4-3 Basic Planning

4-3-1 Site and Layout Plan

(1) Adequacy of the project site

As outlined in 3-3-3, the site is adequate in topography, surrounding environment, and the existing infrastructure. Furthermore, the surface layer of soil at the site is humus soil which will directly affect the experimental breeding of nursery trees at the Center.

(2) Planning of site utilization

Over the entire site area of 5.5 ha, the Center will provide three types of facilities as follows:

① Main Building : Facility to accommodate four sections, for the activities of the Center.

② Support Facilities Building: Facilities to accommodate the ancillary functions to the activities in the Main Building and the orchards.

③ Orchard Facilities: Facilities to permit field work including the production of seeds.

The basic building lots of individual facilities can be classified as outlined below with regard to the three kinds of functions mentioned above:

①	Main Building	: ┐	1.0 ha
②	Support facilities	: ┘	
③	Nurseries	:	1.0 ha
④	Clone banks	:	1.0 ha
⑤	Seed orchard	:	1.0 ha
⑥	Hedge orchard	:	0.2 ha
⑦	Crossing orchard	:	1.0 ha

⑧ Arboretum : 0.3 ha

(3) Plot planning

① The existing 10-meter wide road running along the east side of the project site (the front) is to be broadened to a 21-meter road in the future. Consequently, no facility of any kind will be built within 10.5 meters from the centerline of the road.

② The abovementioned location will therefore be fenced.

③ Based on the specifications of the facilities referred to in (2) above, both the Main Building and the arboretum will be arranged so that they are visible to pedestrians outside.

④ The outdoor orchard facilities will be located in the vicinity of the Main Building close to a group of support facilities for indoor work, for increased work efficiency.

⑤ The outdoor orchard facilities will be located in such a way as to be concealed from pedestrians outside.

⑥ All the facilities will be arranged in conformity to the existing 3% gradient over the entire project site, and to this end, the existing top soil will be graded to create a stepped configuration and to minimize its removal.

4-3-2 Architectural Design

Based on the policies in (2) and (3) above, the details and results of considerations of the plans are as outlined in subsequent paragraphs.

(1) Planar plan (① Main Building)

Prior to developing a detailed planar plan following determination of the scales of individual facilities, consideration was made of buildings with side corridors, middle corridors or a core, resulting

in the details described below. Of these, the side corridor type building was deemed most appropriate.

Consideration of corridor type buildings

	Middle corridor type	Side corridor type	Core type
1. Adaptability to local natural conditions	Insufficient lighting into the corridor, along with its insufficient ventilation will be a vital defect in view of the country's natural conditions.	Although a slightly larger floor area will be required, this type most suits the natural conditions.	This type is greatly inferior to the middle corridor type and is not suitable for the natural conditions.
2. Lighting	Almost no natural lighting into this type corridor is expected.	Both the corridors and the rooms can receive natural lighting throughout the year.	No natural lighting into the core area is expected.
3. Ventilation	Almost no ventilation through this type of corridor is expected.	Both the corridors and the rooms will be properly ventilated.	No ventilation through the core area is expected.
4. Total floor area	This type of corridor requires a slightly larger floor area as in the core type.	This type of corridor tends to require a slightly larger floor area.	Basically, this type requires the minimum floor area.
Evaluation		Optimum	

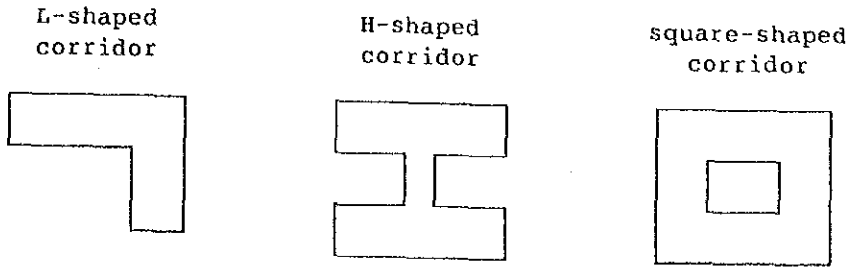
② Consideration of number of stories

Consideration was made of a single-storied building, a two-storied building and a medium-rise building against the entire scale (approx. 2,650m^2) of the main building, and a two-storied building was adopted in view of the parameters; ① the possibility of locating the Center within the authorized construction zone, ② traffic flow lines within the Center facilities, ③ degree of danger in fire prevention, ④ ease of controlling theft, and ⑤ economy. The construction cost of a two-storied main building is inexpensive as well.

③ Study of planar shapes, and results

The following presents the details, and the results of a study made of three patterns of corridor - L-shaped, H-shaped, and square-shaped, which are conceivable in the planning of a one-

sided corridor type two-level facility which can be located within the projected site .



The L-shaped corridor provides continuity to the orchards, the H-shaped corridor provides continuity to the attached facilities, and the square-shaped corridor has the shortest route to any of the facilities. Of the three patterns, the square-shaped corridor is judged to be the most adequate as a whole as it requires the smallest floor area, provides good linkage with all the divisions inside the facilities, as well as being favorable in view of their overall management.

④ Study of research room and laboratory

The following gives the details and results of a study made of three patterns of research room/laboratory combination; one laboratory + one research room (a tie-up pattern), a combined laboratory and research room (a combined pattern), and an in-between pattern. Of these three patterns, the in-between pattern was judged as generally being worthy of adoption by the team.

	Tie-up pattern	Combined pattern	In-between pattern
1. Independence	◎	△	○
2. Combinability	△	◎	○
3. Linkage	△	△	◎
4. Area requirement	Large	Small	Medium
Overall evaluation			○

(2) Sectional plan (① Main Building)

① Roof

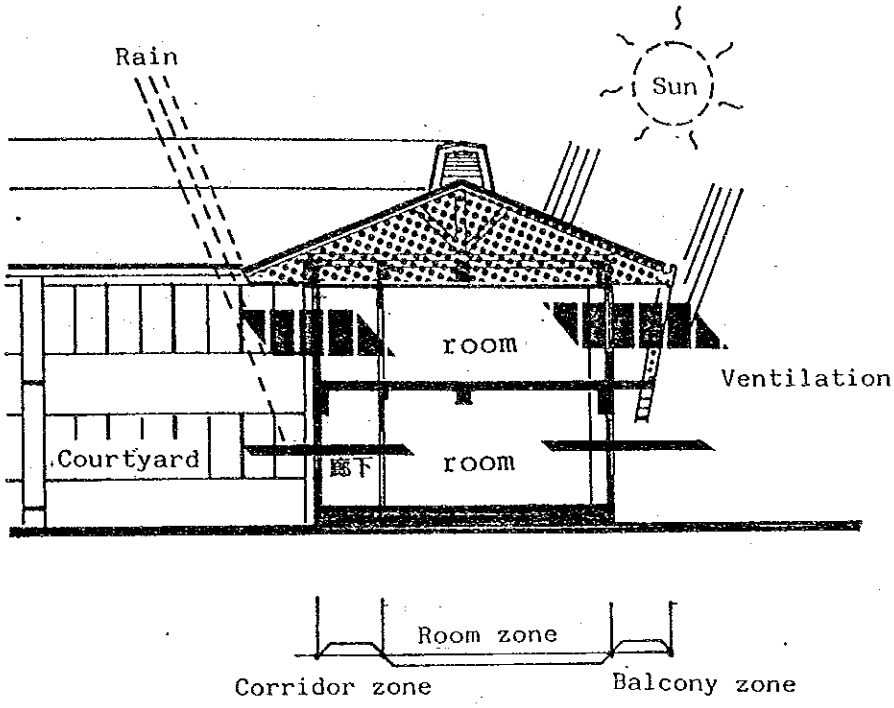
The roof of the room zone will be composed of a truss mounted on the beams of the uppermost floor, followed by application of roof covering to deal with rain. The thermal load on the room zone in the uppermost floor due to direct solar radiation will be alleviated through the use of insulation material (100mm thick glasswool blanket) applied to the back side of the roof, as well as the ceiling.

② Corridors and balconies

On the both sides of the room zone a corridor zone fronting the courtyard will be provided, and balconies at the second floor level fronting the outside. Rain and direct solar radiation will be dealt with by the zones on both sides of the building, as in the case of the roof. To this end, sun controls and a lean-to flashing roof will be provided.

③ Rooms

By locating one room zone along the outer perimeter of the building, rains and direct solar radiation will be dealt with by another room zone on the opposite side, therefore the requirement of the exterior wall will be to ensure natural lighting into the rooms, and ventilation. For this reason, the exterior wall of the room zone will be provided with windows and louvers to ensure ventilation and natural lighting.



Sectional configuration

④ 1F floor

The 1F floor will be located at a level of 500 mm higher than the ground level to deal with local showers in the rainy season.

(3) Structural plan (① Main Building and ② Support Facilities)

In proceeding with the structural planning of the Main Building and Support Facilities, the following basic policies will be set up:

a. The reinforced concrete rigid-frame construction which is the most common type of construction in the Republic of Indonesia, will be employed. The walls will be built up with brick units.

b. The buildings will be supported on a pile foundation due to the poor soil conditions. Pile lengths and pile bearing capacities will be determined following confirmation of boring test results and the weight of the buildings, which will be

determined in the course of practical design. The bottom of footings are assumed to be GL - 1.5 meters.

c. With sufficient consideration given to the local supply capacity for equipment, the qualities of local materials and the local construction technologies and techniques, both local structural materials and construction methods will be employed unless specifically problematic.

d. The buildings will be designed with the focus on economy.

① Applicable codes and structural design criteria

Structural calculations will be made in conformity with the requirements of the National Building Regulation of Indonesia and the Indonesian Loading Code for Buildings.

In addition to the above standards, the allowable unit stresses of structural materials, their analysis and design methods will be established with reference to the Architectural Institute of Japan Structural Design Criteria, and in consideration of the levels of local construction methods as well as variations in the qualities of materials.

Applicable codes and standards are as follows:

1. National Building Regulations
2. Indonesian Loading Code for Buildings 1981
3. Indonesian Code of Practice for Seismic Design of Buildings 1981
4. Indonesian Reinforced Concrete Code 1971
5. Manual for the Design of Normal Reinforced Concrete and Reinforced Masonry Structures
6. Architectural Institute of Japan (A.I.J.) Structural Design Criteria

In addition, the allowable unit stress design method will be used for the design of structural members.

② Design loads

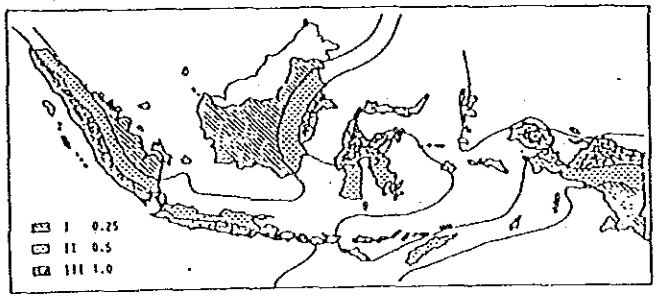
a. Live loads

(In kg/m²)

	For design of floor	For beam	For rigid frame	For calculation of seismic force
Office rooms, research rooms, meeting room	250	200	150	80
Laboratories	400	270	240	160
Storages	400	350	300	200
Library	550	480	400	200
Corridors and stairs	300	280	230	90
Balconies	300	180	130	60
Other rooms	250	220	190	80

b. Seismic load

Indonesia is a volcanic country located on an unsatable part of the earth's crust and crustal earthquakes occur frequently. It belongs to the circum-Pacific active volcanic zone.



Regional seismic intensities of Indonesia

According to the map of regional seismic intensities of Indonesia above, the project site is located within zone 3. As the ground of the project site is composed of a relatively soft soil, the basic seismic coefficient adopted

will be C = 0.07, along with the coefficient of demand being I = 0.1 and the coefficient of structural type being K = 0.1. Therefore, V (the shearing force of typical stratum) = 0.07 × Wt.

c. Wind load

Wind load will be determined in accordance with the requirements of the Indonesian Loading Code for Buildings. The country is affected by the west wind blowing from the Asian Continent to the Australian Continent and the east wind blowing from the Australian Continent to the Asian Continent. The west wind blows from December to February while the east wind between May and July. The maximum velocity of either wind is approximately 14 meters per second, but this is not intense enough to cause damage to the building. Therefore, the following equation will be used for load Pw:

$PW = C \cdot g \cdot A$ Pw: wind load

g : velocity pressure or 25kg/m^2

A : pressure receiving area

C : coefficient of wind force

③ Structural materials

Major structural materials and their strengths will be as given below.

a. Concrete (slump: 15cm)

General structures : Ordinary concrete FC 210 kg/cm^2

Slab-on-grade : Ordinary concrete FC 150 kg/cm^2

Levelling concrete : Ordinary concrete FC 135 kg/cm^2

b. Steel reinforcement (equivalent to JIS G3112)

Deformed rebars : D10 ~ D16 ··· SD30A
Over D19 ···· SD35
Plain rebars : ···· SR24

c. Structural steel : Equivalent to SS41 (JIS G3101) or SSC41 (JIS G3350).

d. High tension bolts: (F10T) Equivalent to JIS B1186.

(4) **Mechanical and electrical plan (① Main Building, ② Support Facilities, ③ Orchard Facilities)**

① Design policy

a. In designing the electrical and mechanical installations of the Center facilities, local weather conditions and daily customs will be taken into account so that both installations can be designed to ensure easy operation, easy maintenance and control as well as low maintenance and control costs.

b. In order to facilitate future replacement, equipment procured will be standard products to the maximum possible extent.

c. Electrical and mechanical installations will be designed as per applicable Indonesian codes. However, in the absence of any applicable codes, the corresponding Japanese codes will be used.

d. All Japanese equipment will be JIS-conforming products, and all Indonesian equipment will conform to RIIS (Indonesian industrial standards).

e. Supplied to the laboratories. Where required, a water distiller or a water softener will be provided.

f. Special gas bottles required for laboratory work will be provided outdoors nearest the place of requirement.

g. Receptacles will be provided where necessary to ensure electric power for laboratory and research equipment. Depending on the type of equipment, the relevant receptacle involved or an independent power switch will be grounded.

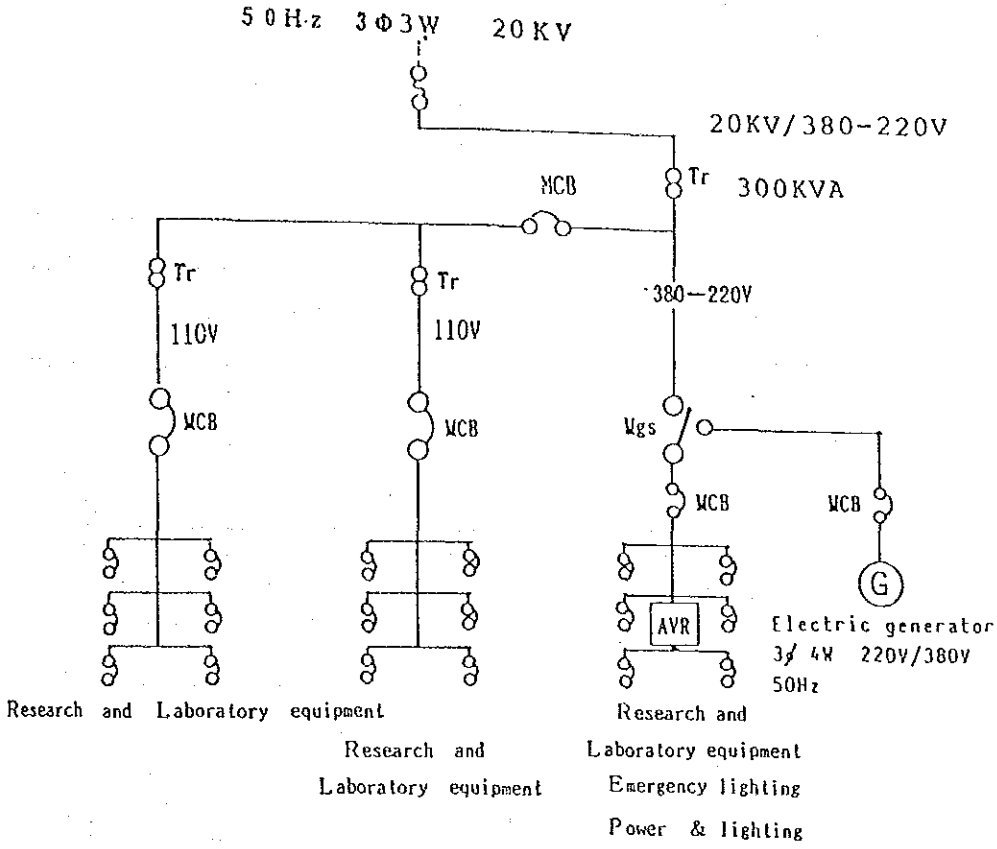
h. As the precision equipment is sensitive to voltage fluctuations during measurement and analysis, a constant voltage device (AVR + UPS) will be provided.

② Electrical installations

a. Power receiving system

Electricity will be supplied by PLN of Indonesia, through a high voltage branch point located 1.5 kilometers north to the site, up to a PLN substation to be provided on the site. From the substation onwards, service transmission cables will be installed up to the power transformer panel in the electrical room.

Power supply will be 3-phase 380V single phase 220V 50Hz.



Single-line wiring diagram

Estimated equipment load for all facilities totals 300 KVA, with the breakdown as shown below:

Lighting and receptacles	70 KVA
Cooling and ventilation	130 KVA
Water supply and drainage	50 KVA
Research and laboratory equipment	80 KVA

In addition, the basic contract demand required will be a minimum of 250 KVA.

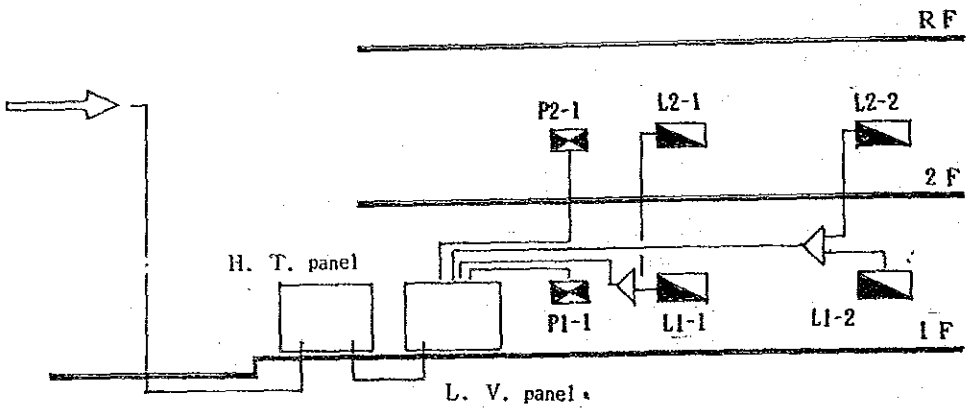
b. Electricity generation equipment

Generator of approximately 75 KVA will be provided to supply electricity, in the event of a power cut, to

laboratory equipment such as freezers, and emergency lighting system, etc.

c. Trunk line equipment

Trunk lines will be installed in metal conduits and cable racks from the distribution panels in the electricity room to the individual lighting panel boards, power control panels and research equipment power panels located on each floor.



d. Lighting and receptacle system

i) An effort will be made to ensure the use of natural lighting. Most artificial lighting will be provided by fluorescent lights, but for incandescent lights to be provided in some areas.

ii) The lighting planned for each of the major rooms is as listed below:

	Design target intensity (LX)	Standard intensity as per JIS (LX)
Office	500	300 ~ 750
Research room and laboratory	450	300 ~ 750
Meeting room	400	200 ~ 500
Library	450	300 ~ 750
Toilet and corridor	100	100 ~ 200

iii) A receptacle for general use will be provided for office equipment, and an earthed receptacle will be provided for research equipment. The voltage will be single-phase 220 volts.

e. High tension power equipment

i) Conduit piping and wiring will be installed to supply high tension power to air-conditioning equipment, ventilation fans, ceiling fans, pumps, etc.

ii) The supply voltage of ventilation fans and other small capacity equipment will be single-phase 220 volts and that of other high-tension power loads will be 3-phase 380 volts.

f. Telephone system

i) Installation of telephone service wiring to the project site will be completed by no later than December 1991. If not completed by then, the existing wireless installation at the Seed Source Development Center will be relocated to the Center at the expense of the Indonesian Government.

ii) Five telephone circuits will be provided up to the terminal panel in the office of General Affairs Section, 1F, at the expense of the Indonesian Government.

iii) A digital telephone exchange unit will be provided, with approximately 30 extension lines.

g. Broadcasting system

An intercom system connecting all the Center facilities will be provided, with a main speaker in the office.

h. Television and radio systems

Piping and wiring will be installed in the Head's room and the General Office. Television antennas will be erected as well.

i. Fire alarm system

To ensure the safety of the Center facilities, a fire alarm system will be installed, to meet the minimum requirements.

j. Lightning earthing system

Very intense thunderstorms occur almost every day, causing damage at many places. For example, thunderstorms occur approximately 300 days a year in Bogor, Java, 187 days in Medan, and 133 days in Jakarta.

Although there is no such regulation enforced in the country, a lightning earthing system will be provided to prevent damage due to lightning.

k. Voltage transformer equipment

As some equipment should not be subjected to voltage fluctuations while performing measurement or analysis, a constant voltage device (AVR + UPS) will be provided to ensure a constant voltage supply. Each piece of equipment will be fitted with a constant voltage device. The load of the AVR will be ±10 ~ 15% on the input side, and ±2% on the output side.

③ Ventilation and air-conditioning system

Basically, the ventilation and air-conditioning system will be selected to ensure low cost maintenance and control as well as easy operation.

i) Areas coveraged by ventilation and air-conditioning system

The table below shows the areas requiring mechanical ventilation and/or air-conditioning.

	Room	Air conditioner	Ceiling fan	Ventilating fan
1F	Office, General Administration Sec.	○		
	Office, Planning and Section	○		
	Office of Research Room, Field Operation Section	○		
	Head's room	○		
	Secretary's room	○		
	Reception room	○		
	Project leaders' room	○		
	Japanese experts' room	○		
	Book storage			○
	Storage for stationery and consumables			○
	Voltage transformation and distribution room			○
	Electric generator room			○
	Storage		○	
	Specimen treatment room		○	○
	Rest rooms (men and women)			○
	Dressing room (men and women)		○	○
	Toilets (men and women)			○
	Shower rooms (men and women)			○
	Dining room and pantry		○	○
2F	Selective breeding laboratory	○		○
	Propagation laboratory	○		○
	Data processing laboratory	○		○
	Library	○		○
	Seed characteristic testing laboratory	○		○
	Freezer	○		○
	Tissue culture room	○		○
	Species arrangement room	○		○

	Chemical analysis laboratory	○		○
	Darkroom	○		○
	Morphological characteristic testing laboratory	○		○
	Project leaders' room	○		○
	Seminar room	○		○
	Conference room	○		○
	Toilets (men and women)			○
	Pantry			○

ii) Design conditions for air-conditioning system

Except for special rooms, the design temperature for all other rooms will be 26°C±3°C.

iii) Air-conditioning system

In order to ensure a low running cost, all rooms, except for special rooms, will each be provided with a split type, air-cooled air conditioner.

iv) Ventilation system

All rooms will be naturally ventilated, but artificially ventilated if functionally unavoidable.

④ Plumbing system

a. Water supply system

A supply of an estimated 55m^3 of well water/day must be ensured for the Center. As the provision of a surface well would draw upon well water used by the neighboring residents, possibly causing the depletion of their water, the Center will provide a deep well.

Estimated consumption of water is as detailed below:

Researchers	50 × 0.2m³/researcher·day	10.0m³/day
Office staff	51 × 0.12m³/staff·day	6.12m³/day
Visitors	35 × 0.025	0.9m³/day
Orchards, etc		35.0m³/day
Total		55.0m³/day

The estimated capacities of water receiving tanks and an elevated water tank are as follows:

i) Water receiving tanks (combined capacity: half the average demand or 35m³)

Settling basin (limited to 1-hour) operation	3m³
Primary water receiving tank	3m³
Secondary water receiving tank	29m³

ii) Elevated water tank (5-hour consumption or average demand)

$20m^3 \times 5/10 = 10m^3$

iii) Lift pump : A deep well pump.

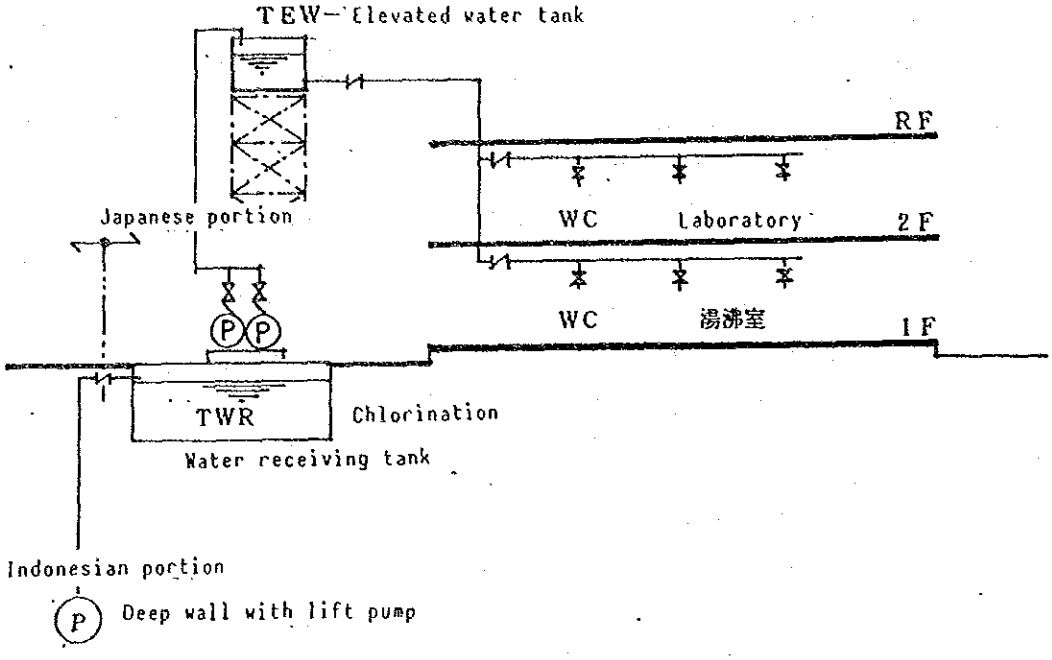
iv) Filter (capacity to filter 1-day consumption of average demand, in 7 hours.

This filter will be composed of an automatic reversing sand settling device, a pack injector, a hypochlorite injector, and a control panel.

$50m^3/day \times 1/7 = 7m^3/hr$

The analysis of the well water available in the vicinity of the project site indicated that the manganese, carbon dioxide, ammonia, and lead contents are in excess of their standard values. The turbidity and odor exceed their standard values as well. Therefore, this well water will be filtered and chlorinated for use as potable water and,

for watering the orchards. The well water should be boiled before drinking.



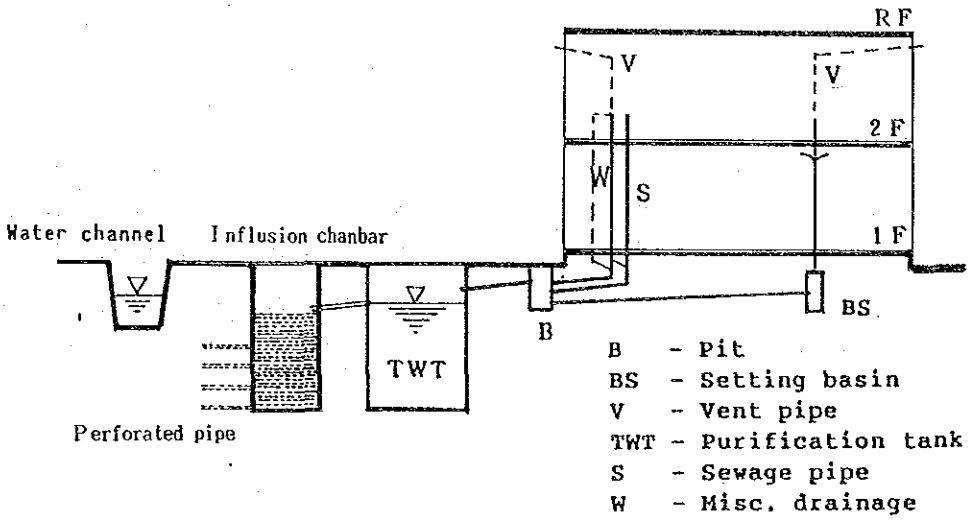
Water supply flow

b. Drainage system

The drainage from the buildings is classified into sewage, miscellaneous drainage and laboratory drainage, which join outdoors. Drainage will be discharged after biological purification treatment.

All waste liquids comprising harmful substances, radioactive substances, heavy metals, strong acids and alkaline solutions from the laboratories will be recovered separately and will not be discharged into the drainage system mentioned in paragraph b above.

Drainage, sewage and misc. drainage → Drainage treatment facility (Septic tank) → To be discharged into the ground



c. Sanitary fixtures

All washrooms will be fitted with Western style water closets (including local style closets), urinals, lavatories, hand basins and shower heads.

d. The pantry will be fitted with gas stoves, gas stands, sinks, etc.

e. Gas supply

All rooms requiring gas will be supplied with LP gas. Gas bottles will be positioned outside the rooms requiring gas.

Gas consumption

Laboratory gas: 0.15 kg/hr × outlet × 6 × 3 hrs/day × 20 days/month = 54 kg/month

Pantry gas : 1.25 kg/hr × outlet × 2 × 1 hr/day × 20 days/month = 150 kg/month

54 + 50 = 104 kg/month + 50 kg/bottle

= 2.08

= 4 bottles/50kg/bottle/ month

Hence eight 50 kg gas bottles will be required per month. A set of gas bottles will be composed of 4 bottles, arranged in two rows of two bottles, for automatic exchange. One set will be enouth for two weeks consumption.

f. Sprinkler system

All orchards will be equipped with a hydrant to enable the sprinkling of water through a portable hose. A sprinkler system will be provided wherever required.

g. Fire extinguisher installation

Fire extinguishers will be provided in the quantity and positions indicated below:

Quantity: Total floor area of 2,800m^2/200m^2 = 14 units

1F : 7 units

2F : 7 units

These extinguishers will be positioned at 20-meter intervals.

(5) Construction materials plan (① Main Building and ② Support Facilities)

All construction will be planned in consideration of weather conditions, climate, building requirements, required functions, local construction situation, construction cost, and maintenance and control costs.

① Structural materials

The buildings will be constructed of a combination of reinforced concrete and brick masonry walls. The cement, aggregate and bricks available in Indonesia pose no problems in quality or production capacity.

② Finishing materials

Basically all finishing materials must be highly durable as well as easy to maintain and control. Those finishing materials that seriously affect the durability of the roof and other installations will be procured from Japan where the performances of such materilas is reliable and economical to use. Other materials will be procured in Indonesia to facilitate easy repair.

a. Exterior finishing materials

i) Roof

The frames of the buildings will be a rigid construction of reinforced concrete. The roofs will be constructed of wooden beams, covered with water resistant plywood battens which will be overlaid with a combination of asphalt and colored galvanized iron sheeting. The roofing will have ribbed seams. The space beneath the roof will function as heat insulation space to prevent the temperature in the uppermost floor from rising.

ii) Exterior wall

The exterior wall being exposed to rain will be constructed of reinforced concrete or bricks to ensure waterproofing. The exterior wall surface will be finished with tiles, while the interior surface will be finished with concrete paint.

iii) Windows

Exterior windows will have aluminum sashes, because they are easy to maintain and do not necessitate repainting, as do steel sashes. Also they will not be subject to damage by termites, as are wooden sashes are. Aluminum sashes can be made more airtight to ensure dustproofing.

b. Interior finishing

i) Floor

The floors of rooms and corridors will be laid with terrazzo blocks or full-length PVC sheeting; both used relatively frequently in office floors etc., or with metal-trowel finished mortar to be laid with ceramic tiles. Terrazzo block and full-length PVC sheeting have smooth surfaces, hence they are easy to clean, and are hygienic.

ii) Interior walls

Interior walls will be constructed of reinforced concrete or brick masonry, followed by the application of cement mortar and, subsequently, concrete paint. Simple partitions will be removable. Toilet floors will be laid with semi-ceramic tiles.

iii) Ceilings

The ceilings of the entrance hall, the reception room, and other rooms on the second floor will be finished with acoustic asbestos board. Those of the laboratories, etc. will be finished with concrete paint.

(6) Orchards plan

① Grading for orchards

Each orchard will be divided into the blocks shown below, and each block properly levelled to provide fine grade differences. No great volume of top soil will be moved. This site requires no ground stabilization or borrow materials.

② Grading for roads on the site

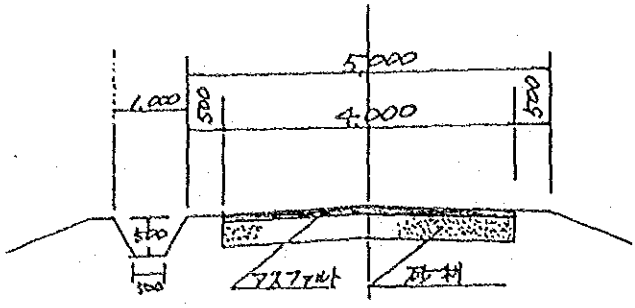
Roads at the site will be planned centering on a main road along the central axis and another main road along the north-south axis. These roads can be classified into main roads, branch roads and work roads. The thicknesses of pavement course and subbase course will be tentatively established, subject to correction following the results of a CBR test to be carried out prior to commencement of road construction.

a. Main roads

Each main road will be a total of 5.0 meters wide, with a 0.5 meter shoulder on each side. The 4.0 meter wide carriageway area will be paved with asphalt.

Surfacing course: A 0.06 meter thick asphalt pavement.

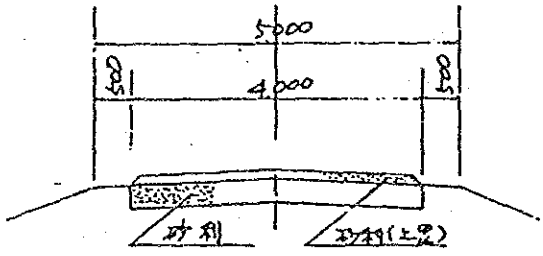
Subbase course : A 0.50 meter thick gravel layer.



b. Branch road

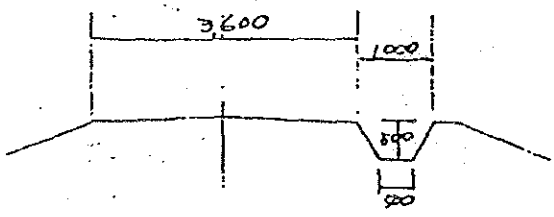
Each branch road will be a total of 5.0 meters wide with a 0.5 meter wide shoulder on each side of the road, with the carriageway constructed of gravel.

Surfacing course: A 0.01 meter thick gravel layer.
Subbase course : A 0.3 meter thick gravel layer.



c. Work roads

Work roads will be a total of 3.6 meters wide, with the road surface laid with gravel compacted with a roller.



d. Open ditch

An open ditch will be constructed at either side of the main roads and the work roads. These open ditches will be planned so that they join the existing water channel, thereby providing the neighboring farmland with facilities for its water supply and drainage facilities.

e. Crossing ditch

An open ditch along the front of the gate and the roads will be constructed of concrete, and covered with a cast iron grating.

③ Water supply facilities plan

Water will be supplied from a deep well provided for use by the Center, through the water supply piping laid underground. Water from the hydrant onwards will be supplied by hoses. The water to be supplied to the orchards, other than nurseries, will be to promote the growth of planted trees, as well as to augment the water supply in the dry season.

A polyethylene water supply tank will be provided near the hydrant at each nursery.

④ Lighting system plan

Overhead electric power lines will be provided over the orchards. In consideration of the effect of illumination on the planted trees, lighting fixtures will be turned on and off manually. Electricity poles will be arranged along the main roads.

A total number of seven poles are required and they will be coal tar coated, wooden poles.

⑤ Nursery facilities plan

Each nursery will occupy an area of 1.0 ha, and its ancillary facility will be planned in correspondence to that acreage.

Garage and equipment storage	:	1 building (5 × 10m)
Oil storage (for heavy construction equipment use)	:	1 building (3 × 5m)
Pump house	:	1 site (3 × 5m)
Burnt soil yard	:	1 site (10 × 10m)
Weather observatory (turfed)	:	1 site (10 × 15m)
(its perimeter fenced at a height of 1.5 meters)	:	One access
Beds overlaid with wood blocks	:	45 beds (1 × 20m)
Beds without wood blocks	:	45 beds (1 × 20m)
Cut lumber (length: 1800)	:	1,080 p'cs (12 p'cs × 45 × 2)
Sunshade (cheesecloth)	:	3,000m^2

4-3-3 Equipment plan

① Policy of plan

Equipment will be selected according to the following criteria:

a. The planning for selection and quantity of equipment will be limited to such equipment that meets the objectives of the Project and is essential to the operation of the Center.

b. The specifications for equipment will be planned in accordance with the technical level of expertise and experience of the Center's staff for its proper usage and so that the goals of the proposed technical cooperation can be met.

c. Equipment will be selected for easy maintenance and inspection and the ready availability of spare parts.

d. All pieces of equipment will be accompanied by the corresponding specifications. Technical instructions will be included for the operation and control of certain types of equipment.

② Equipment and furnishings

The equipment and furnishings required at the Center by section and room are as follows:

a. General Administration Section

Head's room : Glazed cupboards, cabinets, desks and chairs.

Office : Desk type personal computers, typewriters, copiers and fax machines.

Conference room: Projection screens, white boards and lecture tables.

b. Planning Section

Office : Desk type personal computers with a serial printer, whiteboard, glazed cupboards, and cabinets.

Seminar room : Video system, radios, overhead projectors, and projection screens.

c. Breeding Division

o Selective Breeding Laboratory Section

Selective breeding laboratory	:	Laboratory benches, work benches, and cabinets.
Morphological testing laboratory	:	Calorimeters, biological microscopes, soft radiographic devices, micro image observation devices, and automatic analysis balances.
Chemical analysis laboratory	:	Spirit burners and precision balances.
Seed testing laboratory	:	Stereomicroscopes with photographic device, infrared moisture meters, electronic balances, and refrigerators.

- Propagation Laboratory Section

Propagation laboratory	:	Incubators, low temperature pyrostats and refrigerators.
Tissue culture laboratory	:	Clean benches, high-pressure steam sterilizers, swing culture devices, ultrasonic washers, stereomicroscopes and refrigerators.
Chemical analysis laboratory	:	Refrigerators, electric migration device, super high-speed universal homogenizers, electronic balances.

- Data Processing Section

Data processing laboratory	:	Desk type personal computers, laboratory benches, XY plotters, and lap top computers.

d. Activity division

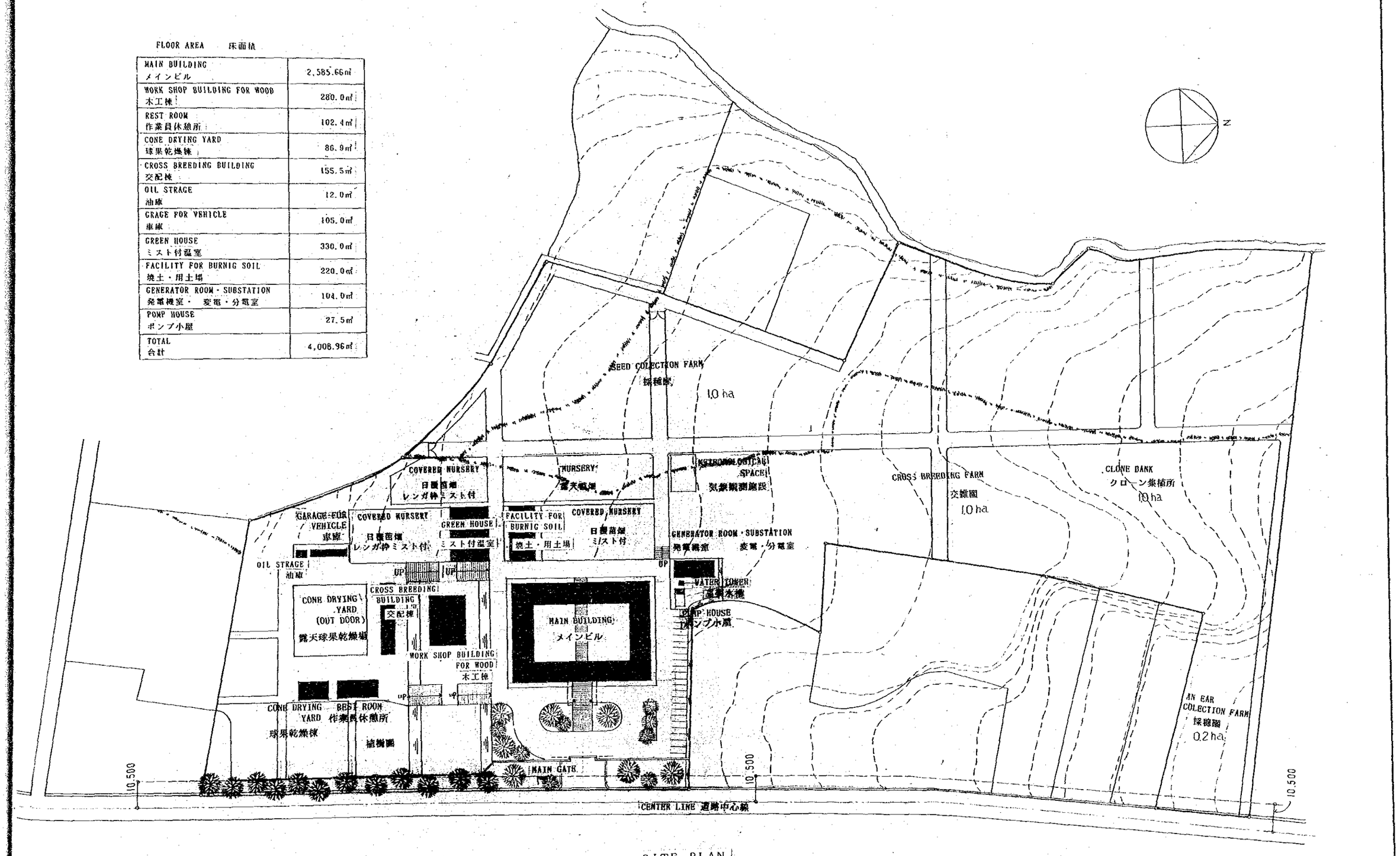
Orchard : Weather observation facility, tractor, dump trailer, rotary belt conveyor, automatic pruning shears, trimming machine, chain saw, back hoe, and stereoscopic machine for operation at elevated place.

4-3-4 Basic Design Drawings

1. Block plan
2. Floor plans of the Center's main building
3. Elevations of the Centers' main building
4. Sections of the Center's main building
5. Floor plans of attached facilities

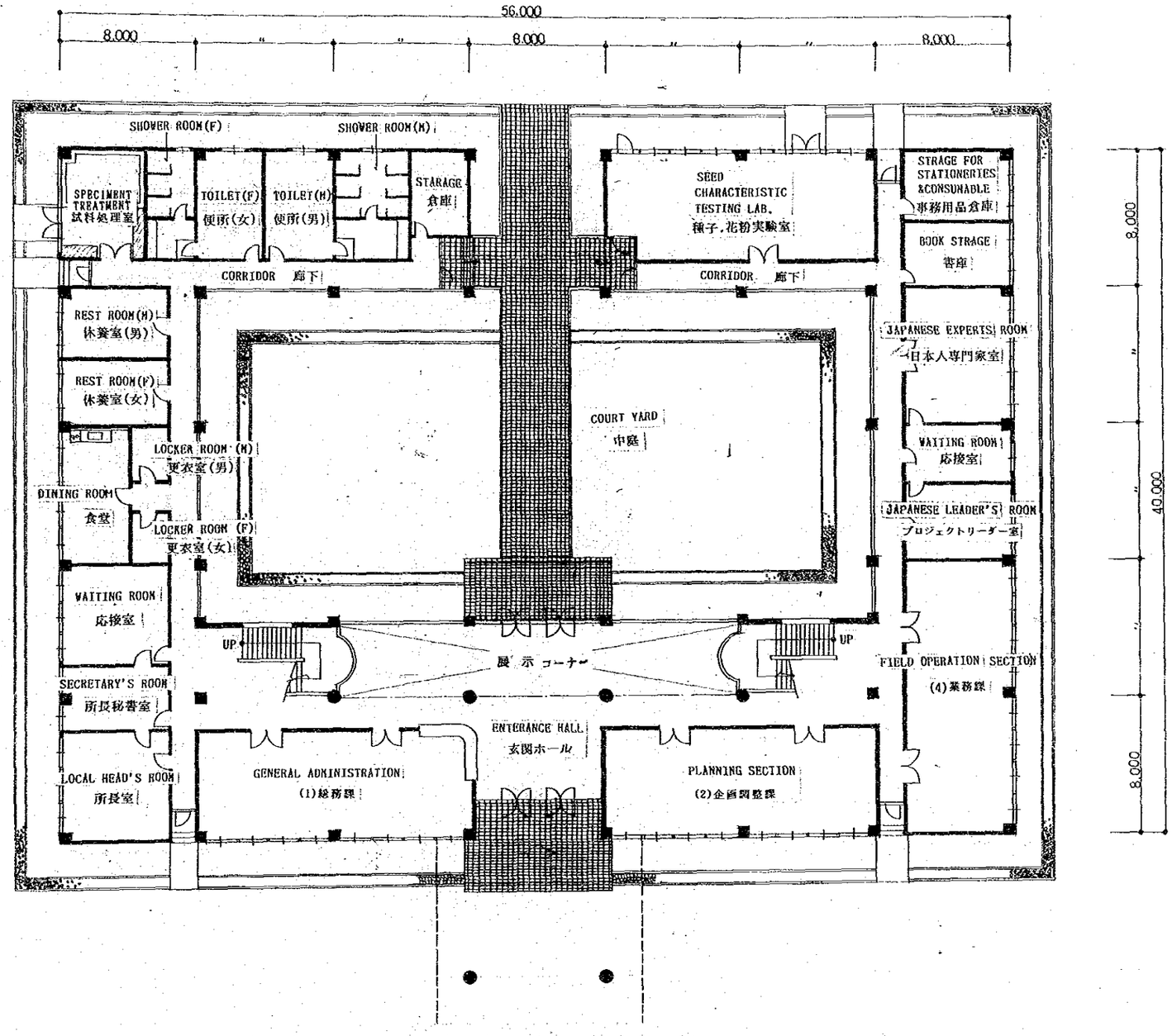
FLOOR AREA　床面積

MAIN BUILDING メインビル	2,585.66㎡
WORK SHOP BUILDING FOR WOOD 木工棟	280.0㎡
REST ROOM 作業員休憩所	102.4㎡
CONE DRYING YARD 球果乾燥棟	86.9㎡
CROSS BREEDING BUILDING 交配棟	155.5㎡
OIL STRAGE 油庫	12.0㎡
GRAGE FOR VEHICLE 車庫	105.0㎡
GREEN HOUSE ミスト付温室	330.0㎡
FACILITY FOR BURNIG SOIL 焼土・用土場	220.0㎡
GENERATOR ROOM・SUBSTATION 発電機室・　変電・分電室	104.0㎡
POMP HOUSE ポンプ小屋	27.5㎡
TOTAL 合計	4,008.96㎡



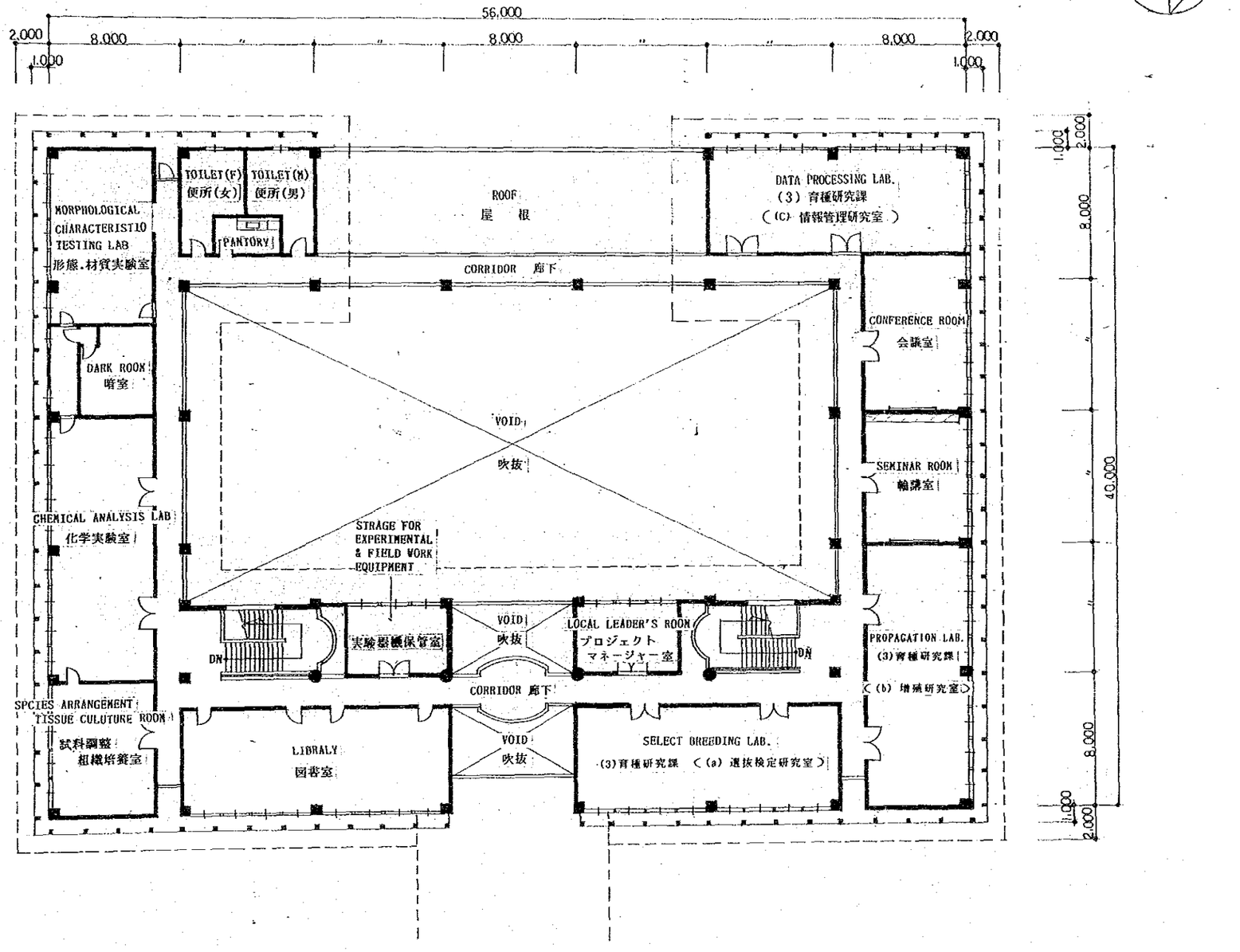
SITE PLAN

NOTE	WORK NO.		DATE	TITLE THE REPUBLIC OF INDONESIA FOREST TREE IMPROV. DEVELOP. C	DRAWN NO.
	APPROVAL	DRAWN	SCALE 1:1,000	SITE PLAN 配置図	01



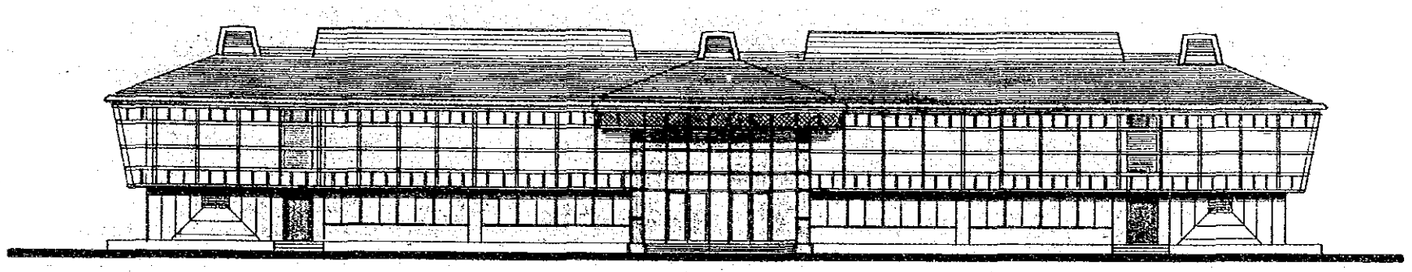
MAIN BUILDING 1F PLAN

NOTE	WORK NO.	DATE	TITLE THE REPUBLIC OF INDONESIA FOREST TREE IMPROV.DEVELOP.C	DRAWN NO.
	APPROVAL / DRAWN	SCALE 1:200	MAIN BUILDING メインビル 1F	02

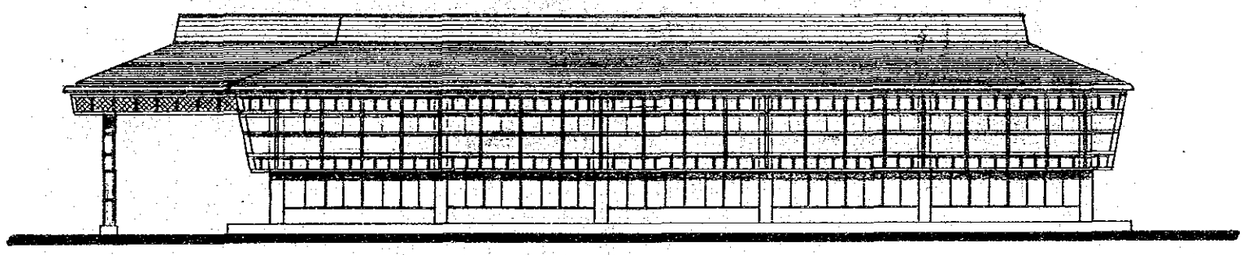


MAIN BUILDING 2F PLAN

NOTE	WORK NO.	DATE	TITLE THE REPUBLIC OF INDONESIA FORREST TREE IMPROV.DEVELOP.C	DRAWN NO.
	APPROVAL / DRAWN	SCALE 1:200	MAIN BUILDING メインビル 2F	03

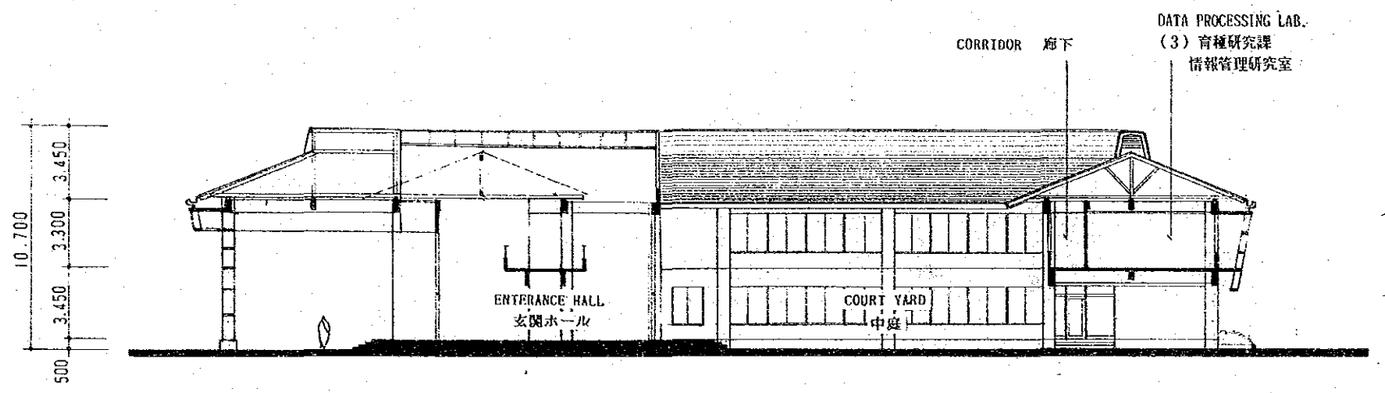


ELEVATION

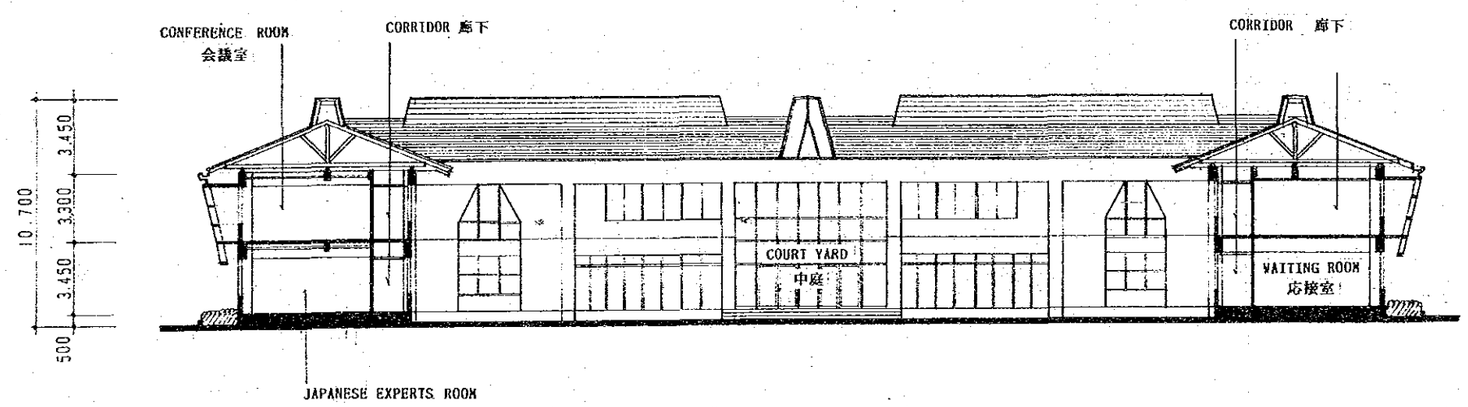


ELEVATION

NOTE	WORK NO.	DATE	TITLE THE REPUBLIC OF INDONESIA FOREST TREE IMPROV.DEVELOP.C	DRAWN NO.
	APPROVAL / DRAWN	SCALE 1:200	MAIN BUILDING メインビル	04



SECTION



SECTION

NOTE	WORK NO.	DATE	TITLE THE REPUBLIC OF INDONESIA FOREST TREE IMPROV.DEVELOP.C	DRAWN NO.
	APPROVAL / DRAWN	SCALE 1:200	MAIN BUILDING メインビル	05

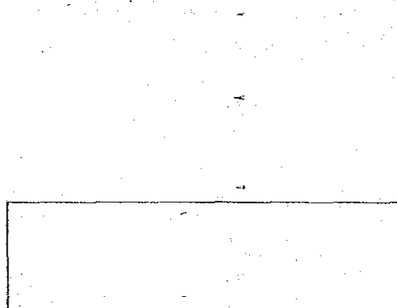
CONE DRYING YARD (OUT DOOR)

露天球果乾燥場

28.800 × 28.800

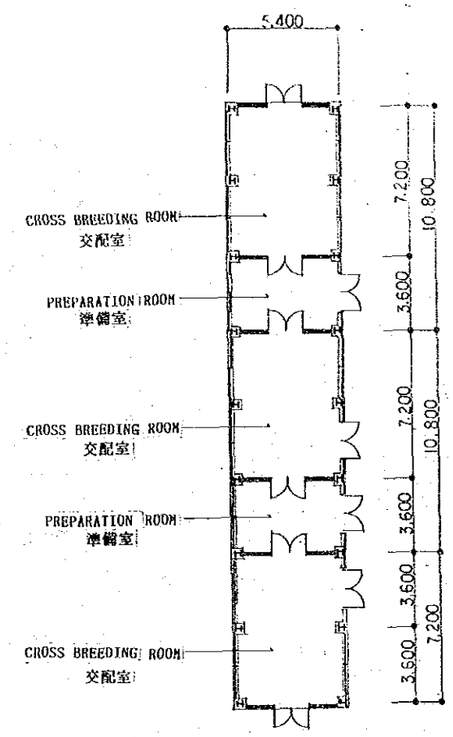
CONE DRYING YARD

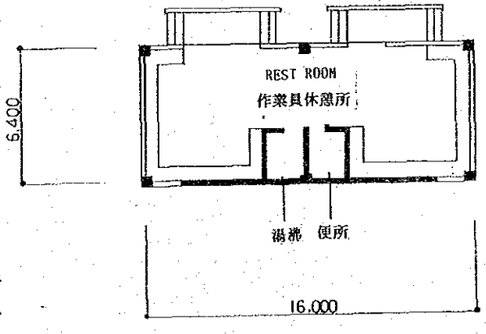
球果乾燥棟



CROSS BREEDING BUILDING

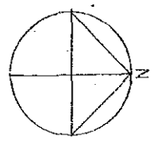
交配棟

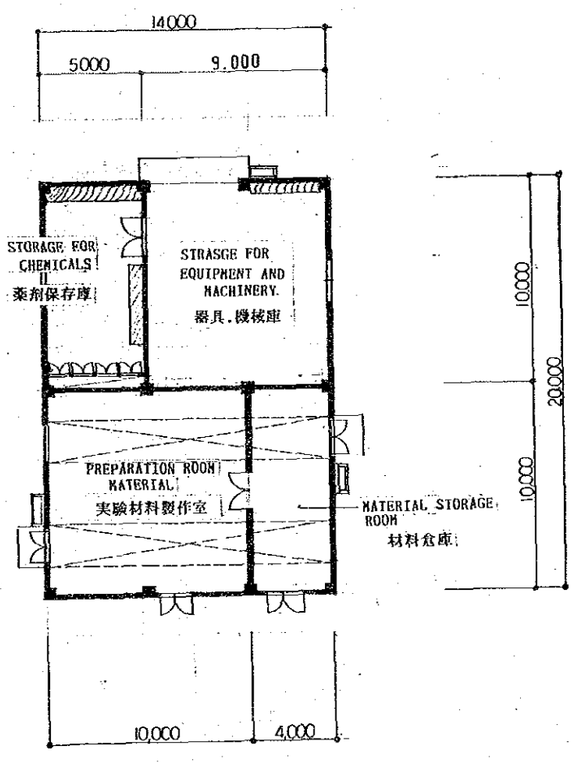




REST ROOM

作業員休憩所

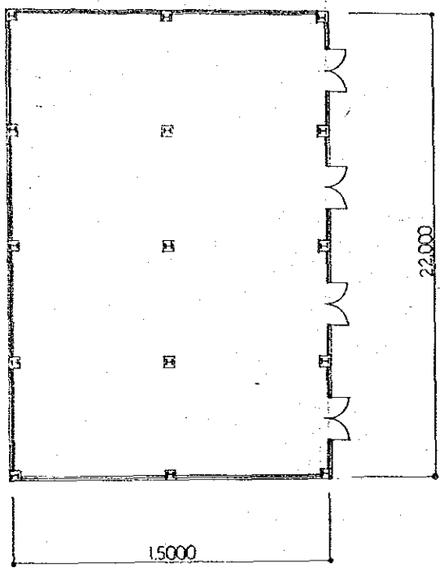




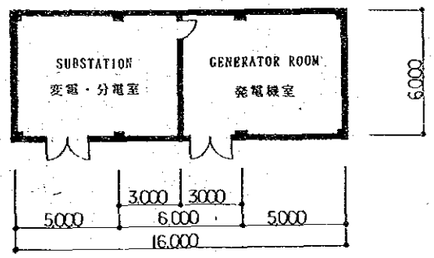
WORK SHOP BUILDING FOR WOOD PLAN

木工棟

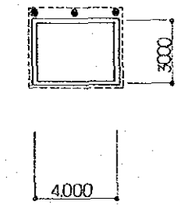
NOTE	WORK NO.	DATE	TITLE THE REPUBLIC OF INDONESIA FOREST TREE IMPROV.DEVELOP.C	DRAWN NO.
	APPROVAL / DRAWN	SCALE 1:700	WORK SHOP BUILDING FOR WOOD PLAN 交配棟 木工棟 球果乾燥棟	06



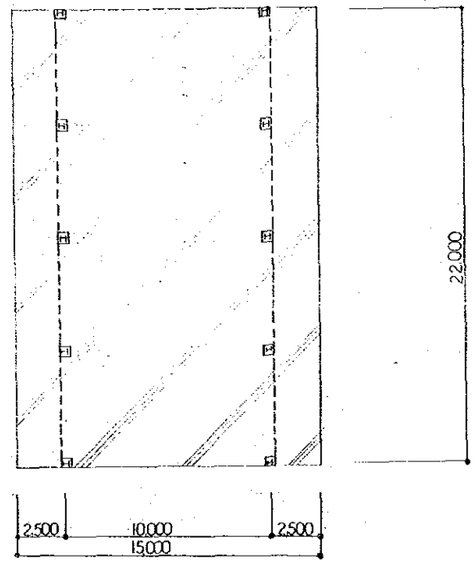
GREEN HOUSE
温室ミスト付



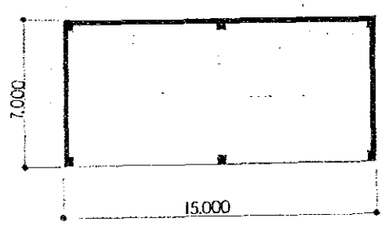
GENERATOR ROOM · SUBSTATION
発電機室 · 変電 · 分電室



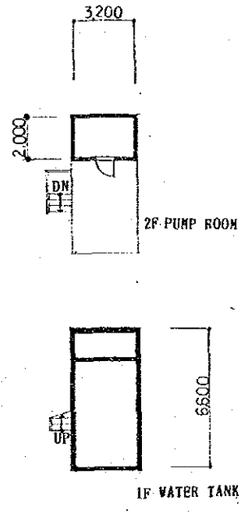
OIL STRAGE
油庫



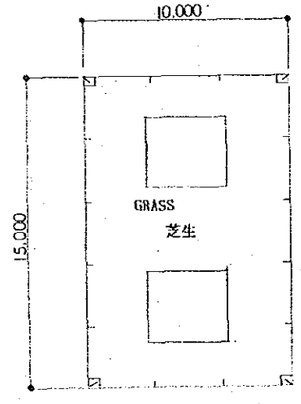
FACILITY FOR BURNING SOIL
焼土・用土場



GARAGE FOR VEHICLE
車庫



PUMP HOUSE
ポンプ小屋



METEOROLOGICAL SPACE
気象観測施設

NOTE	WORK NO.	DATE	TITLE THE REPUBLIC OF INDONESIA FOREST TREE IMPROV.DEVELOP.C.	DRAWN NO.
	APPROVAL / DRAWN	SCALE 1:200	WORK SHOP BUILDING FOR WOOD PLAN 車庫 ポンプ小屋 ，その他	07

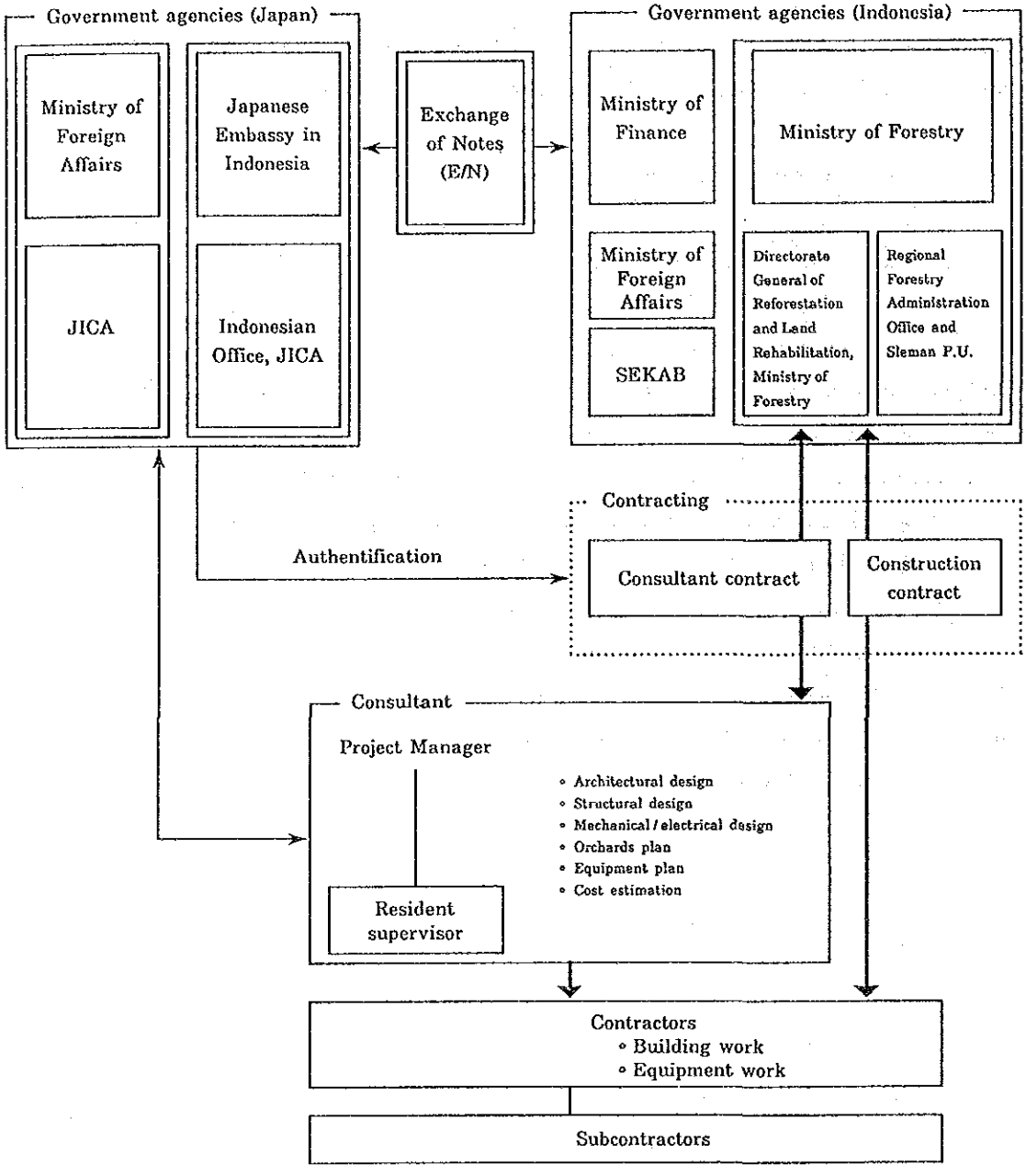
4-4 Construction Execution Program

In the event of this project being executed under the grant aid system of Japan, the following policy will apply.

4-4-1 Construction Execution Policy

(1) Executing Agency (Project Owner)

The Indonesian project owner will be the Directorate General of Reforestation and Land Rehabilitation, Ministry of Forestry, and will be responsible for contractual involvement with a Japanese consultant and a general contractor. The Ministry of Finance will be responsible for formalities involving an Exchange Note and for foreign exchange banking transactions. SEKAB will be responsible for provision of tax exemption measures. The Regional Forestry Administration Office (Sleman P.U.) will be responsible for the acquisition of permission and approval required in the course of design and executing the construction of the Project, as well as inspections of various kinds.



(2) Consultant

The consultant, a duly organized Japanese corporation, will hold meetings and discussions whenever necessary, with the Directorate General of Reforestation and Land Rehabilitation, Ministry of Forestry, other government ministries and agencies concerned, local consultants and building contractors, so that construction of the Project can progress smoothly in accordance with the requirements of contract drawings and specifications. The consultant will also

conduct supervisory activities such as confirmation, coordination, recording, etc., as well keep both the Indonesian and Japanese governments periodically informed of the up-to-date conditions and progress of the Project. The consultant will send to Indonesia mechanical and/or electrical supervisors to supervise and coordinate the progress of mechanical and electrical works. The duties of the consultant also include the issuance of a certificate of completion after each phase of work has been completed, as well as the receipt of approval from the Indonesian Government. The consultant will dispatch an expert specializing in equipment to the site upon delivery of equipment, and, in handing it over to the Indonesian Government, check against the accompanying invoice the items and quantities, and issue a certificate for completion of equipment delivery following the approval of the Indonesian Government.

A local consultant will make a contract with the Japanese consultant for checking and approving the drawings so that they can be approved by the local government agencies concerned.

An application for confirmatory building permission will be submitted to the Indonesian Government through the Regional Forestry Administration Office (in P.U., Sleman district). The local consultant will assist the Japanese consultant in explaining the contents of drawings when asked by any of the agencies concerned.

When, during the supervision of work, the Japanese consultant needs to hold discussions with the Regional Forest Administration Office or the Fire Station, and requires the assistance of the local consultant, he will assist the Japanese consultant.

(3) Contractors

A Japanese general contractor will carry out the construction of the Project. He will keep close contact with the local subcontractors and suppliers in order to complete the project smoothly and without delay, and, to this end, perform sufficient plan supervision, safety control, quality control and materials control. As some of the construction equipment and apparatus will

have to be brought from Japan, local technicians may have difficult handling this equipment, so Japanese technicians will be dispatched to the project site whenever required. Local contractors will proceed with work under the contract with the Japanese general contractor.

(4) Equipment suppliers

Japanese suppliers will procure the required equipment according to the equipment specifications, and deliver the same to the Directorate General of Reforestation and Land Rehabilitation by no later than the designated delivery time. They will provide instructions for the operation, servicing and repair of the equipment, and following this, the Directorate General will issue a receipt for the equipment, and a certificate as evidence of the fact that the methods for operation, servicing and repair of the equipment have been explained.

4-4-2 Construction Conditions

(1) Building construction status

① Construction industry

Most of contractors in Indonesia have maintained a capital and technical tie with foreign firms in order to supplement their construction technology. The advance of foreign capital companies into the construction industry has been increasing in the last decade, mostly by Japanese and U.S. firms.

② Technical levels

The technical levels of local construction workers are relatively high, and therefore deemed adequate for general building. However, their volition for work and efficiency is estimated to be no more than 30% of that of Japanese workers, hence the requirement for supervisors is high. For the amount of work per day per worker, a rebarman's output is 300 ~ 400kg of

rebars (limited to columns and beams) and a form carpenter, some $2m^2$.

③ Construction materials

Recent conditions in Indonesia indicate that employment opportunities must be created to absorb about 2 million people every year, and the use of Indonesian products has been promoted by sacrificing economic rationality to a certain extent, under the strong leadership of the government.

In April 1984 the presidential decree was announced to the effect that the procurement of domestic products is obligatory, and must be incorporated into the annual budget of each ministry; and that the employment of more Indonesian consultants and contractors must be promoted. To this end, therefore, powerful guidance has been issued through the presidential Team No. 10 set up within the State Secretariat (SEKNEG). In January 1985, an instruction book, in which the current state of the progress of domestic production was compiled, was prepared.

Hence, any application for capital investment since then has been accompanied by recommendations for the use of domestic products or domestic raw materials.

Subsequently, the production of more construction materials in Indonesia has been developing, to such an extent that the majority of construction materials to be used in this Project can be procured in the country. The following refers to the present status of construction materials.

※ Major construction materials currently manufactured in Indonesia are as follows:

Structural materials: Cement, rebars, steel shapes, and bricks.

Finishing materials : Glass, paint, tiles, and aluminum shapes.

Mechanical and electrical materials: Sanitary fixtures and special waterproofing materials.

※ Major imported construction materials

Structural materials: Heavy-weight structural steel shapes.

Finishing materials : Builders' hardware, gypsum boards, wallpaper, and carpets.

Mechanical and electrical materials: Lighting fixtures and special waterproofing materials.

(2) Special points regarding execution of construction

① Methods for the connection of electric power and making drain connections, and the timing for execution of these works must be determined following in-depth discussions with the agents concerned.

② In view of the degrees of skill of local workers, timing for the completion of the Project must be decided based on the instructions of Japanese staff to be sent from Japan, including requirements for the establishment of a work execution program along with a plan for temporary works, so that the construction period can be as short as possible.

③ As the country has a rainy season from April to September, site preparation and foundation work need to be carried out with all necessary precautions.

4-4-3 Scope of Work

Based on the premise that this Project is executed under the grant aid system of Japan, the project in its entirety will be divided into the areas of responsibility to be shouldered by the Indonesian Government and the Japanese Government, as follows.

Japanese scope	Indonesian scope
1. Architectural work Structural work and building finishing work.	1. Architectural work Removal of existing buildings from the project site.
2. Electrical work Power receiving and transform system, power distribution system, lighting system, receptacle system, private telephone system, intercom system, and lightning earthing system.	2. Site preparation work Clearing and grubbing of existing trees, and site preparation.
3. Plumbing system and ventilation system Water supply system, drainage and venting system, and sanitary fixtures.	3. Landscaping work Gardening and tree planting.
4. Landscaping work On-site roads and outdoor lighting system.	4. Installation of services and their connection work Telephone system, electrical system, and deep well work.
5. Laboratory and office equipment Laboratory equipment, equipment for field work, audiovisual equipment, automobiles, and office equipment.	5. Furnishings and fixtures Curtains, window blinds, general furniture, and portable fire extinguishers.
	6. Miscellaneous Fee required for application for confirmatory building permission, boring tests, surveys, and customs clearance formalities and tax exemption measures for equipment and materials from Japan.
	7. Costs involved in maintenance, control and operation.
	8. Costs involved in various ceremonies.

4-4-4 Construction and Supervisory Plan

The consultant will dispatch his engineer(s) to the project site, whenever required during the progress of work, to give instructions and to attend inspections, etc.

(1) Main supervision program policies

① To maintain close contact with the agencies concerned of both the governments and their responsible managers, keep them well informed about the progress of work, and completion of the Project without delay in accordance with the work schedule.

② To give proper instructions and advice to contractors, so that the construction of the Project can be carried out in strict accordance with the design documents.

③ To employ local construction methods using local materials to the maximum possible extent, in view of the requirements for the fostering of local building technology.

④ To fully demonstrate the effect of a grant aid project, so that Japanese construction methods and technology can be transferred to the local contractors involved, to the maximum possible extent.

⑤ To give proper advice and instructions to the agents concerned regarding the maintenance and control of the Center facilities and equipment after delivery of the Project to the Indonesian Government, thereby enabling the staff of the Center to carry out its operation smoothly.

(2) Breakdown of supervision services

① Cooperation regarding contractual arrangements

Selection of a contractor, determination of contract conclusion method, preparation of a form of contract, evaluation

of cost estimates, and presence at the signing of a contract as a witness.

② Inspection and approval of working drawings etc.

Inspection and approval of working drawings, materials, samples submitted from the contractor, and mechanical/electrical equipment and materials.

③ Giving work instructions

Examination of work programs and schedules, giving instructions to the contractor, and reporting on the progress of work to the Project Owner.

④ Cooperation with payment approval procedure

Examination of invoices submitted by the contractor against the portions of work completed during the progress of work and after completion of the project, and cooperation on the payment thereof.

⑤ Witness of inspections

The consultant will inspect the portions of work completed from time to time during the progress of work for a period from the commencement of work to the completion of the entire Project, and give instructions to the contractor. Upon completion of the Project and following the confirmation that the contract conditions have been duly fulfilled by the contractor, the consultant will witness the taking over of the Project by the Owner from the contractor. Upon confirmation of the acceptance of the Project by the Owner, the services of the consultant will be deemed as completed. In addition, the progress of work, payments of the contract price, and matters regarding the delivery of the Project to the Owner will all be reported at intervals during the execution of the Project to the Japanese Government officials concerned.

4-4-5 Procurement Plan

(1) Construction work

The majority of equipment and materials to be used in the construction of the Center will be procured in Indonesia, so that they can be promptly repaired, and the facilities easily maintained and controlled. Some equipment and materials will be procured from Japan in view of performance requirements and availability. In principle, however, any inexpensive equipment or material will be procured either from Japan or Indonesia.

Based on the above concept, the procurement of equipment and materials for the Project will be planned as follows:

Table 4-9 Material procurement plan by type

Material	Local procurement	Procurement from Japan	Procured from a third country
1. Sand and gravel	○		
2. Cement	○		
3. Lumber	○		
4. Reinforcing steel bars	○		
5. Structural steel shapes	○		
6. Blocks and bricks	○		
7. Tiles	○		
8. Wooden doors and windows	○		
9. Metal doors and windows	○		
10. Glass	○		
11. Waterproofing materials	○		
12. Subsurfacing plywood	○		
13. Roofing materials		○	
14. P-tiles	○		
15. Ceiling boards	○		
16. Paint	○		

17. Miscellaneous metal items	○		
18. Panelboards	○		
19. Lighting fixtures	○		
20. Telephone service equipment	○		
21. Electric wires and conduit pipes	○		
22. Wiring fittings	○		
23. Transformers	○		
24. Low-tension electrical equipment	○		
25. PVC pipes	○		
26. Sanitary fixtures	○		
27. Elevated water tank	○		
28. Pumps	○		
29. Filters		○	

(2) Equipment procurement

Laboratory and analysis equipment will be procured from Japan as it is not available in Indonesia. Copiers, computers, and personal computers, which require a local support system, will be procured in Indonesia.

The equipment to be procured from Japan includes precision equipment, so it must be transported with utmost care. The installation of such precision equipment on site will need the dispatch of a specialist from Japan. In order to effectively operate the precision equipment after its installation, local operators will receive training until they get accustomed to it. Based on the aforementioned concept, major equipment procurement will be planned as shown on the table below:

	Local procurement	Procurement from Japan
Laboratory equipment		Stereomicroscope with photographic device, weak X-ray microscope with TV monitor, prefab freeze refrigerator, clean bench, water distiller, heavy metal effluent treatment device, micro densitometer, density and moisture measuring device, universal projector, band saw for woodworking, disk planer.
Equipment for field work	Ice box and a set of cameras	Data collector, transit level, photometer, binoculars, digital type portable thermo-hygrometer.
Equipment for work	Tractor, dump trailer, plow, rotary electric double-sided grinder, ladder, trestle, polyurethane tank, planer.	Stereoscopic vehicle for work at high places, belt conveyor, chain saw, shoulder type atomizer, seed classifier, mist type sprinkler.
Data processing equipment	Personal computer with serial printer, personal computer with 5-inch disk drive, lap-top personal computer.	
Vehicles	Standard wagon, pick-up, 4WD truck, mini bus, jeep, motorcycle.	
Weather observation equipment		All-weather type measured data recorder.
Office and audiovisual equipment	Office desk, chair, filing cabinet, electronic typewriter, electronic handy calculator, video system, drafting machine, drafting board.	

4-4-6 Executing Schedule Plan

Based on the premise that the Project is executed under the grant aid system of Japan, the construction will be carried out over two fiscal years in view of the construction period required. Hence, it is necessary to break down the overall period into practical design and the execution of construction as outlined below:

Phase I : Practical designing, construction of the Main Building (including the generator house and the pump house), and laboratory equipment.

Phase II : Practical designing, construction of the support facilities, orchard facilities, and related equipment.

The competent agencies of the Indonesian Government involved after the execution of the Exchange Note will be as listed below:

Ministry of Forestry	Preparation of banking arrangement.
Director General of Reforestation and Land Rehabilitation ...	Signing of consultant contract.
Director of Reforestation and Regreening	Approval of practical design drawings.
Tender Committee	Approval of P/Q.
Tender Committee	Witnessing bidding.
Director General of Reforestation and Land Rehabilitation ...	Signing of a contract with a general contractor.
P.U., Sleman district	Granting an application for confirmatory building permission.
P.U., Sleman district	Issuance of a certificate of completion.
Other agencies, Sleman district	Approval of applications for other items.

(1) Practical design activities

Bid documents will be prepared in accordance with the basic design, and will be composed of practical design drawings, specifications, calculations and budgetary statement. At the initial, interim and final stages of practical design, the consultant will hold detailed discussions with the Indonesian Government officials, and after approval of the final documents by the Indonesian Government, will proceed with bidding. The estimated length of time required to complete the above mentioned job is 3.5 months for Phase I and 1 month for Phase II.

(2) Bidding

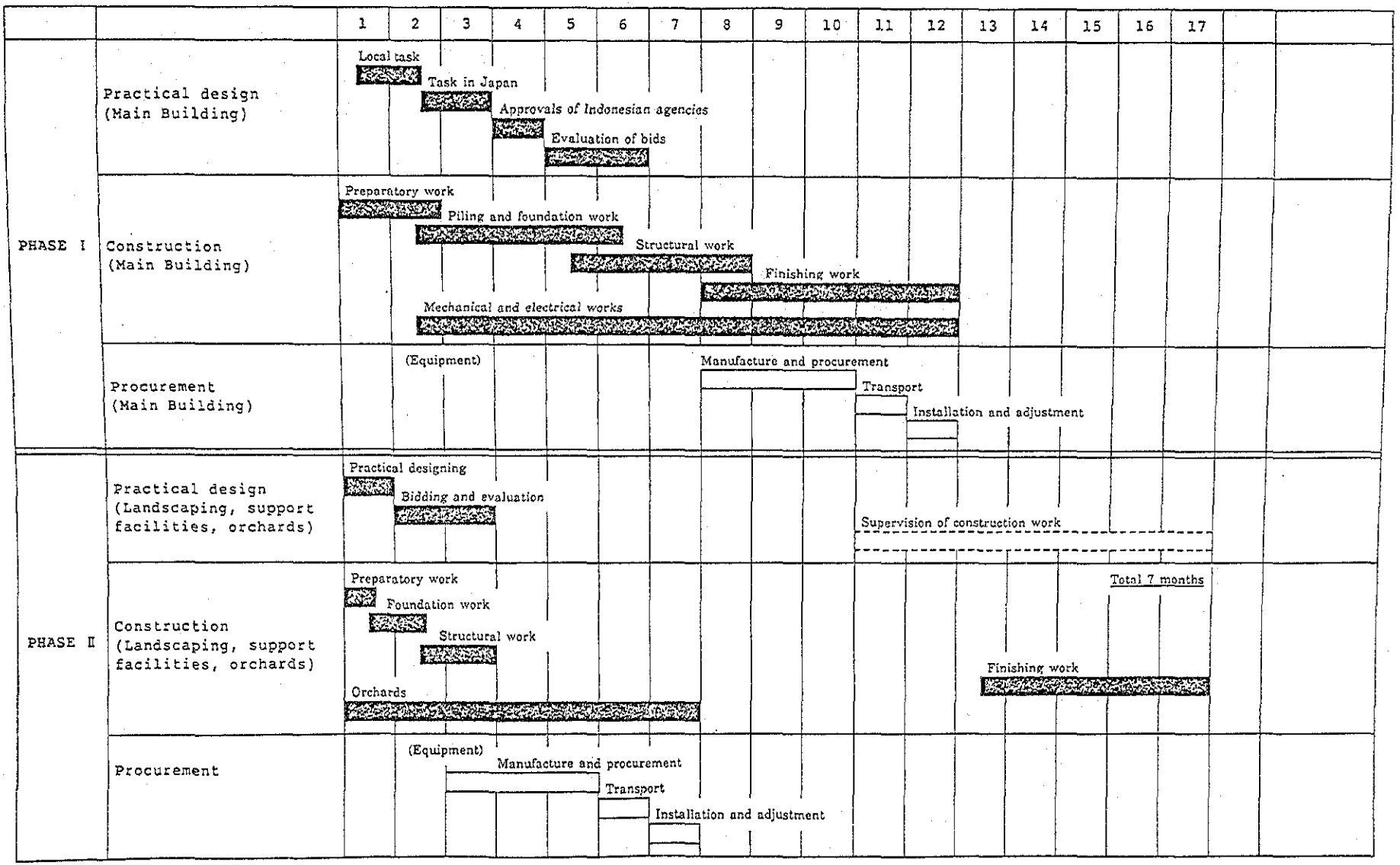
Following completion of practical designing, a public announcement will be made in Japan for the participation of Japanese general contractors. Based on the results of evaluation thereof, the Japanese Consultant will invite prospective bidders, for them to submit their bids in the presence of the organizations and agencies concerned. bidder who presents the lowest price will be deemed the successful bidder insofar as the contents of his bid have been evaluated to be reasonable and appropriate. The successful bidder will then be awarded a contract by the Indonesian Government for the construction of the proposed Forest Tree Improvement Development Center.

The estimated period of time required from bidding to the execution of the construction contract is two months.

(3) Construction work and equipment work

Following the signing of the construction contract, the contractor will commence construction with the authentification of the Japanese Government. Judging from the scale of the proposed Center and the nature of its facilities, and provided that the procurement of construction materials goes smoothly and that the preparatory works within the scope of the Indonesian Government are carried out favorably, Phase I will need an estimated 12 months, and Phase II, 7 months.

Project Execution Schedule



4-4-7 Estimated Project Cost

(1) Preconditions

In calculating an estimated project cost, the following factors have been used as preconditions:

①	Time of calculation	:	February 1990
②	Foreign exchange rate	:	1 US$ = ¥143.6 (Rp 1 = ¥0.08)
③	Construction period	:	Phase I - 12 months Phase II - 7 months
④	Contractor	:	General contractor of Japan
⑤	Miscellaneous	:	Within the limits of the grant aid system of Japan, taxes, levies, import duties, etc., which will otherwise be imposed upon local construction materials and equipment to be used in the Project, and enterprise tax, value-added tax, etc. on the Japanese general contractor, are not included in the estimated project cost.

(2) The breakdown of the Indonesian portion

Site preparation (clearing, grubbing and grading)	¥2,160,000
Landscaping (gardening, planting and fencing)	¥4,050,000
Installation of utility service lines and making of their connections (telephone, electricity and deep well)	¥2,670,000
Furnishings and fixtures (curtains, window blinds, fire extinguishers, and ordinary furniture)	¥3,000,000
Miscellaneous (fees for applications, boring tests, etc.)	¥23,000,000
Total (approx.)	¥34,900,000 Rp436,945,000

SECTION 5 PROJECT EVALUATION AND CONCLUSION

SECTION 5 PROJECT EVALUATION AND CONCLUSION

5-1 Project Evaluation

Possible direct effects in view of the contents of the proposed Center include the following possibilities.

Direct effects:

① Implementation of the production of seeds from the existing forests will enable the scheduled production and stable supply of scions.

② Promotion of tree improvement projects will create such superior scions as those growing faster than existing species as well as being less susceptible to damage by blight and harmful insects, hence contributing to the improvement of productivity of forests.

③ Implementation of the proposed project will enable the collection and utilization of a wide range of information on manpower training, seeds, scions, tree improvement, and reforestation.

Indirect effects:

① An improvement of reforestation technology involved in the protection and revitalization of tropical forests can be expected.

② Systematic reforestation and sustained development can be designed to contribute to a stable development of forestry.

③ The realization of the above-mentioned results will lead to the conservation of forest resources and an increase in the export of forest products, and in linkage with this, produce linked economic effects such as an augmentation of employment opportunities, the creation of skilled manpower, and a substantialization of the social environment.

5-2 Conclusion

Judging from the survey results, the Project will have wide-ranging effects, and its implementation structure is problem-free, hence it fulfils the requirements of the Grant Aid System of Japan.

However, the Project can be more smoothly and more effectively executed if the following is accomplished.

① Establishment of subcenters

Having a large land area, the Republic of Indonesia has a great variety of natural conditions in its regions. As the country still has many undeveloped regions, data on the selection of proper trees obtained from reforestation for a particular location tends to be deficient. The basis for developing tree improvement activities is selecting the species and family that suit the specific characteristics of the region, and therefore it is necessary to produce suitable species or families on a commercial scale. For this reason, a subcenter should be established in each region for the collection of regional data and the carrying out of tree improvement activities on a commercial scale, in parallel with the establishment of this Project, so that such subcenters can be linked to the proposed Center.

② Unified operation of tree improvement-related tests, research and activities

Currently, the Seed Technology Center in Bogor and the Seed Testing Center in Bandung are the related organizations. Their activities are closely connected with tree improvement activities and, therefore, the utilization of efficient improvement activities can be expected through the unified operation of these two organizations.

In addition, the team hopes that Gajah Mada University, Bogor Agricultural Institute and Hasanudin University (South Sulawesi) can extend their cooperation to this end.

③ Technical cooperation from Japan

Current tree improvement activities for industrial reforestation, which are the mainstay of the country's forestry policy, are at an introductory stage, hence there are shortages of both research facilities and engineers. By introducing selective improvement and cross improvement into these activities, the increase of forest products from industrial reforestation, and the enhancement of their morphogenesis can be expected. In view of the trial industrial reforestation being carried out in some regions, Indonesia is ready to accept organizations and technology for tree improvement activities, so the technical cooperation of Japan in this tree improvement is strongly desired.

④ Ensuring operation costs

On the one hand, the promotion of tree improvement activities requires a prolonged period of time, and the production of genetically improved seeds is also a lengthy process; on the other hand, although it is necessary to ensure that the proposed Center is provided with the quick, effective function of collecting seeds from existing species, it will have to be dealt with in a slow, effective manner. Therefore, as funds will be the key to the success of the operation of the Center for the improvement and development of fast-growing species, the team hopes that a sufficient budget can be ensured.

ANNEXES

ANNEX 1

LIST OF B/D AND D/F STUDY TEAM MEMBERS

B/D

Name	Duty	Affliation
Shigeru Eiga	Team Leader	Chief of Breeding Div., Kanto Forest Tree Breeding Institute, Forest Agency, MAFF
Junji Ishizuka	Project Coordinator	Consultant Contract Div., Procurement Department, JICA
Yasunari Baba	Facility Design	Sozosha Co., Ltd.
Hiroyuki Teraya	Orchard Preparation	Sozosha Co., Ltd.

D/F

Name	Duty	Affliation
Susumu Kurinobu	Tree Breeding	Head of First Laboratory, Kanto Forest Tree Breeding Institute, Forest Agency, MAFF
Eiji Kakizawa	Facility Planning	Sozosha Co., Ltd.
Iwao Jinnai	Breeding & Equipment Planning	Sozosha Co., Ltd.

ANNEX 2

STUDY ITINERARY

1. At B/D time
   A. Study Period: Nov. 27 to Dec. 26, 1989 (30 days)
   B. Study Itinerary

Date	Details of activities	
Nov. 27 (Mon.)	11:00 16:30 20:00	Left Narita on GA-873. Arrived in Jakarta. Held a team meeting.
Nov. 28 (Tue.)	09:30 10:30 14:00	Visted JICA Indonesian Office. Paid a courtesy visit to the Japanese Embassy. Paid a courtesy visit to the Directorate General of Reforestation and Land Rehabilitation, Ministry of Forestry and held a joint meeting with the Indonesian Government agencies concerned.
Nov. 29 (Wed.)	11:00 14:00	Held a joint meeting with the Ministry of Forestry agencies. Paid a courtesy visit to the Minister of Forestry.
Nov. 30 (Thur.)	07:40 08:45 09:30 11:00 15:00 18:00	Left Jakarta on GA-432. Arrived in Yogjakarta. Paid a courtesy visit to the Directorate of Reforestation. Visited Gajah Mada University, and held a meeting. Visited the Seed Source Development Center, and held a meeting. Visited the project site.
Dec. 1 (Fri.)	08:30 to evening	Conducted site surveys and visited the Vocational Training Center located near the project site.
Dec. 2 (Sat.)	08:30 to evening	Visited the experimental plantation of Gajah Mada University. Held a meeting with Professor Oemi, the Dean of the Faculty of Forestry, and other persons.
Dec. 3 (Sun.)	08:30 16:00 17:00	Held a team meeting. Left Yogjakarta on GA-437. Arrived in Jakarta.

Date	Details of activities	
Dec. 4 (Mon.)	09:00 09:00 10:00 to evening	Held discussions with the Ministry of Forestry (Team A). Held discussions in the JICA Office (Team B and Mr. Kakizawa). Held a joint meeting with the Ministry of Forestry agencies.
Dec. 5 (Tue.)	10:00	Signed minutes of meeting at the Ministry of Forestry.
Dec. 6 (Wed.)	09:00 14:00 15:00 23:00	Held a joint meeting with the Ministry of Forestry agencies. Visited the JICA Office for reporting the development of activities. Paid a farewell visit to the Japanese Embassy. Team B left for Japan on GA-872.
Dec. 7 (Thur.)	07:30 09:00 10:00	Team B arrived in Tokyo. Visited JICA for reporting subsequent itinerary. Held discussions with the Ministry of Forestry.
Dec. 8 (Fri.)	09:00 14:30	Held discussions with the Ministry of Forestry. Visited JICA to report on and explain how to prepare a technical minutes.
Dec. 9 (Sat.)		Visited the Japanese Club and JETRO for collection of data on local situations.
Dec. 10 (Sun.)		Held a team meeting.
Dec. 11 (Mon.)	09:30	Held discussions with the Ministry of Forestry.
Dec. 12 (Tue.)		Investigated the building construction situation of Indonesia.
Dec. 13 (Wed.)		Investigated the building construction situation of Indonesia.
Dec. 14 (Thur.)	09:30	Held discussions with the Ministry of Forestry.
Dec. 15 (Fri.)	09:00 10:30	Visited the JICA Office to report the interim development of activities. Held discussions with the Ministry of Forestry.

Date	Details of activities	
Dec. 16 (Sat.)	09:30	Visited the Ministry of Forestry for receipt of the first data previously requested.
Dec. 17 (Sun.)	16:00	Left for Yogyakarta on GA-434.
Dec. 18 (Mon.)	09:00 10:30	Held discussions with PLN (Ministry of Electric Power) in Jogjakarta. Held discussions with TELECOM in Jogyakarta.
Dec. 19 (Tue.)	09:00 11:00 14:20 15:30	Held discussions with the Directorate of Building, Ministry of Public Works in Yogjakarta. Held discussions with the Directorate of Water Works, Ministry of Public Works in Yogjakarta. Left Yogyakarta. Arrived in Jakarta.
Dec. 20 (Wed.)	10:00	Held discussions with the Ministry of Forestry and received the second data previously requested. Made a final adjustment of a technical minutes.
Dec. 21 (Thur.)	11:00	Signed the technical minutes.
Dec. 22 (Fri.)	09:00 10:30	Visited the JICA Office to report the process. Visited the Japanese Embassy for reporting the process, and for a courtesy.
Dec. 23 (Sat.)		Investigated the building construction situation of Indonesia. Held a team meeting.
Dec. 24 (Sun.)		Classified and consolidated the collected data. Investigatged the living related matters.
Dec. 25 (Mon.) National holiday	 23:00	Held a team meeting. Classified and consolidated the collected data. Made prepartions for return to Japan. Left Jakarta on GA-872.
Dec. 26 (Tue.)	07:30 11:00	Arrived at Narita. Visited JICA to report the team's return to Japan.

2. At D/F time

A. Study Period: April 2 to April 7, 1990 (for 6 days)

B. Study Itinerary

Date	Details of activities	
April 2 (Mon.)	11:00 16:30	Left Narita on GA-873. Arrived in Jakarta. Held a team meeting.
April 3 (Tue.)	09:30 10:30 14:00	Paid a courtesy visit to the Japanese Embassy. Paid a courtesy visit to JICA Indonesian Office. Paid a courtesy visit to the Directorate General of Reforestation and Land Rehabilitation, Ministry of Forestry.
April 4 (Wed.)	09:00 14:00	Explained the contents of the draft final report to the Directorate General of Reforestation and Land Rehabilitation, and then held a discussion. Held a discussion on the draft minutes at the time of explaining the draft final report.
April 5 (Thur.)	09:00 14:00	Explained the contents of the draft final report, and then held a discussion. Held a discussion on the contents of the minutes at the time of explaining the draft final report.
April 6 (Fri.)	09:00 14:00 23:00	Signed the minutes. Visited JICA Indonesian Office and reported the outcome. Visited the Japanese Embassy and reported the outcome. Left Jakarta for Japan on G-872.
April 7 (Sat.)	07:30	Arrived in Narita on G-872.

ANNEX 3

LIST OF MAIN INTERVIEWEES

[Indonesian side]

Name	Affiliation and post
Ir. Hasjrul Harahap	Minister of Forestry
Ir. Armana Darsidi	Director General of Reforestation and Land Rehabilitation, Ministry of Forestry
Ir. Abdul Manan Siregar	Director of Reforestation and Regreening, Directorate General of Reforestation and Land Rehabilitation
Ir. Waskito Surjodibroto	Secretary of Directorate General of Reforestation and Land Rehabilitation
Ir. Soediro Koesno	Head of Subdivision of DGRLR for Planning and Programming
Ir. Soeparmo	Minister's Secretariat (SEKSEN) Directorate of Foreign Affairs Manager, Multilateral Agreement Sec.
Mr. Asep Suwarna	Assistant Manager, Multilateral Agreement Sec.
Ir. M. Kardi Sabaruddin	Manager, Seedling Section, Directorate of Reforestry and Regreening, Directorate General of Reforestation and Land Rehabilitation.
Ir. Harjono Arisman	Assitant Manager Seed Seedling Section, Directorate of Reforestation and Regreening
Ir. Dayanto Indro Utomo	Assistant Manager, Seedling Breeding Section, Directorate of Reforestation and Regreening
Ir. Budi Santoso	Project Manager, Seed Source Development Center, Kaliuran
Dr. Sumitro	Dean of Faculty of Forestry, Gajah Mada University
Dr. Oemi Hanin Suseno	Professor, Gajah Mada University
Dr. Setijono	Professor, Gajah Mada University

[Japanese side]

Name	Affiliation and post
Mr. Atsushi Ioki	First secretary, Japanese Embassy in Indonesia
Mr. Yasuo Kitano	Head of JICA Office, Indonesia
Dr. Makoto Inaba	Staff, JICA Office, Indonesia
Mr. Yasuyuki Suzuki	Specialist, JICA

(別紙－4)
ANNEX 4

MINUTES OF MEETING
BASIC DESIGN STUDY ON THE PROJECT FOR ESTABLISHMENT OF FOREST TREE IMPROVEMENT DEVELOPMENT CENTER

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 ESTABLISHMENT OF FOREST TREE IMPROVEMENT DEVELOPMENT CENTER, code number HTA-32A of BAPPENAS, (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Republic of Indonesia the study team headed by Dr. Shigeru EIGA, Chief of Breeding Division, Kanto Forest Breeding Institute, Ministry of Agriculture, Forestry and Fisheries, from November 27 to December 26, 1989.

The team had a series of discussion on the Project with officials concerned of the Government of Republic of Indonesia headed by Mr. Armana Darsidi, Director General of Reforestation and Rehabilitation, Ministry of Forestry and conducted a field survey in the Project related places.

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 towards the realization of the Project.

Jakarta, December 5, 1989

Shigeru EIGA
Leader of Mission
Japan International
Cooperation Agency.

Armana Darsidi
Director General of Reforestation
and Land Rehabilitation,
Ministry of Forestry.

JAPANESE GRANT AID SYSTEM

5. Directorate General of Reforestation and Land Rehabilitation has understood Japanese grant aid system explained by the team which includes a principle of usage of a Japanese Consultant firm and a Japanese General Contractor for the construction and supply of material.

UNDERTAKING OF THE GOVERNMENT OF JAPAN

6. The team will convey to the Government of Japan the intention of the Government of Republic of Indonesia that the former takes necessary measures to cooperate in construction of facilitites and material supply.

UNDERTAKING OF THE GOVERNMENT OF THE REPUBLIC OF INDONESIA

7. The Government of the Republic of Indonesia will take necessary measures listed in ANNEX II, as proposed by the team on condition that the Japanese grant aid would be extended to the Project.

O T H E R

8. JICA Consultant Team of Basic Design Study will conduct a supplementary field survey for detail specification of the facilities and conclude technical Minutes within the framework of agreements of this present document.

MAJOR POINTS OF UNDERSTANDING

OBJECTIVE

1. For the smooth operation of the forest plantation programmes set by Indonesian Government, JICA and Ministry of Forestry jointly establish the Forest Tree Improvement Development Center to carry out forest tree breedings and to manage information about necessary breedings and tree characters.

PROJECT SITE

2. The center will be constructed in Purwobinangun, Pakem, Sleman, DIY. The space allocation of the Project is shown in ANNEX I.

R E Q U E S T

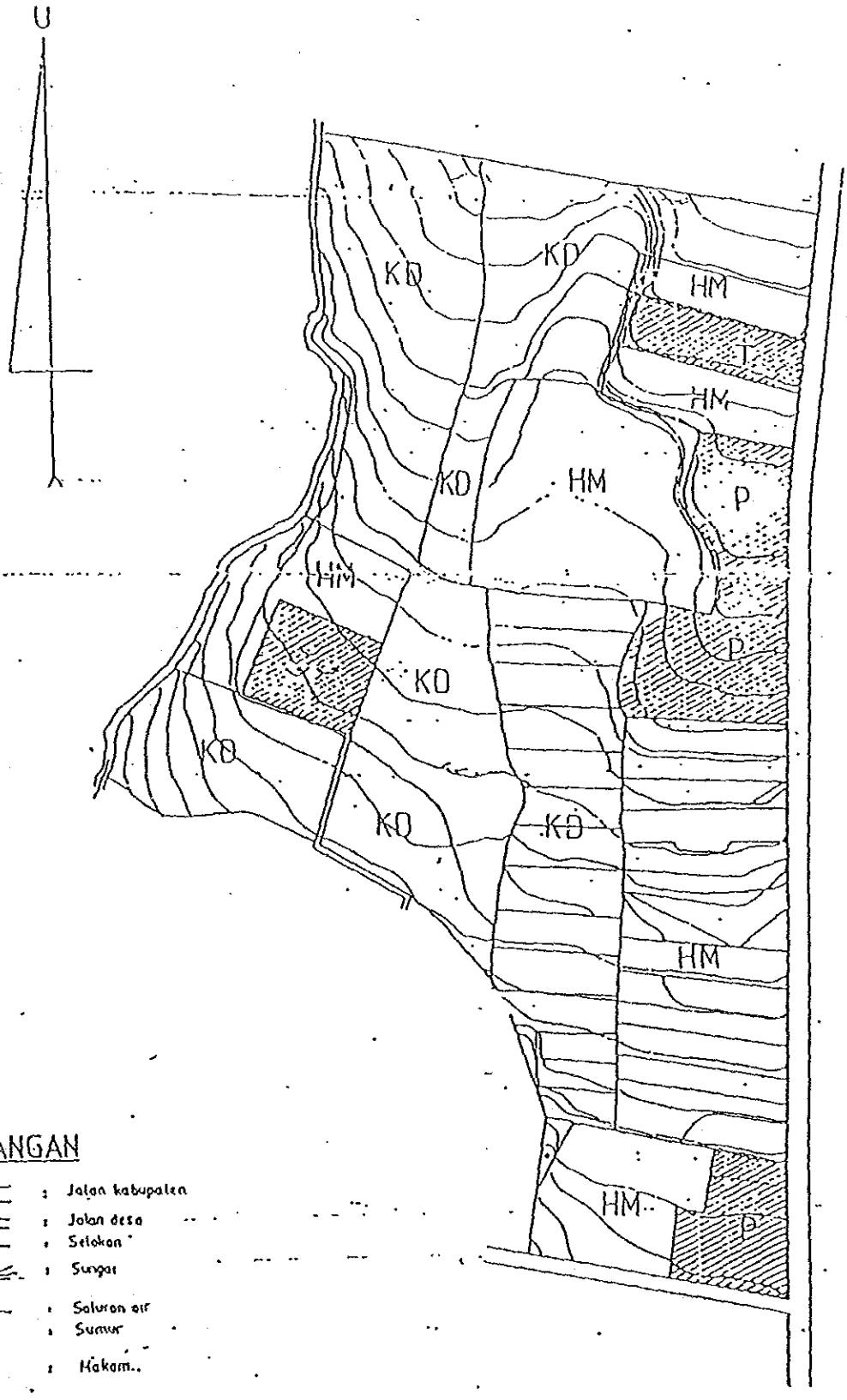
3. The Project components requested by Indonesian side are as follows ;

(1) Construction of Main Building,
(2) Construction of Work Shop Building for Wood,
(3) Construction of Cross Breeding Building,
(4) Construction of supporting structure and related facilities for Breeding,
(5) Provision of Laboratory, field and information equipment,
(6) Provision of vehicle and transportation equipment.

EXECUTING AGENCY

4. Directorate General of Reforestation and Land Rehabilitation is executing agency and responsible for the administration and execution of the Project.

ANNEX-I



KETERANGAN

- : Jalan kabupaten
- : Jalan desa
- : Selokan
- : Sungai
- : Saluran air
- : Sumur
- : Hakam..
- : Kapel
- : Pemukiman
- : Garis kontur (interval 0,50 M)

LOKASI : Desa Purwobinangun Km.14, Kec. Pakem
Kab. Sleman, Prop. D.I. YOGYAKARTA

HM : Hak milik

KO : Tanah kas desa

SKALA. 1 : 3000

ANNEX II

1. To acquire the land or the right-of-way required for the Project implementation.

2. To ensure the land or right-of-way necessary for construction of the temporary access roads from existing rural roads to the proposed construction site.

3. To allow transportation of vehicles, machinery and construction equipment on the existing national and rural roads.

4. To exempt import duties and incidental expenses and to take necessary measures for customs clearance of the materials, equipment and spare parts brought to for the implementation of the Proejct.
   These exemptions shall be subject to the existing Indonesian rules and regulations which are applicable to similar grant aid programs.

5. To assume commissions to the Japanese foreign exchange bank for banking services based on the banking arrangement as follows :

   5.1. Advising Commission of Authorization to Pay
   5.2. Payment Commission

6. To accord Japanese nationals whose services may be required in connection with the supply of products and services under the verified contracts, such facilities as may be necesary for their entry into and stay in Indonesia for the performance of their work.

7. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Indonesia with respect the supply of products and services under the verified contracts.

8. To bear all expenses, other than those to be borne by the grant aid, necessary for the implementation of the Project.

9. To fully maintain the facilities which are constructed under the Japanese grant aid in cooperation with relevant authorities concerned.

MINUTE OF DISCUSSIONS

O N

THE DRAFT FINAL REPORT OF THE BASIC DESIGN STUDY

O N

THE PROJECT FOR THE FOREST TREE IMPROVEMENT DEVELOPMENT CENTER

IN THE REPUBLIC OF INDONESIA

In response to the request made by the Government of the Republic of Indonesia, the Government of Japan decided to conduct a basic design study on the Project for the Forest Tree Improvement Development Center (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA"). JICA sent a study team to the Republic of Indonesia from 27th November to 25th December, 1989.

As a result of the study, JICA prepared a Draft Final Report and dispatched a mission headed by Dr. Susumu Kurinobu, Head of First Laboratory, Kanto Forest Tree Breeding Institute, Forest Agency of Ministry of Agriculture, Forestry and Fisheries (MAFF), to explain and discuss it from 2nd April to 6th April, 1990.

The team held a series of discussions on the Project with the staffs headed by Ir. Abdul Manan Siregar, Director of Reforestation and Regreening.

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

Dr. Susumu Kurinobu

Team Leader,
Basic Design Study Team,
Japan International
Cooperation Agency.

Ir. Armana Darsidi

Director General of
Reforestation and Land
Rehabilitation,
Ministry of Forestry.

A T T A C H M E N T

The major points of understandings are as follows :

1. The Indonesian side agreed in principle on the Basic Design proposed in the Draft Final Report.

2. In response to a request from Indonesian side, Japanese side agreed to provide the following equipments in addition to the original equipment list ;
   a) Two Conviron Germinators,
   b) One Seed Counter.

3. Japan's project-type technical cooperation concerned with this Project was strongly re-requested by the Indonesian side and the team agreed to convey the significance of this technical cooperation to the Japanese Government.

4. The Final Report on the Project will be submitted to the Indonesian Government by the end of May, 1990.

ANNEX 5

HISTORY OF MAJOR ECONOMIC INDEXES

Item	Unit	1982	1983	1984	1985	1986	Remarks
1. Population	Millions	155	159	162	164	167	1985 population as per census. All others are estimated figures.
2. GDP growth (result)		2.2	4.2	6.0	2.3	3.2	Based on the 1979 price until 1983, and on the 1983 price from 1984.
3. GDP per capita	US$	580	560	560	530		Based on World Bank's estimate.
4. Exports (FOB)	1 billion US$	22.33	21.15	21.89	18.59	14.81	
∘ Growth over previous year	%	Δ11.3	Δ5.3	3.5	Δ15.1	Δ20.3	
∘ Exports of petroleum and gas	1 billion US$	18.40	16.14	16.02	12.72	8.28	
∘ Ratio of exports of petroleum and gas to total exports	%	82.4	76.3	73.2	68.4	55.9	
∘ Exports to Japan	1 billion US$	11.19	9.68	10.35	8.59	6.64	
∘ Ratio of exports to Japan to total exports	%	50.1	45.8	47.3	46.2	44.9	
5. Production of crude oil	1 million bbl/day	1.35	1.36	1.37	1.33	1.39	US$ 17.56/bbl from Feb. 1987.
∘ Official price	US$/B	34.53	229.53	29.53	28.53	-	
6. Imports (CIF)	10 billion US$	16.86	16.35	13.88	10.26	10.72	
∘ Growth over previous year	%	27.0	Δ3.0	Δ15.1	Δ26.1	4.5	
∘ Imports from Japan	1 billion US$	4.28	3.79	3.31	2.64	3.13	
∘ Ratio of imports from Japan to total imports	%	25.4	23.2	23.8	25.8	29.2	
7. Foreign currency reserves (year end)	1 billion US$	4.15	4.81	5.75	5.85	5.30	
8. National budget (FY 4-3)	1,000 billion rupiahs	15.60	16.57	20.56	23.05	21.4	1987 budget : Rp22,780 billion
∘ Growth over previous year	%	12.3	6.1	24.1	12.1	Δ7.0	1987 : 6.4%
∘ Petroleum firm tax	1,000 billion rupiahs	9.12	7.90	8.90	9.48	9.74	1987 : 6.98%
∘ Foreign aid	1,000 billion rupiahs	1.85	2.74	4.37	4.30	3.59	1987 : 5.55%
9. Foreign investments (authorized)	100 million US$	12.9	25.2	8.6	7.0	6.1	New projects
∘ Investments by Japan	100 million US$	5.32	4.58	0.31	0.63	2.67	
∘ Ratio of Japanese investments to total investments	%	41.2	18.2	3.6	9.0	43.5	
10. Consumer price index vs. increase over previous year	%	9.69	11.46	8.76	4.31	8.83	
11. Rice production (polished rice)	1 million tons	22.84	24.01	25.93	26.5	26.6	
∘ Growth over previous year	%	2.5	5.1	8.0	2.3	0.2	
12. Rice imports (polished rice)	10 thousand tons	31	117	41	3.4	2.8	
∘ Import value	10 million US$	1.0	3.8	1.3	0.09	0.06	

ANNEX 6

CHANGES IN INDONESIAN LABOR AND EMPLOYMENT STRUCTURE

	1971		1976		1980		1985	
	Number in thousands of persons	Ratio (%)	Number in thousands of persons	Ratio (%)	Number in thousands of persons	Ratio (%)	Number in thousands of persons	Ratio (%)
I. Total population of people over age of ten	80,502	100.0	88,867	100.0	104,353	100.0	120,380	100.0
A. Labor population	41,261	51.3	54,490	61.3	52,421	50.2	63,826	53.0
(1) Gainfully employed	40,422	50.2	53,443	60.1	51,553	49.4	62,457	51.9
(2) Employment candidates	839		1,047	1.2	868	0.8	1,368	1.1
B. Non-labor population	39,246	48.7	34,377	38.7	51,931	49.8	56,554	47.0
(1) Students			12,837	14.4	18,771	18.0	26,174	21.7
(2) Housekeepers			15,762	17.7	22,176	21.3	20,774	17.3
(3) Others			5,777	6.5	10,985	10.5	9,607	8.0
II. Gainfully employed, by industry	40,422	100.0	53,443	100.0	51,553	100.0	62,457	100.0
○ Agriculture and fisheries	26,473	65.5	35,258	66.0	28,834	55.9	34,142	54.7
○ Mining	85	0.2	44	0.1	387	0.8	416	0.7
○ Manufacturing	2,681	6.6	3,560	6.7	4,680	9.1	5,796	9.3
○ Electricity, gas and waterworks	36	0.1	34	0.1	66	0.1	70	0.1
○ Construction	678	1.7	1,098	2.1	1,657	3.2	2,096	3.3
○ Commerce and food/drink	4,261	10.5	6,253	11.7	6,679	13.0	9,345	15.0
○ Transport, warehousing and telecommunications	951	2.4	1,112	2.1	1,468	2.8	1,958	3.1
○ Financial, insurance, real estate and service	93	0.2	74	0.1	302	0.6	250	0.4
○ Public services	4,119	10.2	5,157	9.6	7,145	113.9	8,317	13.3
○ Others	1,039	2.6	853	1.6	334	0.6	67	0.1

Note : All figures above were rounded to two decimal places. "Others" include non-responses.
Source: Censuses conducted in 1971, 1976, 1980 and 1985 by the Directorate of Central Statistics of Indonesia.

ANNEX 7

5-YEAR NATIONAL DEVELOPMENT PLANS AND HISTORY OF INDUSTRIAL REFORESTATION (REPUBLIC OF INDONESIA)

Item \ Year	1st Development Plan (1969/70 ~ 1973/74)	2nd Development Plan (1974/75 ~ 1978/79)	3rd Development Plan (1979/80 ~ 1983/84)
Focal tasks of 5-year plan	Urgent Stabilization of National Life: (1) Expansion of agriculture, particularly food production. (2) Expansion of production of clothes, improvement of infrastructure, and fostering of agro-industries. (3) Control of inflation. Rated GDP growth: Target - 5 % Result - 7.7%	Stabilization of Foundation for Economic Development, and Promotion of Balanced Development: (1) Sufficiency of necessities of life and improvement of infrastructure. (2) Equalization of social welfare and income distribution. (3) Creation of employment opportunities. (4) Stabilization of foundations for fostering of resources processing industries. GDP growth: Target - 7.5% Result - 7.7%	Development, and Impartial Distribution of Development Effects: (1) Realization of economic growth. (2) Stabilization towards sound and dynamic societies. (3) Promotion of export of non-petroleum products. (4) Fostering of labor-intensive industry and enterprises. (5) Encouragement of private activities (6) Accomplishment of self-sufficiency in food. GDP growth: Target - 6.5% Result - 6.1%
	Introduction of foreign currencies (local areas): (1) Acquisition of foreign currencies. (2) Fostering of import agents.	Selective introduction of foreign currencies: (1) Establishment of priority areas and prohibitive areas for foreign currency introduction.	Controlled introduction of foreign currencies: (1) Specification of positive list. (2) Joint ventures by grant aid style projects.

Year / Item	1st Development Plan (1969/70 ~ 1973/74)	2nd Development Plan (1974/75 ~ 1978/79)	3rd Development Plan (1979/80 ~ 1983/84)
Focal points in foreign currency policy	(3) Development of industries capable of gaining development returns in a short period. (4) Fostering of modern industries.	(2) Becoming Indonesian by transfer of technologies. (3) Dispersion of siting.	(3) Clarification of production scale, location and partners by area. (4) Tie-up with medium- and small-sized enterprises. (5) Promotion of becoming Indonesian and プリブミ化.
Economy	(1) Quantitative expansion of production of resources. (2) Augmentation of foreign investments. (3) Stabilization of economy.	(1) Transfer towards high-priced resources. (2) Stagnant foreign investment. (3) Expansion of production in plants and development of domestic production (mainly end-product production area, fertilizers, cement, etc.) (4) Improved balance of international payments and subsequent crisis of PERTAMINA.	(1) Improved balance of international payments (revenue and expenditure ended in the black.) (2) Good rice harvest for three consecutive years (20 million tons) and virtual accomplishment of self-sufficiency in rice. (3) Expansion of industrial production (textiles, household electric appliances, automobiles, etc.)
Other main matters	(1) West Irian reverted to Indonesia (1969). (2) A conference of Indonesian creditor nations was organized in 1966. (3) Diplomatic relations with China were frozen in 1967.	(1) PERTAMINA fell in crisis in 1975. (2) North and South Vietnam were united in 1975. (3) The rupiah was devalued in November 1978, for the first time since the first oil crisis which took place in 1973. (4) Vietnam invaded Cambodia in December 1979.	(1) The Iranian Revolution took place in January 1979. (2) Soviet Union invaded Afghanistan in December 1979. (3) The second oil price rise took place in 1979 ~ 1980. (4) The rupiah was devalued in March 1983.

ANNEX 8

BASIC VALUES UNDER 4TH 5-YEAR PLAN

Population growth	2% (year)
GDP growth	5% (year)
New gainfully occupied	9,300,000
Price rise	8% (year)
Total investment	Rp145,224,500,000,000
Total investment increase	19.1% (year)

ANNEX 9

FOREST STOCK BY ISLAND

(In thousand m^2)

Region	Stock	Ratio (%)
Sumatra	1,035,488	18.9
Kalimantan	3,084,461	56.5
Sulawesi	357,608	6.5
West Nusa Tenggara	1,573	0.1
Maluku	314,210	6.1
Irian Jaya	642,001	11.9
Total	5,435,341	100 %

Source: Forestry Statistics of Indonesia 1987/1988

ANNEX 10

AREA OF BARE LAND BY ISLAND

(In thousand m^2)

Island	Within forests	Outside forests	Total	Ratio (%)
Sumatra	3,685	1,073	4,758	25.9
Java	263	537	800	4.4
Kalimantan	1,320	946	2,266	12.3
Sulawesi	3,870	3,487	7,357	40.1
Nusa Tenggara	611	2,208	2,819	15.4
Maluku	128	86	214	1.2
Irian Jaya	-	150	150	0.7
Total	9,877	8,487	18,364	100 %

Source: "1981 Forestries in Southeast Asia and Oceania" written by Takeo Shinohara.

ANNEX 11

AREA OF FORESTRY BY ISLAND

(In ha)

Region	Total area	Protective forest and reserved forest	Park and preserved forest, and natural protective forest	Production limited forest, and converted forest	Productive forest not for diversion	Productive forest for diversion	Total forest area
Sumatra	46,949,328	7,093,600	3,683,000	7,578,500	6,820,600	5,031,500	30,207,200
Java	13,218,970	554,000	444,615	-	2,014,400	-	3,013,315
Kalimantan	54,824,700	6,923,700	4,100,700	11,415,400	14,234,500	8,293,400	44,967,700
Sulawesi	19,661,451	3,867,200	806,300	3,925,500	2,092,400	1,993,200	13,284,600
Bali	563,286	84,100	32,000	5,700	3,900	-	125,700
Nusa Tenggara	6,754,235	1,159,300	266,700	621,800	502,200	2,997,500	5,547,500
Maluku	8,572,800	1,550,400	441,000	2,075,600	1,029,900	436,400	5,533,300
Irian Jaya	41,066,000	8,648,500	8,311,800	4,732,300	7,123,500	11,775,400	40,591,500
Timor	1,460,937	435,300	38,800	170,500	45,200	10,000	699,800
Total	193,071,707	30,316,100	18,725,215	30,525,300	33,866,600	30,537,400	143,970,615

Source: Forestry Statistics of Indonesia 1985/1986

Note : In addition to the acreage above, coastal forests totalling about 1,000 ha exist.

ANNEX 12-1

FORESTRY RELATED INDEXES UNDER THREE 5-YEAR DEVELOPMENT PLANS IN INDONESIA

	UNIT	IV - 1989	V - 1994	VI - 1999	Total
Lumber production:					
Logs of general type	Million m^3	38.80	42.49	47.40	128.69
Logs for chips	Million m^3	1.9	3.5	4.6	10.00
Logs for firewood	Million m^3	157.72	176.72	197.99	532.43
Lumber	Million m^3	12.10	14.43	17.22	43.75
Plywood	Million m^3	7.00	9.14	11.95	28.09
Exports:					
Lumber	Million m^3	3.70	4.21	4.78	12.69
Plywood	Million m^3	4.50	5.80	7.47	17.77
Reforestation:					
Preserved forest etc.	Thousand ha	800	1,600	1,800	4,200
Industrial reforestation	Thousand ha	1,010	1,575	1,815	4,400
General species	Thousand ha	660	1,150	1,295	3,105
Pulp species	Thousand ha	350	425	520	1,295

ANNEX 12-2

FORESTRY DEVELOPMENT PROGRAMS

- Program for research and evaluation of resources and environments.
- Program for increment of forestry production.
- Program for preservation of forests, land and water.
- Program for reforestation, and restoration of damaged weirs.
- Resources and environment control program.
- Coastal region development program.
- Program for agricultural and irrigation research.
- Program for agricultural and irrigation education.
- Program for optimization of management of public facilities.
- Program for development of younger generation and sports.
- Program for migration of population.

ANNEX 13

PRESENT STATUS OF SEED ORCHARDS IN INDONESIA

(In ha)

Species	Classification	Remarks	North Sumatra	Central Sumatra	South Sumatra	West Java	Central Java	East Java	Sulawesi	Nusa Tenggara	Timor	Total
Merkusi pine	Clone selected by family	Test forest	30			96	96	96	10			288 40
Europyla (selected from natural forest in Nusa Tenggara)	Selected by group	Test forest			50					105		155
		Test forest		5	13					16	9	43
Kamerere	Selected by group	Test forest			47				46			93
		Test forest			3				4			7
Teak	Clone					2.25						2.25
			30	5	113	2.25	96	96	60	121	9	628.25

ANNEX 14

PRESENT STATUS OF BREEDING FORESTS IN INDONESIA

(In ha)

Species	South Sumatra	West Java	Central Java	West Kalimantan	East Kalimantan	Sulawesi	Nusa Tenggara	Total
Mangium	325	20	6	150		100		601
Gin-nemu						35		35
ククイノキ						950	50	1,000
Keruing					65			65
Meranti (type 3)				125				125
	325	20	6	275	65	1,085	50	1,826

ANNEX 15

PRESENT STATUS OF BREEDING FORESTS BY REGION IN INDONESIA

(In ha)

Species	North Sumatera	West Java	Central Java	East Java	West Kalimantan	East Kalimantan	Sulawesi	Nusa Tenggara	Timor	Irian Jaya	Total
Merkusii pine	200	363	251	315			200				1,329
Europhyla								825	102		927
Kamerere							100				100
Morukka-nemu		20									20
Teak		75									75
Gin-nemu					197						197
Ooba-mahoganii		23									23
Keruing						250					250
ラサマラノキ		257									257
Nan'you-sugi										100	100
Agathis		15	76	41		20					152
	200	753	32	356	197	270	300	825	102	100	3,430

ANNEX 16

PRESENT STATUS OF PROVENANCE TEST REGIONS IN INDONESIA

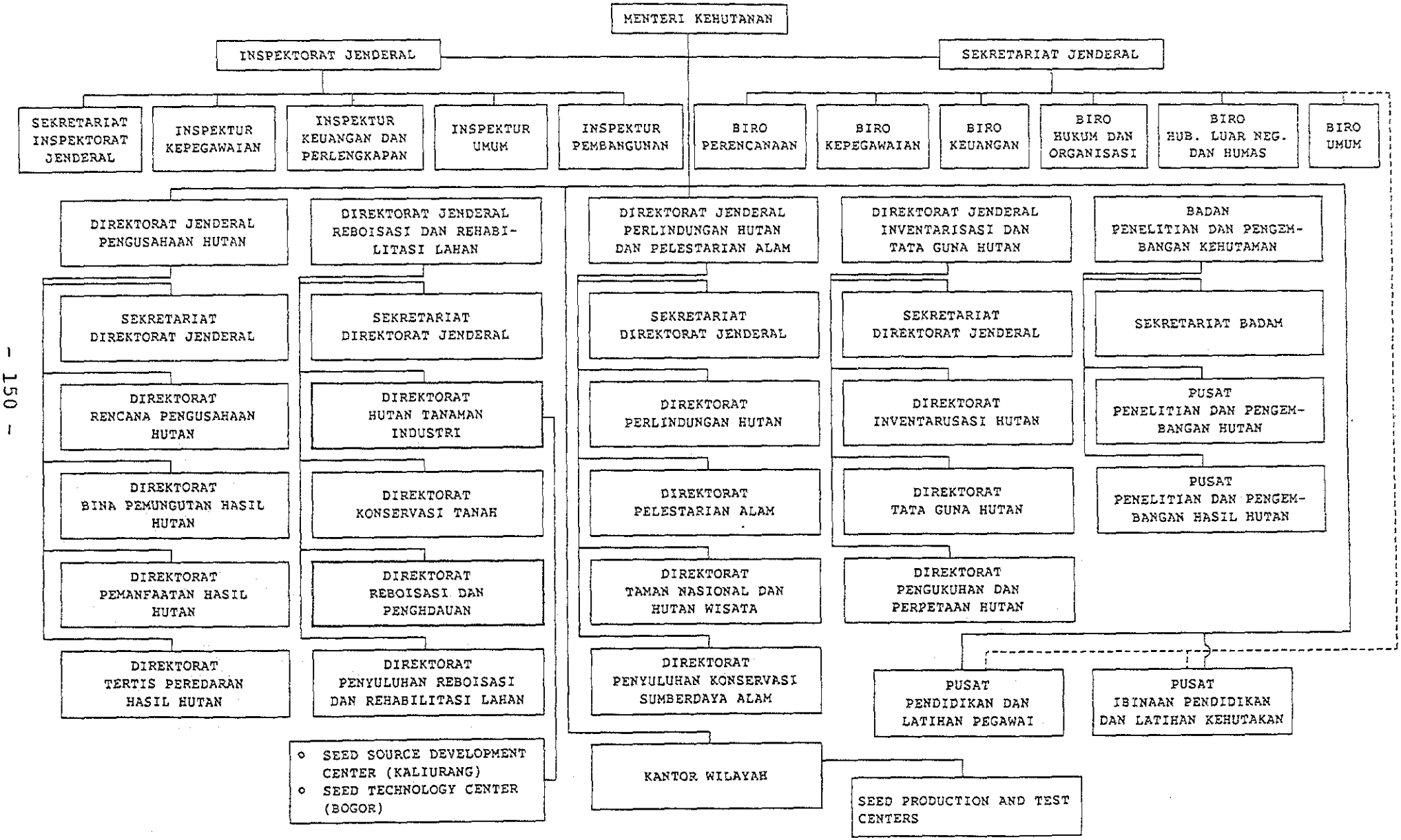
(In ha)

Species	South Sumatera	Central Java	East Java	West Kalimantan	Sulawesi	Total	Remarks
Merkusii pine					2	2	
カリビヤマラ	2					2	
Teak		4			2	6	
Mangium	5			5		10	
Eucalyptus	2		2	4		8	
Species adaptability test	4			4	2	10	
	13	4	2	13	6	38	

ANNEX 17

ORGANIZATIONS OF THE MINISTRY OF FORESTRY AND TECHNOLOGY IMPLEMENTING AGENCIES

As of January 1989



ANNEX 18

STAFFING PLAN

Section	Charge	Researcher or engineer (number)	General staff (number)	Total	
Head's room		Director (1)		1	
General Affairs	1. General Affairs	Head of AD (1), Typist (1), Secretary (1)	AD. Staff (1), Security Guard (2) Driver (2)	8	14
	2. Personnel Affairs	AD. Staff (1)		1	
	3. Accounting	Typist (1), Treasury (1)	AD. Staff (1)	3	
	4. Statistics	AD. Staff (1), Librarian (1)		2	
Planning	1. Facility Planning	Mapping (1), Soil Specialist (1)	Mapping (1)	3	12
	2. Research Planning	Head of Field Operation (1), Soil Specialist (2) Tree Breeder (1), Local Project Leader (1)	Soil Specialist (1)	6	
	3. Program Evaluation	Programmer (1), Librarian (1), Tree Breeder (1)		3	
Tree Improvement Testing	1. Selective Tree Testing	Head Researcher (1), Emtorologist (2), G & Y (1) Tree Breeder (1)	Tree Breeder (1) Emtorologist (1)	8	23
	2. Propagation	Head Researcher (1), Pathologist (2) Tissue Culturist (3)	Tissue Culturist (2) Pathologist (1)	9	
	3. Data Processing	Head Researcher (1), Programmer (1) Tree Breeder (1), EDP Specialist (1)	Tree Breeder (1)	6	
Field Operation	1. Seeds	Seed Technologist (2) Tree Climber (1)	Seed Technologist (1)	4	12
	2. Seedlings	Grafter (1) Nurseryman (2)	Growth & Yield (1)	4	
	3. Orchards	Orchardman (2), Growth & Yield (1)	Orchardman (1)	4	
Total		45	17	62	

Note: 6 Japanese specialists are not included in the table above.

ANNEX 19

CHECK FOR POSSIBILITY OF DUPLICATION WITH SIMILAR PROJECTS

(1) Technical Cooperation by Foreign Countries (Directorate General of Reforestation and Land Rehabilitation)

- o Land Rehabilitaiton and Agroforestry Development Project in Cimanuk Watershed (ADB-762 INO Part B)
- o Citanduy II Watershed Extention Project (USAID 487-T-083)
- o Cibaliung Irrigation Project (ADB-475 INO)
- o Simalungan Irrigation Project (ADB-638 INO)
- o Study on Soil Conservation in Jatigede Catchment Area (IBRD 2543 IND)
- o Upland Agriculture abd Soil Conservation Project in Jratun Seluna and Brabtas Watershed (USAID 497-T-083 & IBRD 2474-0-IND)
- o Kali Konto Project Phase III (Negeri Belanda ATA-205)
- o NTT Integrated Area Development Project (Australia ATA 138)
- o Mechanized Nursery and Plantation Project Phase III (Finland-ATA 267)
- o Geo Information System for Land Use Zoning and Watershed Management (Negeri Belanda)
- o Watershed Rehabilitation in East Nusa Tenggara (WFP 2521)
- o Beekeeping For Rural Development (FAO-INS/85/008/A/ 01/12)
- o Technical Assistance for Feasibility Study on Timber Estate Development (T.A./ADB-807 INO)
- o ASEAN-US Watershed Project (498-0258.03)
- o ASEAN-Canada Forest Tree Seed and Benetic Resource
- o ASEAN-New Zealand Afforestation Project
- o ASEAN-Australia Forest Tree Improvement Program

(2) Cooperation from Japan

① Project type technical cooperation

a. Sulawesi Agricultural Development Project (December 23, 1976 ~ May 23, 1982)

b. Java Mountain Forest Production Technology Project (April 20, 1978 ~ June 19, 1982)

c. Sumatra Reforestation Technology (April 12, 1979 ~ March 31, 1988)

d. Research of Tropical Rain Forests (January 1, 1985 ~ December 31, 1989). Evaluation (July 1989)

e. Study on Soil Conservation and Reforestation in Sulawesi (July 21, 1988 ~ July 20, 1993)

② Developments and researches

a. Kalimantan Forest Development and Harbor Construction Project (1970)

b. Research of Forestry Resources in プカロシガン, Central Java (1976 ~ 1977)

c. Research of Forestry Resources in South Sumatra (1977 ~ 1980)

d. マルンダ Lumber Distribution Area Development Project (1980 ~ 1981)

e. Unutilized Trees Utilization Project (1980 ~ 1981)

f. Model Industrial Reforestation Development Project (1988 ~ 1989)

③ Basic design studies by Grant Aid System

a. Basic Project for Establishment of Institute of Reforestation Technology, Mulawarman University (1978)

b. Project for Establishment of Trial Afforestation Research and Development Center in South Sumatra (1980)

c. Tropical Rain Forest Research Center (1988)

d. Project for Provision of Reforestation Equipment (1985). Two Units in North Sumatra and ランポン

e. Project for Improvement of Reforestation Equipment in East Kalimantan (1988) E/N 3 Units (East Kalimantan)

ANNEX 20

COST OF MAINTENANCE AND CONTROL

① The personnel expenses based on the composition of staff shown below as of the fiscal year (1991/92) when the proposed Center is scheduled to open, are estimated as folows:

Post	Number	Monthly salary/person	Monthly total	Annual total
Head	1	385,000	385,000	4,620,000
Head researcher	3	715,000	2,145,000	25,740,000
Section manager.	4	330,000	1,320,000	15,840,000
Researcher	9	385,000	3,465,000	41,580,000
Engineer	8	275,000	2,200,000	26,400,000
Technical helper	23	172,500	4,427,500	53,130,000
AD staff	15	165,000	2,475,000	29,700,000
Secretary	1	165,000	165,000	1,980,000
Typist	2	110,000	220,000	2,640,000
Driver	2	110,000	220,000	2,640,000
Total	68		17,022,500	204,270,000

Notes: 1. Salaries are based on the responses to the questionnaire.
2. The assumed rate of basic salary increase is 5% per annum.
3. The salary for a section manager is equal to the salary of a controller.
4. The salary for a researcher is assumed.

② Maintenance and control costs for facilities and equipment

a. Electric charges

- Basic charge (contract demand: 250 KVA)

  250KVA × Rp3160/KVA = 790,000 R//month

- Charge for actual consumption (working hours: 8 a.m. ~ 4 p.m.)

  250KVA × 0.6 (rate of operation) × Rp68/KVA × 8 hrs./day × 25 days ··· Rp2,040,000/month

  Subtotal: (790,000 + 2,040,000) × 12 months/year ··· Rp33,960,000/year

b. 75KVA generator (Power outage is assumed to occur once a week)

- Oil cost and replacement cost of filters Rp2,000,000/year

c. Sewage treatment (cleaning of a purification tank by vacuum car is assumed to be carried out once a year)

- Rp25,000/m^3 × 10m^3 × 1 round/year Rp250,000/year

d. Well lift pump (including the cost of inspection, repair, part replacement, and overheads, which are assumed to take place twice a year).

- Rp50,000/round × 2 rounds/year ... Rp100,000/year

e. Cooler (including overheads. Filter replacement and gas replenishment are assumed to take place once a year)

- Service (including filter replacement and parts) Rp15,000/unit × 33 units Rp495,000/year

- Gas replenishment Rp25,000/unit × 33 units ... Rp825,000/year

Subtotal Rp495,000 + Rp825,000 ..... Rp1,320,000/year

f. Lighting fixtures (a lamp is assumed to be replaced once a year. Overhead is included.)

- FL 40W × 1: Rp3,750/p'c × 388 p'cs × 1 round/year Rp1,450,000/year

- FL 20W × 1: Rp3,000/p'c × 76 p'cs × 1 round/year Rp228,000/year

- Incandescent lights: Rp1,000/ea × 800ea × 1 round/year Rp80,000/year

Subtotal Rp1,455,000 + Rp228,000 + Rp80,000 ..... Rp1,763,000/year

g. Propane in bottles (four 25m^3 bottles for 50kg use are assumed to be provided, and replaced once every other month. Overheads are included.)

Total quantity/year = 4 bottles × 6 rounds = 24 bottles

Subtotal Rp10,430/bottle × 24 bottles ≒ ··· Rp250,000/year

h. Telephone charges

- Local call: Rp75/3 min × 20 rounds/section·day × 4 sections × 2 calls × 24 days × 12 months ···· Rp3,600,000/year

- Toll calls : (Jakarta) Rp225/min × 10 rounds/day × 5 min/round × 25 days × 12 months ····· Rp3,375,000/year

Subtotal Rp3,600,000 + Rp3,375,000 ··· Rp6,975,000/year

i. Building repairs (replacement of glass, repainting, repair of roof and tiles)

Subtotal: Wages of craftsman (including material cost): Rp4,000/man·day × total 60 men·day/year ····· Rp240,000/year

j. Repair equipment for general use (repair of equipment, replacement of parts, etc.)

Subtotal: Wage of craftsman (including parts cost): Rp6,000/man·day × total 120 men·day/year ····· Rp720,000/year

k. Gasoline and oil (for heavy equipment, automobile, and nursery equipment)

- Gasoline: Rp440/ℓ × 12 units × 50ℓ/unit·month × 12 months ···· Rp3,168,000/year

- Gas oil : Rp207/ℓ × 10 units × 30ℓ/unit·month ≒ × 12 months ····· Rp745,000/year

Subtotal Rp3,18,000 + Rp745,000 ····· ≒ Rp3,242,000/year

l. Office supplies (stationery, recording paper, perishables for office equipment, etc.)

- (The cost of office supplies is assumed to be 10% of "personnel expenses + ① ~ ⑪)

Subtotal (Rp204,270,000 + Rp51,491,52) × 0.1
····· Rp25,576,000/year

m. Maintenance costs for copier, computer, etc. which will begin from the second year after the date of contract with Indonesian agents. (The costs below include those of the equipment for the first year)

- Copier: Rp700,000/unit·year × 1 unit
····· Rp700,000/year

- Personal computer w/printer: Rp1,200,000/unit· year × 10 units ····· Rp12,000,000/year

Subtotal ····· Rp12,700,000/year

n. Cost of repairs and perishables for laboratory equipment (repair of mechanical failures, replenishment of chemicals and perishables, etc.)

- Repair of mechanical failures: Rp6,000/man·year × total 120 men·day/year ····· Rp720,000/year

- Chemicals and other perishables ··· Rp5,000,000/year

- Gas (five 12kg bottles per month)

Rp7,100/bottle × 5 bottles/month × 12 months ·····
Rp426,000/year

Subtotal Rp720,000 + Rp5,000,000 + Rp426,000 ·····
Rp426,000/year

Total of a ~ n ····· Rp57,332,000/year