JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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DEPARTMENT OF AGRICULTURE
THE REPUBLIC OF THE PHILIPPINES

Basic Design Study Report
on
The Project for Improvement of Seed Production and Distribution and Establishment of Appropriate Seed Storage System

February 1993

NIPPON KOEI CO., LTD, Tokyo

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PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Seed Production and Distribution and Establishment of Appropriate Seed Storage System and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a study team headed by Mr Hideaki Some, Deputy Director, Crop Production Division, Agricultural Production Bureau, Ministry of Agriculture, Forestry and Fisheries from August 18 to September 26, 1992.

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

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

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

February 1993

Kensuke Yanagiya

Kensuke Yanagiya
President
Japan International Cooperation Agency

February 1993

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

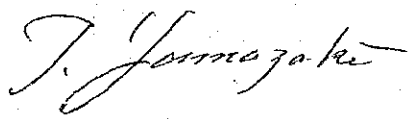
We are pleased to submit to you the basic design study report on the Project for Improvement of Seed Production and Distribution and Establishment of Appropriate Seed Storage System in the Republic of the Philippines.

This study has been made by Nippon Koei Co., Ltd. based on a contract with JICA from July 31, 1992 to February 28, 1993. Throughout the study, we have taken into full consideration the present situation in the Philippines, and have planned the most appropriate project in the scheme of Japan's grant aid.

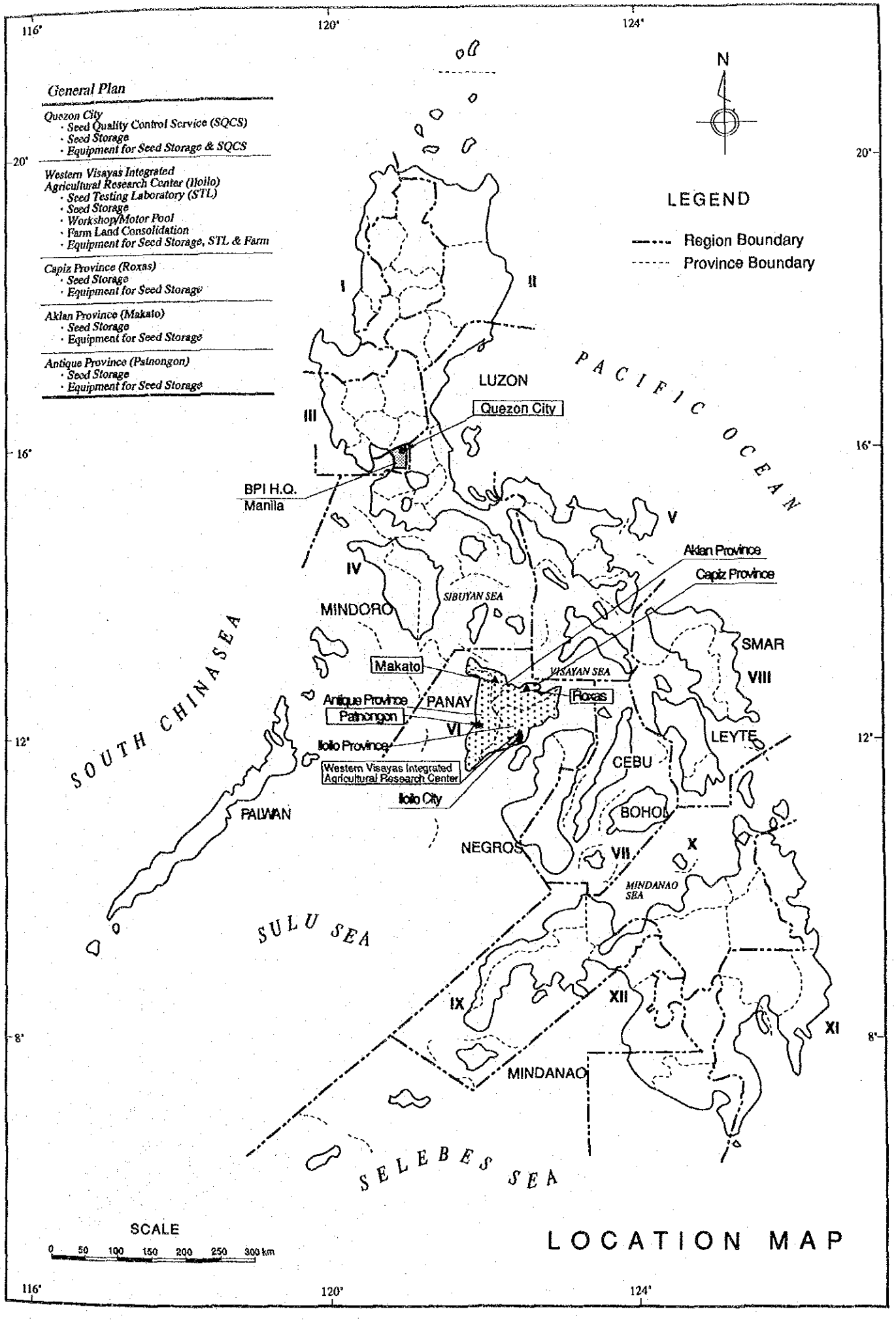
We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs and Ministry of Agriculture, Forestry and Fisheries. We also wish to express our deep gratitude to the officials concerned of Bureau of Plant Industry, Department of Agriculture, JICA Philippines Office, and Embassy of Japan for their close cooperation and assistance during our study.

At last, we hope that this report will be effectively used for the promotion of the project.

Very truly yours



Project Manager, Takayoshi Yamazaki
Basic design study team on
the Project for Improvement of Seed Production and Distribution and Establishment of Appropriate Seed Storage System
Nippon Koei Co., Ltd.


General Plan
Quezon City
· Seed Quality Control Service (SQCS)
· Seed Storage
· Equipment for Seed Storage & SQCS
Western Visayas Integrated Agricultural Research Center (Iloilo)
· Seed Testing Laboratory (STL)
· Seed Storage
· Workshop/Motor Pool
· Farm Land Consolidation
· Equipment for Seed Storage, STL & Farm
Capiz Province (Roxas)
· Seed Storage
· Equipment for Seed Storage
Aklan Province (Makato)
· Seed Storage
· Equipment for Seed Storage
Antique Province (Patnongon)
· Seed Storage
· Equipment for Seed Storage
N
LEGEND
Region Boundary
Province Boundary
116°
120°
124°
20°
16°
12°
8°
I
II
III
IV
V
VI
VII
VIII
IX
X
XI
XII
LUZON
Quezon City
BPI H.Q.
Manila
PACIFIC OCEAN
SIBUYAN SEA
MINDORO
Makato
Aklan Province
Capiz Province
SMAR
VISAYAN SEA
Roxas
Antique Province
Patnongon
PANAY
Iloilo Province
Western Visayas Integrated Agricultural Research Center
Iloilo City
LEYTE
CEBU
BOHOL
NEGROS
MINDANAO SEA
SOUTH CHINA SEA
PALWAN
SULU SEA
MINDANAO
SELEBES SEA
SCALE
0 50 100 150 200 250 300 km
LOCATION MAP

SUMMARY

SUMMARY

The Government of the Philippines (GOP) has published its "Medium Term National Development Plan, 1987-1992", in which the Department of Agriculture's (DA) primary development objectives are to ensure food security and pursue seed policies to expand the supply of high quality seeds and seedlings. In order to increase the certified seed production and achieve scheduled seed distribution, production of 36,000 tonnes of certified rice seed has been programmed under the Rice Production Enhancement Program II (RPEP II) which aims to produce rice at a level of 9.7 million tonnes per year.

The Philippines, however, has the following constraints which hinder the increase in supply of high quality seed:

i) An unstable supply of foundation and registered seeds caused by insufficient production facilities;
ii) Deterioration of seed quality due to improper seed processing and storage facilities;
iii) Weak organization of seed marketing and distribution systems, and
iv) Little development of high quality seeds due to limited farmers' understanding.

Taking all the above into consideration, GOP requested the Government of Japan (GOJ) to undertake a Feasibility Study on Improvement of Seed Production and Distribution, and Establishment of an Appropriate Seed Storage System in September 1987. The Study was carried out from November 1989 to October 1990, and identified a basic concept for the improvement of seed production and distribution, the establishment of a seed storage system, and proposed a model area improvement plan for rice, corn, and peanut crops. Encouraged by this and intending to realize the model area improvement plans, GOP requested GOJ to extend grant aid for the project for the Improvement of Seed Production and Distribution, and Establishment of an Appropriate Seed Storage System (the Project).

In order to investigate the background and the contents of the request, the Japan International Cooperation Agency (JICA) dispatched a Preliminary Study Team from February to March 1992. During the Preliminary Study, the background and the objective of the Project were confirmed and the main items of the Project were roughly decided. Through the results of the Study, the Project was deemed appropriate for grant aid and JICA decided to implement a basic design study on the Project. This included studying and assessing the scope of works and their significance, and the effect and priority as a project to be executed under Japan's grant aid. JICA thus sent a Basic Design Study Team to the Philippines for 40 days from August 18 to September 26, 1992.

The Team investigated and surveyed the Project area to clarify the present agriculture and rural infrastructure conditions, and to confirm the background of the Project. Using the results of the field investigations and discussions with GOP, the Team examined the rationale and viability of the Project and carried out a basic design study for the Project. This included selection of required equipment and materials, estimation of the implementation cost, and formulation of a basic plan for operation and maintenance. This report presents the comprehensive results of this basic design study.

Rice is a mainstay of agriculture in the Philippines, and has a very important role in the economy of the country. Increasing rice productivity is absolutely necessary not only for providing food for the nation but also for increasing small farmers' income and standard of living. However, the farmers have been slow to improved high quality seed varieties due mainly to the many constraints for the increase in supply of high quality seeds. GOP has attempted to eliminate such constraints through enacting the Seed Act as well as enhancing the authority and the responsibility of BPI. BPI also intends to promote an effective and planned seed policy and measures through the implementation of the Medium Term National Seed Program (1991~1995) coordinated with national development plans.

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

farmers. The present condition and problems of each facilities, and benefits expected from the implementation of the Project are as follows:

1) BPI Headquarters

By virtue of the Seed Act, BPI shall have direct responsibility for the production and distribution program. However, existing seed storage facilities are insufficient functionally to stock seed. The construction of seed storage will contribute to sufficiently maintain breeder, foundation, and registered seed in BPI headquarters, and to distribute them timely to related experiment stations.

BPI's seed quality control services are also not insufficient functionally due to the small facilities, and most of the existing equipment for laboratory being used is no longer accurate or out of order. Construction of National Seed Quality Control Services and improvement of the equipment will contribute to the strengthening and expanding the quality control services.

2) Visayas Experiment Station

Existing seed processing plants should be renovated as soon as possible because they are too worn-out, and are becoming less effective. Renovation of the plants will contribute to the improvement of the processing capability, seed quality and decrease of storage loss. Seed farm at VES is well-operated in the rainy season including irrigation for 35 ha, however, the operation in the dry season is limited due to insufficient water supply from Tigum Irrigation System as main water resources, and deterioration of irrigation and drainage facilities. Through the execution of improvement works of seed farm mentioned above, VES shall be provided with maintenance services and domestic water. The irrigable area on the farm will be 10.0 ha in the dry season. Most of the farm machinery has already exceeded their life span and needed to be renewed. Improvement of the farm machinery will contribute that seed shall be cultivated within a short period. It ca be timely distributed to private seed growers. At

the same time, improvement of workshop will contributed to the appropriate maintenance of vehicle and farm machinery.

3) Seed Testing Laboratory (Region VI)

Existing STL facilities is too small to execute the seed testing effectively, and has been deteriorating. Construction of STL and improvement of equipment for laboratory will contribute to the strengthening of STL and expansion of the seed quality control services.

4) Seed Production Association (Aklan, Capiz and Antique Province)

Among seed growers in the model area; Aklan, Capiz and Antique Province, the low quality of seed is a major problem since appropriate seed processing plant and seed storage are not available. Construction of seed storage and improvement of seed processing plant will contribute to produce high quality control seed to meet the demand, and to decrease of storage loss.

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 Bureau of Plant Industry (BPI) Headquarters

1) *Construction of seed storage (reinforced concrete building)*

- Gross floor area : 792m^2
- Affiliated facilities : air-conditioned storage : 456m^3
  box type dryer : 1.5t 1set
  processing machine : 0.5t/hour 1set
- Equipment : truck and etc

2) Construction of the National Seed Quality Control Services' (NSCQS) 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
- Training, data processing equipment
- Field inspection equipment

(2) Improvement of rice seed production, processing and storage facilities in Visayas Experiment Station (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 (3.5 t ; 2 sets, 5.0 t ; 3 sets) : drying of seeds
- Seed processing plant (2.0 t/hr ; 1 set) : processing of seeds

3) Provision of seeds production and distribution equipment
- Farm and harvesting machinery
- Seed transportation vehicle
- Motor shop and workshop equipment

4) Development of water resources and seed production fields
- Development of irrigation & drainage facilities
- Development of water supply system
- Development of farm pond
- Development of farm road

5) Construction of the Seed Testing Laboratory building (reinforced concrete building)
- Gross floor area : 552m^2

6) Provision of seed quality control services equipment
- Seeds testing equipment
- Training, data processing and field inspection equipment

(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 plant : 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

After conclusion of an Exchange of Notes (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 following benefits are expected from the implementation of the Project :

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

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

3) Strengthening of Seed Testing Laboratory at VES

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. It is also expected that rice production will increase up to 360,000 tonnes in the model area. 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 .

Through the field investigations and the subsequent analysis and studies in Japan, it was clarified that the Project would significantly contribute to the rice production in the Philippines' agricultural policy. Further, it was confirmed that GOP intended strongly the implementation of the Project and made appropriate arrangement of the Project implementation, and operation and management of the Project facilities. Under these situation, the early implementation of the Project is eagerly desired.

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.

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CHAPTER 1

INTRODUCTION

CHAPTER 1 INTRODUCTION

The Philippines almost achieved self sufficiency in rice in 1977 due mainly to the successful implementation of MASAGANA 99 (Rice Production Increase Plan by Credit Guarantee for Seeds and Fertilizer). Rice production reached a level of about 8.0 million tonnes per annum in recent years. In order to meet the further demand of an increasing population (at a rate of 2.5% per annum) and to have buffer stock for natural calamities, the yield for paddy field, with a total area of 3.2 million hectares, should be increased to the maximum extent.

In view of the above, the Government of the Philippines (GOP) has published its " Medium Term National Development Plan, 1987-1992", in which the Department of Agriculture's (DA) primary development objectives are to ensure food security and pursue seed policies to expand the supply of high quality seeds and seedlings. In order to increase the certified seed production and achieve scheduled seed distribution, production of 36,000 tonnes of certified rice seed has been programmed under the Rice Production Enhancement Program II (RPEP II) which aims to produce rice at a level of 9.7 million tonnes per year.

The Philippines, however, has the following constraints which hinder the increase in supply of high quality seed:

i) An unstable supply of foundation and registered seeds caused by insufficient production facilities;
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out from November 1989 to October 1990, and identified a basic concept for the improvement of seed production and distribution, the establishment of a seed storage system, and proposed a model area improvement plan for rice, corn, and peanut crops. Encouraged by this and intending to realize the model area improvement plans, GOP requested GOJ to extend grant aid for the project for the Improvement of Seed Production and Distribution, and Establishment of an Appropriate Seed Storage System (the Project).

In order to investigate the background and the contents of the request, the Japan International Cooperation Agency (JICA) dispatched a Preliminary Study Team headed by Mr. Shoji SHIMBO, Managing Director, Grant Aid Study and Design Dept., JICA from February to March 1992. During the Preliminary Study, the background and the objective of the Project were confirmed and the main items of the Project were roughly decided. The rice model area in Region VI (see Location Map), particularly, was considered as appropriate for grant aid taking into account the urgency for attaining self sufficiency in rice and thus strengthening the activities of the Philippines Rice Institute (Phil Rice), for which technical cooperation has been extended by JICA. Through the results of the Study, the Project was deemed appropriate for grant aid and JICA decided to implement a basic design study on the Project. This included studying and assessing the scope of works and their significance, and the effect and priority as a project to be executed under Japan's grant aid. JICA thus sent a Basic Design Study Team to the Philippines for 40 days from August 18 to September 26, 1992. The Team was headed by Mr. 6 SOME, Deputy Director, Crop Production Division, Agricultural Production Bureau, Ministry of Agriculture, Forestry and Fisheries.

The Team investigated and surveyed the Project area to clarify the present agriculture and rural infrastructure conditions, and to confirm the background of the Project. The members of the Basic Study Team, itinerary for the Team, and list of personnel contacted are given in Appendix 1, 2, and 3, respectively. The Team held discussions with the concerned officials of GOP on the scope of the Project. The agreed minutes of these discussions are given in Appendix 4.

Using the results of the field investigations and discussions with GOP, the Team examined the rationale and viability of the Project and carried out

a basic design study for the Project. This included selection of required equipment and materials, estimation of the implementation cost, and formulation of a basic plan for operation and maintenance. This report presents the comprehensive results of this basic design study.

CHAPTER 2

BACKGROUND OF THE PROJECT

CHAPTER 2 BACKGROUND OF THE PROJECT

2.1 Background of the Project

2.1.1 Overview of the Country

The Republic of the Philippines consists of about 7,000 islands with a total area of approximately 299,410 km^2. The total population was estimated to be 60.5 million in 1990 with a population density of 202 persons/km^2. The population growth rate was 2.35% per annum during past decade. Although this rate shows a considerable decrease as compared with 2.7% in the 1970s, the population pressure on the country's economy has remained unchanged; the population is expected to be over 100 million in 2012, assuming a population growth rate of 2.35%. The population over 15 years of age making up the labour force is about 38 million or about 62.6% of the total population. Real employment is, however, limited to only 37.1% of the total population or 59.3% of the total labour force. The share of the labour force involved in agriculture declined marginally from 50.0% in 1986 to 45.2% in 1990.

Economic development in the Philippines was depressed to a serious extent during the early 1980s because of less buoyant export market. However, economic growth has accelerated since 1986 and the economic growth rate grew by 6% annually for the three years from 1987 to 1989 with the main impetus coming from a strong recovery in personal consumption as a result of tax reform, higher wages, and the spending program of the Government. Despite the efforts of the Government, economic activities have again slowed down since 1990 due mainly to a major coup attempt, a drought and power shortage, the Middle East crisis and an acceleration in the inflation rate. GNP in 1990 was Peso 1,132,400 million at current market prices or Peso 18,419 (US$ 725) per capita approximately. The share of the agricultural sector in GDP came down from 24.0% in 1986 to 23.2% in 1990.

The Government's main source of revenue was taxes which amounted to 88%. Taxes have tended to increase. The tax revenue was characterized by a low portion of the taxes coming from income and profits and a high proportion from indirect taxes, such as customs and sales taxes,

which corresponded to more than 60%. The total debt services still account for a large portion of the total government expenditures, although it has dropped from 35.2% in 1986 to 29.3% in 1991.

The whole sale price index and consumer price index rose 7.8% and 6.0% annually from 1986 to 1989 but 1990 showed rapid annual increases of 19.5% and 16.6%, respectively. The increase in prices in recent years has been remarkable.

2.1.2 National Development Plan

GOP is currently executing a medium term national economic development plan covering the specific period from 1987 to 1992 with the following development targets:

1) To alleviate rural poverty;
2) To reinforce existing employment and to create further employment opportunities through development of the rural economy;
3) To realize social justice and fairness; and
4) To achieve sustainable economic growth.

Despite the efforts to implement the plan, the performance in 1989 reflected a slowing down of economic activities. There have been a widening of the trade and budgetary deficits, an acceleration in the inflation rate, and constraints due to droughts and power shortage. In 1990, due to natural disasters and the Middle East crisis, economic growth was constrained. As the above conditions were likely to undermine growth prospects in the remaining period, GOP updated the national plan to address those obstacles and ensure sustained recovery and economic growth.

The development strategies continue to address the same concerns as the original plan: 1) poverty alleviation, 2) economic development, 3) equitable distribution of opportunities, income and wealth, including the means of production, and 4) productivity and growth. The main points of the development strategy are employment-oriented, rural-based, and complementary relationship between agriculture and industry. Rural

development and equity distribution should be pursued through the provision of infrastructures, enhancement of social development, accelerated implementation of agrarian reform, and more committed efforts at decentralization.

2.1.3 Regional Development Program

In line with the updated medium term national development plan, the medium term development plan for Region VI was updated in 1990. For the remaining plan period Region VI will continue to pursue the following socio-economic goals: 1) alleviation of poverty, 2) generation of more productive employment, 3) attainment of sustainable economic growth, and 4) provision of a more just and equitable sharing of the benefits of development.

The regional economy is based mainly on agriculture. The bulk of the population reside in the rural area and rely directly on agriculture for their livelihood or are engaged in services that are linked to this sector. In specific terms, the urban-rural ratio is 28%. Consequently, in order to attain the socio-economic goals the first development strategy of Region VI is to increase the income and productivity of the agricultural sector. The increase in income of the agriculture sector as well as the surplus production would, in turn, generate supportive and complementary industries such as farm equipment manufacturing and food processing industries.

For these scenarios to materialize, the following issues regarding agriculture, land use, and land tenure will be required to be implemented effectively:

1) To expand production and to step up productivity in order to meet the domestic requirement for food;
2) To improve and stabilize farmers' incomes and welfare, and to stimulate employment;
3) To attain food adequacy with special emphasis on foodstuffs that help improve the nutrition and health standard of the nutritionally vulnerable;

4) To optimize land use and to sustain ecological growth by determining through scientific methods, the best possible farming unit area and the concomitant soil fertility management practices in varied land types;
5) To improve adaptive research and technology diffusion methods, upgrade post-harvest technology, expand and improve irrigation and drainage systems, and implement other rural works projects; and
6) To strengthen marketing, rural credit, rural based organizations and further rationalize the agrarian reform system.

2.1.4 Agricultural Setting in the Country

Despite the fact that the share of agriculture in GDP has declined significantly, agriculture, including fisheries, and forestry, is the predominant sector of the Philippine economy. In 1989, it accounted for Peso 226,698 million at current prices or 24.0% of GDP at 1992, constant prices employed about 9.9 million or 47.2% of the total employed in sectoral employment, and generated more than 60% of total foreign exchange earnings from raw and processed agricultural exports.

In the Agricultural Census in 1980, the total farm area in the country was 9.725 million hectares or 32.5% of the total country area and the total number of farmhouseholds was 3.42 million. Most Filipino farmers are small cultivators who do not own the land they cultivate: 55% are owner-operators, 34% are tenants, 6% are leaseholders, and others. The average farm size is about 2.8 hectares. About 86% of all farms are below 5 hectares, in contrast the remaining 14% occupy nearly half of the total farm area.

These facts have led to a low productivity and low economic growth in the agricultural sector, and have widened the income disparity between rural and urban areas.

From 1980 to 1989, the country produced an average of 61 million metric tonnes of agricultural products, however, total production remained at the same level. Paddy production increased by about 2.4% from 7.6 million tonnes in 1980 to 9.5 million tonnes in 1989 as a result of improved cropping intensities. Corn output rose considerably to 4.5 million tonnes

from only 3.1 million tonnes in 1980. This steady climb has enabled the hog and poultry industries to expand rapidly. On the other hand, other crops (except fruits and nuts) posted negative growth rates, in particular sugarcane declined substantially due to an unfavorable international market situation. The livestock and poultry subsector posted a high growth rate. This increase resulted largely from the continually increasing demand for the commodity by consumers. The fishery subsector, particularly aquaculture of prawn farming, also increased substantially.

The agricultural production by major crops in 1989 is shown in the following table:

Crops	Harvested Area (1,000 ha.)	Production (1,000 tonnes)	Unit yield (tonnes/ha.)
Rice	3,497.3	9,458.8	2.70
Corn	3,689.2	4,522.2	1.23
Coconuts	3,110.4	11,810.4	3.80
Sugarcane	261.7	17,590.8	67.22
Banana	293.1	3,190.3	10.88

Source: Selected Statistics on Agriculture, 1990, Department of Agriculture

2.1.5 Agricultural Policy

In consonance with the sustainable growth and equity goals of the Philippines Medium Term Development Plan, the objectives of the Agricultural Development Plan (1991~1995) formulated by DA are the following:

1) To increase the productivity and real incomes of small farming and fishing families;
2) To help ensure the productivity of agricultural resources in the long term;
3) To attain self-sufficiency in rice and corn for food security; and
4) To help attain a favorable balance of trade for the country.

To achieve these objectives, DA will address the following priority concerns:

(1) Increasing the productivity and real income

1) To empower small farmers and fishermen;
2) To improve the DA's capability to deliver the services needed by farmers and fishermen;
3) To create an economic environment conducive to higher agricultural productivity and incomes;
4) To develop and disseminate appropriate location-specific and cost-reducing production and post-harvest technologies;
5) To reduce the cost of production inputs, especially certified seeds, fertilizer, and irrigation, and to increase the availability of these inputs.

(2) Ensuring the long-term sustainability of agricultural resources

1) To formulate a land use policy consistent with the spirit of agrarian reform and optimize the use of agricultural resources;
2) To develop and disseminate ecologically sound technologies; and
3) To enhance the capability of local communities so that they can assume the principal role in protecting the resources within their locality.

(3) Attaining self -sufficiency in rice and corn for food security

1) To provide input assistance and subsidies;
2) To increase the availability of irrigation, certified seeds, and fertilizer;
3) To reduce post-harvest losses and to remove transport bottlenecks;
4) To implement an adequately funded and properly managed rice and corn procurement and distribution program; and
5) To limit rice and corn importation over time and to ensure that subsidized rice is made available to low-income groups.

(4) Attaining a favorable balance of trade

1) To increase agricultural export earnings;
2) To reduce importation of agricultural commodities which the country can produce competitively; and

3) To maintain and improve the access to foreign agricultural markets.

The plan is also designed to increase the agricultural Gross Value Added (GVA) by an average rate of 4.27% per year which is equivalent to an average growth rate of 5.27% per year in agricultural production. For food security purposes, the attainment of self-sufficiency levels in rice production is programmed for 1995. Thus, the average growth rate of rice production is planned to be about 4.1% annually.

In terms of priority, the top five commodities that will be supported by DA are: rice, corn, coconut, sugar, and livestock and poultry, in that order.

2.1.6 Outline of Rice Production, and Rice Action Program

(1) Outline of rice production

Agricultural land in the Philippines is estimated at 8.8 million hectares which is around 29% of the total land area. The proportion of paddy fields in the total agricultural land is estimated at 22%, ranging from 5% to 54% by region. The distribution of paddy fields by region shows that Region VI has the biggest share at 20%, Region III at 15%, both Region IV and II at 11%, and Region I at 9%, and these five (5) regions make up about 70% of the total paddy fields in the country.

The average paddy production between 1986 and 1988 was estimated at 8.9 million tonnes. The major paddy producing regions, Region III, VI, II, IV, I, and XII, produced 17%, 13%, 12%, 11%, 9% and 9% of the total paddy production of 8.9 million tonnes, respectively.

Of the total harvested area of paddy fields in the country, estimated at 3.4 million hectares, irrigated and rainfed paddy areas occupied 56% and 40%, respectively. The remaining 4% was upland paddy area. The average unit yield of irrigated paddy in the country between 1986 and 1988 was estimated at 3.2 t/ha. That of rainfed and upland paddy was 2.1 t/ha and 1.2 t/ha, respectively. The degree of extension of high yielding varieties (HYVs) in the irrigated land has influenced the present unit yield; unit yield

of HYVs of paddy exceed the traditional varieties (HYVs' unit yield was 2.58 t/ha while the unit yield for traditional varieties was 1.52 t/ha, based on the 1986 to 1988 average).

The Philippines achieved self-sufficiency in rice in the beginning of the 1980s, however, since 1984 the Government has had to import rice again. Supply and demand for rice for the 1985~1989 period are shown in the following table:

(unit: thousand tonnes)

Item	1985	1886	1987	1988	1989
Production	5,758.9	6,047.4	5,585.1	5,867.1	6,186.0
Import	538.1	2.1	0.0	181.4	220.0
Demand	5,689.7	5,787.0	5,916.2	6,105.9	6,454.1

Source: Selected Statistics on Agriculture,1990, Department of Agriculture

(2) Rice Action Program

One of the major development objectives in the agricultural sector is to attain self-sufficiency in rice and corn for food security. MASAGANA 99 started in 1973 was implemented successfully for fifteen years and increased rice production up to the level of self-sufficiency. This was largely brought about by enhancing the development of high-yield varieties at International Rice Research Institute (IRRI) and University of the Philippines at Los Banos (UPLB), improving the development ratio of irrigation projects, and making available packing technology for seeds, fertilizers, and agricultural chemicals. Consequently, RPEP was implemented from 1989 to 1990 and now the Rice Action Plan (RAP) is being implemented.

RAP is designed to initiate continuing actions to promote rice productivity and price stability over the long term. A description of the key activities under the program is given below:

1) To improve the availability of water for rice production;
2) To lower the cost and increase the use of fertilizer;
3) To increase the availability, reduce the cost, and increase the use of good quality seeds;
4) To reduce post-harvest losses now estimated at 5% to 30% of production;

5) To improve rice producers', processors', and traders' access to credit for rice production and marketing;
6) To maintain prices at levels equitable to both producers and consumers;
7) To reduce farmers' risk of crop failure due to force majeure; and
8) To intensify research and extension support for rice producers and processors.

2.1.7 Outline of Seed Production and Distribution

(1) Outline of seed production and distribution

The Bureau of Plant Industry (BPI) was designated as the lead agency to implement the seed production and distribution program of DA by virtue of Special Order No.298 in 1989, and is responsible for formulation, implementation, monitoring, and evaluation of the seed production and distribution program in the country. The organization chart of BPI is shown in Figure 1.

An outline of seed production and distribution in the country is given below:

1) Seed production and distribution policy and program

The seed production and distribution policies are stipulated through Executive Orders, Special Orders, Administrative Orders, and Memorandum circulars. The basic order for stipulating general policies on seed is the "Revised Policies and Guidelines on Seed Production and Distribution System", Administrative Order No.32, Series of 1988. The outline of this Order is as follows:

i) Production of breeder seeds shall be the responsibility of the institutions that developed the variety such as BPI, UPLB, IRRI, Phil Rice, Agricultural Colleges Association of the Philippines (ACAP), and other private agencies involved in the varietal improvement program.

ii) Purification and maintenance of breeder seeds shall be the responsibility of the plant breeder. A reasonable reserve of recommended varieties of breeder seeds should be maintained so that at anytime they can be used to replenish and restore foundation seed of the varieties desired.

iii) The seed farms or stations/institutions and seed growers designated to multiply different classes of seeds shall produce and maintain a 10% buffer stock, in addition to the seed production program targets, for contingency use.

iv) As a general rule, certified seeds shall be produced by members of the Seed Growers Association and the program shall recognize only one Seed Association in each province. However, in a province with five (5) or less seed growers, a farmer could be allowed to produce seeds which may be sold within his area if properly monitored and subject to the recommendation of seed coordinators.

v) Foundation seed shall be distributed to registered seed growers through the designated regional seed coordinator of DA.

vi) Registered seed shall be distributed to bonafide certified seed producers designated by seed coordinators.

vii) Only certified, tagged and sealed seeds shall be distributed.

viii) Only the varieties approved by the Philippines Seed Board (PSB) will be recommended for distribution.

ix) Designated regional seed coordinators shall be responsible for monitoring the seed distribution and production program of experiment stations, seed farms, private seed companies, and other seed production entities in their area.

At present, there are forty (40) agricultural experiment stations or seed farms involved in seed production. Except the four (4) National Crop Centers and Phil Rice, the other thirty-six(36) stations are directly managed

by the regional agricultural offices of DA. Regional seed coordinators designated in regional agricultural offices are planning and coordinating seed production and distribution activities at the regional level under close coordination with provincial seed coordinators, seed inspectors and seed grower associations. BPI holds a meeting at the headquarters in Manila every January to make a national seed production and distribution program for the year based on the regional plans.

2) Recommended new varieties, breeding and multiplication

PSB chaired by the Director of BPI is organized to promote and coordinate breeding activities in both public and private sectors. The Board is assisted by the Recommending Committee in formulating policies, rules, and regulations to promote national crop development programs. Under the Recommending Committee, the Technical Working group conducts tests in the experimental stations to evaluate and determine the performance of new crop varieties. The Recommending Committee submits the results of the evaluation of new varieties to the Board for its approval as recommended varieties for commercial plants.

Breeder seeds for rice are produced by Phil Rice, IRRI, ACAP, etc. The main participating agencies in rice seed production and distribution are be summarized as follows:

Seed Production Stage	Agencies
Breeder Seed	Phil Rice, IRRI, ACAP,and IPB
Foundation Seed	Eleven Experiment Stations/Seed farms including Phil Rice.
Registered Seed	i) Twenty-two Experiment Stations/Seed Farms ii) Selected seed growers in provinces without experiment stations.
Certified Seed	Private seed growers (Member of seed growers association)

3) Seed Quality Control

Seed quality control is a basic function of the seed certification program. The Seed Certification and Standard Group in the Technical Committee under PSB has the responsibility for technical matters on seed quality control. The Seed Quality Control Services (SQCS) Section under the Crop Production Division in BPI is designated as the executive agency for the seed certification program. SQCS also functions as a central office for seventeen (17) Seed Testing Laboratories (STL) located at a strategic point in each Region. SQCS has been conducting research on improvement and development of quality control techniques as well as training and workshops on seed pathology, seed production and distribution, processing and certification, etc.

The actual seed certification system is maintained and operated by both seed testing in STLs and field activities of seed inspectors.

(2) Seed Industry Development Act of 1992

Republic Act No.7308 known as the Seed Industry Development Act of 1992 (the Seed Act) was approved by President Corazon C. Aquino on March 27, 1992 which primarily designs to institutionalize, integrate, promote, and develop the seed industry in the Philippines.

The overall goal and objectives of the Seed Act are to produce an adequate supply of quality seeds in order to meet national seed requirements and increase farm productivity and income. The Act consists of twenty-three sections, and is summarized as follows:

1) Creation of National Seed Industry Council

To replace the existing PSB, the National Seed Industry Council (the Council) shall be created. The council shall be composed of nine (9) members; six (6) members from the government sector and three (3) from the private sector, the Secretary of DA as Chairman and the Director of BPI as Vice-Chairman and Executive Director.

The major functions of the Council are as follows:

i) To formulate policies for stimulating plant breeding activities;
ii) To encourage persons as well as institutions engaged in seed research and development, and distribution of seeds;
iii) To promote the establishment of infrastructure and other support services for accelerating the development of the seed industry;
iv) To formulate a comprehensive medium and long-term national seed industry development program for achieving self-sufficiency in the supply of high quality seeds;
v) To promulgate rules and regulations to implement the provision of this Act.

Under the Council, both a Council Secretariat and a Technical secretariat shall be created in BPI. The former is to provide the necessary administration, secretarial, and other support services to the Council, and the latter is to assume the functions of the existing PSB Technical Working groups; such as the establishment seed standards and procedures for varietal identification, evaluation, nomination, review and approval for registration.

2) Creation of National Seed Quality Control Services

To safeguard against the distribution of inferior quality seeds to farmers National Seed Quality Control Services shall be provided which shall be constituted in BPI to undertake control and supervision of field inspections, control services, and seed testing laboratories which shall be established by BPI in various part of the country.

All personnel, funds, and equipment of the existing SQCS of BPI, the seed quality control services, and the field inspection services of DA shall be transferred to the National Seed Quality Control Services.

The major functions of the National Seed Quality Control Services are as follows:

i) To formulate plans and seed quality control programs including seed testing, seed certification, and other quality control schemes that may be developed;

ii) To sample and conduct seed analysis;
iii) To conduct field inspections of seed crops, seed storages, and processing facilities;
iv) To conduct other related activities such as seed research and seed technology training;
v) To collect reasonable fees for testing of seeds and inspection of crop fields and facilities ; and
vi) To supervise and coordinate all official seed testing laboratories in the regions and provincial satellite laboratories, and seed certification in all provinces.

3) Adoption of Seed Industry Development Program

The Council shall adopt within ninety (90) days after it has been constituted, a Seed Industry Development Program which shall be implemented by its constituent agencies.

The constituent agencies involved in the Program and their responsibility are as follows:

i) In order to produce a sufficient quantity of breeder, foundation and registered seeds of all varieties developed by the Government sector, a National Seed Network shall be established at BPI and major agricultural colleges and universities;
ii) DA shall have the overall task of directing and coordinating the seed industry;
iii) The Regional Directors of DA's field office shall be deputized as the Regional Seed Industry Development Coordinators by the council in order to deliver services to the clientele and establish a mechanism to carry out the provision of Seed Act;
iv) BPI shall have direct responsibility for the production and implementation of the program including but not limited to testing laboratories and certification services;
v) The University of the Philippines at Los Banos through IPB shall improve genetic resources conservation and in-vitro mass production of planting materials; and

vi) Phil Rice shall develop appropriate rice varieties (designed under Philippine conditions), propagate them into breeder, foundation, and registered seeds, and extend all necessary technical assistance

4) Funds of the Council

The Seed Fund created in the general fund shall be obtained from the following sources:

i) Five million pesos (P 5,000,000.00) to be appropriated out of any funds in the National Treasury not otherwise appropriated;

ii) The existing Seed Fund;

iii) Revenue from the sales of certified seeds including but not limited to the income derived from products from research stations and seed farms, seed processing and testing fees for the issuance of permits to seed growers/ products, etc;

iv) Donations from private or government agencies either domestic or foreign.

2.2 Outline of the Request

(1) Background of the Request

The Philippines' economy is fundamentally based on agriculture which provides employment for nearly 50% of the total labour force and accounts for about 30% of GDP and more than one third of total export earnings.

Notwithstanding the potential of agriculture in the Philippines, however, agricultural output per capita has declined through the 1980s. This tendency has had a serious implication on the country's ability to produce enough food for its burgeoning population. In particular, the production of rice and corn crops has not kept pace with the growth of consumption in recent years. As a result, about 180,000 tonnes and 220,000

tonnes of rice were imported in 1988 and 1989, respectively, and a much larger quantity has been foreseen in the near future.

GOP has placed priority to the agriculture sector (in the successive national development plans) and implemented an agricultural policy in which the primary objective is to obtain self-sufficiency in rice and corn. However, during the past decades, the land suitable for agriculture has been limited due to rapid disafforestation and environmental disruption. Besides, agricultural lands have continued to steadily and gradually decrease as farmlands have been converted into residential housing and industrial state areas. In order to support the food requirements of the country, the strategy is to maximize production yield per unit area using appropriate production technology such as improved farm management practices, effective irrigation and drainage systems, proper and timely application of fertilizers and pesticides, and use of quality seeds. Among others, the use of high quality seeds of superior varieties is a critical element in increasing production and profitability of the farmers.

Therefore, DA has been promoting the seed industry in the country, establishment of a stable supply system for high quality seeds, as well as appropriate countermeasures from production, storage to marketing and distribution because these are essential and crucial to increase production and productivity and thereby to increase farm family income.

The Philippines, however, has the following constraints on the increase in supply of high quality seed :

i) An unstable supply of foundation and registered seeds caused by insufficient field infrastructure and technical facilities;
ii) Deterioration of seed quality due to improper seed processing and storage facilities;
iii) Weak organization of seed marketing and distribution systems; and
iv) Low extension of high quality seeds due to farmers' limited understanding.

Taking the above into consideration, GOP requested GOJ to undertake a Feasibility Study on Improvement of Seed Production and Distribution,

and Establishment of Appropriate Seed Storage System in September 1987. The Study was carried out from November 1989 to October 1990, and identified the basic improvement plan for seed production and distribution, and proposed the model area improvement plan for rice, corn, and peanut crops. Encouraged with this and intending to realize the model area improvement plans, GOP requested grant aid from GOJ for the Project.

(2) Details of the request

The initial request from GOP consisted of i) strengthening of the seed related facilities in BPI Head Office in Manila, ii) improvement of seed production in each model area for rice(Region VI), corn(Region XI), and peanut(Region II), and iii) improvement of the seed production associations in each model area.

As stated in Chapter I, however, the Preliminary Study Team dispatched by JICA in February 1992 confirmed and roughly decided the Project scope through discussions with officials concerned from GOP. The request covered i) strengthening of the seed related facilities in BPI Head Office, ii) improvement of seed production in Visayas Experiment Station (VES), and iii) improvement of seed production associations in the rice model area. The details are given below:

(1) Strengthening of the seed related facilities in BPI Head Office
   1) Construction of a seed storage facility
      - Floor area : 1,370 m^2
      - Facilities : air conditioning, seed processing
      - Equipment : fork-lift, vehicles for transportation
   2) Construction of a seed testing laboratory (with screen house)
      - Area : 1,824 m^2
   3) Procurement of seed quality control equipment
      - Equipment : equipment for seed testing and training, vehicles for field inspection, etc.

(2) Improvement of seed production in VES
   1) Construction of a seed storage facility
      - Floor area : 2,030m^2 (Storage: 1,370m^2, Plant Build.: 660m^2)

2) Construction of a seed testing laboratory
   - Floor area : 500 m^2
3) Procurement of seed quality control equipment
   - Equipment : equipment for seed testing and training, vehicles for field inspection, etc.
4) Improvement of the seed processing plant
   - Seed dryers : 3.5ton/day : 6 units
   - Seed processing : 2.0ton/hr :1 unit
5) Improvement of the seed production farm
   - Development of water resources, and rehabilitation of irrigation facilities
6) Procurement of equipment related to seed production and distribution
   - Farm machinery
   - Workshop and motor pool

(3) Improvement of Seed Production associations in the model area
   - Seed storage
   - Seed processing plant, etc

2.3 Outline of the Model Project Area

2.3.1 Location and Physical Profile

Region VI, also known as the Western Visayas Region, is located in the center of the Philippines. The Region is composed of six provinces, namely, Aklan, Antique, Capiz, Iloilo, Guimaras, and Negros Occidental. The model project area, however, consists of five provinces, Negros Occidental has been excluded. There are 2 cities, 97 municipalities, and 3,386 barangays in the model area. The city of Iloilo is the regional center.

The islands comprising Western Visayas exhibit similar physical features characterized by relatively wide stretches of rivers and coastal lowlands and a series of rugged hills and mountain ranges in the interior. In Panay island, Mount Madia-as is the highest mountain at 2,117 meters above sea level. The Jaraur River is the main river in Panay, but its flow is greatly reduced during the dry season due to the continuing denudation of the watershed areas.

The model area has a total land area of 12,297 km^2. Land use data as of 1988 show that 44 % (5,476 km^2) of the area is devoted to cultivation, mainly annual crops of which rainfed or irrigated paddy covers the majority of the area, Pasture land, including grassland and shrubland, covers 38% (4,673 km^2), forest land comprises 12% (1,476 km^2), wetlands i.e. fishponds and mangroves, account for about 4% (492 km^2), and various other lands for 2% (180 km^2).

Generally, the model area has a humid and moist climate, though some areas, especially the upper half of Panay, experience the west type of climate. Higher rainfall occurs from June to November when there are more than 15 rainy days per month. Lower rainfall and smaller number of rainy days are observed during the remaining months.

2.3.2 Demographic and Socio-economic Conditions

Based on the results of the 1990 Census on Population and Housing, the total population in the model area is about 3,136,000 or approximately 5.2% of the national population. Between 1980 and 1990, the population grew by 1.7% per year. The total number of households as of 1990 is estimated at 573,000. The overall density is 267 persons per square kilometer, Iloilo is the most dense by populated province (349) and Antique as the least dense (161). With respect to migration pattern, Region VI has been an out-migration region.

The Gross Regional Domestic Product (GRDP) for 1990 amounted to P50.068 billion (at constant 1985 prices) posting a growth rate of 1.86% for 1989-90. Per capita GRDP was P9,283. Among the three economic sectors, namely, agriculture and forestry, services, and industry, the services sector which accounted for 42.7% of GRDP for Region VI provided the largest contribution to the regional economy while the agriculture and forestry sector accounted for 34.0%. The industry sector accounted for only 23.3% of GRDP, but posted the highest annual growth rate.

Data on agricultural land use show that rice occupies around 260,000 ha or 46.8% of the total cultivated land (547,600 ha.) in the model area while sugar-cane covers about 174,000 ha or 31.3%. The other major agricultural crops are coconut, corn, bananas, mangos, and coffee. Over the years, the

aggregate acreage devoted to aquaculture farms and plantation crops have considerably increased due to the increase in demand for prawns, coffee, mangos, etc. in the world market.

Livestock and poultry production have shown positive growth in recent years. Livestock and poultry production in 1990 amounted to 1,192 heads and 7,143,000 heads, respectively.

2.3.3 Infrastructure

The highway network in the model area covers a total length of about 8,288 km. There are about 30 public and private ports operating in the area. The port of Iloilo is classified as a port of entry open to international shipping, while the rest are open to domestic shipping only. The ports of Dumaguit (Aklan) and Culasi (Antique) are classified as secondary ports while the ports of San Jose (Antique) and Estantia (Iloilo) are classified as tertiary ports.

The model area has 5 airports, 2 of which are classified as trunk-line (Iloilo and Roxas City), 2 as secondary (Kalibo in Aklan and San Jose in Antique), and 1 as feeder in Caticlan, Malay, Aklan which serve Boracay Island.

The area is supplied with electric power from the Panay Grid which is composed of the Panay Diesel Power Plant, Iloilo; Panay Diesel Power Plant II in Panitan, Capiz; Power Plant Barge Nos. 3 and 4; and Panay Electric Co. The total generating power capacity of Panay grid was 52.5MW, as of December 1991.

As for water supply, there are 6 major waterworks systems and quite a large number of level III waterworks systems in the model area. Furthermore, through the Barangay Waterworks Program, small communities in the area have acquired potable water from pumps and artesian wells. These water supply facilities service 67% of the rural population and 82% of the urban population.

2.3.4 Present Condition of Rice Production in the Model Area

Paddy field is estimated at 199,350 ha (Cropped area a year : approx.360,000 ha) which correspond to around 16.2% of the total land area of the model area. There are about 115,800ha of irrigated paddy and 243,800ha of rainfed paddy. In addition to this, there are about 10,000ha of upland paddy field.

Paddy crop is planted in the wet season (June, July ~ Sep.,Oct.) and dry season (Nov., Dec.~Feb.,Mar.). Planting method of lowland rice is shown in Table 1 in the model area.

The planted paddy area in the model area is estimated at 359,680ha taking the 1987 to 1989 average. Among the provinces Iloilo is the largest paddy growing province (57% of the total paddy area) followed by Capiz province. Paddy production, 1987 to 1989 average, in each province is as follows:

Province	Harvested area(ha)		Production (t)		Yield (t/ha)	
	Wet	Dry	Wet	Dry	Wet	Dry
Aklan	17,350	18,260	40,790	39,610	2.4	2.2
Capiz	41,020	41,200	114,270	97,040	2.8	2.4
Antique	23,050	14,450	57,680	34,260	2.5	2.4
Iloilo*	117,930	86,420	307,360	194,710	2.6	2.3
Total	199,350	160,330	520,100	365,620	2.6	2.3

Note*: including Guimaras Pro.

2.3.5 Present Condition of Rice Seed Production in the Model Area

(1) Production of foundation and registered seeds

VES which is located in Leganes, Iloilo about 9 kilometers north of Iloilo city, has two functions: one is to conduct the research on rice; the other is to multiply high quality rice seeds. The Station produces foundation and registered seeds needed in Region VI in wet and dry seasons.

The total area of the Station is 62.8ha, and its is composed of the following:

Compound	6.5ha
Roads	2.6ha
Irrigation Facilities	4.3ha
Research Projects	7.3ha
Production Projects	39.5ha
Others	2.6ha
Total	62.8ha

Although it varies year to year, recently the Station multiplies foundation seed of IR 60, 70, 72, 74 on 2ha of field, registered seed of IR 36, 58, 60, 64, 68, 70, 72, 74 on 30ha in the wet season, and registered seed of IR 36, 60, 70, 72, 74 on 5ha in the dry season. In VES 39ha of field are available for production of seed in the wet season but this area is limited to only 5ha or below, owing to water shortages, in the dry season. Therefore most of the registered seed production depends on the efforts of the selected rice seed growers. Actual seed production by varieties is shown in Table 2.

Average yield in the Station was 1.7t/ha for foundation seed and 2.5t/ha for registered seed, however, this average includes one particularly bad year and it is reported that 2.9 ~ 3.2t/ha are produced in a normal year. In the 5 years from 1984 to 1988 the Experiment Station produced 11.8 tonnes of foundation seed and 71.1 tonnes of registered seed, while in addition to this 132 tonnes of registered seed were produced by selected seed growers.

(2) Production of certified seed

Certified seed produced from registered seed is basically multiplied by private seed growers. Rice seed growers are selected from diligent farmers producing paddy crop and assigned as seed growers by the seed coordinators.

In the 5 year period from 1984 to 1988, 1,196 tonnes of certified seed were produced from 723 ha. However, the production areas as well as the number of seed growers have increased remarkably in late years. As of December 1991, the number of seed growers and the total area of certified seed production in the wet season by province are as follows. The area in the dry season is estimated to be one third of that:

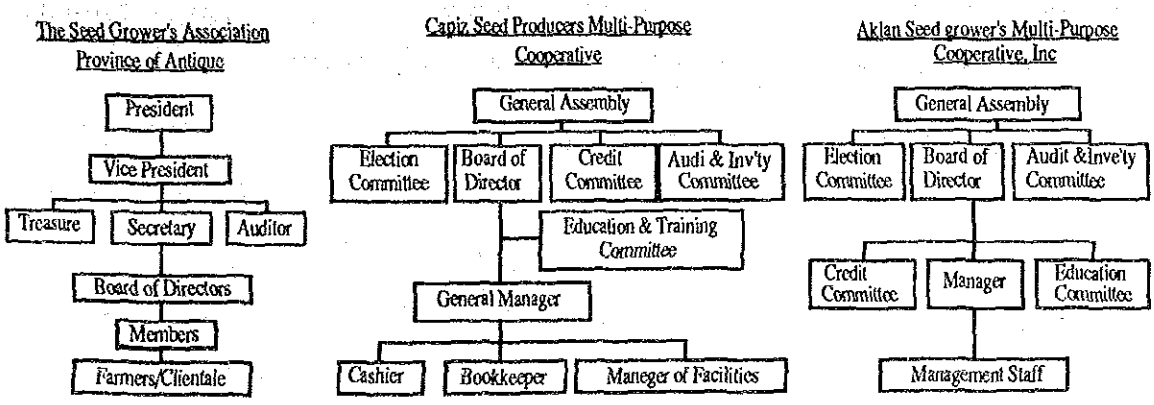
Provinces	Production area in wet season	No. of seed growers
Aklan	159ha	26
Capiz	187ha	41
Antique	162ha	20
Iloilo	492ha	65
Guimaras	65ha	12
Total	1,065ha	164

Source: Regional Office of DA

Seed growers' production fields vary 1~ 4 ha by grower. Generally, several varieties (2 ~ 5) are grown by each grower, especially IR 36, 64, 70, 72, and 74 varieties which are mainly grown because of their favourable traits. The average yield of the seed growers is estimated at 4.0 ~ 4.3 t/ha. Certified seed is recognized widely to be superior to non-certified seed. The yield for non-certified seed is reported to be 70 ~ 80 % of certified seed under the same conditions.

The Seed Producers Associations (SPA) have been grouped, since 1986, by province which in turn are federated at a regional level. Basically the main activity of SPA is the coordination of members to produce the certified seed required by the farmers. In relation to the demand for certified seeds in the province or region, the association, in coordination with the regional seed coordinator and seed inspector, determines the varieties requirement to be produced and distributed on the basis of the seed production program.

The formal name of seed producers associations and their organization in each province are as follows:



(3) Present condition of seed quality control

The seed testing laboratory located in the VES is one of the 18 seed testing laboratories (STL) scattered strategically throughout the country, and conducts the following seed quality control services in Region VI:

- Seed testing section:
  seed analyses, issue of seed testing certificate, spot inspection on seed fields and facilities, etc.
- Seed certification section:
  inspection of seed growers' fields, sampling for seed testing, issue of certification tag, etc.
- Research & training section:
  research and training on seed production and distribution.

Seed testing and certification are the main services provided by STL, and at present, 17 persons, consisting of 8 seed analysis, 3 seed inspectors, and 6 skilled staff, engage in seed testing and certification activities. Seed certification is mainly done by seed inspectors at seed grower's fields. The numbers of seed inspectors by province in the model area are 2 in Aklan, 2 in Capiz, 1 in Antique, 1 in Guimaras, and 4 in Iloilo except ones in STL. Seed inspectors have been working under the supervision of the provincial seed coordinators within the administrative organization, while for technical matters they cooperate with STL. The most serious constraint in performing field inspections and test sampling is the lack of transportation facilities for inspectors.

The following table shows the results of seed certification in the model area in 1991. The major reason for rejection of seed certification is low germination caused by insufficient drying, i.e. high moisture contents, which it is found to occur during the wet season, particularly.

(Unit: Cavan(40kg), ( )=Sample numbers)

Province	Foundation	Registered	Certification	Good	Rejected	Total	Pass Rate(%)
VES	182	1,373	136		90	1,789 (69)	95.0
Iloilo		1,118	17,312	142	1,845	20,417 (184)	91.0
Aklan		618	7,343		851	8,812 (58)	90.3
Antique		600	7,253		735	8,588 (70)	91.4
Capiz		536	4,720	112	1,305	6,673 (66)	80.4
Total	182	4,254	36,764	254	4,826	46,279 (447)	89.6

Source: Visayas STL

2.3.6 Seed Requirement of the Model Area

The seed requirement for paddy crop is estimated based on average harvested area for the three (3) years from 1987 to 1989 and basic factors mentioned:

Seed rate (kg/ha)	
- Transplanting (20%)	40
- Direct planting (80%)	120
Renewal rate (%)	20
Average yield (t/ha)	
- Foundation seed	3.15
- Registered seed	3.20
Buffer stock (%)	
- Foundation seed	100
- Registered seed	20
- Certified seed	10

Required seed of paddy in the model area is as follows (see Figure 2):

Seeds	Wet Season		Dry Season	
	Quantity	Pro. area	Quantity	Pro. area
Foundation	1.7t	0.5ha	1.4t	0.4ha
Registered	68.4t	21.4ha	55.2t	17.3ha
Certified	4,561.0t	1,425.0ha	3,669.0t	1,146.0ha

CHAPTER 3

OUTLINE OF THE PROJECT

CHAPTER 3 OUTLINE OF THE PROJECT

3.1 Objective

Rice is a mainstay of agriculture in the Philippines, and has a very important role in the economy of the country. Increasing rice productivity is absolutely necessary not only for providing food for the nation but also for increasing small farmers' income and standard of living. GOP has placed priority to the agriculture sector in the successive national development plans, and implemented an agricultural policy in which primary objective is to attain self-sufficiency in rice and corn.

However, the farmers have been slow to improved high quality seed varieties due mainly to the many constraints for the increase in supply of high quality seeds. GOP has attempted to eliminate such constraints through enacting the Seed Act as well as enhancing the authority and the responsibility of BPI. BPI also intends to promote an effective and planned seed policy and measures through the implementation of the Medium Term National Seed Program coordinated with national development plans.

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

3.2 Study and Examination of the Project

3.2.1 Justification and Examination of the Project

An assessment of the request from GOP, the content of which is explained in Chapter 2, was made to examine the viability of the Project under Japan's grant aid from the viewpoint the national development, agriculture, and the condition of the model area. The results of the assessment are summarized below:

(1) Significance of the implementation of the Project in the context of the national development plan

The new emphasis on the development of agricultural policies, priorities, and programs of action as outlined in the Medium Term Development Plan (1987 ~ 1992), is focused on the following objectives:

a. To increase farmers income;
b. To sustain the increase in farm productivity;
c. To attain food self-sufficiency; and
d. To create/increase agro-based employment opportunities among the rural population.

In order to increase farmers' income, increase farm productivity, and attain food self-sufficiency, one of key strategies is to expand the utilization of high quality seeds through strengthening their production, for the following reasons:

1) The utilization of high quality seeds of superior varieties is a critical element in increasing productivity and profitability of farm management. As an input, high quality seeds of superior varieties seldom exceed 5% of the cost of paddy production while in many cases they contribute to an increase in production and profitability by as much as 10% or more in the Philippines.

   However, only about 10% of farmers have adopted high quality seeds of improved rice varieties due mainly to the limited access to these seeds as well as the insufficient extension and campaign to farmers. The Government, therefore, needs a seed program to promote the use of improved quality seed varieties, and to improve the seed production and distribution system.

2) In the Agricultural Development Plan (1991 ~ 1995), GOP has set up a target to increase rice production from 9.4 million tonnes in 1989 to 11.75 million tonne in 1995.

   However, land that is suitable for agriculture has been limited due to rapid disafforestation and environmental disruption during the past

decades. Besides, agricultural lands have contribute to steadily and gradually decrease due to the conversion of farmlands into residential housing and industrial state areas. In order to increase production, increasing rice yields through better availability and more efficient use of water, fertilizer, and high quality seeds is essential and crucial.

The five-year medium term plan of the National Seed Program (1991~ 1995) aims to increase the paddy cropping area of 460,000 ha planted with certified seeds in 1990 to 1,400,000 ha planted with certified and good seeds in 1995, and intends to increase the use of certified seeds from 463,000 cavans in 1990 to 960,000 cavans in 1995.

(2) Contribution for strengthening BPI's implementing structure on the Seed Act

The seed production and distribution policies are generally stipulated through various orders such as Executive Order, and Administrative Order. However, Republic Act No.7308 known as the Seed Industry Development Act of 1992, approved by President Corazon C. Aquino on March 27, 1992, is primarily designed to institutionalize, integrate, promote, and develop the seed industry. Pursuant to the Seed Act, the competence and functions of BPI are further clarified and strengthened, particularly in the areas of seed production and distribution as well as seed quality control. BPI, however, requires not only an increase of staff but also a reinforcement of seed related facilities. The implementation of the Project would greatly contribute to the reinforcement of the facilities.

(3) Support for the Comprehensive Agrarian Reform

Another important aspect of the seed industry is its linkage and coordination with the Comprehensive Agrarian Reform Program (CARP). This program aims at improving the social and economic conditions of tenant farmers in rural areas through the establishment of owner cultivated economically sized farms, promotion of agro-industry for increase in employment opportunities, and development of social and economic infrastructure as required. In the agrarian reform law, it has been set forth that beneficiaries of the agrarian reform shall amortize the allocated land

and pay the land charge within 25 years. Therefore, to achieve land amortization and financial self-reliance of these farmers, increase of farm production and upgrading of farm productivity are indispensable. The agrarian reform law also stipulates that wide-ranging support services should be provided for beneficiary farmers. Such services include provision of seeds free of charge. Thus, the Project will contribute to agrarian reform indirectly.

(4) Countermeasures against natural calamities

Due to its geographic location, the Philippines suffers frequently from natural calamities, such as typhoons and droughts. Procurement and distribution of certified seeds in order to rehabilitate the destruction of crops in the case of natural calamities is an additional undertaking. The Disaster Coordinating Committee headed by the Defence Secretary will implement the emergency seed procurement and distribution activities on the national level under the coordination from BPI and DA regional and provincial agricultural offices. In order to assure the governmental procurement of high quality seeds, DA issued Administrative Order No. 32 in which rules that every seed grower shall store a buffer stock of seeds (10% of their total production target). The warehouses for storing buffer seed in good condition have not been adequately established, both in governmental and private sectors. The implementation of this project contributes to the improvement of the above situation.

(5) *Building up a closer connection with Phil Rice*

Increased rice productivity is indispensable to maintain sufficient rice production to cater for the growing population and decreasing rice fields. For this purpose, research programs such as varietal improvement and fertilizer management need to be advanced promptly. Phil Rice created through Executive Order No. 1061 has been promoting such research programs since 1985. Phil Rice has been receiving Japanese Grant Aid and technical assistance since 1992 for strengthening the research activities. However, without adequate multiplication stages and distribution of recommended rice seed varieties, this research would not be effective in attaining self-sufficiency in rice. The Project aims to strengthen and improve the production, multiplication, distribution, and quality control of

seeds developed by breeding institutions such as Phil Rice for increasing rice production in the Philippines. This will ensure that GOJ will continue consistent cooperation.

3.2.2 Examination of the Project Implementation and Operation and Maintenance Plan

BPI will be responsible for implementation of the Project. To smoothly manage and operate the Project, a BPI-JICA Project Office will be established under the Director of BPI, and manage the overall activities of the Project. Besides, National Seed Quality Control Services, Crop Production Division, and Agricultural Engineering Division of BPI will be involved in the Project works. As for the implementation of the Project works in the model area, in addition to these bureaus, VES, Seed Testing Laboratory in Region VI, and regional and provincial agricultural offices also will be involved.

After completion of the Project works, the Project facilities will be transfered to the respective operation and maintenance bodies as described below:

(1) BPI's Head Office facilities in Quezon City

The National Seed Quality Control Services (NSQCS) which will replace the existing Seed Quality Control Services (SQCS) under the Crop Production Division in BPI will move from BPI headquarters in Manila to an existing nursery site in Quezon City. The functions and activities of NSQCS will be greatly strengthened by virtue of the Seed Act. BPI now intends to double NSCQS's staff of 23 in 1993, as shown in the table below, and by the year 2000, the number of staff is planned to be 70.

Number of Personnel	1993	1994	Increase
NSQCS	23	43	20
Seed storage/ processing plant	14	14	0

The following table shows the budget of SQCS in 1991 and 1992, and the draft budget of NSQCS in 1993:

(unit: 1,000 Peso)

Items	1992	1993	1994
Personnel Services	500	500	2,195
Travel & Communication	260	260	415
Repair & Maintenance	233	233	300
Suppl. Material & Transp	1,387	1,387	1,935
Water, light & Gasoline	213	213	320
Total	2,593	2,593	5,165

Source: BPI

NSQCS's laboratory and warehouse, constructed under the Project, will be operated and maintained by BPI at BPI's headquarter facilities. The operation and maintenance costs of the Project will be necessarily adjusted in the 1994 budget and thereafter, but the Department of Budget and Management will take a preferential measure since this Project is regarded as a high priority project by GOP.

An annual operation and maintenance cost of seed storage and vehicle is estimated as follows (Details are shown in Table 3).

i) Seed Storage : Peso 51,400
ii) Seed drying Plant : Peso 1,400
iii) Vehicle : Peso 62,800

(2) The facilities in VES

The organization chart of VES is shown in Figure 3, and the present and planned staff who will be involved in the seed production are as follows:

Personnel	1992	Planned	Increase
Agriculturist	9 (24)	10	1
Agri. Technologist	3 (6)	6	3
Utility Worker	0 (10)	7	7
Worker	10 (15)	10	0
Total	22 (55)	33	11

Note : ( ) is including testing section.

The following table shows the budget of VES in 1991 and 1992, and draft budget in 1993.

(Unit: 1,000 Peso)

Items	1991	1992	1993
Personnel Services	2,118	2,153	-
Travel & Communication	49	43	-
Repair & Maintenance	43	38	-
Suppl. Material & Transportation	740	658	-
Water, light & Gasoline	249	221	-
Total	3,199	3,095	3,293

Source: Regional Agricultural Office

After completion of the Project works, the following Project facilities will be operated and maintained by the Station. The respective yearly operation and maintenance cost of each Project component is estimated below (Details are shown in Table 3). To smoothly manage and operate the constructed facilities, DA and/or BPI should take such budgetary measures as are necessary.

i)	Seed Processing Facilities	:	Peso	88,300
ii)	Seed Warehouse	:	Peso	25,700
iii)	Irrigation system	:	Peso	77,720
iv)	Agricultural Machines	:	Peso	194,500
v)	Water Supply System	:	Peso	84,315

The seed processing facilities and seed warehouse constructed in the Station under the Project shall be open to the seed growers in Iloilo province. The Seed growers shall pay a charge for using facilities determined by DA.

(3) Seed Testing Laboratory in Region VI

In order to strengthen the activities of seed quality control services in the model area, the regional STL's staff is planned to be increased as follows:

Personnel	1992	Planed for 1993	Final Stage
Chief of STL	1	1	1
Seed Analyst	7	9	10
Seed Inspector	4	4	8
Agri. Technologist	1	5	5
Utility	1	7	7
Driver (casual)	1	2	2
Total	15	28	33

Source: STL in Region VI

The budget for STL is firstly requested by DA, transfered to the regional office, and then allocated to STL. The following table shows the budget of regional STL in 1992 and 1993, and the draft budget in 1994:

(Unit: 1,000 Peso)

Items	1992	1993	1994(Request)
Personnel Services	821	821	1,642
Travel & Communication	125	185	2,120
Repair & Maintenance	24	45	51
Supply Material & Transportation	95	61	70
Water, light & Gasoline	74	172	196
Total	1,139	1,284	4,052

Note: the budget of 1991 was subjected to a cut of 35%.
Source: Region VI, STL

Under both plans for staff and budget mentioned above, STL intends to implement the following seed certification activities in 1993:

Number of Samples	969 samples
Approved Foundation Seed	1,500 cavans
Approved Registered Seed	5,800 cavans
Approved Certified Seed	211,360 cavans

(4) Seed storages and processing facilities for the seed growers in the model area

The seed storage and processing facility constructed/provided in the provinces under the Project will be property of BPI. The actual management of these facilities, however, will be entrusted to the each DA's provincial office. A lease contract on the facilities will be made between the

provincial office and the seed growers association in each province. In order to sufficiently maintain the function of the constructed facilities, one seed inspectors in each province will be nominated as the person in charge of management. The above organizational arrangements by BPI will be carried out before completion of the facilities.

A charge for using the facilities will be determined by the seed growers associations taking into account an annual operational and maintenance cost. The yearly cost for electricity and fuel needed for the operation is estimated as follows (Details are shown in Table 3):

Aklan	:	Peso 78,400
Capiz	:	Peso 92,600
Antique	:	Peso 80,200

The following table shows the related agencies for each Project component during the implementation stage and after completion of the Project.

Project Component	Related Agency for Project Implementation	Agency for Maintenance
(1) BPI's Head Office		
Seed Storage	DA	BPI
NSQCS	DA	BPI
(2) VES		
Seed Storage	RDA, VES	VES
Seed Processing	RDA, VES	VES
Workshop	RDA, VES	VES
Irrigation Facilities	RDA, VES	VES
Water Supply	RDA, VES	VES
(3) Regional STL	RDA, STL	STL
(4) Seed Growers Association	RDA, PDA	Seed Growers Association

Note: RDA; Regional Agricultural Office,DA
PDA; Provincial agricultural Office,DA

3.2.3 Examination of the Project Components

The Project will basically consist of the following three components:

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

2) Improvement of seed production in VES; and
3) Improvement of Seed Production association in Capiz, Aklan, and Antique.

The results of examination of the Project components are summarized as follows:

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

BPI was designated as the lead agency to implement the seed production and distribution program of DA by virtue of Special Order No. 298 in 1989, and has the responsibility for formulation, implementation, monitoring, and evaluation of the seed production and distribution program in the country. BPI also has the responsibility for working out countermeasures in emergencies when the country suffers from seed shortage due to natural calamities, etc. The competence of BPI on the seed production and distribution program, however, has been weakened and reduced under the recent decentralized policy in which agricultural experiment stations, seed farms, and seed testing laboratories have been transferred to the control of the regional offices of DA.

However, the Seed Industry Development Act of 1992 has clearly strengthened BPI's competence and functions: namely, i) direct responsibility for the production and distribution of breeder, foundation, and registered seeds of crop varieties developed by the government sector, ii) creation of both the Council Secretariat and the Technical Secretariat in BPI, under the National Seed Industry Council, iii) creation of National Seed Quality Control Services in BPI, and iv) direct responsibility for the implementation of seed Programs, including the management of the existing research stations and seed farms, seed testing laboratories, and certification services under self reliant management schemes.

With the strengthening of the organization and functions stated above, BPI has been under pressure to increase its staff and to improve/construct required facilities. The draft budget for the 1993 fiscal year has been requested by BPI and necessary adjustments for personnel services and working expenses in the budget have been made, however, BPI has expected to improve/construct such facilities as seed storage, and a seed

quality control laboratory including procuring equipment under Japanese Grant Aid.

The existing area of BPI in Manila is so small that facilities/buildings needed for implementing the Seed Act could not constructed or enlarged. BPI intends to construct a Seed Storage facilities and a National Seed Quality Control Services Laboratory within the existing BPI's nursery site at Diliman, Quezon City, and to utilize the STL's existing building as office space for new organizations such as the Council Secretariat.

Taking the above BPI's activities into account, the results of examination of the existing facilities and equipment of BPI are as follows:

a) Construction of NSQCS

BPI's functions covering NSQCS are stipulated clearly in Chapter 12 of the Seed Act. The main functions are divided into three (3): the first is to formulate the plans and programs on seed quality control services and the activities on seed testing and seed certification; the second is to sample/conduct seed analysis on exported and imported seeds as well as on breeder, foundation, and registered seeds sent from breeding institutes, etc.; and the third is to conduct other activities such as seed research and seed technology training.

NSQCS under BPI created by the Seed Act have jurisdiction overall seed testing laboratories and field inspection services throughout the country. In order to expand activities on seed quality control and promote uniformity for implementation of seed testing and seed certification rules and regulations to be promulgated under the Act, there is a need to upgrade NSQCS of BPI to maintain accuracy and high standards of service to serve agriculture efficiently, effectively and promptly. Further improvement is then needed in infrastructures, equipment, vehicles, training and retraining of seed related personnel, and facilities for research in seed quality.

The performance of the services in existing SQCS, and the major services expected under NSQCS are as follows:

Seed Testing and certification: The samples received and quality tests determined by the Central Seed Testing Laboratory under SQCS are shown in the below table. The routine quality tests carried out were germination percentage, moisture content, seed health, purity, vigor tests and others. The new NSQCS will also conduct routine quality tests such as germination and purity moisture content. Seeds to be tested will involve primarily rice, some legumes, vegetable crops, and plant materials totalling more than 100 species. In seed health testing, determination of seedborne viruses in legumes will be given top priority as well as indexing of citrus for systemic diseases.

	1989		1990		1991	
Items	No. of Samples	No. Tested	No. of Samples	No.Tested	No. of Samples	No.Tested
Rice	234	1,200	600	2,607	964	2,614
Peanuts	473	2,402	509	1,861	124	634
Corn	27	97	73	310	55	231

Source: SQCS, BPI

Seed Certification : For seed certification, 63 area fields were inspected for rice and other crops in 1990. The quantity of certified rice and corn seed tested in 1990 and 1991 is shown in the table below.

	1990			1991		
Items/Seeds	Breeder~Registered	Certified	Reject	Breeder~Registered	Certified	Reject
Rice	366	0	0	355	0	36
Corn	321	0	0	111	0	0

Source: SQCS, BPI

Training : The sector constitutes different operations or chains such as seed production, processing, quality assurance and control, storage, packaging, and marketing/distribution, which are all equally important in attaining the goal of providing high quality seed to the farming sectors. It is recognized that personnel capable of developing and operating the various components of the seed program are required. All phases of the seed program require many trained staff before high quality seeds can be made available to farmers in the country. The types of training scheduled to be implemented by NSQCS in and after 1993 are : i) professional education, ii) short courses, seminars, and workshops, iii) training of trainers, iv) training for seed growers, v) seed awareness or seed appreciation sessions, vi) study travel, and vii) training of personnel from the private sector, etc. Proposed training program is shown in Table 4.

b) Procurement of equipment for seed quality control

The seed testing equipment needed for sample receiving, sample preparation, moisture tests, physical purity tests, varietal purity tests, germination tests and seed health tests have been requested. Most of the existing equipment being used is over fifteen (15) years old, and some are no longer accurate or are out of order. It is expected that the above equipment will interfere with strengthening and expanding the quality control services envisaged under the Seed Act.

i) The condition of existing equipment for seed testing are as follows:

Equipment	Q'ty	Use period	Condition
- Sample receiving, preparation, moisture tests			
Oven	1	more than 10 years	old
Mill	1	more than 10 years	old
Grain sample divider (electrical)	1	more than 10 years	old
Grain sample divider	2	more than 10 years	old
Torsion balance	1	more than 10 years	old
Double beam scale	1	more than 10 years	old
Moisture tester (corn,soybean)	1	more than 10 years	old
Moisture tester (rice)	1	more than 10 years	old
Infrared moisture tester	1	more than 10 years	non functional
Chemical balance (Meter)	1	more than 10 years	non functional
Moisture tester (Stainlite)	1	more than 10 years	non functional
Chemical balance (4,500g)	1	more than 10 years	non functional
-Purity and varietal purity test			
Diaphanoscope	2	more than 20 years	old
Magnifier	2	more than 20 years	old
Herbarium rack	1	more than 20 years	old
Seed separator	2	more than 15 years	non functional
Specific gravity balance	1	more than 15 years	non functional
Grain volume-weight tester	1	more than 15 years	old
Seed blower	1	more than 15 years	non functional
-Germination test			
Germinator	2	more than 20 years	old (non functional x1)