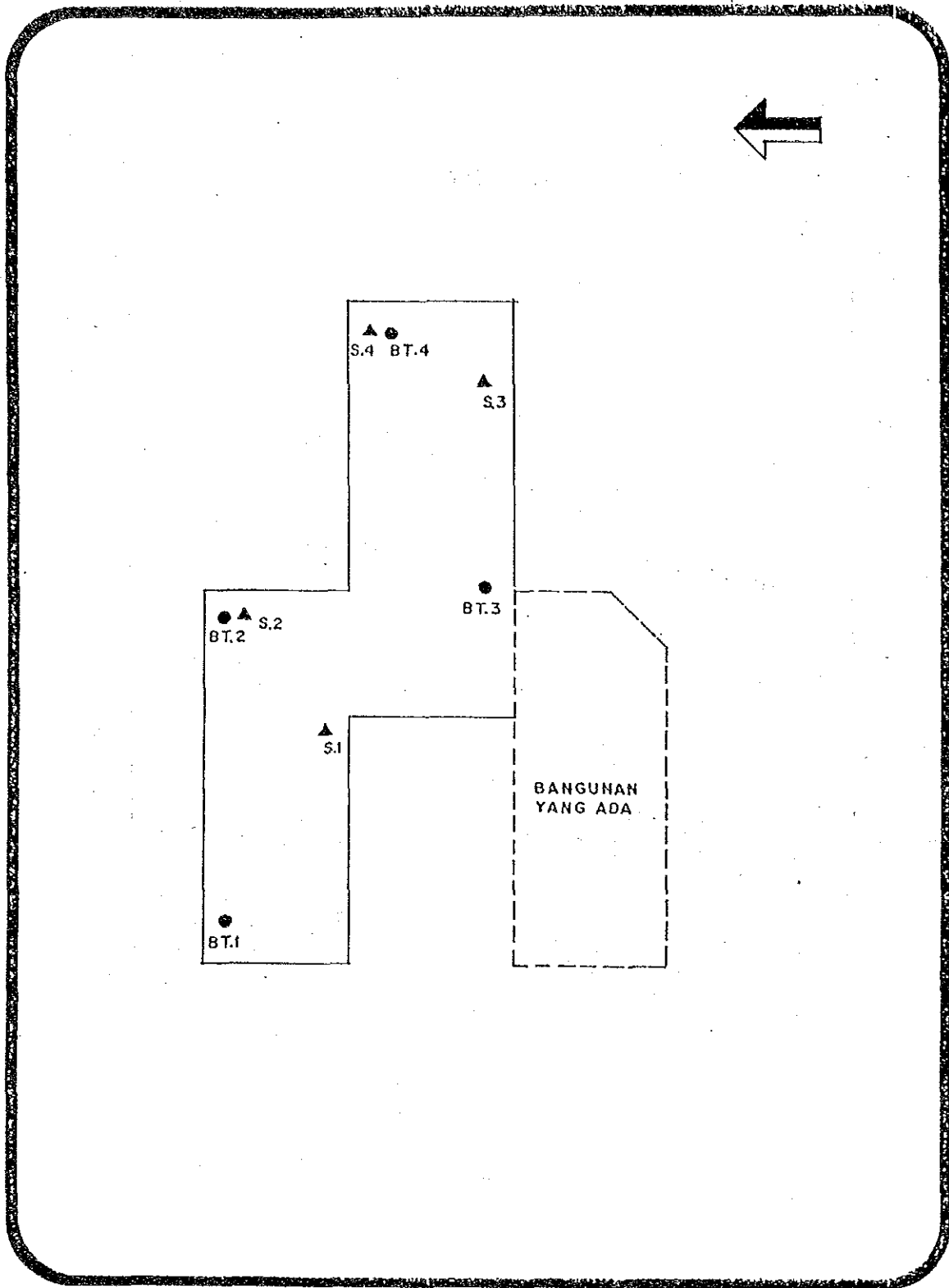


Figure 2. Mean monthly climatic conditions at Muara.

(f) The Boring Data in the Existing Facilities



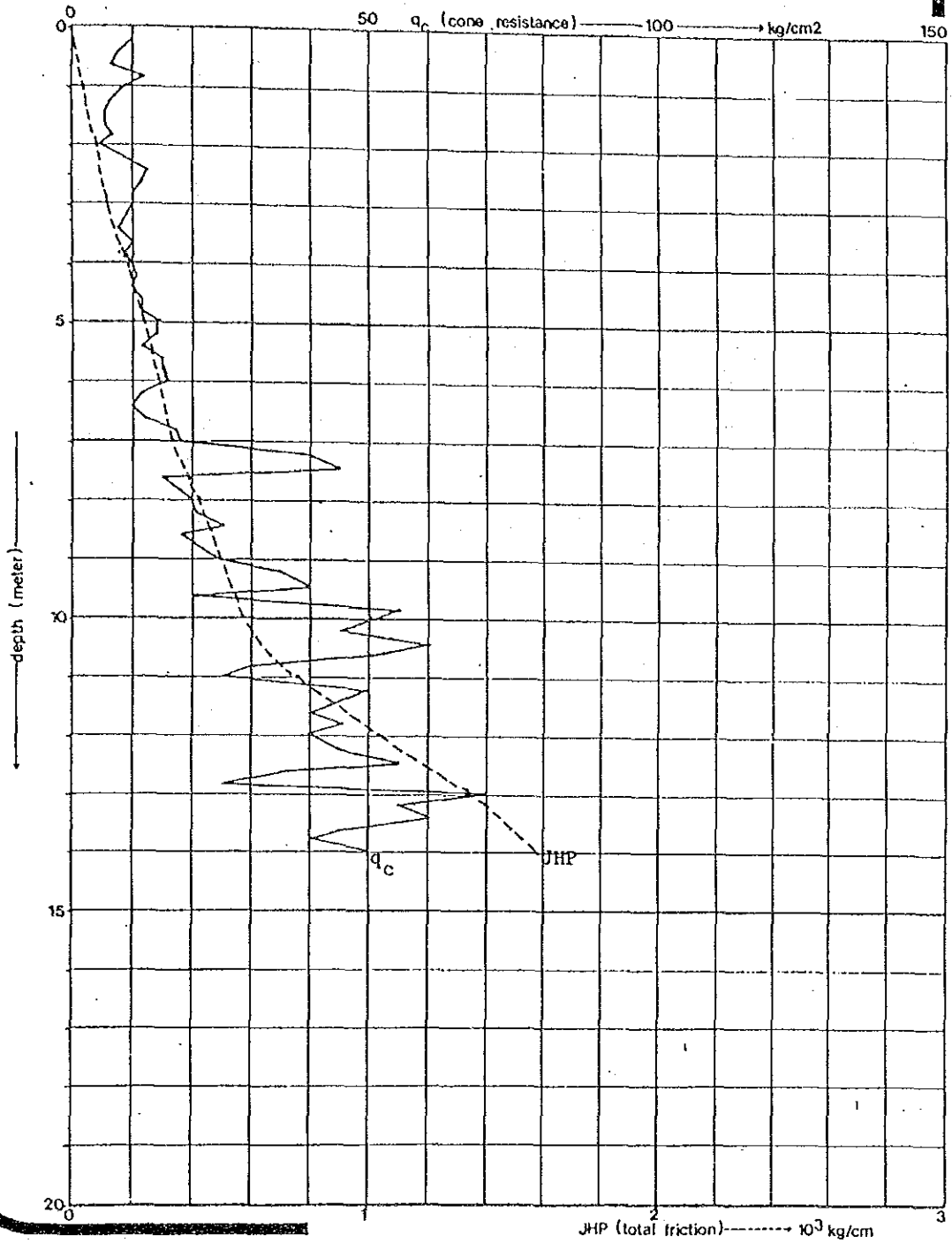
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Project : BALAI PENELITIAN TANAMAN PANGAN

date : 18-12-84.

Location : Jl. Cimanggu, Kabupaten Bogor.

Tested : Agus H.



dee pt.
Bandung - Indonesia







Sounding Diagram

^ S. 1

d₁

PROYEK : BANGUNAN BALAI PENELITIAN TANAMAN PANGAN
 JALAN CIMANGGU, KAB. BOGOR.

bore hole no. : B I

depth m	graph	sample	sample description
1			Inorganic clayey silt, Brown.
2			Inorganic sandy clayey silt, Yellowish brown.
3			Inorganic sandy clayey silt, Yellowish brown.
4			
5			
6			
7			
8			
9			
10			



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Bandung - Indonesia

Boring Log

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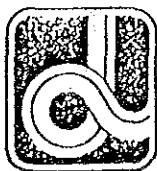
Project : BANGUNAN BALAI PENELITIAN TANAMAN PANGAN, KAB. BOGOR.

B	- 1,00 m	- 2,00 m	- 3,00 m	I
γ	1,51	1,46	1,50	ton/m ³
e	1,89	1,96	1,95	-
s_r	92,30	87,90	89,20	%
w	66,58	66,01	66,64	%
W_L	95,80	95,00	97,60	%
W_p	52,70	51,70	52,00	%
I_p	43,10	43,30	45,60	%
gravel	-	-	-	%
sand	3	15	14	%
silt	73	67	68	%
clay	24	18	18	%
q_{uu}	0,88	0,93	0,91	kg/cm ²
S_t	1,28	1,35	1,32	-
c	0,17	0,17	0,15	kg/cm ²
ϕ	18	19	21	(°)
C_c	0,54	0,68	0,74	-
C_s	0,01	0,02	0,01	-
C_v	$1,90 \times 10^{-3}$	$1,4 \times 10^{-3}$	$1,4 \times 10^{-3}$	cm ² /sec
G_s	2,62	2,61	2,61	-

* NOMENCLATURE :

γ _____ unit weight of soil
 e _____ void ratio
 s_r _____ degree of saturation
 w _____ water content
 W_L _____ liquid limit
 W_p _____ plastic limit
 I_p _____ plasticity index
 q_{uu} _____ undisturbed, unconfined compressive strength

S_t _____ sensitivity
 c _____ cohesion
 ϕ _____ angle of internal friction
 C_c _____ compression index
 C_s _____ swelling index
 C_v _____ coefficient of consolidation
 G_s _____ specific gravity



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Bandung - Indonesia

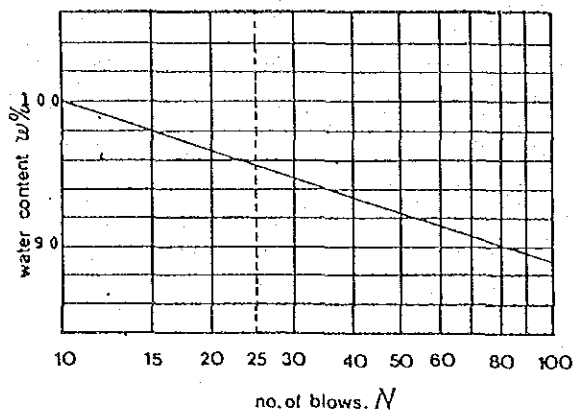
List Of Result
Of Laboratory Testings

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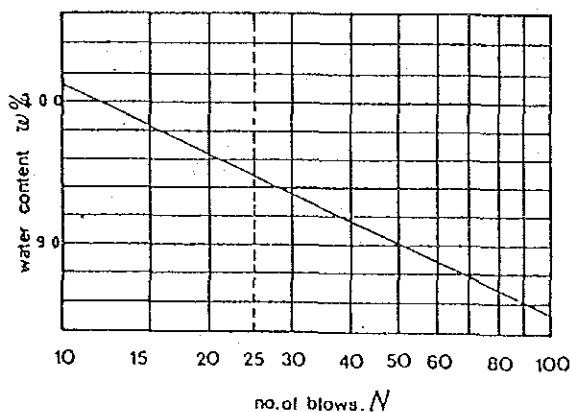
PROYEK : BANGUNAN BALAI PENELITIAN TANAMAN PANGAN

JALAN CIMANGGU, KAB. BOGOR.



BI - 1,00 m

liquid limit	95,80 %
plastic limit	52,70 %
plasticity index	43,10 %



BI - 2,00 m

liquid limit	95,00 %
plastic limit	51,70 %
plasticity index	43,30 %

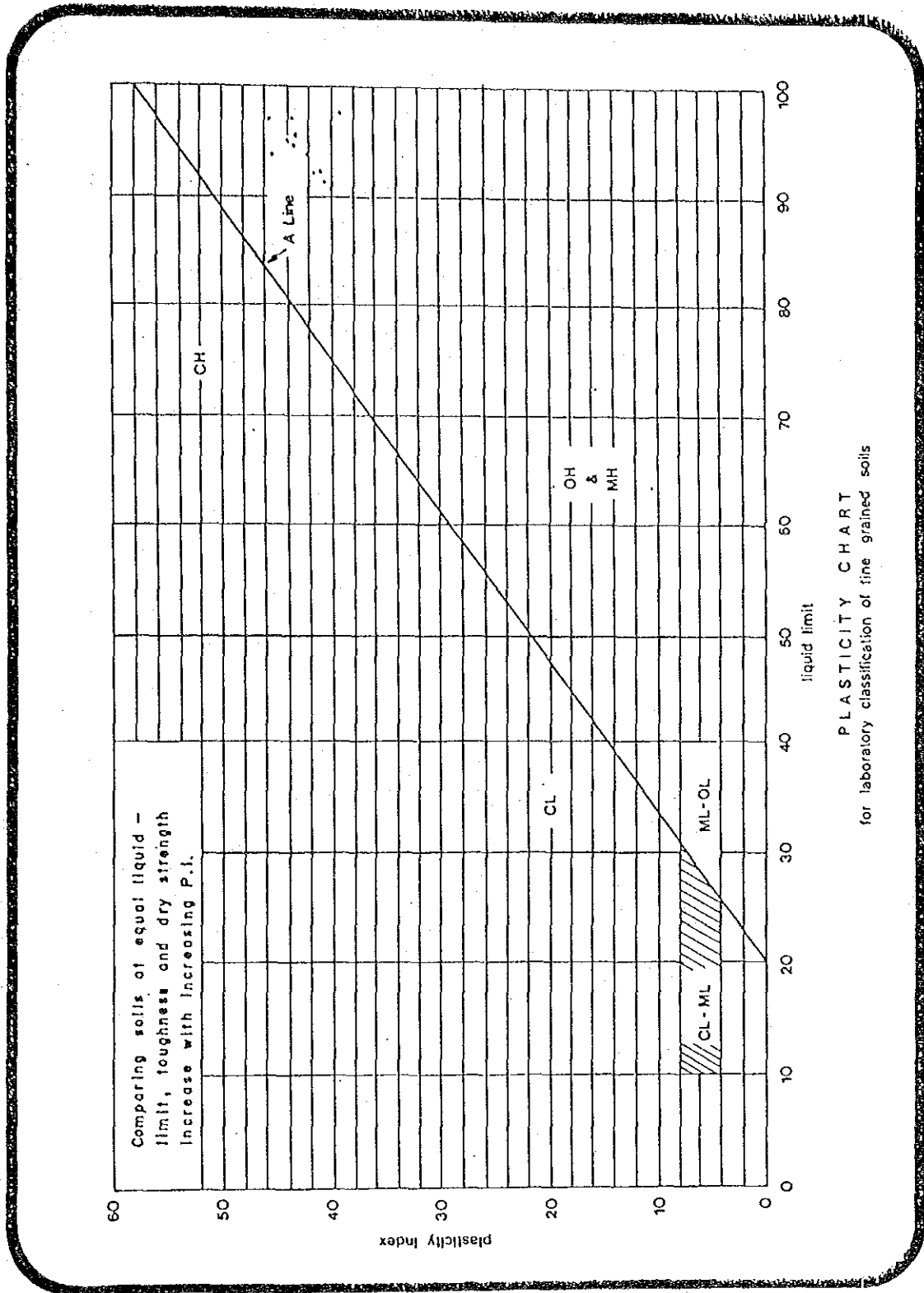


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Arterberg Limits Determination

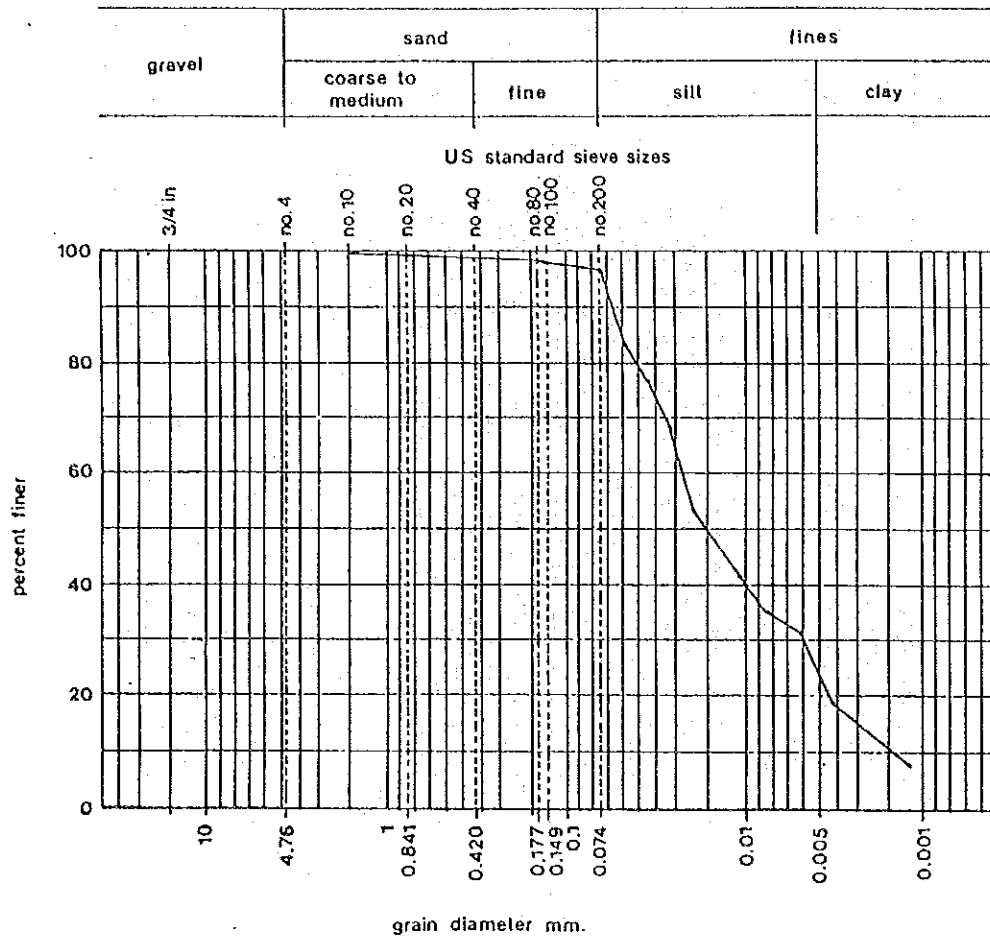
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	<p>dee pt. Bandung - Indonesia</p>	<p>Cassagrande's Chart</p>	<p>d</p>
			<p>19</p>

Project BANGUNAN BPTP Job no. B 01
 Location of project JL. CIMANGGU, KAB. BOGOR Boring/sample no. B I
 Description of soil MH Depth of sample - 1,00 m
 Tested by DCS Date of testing 22-12-84



Visual soil description Inorganic clayey silt, Brown.

Soil classification unified system ASTM D-2487



dee pt.
Bandung - Indonesia

Grain Size Distribution

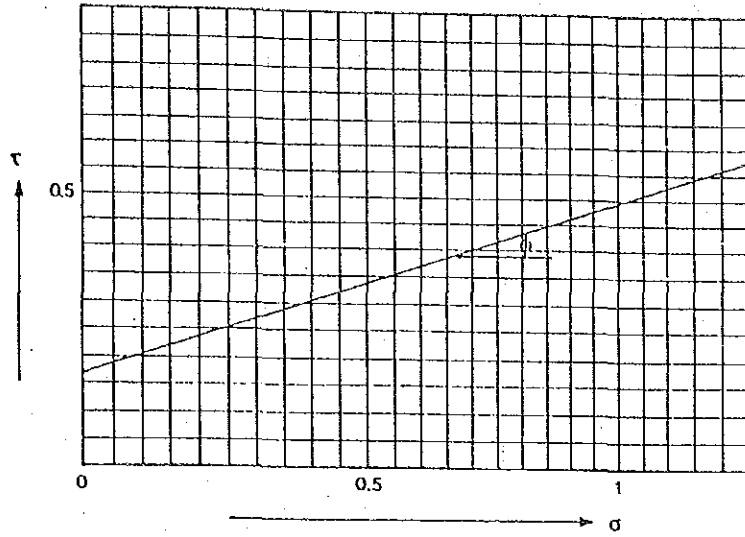
d

20

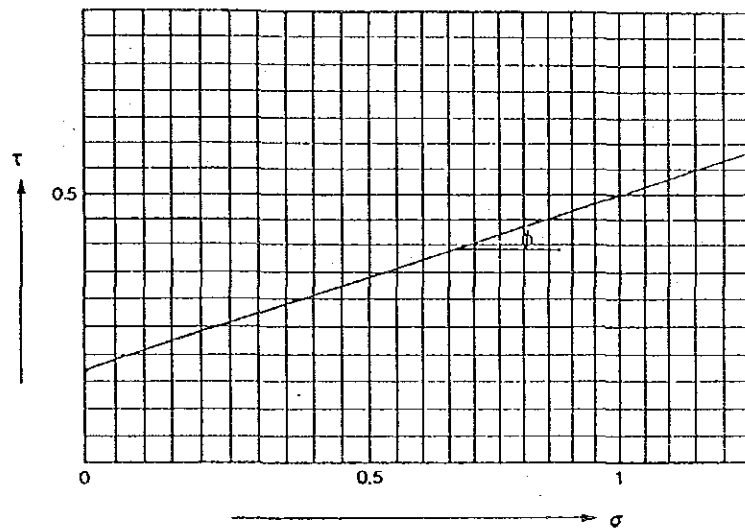
PROYEK : BANGUNAN BALAI PENELITIAN TANAMAN PANGAN

JALAN CIMANGGU, KAB. BOGOR.

(σ & τ in kg/cm²)



BI - 1,00 m ; $c = 0,17$; $\phi = 18^\circ$



BI - 2,00 m ; $c = 0,17$; $\phi = 19^\circ$



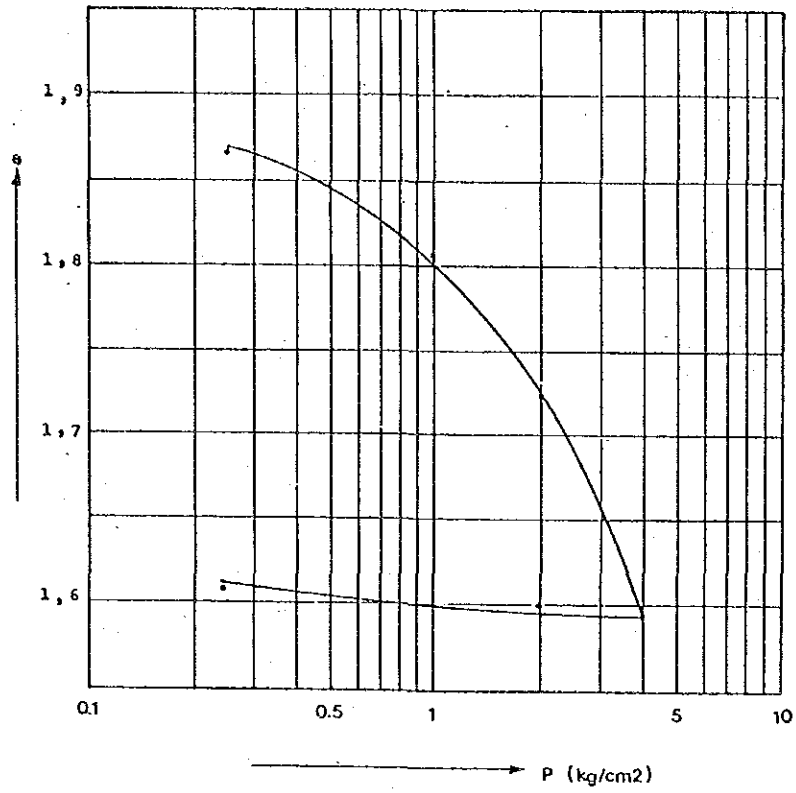
dee pt.
Bandung - Indonesia

Direct Shear Test Result

d

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PROYEK : BANGUNAN BALAI PENELITIAN TANAMAN PANGAN
 JALAN CIMANGGU, KAB. BOGOR.



B I - 1,00 m

$C_c = 0,54$

$C_s = 0,01$



dee pt.
 Bandung - Indonesia

Compression Curve

d

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JICA