Grain counter	1	more than 20 years	non functional
Incubator	1	more than 20 years	non functional
Oven	1	more than 20 years	non functional
Refrigerator	1	1989 purchased	non functional
-Seed health test			
Stereoscope microscope	9	1986 purchased	2 set non functional
Stereoscope microscope	6	more than 15 years	non functional
Microscope	1	1986 purchased	functional
Microscope	5	more than 10 years	old (non functional x3)
Auto clave	1	more than 15 years	non functional
Incubator	1	more than 15 years	old
Oven	1	more than 15 years	old
Freezer	1	more than 15 years	old
Refrigerator	1	more than 10 years	old
Centrifuge	1	more than 10 years	old
Shaker	1	more than 10 years	functional
Stirrer	1	purchased in 1991	functional
Sterilizer	1	purchased in 1991	functional
ELISA reader	1	purchased in 1991	functional

ii) Equipment for training, data processing, field inspection

There is a need to improve the training, facilities, equipment, and mobility to cope with the expanded activities in seed testing and certification and training and research effectively and efficiently. However, NSQCS have no facilities/equipment such as audio visual for training, and only have one personal computer for data processing. Provision of this equipment will be more useful and appropriate to cope with the expanded activities of NSQCS. In addition to these, the provision of field inspection vehicles such as a mini bus, for transportation of staff and trainees is indispensable for the implementation of trainings and seed inspection activities.

c) Construction of seed storage

In order to stock seeds for regulating production and distribution among seed farms/stations, BPI has operated and maintained an ordinary seed storage of 214 cubic meter which was constructed on the ground floor of the Crop Production Building in the 1970s. The storage room has insulated walls with lawanit ceiling, and is equipped with obsolete window type air-conditioners, ill-functioning dehumidifiers.

The main function of the existing storage in BPI Headquarters is to maintain the procured, imported, and station produced seeds of cereals, legumes, and vegetables, particularly, for breeder and foundation seeds procured from breeding institutions. There were about 43 tonnes of cereals, legumes, and vegetables seeds maintained in the storage in 1990. In conformity with the Seed Act, BPI has to maintain and distribute breeder and foundation seeds for multiplying into respective foundation and registered seeds in experiment stations/seed farms. BPI also is obligated to maintain buffer stocks of 100% of breeder seeds and 20% of foundation seeds under the Administration Order No.32.

By virtue of the Seed Act, BPI shall have direct responsibility for the production and implementation of the program including but not limited to the testing laboratories and certification services. Thus, BPI intends to sufficiently maintain breeder, foundation, and registered seeds in BPI Headquarters, and to distribute them timely to related experiment stations in order to produce necessary certification seeds for rice, corn, and peanuts so as to achieve the planned targets in the Medium Term National Seed Program (1991~1995).

As for the buffer stock of seeds, Administrative Order No.32, 1989 has stipulated that seed producers shall maintain 10% buffer stock in addition to the seed production program targets for contingency. BPI plans to maintain the buffer stock of breeder and foundation seeds at its Head Office, while the buffer stock of registered seeds shall be kept in each seed farm/station.

Taking the above into account, the existing ordinary storage would be insufficient functionally to stock seeds over a long period, and too small to maintain the transitory and buffer stocks for all seeds under the regulations.

Seed storage equipment seed processing facilities, and seed transportation vehicles have been requested. The seeds for next seasons crops will be stored in a facilities with no equipment for controlling temperature and moisture. Re-drying of seeds will be necessary in order to keep them in good condition, particularly during the rainy season. Among the seeds sent from breeding institutes and seed farms, some seeds will be rejected after seed testing. However, BPI now plans to re-dry and re-process seeds, which were rejected because of moisture and inert matter contents. The seeds which were rejected for low germination ratio and varietal mixture will not be reused. In regarding to the above point of view, installation of simple seed drying and seed processing facilities is desirable.

The requested vehicles will be utilized to transport breeder seeds and foundation seeds from the storage in BPI Headquarters to related seed production farms, and transport breeder and foundation seeds stored temporarily in the seed production farms to BPI Headquarters. If the above vehicles are provided, seed transportation will be done effectively and economically.

(2) Improvement of rice seed production, processing and storage facilities in the VES

In order to improve seed production and distribution, and seed quality in the rice model area selected, BPI requested that the seed production in VES be improved.

a) Improvement of seed processing plant

The existing seed processing plants consist of a rice processing plant with a one ton per hour capacity and three seed dryer units each with 2.8 tonnes per day capacity. These plants were installed through the First Japanese Yen Loan Program about twenty years ago. The plants have been processing seeds produced not only in the Station but also by private seed growers in the model area at a charge decided by DA.

The table below shows the quantity of seeds processed in 1991:

Items	Station	Seed growers	Total
No. of Cavans* received	1,698	865	2,563
Processed seeds (cavan)	1,098	713	1,811
Processed seeds (kg)	42,920	28,520	71,440
Yield rate of seeds (%)	64.7	82.4	70.7

Note* : 1 cavan = 40kg

More seed growers wish to use the processing facilities, particularly in wet season. According to the Iloilo Seed Growers Association, about 30% or more of seed growers wish to use the facilities, however, only about 10% actually use the facilities in the model area due mainly to the limited capacity of the existing facilities.

The existing facilities are still functional, but defective parts should be replaced. However, it was observed that the facilities should be renovated as soon as possible because the existing ones are too worn-out, and are becoming less effective. In renovating the plants, it will be desirable to take into account the seed growers demand, past performance of existing facilities, and the future utilizing plan for the facilities.

b) Construction of seed storage

The existing seed storage with an area of 200 m^2 and a height of 3.7 meters adjoins the processing plant building. VES, as a principal station of producing foundation and registered seeds, has to maintain a buffer stock of registered seeds produced in the station. The seeds, particularly the buffer stock should be maintained under good conditions as far as possible to avoid deterioration of seeds quality. The existing storage is inappropriate to store seeds over several months since it is designed only for temporary storage to the next cropping. Also, it does not have enough ventilation and birds and rodents preventation measures. Taking the present seed growers' demand into account, the existing storage is also too small to maintain the seeds.

c) Procurement of equipment related to seed production and distribution

Most of the farm machinery for the seed farms of the Government Sector was provided largely under the Expand Seed Production and Distribution Project and two 2-KR. In the government seed farms, the seed should be cultivated within a short period so that it can be timely

distributed to private seed growers. Although a part of the machinery is still functional, farm works are difficult. Most of the machinery has already exceeded their life span and needed to be renewed.

The conditions of existing farm machinery and harvesting machinery in VES are as follows:

Machinery	Q'ty	Year of procurement	Condition
Tractor 31PS	1	1981	old, needing repair
Tractor 35PS	2	1975	non functional
Tractor 35PS	1	1990	needing repair
Tractor 12.5PS	2	1978	non functional
Tractor 14PS	7	1983	old, needing repair
Bulldozer 90PS	1	1976	non functional
Forklift 3t	1	1981	old
Disc Plow	2	1975	old

The seed transportation vehicles requested will be utilized for distributing registered seeds to seed growers, and collecting certified seeds from seed growers. There are two 6-ton trucks in VES which have exceeded their estimated life span and have been quite efficiently utilized. These vehicles should be retired because frequent defects occur which cannot be repaired completely. Moreover, it is expected that the utilization of the storage and processing plant by seed growers will increase substantially, thus, it is judged that provision of new transportation vehicles is appropriate.

d) Improvement of workshop

In the existing workshop, there is only a welder, grinder and bench vise. In parallel with the provision of agricultural machinery and vehicles, it is absolutely necessary that enough spare parts be provided and the work shop be improved in order to maintain machinery and vehicles.

e) Development of water resources and seed production farm

The seed production farm at VES depend on water resources from the Tigum irrigation system controlled by National Irrigation Agency (NIA), farm pond (20,000 m^3), and ground water from shallow wells. However, in the dry season, there is not enough for both irrigation and drinking water due to following reasons:

i) Shortage of irrigation water in Tigum irrigation system because VES is located at the end of the system.
ii) Decrease of ground water level and salinity problems in the shallow wells
iii) A large quantity of evaporation at the farm pond

It is estimated that seed production area required at VES for foundation and registered seed is 18ha in the dry season and 22ha in the rainy season. However, only 5ha can be irrigated even in pluvial years.

During the field work in the Philippines, a geo-hydrological investigation was executed in order to examine the potential of water resources at VES.

As a result of the investigation, it was determined that sandy layers exist between 52 m and 62 m, and between 71 m and 97 m below the surface, and an impermeable layer exist below 100 m. Aquifer tests show there is a possibility that new water resources, with a rate of 3.0 l/sec, exist at VES. The electric log and lithologic log at investigated site are shown in Figure 4.

On the other hand, the seed farm at VES has comparatively good irrigation and drainage facilities, as well as a farm road. However, it has the following problems because of poor maintenance.

- A large quantity of sediment at the desilting pond related to the Tigum irrigation system.
- Damaged pump equipment for the farm pond.
- Damaged irrigation and drainage concrete canals.
- Damaged division boxes, drop and other related facilities for the irrigation and drainage canals.
- Deteriorated farm roads

f) Construction of building for STL and procurement of equipment

STL located in VES is responsible for performing the seed quality control services in Region VI. Under the Superintendent, there are three sections: Seed Testing, Seed/Plant Certification, and Research & Training. The total number of staff is fifteen (15) at present, however, by 1993 it will be increased to twenty-eight (28).

STL's activities have to be strengthened in order to ensure the quality of seeds. The existing STL building is, however, too small to execute the prescribed testing effectively and to accommodate staff, scheduled to increase from 1993. For example, the existing seed sample room, which maintains sample seeds tested for two years under the regulations, is presently compelled to be used for working space.

Most of the equipment being used is over fifteen (15) years old, and some of it is no longer accurate or is out of order. It is judged that the construction of a new building and the improvement of the equipment for STL should be done as soon as possible because this will strengthen and expand the quality control services expected under the Seed Act.

Conditions of existing equipment in STL are as follows :

Equipment	Q'ty	Condition
Tag printer	1	non functional
Germinator	1	non functional
Microscope	2	non functional
Hot plate	1	non functional
Moisture tester (portable)	2	old
Infrared moisture tester	1	non functional
Three beam balance	1	old
Chemical balance	1	old
Seed blower	1	old
Oven	1	functional
Grain sample divider	1	partly broken
Grain trier	2	old
Refrigerator	1	functional
Typewriter	2	old

(3) Improvement of seed production associations in the model area

As of December 31, 1991, there were 26 seed growers in Aklan, 41 in Capiz, 20 in Antique, and 65 in Iloilo. These seed growers were engaged in the production of foundation seeds principally, but some of them, particularly in Iloilo province, produced register seeds.

The annual average production of foundation seeds in the model area was estimated at 1,196 tonnes between 1984 and 1988, at the current rate of 13% which is considered rather low. However, if the rate increases to the ideal renewal rate of 20% or more, the estimated foundation seeds requirement will increase to 2,550 tonnes. There are many reasons for this low rate of 13%. Among others, the low quality of seeds is a fundamental problem. The seed growers wish to establish a good storage with seed processing facilities in order to produce high quality seeds to meet the demand.

3.2.4 Principles of Cooperation

Through the assessment made in the preceding sections, it was clarified that the aims and expected effects of the Project meet the requirements of Japan's Grant Aid Program. The basic design of the Project facilities and equipment will be made in line with the concept that the Project will be implemented Japan's Grant Aid Program.

3.3 Project Description

3.3.1 Executing Agency and Operational Structure

BPI will be the executing agency of the Project. To smoothly manage and operate the Project, the following are to be organized:

(1) Project Coordinating Committee (PCC)

PCC will be established under BPI. The Director of BPI will act as the chairman of PCC. PCC will continue pending the Project's achieve after construction of the facilities. The composition and functions of PCC will be as follows :

1) Composition

- Chairman : Director of BPI
- Vice chairman : Assistant Director of BPI
  : Regional Director of DA (Region VI)
- Member : Chief, Crop Production Division, BPI

Chief, NSQCS, BPI
Chief, Agricultural Engineering Division, BPI
Supervising Agronomist

2) Functions

- Decision on matters/policies relating to overall project implementation;
- Making on recommendations relating to project management; and
- Approval of the Project's annual operating budget.

(2) JICA-BPI Project Office

An office called "JICA-BPI Project Office" will be established under BPI and will be headed by a full time project manager. It will consist of a project management section and a physical infrastructure section with the following functions:

1) Project Management Section

- Undertake general affairs;
- Recommend policies and strategies for the overall project implementation to PCC;
- Implement all policies and directions set by PCC;
- Coordinate project activities with the other agencies involved;
- Review project performance.

2) Physical Infrastructure Section

- Coordinate with contractors regarding work schedule;
- Undertake inspection and quality control of constructed facilities;
- Prepare all required reports.

(3) Consultative Group for promoting the Project (CGP)

In the model area, a Consultative Group will be established to coordinate/liaise with BPI and another agencies involved in the Project. CGP will be held by the request of BPI. The composition of CGP will be as follows:

- Chairman : Regional Director of DA (Region VI)
- Member : Chief, Provincial Agricultural Office in each Province
  Superintendent of VES
  Chief of Seed Testing Laboratory in Region VI
  Seed Coordinator in Regional Office of DA
  President of Regional Seed Growers Association
  President of Seed Growers Association in each Province

Organization chart for the implementation of the Project is shown in Figure 5.

3.3.2 Outline of the Facilities and Equipment

Principal features of the facilities and equipment to be provided under the grant aid are as follows:

(1) Strengthening of the seed-related facilities in BPI Head Office

1) Construction of seed storage (reinforced concrete building)
   - Gross floor area : 792m^2
   - Affiliated facilities : air-conditioned storage : 120m^2
   - Equipment : small scale truck 1 unit
     pickup truck 1 unit
     box type dryer : 1.5t 1set
     processing machine : 0.5t/hour 1set

2) Construction of the NSQCS' building
   - Gross floor area : 1,592m^2 (two stories)
   - Affiliated facilities : Screen House with 64m^2

3) Provision of seeds quality control services equipment
   - Seeds testing equipment
     i) Sample receiving and preparation equipment
     Grain sample divider : dividing the sample seeds in equal ratio
     Testing seed blower : separation of light and heavy fraction
     ii) Moisture test
     Drying oven : drying sample for the moisture test
     Moisture tester : measurement of seed moisture content

iii) Purity and varietal purity test

Diaphanoscope	:	inspection of damaged seeds
Testing rice husker	:	red grain determination for rice seeds

iv) Germination test

Thermostatic germinator	:	inspection of germination ratio

v) Seed care test

Shaker	:	preparation of culture solution
Incubator	:	examination of seed health in artificial climate

vi) General equipment

Hydro-thermograph	:	measurement of temperature and humidity
Top balance	:	measurement of sample weight

- Training, data processing, and field inspection equipment

Video system	:	projection of training materials
Trainee mini bus	:	for field training transportation

(2) Improvement of rice seed production, processing and storage facilities in VES

1) Construction of seed storage and seed processing plant shed (Steel-frame structure)

- Gross floor area : 1,398m^2 (storage:696m^2, shed:702m^2)

2) Renewal of seed processing facilities

- Seed drying plant : drying of seeds
- Seed processing plant : processing of seeds

3) Provision of seeds production and distribution equipment

- Farm and harvesting machinery

Tractor	:	land preparation of all VES fields
Power tiller	:	land preparation of breeder seeds areas

- Seed transportation vehicle

Truck	:	long and medium distance seeds transportation
Pickup truck	:	short distance seeds transportation

- Motor shop and workshop equipment

Workshop tool set	:	maintenance of farm machinery

4) Development of water resources and seed production fields

- Development of irrigation & drainage facilities

  Paddy field : farm road, irrigation & drainage canals, dams

- Development of water supply system

5) Construction of the STL building (reinforced concrete building)

- Gross floor area : $552m^2$

6) Provision of seed quality control services equipment

- Seeds testing equipment

  i) Sample receiving and preparation equipment

  Grain sample divider : dividing the sample seeds in equal ratio

  Testing seed blower : separation of light and heavy fraction

  ii) Moisture test

  Drying oven : drying the sample for moisture test

  Moisture tester : measurement of seed moisture content

  iii) Purity and varietal purity test

  Diaphanoscope : inspection of the damaged seeds

  Testing rice husker : red grain determination for rice seeds

  iv) Germination test

  Thermostatic germinator : inspection of germination ratio

  v) Seed health test

  Incubator : examination of seed health in artificial climate

  Auto clave : sterilization of experiment material

  vi) General equipment

  Hydro-thermograph : measurement of temperature and humidity

  Top balance : measurement of sample weight

- Training, data processing and field inspection equipment

  Printing machine : making training materials

  Video system : projection of training materials

(3) Improvement of seed production associations in the model area

- Provision of seeds processing facilities

i) Seed processing and drying machinery

Seed drying plant : Box type;1.5t/day, 2 units (for each Association)

Seed Processing plan : 0.5 t/hr, 1 unit (for each Association)

ii) Construction of seed storage (reinforced concrete building)

- Gross floor area : Capiz ; 405m^2
: Aklan ; 382m^2
: Antique ; 382m^2

3.3.3 Operation and Maintenance Plan

(1) Agency for operation and maintenance of the Project

The agencies for the operation and maintenance of each Project component after completion of the Project are as follows :

Project component	Agency for Operation and Maintenance
(1) BPI Head Office	
Seed Storage	BPI (Crop Production)
National SQCS	BPI (NSQCS)
(2) VES	
Seed Testing Laboratory(STL)	STL
Seed Storage	VES
Seed Processing	VES
Seed Production Field	VES
Water Supply	VES
(3) Seed Growers Association	
Seed Storage	Seed Growers Association

(2) Operation and maintenance plan

It is considered that there will be no major problems regarding the operation and maintenance of the buildings constructed and the equipment procured through the Project.

The physical life span of a reinforced concrete building is usually 40 to 80 years though the period depends on the environment of the building as well as the concrete ratio, etc. The life span of the installed facilities is

shorter, 20 to 25 years for electric installations, 15 to 20 years for water supply and drainage installations, and 10 to 15 years for air-conditioning equipment. Thus, regular inspections and early repairs are required in order to maintain these buildings/facilities.

The depreciation period for the analytical equipment and laboratory furniture, both of which also require regular inspections, maintenance, and repairs, is considered to be about 10 years. This period can be extended with proper maintenance

The seed storages constructed in the provinces will basically be under the control of BPI, but their actual operation and maintenance will be entrusted to the seed growers association in each province under the provincial seed coordinator. Regarding the operation and maintenance of storage in each province, an agreement will be conclude among BPI, regional office and Governor.

(3) Cost on operation and maintenance

The costs of operation and maintenance for the Project components are estimated on the basis of the following conditions. BPI is requested to include such costs in yearly budgets as far as possible.

1) Operation and maintenance cost of buildings

A maintenance cost corresponding to 0.2% of the building cost is regarded as reasonable for this Project considering the type of buildings and the fact that the buildings is constructed under the Japanese grant aid. Costs of operation and maintenance for the Project shall be earmarked for the special budget.

2) Operation and maintenance cost of seed processing plant

Operation and maintenance cost of the seed processing facilities is composed of fuel expenses and electricity charges. Operation and maintenance costs are as follows :

(Unit : Peso)

	O & M cost
BPI Headquarters	1,400
VES	88,300
Seed Growers Association	
Aklan	78,400
Capiz	92,600
Antique	80,200

3) Operation and maintenance cost of seed storage

Operation and maintenance cost is composed of electricity charges for air conditioner. Operation and maintenance costs are as follows :

(Unit : Peso)

	O & M cost
BPI Headquarters	51,400
VES	25,700

4) Operation and maintenance cost of farm machinery and vehicles

Operation and maintenance cost of farm machinery and vehicles is composed of fuel and lubricant (15% of fuel cost). Operation and maintenance costs are as follows :

(Unit : Peso)

	O & M cost
BPI Headquarters	62,800
VES	194,500

CHAPTER 4

BASIC DESIGN

CHAPTER 4 BASIC DESIGN

4.1 BPI Headquarters

4.1.1 Location and Condition of Proposed Site

BPI Headquarters : Seed quality control service - Seed storage - Proposed site

(1) Location of the proposed site:

The site is located inside the BPI nursery in Diliman, Quezon City, 42 m above sea level.

(2) Traffic condition:

The site is very conveniently located since it surrounded by official facilities such as the Ministry of Agriculture. Construction of the project should cause no interference to traffic.

(3) State of the site:

The site will be located on the northern 5,000 m^2 of the 3.4 ha BPI nursery's site. The site is surrounded by grass fields and nursery. The site area is large enough and the site (for the temporary construction) available for immediate use.

(4) Geographical features - Soil condition:

The land slope gently down to the north from the south side of the site. The soil is greyish silt and the condition is satisfactory.

4.1.2 Proposed Building Plan

(1) Basic Design Concepts

The design of facilities was based on the following basic concepts.

1) Climate of proposed site, natural features, lifestyle, architectural style, function of the building and other peculiarities should be considered carefully and the design should adopt these factors.

2) Maintenance and operation cost should be reduced, by using natural ventilation, natural lighting, and sunlight effectively.

3) Considering the skill of construction, laborers in the Philippines and the design, the facilities should be easy to construct and economical.

4) Considering the maintenance of the building, priority should be given so that the proposed materials can be supplied locally.

5) The building shall be designed as simple as possible, without any special architectural treatment.

(2) Site Planning

The proposed site has sufficient area required for construction, and it is expected that there will be no interference to traffic during construction. The elevation of site is rather low and sand banking may be required. If banking is required, it should be constructed a few months before construction, even if it is during the rainy season, and a drainage route should be secured. The quantity of banking to be required was determined as follows :

BPI Headquarters	2,500 m^3	5,000 m x 50 cm = 2,500 m^3

(3) Layout Planning

Based on the location of the trunk road, traffic conditions on the site, function of each facility, quantity of banking, and location, the facilities will be arranged as follows:

- Road network design

  The approach road, the main traffic line, will be constructed from the existing south gateway on the main trunk road to the site. It will function as the road for seed quality control services. Another road, the sub traffic line, will be constructed from the old north side gateway to the seed storage area, functioning as the road for seed storage. The two roads will be separated. (see Drawing No. 1)

- Separated layout by various functions

BPI Headquarters will be responsible for seed quality testing, research, training, seed drying processing, seed storage. Each function will be undertaken separately necessary. Based on the various operations, the area for seed quality testing, research, training, seed drying processing and seed storage will be arranged as follows:

The entrance for the seed quality control building and the BPI Headquarters facade will be located on the main traffic line. The seed storage area will be located behind this building on the sub traffic line. (see Drawing No. 1, 2 and 3.)

The research facility will be arranged separately to avoid noise from the seed drying processing facility. The two facilities will be connected by two corridors, according to the related functions.

The seed quality laboratory will be "U" shaped so that the courtyard receives sufficient sunlight and testing and research can be carried out.

The entrance for the seed storage area will be arranged to face the sub traffic line to avoid mixing with vehicles used for the other facilities.

(4) Architectural Planning

1) Seed quality control service

The functions of the rooms in SQCS will include seed quality testing, seed care, training, and registration, and other related services. The building will be designed so as to clearly separate each function. The seed quality testing rooms will be located on the 1st floor of the south wing, seed care rooms on the 1st floor of the north wing, training rooms on the 2nd floor of the north wing, and registration rooms on the 2nd floor of the south wing. The testing and research facilities wing will be separated to avoid the entry of general visitors by providing door in the corridor. The seed quality testing facilities, i.e. sample receiving, sample preparation, and testing rooms, will be arranged according to the order of operation, for maximum efficiency. Germination room will be located on the south side in order to received sufficient sunlight. The instruments for testing and research will be located in a private room which will be locked as much as

possible in order to prevent irregular use and loss. The testing and research rooms will be connected to the seed storage area by a corridor having ventilation and sunlight.

2) Screening house

As screening house will be arranged in front of the connecting corridor, inside the courtyard the testing and research rooms have good access.

3) Seed storage

The seed storage rooms will include an office, receiving, drying space and seed storage. The seed storage rooms will be located on the east side in order to avoid the influence of the west sun. The office will be located near the handling space which will face the sub traffic line on the north side. The seed storage floor will be 100 cm above the ground in order to keep the rice dry and to prevent rodent damage. This floor level will also be convenient for trucks.

(5) Structural Design

1) Basic concept

The structure for the raised building will be made of steel. Reinforced concrete will be used for the foundations, floor slab, and wainscot of these building. For foundations and columns, reinforced concrete will be used. Concrete blocks will be used for the walls.

2) Architectural standard

Technical guide-lines prevailing in the Philippines will be applied to loads for structural design. Structural calculations will be based on Japanese standards.

3) Bearing capacity at the site

Design strength was calculated based on the following data.

Proposed Site	Soil Condition	Bearing capacity (t/m^2)
BPI Headquarters	Greyish silt sand layer	15 t/m^2

The structure of each building is as follows ;

Name of Building	Foundation	Pole-Beam
Seed quality control service	independent foundation	reinforced concrete
Seed storage	independent foundation	reinforced concrete
Screen house	independent foundation	steel structure

Walls : concrete blocks will be used.

Roof : foundation:steel structures will be used.

(6) Finishing scheme

In order to select the finishing materials for the proposed buildings, the following items were considered:

- Minimize the kinds of furnishing materials. Based on the type of room the materials will be integrated for various functions.
- Durability, corrosion resistance, and waterproofing.
- Maintenance, such as washable materials.
- Philippines standards' for office and storage equipment.

The road and premises will be paved with concrete, based on economical and maintenance viewpoints and the prevention of sand and dust.

(7) Supporting facilities for proposed buildings

1) Basic concepts

The grade of supporting facilities shall be comparable with those existing and appropriate to the equipment to be installed as well as the activities in the building. The following criteria were considered.

- economical, energy saving
- easy operation and safety
- maintenance

2) Power supply system

Power characteristics	: 3-phase, 380 V and single phase 220 V, 60 Hz
Power supply	: from distribution line
Power sources	: by Manila Electric Company (MERALCO)
Distribution line in the site	: overhead line system

Power facilities

Motor power supply	: to test machinery
Indoor lighting	: fluorescent or incandescent lamp as required
	: minimum illumination
Plug socket	: as required
Outdoor lighting	: fluorescent

3) Water supply system

Water supply on the site	: by city water system
	: by existing well
Water treatment	: none
Water drainage	: water drainage will be discriminated between sewage and other waste water.
Cooking system	: electric cooking system will be provided in the office

4) Air-condition and ventilation system

Air-conditioner	: installed in the test research room or where required
Ventilator	: installed where required

(8) Determination of appropriate plan

The proposed area was designed based on the envisaged uses, various operations, required staff, number of trainees, required accommodation, required management, and machinery. The proposed area for each facility was based on the following calculation method.

1) Seed quality control service

Name of Room	Proposed Area	Calculation Method
Sample receiving and recording	21 m^2	3 m x 70 m = 21 m^2 a) capacity: 3 persons b) per person: 5-7 m^2 c) custody of recording space: 30 cm x 4.5 m
Sample preparation	18 m^2	3 m x 6 m = 18 m^2 a) machinery working space: 18 m^2

Sample seed st. (Before Analyst)	4 m^2	2 m x 2 m = 4 m^2 a) accommodation sample: 300 pcs. b) shelf:30 cm x 3 m, 20 steps
Instrument storage	8 m^2	2 m x 4 m = 8 m^2 a) shelf: 60 cm x 3 m
Balance room	12 m^2	3 m x 4 m = 12 m^2 a) test table: 80 cm x 5.6 m
Moisture test office	12 m^2	3 m x 4 m = 12 m^2 a) capacity: 2 persons b) per person: 5-7 m^2 c) custody of recording space: 30 cm x 2.8 m
Moisture test	24 m^2	3 m x 8 m= 24 m^2 a) machinery - working space: 24 m^2
Physical purity	24 m^2	4 m^2 x 6 m = 24 m^2 a) machinery - working space: 24 m^2
Varietal purity	24 m^2	4 m x 6 m = 24 m^2 a) machinery - working space: 24 m^2
Germination room (natural light)	48 m^2	8 m x 6 m = 48 m^2 a) machinery working space: 48 m^2 b) germination rack for sun test: 8 racks
Germination moisture room	15 m^2	5 m x 3 m= 15 m^2 a) germination rack for moisture test: 8 racks
Germinator's room	15 m^2	5 m x 3 m= 15 m^2 a) germinator: 6
Preparation room	18 m^2	6 m x 3 m = 18 m^2 a) working space: 14.4 m^2 b) germination dish tool storage: 3.6 m^2
Wash room	9 m^2	3 m x 3 m = 9 m^2 a) working space:
Sand soil media preparation	9 m^2	3 m x 3 m = 9 m^2 a) machinery working space: 9 m^2
Sample seed st.	18 m^2	3 m x 6 m = 18 m^2 a) accommodation sample: 2,000 pcs.

		b) case size:20 cm x 30 cm x 10 cm c) shelf: 30 cm x 20 m, 20 steps
Herbarium	18 m^2	3 m x 6 m = 18 m^2 a) accommodation sample: 4,300 pcs. b) accommodation sample case: 2,200 pcs. c) sample shelf: 1.8 m x 40 cm x 1.8 m, 9
Namatology bacteriology	24 m^2	4 m x 6 m = 24 m^2 a) machinery - working space: 24 m^2
Physiological disorders-entomology	24 m^2	4 m x 6 m = 24 m^2 a) machinery - working space: 24 m^2
Mycology room	48 m^2	8 m x 6 m = 48 m^2 a) machinery working space: 24 m^2
Preparation room	24 m^2	4 m x 6 m = 24 m^2, 18 m^2 a) working space: 18 m^2 b) custody of chemical drug: 6 m^2
Wash room	24 m^2	4 m x 6 m = 24 m^2 a) machinery - working space: 8 m^2 b) custody of test instrument: 6 m^2
Virology room	60 m^2	8 m x 6 m + 4 m x 3 m= 60 m^2 a) machinery working space: 60 m^2
Incubator room	12 m^2	4 m x 3 m = 12 m^2 a) cultivation test shelf: 1.8 m x 40 m x 1.8 m, 2 compartments
Incubator room	12 m^2	4 m x 3 m = 12 m^2 a) incubators: 4
Isolation room	12 m^2	4 m x 3 m = 12 m^2 a) machinery working space: 12 m^2
Staff room	48 m^2	8 m x 6 m = 48 m^2 a) capacity: 9 persons b) per person: 5-7 m^2
Secretary room	24 m^2	6 m x 4 m = 24 m^2 a) capacity: chief: l person secretary: 3-5 persons b) per person: 5-8 m^2
Reception room	12 m^2	4 m x 3 m = 12 m^2

Chief room	18 m^2	6 m x 3 m = 18 m^2
Staff room	48 m^2	8 m x 6 m = 48 m^2
		a) capacity: 6-8 persons
		b) per person: 5-7 m^2
Dressing room	36 m^2	6 m x 6 m = 36 m^2
Driver's waiting room	9 m^2	3 m x 3 m = 9 m^2
Information	6 m^2	3 m x 2 m = 6 m^2
Lobby hall	54 m^2	6 m x 9 m = 54 m^2
Conference room	128 m^2	16 m x 80 m = 128 m^2
		a) capacity: 100 persons
		b) per person: 1.2-1.5 m^2
Storage	8 m^2	2 m x 4 m = 8 m^2
Audio visual preparation room	16 m^2	4 m x 4 m = 16 m^2
		a) machinery - working space: 6 m^2
Printing room	30 m^2	5 m x 6 m = 30 m^2
		a) machinery working space: 30 m^2
Training Preparation (seminar room)	18 m^2	3 m x 6 m = 18 m^2
Meeting room	24 m^2	4 m x 6 m = 24 m^2
		a) capacity: 18 persons
		b) per person: 1.2-1.5 m^2
Registration room	24 m^2	4 m x 6 m = 24 m^2
		a) capacity: chief: 1 person
		register: 2 persons
		a) per person: 5-8 m^2
Inspector office	84 m^2	9 m x 8 m + 3 m x 4 m = 84 m^2
		a) capacity: chief: 1 person
		inspector: 4-12 persons
		b) per person: 5-8 m^2
Library	48 m^2	8 m x 6 m = 48 m^2
		a) stacks - reading space
Data bank	20 m^2	4 m x 5 m = 20 m^2
Computer room	20 m^2	4 m x 50 m = 20 m^2
		a) capacity: 4 persons
		b) per person: 5-7 m^2
Office supply storage	12 m^2	3 m x 4 m = 12 m^2
Hot water supply room	16 m^2	2 m x 2.5 m x 2 + 2 m x 3 m = 16 m^2

		a) 1F: 2, 2F: 1
Water Closet	72 m^2	6 m x 6 m x 2 =7 2 m^2
		a) 1F: 1, 2F: 1
Corridor - Stairs	280 m^2	
Total area	1,592 m^2	

The area of each test room was determined, taking into account new trainees. Especially, the areas of the germination room, mycology room, and virology room were determined assuming that there would be about ten trainees. The areas were based on similar areas in Japan where, for example, the average area for each person in a science examination room (physics and biology) is approximately 15.5 m^2.

2) Screen house

Name of Room	Proposed Area	Calculation Method
Screen house (Varietal)	64 m^2	4 m x 8 m x 2 = 64 m^2
		a) varietal: 32 m^2
		b) seed care: 32 m^2
		c) each m^2: about 25-50
Total area	64 m^2	

3) Seed storage

The proposed area for distribution seed storage was determined from the pallet size; 1 unit is equivalent to 1.4 m x 1.8 m with a piling height of 2.6 m and 0.9 m is required for the width of working passage. The buffer seed storage area was determined the same way, but the piling height was 1.8 m for 1 unit.

Name of Room	Proposed Area	Calculation Method
Staff room	30 m^2	5 m x 6 m = 30 m^2
		a) capacity: 4 persons
		b) per person: 5-7 m^2
		c) machinery - working space
Generator room	42 m^2	7 m x 6 m = 42 m^2
Dryer separator space	81 m^2	5.4 m x 15 m = 81 m^2

		a) machinery - working space: 81 m^2
Work space	48 m^2	8 m x 6 m = 48 m^2
Distribution seed storage	288 m^2	12 m x 12 m x 2 rooms = 288 m^2
		a) accommodation capacity: 60 units 30 units x 2 rooms
Buffer seed storage	120 m^2	12.5 m x 9.6 m = 120 m^2
		a) accommodation capacity: 24 units
Temporary stock	15 m^2	5 m x 3 m = 15 m^2
Machine room	30 m^2	5 m x 6 m = 30 m^2
Sand, soil and Chemical storage	15 m^2	5 m x 3 m = 15 m^2
Workers' room	15 m^2	5 m x 3 m = 15 m^2
Others: Corridors	110 m^2	
Total area	794 m^2	

4.1.3 Equipment Plan

The criteria for selection of the main equipment and equipment plans are summarized and shown below:

(1) Seed Quality Control Service

1) Basic criteria

- Equipment should be flexible and able to be adjusted to all kinds of activities, such as tests, research and training, and field inspections.
- NSQCS is responsible for organization of not only tests and research for seed quality control but also central training. In the view of the above point, the kinds of equipment and specifications should be carefully examined.
- Decisions on the amount of equipment required should taken into consideration the condition of the existing equipment and staff numbers.

2) Determination of the quantity of equipment required

- Basically one set of equipment will be provided. However, if a large quantity of equipment is required, it should be allocated according to the number of staff in each laboratory (two staff on average).

- For equipment used frequently, such as grain sample dividers, moisture testers, personal computers and cameras, two sets should be provided. If required, two sets of spare equipment should be provided.
- Determination of the number of drying ovens, thermo-static germinators, weighing cans and germination dishes is based on a weekly sample number of 120. If the existing equipment can be utilized, planned quantities will be reduced. Examples of the calculation are as follows :

Weighing cans	120 samples x 2 = 240 cans
Drying ovens	120 samples x 2 / 30 (Number of weighing cans per drying oven) / 4 (testing times per week) = 2 sets
Thermo-static germinator	120 samples / 30 (Number of germination dishes per germinator) - 1 (Number of functional existing equipment) = 3 sets

- For commonly used equipment, such as magnifier and hydro-thermograph, in view of the possibility of sharing to another laboratories and seed storage, four sets of equipment will be provided.

3) Provision of equipment under the project (see Table 7)

Sample receiving and preparation	Grain sample divider, Testing seed blower
Moisture test	Drying oven, Moisture tester
Purity and varietal test	Diaphanoscope, Testing rice husker
Germination test	Thermo-static germinator, Seed vacuum counter head set
Seed health test	Shaker, Incubator
Others	Hydro-thermograph, Top pan balance
Training	Video system, OHP
Printing	Printing machine, Cutter
Computer room	Personal computer, software
Field inspection	Camera set, Portable seed testing set
Vehicle for training and inspection	Trainee mini bus, Field inspection/ test vehicle

(2) Facilities and equipment for seed storage

1) Seed processing facilities for seed storage

Basic criteria for design are as follows :

- The drying plant and seed processing plant are re-processing facilities for an emergency, therefore, the facilities should be small and simple.
- These facilities will be utilized for not only rice seeds but also other seeds such as peanuts, therefore, a box type should be considered instead at a circulating type drying plant.
- In the viewpoint of rejected seeds of high moisture (3.5t) and varietal mixture (13.5t) of total processing seeds in this plant, minimum capacity of facilities should be provided.

Therefore, the following facilities and equipment should be provided: (see Table 7.)

Box type dryer	1.5 t x 1 set
Processing machine	0.5 t/hour x 1 set

2) Seed transportation vehicles

The criteria for design are as follows:

- For medium distance transportation of seeds, a two ton small scale truck will be provided.
- For short distance transportation of seeds, communication will seed growers, and transportation of small items, a one ton pick up truck will be provided.
- The number of trucks will be determined taking into consideration the seed handling capacity of the plant, condition of existing equipment, and future plans.

Therefore, the following equipment should be provided (see Table 7):

Small scale truck	2 t x 1
Pick up truck	1 t x 1

4.2 Visayas Experiment Station (VES)

4.2.1 Location and Condition of Proposed Site

Seed testing laboratory - Seed storage - Seed processing plant - Motor pool and Workshop - proposed site

(1) Location of the proposed site

The site is located 9 km north of Iloilo City and it takes 15 minutes by car to get there, along the national road which is paved with concrete. The airport is 6 km north of Iloilo on the same nation road. The site is 14 m above sea level.

(2) Traffic condition:

The national road to the site from Iloilo city is concrete paved. The road on the site is graveled. Regarding traffic, there will be no interference during the construction stage.

(3) State of the site:

Of the 62 ha approximately 6,000 m^2 and 2,000 m^2 on both sides of the road will be used for paddy, the proposed site will be located on the VES site. The site is surrounded by grass fields, paddy fields and a nursery. The site area is sufficient, and for temporary construction is ready for use.

(4) Geographical features - Soil condition:

The site is almost flat and is covered with a greyish to brownish soft clay layer. The groundwater was found 75 cm below the surface.

4.2.2 Proposed Building Plan

(1) Basic Design Criteria

Same as BPI headquarter (refer to 4.1.2).

(2) Site Plan

VES	5,280 m^3	1,080 m^3 + 4,200 m^3 = 5, 280 m^3	
Seed testing laboratory	1,080 m^3	1,350 m^2 x 80 cm =	1,080 m^3
Seed processing, storage	4,200 m^3	1,500 m^2 x 120 cm =	4,200 m^3

(3) Layout Plan

- Road network design

  The approach road for the proposed site which leads to VES's farm fields will be paved. The proposed site will be separated and arranged on both sides of the entrance road.

- Separated layout by various functions

  The functions of VES will include seed quality testing, research, training, seed drying processing, seed storage, and maintenance (workshop). Each function will be separated as necessary.

  Based on the various operations, the area for seed quality testing, research, training, seed drying processing, seed storage, and maintenance (workshop) will be arranged as follows :

  The workshop will be reconstructed so that the existing motor pool can function efficiently, and it should be located inside the existing site.

  Based on the area required, the seed processing-seed storage area will be located on the northern side of the road, and the seed testing laboratory will be located on the southern side.

  The seed testing laboratory will be "U" shaped so that the courtyard receives sufficient sunlight and testing and research can be carried out. The facility will be located near the road as well as the extension area, taking into account the sand banking.

  Seed processing-storage, the higher building, will be located on the west side of the site to the seed drying processing facilities from the setting sun. Taking into account the sand banking, the facility will be located near the road.

  Seed storage will be arranged perpendicular to the seed drying processing facilities in order to obtain sufficient natural ventilation.

(4) Architectural Planning

1) Seed testing laboratory

The functions of the seed testing laboratory will include seed quality testing, seed care, training, registration, and other related activities. Each function will be clearly separated. Seed quality testing and related rooms will be located in the east wing and the others in the west. The testing and research facilities wing will be separated to avoid the entry of general visitors by providing a door in the corridor. The seed quality testing facilities, i.e. sample receiving, sample preparation, and each test room will be arranged according to the order of operation for maximum efficiency. Germination room will be located on the south side in order to receive sufficient sunlight. The instruments for testing and research will be located in a private room which will be locked as much as possible in order to prevent irregular use and loss. The corridor for the test- research and related rooms will face the courtyard, and be arranged to have circulation, sunlight and ventilation. The floor will be 50 cm above the ground in order to keep the rice dry and clean, and to prevent rodent damage.

2) Seed processing-storage

The seed storage rooms will include an office, receiving, drying space and seed storage. The seed storage will be located on the east side to avoid the influence of the setting sun. The office will also be used as operation control room, and located near the working space facing the sub traffic line on the north side. Receiving, drying space, space saving, and flat arrangements shall take into account the work flow at operation and the maintenance of machinery, testing and transportation. The two doorways which face the road will be arranged, taking into consideration seed transportation efficiency. The floor will be 100 cm above the ground to keep the rice dry, to coordinate with the deck of trucks, and to prevent rodent damage.

3) Workshop

The workshop will be made up of office, tool storage, workshop, and motor pool rooms, and arranged speciously to the road, according to their operation and efficiency.

(5) Structural Design

1) Basic concept

Steel structures will be used in the buildings. Reinforced concrete will be used for the foundations, floor slab, and wainscot of these buildings. For foundations and columns, reinforced concrete will be used. For walls, concrete blocks will be used.

2) Architectural standard

Technical guide-lines prevailing in the Philippines will be applied to loads for structural design. Structural calculations will be based on Japanese standards.

3) Bearing capacity

Design strength was based on the following data.

Proposed Site	Soil Condition	Bearing capacity (t/m^2)
VES	Greyish silt clay layer	5.5 t/m^2

Structure of each buildings is as follows ;

Name of Building	Foundation	Pole-Beam
Seed testing laboratory	continuous footing	reinforced concrete
Seed processing-storage	continuous footing	steel structure
Workshop	continuous footing	reinforced concrete

Walls : concrete blocks will be used.

Roof : foundation:steel structures will be used.

(6) Finishing scheme

In order to select the finishing materials for the proposed building, the following items were considered:

- Minimize the kinds of furnishing materials. Based on to the type of room the material will be integrated for various functions.
- Durability, corrosion resistance and waterproofing.
- Maintenance, such as washable materials.
- Philippines standards' for office and storage equipment.

The road and premises will be paved with concrete, based on economical and maintenance viewpoints and the prevention of sand and dust.

(7) Supporting facilities for proposed buildings

1) Basic concepts

The grade of supporting facilities shall be comparable with those existing and appropriate to the equipment to be installed as well as the activities in the building. The following criteria were considered.

- economical energy saving
- easy operation and safety
- easy maintenance

2) Power supply system

Power characteristics	: 3-phase, 380 V and single phase 220 V, 60 Hz
Power supply	: from distribution line
Power sources	: by MERALCO
Distribution line in the site	: overhead line system

Power facilities

Motor power supply	: to test machinery
Indoor lighting	: fluorescent or incandescent lamp as required
	: minimum illumination
Plug socket	: as required
Outdoor lighting	: fluorescent

3) Water supply system

Water supply on the site	: by new deep well in the site gravity supply
Seed production association of each prefecture	
	: by existing well
Water treatment	: none
Water drainage	: waste water to be treated in a deposit tank and disposed to the soak away
Cooking system	: electric cooking system will be provided in the office

4) Air-condition and ventilation system

Air-conditioner	: install in the test research room or where required
Ventilator	: install where required

(8) Determination of appropriate plan

1) Seed testing laboratory

The proposed area is based on the uses, various operation, required staff, number of trainees, available accommodation, ability of management, and machinery. Proposed area of each facilities is based on the following calculation method.

Name of Room	Proposed Area	Calculation Method
Sample receiving and recording	15 m^2	3 m x 5 m = 15 m^2 a) capacity: 1 person b) per person: 5-7 m^2 c) custody of recording space: 30 cm x 2 m
Sample preparation room	12 m^2	3 m x 4 m = 12 m^2 a) machinery - working space: 12 m^2
Seed storage (Before analyst)	4 m^2	2 m x 2 m =4 m^2 a) accommodation sample: 100 pcs. b) shelf: 30 cm x 20 m 20 steps
Instrument storage	6 m^2	2 m x 3 m =6 m^2 a) shelf: 60 cm x 3 m
Balance room	9 m^2	3 m x 3 m =9 m^2 a) test table: 80 cm x 5.6 m
Moisture test	18 m^2	3 m x 6 m = 18 m^2 a) machinery - working space: 18 m^2
Physical purity	18 m^2	3 m x 6 m = 18 m^2 a) machinery working space: 18 m^2
Varietal purity	18 m^2	3 m x 6 m = 18 m^2 a) machinery working space: 18 m^2
Sample seed storage	18 m^2	3 m x 6 m = 18 m^2

		a) accommodation sample: 2,000 pcs. b) case size: 20 cm x 30 cm x 10 cm c) shelf: 30 cm x 20 cm 20 steps
Germination room (natural light)	24 m^2	4 m x 6 m = 24 m^2 a) machinery - working space b) germination rack for sun test: 3 racks c) germinater: 4
Wash+preparation room	18 m^2	3 m x 6 m = 18 m^2 a) preparation working space b) germination dish, custody of instrument
Herbarium	15 m^2	2.5 m x 6 m = 15 m^2 a) accommodation specimen: 1,000 b) specimen shelf: 1.8 m x 40 cm x 1.8 m 3 shelfs c) specimen display space
Library & data room	18 m^2	3 m x 6 m = 18 m^2 a) stacks reading space
Seed inspector room	36 m^2	6 m x 6 m = 36 m^2 a) capacity: 4-12 persons b) per person: 5-7 m^2
Seed care test room	36 m^2	6 m x 6 m = 36 m^2 a) machinery working space: 42 m^2
Seed care - wash+preparation room	14 m^2	3 m x 6 m = 18 m^2 a) preparation working space b) custody of test instrument
Staff room	40 m^2	8 m x 5 m = 40 m^2 a) capacity: 9 persons b) per person: 5-7 m^2
Computer room	12 m^2	3 m x 4 m = 12 m^2 a) capacity: 1-2 persons b) per person: 5-7 m^2
Reception room	10.5 m^2	3.5 m x 3 m = 10.5 m^2
Chief room	15 m^2	5 m x 3 m= 15 m^2
Chief room - Water closet	2.4 m^2	1.5 m x 1.6 m = 2.4 m^2
Lobby hall - Exhibition corner	24 m^2	6 m x 4 m = 24 m^2

Meeting room	21 m^2	3.5 m x 6 m = 21 m^2
		a) capacity: 17 persons
		b) per person: 1.2-1.5 m^2
Printing room	24 m^2	4 m x 6 m = 24 m^2
		a) machinery - working space: 24 m^2
Hot water supply room	6 m^2	3 m x 2 m = 6 m^2
Water closet	24 m^2	6 m x 4 m = 24 m^2
Corridor	90.1 m^2	
Total area	552 m^2	

2) Seed storage and seed processing

The proposed area for distribution seed storage was determined from the pallet size of 1.4 m x 1.8 m, piling height of 3 m which is equivalent to 1 unit and 0.9 m for the width of working passage. Buffer seed storage was determined by the same method but the piling height is 1.8 m for each unit.

Seed Storage

Name of Room	Proposed Area	Calculation Method
Office	30 m^2	6 m x 5 m = 30 m^2
		a) capacity: 4 persons
		b) per person: 5-7 m^2
		c) machinery - working space
Distribution seed storage	541.5 m^2	29 m x 18 m + 3 m x 6.5 m = 541.5 m^2
		a) capacity: 351 t , 117 unit
Buffer seed storage	77 m^2	7 m x 11 m = 77 m^2
		a) capacity: 21.6 t , 12 unit
Chemical	11 m^2	4 m x 2 m =8 m^2
Machine room	18 m^2	6 m x 3 m = 1 8 m^2
Others: corridors	18.5 m^2	
Total area	696 m^2	

Seed processing

Name of Room	Proposed Area	Calculation Method
	56 m^2	10 m x 5.6 m = 56 m^2
Receiving	80 m^2	8 m x 10 m = 80 m^2
Drying	182 m^2	14 m x 13 m = 182 m^2
Processing	144 m^2	18 m x 8 m = 144 m^2
Generator room	30 m^2	5.8 m x 5.2 m = 30 m^2
Temporary stock	33 m^2	15 m x 2.2 m= 33 m^2
Dust room 1	52 m^2	10 m x 5.2 m = 52 m^2
Dust room 2	78 m^2	15 m x 5.2 m = 78 m^2
Others: Corridors	47 m^2	
Total area	702 m^2	

The proposed area was determined, based on the machinery layout and working space.

3) Motor pool & Workshop

Name of Room	Proposed Area	Calculation Method
Office	30 m	6 m x 5 m = 30 m^2 a) capacity: 6 persons b) per person: 5-7 m^2 c) machinery - working space
Tool storage	30 m^2	6 m x 5 m = 30 m^2, 720 m^2
Motor pool & work shop	372 m^2	30 m x 12 m + 6 m x 2 m = 372 m^2
Total area	432 m^2	

4.2.3 Water Resources Development Plan at VES

(1) Basic Plan

Irrigation water for the seed farm and maintenance water for the related buildings in VES are supplied from the Tigum Irrigation System through an intake structure, an existing farm pond, and several shallow wells in the farm. The center is well-operated in the rainy season, including irrigation for 35 ha of

farm land, however, the operation in the dry season is very limited due to the following reasons;

i) Insufficient water supply from the Tigum Irrigation System because the seed farm is located at the end of the system,
ii) Sedimentation and huge amount of evaporation of the farm pond,
iii) Drawdown of groundwater level in the shallow wells, and
iv) Deterioration of irrigation and drainage facilities in the seed farm due to their poor maintenance.

In due consideration of the above, the following improvement works for the seed farm, including development of a deep tube well, are planned to effectively utilize the limited water supply in the dry season (Details are shown in Figure 6);

i) Improvement of farm roads,
ii) Improvement of the farm pond,
iii) Improvement of irrigation and drainage facilities, and
iv) Construction of a water supply system.

(2) Improvement of Farm Roads

1) Design Policy

The farm roads consist of i) approach road from entrance of the research center to the buildings, ii) main farm road from the intersection of the approach road to intake structure site, and iii) lateral farm road branching off the main farm road. Most roads are unpaved and as a resulted in the rainy season, it is in difficulty to pass due to their muddy condition.

It is planned to improve these roads by providing concrete or gravel pavement.

2) Basic Plan

- Approach Road

A concrete pavement will be provided taking into consideration the amount of traffic. Total width of the road and width of pavement shall be

6.0m and 4.0m, respectively. The thickness of the pavement shall be 20cm and thickness of the base course shall be 13cm based on the condition of the road. Transverse slope of the road shall be 1.5% for the paved portion and 3% for the shoulders. An earth side drain ditch with a side slope of 1:2 will be provided on both sides of the road.

- Main Farm Road and Lateral Farm Road

A gravel pavement with a thickness of 20cm will be provided for these roads based on the design standard prepared by Department of Public Works and Highways (DPWH). In due consideration of the present road conditions, the width of the main farm roads and lateral farm roads shall be 5.0m and 3.0~4.0m, respectively. The width of pavement shall be 4.0m on the main farm road ands 2.0~3.0m on the lateral farm roads.

The principal features of the farm roads to be improved are as described below:

Description	Approach road	Main farm road	Lateral farm road
Length	820m	900m	3,348m
Pavement			
Type	Concrete	Gravel	Gravel
Thickness	20cm	20cm	20cm
Road width			
Total width	6.0m	5.0m	3.0~4.0m
Pavement	4.0m	4.0m	2.0~3.0m

(3) Improvement of Farm Pond

1) Design Policy

The designed storage capacity of the existing farm pond (Lagoon), located on the eastern side of the seed farm, is 20,000m^3 and water is utilized for irrigation of the seed farm through pump facilities. However, these facilities do not function effectively due to the following reasons;

a) Decrease of storage capacity due to sedimentation on the bottom of the pond which has occurred from the erosion the inside slope

b) Deterioration of pump facilities

Restoration of the farm pond and replacement of pump facilities is planned for the improvement works.

2) Study of Design Condition

Through the field investigation for the basic design study, the actual storage capacity of the farm pond is assumed to be 16,000m^3 against the designed one of 20,000m^3 due to sedimentation in the pond as mentioned above. This means that only 1.6ha of land can be irrigated from the storage water in the dry season.

Water loss from the pond reservoir occur from evaporation of the water surface and percolation . Rainfall and drainage water from a part of the farm land (about 10ha) is stored in the farm pond. From the latest 10 year rainfall data at VES (see Table 5), droughty rainfall in probable ten (10) year was estimated, and total rainfall on June to November was estimated at 1,468.9mm. The average evaporation rate of 673.0mm for the same period was also estimated on the basis of the 10 year evaporation data at the station (see Table 5). It was found that about 45% of rainfall stored in the pond will evaporate from the reservoir surface.

The farm pond can be widened only on its north-east side because the other sides are surrounded by existing roads. A large volume of excavation will be required for the widening, however, the irrigable area extended by this work will be extremely small due to the large amount of evaporation from the reservoir surface mentioned above. Therefore, it is judged that widening of the pond will be an ineffective investment.

Restoration of the pond section together with replacement of pump facilities will be executed in this improvement plan, based on the above study.

3) Basic Plan

The improvement works consist of restoration of the pond and replacement of pump facilities.

a) Restoration of Pond Section

The average base width, height, crown width, and length of the existing pond are 12~15m, 2.0~3.5m, 25~30m and 500m, respectively. Restoration of the pond including removal of sedimentation shall be executed in as follows :

Base width	:	15.00m
Height	:	3.50m
Maximum water depth	:	3.00m
Freeboard	:	0.50m
Inside slope	:	1: 2

In order to prevent erosion of the slope and to make maintenance works easy in the future, a compound cross-section with a 0.5m width of berm on both sides of the pond shall be applied. Compaction of the bottom shall be strictly executed to decrease percolation loss.

b) Replacement of Pump Facilities

The existing pump facilities located on the north edge of the pond consist of a volute pump of 125mm diameter, a diesel engine, a pump house surrounded by a wire mesh wall, and a steel discharge pipe. The facilities are mainly operated to irrigate the seed farm in the dry season, however, they are often out of order as they are now becoming obsolete. Accordingly, replacement of them shall be required. The capacity of the pump equipment to be replaced shall be basically the same as the existing one, however, from a operation and maintenance viewpoint, electric power shall be provided. A power-transmission line, 110m in length, from the existing power system in the center will be installed. In accordance with improvement of the pond, a suction sump shall be also constructed.

The principal features of the pump facilities to be replaced are as follows;

Type of pump	:	Horizontal shaft volute pump
Discharge	:	$2.5m^3/min.$

Diameter	: 125mm
Total head	: 7.6m
Number	: 1 set
Pump house	: $16m^2$

(4) Improvement of Irrigation and Drainage Facilities

1) Design Policy

Existing irrigation and drainage facilities are provided at appropriate intervals in the seed farm. However, they are in bad condition due to poor maintenance and shall be rehabilitated. Additional facilities will be also constructed, if necessary, taking into account effective operation and maintenance of the farm.

2) Study of Design Condition

a) Irrigation Water Requirement

Irrigation water requirement was estimated under the following conditions;

- Evapotranspiration was estimated by multiplying the potential evapotranspiration by the crop coefficient relating to the crop growth stages.
- Percolation of 2mm/day was applied.
- Puddling water requirement was estimated to be 125mm.
- Average effective rainfall over the last 10 year probability was applied, which was estimated by using the rainfall data at VES.
- Irrigation efficiencies of 80% for application and 95% for conveyance, taking into consideration the concrete flume canal.

The unit water requirement for dry season crop was estimated at 1.5 lit/sec/ha, as shown in Table 6. The value obtained is same as the designed unit water requirement for Tigum Irrigation System.

b) Drainage Requirement

The unit drainage requirement was estimated by using the following formula;

$Q = (C \times Rn \times 10{,}000) / (3{,}600 \times T)$

where, Q : Unit drainage requirement (lit/sec/ha)
C : Peak run-off coefficient, 0.5
Rn : Hourly maximum rainfall, 143mm in 10 year probability
T : Drainage time, 24hr

A unit drainage requirement of 8.3 lit/sec/ha was estimated.

c) Cropping Pattern

The cropping pattern in the research center was applied.

3) Basic Plan

a) Irrigation Canal

Most of the existing irrigation canals are lined with concrete flume, however,are fairly damaged. In order to utilize the limited water effectively, and from a quality control and maintenance viewpoint, U-shaped precast concrete flume shall be applied to this improvement plan.

Design discharge was determined by the following formula;

$Q = q \times A \times 1/1{,}000$

where, Q : Design discharge (m^3/sec)
q : Unit water requirement (lit/sec/ha)
A : Command area (ha)

The Manning formula was used for the canal design and an allowable velocity of 0.3~1.5m/sec and roughness coefficient of 0.015 were applied.

Irrigation water from the Tigum Irrigation System is supplied to the farm through an intake structure with a settling basin. Since a huge volume of sedimentation remains in the settling basin, its removal shall be executed together with replacement of the gate for smooth irrigation water flow. In accordance with the rehabilitation of the canals, related structures, such as division boxes, culverts and farm inlets, shall be also improved.

b) Drainage Canal

The existing drainage canals, lined by concrete, shall be rehabilitated due to their deterioration. U-shaped precast concrete flume shall be applied for the improvement of canals and related structures shall be also improved. The design of the canals was carried out by using the unit drainage requirement, mentioned in the previous section, and Manning formula.

The principal features of the irrigation and drainage facilities to be rehabilitated are as follows;

Irrigation canal	
Length	3.7km
Type	U-shaped precast concrete flume
Related structures	138 nos.
Drainage canal	
Length	1.4km
Type	U-shaped precast concrete flume
	Related structures 6 nos.

(5) Water Supply System

1) Design Policy

Water for the related buildings in the center is supplied from several shallow wells, however, it is difficult to supply water in the dry season due to the drawdown of groundwater. Accordingly, new water resources will be developed by providing a deep tube well.

2) Study of Design Condition

On the basis of the field investigation, groundwater of 3.0 lit/sec is expected from the new deep tube well.

The capacity of water supply system was determined based on the daily unit water consumption of 80 lit/person. The daily average water supply of 36.96 m^3/day and a maximum hourly water supply of 4.62 m^3/hr (1.28 lit/sec) for the expected 62 households (1 household : 6 persons) in the center was obtained. The surplus water will be used for irrigation of the farm.

3) Basic Design

The water supply system shall consist of a deep tube well, pump facilities, a storage tank, and distribution pipeline. Taking into account ease of maintenance, electric power will be used for the operation of pump facilities. Accordingly, installation of transmission lines, extended from the existing power line in the center to the well site shall be included in this plan. The layout of the distribution pipeline shall be determined taking into consideration the related buildings to be constructed in the center. One faucet shall be provided so as to serve about 4 households. The designed storage tank capacity is 20 m^3, which is half the average daily water demand of the center.

Irrigation water from the deep tube well will be supplied to the canal through a regulating pond. The regulating pond shall be constructed beside of the storage tank and store irrigation water for 18 hours of operation.

The principal features of the water supply system are as shown below;

Deep tube well	
Depth	100m
Borehole dia.	350mm
Casing	203mm
Pump	
Type	Submersible type
Diameter	65mm
Discharge	0.18 m^3/min
Total head	60m
Output of motor	5.5kw
Number	1set
Storage tank	
Capacity	20m^3
Distribution pipeline	
Diameter	75~25mm
Length	1.84km
Faucet	22nos.
Transmission line(3 phase, 60 Hz)	
Length	1.2km
Regulating pond	
Capacity	130m^3

Through the execution of improvement works of the seed farm mentioned above, the center shall be provided with maintenance services

and domestic water. The irrigable area on the farm in the dry season will be improved as follows;

Water resource	Present	After improvement
- Tigum System	5.0ha	6.0ha
- Farm pond	1.6ha	2.0ha
- Deep tube well		2.0ha
Total	6.6ha	10.0ha

4.2.4 Equipment Plan

(1) Equipment for Seed Testing Laboratory (STL)

The basic criteria for basic design are as follows :

- Equipment should be adjusted for all kinds of activities, including tests, research and training, and field inspections.
- STL shall be a part of the research station. The main activities include practical seed quality control services and related works. In the view of the above points, the kind of equipment and specifications should be examined. Staff level should be also considered.
- The condition and quantity of existing equipment and staff levels should be taken into considerations.

The main criteria for amount of equipment required are as follows :

- Basically one set of equipment will be provided each. Regarding the equipment which will be provided in plural, basically the quantity of equipment should not be within the limits of staff numbers at each laboratory (average two staff).
- For equipment that is utilized frequently, such as grain driers, moisture tester for rice, magnifiers and hydro-thermographs, two sets should be provided. Also two sets of spare equipment and commonly used equipment should be provided .
- The number of drying ovens, thermo-static germinators, weighing cans and germination dishes, is based on a weekly sample number of 60. Examples of the calculation are as follows :

Weighing can	60 samples x 2 = 120 cans
Drying oven	60 samples x 2 / 30 (number of weighing can per one drying oven) / 4 (testing times per week) = 1 set
Thermo-static germinator	60 samples / 30 (number of germination dishes per germinator) = 2 sets

- Portable seed test set should be supplied in the ratio of two inspectors to one, therefore, 10 sets will be provided.

Therefore, the amount of equipment to be provided is as follows, and details are shown in Table 7.

Sample receiving and preparation	Grain sample divider, Testing seed blower
Moisture test	Drying oven, Moisture tester
Purity and varietal test	Diaphanoscope, Testing rice husker
Germination test	Thermo-static germinator, Seed vacuum counter head set
Seed care test	Shaker, Incubator
Others	Hydro-thermograph, Top pan balance
Training	Printing machine, Video system

(2) Facilities and equipment for seed processing

The basic criteria for basic design are as follows :

- The total plant capacity is designed from the maximum rainy season yield of the VES field and 30 % of the rainy season yield of the Iloilo province seed growers (Maximum drying capacity per day is 20.0 t).
- The seed drying plant was designed based on the peak time, and number of sets of dryers to be used.
- The basic criteria regarding the capacity of each dryer, basic concepts are as follows. Each variety of seed will be dried by one seed dryer unit to avoid mixing. BPI has carried out the seed cropping instructions, which directed that one variety be cropped more than one hectare. Therefore the minimum carrying seeds from one seed grower is 100 ~ 120 cavans (average yield per 1 ha : rainy season 100 cavans, dry season 120 cavans), as

a consequence 4,000 ~ 4,800 kg capacity dryers should be provided. The possibility of drying small scale yield seeds from VES (yield 1.8 ~ 2.8 t) should be examined.

- The paddy moisture will be reduced from 24 ~ 20 % to 12 % in the dryer. The dryer should be a circulating and seed type which is easy to maintain and clean. The typical abrasion of indica rice should be also taken into consideration.
- The seed processing plant should be designed in accordance with the capacity of the drying plant. For the purpose of plant and small quantity seed processing, the processing plant should be separated into two lines.

The calculations for scale of the facilities scale are as follows :

Seed drying plant

- Maximum yield from VES in rainy season	: 35 ha x 3.2 t = 112 t
- 30% of Iloilo province seed yield in rainy season	: 492 ha x 3.2 t x 0.3 = 472.3 t
- Peak processing month/quantities in last 3 years	: October, 60%
- Working days per month	: 25days
- Processing efficiency	: 70%
- Maximum drying capacity per day	: (112t + 472.3t) x 0.6 / 0.7 / 25days = 20.0 t

Seed processing plant

- Processing capacity per hour
  (processing hours per day is approximately 11 hours < 8:00 ~ 19:00>)
  :20.0t / 11h = 1.82 t/h

Therefore facilities to be provided are as follows, and details are shown in Table 7.

- Seed drying plant (circulated type)	: 3.5 t x 2 sets
	: 5.0 t x 3 sets
- Seed processing plant	: 2.0 t/hour

(3) Transportation vehicles

The basic criteria for basic design are as follows :

- For the long distance transportation of seeds, six ton capacity medium scale trucks will be provided. For the medium distance transportation of seeds, two ton capacity small scale trucks will be provided. For the short distance transportation of seeds, communication for seed growers, and transportation of small items, one ton capacity pick up trucks will be provided.
- The high mobility small scale motor bicycles will be supplied to seed inspectors.
- The amount of equipment will be decided taking into consideration the amount of seed handled in the plant, number of staff, conditions of existing equipment, and future plans.
- Two medium scale trucks will be provided to replace the existing. one.
- The number of small scale trucks and pick up trucks were estimated as follows :

Total quantity to be transported	seed growers within 20 km of VES - area :219 ha ; amount : 700t
Peak quantities/month/working days	60% of wet season yield, October, 25days
Maximum quantity to be transported per day	700t x 0.6 / 25days = 16.8t
Number of trips per day	3
Maximum quantity per trip	16.8t / 3 trips = 6 t

Therefore the equipment to be supplied is as follows (see Table 7):

Medium scale truck	6 t x 2
Small scale truck	2 t x 2
Pick up truck	1 t x 2
Motorcycle	90 cc x 10

(4) Farm and harvesting machinery

The basic criteria for basic design are as follows :

- The planned equipment is applied to all VES fields, 7 PS level power tillers will be provided for relatively small field works, such as foundation seeds, and 35 PS level 4WD tractors and attachments will be provided for general works.
- Equipment should be selected taking into account utilization flexibility, existing condition of the management, and future plans.
- For the equipment specifications and quantities, the existing condition of equipment, contents of management, and staff number and level should be taken into consideration.

Specifications and quantities should be examined.

An example calculation for 4WD tractors is as follows (35PS, paddy field, rotary)

Units = (10 x area;ha) / (rotary width;m x working speed;km/h x working hours per day x working days x working efficiency)
= (10 x 35ha) / (1.6m x 2km/h x 7h x 0.4)
= 2 units

Therefore the equipment to be provided is as follows, and details are shown in Table 7.

- 4WD tractor : 35PS x 2 units
- Power tiller : 7PS x 2 units
- Disk plow : 2 disk x 1 unit

e) The basic criteria for basic design are as follows :

- General repair tool sets should be provided for vehicles and farm machinery in VES field.
- For the equipment specifications and quantities, staff level and numbers, and management plans should be taken into consideration.

Therefore the equipment be provided is as follows (Table 7):

- Work shop tool set 1 set
- Portable tool set 2 sets

4.3 Three Provinces (Aklan, Capiz , and Antique)

4.3.1 Location and Condition of Proposed Site

(1) Aklan seed production association

1) Location of the proposed site:
The site is located 180 km to the north and takes 3 hours by car from Iloilo city. It is 9 km and takes 15 minutes by car from Kalibo along the prefectural road to be graveled which is 1 km inside of the national road. The site is 50 m above sea level.

2) Traffic condition:
80 % of the road from the site to Iloilo city is paved with concrete. The road from near Kalibo is graveled. The construction will cause no interference to traffic.

3) State of the site:
The area of the proposed site is 1,600 m^2 out of approximately 4,600 m^2 including Makato swine breeding center of the Ministry of Agriculture. The site is surrounded by grass fields, paddy fields, and nursery. The site area is sufficient and the site for the temporary construction is ready to use.

4) Geographical feature - Soil condition:
The site is almost flat. A greyish to brownish silt layer covers the site and at 2.7 m deep it changes to a sandish silt layer. The underground water level was found at 1.0 m.

(2) Capiz seed production association

1) Location of the proposed site:
The site is located 135 km to the north and takes 2.5 hours by car from Iloilo city. It is 8 km and takes 20 minutes by car from Roxas along the

national road which is paved with concrete. The site is 50 m above sea level.

2) Traffic condition:
The site runs along the national road which is paved with concrete. There are a lot of graveled roads, and two bridges with a 10 t limit on the way. The construction will cause no interference to traffic.

3) State of the site:
The site is proposed to be located in the southern part inside the guest house area in Capiz prefecture. The site is planted with old mango trees, guava trees and entirely surrounded by rain water drains. There are a training center and some wooden houses in addition to the guest house. The site is surrounded by paddy field, has sufficient area, and is ready for use for temporary construction works.

4) Geographical feature - Soil condition:
Undulating land. The soil condition is yellowish to brownish clay layer and changed into sand layer from 1 m deep. Satisfactorily to construct. The underground water level was 100 cm when examined.

(3) Antique seed production association

1) Location of the proposed site:
The site is located in 97 km to the northwest and takes 2 hours by car from Iloilo city, 22 km and takes 30 minutes by car from San Jose, along by the national road which is paved with asphalt. 50 m above sea level.

2) Traffic condition:
All roads to the site from Iloilo city are paved. The construction will cause no interference to traffic.

3) State of the site:
The site is located on approximately 6,700 m^2 which faces the national road, inside the Patnongon Lowlands Research Outreach Station's (ROS) site. The site is surrounded by grass fields and ROS's office and swine breeding center building are on the site. The site is surrounded by farm and paddy fields. The site area is sufficient and is ready for use for temporary construction works.

4) Geographical features - Soil condition:
The site slopes gently down from the national road to the northwest corner. A large grained sand, brownish silt layer including very small amount of gravel covers the site which is satisfactorily for construction. The underground water level was found 30 cm below the surface.

4.3.2 Proposed Building Plan

(1) Basic Design Criteria

Same as BPI Headquarters (refer to 4.1.1)

(2) Site Plan

On each proposed site there is sufficient area for construction, and traffic should not be interfered with during constructing. The height of site seems to be rather low after due consideration, and will require sand banking. It is desirable banking be constructed a few months before, even in the rainy season, and a route for drainage should be secured. The quantity of banking to be required was determined as follows :

Aklan seed production association	: 462 m^3	(924 m^2 x 50 cm = 462 m^3)
Capiz seed production association	: 1,750 m^3	(1,250 m^2 x 140 cm =1,750 m^3)
Antique seed production association	: 1,200 m^3	(1,200 m^2 x 100 cm = 1,200 m^3)

(3) Layout Plan

Each facilities will be arranged, in order to minimize the banking as much as possible. Sun drying floor will be arranged to the south side.

Seed drying processing facilities will be arranged on the west side to avoid the bad influence of the setting sun on the seed storage facilities.

The Capiz seed production association facility will be arranged on the inner part of the east side of the guest house site so that noise coming from the seed drying processing facilities to guest house is minimized. An independent

approach road from the trunk road will be arranged to avoid the mixing of vehicles which use both facilities.

(4) Architectural Plan

The seed production association's facilities will include an office, receiving space, drying space, seed storage, and sun drying concrete pavement. The seed storage facilities will be located on the east side to avoid the influence of setting sun. In arranging this equipment, priority should be given to proper location, space saving, and flat arrangement taking into account the working flow such as loading and unloading to receiving and classifying, and sun drying to storage. The office will be arranged adjoining the work space which will face the road. The height of the floor will be 100 cm in order to keep the rice dry and clean, and coordinate with the deck of trucks, and prevent rodent damage. The floor will be constructed of concrete to maintain a clean surface, good drainage, and efficient drying along the road near the paddy warehouse. The floor will be sloped toward the edges from the center for smooth drainage.

(5) Structural Design

1) Basic concept
Steel structures will be adopted for raised buildings. Reinforced concrete will be used for the foundations, floor slab, and wainscot of these building. For foundations and columns, reinforced concrete will be used. For walls, concrete blocks will be used.

2) Architectural standard
Technical guide-lines prevailing in the Philippines will be applied to loads for structural design. Structural calculations will be based on Japanese standards.

3) Bearing capacity at the site
Design strength is based on the following data.

Proposed Site	Soil Condition	Bearing capacity (t/m^2)
Aklan seed production association	sandish silt layer	6 t/m^2
Capiz seed production association	brown clay layer	15 t/m^2
Antique seed production association	brown silt layer	12 t/m^2

Structure of each building is as follows ;

Name of Building	Foundation	Pole-Beam
Seed storage	continuous footing	reinforced concrete

Walls : concrete blocks will he used.
Roof : foundation:steel structures will be used.

(6) Finishing scheme

In order to select the finishing materials for the proposed building, the following items were considered :

- Minimize kinds of furnishing materials. Based on the room, they will be integrated for various functions.
- Durability, corrosion resistant, and waterproof materials.
- Maintenance, such as washable materials.
- Philippines standards for office and storage materials.

The road and premises will be paved with concrete, considering economical and maintenance viewpoints ,and sand dust prevention.

(7) Supporting facilities for proposed building

1) Basic concepts

The grade of supporting facilities shall be comparable with those existing buildings and appropriate to the equipment to be installed as well as activities in the building. The following criteria were considered.

- economical, energy saving
- ensure easy operation and safety
- easy maintenance and repair

2) Power supply system

Power characteristics	: 3-phase, 380 V and single phase 220 V, 60 Hz
Power supply	: from distribution line
Power sources	: by MERALCO
Distribution line in the site	: overhead line system

Power facilities

Motor power supply	: to test machinery
Indoor lighting	: fluorescent or incandescent lamp as required
	: minimum illumination
Plug socket	: as required
Outdoor lighting	: fluorescent

3) Water supply system

Water supply in the site	: by existing well
Water treatment	: none
Water drainage	: waste water to be treated in a deposit tank and disposed to the soak away
Cooking system	: electric cooking system will be provided in the office

4) Air-condition and ventilation system

Air-conditioner	: install in the test research room and etc.
Ventilator	: install in the place to be required

(8) Determination of appropriate plan

1) Aklan seed production association

Name of Room	Proposed Area	Calculation Method
Office	19.2 m^2	4 m x 4.8 m = 19.2 m^2
		a) inspector: 3 persons
		b) machinery - working space
Dryer work space	80 m^2	8 m x 8 m + 4 m x 4 m = 80 m^2
		a) machinery working space
Temporary stock	16 m^2	8 m x 2 m = 16 m^2
Seed storage	237.6 m^2	18 m x 13.2 m = 237.6 m^2
		a) capacity: 144 t , 48 unit
Others: corridors	28.8 m^2	
Total area	381.6 m^2	
Sun drying concrete floor	144 m^2	a) max. drying capacity: 51 t/day
		b) drying amount: 0.55

c) average layer thickness:0.05 m
d)working and passage space: 84 m^2
(a b c) + d 138 m^2, 8 m x 18 m= 144 m^2

The proposed area of seed storage was determined from the pallet size of 1.4 m x 1.8 m, piling height of 3 m for 1 unit, and 0.9 m for the width of working passage.

2) Capiz seed production association

Name of Room	Proposed Area	Calculation Method
Office	19.2 m^2	4 m x 4.8 m = 19.2 m^2 a) inspector: 3 persons b) machinery - working space
Dryer work space	80 m^2	8 m x 8 m + 4 m x 4 m = 80 m^2 a) machinery - working space
Temporary stock	16 m^2	8 m x 2 m = 16 m^2
Seed storage	261.4 m^2	19. 8 m x 13. 2 m = 261.4 m^2 a) capacity: 162 t , 54 unit
Others: Corridors	28.8 m^2	
Total area	405.4 m^2	
Sun dryer concrete pavement	158.4 m^2	a) max. drying capacity: 78 t/day b) drying amount: 0.55 c) average layer thickness: 0.05 m d) working and passage space: 95 m^2 (a b c) + d 159.7 m^2, 8 m x 20 m = 160 m^2

The proposed area of seed storage was determined from the pallet size of 1.4 m x 1.8 m, piling height of 3 m for 1 unit and, 0.9 m for the width of working passage.

3) Antique seed production association

Name of Room	Proposed Area	Calculation Method
Office	19.2 m^2	4 m x 4.80 m = 19.2 m^2 a) inspector: 2 persons b) machinery - working space
Dryer work space	80 m^2	8 m x 8 m + 4 m x 4 m = 80 m^2 a) machinery - working space
Temporary stock	16 m^2	8 m x 2 m = 16 m^2
Seed storage	237.6 m^2	18 m x 13.2 m = 237.6 m^2 a) capacity: 144 t, 48 unit
Others: Corridors	28.8 m^2	
Total area	381. 6 m^2	
Sun dryer concrete pavement	144 m^2	a) max. drying capacity: 54 t/day b) drying amount: 0.55 c) average layer thickness: 0.05 m d) working and Passage space: 84 m^2 (a b c)+d 140 m^2, 8 m x 18 m = 144 m^2

The proposed area of seed storage was determined from the pallet size of 1.4 m x 1.8 m, piling height of 3 for 1 unit and, 0.9 m for the width of working passage.

4.3.3 Equipment Plan

The basic criteria for basic design are as follows :

- The level of facilities should be simple and easy to maintain because these storages will be the model case for seed storages and it is possible to introduced these facilities to other seed grower associations by using loans.
- The capacity of the dryer will be determined from the following conditions :
  - These facilities should take into account the existing sun dry methods during the rainy season.
  - The capacity basically should be determined by the quantity of seeds in the storages.

- The capacity of the processing facilities should be determined by the quantity of seeds in the storages.
- Basically the certified seeds quality tests should be done by VES. Therefore the level of provided equipment in these storages will be for simple activities in the sites. The quantities will be determined in based on staff numbers in each province (2 ~ 3 persons).

The drying and processing plant were determined as follows :

Seed drying plant

- Quantity of total handling seeds : 50% of rainy season yield
- Peak month/quantity/working days : October, 60% of rainy season yield, 25days
- Processing efficiency : 70%
- Utilized ratio : 30% (for emergency use in rainy season)
- Quantity of handling seeds per day
  - : Aklan 159ha x 3.2t x 0.5 x 0.6 / 0.7 / 25days x0.3 =2.6t
  - : Capiz 187ha x 3.2t x 0.5 x 0.6 / 0.7 / 25days x0.3 =3.0t
  - : Antique 162ha x 3.2t x 0.5 x 0.6 / 0.7 / 25days x0.3 =2.7t

Seed processing plant

- Minimum processing machine : 0.5 t/h
- Processing time
  - : Aklan 2.6t / 0.5 t/h = 3 h
  - : Capiz 3.0t / 0.5 t/h = 3 h
  - : Antique 2.7t / 0.5 t/h = 3 h

Therefore the seed processing equipment provided for each province project is as follows, and details are shown in Table 7.

- Seed drying plant (box type) : 1.5t x 2 units
- Seed processing plant : 0.5 t/h x 1unit
- Storage equipment : Top pan balance

4.4 Implementation Plan

The Project implementation and the scope of the works were discussed in the preceding chapter, and the implementation plan is outlined as follows.

4.4.1 Implementation Method

The executing body of the Project is BPI as described in Chapter 3. The Project works covered under Japanese grant aid are executed by a Japanese contractor selected through competitive bidding, and the construction supervision is rendered by the Japanese consultant engaged in the basic design study. The construction is carried out under the cooperation of BPI and other Government agencies.

The construction materials will be mostly procured in the Philippines. All of the required construction equipment are available from the lease system in the Philippines since specific equipment is not required for the construction. However, the seed processing plant, seed quality control and storage equipment, vehicles, farm equipment, and pump equipment for the deep tube well and irrigation will be imported from Japan, because those in the Philippines do not meet the technical specifications required for the Project.

Aggregates for concrete and materials for the base course of road are procured through suppliers near the Project site.

The climate of the Project area is divided into the dry season and rainy season. In the rainy season from July to October, the structural works are concentrated, and earthworks, limited by rainfall, are executed in the dry season. The workable periods are estimated at 211 days in Quezon and 205 days in Panay on the basis of annual rainfall patterns, soils at the work sites, and national holidays in the Philippines.

Of the Project components, construction of building facilities are scattered in Quezon, Iloilo, Capiz, Aklan, and Antique, however, each of them can be executed separately without any limitation to the construction sequence of the respective facilities.

4.4.2 Condition of Construction

The key points for the construction of each component involved in the Project are as follows;

1) The construction of buildings shall be strictly controlled so that equipment provided in the buildings can be installed as schedule.

2) The improvement works of the seed farm shall be scheduled mainly in the dry season, taking into account the cropping on the farm.

3) The tube well shall be constructed with due attention to the optimum design for pumping water, confirming position and thickness of aquifer layer together with water quality during the drilling works.

4) Since electric power required to the building facilities will be supplied from the existing transmission lines, discussions with the Ministry of Power and other agencies concerned and their arrangement shall be essential in order to supply sufficient power for the operation of the facilities immediately after completion of their construction.

4.4.3 Construction and Supervisory Plan

(1) Detailed Design and Tender Works

Prior to the implementation of the Project, detailed design and tender works have to be carried out. After conclusion of an Exchange of Notes (E/N), the consulting services agreement will be immediately contracted with BPI and the consultant will commence the detailed design. The consultant shall discuss with BPI, at the detailed design stage, the design and implementation schedule of the works. BPI is requested to acquire the land required for the construction works, arrange the temporary construction office and other necessities prior to the commencement of the project works. For the electric power supply to the facilities, required arrangements though discussion with the Ministry of Power and other agencies concerned shall be conducted to avoid any difficulties in their operation at the completion of the works.

The works involved in the detailed design are as follows;

- Topo-survey
  Additional survey based on the basic design study

- Detailed design
  1) Review of the basic design through the topo-survey
  2) Review of the Project cost through the detailed design

- Preparation of tender documents
  1) *Preparation of the tender drawings*
  2) Preparation of the tender documents for the construction works and the supply of equipment and materials to be granted

The tender for selection of a contractor for the construction works will be conducted after approval from BPI of the tendering process. The first step is the pre-qualification tender of which notice is published in the major daily newspapers on construction and the economy in Japan on behalf of BPI.

The pre-qualification documents are distributed by the consultant to the tenderers and the tender documents are distributed by the consultant to the pre-qualified tenderers.

The quoted tenders are received by the consultant and opened in the presence of the representatives of BPI. After the opening, the tender evaluation is carried out by the consultant in collaboration with the representatives of BPI, and the draft contract is prepared by the consultant based on the tender evaluation result.

(2) Construction Supervision

Once the contract has been decided for the construction works, the consultant clarifies the construction methods and time schedule in discussion with the contractor. The resident engineer of the consultant is assigned to supervise the construction works with the commencement of the construction, and regularly reports the work progress to both JICA Philippines office and BPI. He also coordinates among the agencies concerned with the Project, including the contractor, to smoothly implement the Project.

Since the project comprises many kinds of work components, the consultant's construction engineer, in addition to the resident engineer, is assigned to supervise the construction works for the improvement of the seed farm and water supply system.

Through these arrangements, the Project works will be completed on schedule with sufficient results.

The scope of the construction supervision is outlined below;

1) Evaluation and approval of construction drawings
   Evaluation and approval of construction drawings, application for commencement of works, sample of materials, specification of equipment, etc. submitted by the contractor

2) Progress and quality control of construction
   Check and guidance and on construction plans and time schedules, progress and quality control of construction and necessary inspection of construction methods

3) Approval of payment to the contractor
   Check and evaluation on performance of works necessary for issue of payment certificates and completion certificate to the contractor

4) Report on progress of construction
   Regular reporting to and discussing with BPI and concerned agencies of GOJ on the progress of construction for smooth execution of the works

5) Handing-over of completed facilities
   Attendance at the handing-over of the completed facilities to the Government after confirming the completion of works and fulfilment of the contract

4.4.4 Procurement Plan

Basically, equipment for this project will be procured in Japan.

1) General equipment
Procuring general equipment such as forceps, locally, is not cheap and difficult.

2) Computer and software
Regarding the plan for a data base of seed quality control services, software is very important for improvement and, thus, a more complete computer system. There are excellent computer agencies in the Philippines and it is, therefore, possible to be procured software locally.

3) Farm machinery and harvesting machinery
There are IRRI model equipment, such as threshers and weeders available which is adequate for indica rice. Taking into consideration after sales service, simple equipment is possible to be procured locally.

4) Others
Additional equipment, such as ELISA reader, is likely to be procured from a third nation taking into consideration coordination with the existing equipment.

4.4.5 Implementation Plan

After conclusion of E/N between GOJ and GOP the consulting services agreement is immediately contracted with BPI. The detailed design will be performed by the consultant in 1.5 months for the field investigation and 2.5 months for the detailed design including preparation of tender documents, which is followed by the pre-qualification, tender, tender evaluation, and contract for the construction works. The construction period is set to be 12 months.

The implementation schedule for the Project is shown in Figure 7.

The works to be borne by the Philippines side are summarized below;

1) Supply of data necessary for the detailed design
2) Land acquisition required for the construction works
3) Land compensation required for the construction site office, borrow area, and disposal area

4) Arrangement for supply of electric power required for the building facilities
5) Assurance of prompt unloading and custom clearance at ports of disembarkation in the Philippines and internal transportation of the equipment, materials, vehicles, tools, and spare parts necessary for the Project works
6) Banking arrangement for payments, issue of Authorization to Pay, and bearing all expenses on such arrangements
7) Permission for Japanese nationals to enter and stay in the Philippines and other necessities for the performance of their works under the verified contracts
8) Exemption of Japanese nationals from custom duties, internal taxes, and fiscal levies which may be imposed in the Philippines with respect to the supply of products and services under the verified contracts
9) Assurance on operation and maintenance of the facilities, plant, and equipment constructed or installed under the Grant and on proper and effective use of them for the Project
10) Bearing all the expenses, other than these covered by the Grant, necessary for the Project

CHAPTER 5

PROJECT EVALUATION AND CONCLUSION

CHAPTER 5 PROJECT EVALUATION AND CONCLUSION

5.1 Project Evaluation

GOP has given priority to the agriculture sector in its successive national development plans, and implemented the agricultural policy focusing on the primary objective of attaining self-sufficiency in rice and corn. GOP has attempted to eliminate constraints by enacting the Seed Act as well as enhancing the authority and the responsibility of BPI.

The overall goal of the Project is to adequately supply quality seeds to meet national seed requirements through strengthening the seed related facilities in BPI Head Office and improving seed production in the rice model area in Region VI, in order to increase farm productivity and farmers' income.

The following benefits are expected from the implementation of the Project :

(1) Strengthening of the competence and functions of BPI in seed production and distribution

Under the Seed Act, the competence and functions of BPI are more further clearly defined and strengthened, particularly in the areas of seed production and distribution as well as seed quality control. BPI, however, is needing not only to increase its staff but also to reinforce seed related facilities. The implementation of this Project would greatly contribute to the reinforcement of the facilities.

(2) Strengthening of the competence and functions of BPI in seed quality control services

Construction of seed quality control services and improvement of related equipment would contribute to the strengthening of the competence and functions of BPI for good quality control. In addition to the above, SQCS play an important role in enhancing seed industry in the Philippines.

SQCS are also envisaging to strengthen quality and quantity of the seed inspectors and seed research workers.

(3) Strengthening of Seed Testing Laboratory at VES

Construction and improvement of the Seed Testing Laboratory at VES would contribute to the strengthening of seed quality control activities in the model area.

(4) Other benefits at VES

(i) Farmland consolidation and provision of farm machinery

In the dry season, the production of the registered seed depends largely on seed growers because of a shortage of irrigation water at VES. The Project, farmland consolidation and provision of farm machinery would contribute to the expansion of irrigable area and the increase/stabilization seed production and quality.

(ii) Installation of drying plant

Replacement of the seed drying plant would contribute to the improvement of seed quality, and enable seed growers to improve the quality of certified seeds.

(iii) Construction of seed storage facilities

Construction of seed storage facilities would help to prevent poor quality of seeds, decrease storage losses, and improve the seed distribution system.

(5) Construction of seed storage for seed growers associations

Construction of seed storages would help to prevent poor quality of seeds and to decrease storage losses, and installation of seed processing plants would be allows increase the quality of certified seeds.

After the seed production and distribution system in the model area is improved by the implementation of the Project, and the seed renewal rate comes up to 20%, the average unit yield would increase up to 3.5 tonnes/ha. It is also expected that rice production will increase up to 360,000 tonnes in the future.

The Project would greatly contribute to the promotion of the national production and distribution program and the strengthening of BPI's functions. It is expected that self-sufficiency in rice can be achieved in the Philippines.

5.2 Conclusion and Recommendation

It is concluded that the implementation of the Project under Japan's Grant Aid is justifiable, because the Project will significantly contribute to the self-sufficiency in rice in the Philippines, in addition to the numerous direct and indirect benefits already described. Furthermore, the Philippines' operation and maintenance system for the constructed Project facilities is judged to be reliable in view of the sufficient supporting arrangement to be provided.

To ensure smooth implementation of the Project and the proper operation and maintenance of the Project facilities, the Government of the Philippines is recommended to

(1) Secure a lot of land necessary for regular and temporary construction, borrow areas, and disposal area including embankment mentioned below, before the start of the construction :

	Embankment (m^3)
BPI	2,500
VES	
– STL	1,080
– Seed Storage	4,200
Aklan	462
Capiz	1,750
Antique	1,200

(2) Complete the construction of the power supply facilities to be executed by the Philippines side by September 1994 ;

(3) Arrange a budget necessary for the implementation of the Project and the operation and maintenance (O&M) of the constructed project facilities, and for education and training of the O&M staff ;

(4) Provide guidance on regular maintenance and repair of the constructed project facilities, plant and equipment after the completion of the Project.

TABLES

Table 1 Planting Method of Lowland Rice

Direct planting (fill fields with water after sowing seed on dry field)

Seed preparation	: Incubation 24-36 hours in warm water.
Planting time	: May-June in Wet Season
Seed Rate	: 100-150kg/ha
Land preparation	: Plowing or Ratavating
Fertilizer	: Basal fertilizer;
	Ingradient N; 14 kg/ha
	P; 14kg/ha
	K; 14kg/ha
	Side Dressing;
	Ingradient N; 23-46 kg/ha
Water management	: Done
Weed control	: Hand weeding with one time of herbicide
Protection	: When insets/pest are prevalant,
	insecticide/pesticide will be applied
Harvesting	: Grain sickle
Threshing	: Thresher
Drying	: Sundry 2-3 time to 14% moisture

Table 2 Actual Seed Production by Variety at WESVIARC

Vaiety	Class	1989 (Wet Season) Planted Area (ha)	1989 (Wet Season) Production (kg)	1989 (Dry Season) Planted Area (ha)	1989 (Dry Season) Production (kg)	1990 (Wet Season) Planted Area (ha)	1990 (Wet Season) Production (kg)	1990 (Dry Season) Planted Area (ha)	1990 (Dry Season) Production (kg)	1991 (Wet Season) Planted Area (ha)	1991 (Wet Season) Production (kg)	1991 (Dry Season) Planted Area (ha)	1991 (Dry Season) Production (kg)
IR36	F			0.5	765	0.25	1,080			0.5	1,560		
IR36	R	6.5	10,350			3.25	13,095			5	10,440	3	1,960
IR58	C					0.04	270						
IR60	F	0.25	900	0.7	1,305	0.5	1,215	No Plant (Drought)					
IR60	R	1.5	1,665			7.5	19,430						
IR64	F			0.5	1,980					0.75	1,240		
IR64	R	7	6,030	1	4,635	1.5	6,705			6.5	16,200	2	2,240
IR66	F			1.5	675								
IR66	R	3.75	8,955	1	2,295	3.75	2,340						
IR68	R					0.75	1,800						
IR70	F	0.5	1,350			0.25	583			0.25	1,440		
IR70	R					7	9,945						
IR72	F	0.25	990			0.55	810						
IR72	R	6.25	17,910	0.5	1,350	2.75	5,454						
IR72	C									0.3	960		
IR74	F	0.25	1,395			0.3	720			0.5	1,080		
IR74	R					2.5	3,780						
BPIR10	R									3	5,000		
	F	1.25	4,635	3.2	4,725	1.85	4,408			2	5,280		
TOTAL	R	25	44,910	2.5	8,280	28	61,820			14.5	31,640	5	4,200
	C					0.04	270			0.3	960		

Notes : Class F : Foundation Seed, R : Registered Seed, C : Certified Seed

Source : WESVIARC

Table 3 Cost of Operation and Maintenance (1／3)

1. Seed Storage (Air-conditioned storage)

Condition of storage : Temperature15～20℃、 Humidity65～70%
Working hours : 8h/day
Electric capacity : BPI Headquarters 22kwh
: WESVIARC 11kwh

(1) BPI Headquarters
22kwh x 8h x 365 days x 0.8 P = P 51,400
(2) WESVIARC
11kwh x 8h x 365 days x 0.8 P = P 25,700

2. Drying Plant

(1) BPI Headquarters
Re-drying Q'ty : 3.5 t Re-processing Q'ty : 13.5 t
Oil consumption : 5L/h
Electric capacity : Drying plant 3.7kwh Re-processing Q'ty : Drying plant 1.5t/day
Processing plant 5.5kwh Processing plant 0.5t/h
Processing effeciency : 60%

1) Drying plant
3.5t ÷1.5t/day÷0.6 x 8h =31 h
Fuel expenses : 5L x 31h x 7.17 L/P = P 1,100
Electric charges : 3.7kwh x 31 h x 0.8 P = P 100
2) Processing plant
3.5t ÷1.5t/day÷0.6 =45 h
Electric charges : 5.5kwh x 45 h x 0.8 P = 200 P P 200
Total (1) + 2)) P 1,400

(2) WESVIARC
Processing Q'ty : 584.3 t Maximam daily processing Q'ty : 20.0 t
Oil consumption : 10L/h・no
Electric capacuty : Drying plant 7.5kwh／no
Processing plant 30.0kwh
Processing efficency : 70%

1) Drying plant
584.3t ÷20.0t/day x 8h =212 h
Fuel expenses : 10L x 5nos x 212h x 7.17 L/P = P 76,000
Electric charges : 7.5kwh x 5nos x 212 h x 0.8 P = P 6,300
2) Procesing plant
Electric charges : 584.3 t ÷2.0t/day x 30.0kwh x 0.8 P = P 7,000
Total (1) + 2)) P 89,300

Table 3 Cost of Operation and Maintenance (2/3)

(3) Seed growers

Oil consumption : 5L/h

Electric capacity : Drying plant 3.7kwh Processing Q'ty : Drying olant 1.5t/day
Processing plant 5.5kwh Processing plant 0.5t/h

Processing efficiency : 70%

Processing Q'ty

Aklan	: 159 ha x 0.5 x 3.2 t/ha ÷0.7 = 363.4 t
Capiz	: 187 ha x 0.5 x 3.2 t/ha ÷0.7 = 427.4 t
Antique	: 162 ha x 0.5 x 3.2 t/ha ÷0.7 = 370.3 t

1) Aklan

· Drying plant

363.4t ÷3t/day x 8h =970 h

Fuel expenses : 5L x 2nos x 970h x 7.17 L/P =	P 69,500
Electric charges : 3.7kwh x 2nos x 970 h x 0.8 P =	P 5,700

· Processing plant

Electric charges : 363.4 t ÷0.5t/day x 5.5kwh x 0.8 P =	P 3,200
Total	P 78,400

2) Capiz

· Drying plant

427.4t ÷3t/day x 8h =1,144 h

Fuel expenses : 5L x 2nos x 1,144h x 7.17 L/P =	P 82,000
Electric charges : 3.7kwh x 2nos x 1,144 h x 0.8 P =	P 6,800

· Processing plant

Electric charges : 427.4 t ÷0.5t/day x 5.5kwh x 0.8 P =	P 3,800
Total	P 92,600

3) Antique

· Drying plant

370.3t ÷3t/day x 8h =992 h

Fuel expenses : 5L x 2nos x 992h x 7.17 L/P =	P 71,000
Electric charges : 3.7kwh x 2nos x 992 h x 0.8 P =	P 5,900

· Processing plant

Electric charges : 370.3 t ÷0.5t/day x 5.5kwh x 0.8 P =	P 3,300
Total	P 80,200

3. Vehicle

Oil consumption

Pickup truck1t	7.5 km/L	Motorcycle for inspector	20.0 km/L
Truck2t	5.5 km/L	Tractor35PS	220g/PS.h
Truck6t	5.0 km/L	Powre tiller7PS	250g/PS.h
Mini bus	5.0 km/L		

Lublicating oil expenses : 15% of fuel charges

(1) BPI Headquarters

Frequency in use : Twice a week、50 times a year

Distance covered : 4~5 working hours a day、average speed 40~50km (200km a day)

1) Pickup truck1t	:	2nos x 50 x 200km x 1.15 ÷7.5km/L x 7.64 L/P	P 11,700
2) Truck2t	:	2nos x 50 x 200km x 1.15 ÷5.5km/L x 7.64 L/P	P 16,000
3) Mini bus	:	50 x 200km x 1.15 ÷5.0km/L x 7.64 L/P	P 35,100
		Total	P 62,800

Table 3 Cost of Operation and Maintenance (3／3)

(2) WESVIARC

1) Vehicle

Frequency in use : twice a week、50 times a year

Distance covered : 4～5 working houra a day、average speed 40～50km (200km a day)

Pickup truck1t	:	2nos x 50 x 200km x 1.15 ÷7.5km/L x 7.64 L/P	P 23,400
Truck2t	:	2nos x 50 x 200km x 1.15 ÷5.5km/L x 7.64 L/P	P 32,000
Truck6t	:	2nos x 50 x 200km x 1.15 ÷5.0km/L x 7.64 L/P	P 35,100

2) Autocycle

Frequency in use : 280 days a year

Distance covered : 50km a day

Motorcycle for inspector	:	10nos x 280 x 50km x 1.15 ÷20.0km/L x 7.76 L/P	P 62,500

3) Farm machine

Frequency in use : 35 days a year、500h

Tractor	:	35PS x 2nos x 500h x 200PS.h ÷1,000 x 7.64 L/P x 1.15	P 33,800
Power tiller	:	7PS x 2nos x 500h x 250PS.h ÷1,000 x 7.64 L/P x 1.15	P 7,700
		Total	P 194,500

4. Farm (WESVIARC)

(1) Irrigation & drainage facilities

Operating cost of pump		
5.5kwh x 3.5 P x 8 x 180 day		P 27,720
Maintenance cost		P 50,000
	Total	P 77,720

(2) Water supply system

Working hours of pump : 12h/d

Operating cost of pump	
12 h/d x 5.5kwh x 3.5 x 365	P 84,315

Table 4 Training to be conducted by the National Seed Quality Control Services

Types of Taining	No. of Participant	Number of Training				
		1993	1994	1995	1996	1997
1. Refresher course for seed inspectors	30~40	1	1	1	1	1
2. Refresher course for seed analyst	30~40	1	1	1	1	1
3. Training course on plant material certification scheme	30~40	1	—	1	—	—
4. Establishment and management of nursery to produce quality fruits	30	1	—	1	—	—
5. Seed certification and standard technical working group meeting	50~70	2	2	2	2	2
6. Semi-annual and annual meeting of 18 seed testing lab. chief and 70 field inspection services personnel & central office staff	90~100	2	2	2	2	2
7. Update course of Philippine Seed Industry Association	20~30	1	1	1	1	1
8. Visit of student of Science curriculum & high school graduating student	40~80	4	4	4	4	4
9. Visit of provincial/regional seed grower association	40~60	4	4	4	4	4
10. Meeting of other technical working group of the council	40~50	4~6 meetings	4~6 meetings	4~6 meetings	4~6 meetings	4~6 meetings
11. Quartely meeting of chief of 18 SQCS national staff & invited provincial field inspection personnel	35~40	4	4	4	4	4
12. National seminar on Seed related activities of multi-agency like the Seed Act implementation.	40~50	1	1	1	1	1
13. Monthly meeting of Philippine Seed Industry Association	28~37	12	12	12	12	12
14. Meeting of BPI national staff, crop center chief and chief and of field facilities	60~75	2~3	2~3	2~3	2~3	2~3
15. Training on seed production to be participated by seed growers/cooperatives /farmers.	35~45	3	3	3	3	3

Table 5 Monthly Rainfall and Evaporation at WESVIARC

Rainfall

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1982	72.85	3.43	189.54	8.91	148.73	407.06	338.66	692.56	409.19	329.60	117.60	48.10	2,766.23
1983	43.40	16.80	1.20	10.40	1.70	115.20	228.00	357.50	404.30	258.10	339.60	173.28	1,949.48
1984	54.30	99.50	94.00	118.67	59.59	569.74	267.54	541.52	390.07	466.66	303.01	87.77	3,052.37
1985	52.03	75.73	40.87	169.71	53.81	282.78	322.02	110.99	330.79	450.04	148.84	140.47	2,178.08
1986	33.26	15.85	24.65	93.41	93.62	190.84	285.04	719.88	247.98	154.37	204.27	61.19	2,124.36
1987	61.89	9.39	2.79	14.22	5.09	151.24	514.14	191.03	350.35	188.40	210.04	35.35	1,733.93
1988	22.33	26.15	14.21	110.85	107.30	457.10	307.02	258.78	215.95	448.21	333.47	39.97	2,341.34
1989	87.73	44.66	52.78	71.10	204.09	243.59	265.46	809.70	228.13	179.94	87.35	20.06	2,294.59
1990	20.31	1.77	11.17	6.83	239.71	481.60	474.61	570.60	268.45	148.98	154.57	26.33	2,404.93
1991	6.83	24.79	5.98	74.67	35.15	319.50	298.68	513.65	75.30	135.90	192.46	39.00	1,721.92

Evaporation

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1982	160.87	167.91	262.01	253.67	244.67	207.34	152.58	168.97	157.58	184.60	181.90	170.20	2,312.29
1983	204.70	235.10	316.30	360.70	358.60	232.50	151.10	172.50	152.30	133.60	112.10	0.00	2,429.50
1984	141.50	147.10	212.72	208.70	196.38	157.89	185.86	191.06	145.09	152.70	143.71	135.97	2,018.68
1985	154.27	187.04	250.12	215.67	196.06	192.01	177.31	181.29	140.02	175.25	169.11	144.88	2,183.03
1986	132.73	169.34	211.85	224.35	219.36	155.65	149.95	171.85	168.39	151.09	131.37	181.38	2,067.31
1987	150.63	158.52	270.29	297.77	319.28	226.73	126.87	159.55	123.39	154.26	108.88	149.21	2,245.38
1988	162.18	207.66	298.57	282.32	298.34	115.07	171.14	153.22	137.21	106.90	131.19	154.00	2,217.80
1989	146.18	154.94	192.98	225.08	199.85	128.53	161.07	109.64	160.38	164.31	155.95	188.25	1,987.16
1990	183.86	264.78	316.17	293.25	225.24	123.72	128.81	142.77	128.04	133.00	90.67	132.53	2,162.84
1991	160.98	191.71	202.95	260.47	234.09	166.55	123.92	107.19	127.76	136.42	109.66	133.10	1,954.80

Source: Visayas Experiment Station

Table 6 Irrigation Water Requirement of Dry Season Cultivation

Item	Unit	Weight	Oct.			Nov.			Dec.			Jan.			Feb.			Mar.			Apr.		
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1) Crop water requirement	mm	1.00	0.0	36.5	43.9	34.4	7.0	15.5	50.3	64.3	77.2	58.8	48.8	65.9	75.0	73.1	12.7	0.0					
for each planted date	mm	0.00																					
	mm	0.00																					
	mm	0.00																					
	mm	0.00																					
2) Average	mm	1.00	0.0	36.5	43.9	34.4	7.0	15.5	50.3	64.3	77.2	58.8	48.8	65.9	75.0	73.1	12.7	0.0	0.0	0.0	0.0		
3) Puddling water	mm		0.0	62.5	62.5	0.0	0.0	0.0															
4) Nursery water req.	mm		0.0	1.8	2.2	1.7	0.4	0.8															
5) Total (2+3+4)	mm		0.0	100.8	108.6	36.1	7.4	16.3	50.3	64.3	77.2	58.8	48.8	65.9	75.0	73.1	12.7	0.0	0.0	0.0	0.0		
6) Days			10	10	11	10	10	10	10	10	11	10	10	11	10	10	8	10	10	11	10	10	10
7) Net water requirement	mm/day		0.0	10.1	9.9	3.6	0.7	1.6	5.0	6.4	7.0	5.9	4.9	6.0	7.5	7.3	1.6	0.0	0.0	0.0	0.0		
	l/sec/ha		0.0	1.2	1.1	0.4	0.1	0.2	0.6	0.7	0.8	0.7	0.6	0.7	0.9	0.8	0.2	0.0	0.0	0.0	0.0		
8) Gross water requiremen	l/sec/ha		0.0	1.5	1.5	0.6	0.1	0.2	0.8	1.0	1.1	0.9	0.7	0.9	1.1	1.1	0.2	0.0	0.0	0.0	0.0		
Eff.= 76%																							

Table 7 Equipment List (1/4)

BPI				Q'ty	Remarks
1.1. 1	Storage and	Storage and	Drying Plant (1.5t)	1	Re-drying for high moisture seeds
2	Processing	Processing	Seed Processing Plant (0.5t/h)	1	Re-processing for varital mixture
4			Truck 2t	1	For medium distance transportation
5			Pick Up Truck 1t	1	For short distance transportation
2.1. 1	SQCS	Sampling	Grain Trier Set (Rice, Soybean, Peanut)	3 set	Sampling the test seeds
2			Seed Sampler Set	3 set	Sampling the test seeds
3			Grain Sample Divider	2	Divide the sample seeds in equal ratio
4			Testing Seed Blower	1	Separaate of light and heavy fraction
5			Electric Top-Pan Balance (1kg, 10kg)	1 each	Measurement of sample weight
6			Grain Sieve Seed Set (Slot,Round,Soybean)	2 each	Divide the seeds by size
7			Sieve Shaker	1	Used for rapid mechanical sieve analsis
2.2. 1		Moisture Test	Mill	1	Crushing the moisture measuring sample
2			Weighing Can	240	Sample can for the moisture test
3			Drying Oven	2	Make the drying condition of moisture test
4			Desicator (L, M, S)	2 each	Keep the seeds of moisture test
5			Grain Moisture Tester (Rice, Corn, Soybean, Vegetable)	2 each	Measurement of seed moisture content
6			Infrared Moisture Tester	2	Measurement of seed moisture content
2.3. 1		Purity & Varietal	Diaphanoscope	3	Inspection of the damaged seeeds
2		Purity Test	Granometer (3 size)	2 each	Counting of the seeds
3			Grain Cutter	2	Inspection of the seed section
4			Grain Shape Tester	2	Measurement of the grain size
5			Testing Rice Husker	1	Red grain determination for rice seeds
2.4. 1		Germination Test	Themostatic Germinator	3	Inspection of the germination ratio
2			Automatic Seed Analyzer	1	Measurement of the viability of seeds
3			Seed Vacuum Counter Head set	1 set	Seeds ranging on the Germination Dishes
4			Humidifier	1 set	Control of humidity at germination test
5			Germination Dish, Unglazed Pottery	120	Tray for germination test seeds
2.5. 1		Seed Health Test	Shaker	1	Preparation of the culture solution
2			Ultracentrifuge	1	Centrifugation of sample
3			Glassware Washer	1	Automatic glassware washing machine
4			Incubater	1	Examination of seed health
5			Stereoscope Microscope Photomicrographic System with Camera	2	Magnified observation of sample
6			Slurry Small Seed Treater	1	Treatment of the sample seeds
7			ELISA Reader	1	Inspection of seeed pathogenic
8			Personnal Computer for ELISA Reader CPU, CRT, Harddisk, Floppy Drive, Printer, Software, UPS	1	Data processor of the ELISA Reader
9			Autoclave	1	Sterilization of experiment material
10			Growth Chamber	1	Seeding test of infected seeds

Table 7 Equipment List (2/4)

				Q'ty	Remarks
2.6. 1		General	Forceps, Scalpel and Blade, Scissors	20 each	General use
2			Magnifier (3 type: Stand,W/Ligting,Flip-up)	4 each	Magnified observation of sample
3			Hygro-Thermograph	4	Measurement of temperature and humidity
4			Electric Top Balance (1kg, 10kg)	1 each	Measurement of sample weight
5			Electric Analytical Balance (200g)	2	Measurement of weight at moisture test
6			Poly Bag Sealer	1	Packing for sample seeds
7			Compound Microscope	2	Magnified observation of sample
8			Stereoscope Microscope	4	Magnified observation of sample
9			Chemical Experiment Table	1 set	For chemical
10			Equipment Store Rack	1 set	Store for precision equipment
2.7. 1	Training, Data Processing and Field Ispection	AV Room	Video System (Camera,Monitor,Video Deck)	1 set	Making of training materials
		Conference Room	Video System (Monitor, Video Deck)	1 set	Projection of the training materials
3			Over Head Projector (w/Screen)	1	Projection of the training materials
4			Public Announcement System	1 set	Loudspeaker system for training
5		Printing Room	Printing Machine	1 set	Making of materials
6			Photo Copy Machine	1	Making of materials
7			Tag Printer set	1 set	Making of seed tags
8		Computer Room	Personnal Computer CPU, CRT, Harddisk, Floppy Drive Printer, Software, UPS	1 set	Data processing of seed quality control seavices
9		Field Inspection & Training	Camera Set	2 set	Used for photographing of field conditions
10					
11		Vehicle for Field Inspection & Training	Trainee Mini Bus (25 Seats)	1	For field training tansportation

Table 7 Equipment List (3/4)

WESVIARC				O'ty	Remarks
3.1. 1	Drying and		Seed Drying Plant 3.5t	2	Drying for seeds
2	Processing		Seed Drying Plant 5.0t	3	Drying for seeds
3			Seed Processing Plant 2t/h	1	Processing for seeds
3.2. 1	Transportation		Truck 2t	2	Fro medium distance transportation
2	Machine		Truck 6t	2	For long distance transportation
3			Pick Up Truck 1t	2	For short distance transportation
4			Motor Bicycle 90cc	10	Seed inspectors transportation vehicles for short distance fields
4.3. 1	Fram and		Tractor 35PS	2	Land preparation of all WESVIARC field
2	Harvesting		Power Tiller 7PS	2	Land preparation of breeder seed areas
3	Machine		Weeder	5	Works for weeding
4			Thresher	2	Threshing for harvested paddy
4.4. 1	Motor Pool		Workshop Tool Set	1 set	Maintainance of farm machinaries
2			Portable Tool Set	2 set	Maintainance of farm machinaries on field
5.1. 1	STL	sampling	Grain Trier Set (Rice, Soybean, Peanut)	2 set	Sampling the test seeds
2			Seed Sampler Set	2 set	Sampling the test seeds
3			Grain Sample Divider	2	Divide the sample seeds in equal ratio
4			Testing Seed Blower	1	Separate of light and heavy fraction
5			Grain Sieve Seed Set (Slot,Round,Soybean)	1 each	Divide the seeds by size
6			Sieve Shaker	1	Used for rapid mechanical sieve analsis
5.2. 1		Moisture Test	Mill	1	Crushing the moisture measuring sample
2			Weighing Can	120	Sample can for the moisture test
3			Drying Oven	1	Make the drying condition of moisture test
4			Grain Moisture Tester (Rice)	2	Measurement of seed moisture content
5			Grain Moisture Tester (Corn,Soybean,Vegetable)	1 each	Measurement of seed moisture content
6			Infrared Moisture Tester	1	Measurement of seed moisture content
5.3. 1		Purity & Varietal	Diaphanoscope	2	Inspection of the damaged seeds
2		Purity Test	Granometer (3 size)	1 each	Counting of the seeds
3			Grain Cutter	2	Inspection of the seed section
4			Grain Shape Tester	2	Measurement of the grain size
5			Testing Rice Husker	1	Red grain determination for rice seeds
5.4. 1		Germination Test	Themostatic Germinator	2	Inspection of the germination ratio
2			Seed Vacuum Counter Head set	1 set	Seeds ranging on the Germination Dishes
3			Germination Dish, Unglazed Pottery	60	Tray for germination test seeds
			Refrigerator	1	Breaking of seeds dormancy

Table 7 Equipment List (4/4)

				Q'ty	Remarks
5 .5. 1		Seed Health Test	Table Top Centifuge	1	Centrifugation of sample
2			Incubater	1	Examination of seed health
3			Autoolave	1	Sterilization of experiment material
4			Stereoscope Microscope Photomicrographic System with Camera	1	Magnified observation of sample
5			Stainless Steel Aseptic Box	1	For works of culture
5 .6. 1		General	Tag Printer set	1 set	Making of seed tags
2			Forceps, Scalpel and Blade, Scissors	12 each	General use
3			Magnifier (3 type: Standard,W/Ligting,Flip-	2 each	Magnified observation of sample
4			Hygro-Thermograph	2	Measurement of temperature and humidity
5			Electric Top Balance (1kg, 10kg)	2 each	Measurement of sample weight
6			Poly Bag Scaler	1	Packing for sample seeds
7			*Compound Microscope*	2	Magnified observation of sample
8			Portable Seed Testing Set	10 set	For seed inspectors' field inspection
9			Chemical Experiment Table	1 set	For chemical
10			Equipment Store Rack	1 set	Store for precision equipment
6 .7. 1		Training and	Printing Machine	1 set	Making of training materials
2		Data Processing	Photo Coppy Machine	1	Making of training materials
3			Over Head Projector (w/Screen)	1	Projection of the training materials
4			Video System (Camera, Monitor, Video Deck)	1 set	Making of training materials and projection of the training materials
5			Camera Set	1 set	Used for photographing of field conditions
6			Personnal Computer CPU, CRT, Hearddisk, Floppy Drive Printer, Software, UPS	1 set	Data processing of seed quality control services
7			Public Announcement system	1 set	Loudspeaker system for training

Seed Growers Association (Q'ty for One Province)				Q'ty	Remarks
7 .1. 1		Drying and	Seed Drying Plant (1.5t)	2	Processing for seeds
2		Processing	Seed Processing Plant (0.5t/h)	1	Drying for seeds
7 .2. 1		Equipment	Compound Microscope	1	Magnified observation of sample
2			Grain Moisture Tester (Rice, Soybean, Vegetable)	1	Measurement of seed moisture content
3			Table Spring Scale (10kg)	1	Measurement of sample weight
4			Magnifier (w/Stand)	2	Magnified observation of sample
5			Thermometer (WB, DW)	1	Measurement of temperature and humidity
6			Forcepts, Scalpel and Blade, Scissors	4 each	General use