4-3 Site Plan

In consideration of the climate in this region, the wind blows from the south between March and October, and from the north between November and February. So the facilities will be laid out from east to west leaving wide space from ARI's existing facilities for good ventilation.

A passage within the site will run from west to east in consideration of entry from the front road and connection with the existing laboratories and accomodations. Along the passage, the paths of flow for people and genetic resources will be separated.

As was described in 3-2-1, the functions of the Seed Bank can be classified as follows:

Preservation and distribution of seeds, information management on seeds, and publicity work.
Research and training in the fields of genetic resources, and managing functions for coordination.
Function as a link between the Seed Bank and the existing laboratories.
Testing, isolation, and sterilization of introduced genetic resources in quarantine.
Accomodations of lecturers for training and researchers for group work.

It is necessary that the facilities should be so designed as to be able to keep its functions in close contact with one another to display combined effects.

According to the above-mentioned reasons, the Basic Design Study Team explained the conceptual site plan (Fig. 4-2) during the discussion with the Burmese government in which the scope of the project had been divided into four conceptual blocks.

1) Managing and training activities, research activities, information management, and section for ARI's existing laboratories
2) Seed preservation activities
3) Quarantine and sterilization
4) Accomodations

But as the result of serious study and analysis by the Basic Design Study Team, it was proved that the conceptual blocks should be constituted again under the conditions of the following reasons.

The information management should be in a position between the research activities and the seed preservation activities.
The facilities of the section for ARI's existing laboratories, should be situated near ARI's existing laboratories.

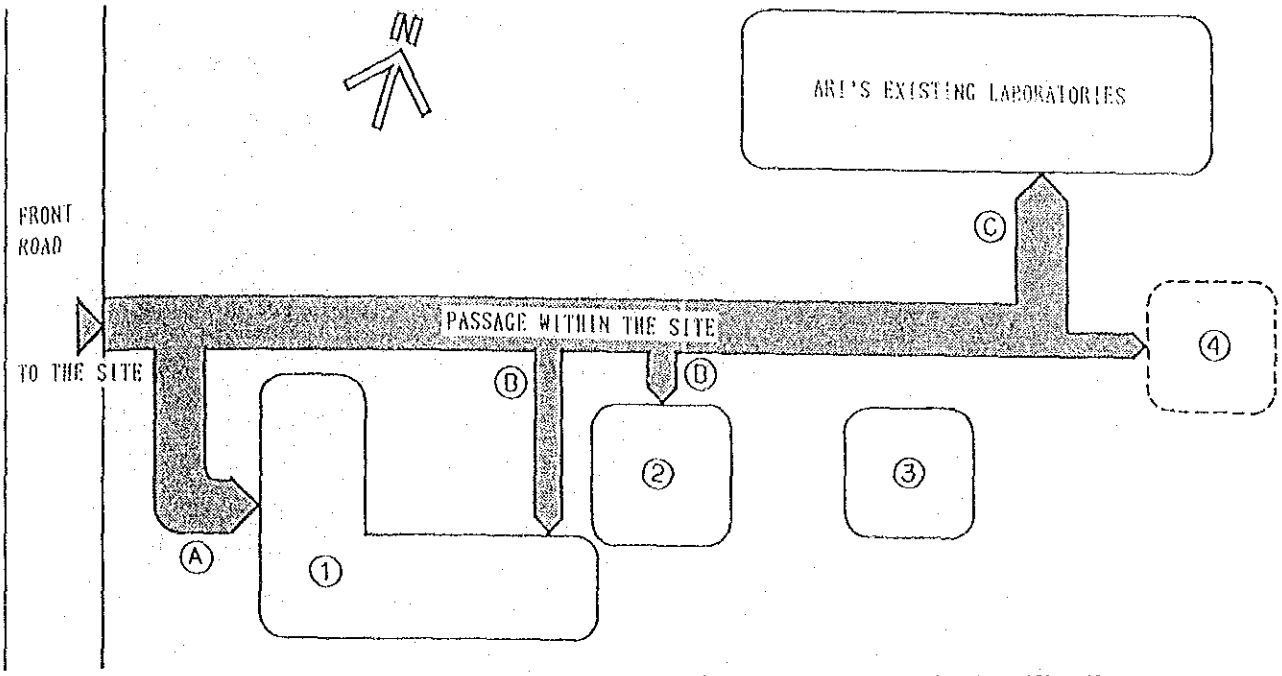
Therefore the above four conceptual blocks will be divided into the following seven blocks.

1) Management and training activities.
2) Research activities
3) Seed preservation activities
4) Information management
5) Facilities for ARI's existing laboratories
6) Quarantine and sterilization
7) Accomodations

In terms of the activities, blocks 2),3),4) and blocks 3),4),5) are closely related to each other. Block 1) has relations with all facilities, but block 6) should be established apart from the other blocks on account of its function. Fig. 4-3 shows the most functional arrangement.

The order of the facilities from west to east are as follows; Administration and training section. research laboratory section, Seed bank. Divisions' sections, and Net house. Accomodations will be located near the northwest corner of the site.

A comfortable working and studying environment will be created by the inner court located between the buildings and the ventilated wall.

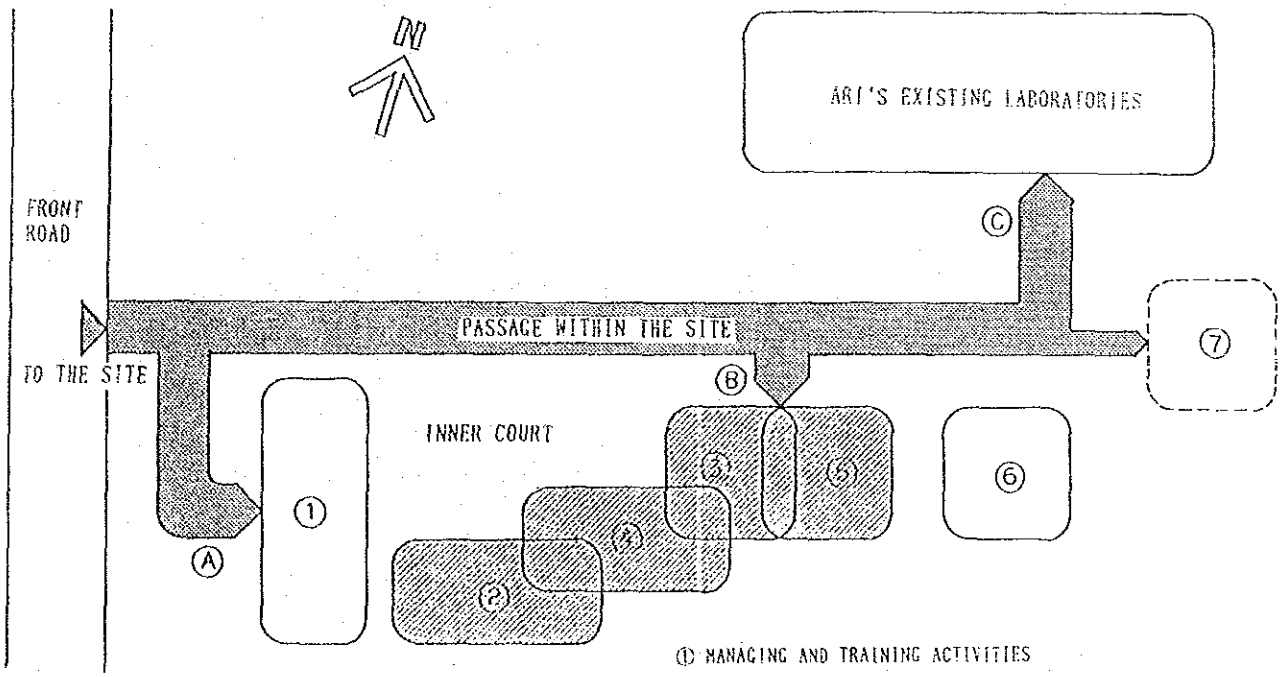


① MANAGING AND TRAINING ACTIVITIES , RESEARCH ACTIVITIES ,
INFORMATION MANAGEMENT , AND SECTION OF THE ARI'S EXISTING LABORATORIES

Ⓐ PEOPLE'S APPROACH
Ⓑ GENETIC RESOURCES
Ⓒ TO EXISTING FACILITIES

② SEED PRESERVATION ACTIVITIES
③ QUARANTINE AND STERILIZATION
④ ACCOMODATIONS

FIG. 4-2 CONCEPTUAL BLOCK PLAN (1)



Ⓐ PEOPLE'S APPROACH
Ⓑ GENETIC RESOURCES
Ⓒ TO EXISTING FACILITIES

① MANAGING AND TRAINING ACTIVITIES
② RESEARCH ACTIVITIES
③ SEED PRESERVATION ACTIVITIES
④ INFORMATION MANAGEMENT
⑤ SECTION OF THE ARI'S EXISTING LABORATORIES
⑥ QUARANTINE AND STERILIZATION
⑦ ACCOMODATIONS

FIG. 4-3 CONCEPTUAL BLOCK PLAN (2)

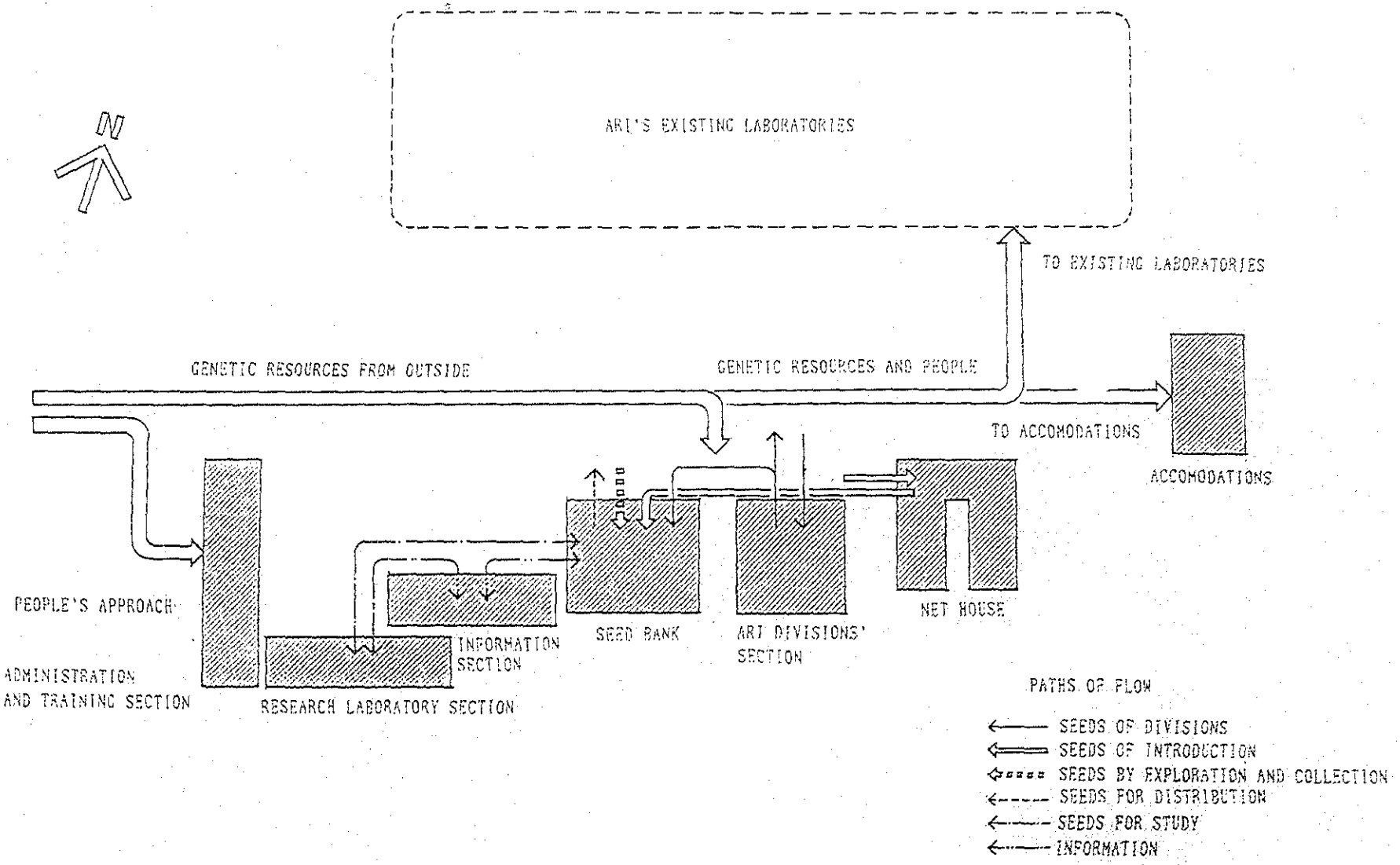


FIG.4-4 FLOW PLAN IN THE SITE

4-4 Architectural Plan

(1) Administration, training, and research laboratory section

The research function is closely related with the activities of the Seed Bank in promotion of breeding. And this function comprises three fields; the research on exploration, collection, and introduction methods of genetic resources, the research on classification and evaluation methods, and the research on multiplication and preservation methods.

The training function is meant to secure human resources to operate the project for breeding work and to collect genetic resources in Burma. And this function is intended for experts who are now working in other laboratories and experimental stations. The training will be carried out by using audiovisuals, laboratory equipment and so on.

And the managing function is necessary for the adjustment of research and training activities to control the Seed Bank Center smoothly.

The administration and training section will be laid out facing the front road to represent the facade. And this section, having a main entrance on the first floor, is expected to have a number of visitors, so it will be provided with an entrance hall and a reception room. A managing office and a printing room for the managing office will also be located on the first floor. The Project Manager's room, conference rooms, and an experts' room will be located on the second floor. A training room, a preparation room for training, a library, and a students' room will be located on the third floor.

As to the research section, the first, second, and third floors have the same ground plan (consisting of a research office, laboratories, a work shop, and an experiment equipment room). Each floor will provide a different section.

The first floor will be used for the introduction of genetic resources.

The second floor is for the evaluation of the genetic resources and the third floor is for research into seed preservation methods.

(2) Information Section

This section consists of the following rooms: An information office and a computer room (for reception and registration of information, information management, and establishment of a data bank), a compiling, copying and printing room with a dark room (for preparation, printing, and distribution of catalogues).

(3) Seed Bank

The Seed Bank is provided with such functions as follows.

- Preservation of seeds in short-term and long-to medium-term storage. (The seeds are collected through exploration, carried in from Divisions' Section, and carried in through epidemic prevention tests in the isolation and sterilization facility.)
- Cleaning, drying, and packing the seeds which will be carried into storages
- Germination test of the stored seeds.
- Preparation of samples for specimens.
- Distribution of short-term stored seeds.

The seed Bank will comprise a cleaning room, a drying room, a packing room for storage, a distribution room, a germination test room, a specimen room, and a machinery room.

As to the long-to medium-term storage, in consideration of workers' health and effective workability, the reach-in type will be adopted. Seeds will be stored at 5°C in storage cabinets, and the room temperature will be kept at 26°C against the sudden change of the temperature of the seeds when carried out from a storage cabinet.

And as the room temperature of the short-term storage will be kept at 15°C, the walk-in type will be adopted. Moving racks will be used to minimize the area.

In view of the efficient use of electricity, both the short-term and long-to medium-term storages will be divided into two spaces, and only the space in use will be air-conditioned. Except for the storage cabinets in use no power will be consumed.

Taking into account the life-span of a storage cabinet and the number of preserved seeds, storage cabinets will be provided for one long-to medium-term storage. But the other long-to medium-term storage will be air-conditioned in order to be used for a workshop.

(4) ARI Divisions' Section

This Section acts the part as a link between the Seed Bank and ARI's existing laboratories. It will take charge of cleaning and preservation of seeds for the Crop Divisions of ARI's existing laboratories. And it will supply seeds to the Seed Bank, too.

This section will consist of nine workshops and a common workshop.

Each workshop will be provided with a cold storage, thus making it possible to preserve seeds in storage cabinets. Seven of the workshops are designed for ARI's Crop Divisions, and the remaining two are for ARI's Disciplinary Divisions.

(5) Net House

The Net House is related to research on introduction methods. It will take charge of cultivation of introduced seeds in a quarantine nursery in terms of epidemic prevention, detection of diseases and vermin, and breeding of virus-free seedlings through an apical meristem culture method.

The facilities comprise a net house for quarantine, a sowing preparation room for introduced seeds, a cleaning and testing room, chemical storage, material storage, and a sterilization and incineration room.

(6) Accomodations

In consideration of the situation in and around the project site and the contents of this project, accomodations are necessary for lecturers and researchers of training and group works.

The facilities consist of two family houses, four rooms for single persons, a cafeteria and so on. Comfortable living spaces will be secured with consideration given to the natural conditions of the site.

(7) Other facilities

Other facilities are planned as follows.

A substation to maintain the functions of the Seed Bank
A garage for cars for exploration
Tanks for water-supply

4-5 Scale of Facilities

(1) Scale of each room

After several discussions with the Burmese government, the Basic Design Study Team has decided the area of each room of the facilities. The areas are based on the number of staff as described in 3-2-3, the layout of the equipment and furnishings, and economical structural spans (7.5 m x 7.5 m). But the areas of the library and the laboratories are smaller than that because of their purposes.

(2) Scale of Seed Bank

Both short-term and long-to medium-term storage are meant to preserve about 50,000 samples. As shown in Fig. 4-6 the rack system will be adopted for short term storage in order to keep the space as small as possible. If two 7.5 m x 5.6 m rooms are provided, 24,300 samples can be stored using 500 g holding plastic containers in one room and 48,600 samples in two rooms.

For long-to medium-term storage, the cabinet system which is shown in Fig. 4-7 will be adopted. If two 9.4 m x 7.5 m rooms are provided, 48,640 samples can be stored because 1,216 samples can be storaged using 170 g holding aluminum packs in a storecabinet, and 24,640 samples in one room, and 48,640 samples in two rooms.

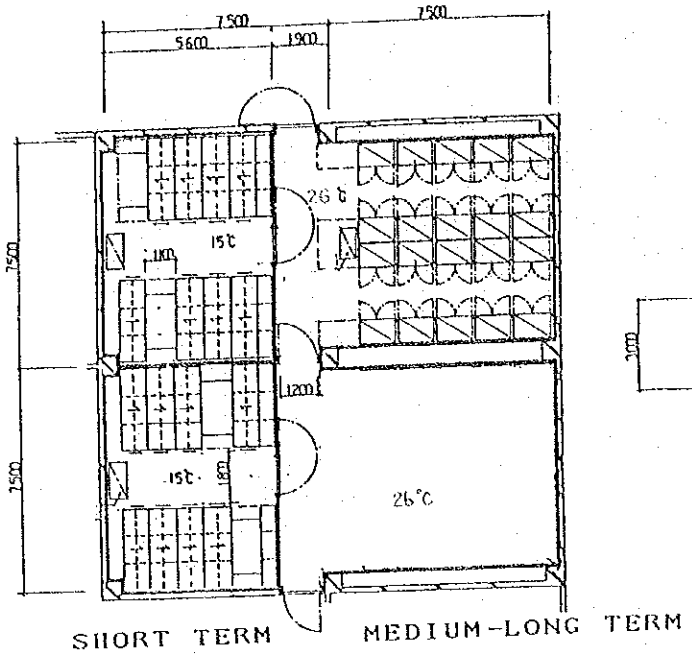
(3) Scale of Accomodations

As the result of the investigation of existing accomodations and the residential situation, the facilities consist of 2 bedrooms, a living room, a dining room, a kitchen, and a bathroom for a family house. And the area of each room is based on Japanese standards.

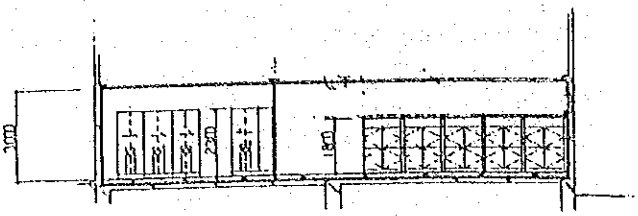
(4) Scale of other facilities

The areas of other facilities have been decided by the layout of equipment and furnishings shown in Basic Design Drawings.

LAYOUT OF COLD STORAGES



PLAN



SECTION

FIG. 4-6

RACK-SYSTEM OF SHORT TERM STORAGES

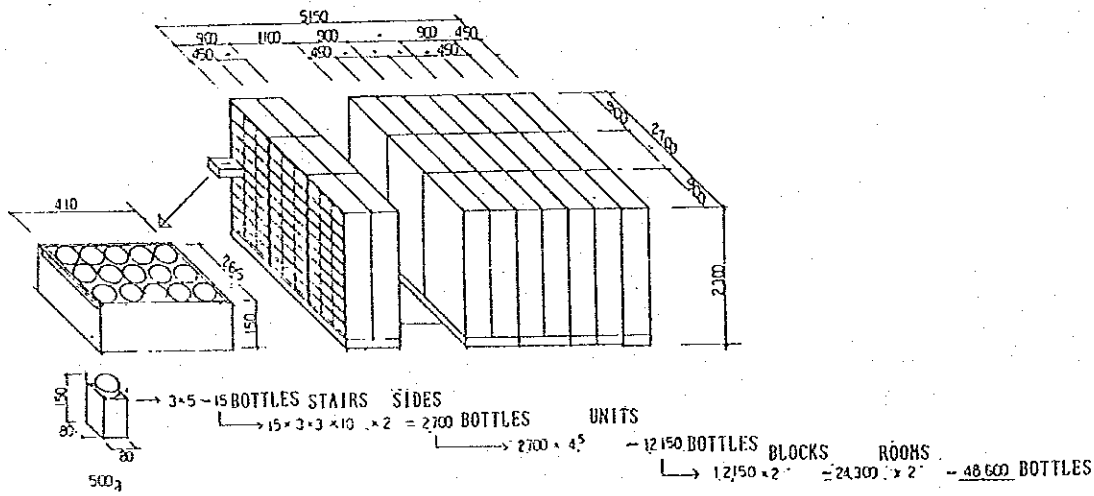
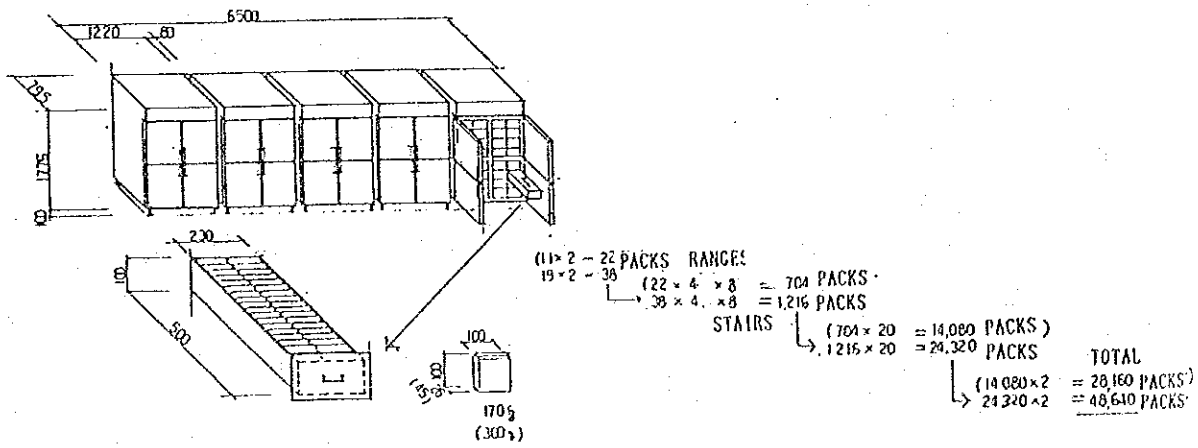


FIG. 4-7

STORECABINET OF MEDIUM-LONG TERM STORAGES



Calculation of lavatory for common use

The first floor: 14 persons (Research Lab) + 11 persons (Administration section) + 13 persons (Information section) = 36 persons (men: 24, women: 12)

The second floor: 11 persons (Research Lab) + 2 persons (secretaries) + 14 persons x 2 (Conference rooms) = 41 persons (men: 28, women: 13)

The third floor: 11 persons (Research Lab) + 30 persons (Training room) = 41 persons (men: 28, women: 13)

The sanitation fixtures requirement for each floor is calculated as follows based on the above assumption: Urinals 2, Toilet bowls for men: 2, Wash bowls for men: 2. Toilet bowls for women: 2, Wash bowls for women: 2.

In the plan drawing, a lavatory for visitors and one for senior personnel are provided on the first and second floor.

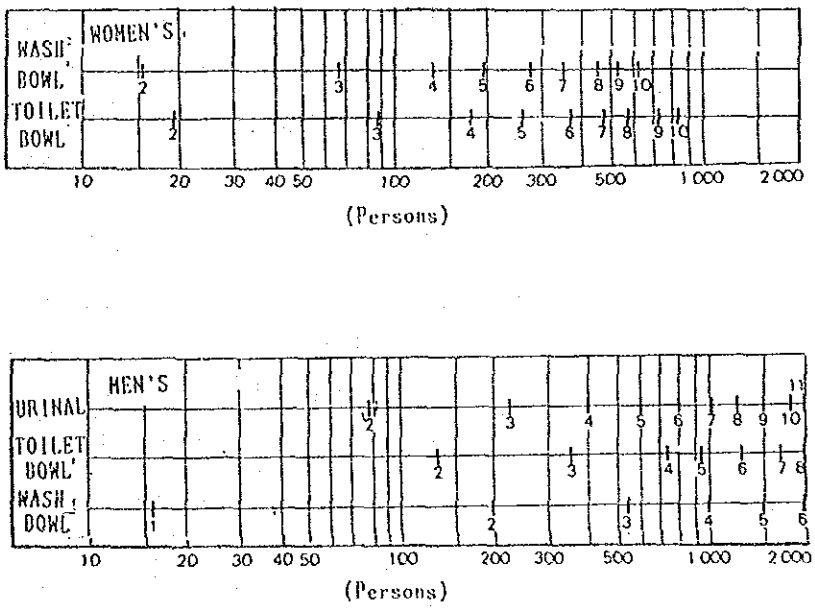


DIAGRAM FOR CALCULATION OF SANITATION FIXTURES

Fig. 4-8

4-6 Element Planning

The selection of the construction method and materials are essential parts of the architectural planning, and this is based on the Basic Design Policy (4-1).

(1) Structure

The structure will be of reinforced concrete. And it is the most common method adopted for public facilities in Burma.

(2) Roof

A roof frame over the reinforced concrete structure will be adopted and corrugated asbestos cement board will be used as the roofing material.

This method has many advantages such as the fact that the air layer in the garret can be used as a heat insulating layer, the fact that the naturally created slope can effectively work against rainfall, and the fact that it is both economical and a domestic construction method.

Light gauge steel is to be used for the material of the roof frame from the standpoint of strict observance of the construction period, of quality guarantee, and of guard against termites.

For the Seed Bank and the Information Section, due to the functions of the facilities and the necessity of a short construction period, the asphalt shingle waterproof method of Japan will be adopted. The method has higher waterproofing qualities and easier execution. In this method the roofing is carried out directly over an inclined concrete roof structure without roof frames.

(3) Outer wall

In the planning of outer walls, eaves and sunshades will be introduced to prevent fierce sunlight and rain from coming into the facilities. But natural lighting and ventilation will be secured by making openings as large as possible in consideration of the wind direction. Providing effective

ventilation and shading, louvers of porous blocks are widely used in Burma. They will be positively used also in this project.

The walls that can be used as quake-resisting walls will be built of reinforced concrete. Outer walls will be finished with plastic spray paint over the cement mortar layer on the structure in consideration of weatherproofing and waterproofing.

(4) Inner wall

Prefabricated lightweight partitions of Japanese make will be adopted in view of future expansion of the facilities, improvement of execution accuracy, a short construction period, and reduction of structure weight. Inner walls, to which the partition cannot be applied in terms of the functions, will be built with concrete blocks.

The concrete structure and block portions will be basically finished with painting over the cement mortar trowelling.

(5) Floor

Either terrazzo polished on the spot, or concrete trowelling, or the washing finish of stucco will be adopted for flooring. And the method to install glass joints at an interval of 1.5 - 2.0 m will be adopted to prevent floor-cracking. But floor blocks made of teakwood, a special product of Burma, will be used in some places, such as the project manager's room.

(6) Ceiling

A reinforced concrete slab ceiling with paint finish will be basically adopted. But sound-absorbing rockwool boards will be used over a lightweight iron ceiling frame in the Seed Bank, Information Section, training room, and so on.

(7) Doors and windows

Wooden fittings are common in Burma, but they have problems in product accuracy, durability, and maintenance. In this project, metal fittings of Japanese make, mainly aluminum sashes and steel sashes, will be used from the standpoint of long term economy. And outside openings will be fitted with durable aluminum lattices for prevention of crimes.

(8) Heat insulating material

As the Seed Bank forms the core function of this project, its heat insulating quality is a vital factor. For heat insulation, molded polystyrene boards with a metal outer layer will be adopted, which have high heat insulation, execution accuracy, and easy workability.

4-7 Structural Plan

Located within the Europe-Asia Seismic Zone, Burma has recorded much damage from earthquakes, which should be taken into due consideration in the structural planning. British standards, which are not prepared for countries with frequent earthquakes, have been used in Burma. It will be reasonable to decide the design seismic coefficient according to the Aseismatic Standard in Burma which was reported by the Japanese mission about earthquakes in 1973.

Then the design seismic coefficient is calculated as:

$$Kh = K \quad n_1 \quad n_2 \quad n_3 = 0.1 \times 1.0 \times 1.0 \times 1.5 = 0.15$$

Note: K: Standard design seismic coefficient = 0.1

n_1: Earthquake regional coefficient = 1.0
(Mandalay District)

n_2: Ground classification coefficient = 1.0
(Ground of Classification 2)

n_3: Importance coefficient = 1.5
(Public buildings)

According to the attached data on boring tests, a spread footing on the sand layer mixing with silt, which lies - 1.0 m from the ground surface and has the N value of 15, will be adopted for the foundation. And partly poor-combination concrete will be used to reform the foundation. It is provided that the design wind pressure should be 30 lb/ft^2 (about 146.5 kg/m^2) which represents the wind velocity of about 100 miles/h. The value, which is in common use, will be adopted to the design of the project.

(1) External loads on the structure

1) Earthquake load
Design seismic coefficient K = 0.15

2) Wind pressure
q = 150 kg/m^2

3) Design bearing capacity of ground
Footing ground GL - 1.0 m 15 t/m^2 (partly poor-combination concrete)

4) Dead load
Calculations according to structural materials and finished materials

5) Live load
Conforming to Japanese Architectural Standards

Materials

1. Concrete
Fc = 210 kg/cm^2 (compression strength at 28 days)

2. Reinforced bar
SD 35 (above D19)
SD 30 (under D16)

3. Structural steel
SS 41

4-8 Service Plan

4-8-1 Air Conditioning and Ventilation

In view of the local weather conditions, power situation and social customs, air conditioning will be installed only in the rooms where their functions and the contents of experiments demand it.

(1) Air conditioning

The conditioner units will be air-cooling types in consideration of water quality and running cost. In the rooms of the Seed Bank, in which seeds are kept, a one room-one unit system will be adopted to prevent complete stoppages.

Other rooms will be furnished with the window type individually.

(2) Ventilation

Ventilation equipment will be installed in the laboratories, lavatories, power room and so on. And in each room will be installed ceiling fans.

4-8-2 Water Supply and Drainage

(1) Water supply

Water will be stored in a tank from the water station near the project site, filtered, pumped up to a high-level tank and supplied to each building by gravity.

(2) Drainage

Drainage from the site and buildings discharges rain water, sewage, miscellaneous wastewater and experimental wastewater which will be treated in the following way.

1) Rain water

It is collected from the buildings and discharged into the existing drainage.

2) Sewage

Sewage from the lavatories, after treatment in a septic tank, penetrate into the ground through the penetrating basin.

3) Household wastewater

It is collected from the buildings to be discharged into the existing drainage.

(3) Sanitary fixtures

Asian-style toilets will be installed. A water faucet will be provided in each toilet stall.

4-8-3 Electrical Facilities Plan

(1) Power receiving and substation

Power will be received from the 11 kV line of the ECP through overhead wire to the site boundary, then will lead to the substation through an underground cable and supplied to loads at three-phase, four-wire 400 V/230 V.

(2) Generator

To prevent interruption of cold storage and experimentation, as a countermeasure against power outages, a generator will be installed. In view of Burma's situation in power supply, a generator which bears long running will be employed.

(3) Power distribution

Power will be distributed from the substation through an underground cable to the buildings. After which, power will be supplied to distribution boards and motor control boards through wiring with piping.

(4) Lighting and receptacles

Fluorescent lamps will be used as light sources. Incandescent bulbs and mercury bulbs will also be used occasionally. Illumination will be decided according to the local customs. We planned the illumination layout in small zonings which can be turned on and off.

The intensity of average illumination for the rooms:

Office, laboratory, conference rooms	200 Lx
Hall, machinery room	100 Lx
Corridors	75 Lx

Receptacles will be provided at necessary places as power sources for small electric apparatus. The voltage will be 230 V.

(5) Public-address system

An amplifier will be installed at the office on the first floor of the administration and training building, and the conference rooms, laboratories, and halls will be fitted with speaker systems.

(6) Fire alarm system

A manual fire alarm system will be provided in each floor which will make the people in the building notice any fire at an early stage. Fire control panels will be installed in the office of the administration and training building.

(7) Lightning rods

Each building will be fitted with a lightning rod to avoid damage from lightning.

(8) Clock system

A master clock will be installed in the office on the first floor of the administration and training building, and secondary clocks in the conference rooms, laboratories, halls and so on.

(9) Telephone system

An intercom system will be installed in the conference rooms and laboratories.

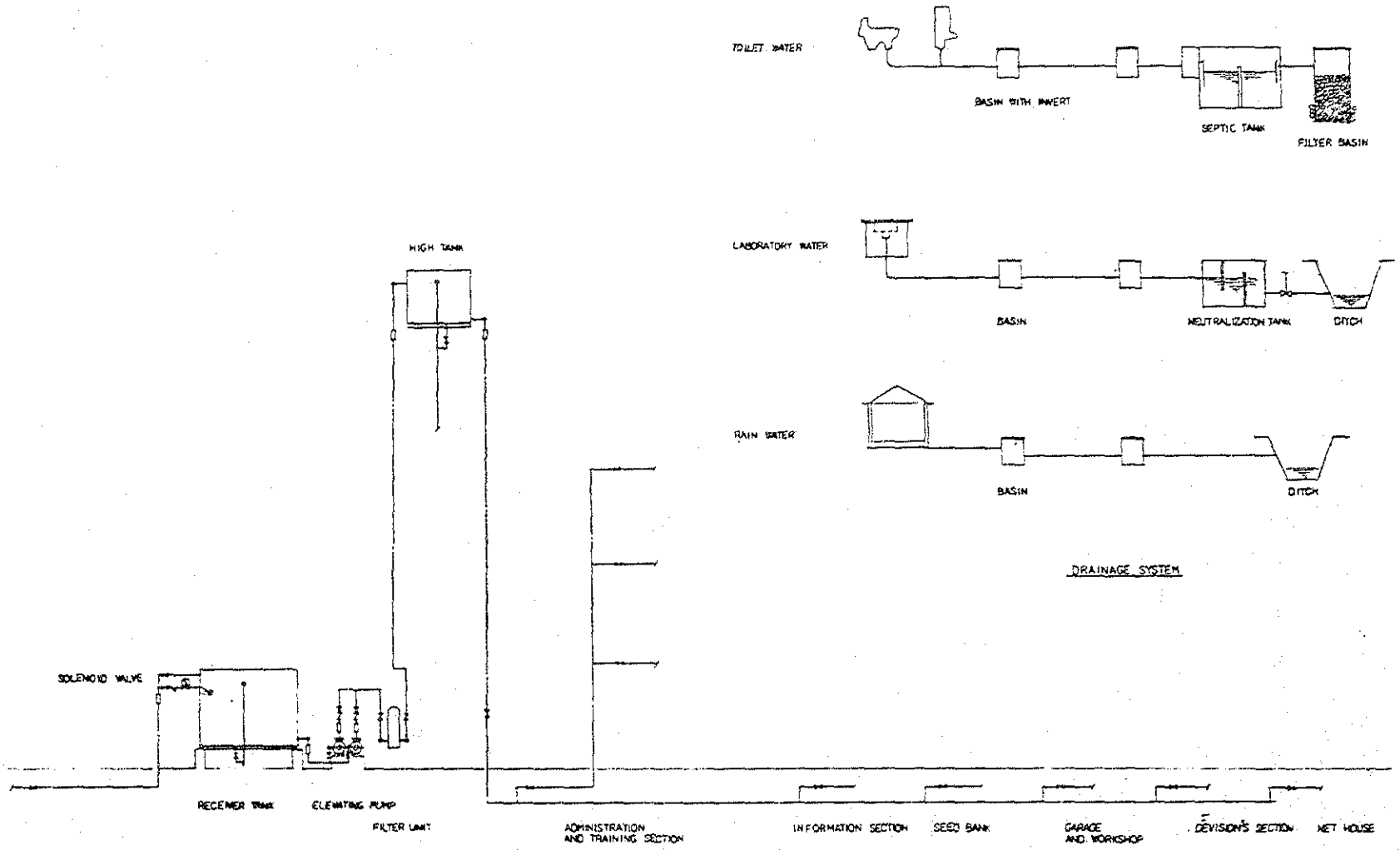
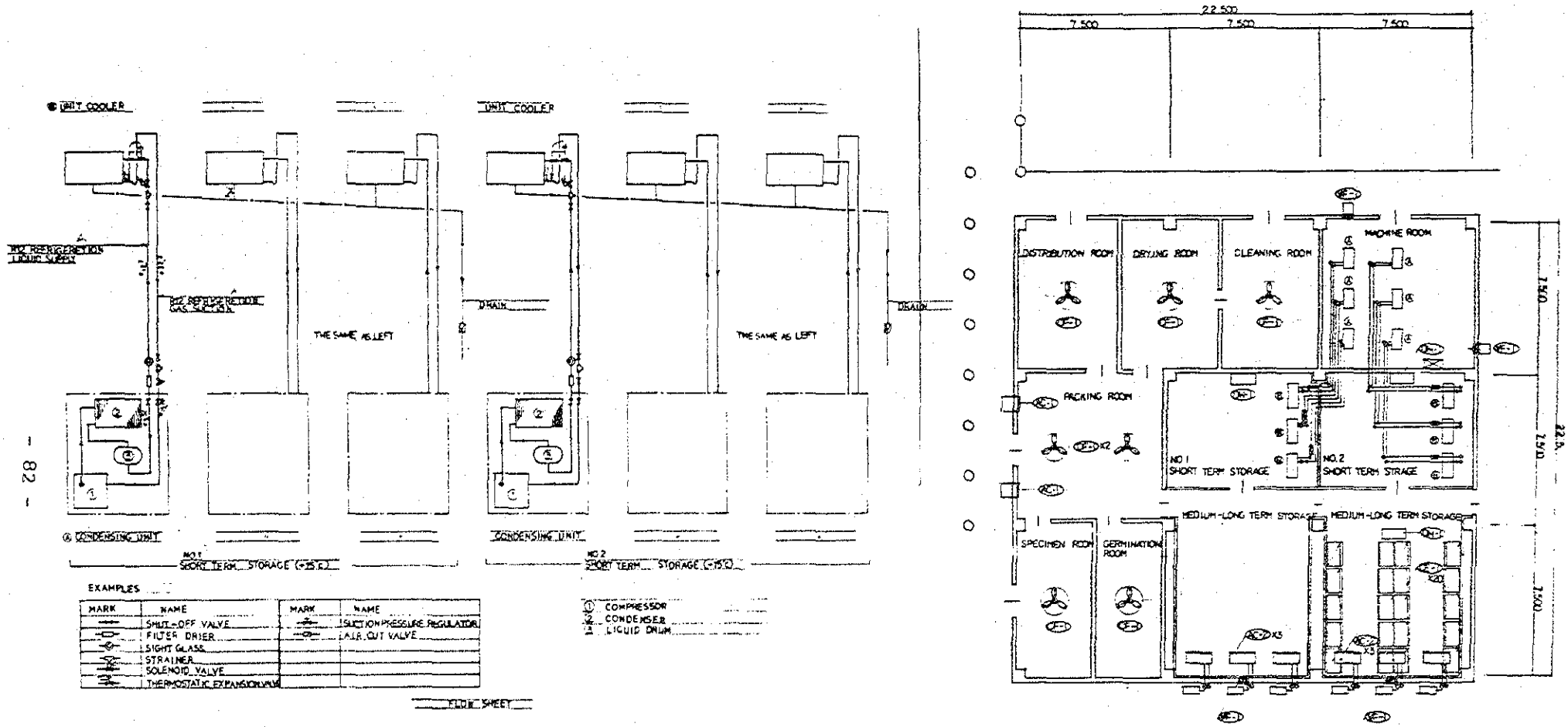
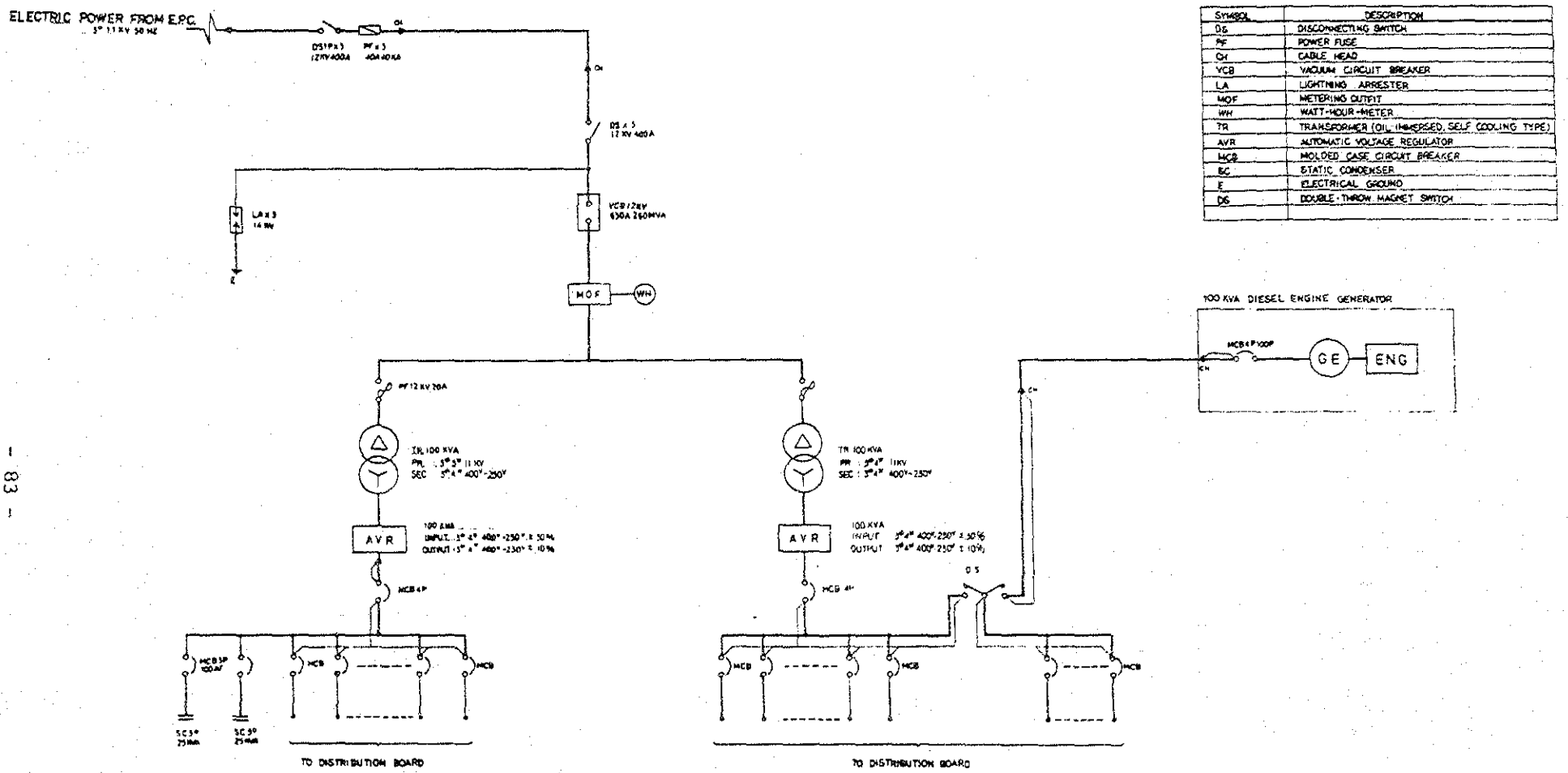


FIG. 4-9 WATER SUPPLY SYSTEM



NO.	MACHINE NAME	TOTAL Q'TY
AC-1	WINDOW TYPE AIR CONDITIONER	2
AC-2	CEILING TYPE AIR CONDITIONER	6
DH-1	DEHUMIDIFIER	3
CE-1	COOLING EQUIPMENT UNIT	20
CF-1	CEILING FAN	7
VF-1	VENTILATING FAN WALL MOUNT TYPE	4

FIG.4-10



SYMBOL	DESCRIPTION
DS	DISCONNECTING SWITCH
PF	POWER FUSE
CH	CABLE HEAD
VCB	VACUUM CIRCUIT BREAKER
LA	LIGHTNING ARRESTER
MOF	METERING OUTFIT
WH	WATT-HOUR-METER
TR	TRANSFORMER (OIL IMMERSED, SELF COOLING TYPE)
AVR	AUTOMATIC VOLTAGE REGULATOR
MCB	MOLDED CASE CIRCUIT BREAKER
SC	STATIC CONDENSER
E	ELECTRICAL GROUND
DS	DOUBLE-THROW MAGNET SWITCH

FIG. 4-11 SCHEMATIC DIAGRAM OF SUBSTATION SYSTEM

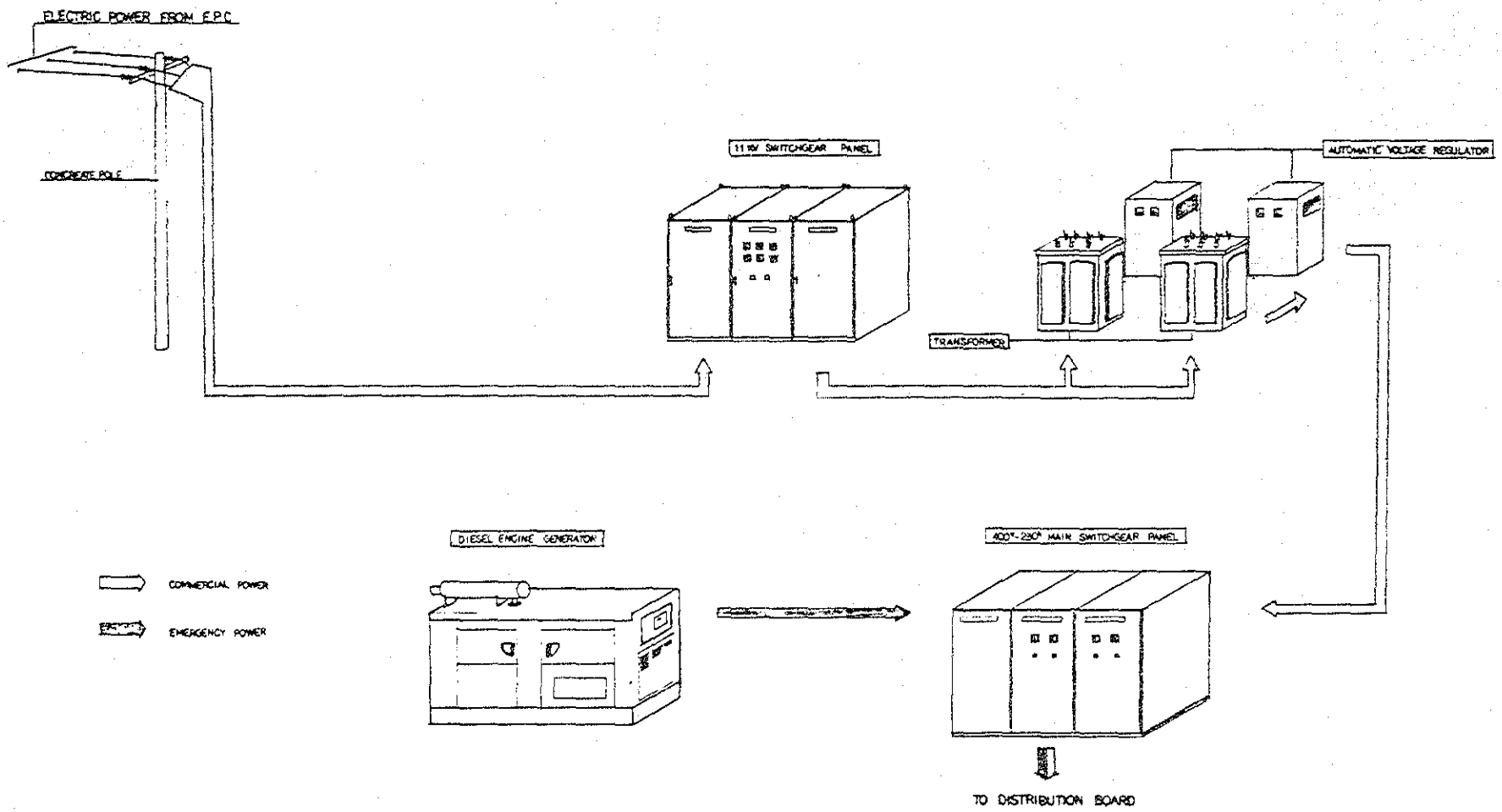


FIG. 4-12 MAIN POWER SUPPLY SYSTEM

4-9 Equipment Plan

A list of required equipment was not included in the content of the request from the Government of Burma as few works related to seed storage and plant breeding are presently being implemented and consequently, the listing of actual equipment is difficult. During the survey, therefore, the scope of works to be conducted at the Seed Bank was clarified and in consideration of the number of researchers and the level of research conducted in Burma, the Study Team drew up an equipment plan. The content of the project is as follows:

(1) Collection and exploration of seed crop genetic resources

(2) Description and documentation of collected materials for each crop

(3) Classification, evaluation, rejuvenation and multiplication of seed crop genetic materials

(4) Procedures for testing introduced materials for various crop species including isolation and purification of genetic materials

(5) Techniques for long-term preservation including management of seed genetic resources storage facilities

(6) Physiology for seeds which are Seed Bank materials

(7) Information system for genetic materials collected, introduced and preserved

(8) Collaboration with national and international institutions on plant genetic resources

(9) Training scientific staff in technology related to seed genetic resources

The equipment plan is based on the above work content and the basic design was drawn up according to the following considerations concerning present conditions in Burma.

(1) Possibly unreliable electric supply and consequent need for countermeasures

(2) Ease of operation

(3) Ease of maintenance

(4) Low maintenance cost

(5) Inclusion of practically all equipment required for research

(6) Provision of auxiliary equipment and parts

(7) Preparation of manuals for operation, maintenance, management, etc.

(8) In view of present conditions in existing research centers, provision of basic equipment in the initial stage, with subsequent provision of high standard analysis equipment as part of later technical cooperation projects

Implementation of the project is envisioned to cover a twenty year period. Establishment and expansion of research equipment in accordance with the progress of basic preparations and the research level is therefore essential for expansion of plant breeding research activities in Burma.

The basic design for equipment required for the project and related research equipment was drawn up in accordance with the above considerations. The number and type of equipment was determined on the basis of research items and number of staff and trainees and classified according to function. An outline of the equipment plan is presented below.

List of Equipment

	Name	No.	Specification
(1)	Introduction Laboratory		
	Camera set	3	Body, lens (standard, zoom, close-up) strobe, tripod, hard case
	Camping set	3	Tent, flight sheet; ground sheet, camp mat
	Compass	5	For investigation
	Magnifying glass	5	For investgation
	Convex rule	5	5 m
	Paper holder	5	25 cm x 30 cm
	Plastic container	100	30 cm x 50 cm x 50 cm
	Curvimeter	5	Pencil type
	Pocket type altimeter	5	5000 m altitude
	Miniature thresher	1	For laboratory analysis
	Seed sample pan	150	Plastic type
	Balance	1	Max. limit 20 kg, min. graduation 5 g
	Grain moisture tester	3	For grain, maize, soybean analysis
	Electric burner	4	Portable type
	Drying oven	1	40 - 200°C 60 cm x 50 cm x 50 cm
	Multi-autocounter	1	For experiment
	Refrigerator	1	450 ℓ capacity
	Biological microscope	1	2 auxiliary, possibility for camera 5 object lens
	Stereoscopic microscope	1	2 auxiliary, zoom lens (1 x - 6.3 x)
	Laboratory center table	2	300 cm x 150 cm x 80 cm, sink
	Chemical storage cabinet	2	Stainless steel, 90 cm x 50 cm x 180 cm

Continued

Name	No.	Specification
Autoclave	1	Usable capacity (ϕ 30 x 63 cm)
Clean bench	1	130 x 90 x 200, dust-collecting efficiency 99.99%
Low-temp. incubator	2	80 x 70 x 160 cm, -10°C - 50°C
pH meter	1	Changable range, pH 0 - 14
Auto-still	1	Distillation and ion exchange 10 ℓ/h
Monabed deionizing equipment	1	Ion exchange 20 ℓ/hr
Installment cabinet	4	180 x 40 x 180 cm
Laboratory sink unit	3	
Drying rack	1	90 x 75 x 120 cm
Microphotographic attachment	1	Adaptor for 35 mm lens, auto-photometer
Working table	1	240 x 75 x 80 cm with drawers
Top loading balance	1	Readability 6,000 g/0.10 g
Daylight shaking incubator	1	Effective internal dimension 72 x 65 x 52 cm
Magnetic stirrer	1	100 - 1,000 rpm, stir cap 50 - 2,000 ml
Calculator	2	Portable type, 12 unit indicator
Daylight thermostat	2	Daylight type, 80 x 50 x 110 cm, 5 - 50°C
Pipet washer with surface acid tank	1	ø18 x 70 cm with sulfur acid tank
Dissecting set	2	17 units
Vacuum pump	2	Pumping speed 15 ℓ/min, pressure 7×10^{-1} torr
Water bath	1	2 lines, max. temp. 95°C
Testing screen	1	For rice, wheat, maize, pulses
Laboratory cabinet	2	For storage of laboratory white

Continued

	Name	No.	Specification
	4 wheel-drive vehicle	3	For exploration and collection 2500cc, Diesel engine, attach Air conditioner, Winch, Roof lack
	Fume hood	1	150 x 75 x 230 cm
	Electric analytical balance	1	Readability 200 g/0.01 mg
	Mortar and pestle	5	ø15 cm
	Finger dispenser	2	Cap. 2 - 10 ml accuracy ±1.0%
	Vinier calliper	5	Readability 30 cm/0.05 mm
	Outside micrometer	3	Readability 50 mm/0.01 mm
	Measuring rule	5	Readability 10 m/1 mm
	Caliper	2	Readability 35 mm/0.025 mm
	Key box	1	20 units
	Laboratory side table	4	
	Balance table	1	Micro type
	Alchol lamp	5	
	Blower brush	1	
	Test rice husker	4	Handy type
(2)	Evaluation Laboratory		
	Seed sample pan	150	Plastic type
	Drying oven	1	40 - 200°C 60 x 50 x 50 cm
	Refrigerator	1	450 ℓ capacity
	Biological microscope	1	2 auxiliary, possibility for camera, 5 object lens
	Stereoscopic microscope	1	2 auxiliary zoom lens (1 x - 6.3 x)
	Laboratory center table	2	300 x 150 x 80 cm, sink
	Chemical storage cabinet	2	Stainless steel, 90 x 50 x 180 cm
	Instrument cabinet	4	180 x 40 x 180 cm

Continued

Name	No.	Specification
Autoclave	1	Usable capacity (ϕ30 x 63 cm)
pH meter	2	Capable range 0 - 14
Refrigerated centrifuge	1	Max. 5,000 rpm, -20°C - 20°C
Auto still	1	Distillation and ion exchange 10ℓ /h
Monobed deionizing equipment	1	Ion exchange 20ℓ /hr
Laboratory sink unit	4	
Drying rack	1	90 x 75 x 120 cm
Microphotographic attachment	1	Adaptor for 35 mm lens, auto-photometer
Top loading balance	1	Readability 6,000 g/0.10 g
Hot plate	1	70°C - 250°C, 45 x 30 cm
Testing grain crusher	1	Roll-mill type, sample cap. 5 g
Grain-sieving mill	1	Cap. 5 - 15 log/hr
Electric rice cooker	10	Cap. 1
Green leaf area meter	1	Measuring area 20 x 15 cm, range 0 - 300 cm
Kjeldahl Nitrogen Digester	1	Semi-microtype, 6 piece sets
Kjeldahl Nitrogen Distiller	2	Semi-microtype
Spectrophotometer	1	Range 200 - 1,000 mm
Profile projector	1	Projection lens (5 x - 50 x)
Testing mill	1	Cap. 200 g/one time
Isoelectrofocusing apparatus	4	Gel destainer
Magnetic stirrer	1	100 - 1,000 rpm. stir cap, 50 - 2,000 ml
Working table	1	240 x 75 x 80 cm with drawers
Calculater	2	Portable type, 12 units

Continued

Name	No.	Specification
Pipet washer with surface acid tank	1	ø18 x 70 cm with sulfur acid tank
Dissecting set	2	17 units
Vacuum pump	1	Pumping speed 15 ℓ/min, pressure 7×10^{-1} torr
Water bath	1	2 lines, max. temp. 95°C
Laboratory cabinet	2	For storage of laboratory white
Fume hood	1	150 x 75 x 230 cm
Electric analytical balance	1	Readability 200 g/0.01 mg
Gel slab casting apparatus	1	
Gel destainer	1	
Power supply	2	
Gel support	1	
Mortar and pestle	50	ø18 cm
Gel dryer	1	
Deep freezer	1	-40 - 50°C
Muffle furnace	1	250°C - 1,150°C, usable cap. 10 x 20 x 10 cm
Fat extractor	1	6 supports
Finger dispenser	2	Cap. 2 - 10 ml, accuracy ±1.0%
Vinier caliper	3	Readability 30 cm/0.05 mm
Outside micrometer	2	Readability 50 mm/0.01 mm
Measuring rule	2	Readability 10 m/1 mm
Caliper	2	Readability 35 mm/0.025 mm
Key box	1	20 units
Laboratory side table	7	
Balance table	2	Micro, semi-micro type

Continued

	Name	No.	Specification
	Alchol lamp	3	
	Blower brush	1	
	Testing rice husker	4	Handy type
	Incubator	1	0 - 50°C usable cap. 50 x 35 x 40 cm
	Electric burner	4	Portable type
(3)	Preservation Laboratory		
	Seed sample pan	150	Plastic type
	Grain moisture tester	3	For grain, maize, soybean analysis
	Drying oven	2	40 - 200°C, 60 x 50 x 50 cm
	Refrigerator	1	450 capacity
	Biological microscope	1	2 auxiliary, possibility for camera, 5 object lens
	Stereoscopic microscope	1	2 auxiliary, zoom lens (1 x - 6.3 x)
	Laboratory center table	2	300 x 150 x 80 cm, sink
	Chemical storage cabinet	2	Stainless steel, 90 x 50 x 180 cm
	Instrument cabinet	4	180 x 40 x 180 cm
	Autoclave	1	Usable capacity 46
	Low-temp. incubator	2	80 x 70 x 160 cm, -10 ~ 50°C
	Clean bench	1	130 x 90 x 200 cm, dust-collecting capacity 99.99
	pH meter	1	Capable range pH 0 - 14
	Auto still	1	Distillation and ion exchange 10 ℓ /hr
	Monobed deionizing equipment	1	Ion exchange 20 ℓ /hr
	Laboratory sink unit	3	
	Drying rack	1	90 x 75 x 120 cm

Continued

Name	No.	Specification
Microphotographic attachment	1	Adaptor for 35 mm lens, auto-photometer
Top loading balance	1	Readability 6,000 g/0.10 g
Daylight shaking incubitor	1	Effective internal dimension 72 x 65 x 52 cm
Magnetic stirrer	1	100 - 1,000 rpm, stir cap. 50 - 2,000 ml
Calculator	2	Portable type, 12 unit indicator
Daylight thermostat	2	Daylight type, 80 x 50 x 110 cm, 5 - 50°C
Pipet washer with surface acid tank	1	ø18 x 70 cm with sulfur acid tank
Dissecting set	2	17 units
Vacuum pump	1	Pumping speed 15 ℓ/min, pressure 7×10^{-1} torr
Water bath	1	2 lines, max. temp. 95°C
Laboratory cabinet	2	For storage of laboratory white
Inverted microscope	1	Possibility for camera, lens (4 x - 100 x)
Top loading balance	1	Readability 6,000 g/0.10 g
Thermo-bath	1	Max. temp. 70°C
Electric burner	4	Portable type
Working table	1	240 x 75 x 80 with drawers
Mortar and pestle	5	ø15 cm
Deep freezer	2	-40 - 50°C/-20°C
Finger dispenser	2	Cap. 2 - 10 ml, accuracy ±1.0%
Vinier caliper	3	Readability 30 cm/0.05 mm
Outside micrometer	2	Readability 50 mm/0.01 mm
Measuring rule	5	Readability 10 m/1 mm
Caliper	2	Readability 35 mm/0.025 mm

Continued

	Name	No.	Specification
	Key box	1	20 units
	Laboratory side table	5	
	Balance table	1	Micro type
	Alcohol lamp	5	
	Blower brush	1	
	Testing rice husker	4	Handy type
	Thermograph	1	6 dotting, -50 - 50°C
(4)	Isolation Laboratory		
	Seed sample pan	150	Plastic type
	Balance	1	Max. limit 20 kg, min. graduation 5 g
	Incubator	1	0 - 50°C, 50 x 35 x 40 cm
	Drying oven	1	40 - 200°C
	Refrigerator	1	450 capacity
	Biological microscope	1	2 auxiliary, possibility for camera, 5 object lens
	Stereoscopic microscope	1	2 auxiliary, zoom lens (1 x - 6.3 x)
	Laboratory center table	1	240 x 90 x 80 cm
	Chemical storage cabinet	1	Stanless steel, 90 x 50 x 180 cm
	Instrument cabinet	2	180 x 40 x 180 cm
	Low-temp. incubator	1	80 x 70 x 160 cm, -10°C - 50°C
	pH meter	1	Capable range pH 0 - 14
	Auto still	1	Distillation and ion exchange 10 ℓ/hr
	Laboratory sink unit	2	
	Electric burner	2	Portable type
	Drying rack	1	90 x 75 x 120 cm
	Working table	2	240 x 75 x 80 cm, with drawers

Continued

Name	No.	Specification
Electric analytical balance	1	Readability 6,000 g/0.10 g
Isoelectrofocusing apparatus	4	Gel destainer
Magnetic stirrer	1	100 - 1,000 rpm stir cap. 50 - 2,000 ml
Vacuum pump	1	Pumping speed 15 ℓ/min, pressure 7 x 10^{-1} torr
Gel slab casting apparatus	1	
Gel destainer	1	
Power supply	2	
Gel support	1	
Mortar and pestle	50	ø18 cm
Gel dryer	1	
Electrochrome densitometer	1	6 slit 400 - 700 mm
Mist-o-matic treater	1	Seed treatment cap. 400 - 500 g
Soil sterilizer	1	Steam type, 2.2 m^3/hr
Hand truck	5	Weight cap 500 kg
Vinier caliper	3	Readability 30 cm/0.05 mm
Outside micrometer	3	Readability 50 mm/0.01 mm
Measuring rule	3	Readability
Caliper	2	Readability 35 mm/0.025 mm
Incubator for storage of seed	2	(Same with low temp. incubator)
Hydro-thormograph	2	Temp range -15 - 40°C, moisture range 0 - 100%
Soil crushing-sieving	1	Cap. 2 - 3 m^3/hr
Hand sprayer	2	Handy type tank cap. 10
Laboratory side table	2	

Continued

	Name	No.	Specification
	Gas mask	10	For chemical spray
	Alchol lamp		3
	Blower brush	1	
	Test rice husker	4	Handy type
	Steel rack	2	Middle weight range
	Deep Freezer	1	-40 - 50°C
	Wheelbarrow	3	
(5)	Seed Bank Center		
	Seed sample pan	300	Plastic type
	Balance	1	Max. limit 20 kg, min. graduation 5 g
	Grain moisture tester	4	For grain, maize, soybean analysis
	Drying oven	2	40 - 200°C, 60 x 50 x 50 cm
	Stereoscopic microscope	1	2 auxiliary, zoom lens (1 x - 6.3 x)
	Instrument cabinet	4	180 x 40 x 180 cm
	Laboratory side table	6	
	Storage cabinet	1	180 x 55 x 180 cm
	Low-temp. incubator	2	80 x 70 x 160 cm, -10°C - 50°C
	Auto still	1	Distillation and ion exchange 10 ℓ/hr
	Laboratory sink unit	2	
	Working table	6	240 x 75 x 80 cm with drawer
	Laboratory cabinet	2	For storage of laboratory white
	Hand truck	2	Weight cap. 300 kg
	Hydro-thermograph	3	Temp. range -15 - 40°C, moisture range 0 - 100°C
	Moving rack	4	For seed storage

Continued

	Name	No.	Specification
	Quadrat sampling stot separator	1	2 sieve held sets, revolution 400 rpm
	Testing dryer	1	35 - 45°C, 24 sample boxes
	Soft X-ray apparatus	1	Display visible type
	Granometer	10	100 and 500 grains counting
	Vacuum sealer	1	Vaccunie type
	Specimen cabinet	8	17 trays (65 x 47 x 0.3 cm)
	Specimen screw tube	20,000	Pyrex glass, 30 ml
	Laboratory seed sorter	2	Cyclon type with vibration
	Key box	1	20 units
	Step ladder	1	
	Steel rack	2	Middle weight range
	Test rice husker	4	Handy type
(6)	Information Center		
	Instrument cabinet	8	180 x 40 x 180 cm
	Laboratory sink unit	2	
	Working table	6	240 x 75 x 80 cm with drawers
	Laboratory cabinet	3	For storage of laboratory white
	Electric movable cabinet	1	8 carriers, for A5 size
	Printer table	1	For computer printer
	O.A. desk	1	For computer
	Computer unit	1	(See attached paper)
	Photocopy machine	1	Cabinet type
	Typewriter	2	Electric and handy type
	Lefax platemaker	1	
	Offset printing machine	1	
	Power cutting machine	1	Handy type, cutting cap. 6 cm

Continued

	Name	No.	Specification
	Wire stitch machine	1	
	Word processor	1	
	Shoe box	1	For about 20 persons
	Refrigerator	1	240 ℓ capacity
	Blackboard	1	Monthly schedule
	Key box	1	20 units
	Dark room equipment	1 set	For film development
	Laboratory side table	1	
(7)	Training Center		
	Grain moisture meter	3	For grain, wheat, maize, soybean analysis
	Drying oven	1	40 - 200°C, 60 x 50 x 50 cm
	Biological microscope	3	2 auxiliary, 5 object lens
	Stereoscopic micrometer	3	2 auxiliary, zoom lens (1 x - 6.3 x)
	Instrument cabinet	1	180 x 40 x 180 cm
	Laboratory side table	3	
	Laboratory sink unit	1	
	Vinier caliper	5	Readability 30 cm/0.05 mm
	Outside micrometer	5	Readability 50 cm/0.01 mm
	Measuring rule	5	Readability 10 m/1 mm
	Caliper	2	Readability 35 mm/0.025 mm
	Refrigerator	1	240 ℓ capacity
	Video system	1 set	For training (See attached paper)
	Screen with tripod stand	1	Screen size 180 x 180 cm
	Screen (wall hanging)	1	Screen size 240 x 180 cm
	Overhead projector	1	Auto focus
	Stand of OHP	1	

Continued

	Name	No.	Specification
	Blackboard	1	Steel 120 x 360 cm
	Stencil duplicator	1	Handy type
	Stencil scanner	1	Size 280 x 390 mm
	Stapler	1	Max. thickness 13 mm
	Grain micrometer	10	Readability 10 mm
	Grain shape tester	10	Readability 10 mm
	Storage cabinet	1	180 x 55 x 180 cm
	Video cabinet	1	
	16 mm projector	1	
	Teacher's table	1	Sink storage attachment
	Slide projector	1	Auto-focus remote-control
	Micro bas	1	25 persons
	Magazine rack	1	180 x 36 x 180
	Alchol lamp		5
(8)	Division's Annex		
	Seed sample pan	1,050	Plastic type
	Drying oven	7	40 - 200°C, 60 x 50 x 50 cm
	Laboratory sink unit	9	
	Working table	9	240 x 75 x 80 cm with drawers
	Testing grain crusher	7	Sample 5 g, Roll-mill type
	Vacuum sealer	7	
	Refrigerator	7	240 ℓ capacity
	Thermometer	7	
	Sealer	7	
	Laboratory side table	11	
	Balance	7 sets	Weight range 1 kg/10 kg
(9)	Storage		

Continued

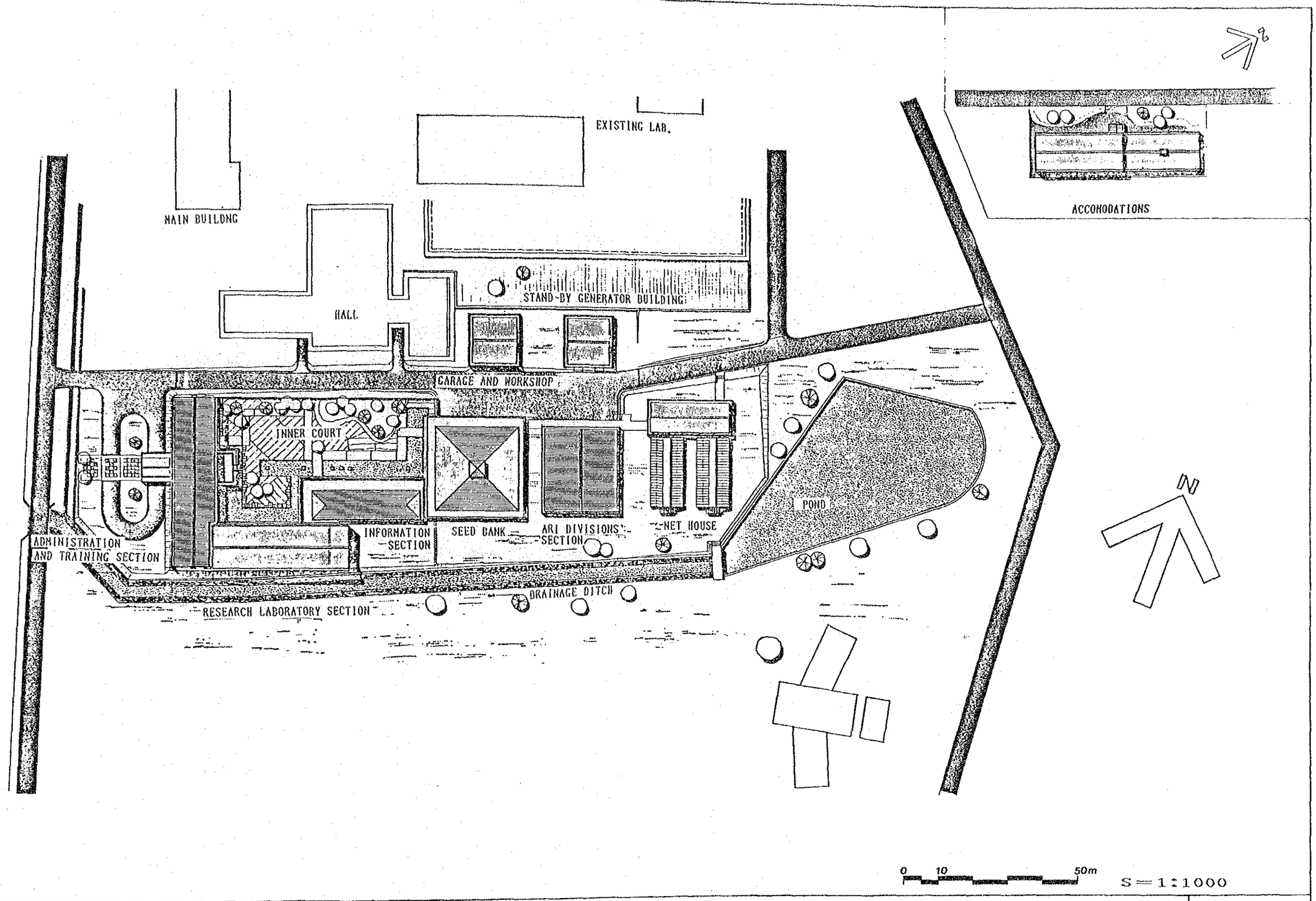
	Name	No.	Specification
	Hand truck	4	500 kg/300 kg
	Vinier caliper	5	Readability 30 cm/0.05 mm
	Outside micrometer	3	Readability 50 mm/0.01 mm
	Steel rack	1	Heavy type 270 x 100 x 240 cm
	Cord reel	2	Length 30 m, 15 A
	Generator	1	130, 220 V, 10 A
	Electric drill	1	
	Electric soldering iron	2	
	Disk grinder	1	Load-speed 12,000
	Bench grinder	1	
	Hand tool set	1 set	
	Handy sprayer	2	Handy type, 10 chemical tank
	Miltmeter	1	Voltage, current, resistance
	Booster cable	1	200 A
	Lawn mower	3	Handy/leisure type
	Wheelbarrow	3	
	Tape measure	3	Readability 50 m/1 mm
	Extension ladder	1	7 m
	Step ladder	1	
	Tire pressure gauge	2	8 kg/cm^2
	Handy rotary pump	2	Handy type
	Vise with vise table	1	
	Balance	2	10 kg/20 kg
	Drilling machine	1	Capacity 13 mm, table 24 x 24 cm
	Battery charger	1	
(10)	Administration Sector		
	Calculator	1	12 units

Continued

Name	No.	Specification
Photocopy machine	1	Cabinet type
Typewriter	2	Electric/handy type
Blackboard	1	For monthly schedule
Key box	1	120 units
Storage cabinet	1	180 x 55 x 180 cm
Card cabinet	2	50 x 62 x 74 cm, 50 x 62 x 130 cm
Binding machine	1	Handy type, 21 holes
Auto puncher	1	2 poles, drilling depth 25 mm
Blackboard	1	120 x 180 cm
Diazo copier	1	For blue print
Working table	1	
Laboratory cabinet	1	
Storage locker	6	
Detail specification of computer and video systems		
(1) Computer system		
CPU (512 KB, 30M)	1	
Color monitor	1	
Printer	1	
Cut sheet feeder	1	
Basic manual	1	
Soft program for seed control	1	
(2) Video system		
Controler	1	
8 mm VTR	1	
Video	1	
Tripod for video camera	1	

Continued

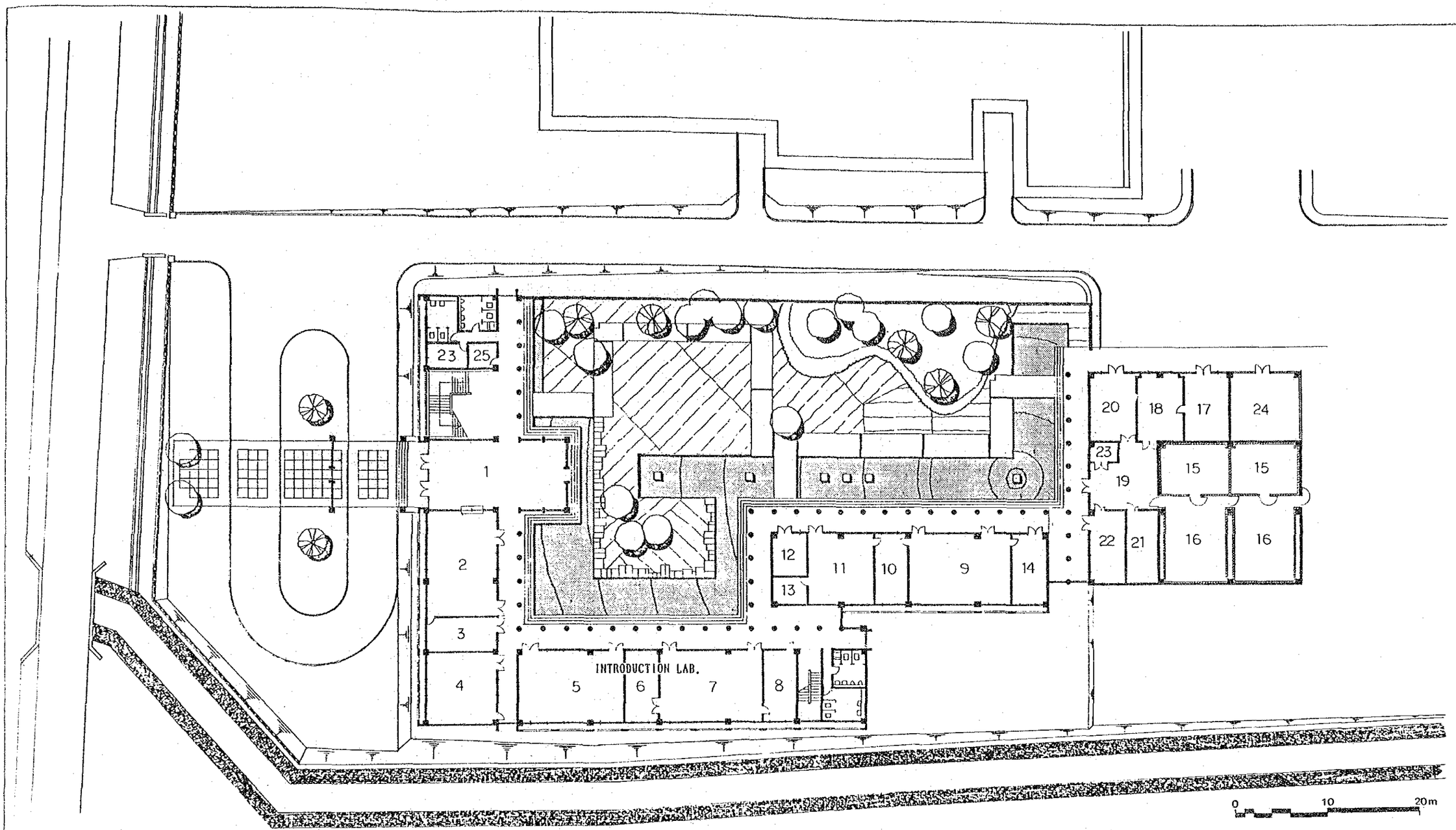
Name	No.	Specification
8 mm video camera	1	
Multicolor TV	2	
Hunger for TV	2	
Video cabinet	1	
Speaker	1	
Carring case	2	
Battery charger	2	
8 mm video tape	1 lot	
Video tape	1 lot	



THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

PLOT PLAN

01



FIRST FLOOR

1 ENTRANCE HALL	6 LAB. EQUIPMENT ROOM	11 COPY AND PRINTING ROOM	16 MEDIUM-LONG TERM STORAGE	21 GERMINATION TEST ROOM
2 MAIN OFFICE	7 LAB. EXPERIMENT ROOM	12 COMPLITATION ROOM	17 CLEANING ROOM	22 SPECIMEN ROOM
3 COPY ROOM	8 WORKING ROOM	13 DARK ROOM	18 DRYING ROOM	23 STORAGE
4 RECEPTION ROOM	9 INFORMATION OFFICE	14 EXPERTS' ROOM	19 PACKING ROOM	24 MACHINE ROOM
5 LAB. OFFICE	10 COMPUTER ROOM	15 SHORT TERM STORAGE	20 DISTRIBUTION ROOM	25 PANTRY

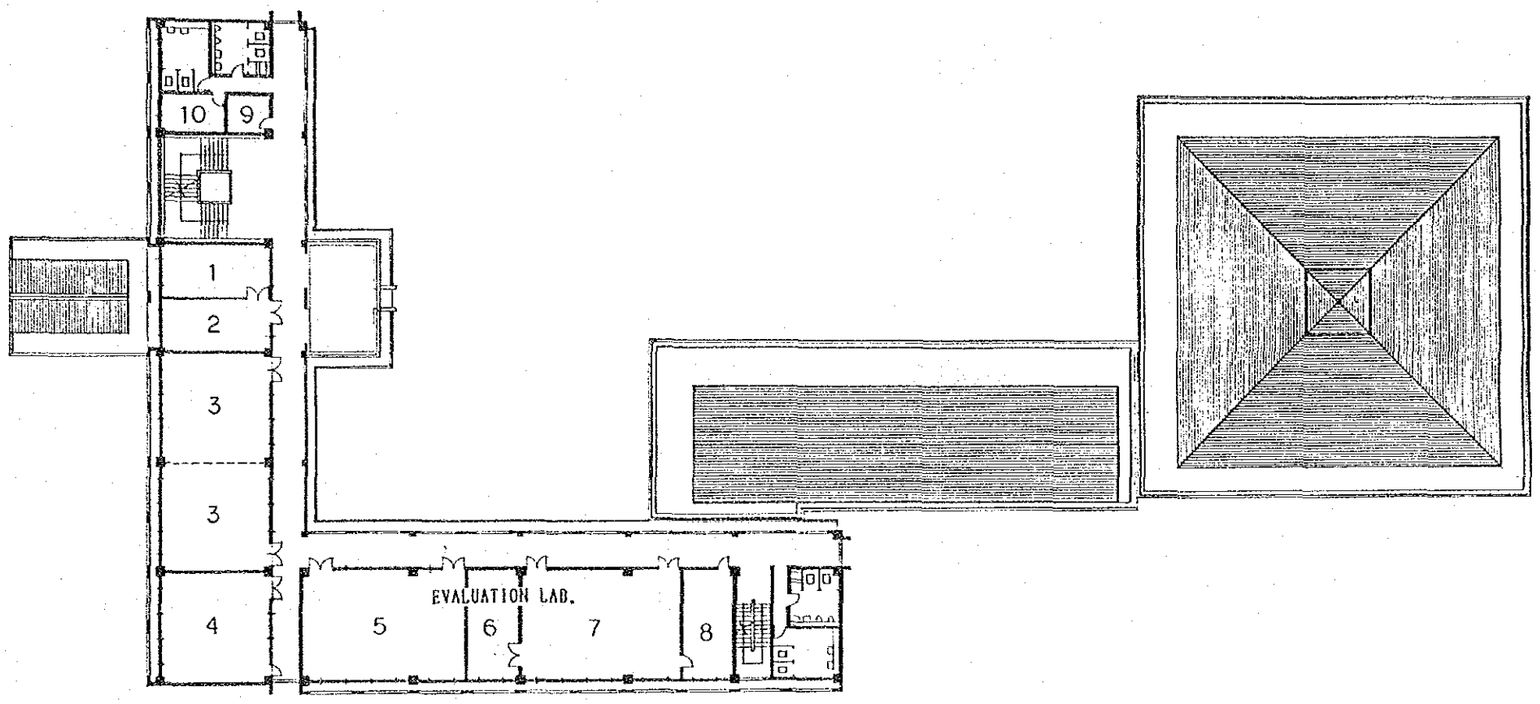
S = 1:400

THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

ADMINISTRATION , TRAINING
AND RESEARCH BUILDNG

INFORMATION SECTION
SEED BANK

02



SECOND FLOOR

1 Pj.M.'S ROOM
2 SECRETARY ROOM
3 CONFERENCE ROOM
4 EXPERTS' ROOM
5 LAB. OFFICE
6 LAB. EQUIPMENT ROOM
7 LAB. EXPERIMENT ROOM
8 PREPARATION ROOM
9 PANTRY
10 STORAGE

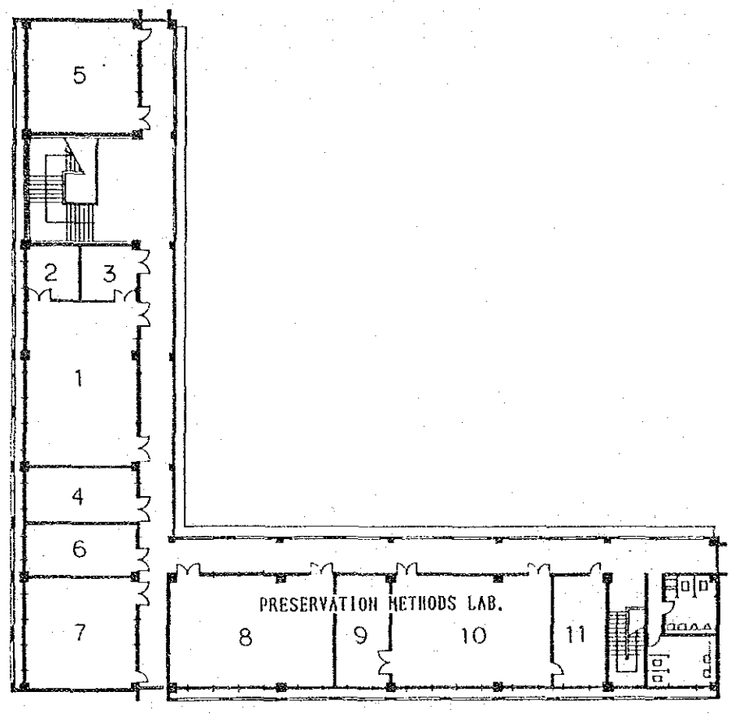
0 10 20m S=1:400

THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

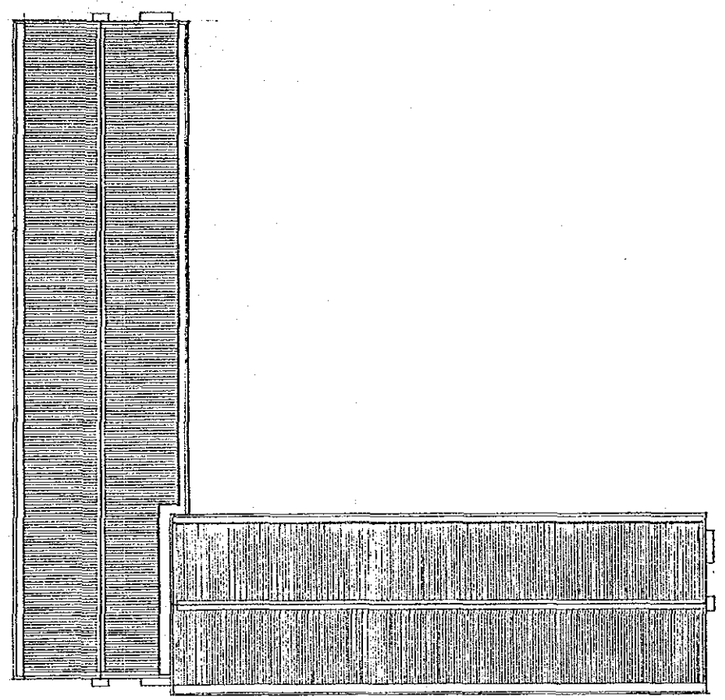
ADMINISTRATION , TRAINING
AND RESEARCH BUILDNG

INFORMATION SECTION
SEED BANK

03



THIRD FLOOR



ROOF

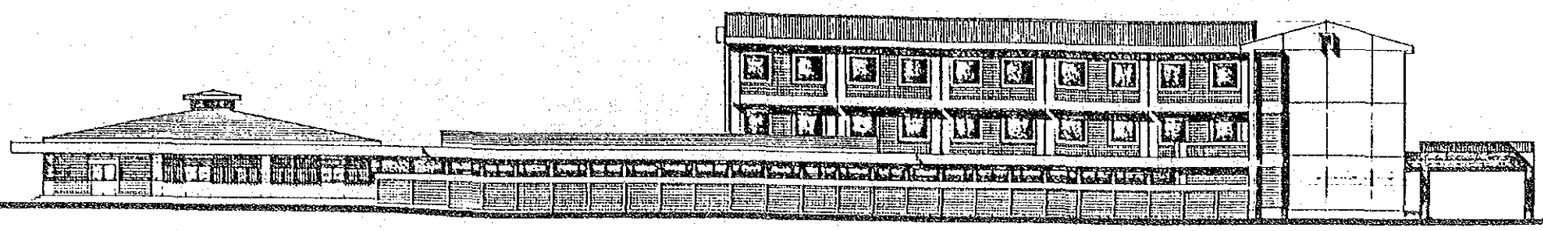
1 LECTURING ROOM
2 LECTURE PREPARATION ROOM
3 EXPERIMENT PREPARATION ROOM
4 LECTURERS' ROOM
5 STUDENTS' STUDY ROOM
6 STORAGE
7 LIBRARY
8 LAB. OFFICE
9 LAB. EQUIPMENT ROOM
10 LAB. EXPERIMENT ROOM
11 PREPARATION ROOM

0 10 20m S=1:400

THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

ADMINISTRATION , TRAINING
AND RESEARCH BUILDNG

04



NORTH SIDE

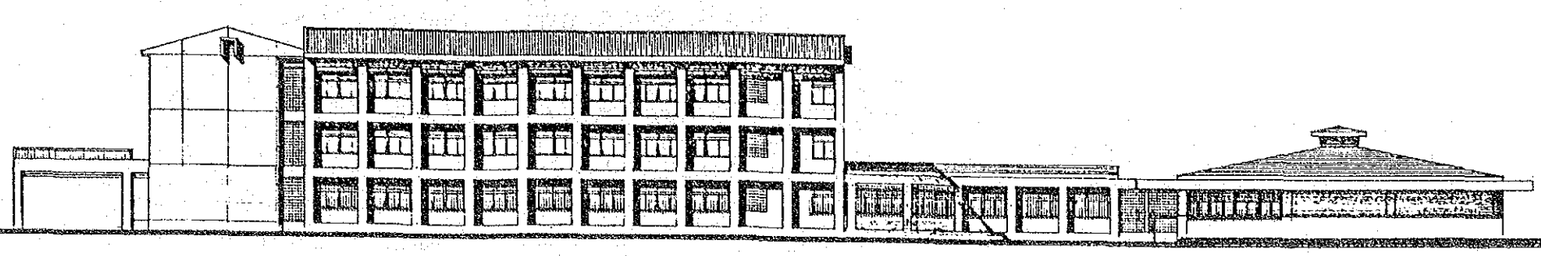
WEST SIDE

0 10 20m S = 1 : 400

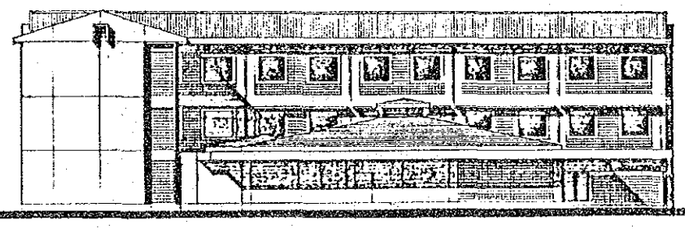
THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

ADMINISTRATION , TRAINING
AND RESEARCH BUILDNG
INFORMATION CENTER
SEED BANK

05



SOUTH SIDE



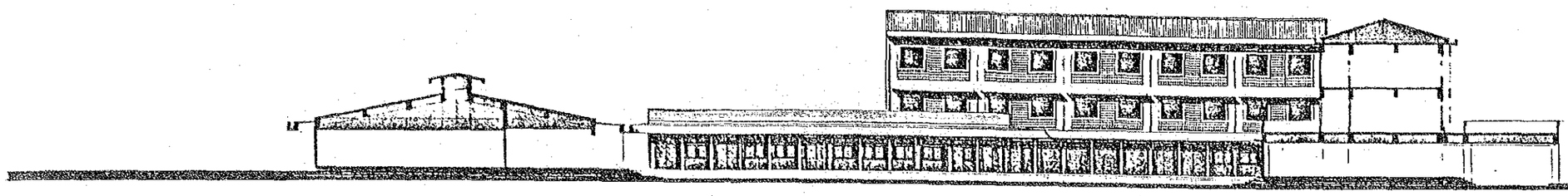
EAST SIDE

0 10 20m S=1:400

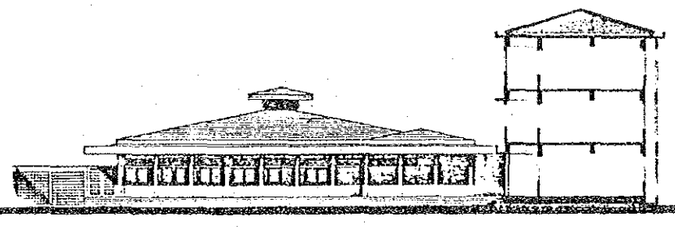
THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

ADMINISTRATION , TRAINING
AND RESEARCH BUILDNG
INFORMATION CENTER
SEED BANK

06



SECTION



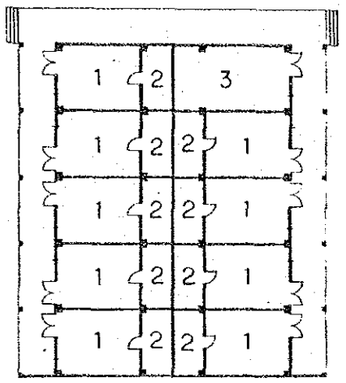
SECTION

0 10 20m S=1:400

THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

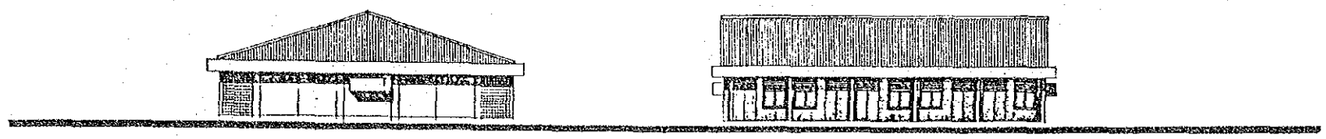
ADMINISTRATION , TRAINING
AND RESEARCH BUILDNG
INFORMATION CENTER
SEED BANK

07



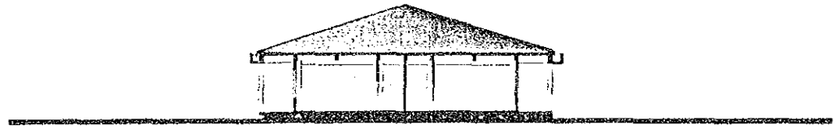
PLAN

1 WORK SHOP
2 COLD STORAGE
3 COMMON WORK SHOP



SOUTH SIDE

EAST SIDE



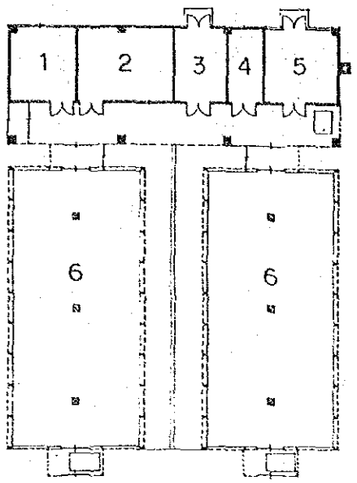
SECTION

0 10 20m S = 1:400

THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

ARI DIVISIONS' SECTION

08



PLAN

1 SOWING PREPARATION ROOM
2 CLEANING AND TESTING ROOM
3 MATERIALS STORAGE
4 CHEMICALS STORAGE
5 STERILIZATION AND INCINERATION ROOM
6 NET HOUSE

SOUTH SIDE

EAST SIDE

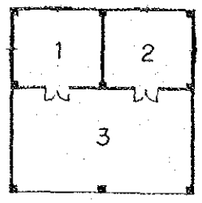
SECTION

0 10 20m S=1:400

THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

NET HOUSE

09

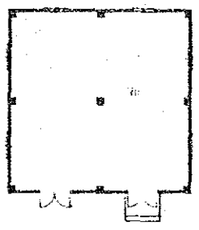


PLAN

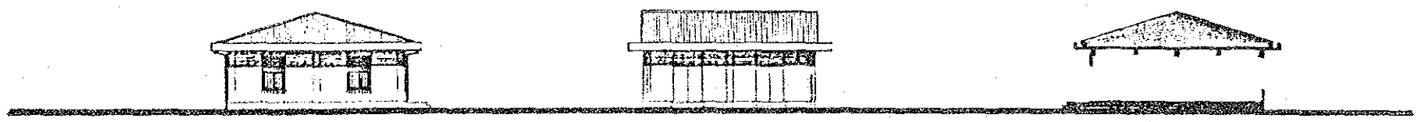
1 WORK SHOP
2 STORAGE
3 GARAGE

WEST SIDE　SOUTH SIDE　SECTION

GARAGE AND WORKSHOP



PLAN



WEST SIDE　SOUTH SIDE　SECTION

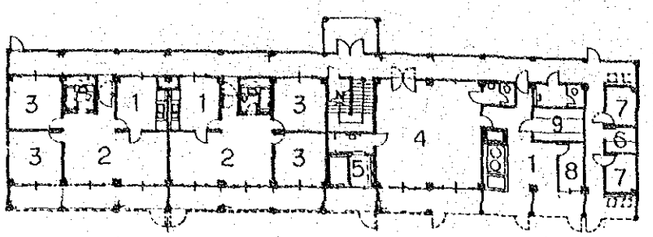
STAND-BY GENERATOR BUILDING

0　10　20m　S = 1 : 400

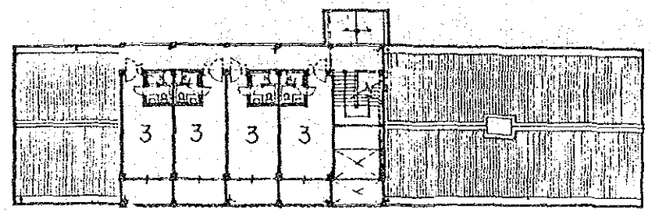
THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

GARAGE AND WORKSHOP
STAND-BY GENERATOR BUILDING

10

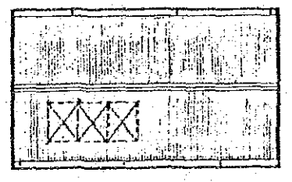


FIRST FLOOR

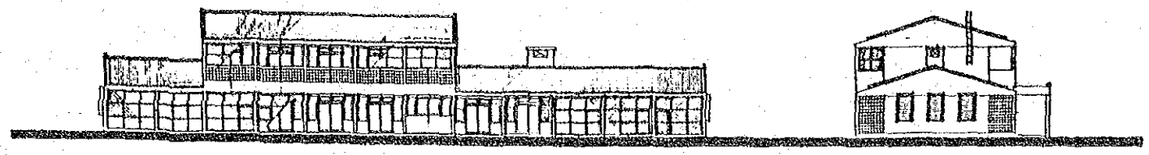


SECOND FLOOR

1 KITCHEN
2 LIVING ROOM AND DINING ROOM
3 BED ROOM
4 CAFETERIA
5 BATH ROOM
6 STORAGE
7 MAID'S ROOM
8 COOKS' ROOM
9 PANTRY

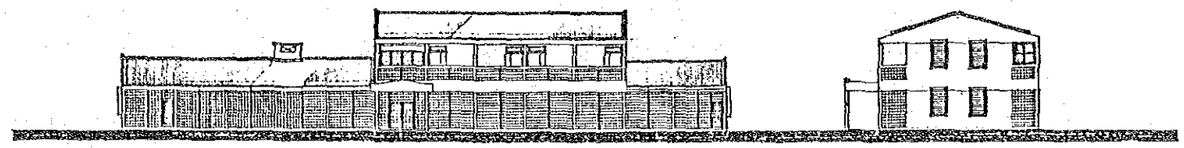


ROOF



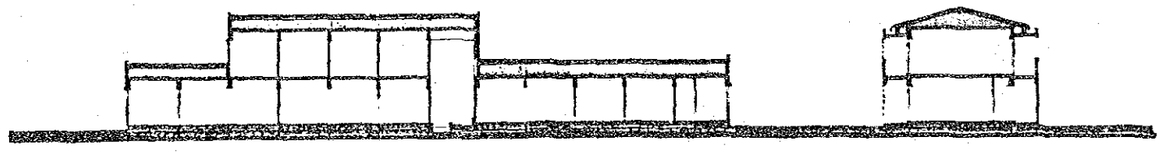
SOUTH SIDE

EAST SIDE



NORTH SIDE

WEST SIDE



SECTION

SECTION

0 10 20m

S=1:400

THE CONSTRUCTION PROJECT OF SEED BANK
IN THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

ACCOMODATIONS

11

CHAPTER 5 PROJECT EXECUTION SYSTEM

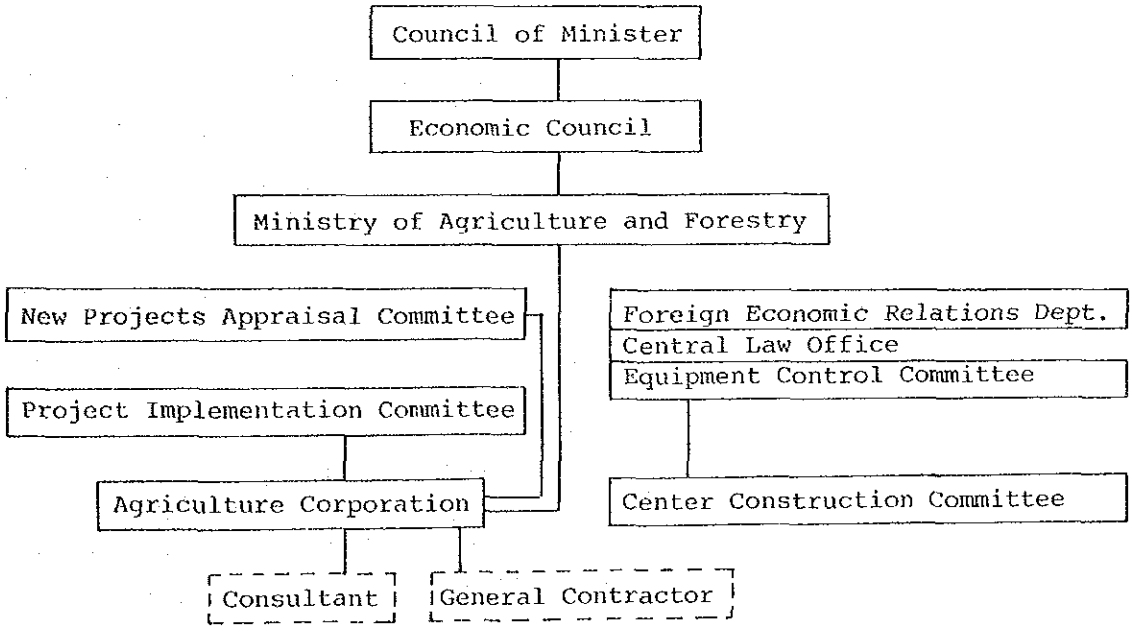
CHAPTER 5 PROJECT EXECUTION SYSTEM

5-1 Authority in Charge of Execution of the Project

The authority in charge of the project -- from planning to completion of the project -- will be the Agriculture Corporation under the Ministry of Agriculture and Forestry. It will serve as the Burmese agent directly responsible for execution of the project and at the same time as the agent to represent the Government of Burma.

While the Agriculture Corporation will be directly responsible for such contractual procedures as design of the execution program, consultant contract, construction contract and bank financing, it will establish a Center Construction Committee within it to discuss matters subject to review by the Foreign Economic Relations Department, the Central Law Office and the Equipment Control Committee. The Construction Corporation's staff members concerned will also participate in discussions in the Center Construction Committee.

Other organizations concerned with construction works include the Construction Corporation, Electrical Power Corporation and so on. The Agriculture Corporation will go through the formalities with these organizations.



- Authorities and Committees concerned -

5-2 Construction Program

5-2-1 Construction Conditions

An on-site survey, including the collection of published data, was conducted on the items mentioned later in this report. Descriptions about the following items are based on investigation and consultations with the Construction Corporation.

(1) Laws and regulations

In Burma there are no laws equivalent to the Building Standards Act and the Fire Services Act of Japan. The British Standards usually apply to building materials and execution methods.

(2) Current state of builders and equipment suppliers

In Burma the Construction Corporation is responsible for all public construction works. The corporation, which is under the direct control of the Construction Minister, acts as a lower branch of the Construction Council which makes decisions on important construction-related policies.

(3) Procurement of building materials

The Construction Corporation owns a very limited number of construction machines. It is very difficult to procure heavy machines in Burma so the necessary machines will be transported from Japan.

In the Yezin District only sand, gravel and bricks are available from local suppliers. Cement, slate, glass, lumber and so on are transported from Rangoon. All the other materials must be procured by Japanese organization.

(4) Trend of construction costs

In Burma, there are very few price increases. In recent years, however, prices are rising due to the global inflationary trend.

The unit prices of building materials are set by the public corporations in charge of their supply. The costs of labor are decided by the Construction Corporation for each job.

(5) Construction in rainy season

The meteorological conditions of Rangoon are characterized by the very long rainy season (mid-May to October). Throughout this season there are sudden showers every day, and the monthly rainfall exceeds 300 mm. However, the project site is located in the central part of Burma, where the average annual rainfall is less than 50% of that in Rangoon. Therefore, the weather should not largely affect construction of the project.

(6) Transportation of construction materials

All the construction materials transported to Burma from Japan will be shipped to the Port of Rangoon and then delivered to the project site by truck. The road to the project site is mostly paved. It takes approximately 10 hours to transport materials to the project site.

5-2-2 Construction Planning

This project will be executed on the basis of the guidelines of the Japanese Government's grant aid program. Considering the scope of the project, the construction period will be one fiscal year.

In planning the execution program, it is necessary that the Center Construction Committee and the Japanese organizations concerned jointly examine the details of the construction process and set the dates for starting construction works, and then expedite procurement of necessary materials and machines, as well as scheduling each construction work.

(1) Site preparation

The project site is located beside the main building of ARI. There are differences in levels of up to 3 m. It is necessary to level the site and cut trees.

Also, it is necessary to replace some parts of the drainage ditch on the southern side of the site according to the site use plan.

Above works should be by the Government of Burma by the commencement of the project.

(2) The construction work will be devided into following items.

1) Facilities

a. Administration, training, and research building
   Seed Bank and information section
b. ARI divisions' section
c. Net house
d. Stand by generator building
e. Garage
f. Accommodations

2) Exterior facilities

Those facilities which will help the above facilities function satisfactorily.

3) Basic facilities for buildings

Those facilities which will help the above facilities function satisfactorily.

5-2-3 Supervising Schedule

Upon the start of the project, a consultant contract between the Government of the Socialist Republic of the Union of Burma and the Japanese consultant should be made on the basis of the guidelines.

The consultant services may be classified in three stages: basic design, detail design and supervision. Among them, the specification of the supervision services are as follows.

(1) Procedures for conclusion of the construction contract

The consultant will decide the form of tender and then the consultant will also prepare the tender documents including drafts of the construction contract. Then several construction companies will be nominated for selection by tender. After the selection process, the chosen construction company will enter into negotiation with the Government of Burma in the presence of the consultant. And then the consultant has to examine the cost breakdown, which also assists in the examination of the construction contract.

(2) Dispatch of a resident engineer

After the commencement of the construction works, a supervising expert will be dispatched immediately from Japan. He is responsible for the following items.

1) Supervision of the construction process

2) Technical instruction

3) Reporting the progress to the Government of Burma and Japan

4) Examination of and approving the final drafts submitted by the constructor

5) Checking the quality and quantity of the materials and equipment

Throughout the duration of the project the consultant company will make available all experts and engineers needed.

(3) Inspection

During the period of construction, inspection should be carried out by the resident engineer and if necessary by the experts properly dispatched from Japan.

(4) Cooperation regarding office routine

As the construction progresses, the following office routine shall be coordinated by the consultant.

1) Working documents for payment

2) Compiling basic data on custom clearance

3) Making reports to the Government of Burma, and so on

And also, the consultant shall have the responsibility for implementation of the whole project and the reporting of necessary affairs to Japanese authorities concerned.

5-3 Scope of Work

This project will be carried out by bilateral cooperation between the Government of Burma and the Government of Japan. The entire project is divided into those construction works to be carried out by the Japanese Government and those to be implemented by the Government of Burma.

5-3-1 Undertaking to be Carried Out by the Government of Japan

1) Buildings

a. Administration, training, and research building
b. Seed Bank and information section
c. ARI divisions' section
d. Net house
e. Stand by generator building
f. Garage
g. Accomodations (for visiting lecturers, etc.)

2) Exterior facilities

a. Paved roads, parking lots
b. Drainage facilities
c. Lighting

3) Basic facilities for buildings

a. Water towers
b. Water supply facilities (including pumps in the areas covered by the Japanese Government)
c. Drainage facilities (including pumps in the areas covered by the Japanese Government)
d. Septic tanks (including pumps in the areas covered by the Japanese Government)
e. Electricity equipment

4) Equipment and machinery

a. For the Seed Bank
b. For information processing
c. For laboratory experiments
d. For training
e. For general affairs
f. For exploration (vehicles)

5-3-2 Undertakings to be Carried Out by the Government of Burma

1) Provision of data and information required for the construction

2) Provision of the site and site clearance

3) Provision of data on boring and water quality tests

4) Facilities

   a. Canteen
   b. Dormitory for trainees
   c. Accommodations for staff members and workers

5) Outdoor works

   a. Site preparation (including removal of trees and the septic tank)
   b. Replacement of drainage ditches
   c. Fence and gate
   d. Landscaping (including tree planting and the pond)

6) Provision of furniture and fire extinguishers

7) Tax exemption for construction machinery and materials to be imported and customs clearance on them

8) Tax exemption for Japanese nationals engaged in the construction work for taxes imposed in Burma

9) Provision of accommodations to Japanese nationals to offer services in the construction work in their entry into and stay in Burma

10) Payment of expenditures for maintenance of facilities and machinery

Estimated expenses for 2), 4) and 5) stated above are K600,000 (kyat) and for 6) are K150,000 (kyat), totaling K750,000 (kyat).

5-4 Construction Schedule

After signing of the Exchange of Notes (E/N) by the two governments, the project proceeds to the selection of a Japanese corporate consultant, selection of a contractor by tender, contract and execution of the construction work. The construction schedule after conclusion of E/N is as follows:

(1) Detail design - from E/N to tender - (3 months)

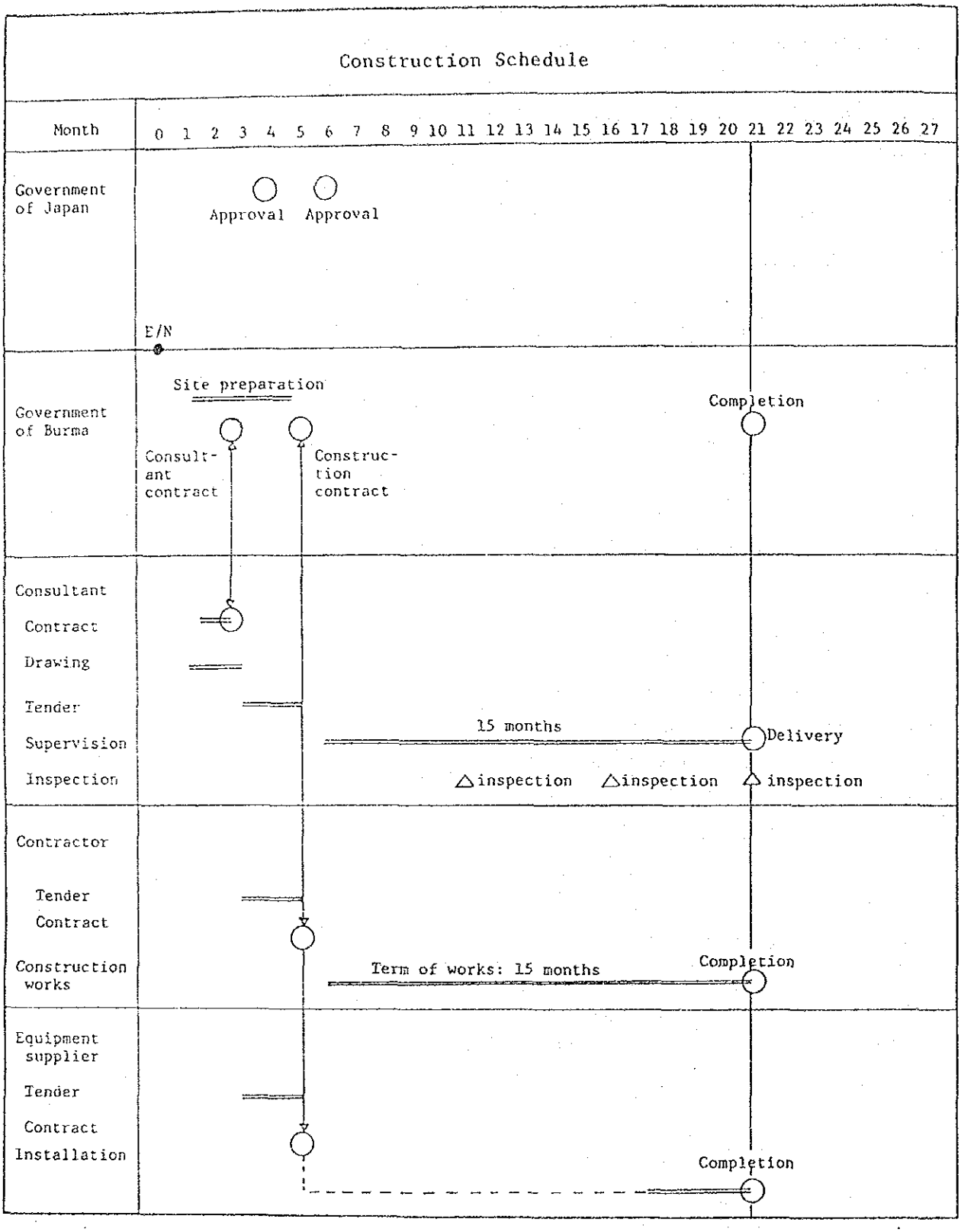
Upon signing of E/N, a design supervision contract will be concluded between the Japanese consultant firm and the Agriculture Corporation of the Ministry of Agriculture and Forestry. Then the consultant will prepare detail design documents and tender documents on the basis of the Basic Design Study Report. After obtaining approval for these documents, the project moves on to the tender procedures. The detail design will take about 3 months including verification process by the Government of Burma.

(2) Tender (3 months)

The procedures of the tender includes notice, explanation, bid opening, evaluation of tender amount, appointment of the successful tenderer and signing of the contract. This process will take about 3 months.

(3) Construction (15 months)

Upon conclusion of the construction contract, construction work will be commenced. In view of the scale and contents of the project, the construction period is estimated to be 15 months. It is desirable that the term be shortened by accelerating required procedures.


Construction Schedule
Month
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Government of Japan
Approval
Approval
E/N
Government of Burma
Site preparation
Completion
Consult-ant contract
Construc-tion contract
Consultant
Contract
Drawing
Tender
Supervision
Inspection
15 months
Delivery
△inspection
△inspection
△inspection
Contractor
Tender
Contract
Construction works
Term of works: 15 months
Completion
Equipment supplier
Tender
Contract
Installation
Completion

5-5 Procurement

As regards the material procurement, basically, local materials should be adopted. However, in the view of cost and supply capacity, it may be procured from Japan.

Materials and equipment to be imported from Japan will be transported by sea to Rangoon (17-37 days for transportation and 5-48 days for customs clearance) and by truck to the project site (about 10 hours). Except for special cases, no consideration will be given to air transportation.

The labor force supply is greatly depending on the Construction Corporation. But dispatch of Japan's specialist is deemed necessary for several construction fields to secure the quality of the job. And the laborers can be easily collected, so the construction schedule can include approximately 200 to 300 workers per day. An outline of the procurement plan is as follows:

5-5-1 Local Procurement of Materials

(1) Sand and gravel

Sand and gravel for concrete aggregates will be locally procured in Pyinmana (river sand and river gravel). The quality is satisfactory.

(2) Cement

Normal Portland cement produced in Ceramic Industries Corporation (British Standard BSS-12) will be used. Provision of required quantity, however, seems uncertain. It is therefore necessary to request the Government of Burma for secured provision of cement, prior to the commencement of the construction work.

(3) Reinforcing bars

Though a small amount of normal round bars are produced in Burma, it has been decided that Japanese-made deformed bars will be used for this project.

(4) Steel-frames

No steel frame for construction use is produced in Burma. Light gauge steel frames of Japanese make will be used.

(5) Moulds

Jungle wood moulds which are locally available will be used for the underground structure. All other moulds, including those for temporary facilities, will be of Japanese-made plywood.

(6) Concrete blocks

Concrete blocks can be produced on the site with relatively low cost. They will be used for exterior walls and partition walls. Local bricks will not be used due to their irregular shape.

(7) Corrugated slates

Along with cement, corrugated slates will be procured from the Ceramic Industries Corporation. However, it is necessary to secure required quantity including reserves through negotiation prior to the construction work. Metal fittings and packings of Japanese make will be used taking into account their durability and waterproof properties.

(8) Fittings

Wooden fittings are widely used in Burma. In this project, however, metal fittings such as aluminum and steel sashes will be procured from Japan because they are more economical than the wooden ones in terms of durability and maintenance in the long run. Teak doors will be adopted where there are no functional deficiencies.

(9) Glass

Local materials (normal transparent glasses 2 mm - 6 mm thick) will be used except for frame/net glasses and sealing materials which will be imported from Japan.

(10) Paint

Japanese-made paints will be used for both interior and exterior works, since there is no synthetic resin paint available in Burma.

(11) Other interior materials

Some asbestos boards and plywood are produced locally. Where it is necessary to hang ceilings, light gauge steel undercoatings will be used together with sound-absorbing boards. Both materials will be procured from Japan.

(12) Heat insulators

Heat insulating materials for construction use are not produced in Burma. To ensure heat insulation for refrigerating facilities which will play the key role in this project, expanded polystyrene boards will be imported from Japan.

5-5-2 Division of Procurement

(1) Materials to be procured in Burma:

1) Cement and aggregates
2) Concrete blocks (machine-made and hand-made)
3) Corrugated slates (roofing material)
4) Lumber -- foundation and flooring block
5) Glass -- thickness: up to 6 mm
6) Terrazo block
7) Wooden fittings

(2) Materials and equipment to be imported:

1) Steel bars and frames
2) Plywood for concrete formwork
3) Paint
4) Aluminum sashes, steel doors
5) Heat insulators
6) Water-proofing materials
7) Pipes (PVC pipes, steel pipes)

8) Electrical installation materials (lighting fixtures, socket outlets, ceiling fans,cables and power transformers)
9) Utility equipment (sanitary fixtures, pumps and air conditioners)
10) Construction equipment
11) Temporary facility materials (power generators, scaffoldings, tools and plywood plates)
12) Research equipment

It is significant to know the accurate capacity of each material, and the transportation period. And then the procurement schedule may be accurately set in fine detail.

5-6 Maintenance and Administrative Schedule

Maintenance and administrative expenses, operation expenses, expendables expenses, etc. will be appropriated out of the budget of the Agriculture Corporation of Burma.

The budget for this project will be 5.6 million kyat.

The following is a rough estimate of the annual expenses for maintenance and administration for this project.

Overhead expenses	480,000 kyats
Heating and lighting expenses	268,000 kyats
Material, equipment and expendables expenses	130,000 kyats
Facility maintenance expenses	250,000 kyats
Miscellaneous expenses	40,000 kyats
TOTAL	1,168,000 kyats

The facility's operational utilities are composed of electricity mainly. The expenses for water can be excluded, since the facility will depend on the well at the site.

(1) Quantity of electricity consumed (kWH)

Load item	Load Capacity (kW)	Hours h/day	Days day/M	Demand Rate (%)	Power consumable (kWH)
1. Power (general)	73.8	5	25	100	9,225
2. Power (cold storage)	52.0	24	30	50	18,720
3. Socket outlet (with fan, cooler)	139.4	8	25	60	16,728
4. Research, experiments	57	8	25	30	3,420
5. Cabinets	21.5	24	30	50	7,740
Total					55,833

(2) Electricity charge

The following is the electricity charge rate in Burma:

Initial 100 kWH: 0.46 kyat/kWH
Additional 100 kWH: 0.40 kyat/kWH

Therefore the electricity charge for this facility will be:

Monthly charge = 100 kWH x 0.46 kyat + (55,833 kWH - 100 kWH)
x 0.40 kyat
= 22,339 kyat/month
Annual charge = 22,339 kyat/month x 12 months = 268,068 kyat/year

Hence the annual electricity charge will be 268,000 kyat.

CHAPTER 6 PROJECT EVALUATION

CHAPTER 6 PROJECT EVALUATION

The project is classified as a top priority project in the 1986-1990 Five-Year Development Plan formulated by the Government of Burma. The significance of this project lies in that it aims at establishing a long-term seed preservation system for genetic resources of major crops.

Ever since independence, the Government of Burma has been pushing forward an agricultural expansion policy, encouraging breeding and introduction of high yield varieties. As a result, production has been increased and high yield varieties have penetrated into areas where native (local) varieties had long been cultivated. Though Burma is called "a treasury of genetic resources," the country now faces a serious deterioration in native varieties.

Recognizing the importance of native varieties as resources for future breed improvement, the Agricultural Research Institute in Yezin has come to direct its efforts toward preserving genetic resources of major crops. At first they did this through seed reproduction in the field. In recent years, however, the need to establish a more stable and labor-saving method for seed preservation has become urgent because of the great number of resources to be preserved which must be collected through prompt exploration. A shift from seed preservation by reproduction to long-term artificial preservation in a facility has become inevitable.

Through constructing a Seed Bank on the premises of ARI and furnishing it with necessary equipment, this project aims at strengthening and improving technology for artificial seed preservation.

The following results will be achieved through successful implementation of the project.

(1) Development and Dissemination of Technology for Seed Storage and Breeding

Seed preservation in Burma mostly depends upon "reproduction" in the field. This method requires tremendous labor and thus interferes with other ARI activities. The implementation of this project will not only eliminate such interference but also enhance various ARI research activities. Furthermore, the new method for long-term preservation of genetic resources will make possible seed provisions to other countries as well as advancement of breeding technology in Burma.

In designing research equipment to be installed in the three laboratories, which are the main components of the project, due consideration has been given to the above perspectives. It is also envisaged that fundamental studies will be carried out in the early stages of the project implementation, whereas applied technology will be transferred later on through international technical cooperation.

From a broad perspective, the project is expected to bring about an increase in food-crop production and export through development of new varieties utilizing diverse genetic resources gathered within the country. Furthermore, successful preservation of genetic resources in Burma will contribute greatly in the struggle against a world food crisis in future.

(2) Improvement in Staff Training and Education Regarding Seed Storage and Breeding

Very few courses in thremmatology are offered in Burmese universities. Such courses mostly consist of lectures and very little time is allocated for practical technical training using experiments and field work. Though some researchers were sent to overseas training (mainly to IRRI in the Philippines), they cannot pass on the acquired technology to their colleagues because there are no facilities to work with.

The training course planned through this project will provide a three-month live-in training course comprising lectures, experiments and field work for up to 20 technicians at a time. The training will be led by thremmatologists and foreign experts.

Through this training, plenty of intermediate level technicians will be trained and assigned not only to ARI but also to regional agricultural stations, experimental farms and breeding farms, mediating between central (ARI) and regional organizations. In view of regional differences in the meteorological conditions of the country, a breeding system fitting the locality of each region should be developed.

In addition, the effect of the training and education brought about by the project will have an indirect influence upon the activities of other organizations such as agricultural extension offices and agricultural cooperatives.

(3) Socio-Economic Influence

Expansion of agricultural production in Burma is vital to ensure a self-sufficient food supply and proper nutrition. It also plays an important role in foreign exchange earnings. Though the market price has been declining recently, farm products are still the mainstay of Burma's export income.

The major target of this project is rice but other crops such as oil, fiber and leguminous crops are also included in the project. These crops may be incorporated into a group of strategic products for promoting future growth of the Burmese economy.

The socio-economic effects expected from this project are as follows:

1) Improvement in the standard of research, education and facility levels in Burma.

2) Leveling off of regional disparities in study levels by constructing the Seed Bank in Yezin.

3) Increase of cash income and vitalization of economic activities on the part of producers.

4) Increased foreign exchange earnings through export of surplus products.

5) Improvement of the diet and health of the people brought by the expansion and diversification of agricultural products.

6) Establishment of the Seed Bank as an international research institute dealing with seed storage and breeding.

CHAPTER 7 CONCLUSION AND RECOMMENDATIONS

CHAPTER 7 CONCLUSION AND RECOMMENDATIONS

7-1 Conclusion

Through surveys in Burma and post-survey analysis in Japan regarding the contents of the Seed Bank Construction Project drawn up by the Government of Burma, the Study Team concludes that the project is highly eligible for implementation under Japan's grant aid. From the domestic point of view, the project will contribute to the development of plant breeding technology in Burma, whereas from the global standpoint it will help to ensure the preservation of genetic resources which are essential for the welfare of the people of the world.

As explained earlier, Burma is endowed with prominent genetic resources unique in the world, but these have been decreasing due to the wide dissemination of high yield varieties (HYV). Long-term preservation of these decreasing resources by means of facilities will facilitate the development of more favorable seeds fitting the conditions of the Burmese climate. The Seed Bank will also play an important role as an international research institute which studies and provides genetic resources and thus contributes to the global development of technology for genetic resources manipulation.

As regards the construction site, the Study Team concludes that the proposed site is appropriate for the project as it is situated in a research area and many research organizations such as the Institute of Forestry and the Forestry Research Institute are located nearby.

As a result of overall consideration of the findings of the Basic Design Study, the team concludes that the project, if implemented under Japan's grant aid program, will produce significant effects not only on the agricultural development of Burma but also on the infrastructure base for socio-economic development and the fostering of human resources.

7-2 Recommendations

(1) Establishment of a Cooperative Study System between the Seed Bank and ARI

The development and dissemination of favorable seeds useful for future progress of Burmese agriculture is one of the major objectives of the Seed Bank Construction Project. To achieve this objective, it is necessary for the Seed Bank to establish a cooperative study system with the respective divisions of ARI which deal with each crop. Joint study meetings should be held on a regular basis.

The Seed Bank, though basically affiliated to ARI, will also act as an independent organization. Successful coordination of these factors is essential for effective Seed Bank operation.

(2) Staff Training

There is a shortage of qualified technicians in the field of genetic resources preservation in Burma. The administrative sections of each research agencies should make every effort to upgrade the overall level of the technical staff by utilizing internal and external research institutions.

(3) Systematic Maintenance of Research Equipment and Vehicles

Depreciation for the maintenance and replacement of the equipment and vehicles must be appropriated in the budget allocation. Supervision of small equipment (such as accessories and consumables) must be carried out by preparing a "managerial handbook" which specifies responsible persons (laboratory heads) and methods of inspection according to which a report is regularly submitted to the administrator. It is also possible to supervise the equipment using the computer system which will be provided under this project.

(4) Staff Arrangement in the Seed Bank

The Seed Bank is designed for an assumed staff of 60 people. Therefore, if a sufficient number of personnel are not available, the operation of the Seed Bank will be seriously affected. It is thus very important for the Government of Burma to obtain the required personnel promptly and furnish them with the training necessary for smooth operation of the Seed Bank.

(5) Preparation for Future Expansion of Research Activities

The activities of the Seed Bank must be determined based on a long-term perspective. Though usefulness of genetic resources is widely recognized, the study is still in its early stages and the scope of the activities of the Seed Bank should be widened with the advancement of the study.

As described earlier, the project is drawn up in accordance with the current study level in Burma. Presumably, more facilities and equipment will be needed in the future. It is therefore necessary to establish a research system that can be expanded in future in accordance with the increase in social requirements.

(6) Recommendations Regarding Execution of the Construction Project

Facilities to be constructed under this project are those with highly intensified functions. For the smooth implementation of the construction work, it is essential that the Goverment of Burma offer unstinting cooperation including strengthening of the administrative organization and provision of a budget for the maintenance of the Seed Bank. Furthermore, it will be important to continue maintenance of the facilities, including replacement of the construction materials and research equipment, as they will be used continuously.

(7) Further Cooperation by the Japanese Government

As the Seed Bank is the first full-scale institute in Burma dealing with the preservation and study of genetic resources, it is probable that technical staff are not equipped with sufficient experience and technology for the work. To increase the effects of grant aid from the Japanese Government, it is desirable that both governments continue their efforts for technical cooperation.

APPENDIX

APPENDIX

Appendix 1 Member List of the Basic Design Study Team

Basic Design Study (Jyly 27 - Aug. 19, 1986)

Dr. Masahiro Nakagawara — Team Leader

Chief, Ecological Genetics Lab.,
National Institute of Agrobiological Resources,
Ministry of Agriculture, Forestry and Fisheries

Mr. Shiro Kanayama — Project Coordinator

Training Division, Tsukuba International Agricultural
Training Center, Japan International Cooperation Agency

Mr. Hidejiro Uchigasaki — Architectural Planner

Architectural Engineers Firm of
Japan Agriculture Cooperation Co., Ltd.

Mr. Hideki Nagaoka — Architectural Designer

- ditto -

Mr. Yoshiro Mori — Mechanical Planner

- ditto -

Dr. Hidetoshi Matsuo — Genetic Resources Specialist

Chuo Kaihatsu International Corp., Ltd.

Mr. Yoshihiro Zaitsu — Equipment Planner

- ditto -

Dr. Yoshihisa Serizawa — Facilities Planner

- ditto -

Draft Report (Nov. 1 - Nov. 14, 1986)

Mr. Noriaki Niwa — Team Leader

1st Basic Design Study Division,
Grant Aid Planning & Survey Department
Japan International Cooperation Agency

Mr. Hidejiro Uchigasaki — Architectural Planner

Architectual Engineers Firm of
Japan Agricultural Cooperation Co., Ltd.

Mr. Hideki Nagaoka — Architectural Designer

- ditto -

Mr. Kentaro Kimura — Mechanical Planner

- ditto -

Dr. Hidetoshi Matsuo — Equipment Planner

Chuo Kaihatsu International Corp., Ltd.

Appendix 2 Itinerary of the Basic Design Study Team

1. Basic Design Study (July 27 - Aug. 19)

Date	Day	Morning	Afternoon	Remarks
July 27	Sun.		Tokyo - Bangkok TG 741	6 members
July 28	Mon.	Observation of Rice Research Center, Seed Bank in Bangkok	Bangkok - Rangoon TG 305	Team leader and one member join the Team
July 29	Tue.	Formal visit to the Japanese Embassy, JICA Office Briefing on AC and KZ	Team meeting on the itinerary and agenda	
July 30	Wed.	Observation of existing facilities 1) CADTC 2) Crop Research Center	Team meeting on the minutes of discussions	
July 31	Thu.	Rangoon - Pyinmana 6:00 14:15	Observation of ARI Discussion concerning the site	
Aug. 1	Fri.	Meeting with ARI 1) Administration and budget 2) Architectural plan 3) Equipment plan	Meeting in groups 1) Discussions with CC, EPC and WS 2) Discussions with respective divisions	
Aug. 2	Sat.	Meeting with ARI 1) Architectural plan 2) Equipment plan	Site survey Discussions with respective divisions	
Aug. 3	Sun.	Observation of existing facilities of ARI	Pyinmana - Rangoon	
Aug. 4	Mon.	Discussions with AC on the minutes	Team meeting	
Aug. 5	Tue.	Meeting with CC 1) Construction situation 2) Power supply situation	Team meeting	
Aug. 6	Wed.	Discussion with AC on the minutes	Meeting in groups 1) Discussion with CC 2) Discussion with AC on customs clearance	
Aug. 7	Thu.	Survey of Nurse Training Center	Observation of the stadium Data collection	

(Cont'd)

Date	Day	Morning	Afternoon	Remarks
Aug. 8	Fri.	Data collection	Data collection	Formal visit to the Japanese Embassy (Team leader & 2 members)
Aug. 9	Sat.	Data arrangement	Data arrangement	Return to Japan (Team leader & 2 members)
Aug. 10	Sun.	Rangoon - Yezin 7:30 18:30		
Aug. 11	Mon.	Discussion with ARI staff 1) Architectural plan 2) Equipment plan	Meeting in groups 1) Discussion with CC (Construction, electricity, water supply) 2) Survey of existing laboratory equipment	
Aug. 12	Tue.	Site survey Survey of seed storage	Observation of Forestry Research Institute Data arrangement	
Aug. 13	Wed.	Yezin - Rangoon 7:30 19:00		
Aug. 14	Thu.	Meeting in groups 1) Discussion with AC (on construction) 2) Confirmation of the relation between ARD and ARI	Meeting in groups 1) Discussion with CC (Data receipt) 2) Data collection	
Aug. 15	Fri.	Meeting in groups 1) Boring test application at Soil Testing Institute 2) Data collection	Data collection Team meeting	
Aug. 16	Sat	Team meeting	Data arrangement	
Aug. 17	Sun.	Data arrangement Compilation of discussed items	Data arrangement	
Aug. 18	Mon.	Reporting to the Japanese Embassy, JICA Office	Rangoon - Bangkok TG 306	
Aug. 19	Tue.	Bangkok - Tokyo TG 740		

2. Draft Report (Nov. 5 - Nov. 14)

Date	Day	Morning	Afternoon	Remarks
Nov. 5	Wed.		Tokyo - Bangkok TG 741	Team Leader and 4 members
Nov. 6	Thu.	Team meeting	Bangkok - Rangoon TG 305	
Nov. 7	Fri.	Formal visit to JICA Office and FERD	Presentation of Draft Final Report at AC	
Nov. 8	Sat.	Rangoon - Pyinmana 6:00 14:30	Discussion on itinerary at ARI Site survey	
Nov. 9	Sun.	Presentation of Draft Final Report to ARI	Team meeting	
Nov. 10	Mon.	Explanation of project outline to the Managing director of AC	Pyinmana - Rangoon 12:00 20:30	
Nov. 11	Tue.	Reporting to JICA Office	Discussion on the contents of Draft Final Report at AC	
Nov. 12	Wed.	Discussion with MAF on the minutes	Signing of the Minutes of Discussions	
Nov. 13	Thu.	Final reporting to the Japanese Embassy and JICA Office	Rangoon - Bangkok TG 306	
Nov. 14	Fri.	Bangkok - Tokyo TG 740		

Appendix 3 Member List of Authorities Concerned

Name	Position Held
Foreign Economic Relations Development (F.E.R.D.)	
U Antt Kyaw	Deputy Director
U Than Myint	Assistant Director
Ministry of Agriculture and Forests (M.A.F.)	
U Hla Moe	Director General
	Planning and Statistics Department
U Kyaing	Deputy Director
Agriculture Corporation (A.C.)	
U Khin Win	Managing Director
U Aye Kyew	General Manager
Dr. Myint Thein	General Manager (Planning)
U Hla Myint Oo	General Manager (Planning)
U Tin Hlaing	General Manager (Extension)
U Kyaw Win	Assistant General Manager (Planning)
U Tin Htut Oo	Deputy Assistant General Manager
U Hla Than	Deputy General Manager (Planning)
U Ba Toke	Deputy General Manager
U Ma Ma Tin	Project Manager
Agriculture Research Institute (A.R.I.)	
Dr. Tun Saing	General Manager
U Ohn Kyaw	Deputy General Manager (Rice Div.)
U Aung Khine	Assistant General Manager
U Thein Han	Assistant General Manager (Pulses)
U Arttiur Mundt	Assistant General Manager (Farm Equipment)
U Tun Hlaing	Deputy General Manager (Sugar)
U Saw Win Kyi	Deputy General Manager (Oil Seed)
U Kyaw Shin	Assistant General Manager (Agronomy)
U Maun Luai	Assistant General Manager (Horticulture)
U Myat Htwe	Deputy General Manager (Fibre Crops)

(cont'd)

Name	Position Held
U Mya Thein	Agricultural Engineer (Farm Machineries)
Dr. Sein Tun	Deputy General Manager (Chemistry)
U Shwe Hla Baw	Deputy Assistant General Manager
U Myo Nyunt	Assistant General Manager (Oil Crops)
U Mya Lwin	Assistant General Manager (Plant Botany)
U Chit Ko Ko	Junior Research Officer (Rice Div.)
U Kyi Tun	Junior Research Officer (Rice Div.)
U Tin Aung	Assistant General Manager (Oil Seed)
U Hla Kyauk	Deputy Assistant General Manager (Oil Seed)
U Nyunt Lwin	Junior Research Officer (Oil Seed)
U Saw Lucky Tun	Deputy Assistant General Manager (Food Legume Div.)
Kyi Aung	Junior Research Officer (Food Legume Div.)
U Tin Tun Myine	Assistant General Manager (Chemistry Div.)
U Sein Win	Research Assistant (Chemistry Div.)
U Ohn Thein	Deputy Research Assistant (Chemistry Div.)
U Toe Aung	Deputy Assistant General Manager (Maize and Other Cereals Crop Div.)
U Jhon Ma Maw	Junior Research Officer (Maize and Other Cereals Crop Div.)
U Tin Htot	Field Assistant (Horticulture Div.)
U Tha Sein	Assistant General Manager (Sugar Cane)
U Aung Myint	Deputy Assistant General Manager (Sugar Cane)
U Hla Kyi	Research Manager
U Maw Kyi	Deputy Assistant General Manager
U Chit Wai	Accountant
Daw Shiolay	Junior Officer (ARI Branch Office)
Dr. R.K. Palis	I.R.R.I. Expert

Construction Corporation (C.C.)

U Myint Thoung	Staff Officer I, (Q/S Research)
U Win Htain	Staff Officer I, (Electrical)
U San Tin	Staff Officer II, (Electrical)
U Ngwe Tun	Staff Officer II, (Water Supply)

(cont'd)

Name	Position Held
U Tin Aung	Architect
U Tint Swe	Structural Engineer
U Saw Mya Than	Quantity Surveyor
U Sein Tun	Sanitary Engineer
U Maung Maung	Structural Engineer
U Ne Pu	Quantity Surveyor
U Than Tun	Staff Officer III, (Electrical) Construction Corporation, Head Office
U Aung Kyaw Minn	Staff Officer III, (Architect) C.C., Head Office
U Zaw Lin	Staff Officer III, (Design 4) Q/S Research Department, C.C. (H.O.)
U Nay Phoo Ba Swe	Staff Officer III, (Estimate 4) Q/S Research Department, C.C. (H.O.)
U San Hein	Assistant Chief Engineer, Pyinmana
U Tin Nicin	Assistant Engineer (Civil), Pyinmana
U Naing Win	Assistant Engineer (Water Draining), Pyinmana
U Nyan Hlaing	Assistant Engineer (Electrical), Pyinmana
U Khin Thint	Assistant Engineer (Electrical), Pyinmana

Electric Power Corporation (E.P.C.)

Mr. C.K. Taikwel	Deputy Chief Engineer
U Khin Hlaing	Superintending Engineer
U Thaung Sin	Township Electrical Engineer, Pyinmana

Other Organizations Concerned

Mr. Katsuhide Kitatani	President Representative, U.N.D.P., Rangoon
Mr. Oscar J.S. Lazo	F.A.O. Representative in Burma, F.A.O./U.N.
U Tin Myint	Farm Manager, Nyung Bin Tha Central Farm, Pyu Township, A.C.
Daw Than Nwe	National Programme Officer, U.N.D.P., Rangoon
Mr. Ranel Kral	Assistant President Representative U.N.D.P., Rangoon
Mr. Charles Simkins	Agriculture Office, U.S.A.I.D., U.S. Embassy, Rangoon

MINUTES OF DISCUSSION
ON
SEED BANK PROJECT
IN
THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

In response to the request of the Government of the Socialist Republic of the Union of Burma, the Government of Japan decided to conduct a basic design study on the Seed Bank Project (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Socialist Republic of the Union of Burma, the Team, headed by Dr. Masahiro NAKAGAWARA, Chief, Ecological Genetics Laboratory, National Institute of Agro-biological Resources, Ministry of Agriculture, Forestry and Fisheries, from July 27 to August 18. The Team had a series of discussions on the Project with the officials concerned of the Government of the Socialist Republic of the Union of Burma headed by U KHIN WIN, Managing Director, Agriculture Corporation, Ministry of Agriculture and Forests and carried out field survey.

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.

Rangoon, August 6th, 1986

6th Aug. 1986

U Khin Win
Managing Director
Agriculture Corporation
Ministry of Agriculture and Forests

Dr. Masahiro NAKAGAWARA
Leader, Basic Design Study Team
Japan International Cooperation Agency

ATTACHMENT

1. The objective of the Project is to provide necessary buildings, facilities and equipment for the Seed Bank Project, with a view to contributing further crop improvement through activities for collection, preservation, evaluation and utilization of seed crop genetic resources such as rice, cereal grains, oil crops, food legumes, fibre crops, vegetables and so on.

2. The site of the Project is located in land belonging to the Agriculture Research Institute at Yezin, Pyinmana township. (Site Map is attached as ANNEX I).

3. The activities of the Seed Bank are as follows:-
   (1) Collection and exploration of seed crop genetic resources;
   (2) Description and documentation of collected materials of each crop;
   (3) Classification, evaluation, rejuvenation and multiplication of seed crop genetic materials;
   (4) Procedures for testing introduced materials for various crop species including isolation and purification of genetic materials;
   (5) Technique for long term preservation including management of seed genetic resources storage facilities;
   (6) Physiology for seed of seed bank materials;
   (7) Information system for genetic materials collected, introduced and preserved;
   (8) Collaboration with national and international institutions on plant genetic resources;
   (9) Training scientific staff for the technology on seed genetic resources.

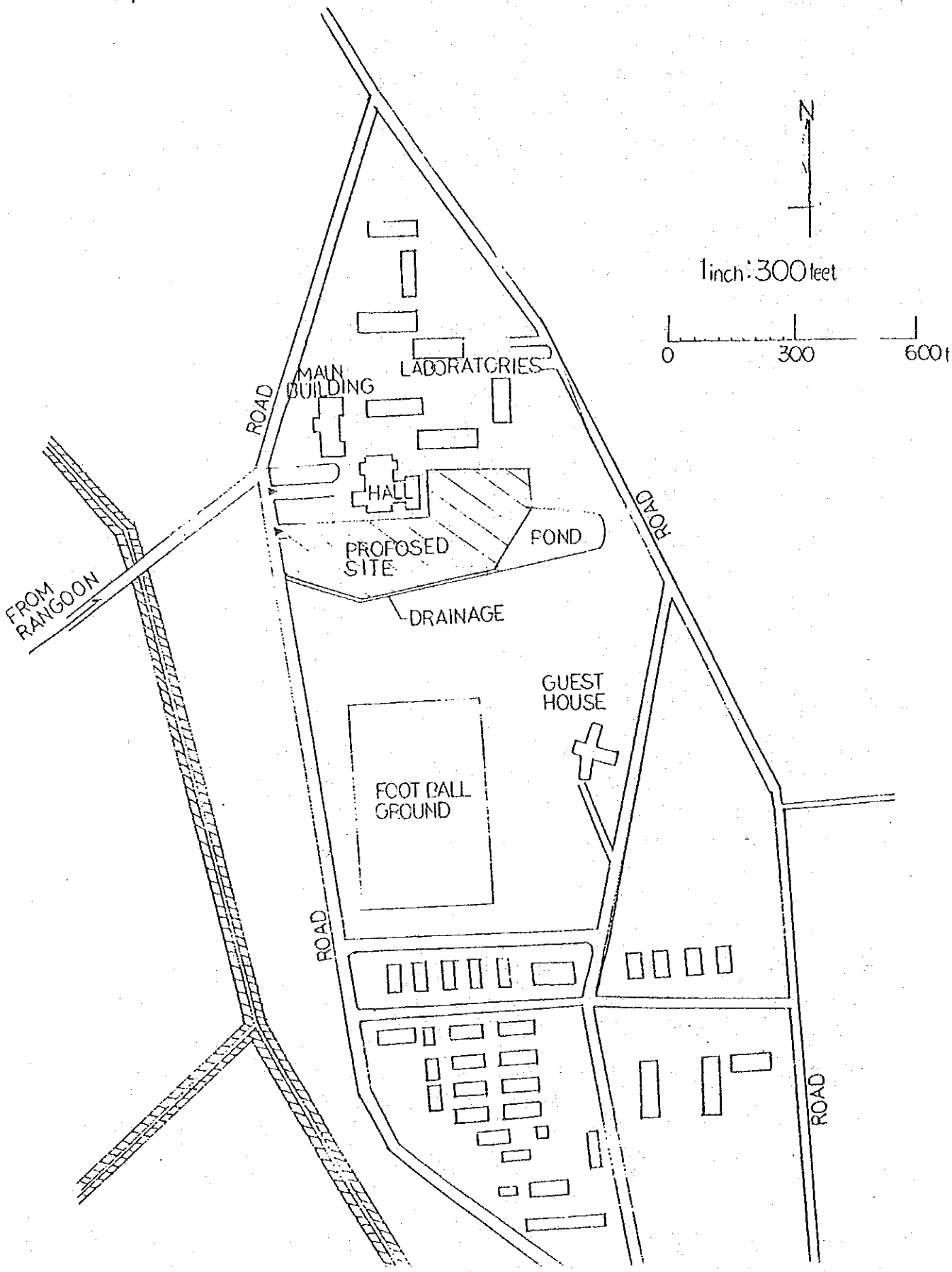
4. The Team will convey to the Government of Japan the request of the Government of Burma that the former takes necessary measures to cooperate in implementing the project and bears the cost of facilities and other items as listed in ANNEX II, within the scope of Japanese economic cooperation program in grant form.

5. The Government of Burma will take necessary measures as listed in ANNEX III on condition that grant assistance by the Government of Japan is extended to the Project.

6. The Burmese side has understood Japan's Grant Aid System as explained by the Team.

ANNEX-I

Proposed Site Plan for Seed Bank



For the purpose of accelerating research works on the Seed Bank Project, facilities and appropriate equipment are required as follows:-

I. Facilities

1. Buildings for:-
   (1) Seed Bank
   (2) Administration, Information & Research Laboratory
   (3) Training
   (4) Utility
   (5) Others related to the Project, if necessary.

II. Equipment

1. Equipment for Seed Bank Section:-
   (1) Cleaning Seeds
   (2) Drying Seeds
   (3) Packing Seeds
   (4) Distributing Seeds
   (5) Germination Tests
   (6) Making Specimen
   (7) Cold Storage.

2. Equipment for Information System Section:
   (1) Computing System
   (2) Card System
   (3) Information Services.

3 Equipment for Research Laboratory:
   (1) Exploration and Collection
   (2) Introduction, Isolation and Sterilization
   (3) Classification and Evaluation
   (4) Seed Quality Analyses
   (5) New Storage System
   (6) Rejuvenation and Multiplication.

4. Training Facilities.

5 Office Equipment.

6. Vehicles.

7. Utility Equipment for:
   (1) Workshop
   (2) Stand-by Generator

8. Others related to the Project, if necessary.

ANNEX III

Following arrangements will be required to be undertaken by the Government of Burma.

1. To secure the site for the Project .
2. To clear, level and reclaim the site prior to commencement of the construction works .
3. To construct fence and gate in and around the site .
4. To construct the access road to the site prior to commencement of the construction works .
5. To obtain the building permit .
6. To connect distributing line of electricity to the site .
7. To make available water supply for the Project .
8. To provide furniture and office stationery for daily activities .
9. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment to be brought for the Project at the port of disembarkation .
10. To accord Japanese national(s) whose services may be required in connection with the supply of the materials/equipment and the services under the verified contract; such facilities as may be necessary for their entry into Burma and stay therein for the performance of their works .
11. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant .
12. To bear necessary expenses other than those to be borne by the Grant.

MINUTES OF DISCUSSIONS

ON

THE BASIC DESIGN STUDY

ON THE CONSTRUCTION PROJECT

OF SEED BANK

IN

THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

In response to the request of the Government of the Socialist Republic of the Union of Burma for Grant Assistance for the Construction Project of Seed Bank (hereinafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Burma the basic design study team from July 28 to August 18, 1986.

As a result of the study, JICA prepared a draft report and dispatched a mission to explain and discuss it from November 6 to November 13, 1986.

Both parties had a series of discussions on the Report and 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.

Rangoon, November 12, 1986.

Mr. NORIAKI NIWA
Team Leader,
Basic Design Study Team,
Japan International
Cooperation Agency.

U AUNG KHIN
General Manager,
(Special Duty)
for U KHIN WIN
Managing Director
Agriculture Corporation,
Ministry of Agriculture
and Forests.

ATTACHMENT

1. The Burmese side has agreed in principle to the basic design proposed in the Draft Final Report and appropriate alterations agreed by both sides in the course of discussions will be incorporated in the Final Report.

2. The Burmese side has accepted Japan's grant aid program for the realization of the Project.

3. The Final Report (10 copies in English) will be submitted to the Burmese side early in December, 1986.

4. The Team reconfirmed the undertakings to be taken by the Burmese side on condition that the relevant Japan's grant aid will be extended for the Project.

Burmese side suggested that it will be more appropriate to start the Project at the beginning of the next fiscal year, in view of the formalities and procedure to be undertaken for the necessary clearance from the higher authorities.

The Team agreed to convey the Burmese side's suggestion to the Government of Japan.