BASIC DESIGN STUDY REPORT
ON
THE PROJECT
FOR
IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF THE PHILIPPINE RICE RESEARCH INSTITUTE
IN
THE REPUBLIC OF THE PHILIPPINES

JULY 1989

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to a request of the Government of the Republic of the Philippines, the Government of Japan decided to conduct a basic design study on the Project for the Improvement of the Central Experiment Station of the Philippine Rice Research Institute, and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a study team headed by Mr. Hiromi Kobayashi, Director of the Cultivation Ecology Center, Planting Development Dept., Shikoku Agricultural Experiment Station, Ministry of Agriculture, Forestry and Fisheries, from March 29 to April 18, 1989.

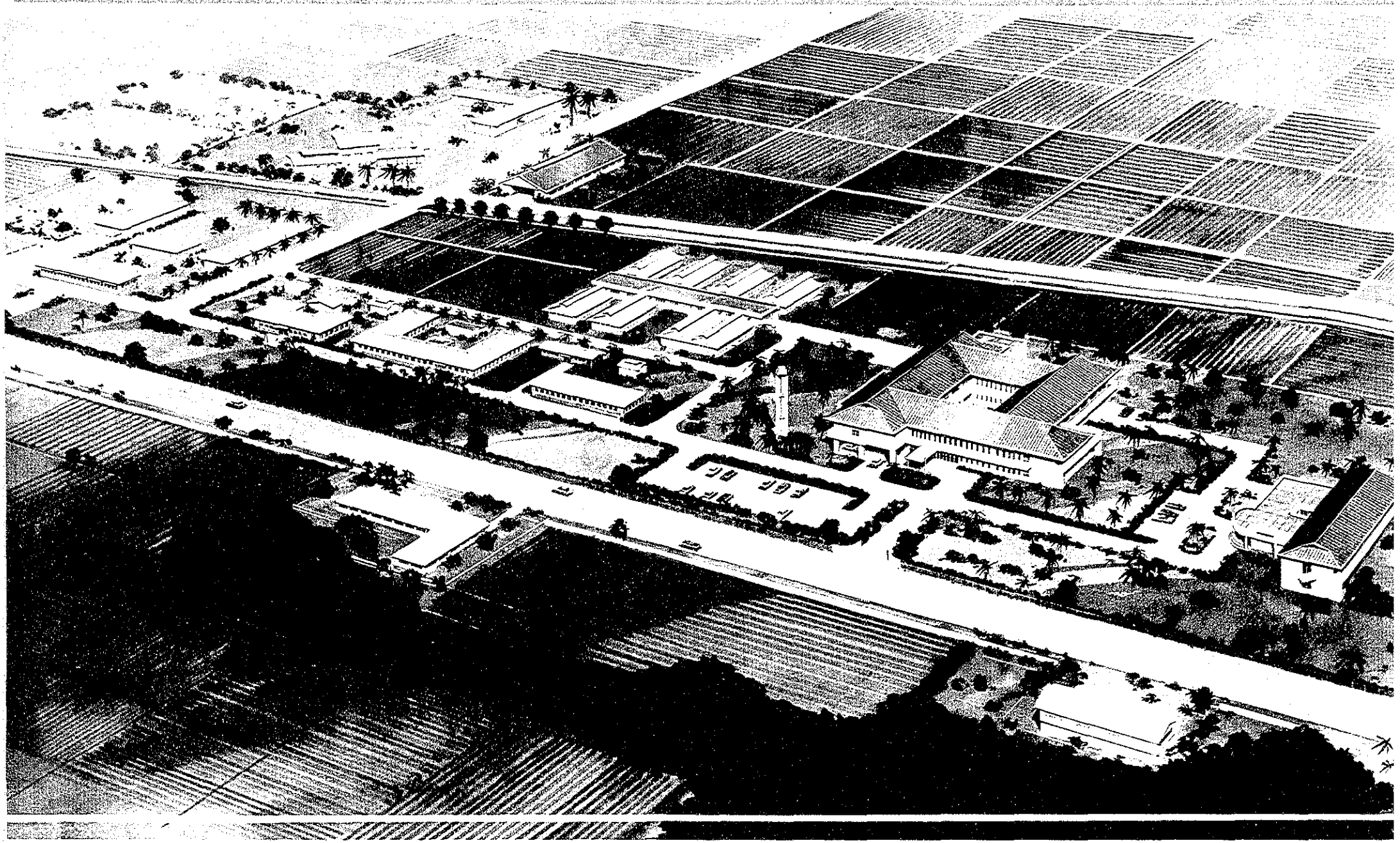
The team exchanged views with the officials concerned of the Government of the Philippines and conducted a field survey in the project area. After the team returned to Japan, further studies were made. Then, a mission was sent to the Philippines in order to discuss a draft report, and the present report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

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

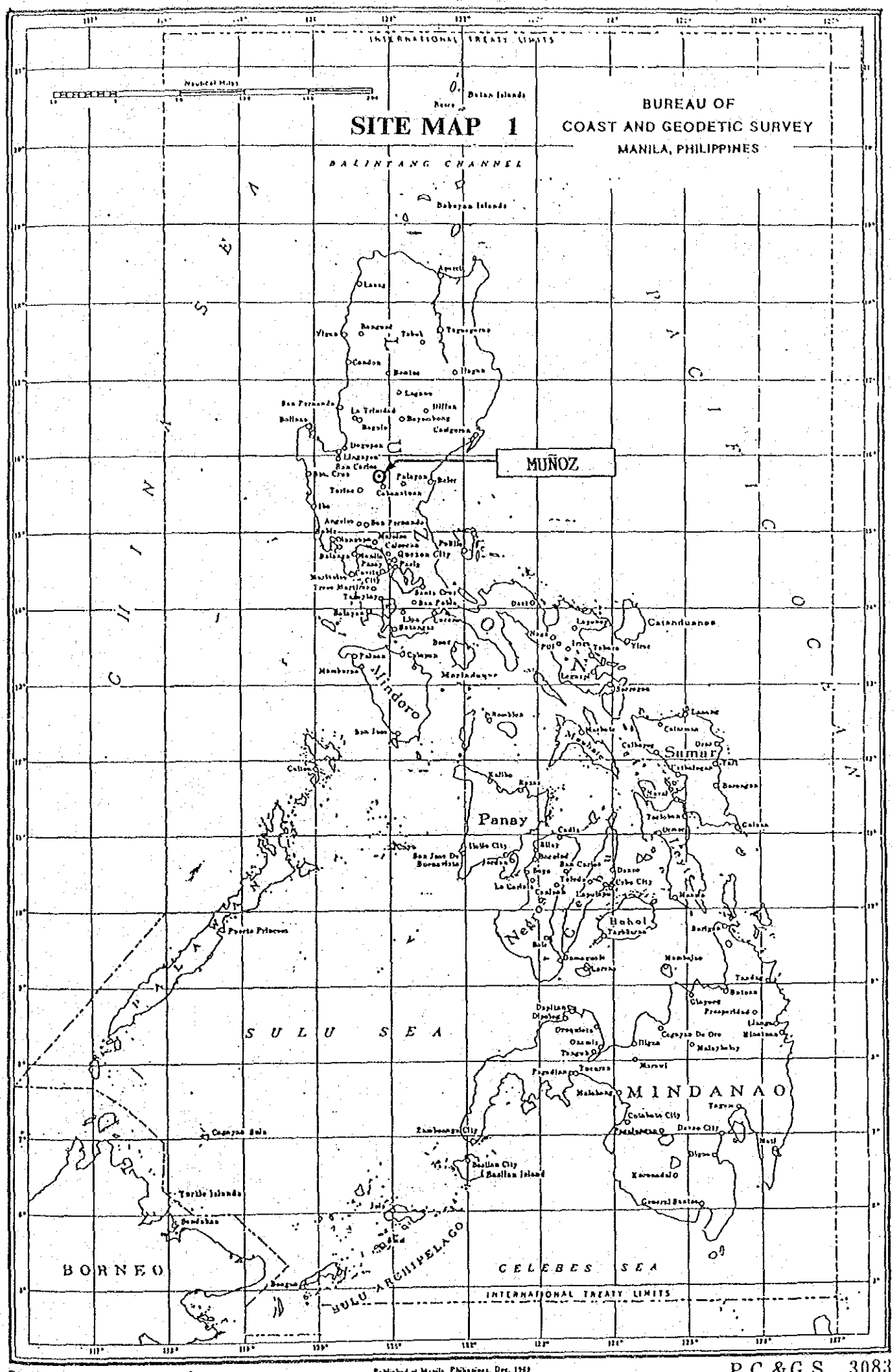
I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the team.

July 1989

Kensuke Yanagiya
President
Japan International Cooperation Agency



PERSPECTIVE

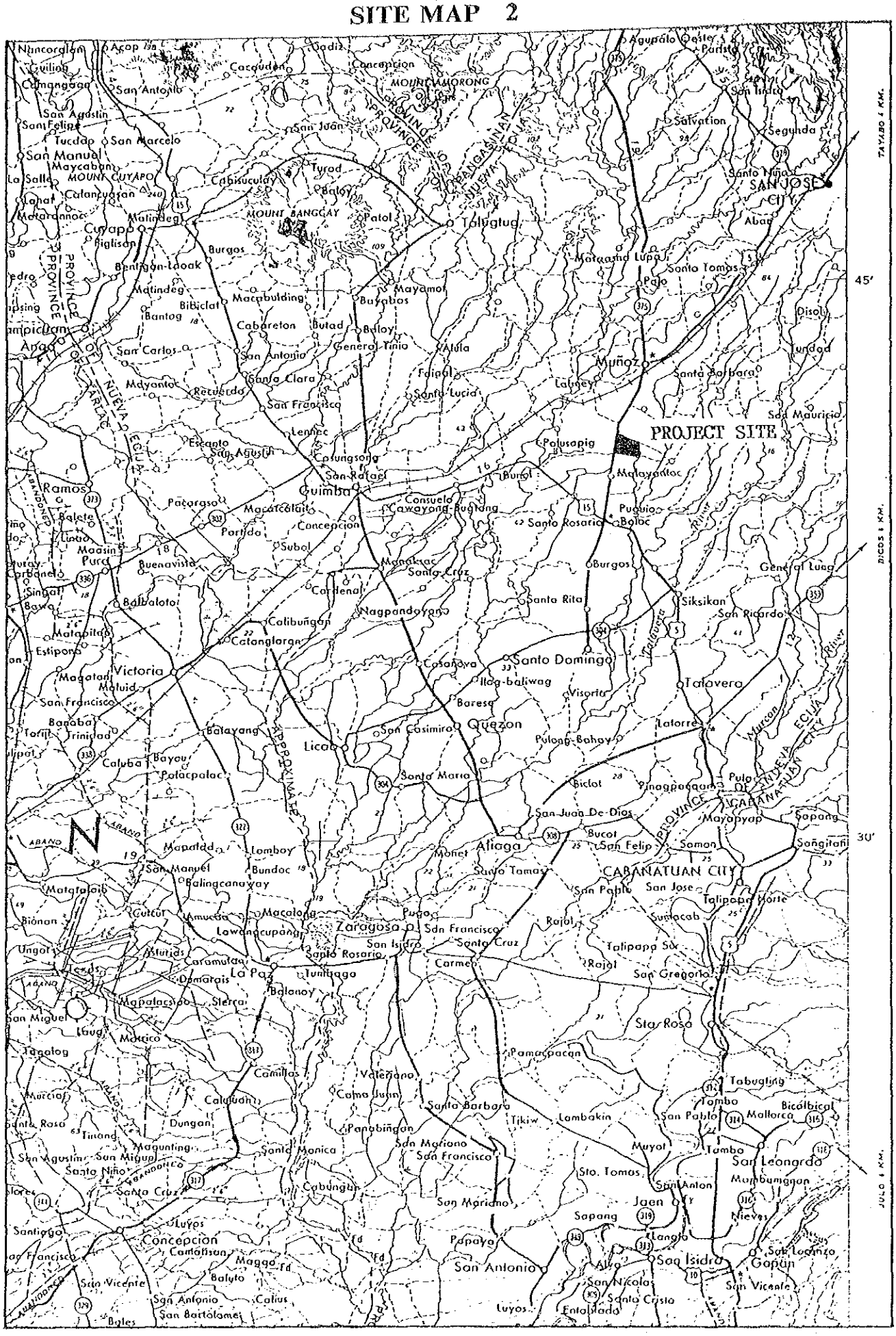


Philippines Base Map 1968

Published at Manila, Philippines, Dec. 1969
PHILIPPINE COAST AND GEODETIC SURVEY
Cayetano Paloa, Director

P.C.&G.S. 3083
PRICE P0.50

SITE MAP 2


PROJECT SITE
CABANATUAN CITY
SAN JOSE CITY
Muñoz
Quimba
Victoria
Talavera
Santo Domingo
Quezon
Licab
Aliaga
Zaragosa
La Paz
Concepcion
Ramos
Anao
Cuyapo
Tayabo 4 Km.
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Julo 6 Km.
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SUMMARY

SUMMARY

The Government of the Philippines has been making attempts to rebuild its economy by promoting the "Medium-Term Economic Development Plan" (1987 - 1992).

The government has placed particular importance on agriculture in economic development, as agriculture has consistently yielded the largest surplus in the country's foreign trade, reviewing that former government policy had stressed industrial development which resulted in delays in coping with investment, mechanization and modernization and thus reduced agricultural productivity.

In addition, since the output of rice in the Philippines is susceptible to the effects of weather, pest infestation, etc., and has varied considerably, it has been difficult to maintain sufficient output of rice to cope with the increasing population. To establish a means to cope with this problem has been an urgent issue in setting government policy. To date, because the government has depended on the International Rice Research Institute (IRRI), an international body for research and development of rice, the development of domestic expertise in rice research has lagged markedly, and consequently, the development of rice technology suited to the diverse ecological conditions of the Philippines is far behind.

To rectify this situation, the government established the Philippine Rice Research Institute (PhilRice) in November 1985 to promote research and development of rice, including improvements in rice varieties and productivity to match the various conditions existing in the country and to lead domestic research in the field. PhilRice has its temporary headquarters on the campus of the University of the Philippines located at Los Baños and is pushing forward with its activities.

Last year, the research and testing facility of the Bureau of Plant Industry (BPI) located at Muñoz in Nueva Ecija Province was combined with PhilRice. The objectives of PhilRice are to coordinate rice farming research throughout the country, acting as a nucleus for rice research institutes in the Philippines, to conduct research and development and to pass the results

on to the farmers. Progress in research and development at PhilRice has been seriously hindered by the lack of adequate facilities and equipment to carry out its aims. Adding to this problem, the temporary headquarters and the experimental farms are too far apart for effective tests to be conducted, and satisfactory results cannot be obtained.

In view of this situation, the government has decided to set up the "Establishment Plan for a Central Rice Research Institute" and has requested that the Government of Japan provide grant aid for provision of the facility and the equipment needed to realize the subject plan. In response, the Government of Japan entrusted preliminary study to the Japan International Cooperation Agency (JICA), which in turn dispatched a preliminary study team to the Philippines from November 29 to December 10, 1988 to explore the feasibility of the request and the scope of cooperation. As a result, the preliminary study team concluded that the plan should begin with developing the central experiment station into a key location for the breeding and selection of rice varieties suitable for cultivation in areas with diverse conditions, and for the development of cultivation technology and its promotion.

Based on the results of the study, the Government of Japan decided to carry out a basic design study on "The Project for Improvement of the Central Experiment Station of the Philippine Rice Research Institute" and JICA dispatched to the Philippines a basic design study team from March 29 to April 18, 1989. The team conducted the basic design study including contents of the request, background of the plan, confirmation of objectives, survey of actual conditions and confirmation of implementation structure of the project, etc.

Following this basic design study, JICA examined the appropriateness of the plan, its scope, the construction period and costs in Japan, and its conclusions are contained in the Basic Design Study Report (Draft Final Report). A team was sent to the Philippines to explain the report from July 2 to 8, 1989. The draft final report was presented to and discussed with the people concerned of the Philippines.

PhilRice major program thrusts are as follows:

(1) Varietal improvement
(2) Planting and fertilizer management
(3) Integrated pest management
(4) Rice-based farming systems
(5) Rice engineering and mechanization
(6) Rice chemistry and food science
(7) Social science and policy research
(8) Technology transfer of results from items (1) to (7) above to farmers

PhilRice requested in its plan that the project should start with the maximum stable number of personnel (355 persons) planned for 1992. The total area of the requested facilities was 22,100 m^2, consisting of an administration building, program building, training dormitory, field service building, greenhouses, etc. It is considered appropriate, however, that the project should be implemented with a scale of facilities and equipment which meets the present number of the personnel (210 persons) for a steady growth of the organization.

The project facilities will be composed of a laboratory building for research and experiments and a dormitory for training and promotion with floor areas of 7,306 m^2 along with ten support facilities including a field service building, greenhouses, a headhouse, etc. with 2,731 m^2. The composition of facilities and the summary of the equipment are as follows:

1. Facilities

Laboratory building (5,624.0 m^2) - (1F) varietal improvement laboratory and research room, seminar rooms, training rooms, printing room, A-V production room, rice chemistry & food science laboratory and research room, farming systems laboratory, central chemicals storage room, etc.
(2F) rice engineering research room, planting & fertilizer management laboratory and research room, integrated pest management laboratory and research room, social science & policy research room, technology transfer research room, farming systems research room, book stack, reading room, director's office, administration office, etc.

Dormitory (1,682.2 m^2)	- (1F) cafeteria, kitchen, 4-bed rooms, lounge, caretaker's room (2F) 4-bed rooms, guest rooms, etc.
Generator house (135.0m^2)	- generator room and electric machine room
Greenhouse (1,280.0 m^2)	- 7 houses for varietal improvement, plant physiology, planting & fertilizer management, pathological research and pest management
Headhouse (416.0 m^2)	- work rooms
Field Service Building (900.0 m^2)	- work area, test milling facilities room, comparative milling facilities room, seed storage room, yield survey rooms, drying room, machine shop, fertilizer storage rooms, etc.

2. Major Equipment

(1) Equipment for testing and research (for use in laboratories and headhouse)

a) Equipment for varietal improvement
b) Equipment for planting and fertilizer management
c) Equipment for crop protection/integrated pest management
d) Equipment for rice-based farming systems
e) Equipment for rice engineering and mechanization
f) Equipment for rice chemistry and food science, utilization and processing
g) Apparatus for laboratories

(2) Equipment for training

a) Simple audio-visual equipment (for training and seminar rooms)
b) Equipment for preparation of materials (A-V and printing rooms)
c) Printing equipment (for printing room)

(3) Equipment for improvement of the experimental farm (stored in the field service building)

(4) Maintenance equipment (stored in the field service building)

(5) Vehicles (in parking area)

(6) Equipment for administration office (for the administration department)

3. Experimental Farm

The aim is to equalize conditions in the planned fields by constructing an approx. 3.5 km long main drainage ditch that satisfies the minimum requirements for the experimental farm.

The project site is located at Muñoz in Nueva Ecija, 142 km northeast of Manila, along Route 5, with 28 ha for the construction site and 70 ha for the experimental farm, a total of 98 ha. There are 12 existing buildings on the site, of which 5 ha will be used for this project. The whole peripheral zone is used for farming, and the environment is considered ideal for experiment and research. Taking into account the structures in the nearby area and harmony with the environment, the project building are designed to have two storeys.

The research equipment shall be selected to provide for basic research as a first step in rice research, and those required for research that are currently being implemented, including those which correspond to the planned research items.

The implementing agency in the Philippines will be PhilRice, an attached agency of the Department of Agriculture. When the project is realized, it is expected to take three months for design preparation and about 12 months for construction.

To improve the level of rice farming technology, it is most important to improve the technical competence of rice researchers. Therefore, the role of this station in research and training related to rice farming technology will be great. As an improvement in rice farming technology result in increased agricultural production and thus in higher incomes for farmers, it will eventually contribute to a higher living standard for the citizens of the Philippines as a whole. If the project is realized through grant aid

from the Government of Japan, considerable benefits can be expected for the citizens of the Philippines.

Since this project is financed as a concomitant to the development of PhilRice, it shall be concerned only to urgent necessity, that is, to what is needed for rice production improvement to cope with the rapid population increase. The project shall be planned in accordance with the present PhilRice staff allocation program as well as research and training activities. High leveled research and studies are suggested to be introduced in the future after this project is completed with successful results in achieving its initial objectives.

The following recommendations are presented for the prompt realization of the project as well as the smooth and effective operation of the station to achieve its objectives.

(1) The research programs to be carried out at the station are planned exclusively basic research and studies so that PhilRice can make a new step as a national rice research institute. Thus, the initial objectives of varietal improvement and other research programs shall be accomplished promptly.

(2) The facilities are planned according to the current PhilRice staff members including the vacant positions. Thus, proper number of persons shall be employed promptly to fill this vacancy.

CONTENTS

ABBREVIATIONS

ACI Code	Building Code Requirements for Reinforced Concrete, American Concrete Institute
ACSN	Asian Cropping System Network
AICAF	Association for International Cooperation of Agriculture & Forestry
AMDP	Agricultural Machinery Development Program
AMTEC	Agricultural Machinery Testing & Evaluation Center
ASEAN	Association of South-East Asian Nations
ASTM	American Society for Testing and Materials
BAEx	Bureau of Agricultural Extension
BAR	Bureau of Agricultural Research
BES	Bicol Experiment Station
BPI	Bureau of Plant Industry
CARP	Comprehensive Agrarian Reform Program
CLSU	Central Luzon State University
COLA	Cost of Living Allowance
CVES	Cagayan Valley Experiment Station
DA	Department of Agriculture
DBM	Department of Budget and Management
DCIEC	Diversified Crops Irrigation Engineering Center
E/N	Exchange of Notes
FAO	Food and Agricultural Organization
FCC	Fertility Capability Classification
IBRD	International Bank for Reconstruction and Development
INSFFER	International Network on Soils Fertility and Fertilizer Evaluation
IPM	Integrated Pest Management
IRGC	International Rice Germplasm Center
IRRI	International Rice Research Institute

IRTP	International Rice Testing Program
ITP	International Training Program
MES	Mindanao Experiment Station
MFA	Ministry of Food and Agriculture
MRRTC	Maligaya Rice Research and Training Center
MTDP	Medium-Term Development Plan (1987 - 1992)
NAFC	National Agriculture & Fishery Council
NAPHIRE	National Post-harvest Institute for Research and Extension
NCSO	National Census and Statistics Office
NEDA	National Economic and Development Authority
NIA	National Irrigation Administration
NSCP	National Structural Code of the Philippines
PAGASA	Philippine Atmospheric, Geophysical, Astronomical Services Administration
PCARRD	Philippine Council for Agriculture, Forestry and Natural Resources Research and Development
PHILRICE	Philippine Rice Research Institute
PLDT	Philippine Long Distance Telephone Company
PSB	Philippine Seed Board
PSU	Pangasinan State University
RCPCs	Regional Crop Protection Centers
REMP	Rice Engineering and Mechanization Program
RVIG	Rice Varietal Improvement Group
SCUs	State Colleges and Universities
TIPLP	Tarlac Integrated People's Livelihood Program
UAP	United Architects of the Philippines
UPLB	University of the Philippines at Los Baños
UPS	University of the Philippines System
VES	Visayas Experiment Station

CHAPTER 1 INTRODUCTION

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Although the Philippines has almost attained self-sufficiency in rice, the country is confronted with a number of problems in its effort to increase the production of rice to cope with estimated future increases in population.

The population of the Philippines is expected to reach 75 million from the present 58 million in the year 2000, while it is difficult to expand the rice growing area, which is thought to be 3.2 million hectares at present because of urbanization and industrialization. To maintain self-sufficiency in the face of this population increase will, it is thought, require a production increase of at least one ton per hectare from the present 3 tons/ha by the year 2000.

Until now, the Government of the Philippines has depended largely on the International Rice Research Institute (IRRI), an international body for rice research and development. The government, however, recognized the necessity to establish its own organized research system for the development of rice farming technology, and thus established the Philippine Rice Research Institute (PhilRice) in 1985 as the national rice research institute. Since the IRRI is an international institute, it cannot completely match development in rice farming technology to the regional features and varying weather and soil conditions of the Philippines.

The aim of founding PhilRice was to carry out research on rice, including the improvement of varieties, which conform to various Philippine conditions and to transmit the results to the farmers. In addition, PhilRice plays a role in monitoring the results of research undertaken at other research institutes, and in spreading them to the farmers together with the results of its own research. In this work, PhilRice is confronted with a hindrance to its future research and development by a lack of facilities and equipment needed to carry on its activities. To make matters worse, the inconvenience of separated temporary headquarters and test site hinders the work. In view of this situation, the government has worked out an "Establishment Plan of a Central Rice Research Institute" in which the headquarters will be unified at Muñoz, and has requested that the Government of Japan supply grant aid.

In response, the Government of Japan decided to carry out a preliminary study and the Japan International Cooperation Agency (JICA) dispatched a preliminary study team headed by Mr. Satoshi Kinugawa, Grant Aid Division, Economic Cooperation Bureau of the Ministry of Foreign Affairs, during the period from November 29 to December 10, 1989.

The purpose of the preliminary study was to confirm the background of the plan and the contents of the request, to investigate the expected effects and the adequacy of the plan, and to determine the acceptability of the plan to the Government of Japan as well as the scope of cooperation. The preliminary study team reviewed the appropriateness of the plan and prepared a report. Based on the report, the Government of Japan investigated the details of the plan and entrusted JICA to dispatch a basic design study team headed by Mr. Hiromi Kobayashi, Director of the Cultivation Ecology center, Planting Development Department, Shikoku Agricultural Experiment Station of the Ministry of Agriculture, Forestry and Fisheries from March 29 to April 18, 1989, to explore the feasibility of cooperation.

The team verified and discussed contents of the request and the project, and investigated the actual situation including the background of the project, the construction situation, the proposed site, etc. The team also checked the mechanism for implementing the plan and explained the grant aid system, and application procedures, etc. to the authorities concerned in the Philippines while clarifying the scope of responsibilities of both governments should the project be implemented.

Based on the study, the plan was examined regarding its scope, construction period, cost, appropriateness, etc. and the results was compiled in the Basic Design Study Report (Draft Final Report). A team led by Mr. Hiroshi Takasawa, Deputy Director, International Research Division, Agricultural, Forestry and Fisheries Research Council Secretariat of the Ministry of Agriculture, Forestry and Fisheries, was sent to the Philippines from July 2 to 8, 1989, to present the draft final report. The team submitted the draft final report to the authorities concerned of the Philippines and after explaining the report and reaching a basic agreement between the Governments of Japan and of the Philippines, this report was compiled.

CHAPTER 2
BACKGROUND OF THE PROJECT

CHAPTER 2 BACKGROUND OF THE PROJECT

2-1 Summary of Agriculture in the Philippines

2-1-1 Agriculture in the Philippines at Present

Looking at the national economy as a whole, agriculture is the most important industrial sector. In terms of employed population, the agriculture sector accounted for a high 49.6% of the total employment population at the end of 1985. It was always the agriculture sector that absorbed the large number of laborers who were laid off in Manila and other cities during the economic crises that have confronted the country many times. Until the 1960s considerable foreign currency reserves were spent on importing foodstuffs, grain in particular, but there was no shortage of rice after self-sufficiency was attained in 1977. However, in 1984, a shortage occurred once again, forcing the country to import rice.

Although there has been an increase in the import of fertilizers and agriculture-related capital goods, agriculture has actually been the sector yielding the largest surplus in foreign trade.

In other words, it may be said that the surplus in the agriculture sector has been making up for approximately half of the trade deficit generated by other sectors. Even during the period 1984 to 1985 when economic growth became negative due to the failing economy and contraction of industrial and service sectors, the agriculture sector displayed strong stability. When the economy indicated an improvement in 1986, it was the agriculture sector which led the way. Despite agriculture's leading role, the low productivity of the agriculture sector is notable.

This low productivity is a result of delays in investment in agriculture, made more conspicuous by the government policy to place emphasis on manufacturing. While the price of agricultural equipment remained high, the export of agricultural products was not necessarily linked to an increase in earnings due to the government policy of maintaining the peso currency at a lower level, holding down prices of agricultural products. In addition, as industrialization became capital-intensive it

did not serve to absorb the labor force and the stagnant excessive labor population in rural areas forced down the wages of agricultural laborers, resulting in stagnation and income problems for the farming villages.

For this reason, growth in agriculture has always been lower than that in other sectors, leaving farming communities in poverty, and the difference in income between urban and rural areas and farming villages is growing. The average income of families in farming communities was 67% of that in urban areas in 1975, but went down to 46% in 1985. Of farmers, those who were below the poverty line amounted to 64% in 1985, or 2/3 of farmers, according to government investigations.

TABLE 2-1 TRADE BALANCE BY INDUSTRIAL SECTOR

(in million dollars)

	1980	1985
Mining (net)	1,094	346
Exports of steel	545	84
Other exports	623	318
Imports of steel	74	56
Agriculture (net)	1,504	565
Exports	2,274	1,213
Coconut products	781	440
Sugar	590	161
Forestry products	420	193
Others	483	419
Imports	- 770	- 648
Fertilizers	- 139	- 106
Agricultural products	- 603	- 540
Capital goods for agriculture	- 28	- 2
Manufacturing (net)	-1,008	689
Export of non-traditional products	2,073	2,829
Import of intermediate goods for export	- 691	- 780
Import of raw materials and intermediate goods	-1,740	-1,111
Import of capital goods for manufacturing	- 650	- 249
Energy (net)	-2,448	-1,537
Others (net)	-1,081	- 545
Total Exports	5,788	4,629
Total Imports	-7,727	-5,111
Trade Balance	-1,939	- 482

Source: IBRD, The Philippines : A Framework for Economic Recovery (1986)

2-1-2 Present Rice-growing Conditions in the Philippines and the Point of Issue

(1) Achievement of Self-sufficiency in Rice

Rice is the staple food of the Philippines and is consumed by more than 80% of the population. In 1977 the Philippines succeeded in the Masagana 99 Project to increase production (Rice Production Increase Plan by Credit Guarantee for Seeds and Fertilizer) and self-sufficiency in rice was attained. This was largely brought about by enhancing the development of high-yield varieties at the IRRI, UPLB and MRRTC, improving the development ratio of irrigation projects and making available packaging technology for seeds, fertilizers, and agricultural chemicals. However, the available area for rice farming is only 3.2 million ha, and it may be further reduced by urbanization and population increases. The rate of population increase is higher than the ASEAN average at 2.5% per year and the population is estimated to reach 75 million in the year 2000 as against 58 million in 1988. In the future, although improvements in the food situation are expected due to changes in staple diet, it is correct to say that the demand for rice will increase and a large issue to be faced is how to increase the

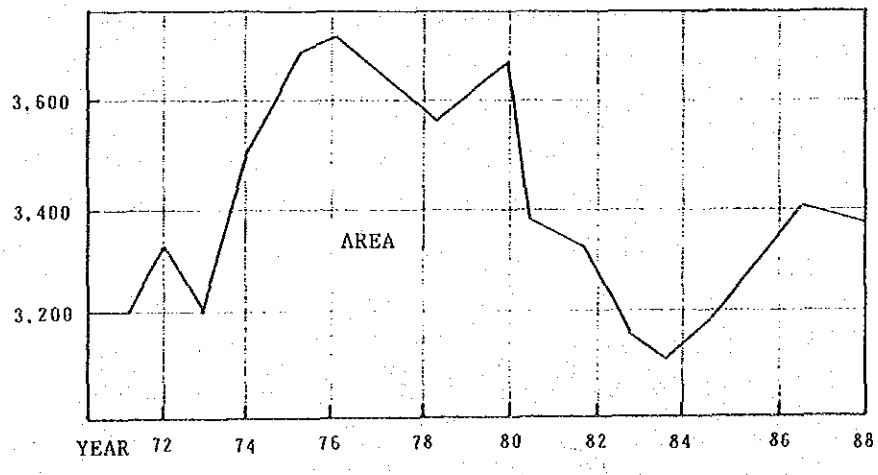

FIGURE 2-1 RICE GROWING AREA IN THE PHILIPPINES BETWEEN 1970 AND 1988 (1000 Ha)

Source: Answer sheet submitted by PhilRice

TABLE 2-2 CHANGES IN POPULATION IN THE PHILIPPINES

	1986	1987	1988	1989	1990	1991	1992	Ann.avg. 1987-92
POPULATION								
Total population level (million persons)	56.0	57.4	58.7	60.1	61.5	62.9	64.3	
Population growth rate	2.44	2.41	2.38	2.34	2.30	2.26	2.21	2.32
Urban population (share of total population)	40.5	41.0	41.6	42.1	42.7	43.2	43.8	42.7
Rural population (share of total population)	59.5	59.0	58.4	57.9	57.3	56.8	56.2	53.3
Population density (persons/sq.km)	186.7	191.2	195.7	200.3	204.9	209.6	214.2	202.7
LABOR AND EMPLOYMENT								
Labor force participation rate (%)	64.0	64.2	64.4	64.6	64.8	64.9	65.0	64.6
By sex:								
Male	82.5	82.7	82.8	82.9	83.0	83.1	83.2	82.9
Female	45.8	46.0	46.3	46.6	46.8	46.9	47.0	46.6
By age group:								
15-19 years old	41.4	41.5	41.6	41.7	41.7	41.7	41.7	41.6
20-24	62.4	62.6	62.8	63.0	63.2	63.3.	63.3	63.0
25-34	71.4	71.5	71.6	71.8	72.0	72.2	72.4	71.9
35-44	76.7	76.8	76.8	76.9	77.0	77.0	76.9	76.9
45-54	76.1	76.2	76.4	76.5	76.7	76.7	76.8	76.6
55-64	67.4	67.4	67.6	67.8	67.9	67.9	68.0	67.8
65 and over	41.8	41.8	41.8	41.8	41.8	41.7	41.6	41.8

Note) 1986-89: Recorded data 1990-92: Estimated data

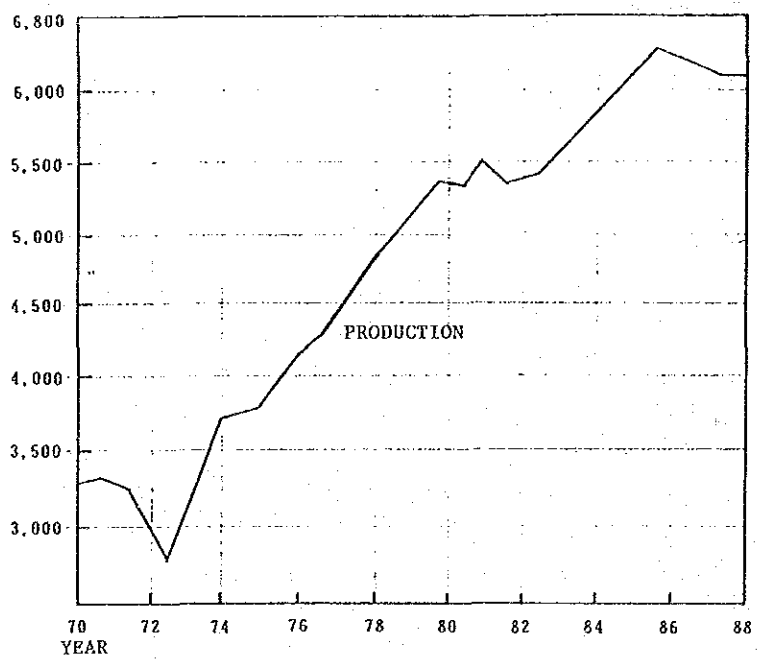

FIGURE 2-2 YIELD OF RICE IN THE PHILIPPINES BETWEEN 1970 AND 1988 (1,000 tons)

production of rice to cope with the increase in population. That is to say, assuming the consumption of rice per person per year is 100 kg, it is necessary to increase the present rate of production from 2.8 tons per ha to 3.8 tons per ha, an increase of one ton per ha, or 35% by the year of 2000.

(2) Problems to Sustain Self-sufficiency in Rice

a) Delays of rice varietal improvement suitable to specific conditions of the Philippines
b) Insufficient protective measures against natural disasters due to unadvanced infrastructure
c) Delays of integrated pest management
d) Financial inadequacy of small farmers or tenant farmers
e) Reducing cultivation area
f) Stagnant R & D of rainfed and upland rice farming that the IRRI is not concerned
g) Location of the major Philippine rice cultivation areas being frequently struck by typhoons
h) Low incomes of farmers
i) Population increase

(3) Necessity of rice research

The Philippines needs steady research and study efforts to solve the problems like mentioned above. Improvement of rice productivity is indispensable to sustain sufficient rice production in corporation with the population growth and decreasing rice fields. For this purpose, research programs like varietal improvement, fertilizer management, pest management, etc. of which the Philippines has been in delay, need to be advanced promptly. In the pas six years, the rice production rate showed about 1.9% annual increase, lower than the population growth rate of 2.5%. The rice production shall be increased continuously to keep up with the population increase for sustaining self-sufficiency in rice, and here the necessity lies for the country's own rice R & D and promotion activities suited to the specific ecological conditions.

2-2 Summary of the Related Plans

2-2-1 Medium-Term Development Plan

The Aquino Administration which took office in February 1986 announced an economic plan for the period between 1987 and 1992 known as the "Medium-Term Development Plan (MTDP)" in the form of Presidential Decree. It contains the following four targets for national development.

a) Alleviation of poverty
b) Creation of employment opportunities
c) Promotion of equality and social justice
d) Achievement of sustainable economic growth

In order to realize these targets, continuous development of the national economy and control of the population will be necessary and the immediate target is to rebuild the failing economy. In addition, development the of agriculture, forestry and fisheries areas will be most emphasized and it greatly stressed that development through growth in the agricultural economy in the local sector and activation of the economy must be led by private concerns. The following aims to be achieved in the agricultural village sector within six years were listed.

a) Increase in income of small-scale farmers
b) Continuous improvement in agricultural productivity
c) Equal distribution of production elements and products
d) Self-sufficiency in food in order to sustain the improvement in nutrition
e) Creation of employment opportunities based on agriculture for the labor force in forming communities, particularly for those farmers without land and for small-scale farmers
f) Improvement of the system for distributing agricultural products, goods to be invested, and various services
g) A system for farmers to participate in agricultural cooperatives and a farmers' organization

A more concrete target for the growth rate has been established by crop as shown in table 2-3.

TABLE 2-3 ESTIMATE OF GROWTH RATE BY CROP IN THE MEDIUM-TERM DEVELOPMENT PLAN

	Average growth rate between 1987 and 1992		
Total	3.9	Crops for Processing	2.1
Food crops	4.1	Coconuts	0.5
		Corn	1.4
Rice	3.7	Banana	2.2
Corn	6.4	Mango	4.7
Abaca	1.7	Pineapple	2.4
Potato	1.9	Coffee	6.8
Cassava	4.1	Cacao	7.4
Peanuts	3.6	Tobacco	5.4
Mango beans	3.2	Abaca	2.1
Others	1.0	Rubber	7.2
		Others	1.5

Source: Medium-Term Development Plan 1988-1992 (1986)

The plan also states that an increase in employment in farming communities is a major premise for improved domestic demand, increased savings and greater investment, which in turn bring about further employment and higher income in the village. This is a mechanism that supports economic development. The major reason for the differences in income by region, the existence of regions that are extremely low in productivity and the bad distribution of population is in fact that there was no development plan that took account of the actual circumstances in the various regions. Therefore, a plan whose major goal is the development of farming communities and the promotion of employment in them must be urgently established, and for this purpose decentralization of the administration structure must be pursued on a large scale.

2-2-2 Field Development Plan

(1) Masagana 99 Project

The purpose of the Masagana 99 Project was to increase the production of rice based on an improved method.

The Bureau of Agricultural Extension (BAEx), established in 1954, was very interested in the fact that a Mr. Eugenio Margate, who was originally from North Zamboanga in Mindanao, a most efficient farmer, attained a yield of 5.28 ton/ha of unhulled rice from a paddy by using a traditional Calalwa variety, planting in wide checkrows and with chemical fertilizer. This gave birth to the Masagana farming method.

The BAEx enlarged its organization in order to spread this improved method, dispatched officers to make it known to villages throughout the country, distributed pamphlets and opened exhibition fields. However, knowledge of the technique remained low, the reason for which was considered to be the share renting system of farming then prevalent in the Philippines. This is the fore-runner of the Masagana 99 Project. President Ferdinand Marcos started the new production increase plan "Masagana 99" in 1973 and fixed its target yield at 99 cavan/ha (45 kg/cav). This plan financed a package of the latest technology in farming, consisting of high-quality seeds, expenditures and the necessary materials.

The increase in production as a result of the Masagana 99 Project was in fact remarkable in the period between 1974 and 1975. The total production of rice in the Philippines also increased in the period between 1975 and 1977, although this was considered due rather to improvements in technology than to the results of the Masagana 99 Project alone.

Although the Masagana 99 Project practically collapsed between 1984 and 1985 due to reduced loan repayment ratios and lack of funds, the fact remains that it did in fact contribute greatly to raising rice production in the Philippines.

(2) Comprehensive Agrarian Reform Program

On July 22, 1987 the Government of the Philippines enforced the Comprehensive Agrarian Reform Program (CARP), which emphasizes the reform of agricultural land.

The land reform under this program covers all agricultural land. The man frame of this program is that land owners are compensated with land bonds issued by the Land Bank and redeemable in ten years, 10% of which can be realized every year, and that the farmers who purchase land repay the Lang Bank within a period of 17 years without interest. It is expected that about 400,000 new farmers will be benefited by the CARP with particular emphasis being placed on land reform for small-scale rice farmers. The most critical elements for the success of the land reform program together with the development of agriculture itself and agricultural communities as well as the preparation of land ledgers are to improve the productivity and profitability of agricultural products and to further foster and settle small-scale farmers.

In order for this program to succeed, the prerequisites are to improve rice farming technology and increase production so that the farmers will ultimately be able to own their lands. This is the role expected of PhilRice. For this reason, PhilRice not only renders training and technical advice, but also participates in the rice seed production program on a country-wide scale.

2-3 The Request

2-3-1 Background

The output of rice in the Philippines is subject not only to the diverse weather conditions, such as storms, flood and drought, but also soil conditions and pest infestation. Likewise, the present farmed area of 3.2 million ha will be difficult to maintain in the future as a result of urbanization and industrialization pressure in addition to the high population growth. The population is expected to increase from the present 58 million to 75 million by the year 2000. In view of these

conditions, maintenance of rice output to cope with the population increase is an issue of some urgency.

With this background, the Government of the Philippines established PhilRice in November 1985 with the aim of enhancing rice farming productivity based on R & D for the improvement of rice varieties and production technology suited to the diverse ecological conditions of the country.

PhilRice, when established, was provided with temporary headquarters within the campus of the University of the Philippines at Los Baños, and has remained there till the present. Because the facility at the temporary headquarters is small and also since it lacks equipment, future R & D will be hindered. The inconvenience of having the headquarters and the experimental farm separated from each other also reduces the effectiveness. For this reason, the government worked out a plan for constructing a general headquarters building with functions for rice R & D, promotion of farming technology and training, and this is to be constructed at Muñoz in Nueva Ecija Province in Central Luzon. The government has requested cooperation of the Government of Japan for the construction of the headquarters building as well as the supply of necessary equipment in the form of grant aid.

2-3-2 Details of the Request

(1) Background

PhilRice was established on November 5, 1985 by Executive Order No. 1061. Thereafter the Charter of the Institute was amended by Executive Order No. 60 on November 7, 1986. PhilRice is an agency attached to the Department of Agriculture. At present its temporary headquarters is at Los Baños while its permanent headquarters will be at Muñoz in Nueva Ecija.

PhilRice, being an independent rice research institute of the Philippines, is attempting to build a strong organization in terms of technology and facilities by forming links with other research institutes in the country.

Founding targets of PhilRice are --

a) To sustain and improve the productivity of rice farming,

b) To increase the income of small-scale farmers,

c) To increase employment opportunities and to promote economic growth in regional societies, and

d) To aim at improving the welfare of the nation as a whole through self-sufficiency in rice.

(2) Objectives

The objectives of PhilRice are to improve the production technology of each rice farming region through R & D and by solving problems that are peculiar to each region with its diverse conditions, thereby improving the production capability of the region.

To achieve these objectives, following targets have been proposed:

a) Planning, drawing up, implementation, coordination and procurement of funds for R & D activities on a national scale.

b) Formation and coordination of a national network of rice farming research facilities that conform to the diverse topography, climate, natural features and soil conditions of agricultural land within the Philippines.

c) Packaging of technology for introduction and transfer that is economically feasible and that is acceptable to current rice farmers in the Philippines.

d) Furnishing of the latest information required for formulating basic policy concerning rice farming, marketing and consumption trends.

e) Organized training of workers, scientists, extensionists, agriculture managers, and farmer-leaders related to rice farming.

(3) Facility Development Plan

The facility development plan for which the request has been made was proposed in consideration of eight program thrusts of PhilRice. There are three common component in each thrust, namely, testing and research, development and capability improvement. Testing and research places particular emphasis on the evolution of suitable technology while development emphasizes spreading the technology developed by testing and research, and the maturing and formulation of training materials. On the other hand, capability improvement emphasizes the development of manpower and technical guidance. Of the facilities and equipment, some are to be used only for specific program thrusts, but most of them are mutually related to each other and could be used in common. Since the development plan for this facility emphasizes the testing and research network for rice farming on a national scale, linking agriculture regions within the country, the design of the facility must take into account the existence of joint research bodies in each region.

(4) Training Plan

The goal of PhilRice training programs is to improve the competence and skills of the rice industry's manpower, in particular farmer-leaders, extensionists, subject matter specialists, researchers, seed growers and other sectors. Thus, the contents of the training programs are organized so that they can cater to the specific needs of the trainees.

PhilRice training programs normally have two general curricular thrusts: rice production technology and related social technology. Under rice production technology, lessons on varietal and seed selection, integrated nutrient management, integrated pest management, irrigation and water management, land/seedbed separation and other cultural practices for rice as well as harvest/post-harvest operations are included. Under social technology, lessons on effective communication, leadership, group dynamics, rural development overview and action planning are included.

(5) Research Program

a) Major program thrusts

1. Varietal improvement : improving and stabilizing yields of important agro-ecological types of rice through breeding and facilitating the production of seeds from released varieties.

2. Planting and fertilizer management : improving and sustaining the productivity of soils planted in rice with low-cost inputs and developing efficient planting methods.

3. Integrated pest management : developing and adopting pest management approaches that will improve and sustain rice yields and maintain the stability of the environment.

4. Rice-based farming systems : to identify constraints and opportunities in the improvement of rice farming systems and to develop R & D strategies to overcome these constraints.

5. Rice engineering and mechanization : promoting farm mechanization, better uses of land and water resources, and developing post-harvest technology for rice and rice by-products.

6. Rice chemistry and food science : establishing grain qualities preferred by various consumers and maximizing the use of rice and rice by-products.

7. Social science and policy research : utilizing technology development and adoption process, strengthening institutional support for rice production and improving the policy environment of rice farmers.

8. Technology transfer : adapting, verifying and packaging location-specific rice and rice-based technology, training the rice industry's work force and communicating technology from PhilRice to the farms.

Among the above program thrusts, technology transfer, coordinating with other divisions, stresses standardization of rice production technology developed by the other programs and dissemination to researchers, extensionists, farm distribution and other concerned persons or agencies.

(6) Contents of the PhilRice Improvement Plan

The contents of the plan consist of buildings, greenhouses, research equipment, furniture, vehicles and farm facilities. The requested facilities are listed as follows:

A. Building Facilities

Buildings/Description	Area (m^2)	
I. Administration Building (2 storeys)		
1. Office of the Director and Administrative Staff		1,050 m^2
2. Attached Common Facilities		2,280 m^2
a) Auditorium	(600)	
b) Library and Publications	(1,000)	
c) Central Statistics Services	(300)	
d) Cafeteria	(300)	
e) Others	(80)	
II. Program Building (2 storeys)		8,820 m^2
1. Varietal Improvement (VI)	(1,460)	
2. Planting and Fertilizer Management (PRM)	(910)	
3. Integrated Pest Management (IPM)	(1,340)	
4. Farm Mechanization and Post-Harvest Engineering	(1,130)	
5. Rice Farming Systems (RFS)	(780)	
6. Social Science and Policy Research (SSPR)	(680)	
7. Technology Transfer (TT)	(1,220)	
8. Rice Chemistry and Food Science (RCFS)	(680)	
9. Attached Common Facilities	(620)	
III. Training Dormitory (2 storeys)		2,000 m^2
IV. Engineering Equipment and Service (1 storey)		1,200 m^2
V. Field Service Building (1 storey)		600 m^2
VI. Staff Housing		1,900 m^2
T O T A L		17,850 m^2

B. Greenhouse Facilities

Facility	No. of Units	Area (m^2)
I. Varietal Improvement		
Headhouses	3	150
Greenhouses	3	600
Screenhouses	4	800
Subtotal	10	1,550
II. Planting and Fertilizer Management (PFM)		
Headhouses	2	100
Greenhouses	2	400
Screenhouses	2	400
Subtotal	6	900
III. Integrated Pest Management (IPM)		
Headhouses	3	150
Greenhouses	3	600
Screenhouses	3	600
Subtotal	9	1,350
IV. Rice Farming System (RFS)		
Headhouse	1	50
Greenhouse	1	200
Screenhouse	1	200
Subtotal	3	450
T O T A L	28	4,250 m^2
G R A N D T O T A L		22,100 m^2

The criterion for estimating the required floor area is a PhilRice staff size of 357 persons in 1992. The year 1992 is the target year by when PhilRice plans to allocate the full number of personnel annually.

CHAPTER 3
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3-1 Objectives of the Project

Improvement of rice productivity is an urgent consideration to meet the rice requirements of an increasing population during a time the area for rice cultivation may decrease through urbanization and population concentration into urban areas to improve job opportunities. The traditional Philippine farming system is affected by weather changes, pests or insects and is vulnerable to these influences. In order to sustain steady production, it is important to develop and select rice varieties suitable to the specific environment in the Philippines as well as to develop and promote appropriate cultivation technology.

The Government of the Philippines, aware of the necessity for establishing a national rice research institute, founded PhilRice in 1985. As the core of the Philippine rice research institutional structure, PhilRice is to coordinate rice R & D in the Philippines, to carry out various rice research and tests and to transfer the developed technology to Filipino farmers. However, the present PhilRice facilities are incapable of pursuing these activities, and the government has planned to move its headquarters to Muñoz along with a request of a new facility plan "the Establishment Plan for a Central Rice Research Institute".

This project involves developing rice varieties and cultivation technology adaptable to the specific environments of the various regions and improving the facilities of the central experiment station, because they are regarded as having the highest priority and the most urgent necessity today. This project is, as a first step, to improve the central experiment station for the purpose of strengthening its capabilities of research, training and extension. The original request has been reviewed in the following pages on the basis of these concepts.

3-2 Review of the Request

3-2-1 Necessity of the Project

Since it was established in the Philippines in 1960, the IRRI has accomplished significant results from the international point of view. The IRRI, though located in the Philippines, does not serve the Philippines only but has international objectives and responsibilities. However, the Philippine government in the past had been too dependent on the IRRI to deal with the country's problems of food production including rice, and Philippine R & D in rice farming was delayed due to the small number of rice scientists. Rice productivity in the Philippines has not shown satisfactory increase, but it is impossible to rely completely on the IRRI to solve this problem. The Government of the Philippines thus became aware of the necessity to develop and improve its own rice technology appropriate to specific Philippine environment.

Other rice-producing Asian countries have their own research institutions though they realize the IRRI's standing as an international institution. The IRRI is working on the international level, aiming at basic scientific research to solve global rice problems, collection and conservation of germplasm for high productivity, generation of hybrid rice from existing varieties, development of basic and applied technology for production and information, training of core researchers in various countries, preparation and dissemination of pamphlets and documents showing newly developed technology and other information. The IRRI, without sufficient personnel and materials to carry out or support research and development applicable to each location in various countries has strong desire for the improvement of their national rice research institutions.

In the Philippines, the IRRI has only a few experiment stations and testing facilities. PhilRice is responsible for conducting these tests and experiments to develop specific technology appropriate to various areas with different conditions. It is also responsible for pointing out problems specific to various agronomical conditions and for developing new varieties or introducing new technology applicable to each of them. Thus, problems specific in the Philippines shall be dealt

with by a national institution like PhilRice, not by an international one like the IRRI.

In order to avoid dependence on the IRRI, development of trained manpower and improvement of facilities to which the IRRI's technology can be carried out is indispensable. Some of the Asian countries like South Korea, Thailand and India utilize national rice research institutions to their maximum so that they can take advantage of the physical and engineering resources of the IRRI through collaborative research.

In summary, PhilRice shall produce Filipino rice researchers who can "rearrange" technology developed by the IRRI or can develop technology themselves, adopt it to rice farming, review the adopted on-farm technology, and work on R & D in collaboration with the IRRI. By improving PhilRice, better results can be expected with collaborative research with the IRRI, and PhilRice researchers can be on an equal level with other rice scientists. Through the improvement of the central experiment station, this project can contribute to Philippine's rice research organization to establish research and development capability with its own technological infrastructure to satisfy the urgent needs of the Philippines.

3-2-2 Project Implementation Plan

Establishment of PhilRice

In March 1985, Sen. E. J. Angara, then president of the University of the Philippines System convened a committee to discuss the possibility of establishing a national rice research institution for the country. After earnest discussions, Executive Order 1061 was issued on November 5, 1985, by which PhilRice was officially established under the Ministry of Agriculture and Food Later on July 22, 1988, Administrative Order 79 was issued to merge the MRRTC and MES to form PhilRice by

(1) Implementing Organization

The Philippine organization responsible for the implementation of the project is PhilRice. The director is Dr. Santiago R. Obien. Figure 3-1 shows its present organizational structure.

PhilRice is operated under a board of trustees composed of the following members:

Chairman	Secretary of the DA
Secretary	Director of PhilRice
Members	UPS
	PCARRD
	NEDA
	UPLB
	DBM
	Science Community Rep.
	Academic Sector Rep.
	Business Sector Rep.
	Consumer's Rep.

Under the Director of PhilRice, three deputy directors are appointed for research, technology transfer, and administration. There are 146 staff members as of April 1989 and 21 consultants, for a total of 167 in Los Baños and Maligaya, and there are 28 staff members in the MES. The total PhilRice staff consists of 195 members. As the personnel limit appropriated in 1989's budget is 210 excluding MES staff, there is still a shortage of 43. This shortage is to be filled up with the employment of 23 persons in June and 20 more in October. Applications are now being accepted for evaluation and consideration. PhilRice explains its staff shortage as follows:

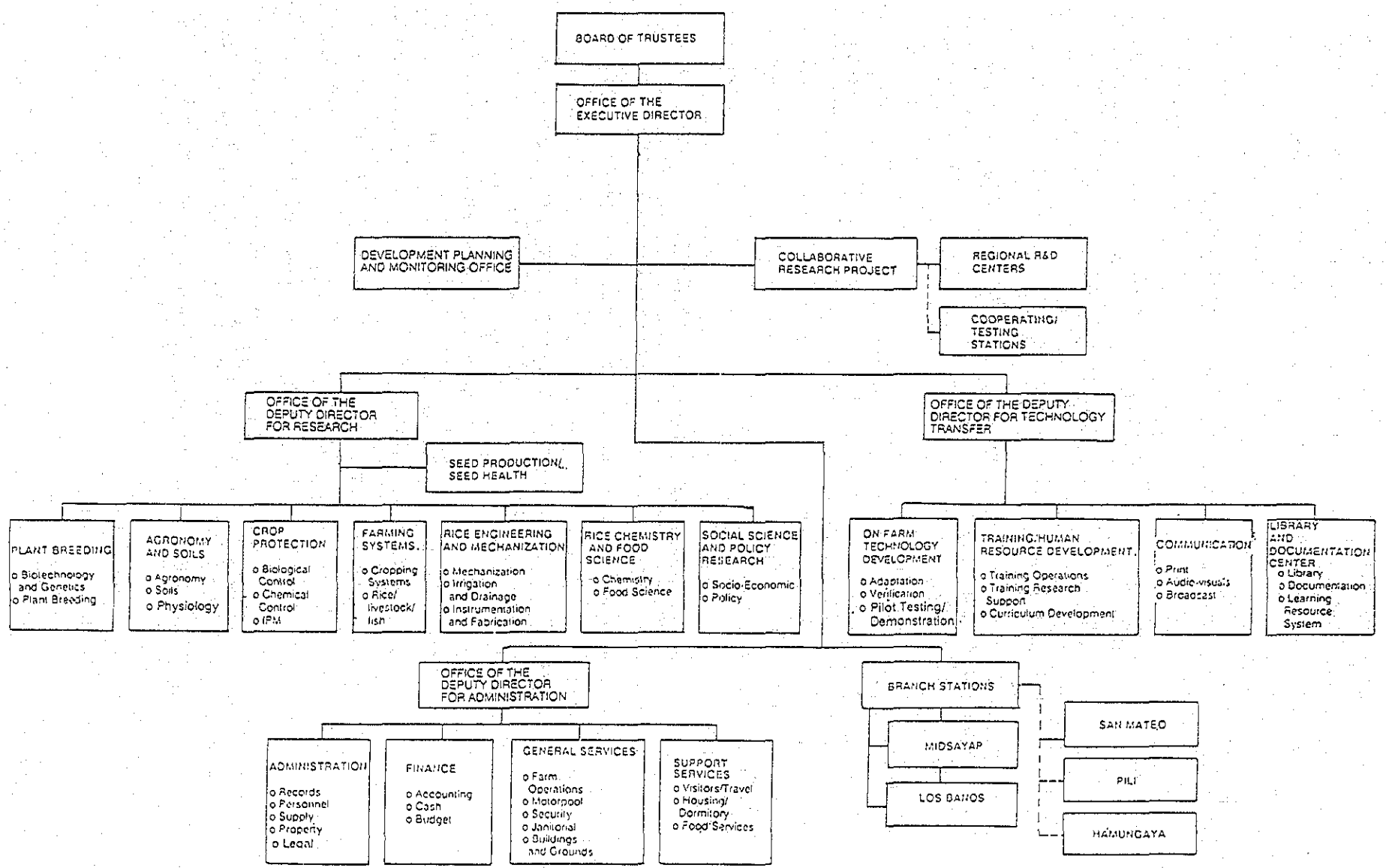
a) Because of the limited facilities and space for the experimental farm, the present temporary headquarters in Los Baños is not capable of accepting more staff. More staff members will be employed in accordance with the gradual movement of facilities to Maligaya starting in June.

b) Qualified graduates from CLSU in Muñoz will be employed.

The staff will increase gradually by 1992, the total number reaching 447, 357 excluding those in the MES. After 1992 no staff increase is scheduled, the number staying more or less at 447.

PhilRice is rather a young institution and has scheduled a rapid staff expansion program which intends to double the present staff in three years from 1989 to 1992 as shown in table 3-1. As the

FIGURE 3–1 ORGANIZATIONAL STRUCTURE OF PHILRICE AT FULL OPERATIONS



average age of the staff is 25, and their wages are not very high, there would seem to be few problems in the staff expansion program if the needed government budget appropriations are obtained.

TABLE 3-1 PROJECTED PHILRICE MANPOWER

	1989	1990	1991	1992
Director's Office	6	9	9	9
Develop. Plan Man. Office	6	5	7	8
Collaborative Program	6	8	9	9
Research	127	136	156	155
Technology Transfer	25	76	91	91
Finance/Administration	40	71	81	83
MES	28	40	50	60
Cooperative	-	10	15	20
RRC	-	5	8	10
T O T A L	238	360	426	445

(2) Budgetary Measures

PhilRice received financial support from the NAFC (National Agriculture & Fisheries Council) in 1986, and in 1987, the first annual governmental budget appropriation was obtained. Unlike other governmental institutions, PhilRice's personnel expenses make up only a small percentage of the 1989 budget (17.5% compared to 40 to 50% in others).

The total annual budget of PhilRice is assumed to triple during 1989 to 1994. Although PhilRice is attached to the DA, its budget schedule is submitted directly to the DBM. Since this project is regarded as high priority by the Government of the Philippines, and the PhilRice's budget has doubled from 1988 to 1989; the appropriation for this project is to be assured in most part. In addition, PhilRice is allowed to sell orginally developed seeds applicable to various cropping conditions. Income from these seed sales forms part of the budget and used upon approved by the board trustees.

TABLE 3-2 1989 BUDGET ALLOCATION

(in pesos, as of June 1989)

Department/ Program	Total Amount	Personal Services	MOE
General Administrative & Support Services	40,393,089	2,578,089	1,815,000
Rice Varietal Improvement	2,884,587	1,087,735	1,796,852
Planting & Fertilizer Mgt.	2,019,887	450,927	1,558,960
Integrated Pest Mgt.	1,884,632	292,800	1,591,832
Rice Farming System	1,801,714	430,730	1,370,984
Rice Engineering & Mechanization	3,417,773	397,903	3,019,830
Rice Chemistry & Food Science	1,537,641	447,113	1,090,528
Social Science & Policy Research	1,559,633	461,415	1,098,218
Training, Communication and Technology Transfer	5,251,084	1,025,288	4,225,796
Capital Outlay	16,000,000		
TOTAL ALLOCATED	40,750,040	7,172,000	17,578,000

TABLE 3-3 PROJECTED BUDGETARY SCHEDULE FOR ABOUT FIVE YEARS AFTER THE STATION STARTS OPERATION

(in thousand pesos)

OBJECT OF EXPENDITURES	1990	1991	1992	1993	1994	Total
Personnel	23,420	29,447	37,584	44,239	53,198	187,888
Maint. & Other Oper. Expenses	41,084	59,434	81,600	95,673	105,355	383,146
Capital Outlays	22,826	20,929	18,497	24,887	44,159	131,298
T O T A L	87,330	109,810	137,681	164,799	202,712	702,332

TABLE 3-4 ESTIMATED MAINTENANCE AND OTHER OPERATING EXPENSES FROM 1990 TO 1994 (in thousand pesos)

Particulars	1990	1991	1992	1993	1994	Total
Travelling Expenses	5,156	7,460	10,241	12,010	13,225	48,092
Communication Services	3,345	4,839	6,643	7,788	8,576	31,191
Repairs/Maint. of Govt. Facilities	2,216	3,204	4,398	5,158	5,680	20,656
Transportation Services	486	704	963	1,130	1,244	4,527
Other Services	6,252	9,045	12,419	14,563	16,136	58,415
Supplies & Materials	13,472	19,490	26,756	31,373	34,547	125,638
Grants, Subsidies, & Contributions	1,114	1,611	2,211	2,594	2,856	10,386
Auditing Services	3,904	5,648	7,752	9,088	10,008	36,400
Maintenance of Motor Vehicles used for Official Travel	2,401	3,471	4,765	5,589	6,155	22,381
Discretionary Expenses	838	1,213	1,665	1,955	2,152	7,823
Extraordinary/Emergency Contingency Expenses	1,900	2,749	3,787	4,425	4,776	17,637
T O T A L	41,084	59,434	81,600	95,673	105,355	383,146

TABLE 3-5 SCHEDULE OF FUNDS AND EXPENDITURES BALANCES YEARS ENDING 1986 TO 1988 (in thousand pesos)

Particular	1986	1987	1988
Balance, Beg. of the Year	0	7,336	3,460
Funds/Revenue Received:			
NAFC Grant	7,500		
USG Grant			408
Govt. Subsidy			15,164
Interest Income	700	492	617
Income from Seeds			314
Misc. Income			57
Total Funds Avail.	8,200	7,828	20,020
Expenditures			
Personal Services	541	1,696	6,562
Travelling	46	46	653
Communication	3	7	234
Repairs & Maint. of Govt. Facilities		1,148	379
Supplies & Materials	46	280	2,104
Grants & Contributions			335
Water, Light, Power	15	39	61
Maint.-- Motor Vehicles	1	301	361
Other Services	212	400	2,175
Equipment Outlay		423	3,342
Total Expenditures Incurred	864	4,368	16,288
BALANCE, ENDING	7,336	3,460	3,732

TABLE 3-6 GRANT AID PROJECT FOR PHILRICE IMPROVEMENT PROGRAM GOP COUNTERPART FUND BUDGET SUMMARY For the Period from July 1, 1989 to December 31, 1990

(in pesos)

Particular	Total Amount	Budget 1989	Budget 1990
PERSONNEL SERVICES			
Salaries	964,260	321,420	642,840
COLA	128,700	42,900	85,800
Honoraria	663,000	221,000	442,000
Other Benefits	1,460,868	486,956	973,912
Total Personnel Services	3,216,828	1,072,276	2,144,552
Maintenance and Other Operating Expenses			
Travelling Expenses	1,950,000	650,000	1,300,000
Supplies and Materials	1,500,000	500,000	1,000,000
Representation Expenses	1,650,000	550,000	1,100,000
Rent	500,000	168,000	332,000
Communication	850,000	284,000	566,000
Maintenance of Vehicles Used for Official Travel	800,000	265,000	535,000
Extraordinary/Emergency Expenses	650,000	216,000	434,000
Other Services	2,800,000	933,000	1,867,000
Total MOE	10,700,000	3,566,000	7,134,000
Capital Outlay			
Office & Transport Equipment	4,192,259	3,144,194	1,048,065
Infrastructure	42,935,282	32,201,462	10,733,820
Total Capital Outlay	47,127,541	35,345,656	11,781,885
TOTAL BUDGET FOR 1989 AND 1990	61,044,369	39,983,932	21,060,437

3-2-3 Collaborating Institutions

(1) PhilRice and IRRI

PhilRice and the IRRI will actively collaborate in research, training and technology transfer activities involving rice and rice-based farming systems. The IRRI will also assist PhilRice in the massive training and retraining of Filipino scientists and extensionists to update them on the latest information on rice research and development. Likewise, the IRRI will make available seed materials to Filipino rice scientists and researchers.

Moreover, the IRRI will continue to implement its programs and maintain its leadership in rice research at the international level. However, as to its activities which are considered national in nature, PhilRice will assume leadership in them.

(2) Role of the IRRI

For the purpose of improvement of rice productivity in the developing countries, the IRRI provides agronomical research and studies as well as training especially for small-scale farmers. Many of the research and study activities are undertaken in cooperation with related research institutions in several countries. The major responsibilities that the IRRI bears are as follows:

a) Technology development to improve rice science and technology,

b) Training rice researchers to enhance their R & D capability,

c) Germplasm conservation and supplies (collect wild, native, and recommended varieties from all over the world and conserve them for use in the future by plant breeders as sources of characteristics that are desired for various purposes: high yield, quality, resistance to pests, adverse soils and climates, etc.),

d) Exchange and share of knowledge about rice through publications, seminars, conferences, workshops, and field visits.

e) The training of rice scientists from various countries by giving attention to the staff of the national research systems that need training in production, special techniques or methods in modern research, and advances in all fields of rice science and technology.

f) Networking as a means to facilitate the exchange of materials and knowledge among countries and between the IRRI and other countries by providing technical support for national or regional programs, consultancy to improve programs, etc.

(3) IRRI Responsibilities Turned Over to PhilRice

Some of the IRRI responsibilities that will be turned over to PhilRice are as follows:

a) IRRI-DA technology transfer workshops

Research results have to be passed on to technology implementors of the DA. Thus, the IRRI initiated a bi-annual technology transfer for the top management staff (Regional Directors and their senior staff). This will update implementors on the new results that need to be verified in their respective production areas. PhilRice will take over these tasks with the IRRI's collaboration. It will also take the lead in determining the needs of the regions and preparing the appropriate procedures to be taken so that the new information and technology from the IRRI can be chosen and processed for the agenda of the workshop program.

Technology transfer is a national responsibility, thus PhilRice investigates the IRRI's research results, prepares these for field verification and disseminates the results to farmers. Field problems are referred to the IRRI for the necessary modifications of technology.

b) Training on rice production, IPM, postharvest systems and other related activities will be undertaken by PhilRice, with the IRRI in collaboration. The IRRI will develop rational training modules and PhilRice will modify them for the various levels of

trainees to make learning more applicable to their specific conditions.

c) PhilRice will be responsible for improving the skills and knowledge of the agrarian reform beneficiaries on rice and in encouraging them to produce their own certified seeds. The Institute will also activate the utilization of indigenous fertilizers such as azolla and Sesbania rostrata, as well as farm machines like the roto-tiller and rice thresher.

d) The IRRI has been undertaking the publication of books and bulletins in Tagalog as a service to Filipino farmers, but this is not in fact its responsibility. PhilRice will publish materials useful to the Filipino farmers.

e) On policy formulation, the IRRI does not formulate rice policies for the Philippines. PhilRice will assume this role.

(4) IRTP, INSFER, ACSN

PhilRice has a collaborative agreement with the IRRI, linking it with six other international programs. They are:

a) International Rice Testing Program (IRTP)
b) Asian Cropping Systems Network (ACSN)
C) International Network on Soils and Fertilizer Efficiency (INSFER)
d) International Rice Germplasm Center (IRGC)
e) International Training Program (ITP)
f) International Co-Publication Program (ICPP)

(5) MRRTC and Other Regional Centers

The central experiment station will be established in Muñoz, Nueva Ecija at the site and facilities of the MRRTC. The present PhilRice office at Los Baños will be maintained to house the liaison office, the scholars and joint programs with the UPLB.

The station shall undertake analysis work and studies on varietal improvement, planting and fertilizer management, integrated pest management, rice engineering, farming systems, rice chemistry and

processing, and social science research, development work, training and communication. The nationwide R & D network as shown in figure 3-2 will be established under PhilRice coordination.

The regional centers (the state colleges and universities) will undertake a broad range of research and development studies appropriate to regional needs.

The cooperating stations will primarily conduct adaptation, verification, demonstration and pilot testing studies.

(6) PCARRD and DA-BAR

PhilRice coordinates with PCARRD and DA-BAR in planning, monitoring and reviewing its eight program thrusts. PhilRice also collaborates with SCUs in technology generation and with DA regional offices on technology adaptation, verification and dissemination. Moreover, PhilRice involves farmers and non-governmental organizations in its planning and decision-making.

(7) UPLB

To formalize international collaboration, UPLB and PhilRice signed a Memorandum of Agreement in August 1987 to jointly undertake research and related activities on rice varietal improvement, integrated pest management, farming systems and technology transfer. To effect this tie-up, a management committee was formed to determine the activities to be undertaken by each agency, and recommend policies and guidelines for PhilRice management.

At present, UPLB provides its service for PhilRice in screening and recommending UPLB staff to be program leaders (seconded staff) to PhilRice. The program leaders render 50% of their time to the University and the other 50% to PhilRice.

The major area of collaboration is on varietal improvement since UPLB has been involved in the development and breeding of rice for a long time and its basic and applied research on rice is unsurpassed by any other university in the country. Another major area in which UPLB and PhilRice have joined hands is in the program for

rice mechanization, irrigation and drainage, in which several other agencies are involved.

(8) NIA

In one of the projects of REMP, specifically the sourcing and utilization of underground water, there will be a collaborative activity with the National Irrigation Administration. In another project, the Small Water Impounding Project, there is collaboration with the Bureau of Soils and Water Management, CLSU, PSU and PCARRD.

(9) Program for Rice Mechanization in the Philippines

The traditional slow, backbreaking and inefficient rice growing techniques have changed a bit, thanks to agricultural engineers and local fabricators who have persisted in mechanizing every aspect of the production process.

One of their immediate concerns is to determine the state of rice mechanization in the Philippines and the local problems of people in the rice industry. PhilRice will manage the program. It will coordinate the development of new machines, test and evaluate its own and those developed by independent manufacturers, and promote them in the villages. The IRRI being quite advanced, it will provide the initial prototypes for the testing, evaluation and promotion of the equipment while it continues to build new machines. UPLB-AMDP-AMTEC will do the testing and evaluation of the farm machinery while the NAPHIRE will funnel its resources to postharvest technology of crops other than rice.

Consequently, PhilRice will proceed with rice research and development in cooperation with the IRRI, UPLB and other rice research institutions. Roles of other institutions will gradually be shifted to PhilRice so that it can take the initiative in rice research and study activities in the Philippines. However, it will be difficult without cooperation from other institutions. Thus, as the first step, PhilRice is responsible for coordinating research and studies developed by various institutions and incorporating them into composite results.

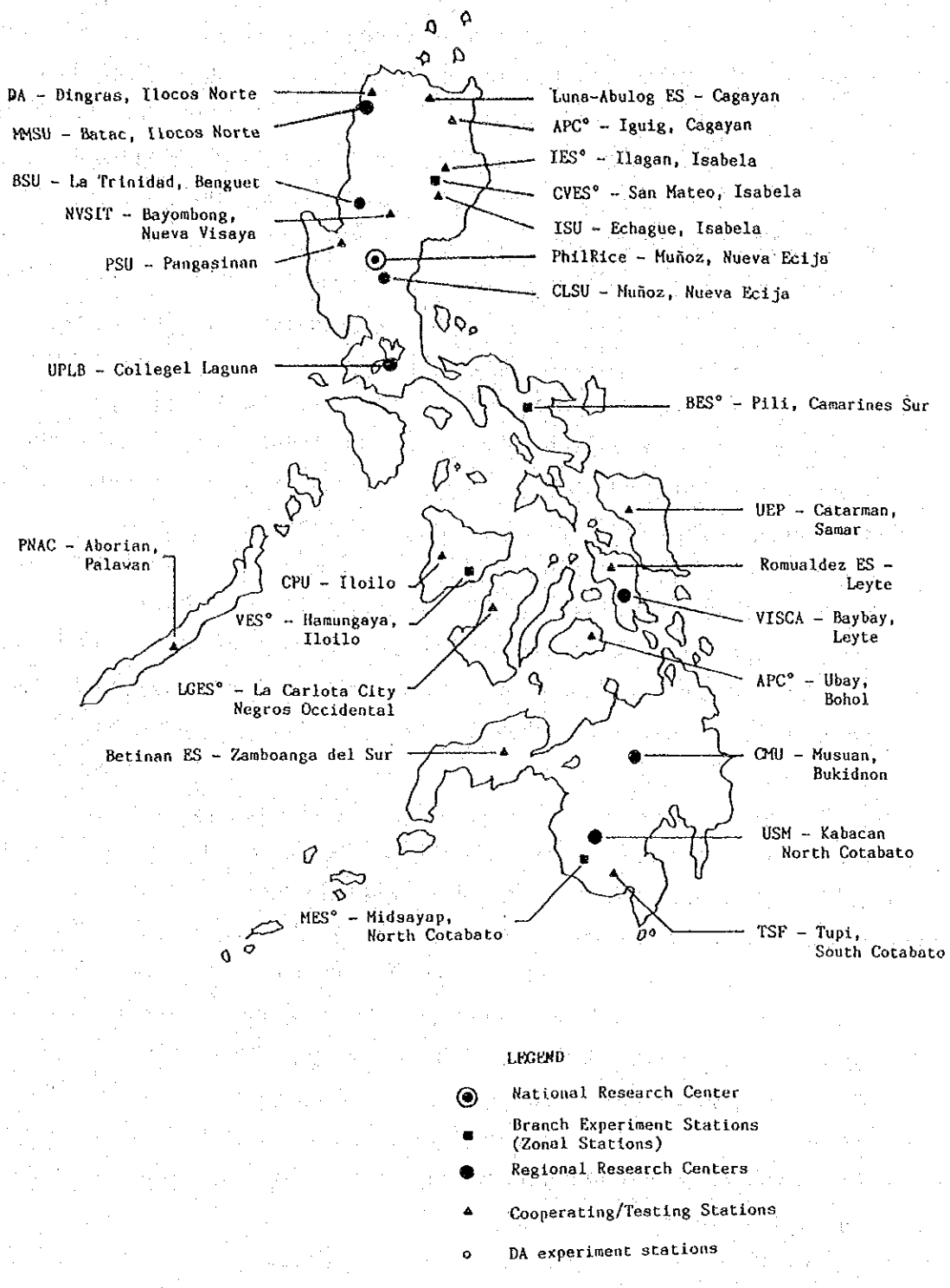


FIGURE 3-2 THE PHILRICE R & D NETWORK

3-2-4 Review on the Requested Facilities and Equipment

(1) Facilities

The original request from the Government of the Philippines shown in Sec. 2-3-2 was for quite large facilities. The criterion for estimating the required floor area is a PhilRice staff size of 357 persons in 1992. The year 1992 is the target year by when PhilRice plans to allocate the full number of personnel annually. The staff members will start to move in June. The transfer of a staff of about 90 in Los Baños with their families is a big project. There may be many difficulties like staff housing, for example. PhilRice plans to renovate existing facilities such as the dormitory and assembly hall so that they can be used for staff housing. These arrangements are only a temporary, not a fundamental solution. A steady, long-term housing program is necessary, taking into account the conservation of a favorable environment.

There are only four years until 1992. Even though it may be programmed under Japanese grant aid, transfer of the present staff plus an increase doubling the total staff in four years may not be feasible because of problems like the insufficiency of housing, etc.

Among the economic revitalization policies of the Aquino administration, agriculture is given the highest priority for prompt redevelopment, but even a high priority project may not be able to acquire appropriations for new staff housing, etc. given the stringent financial condition of the government. Money for repairing or remodelling existing facilities is the most that can be expected. The total Philippine budget appropriation for Japan's grant aid projects that PhilRice has applied to in fiscal year 1989 is 47 million pesos (about 300 million yen), which is to be used in the following work:

a) Construction of a fence around the entire compound including the experimental farm
b) Overflow protection of the NIA irrigation canal
c) Construction of screenhouses
d) Transfer cost from Los Baños to Muñoz

e) Cost of repairing or remodelling present facilities to create staff housing
f) Site preparation work of the project site
g) Infrastructure improvement work

Considering this situation, it seems appropriate to provide grant aid for facilities and equipment based on this year's staff size aiming at steady growth of the organization along with improvement in staff housing. By assuming a total staff of 210, 189 regular staff and 21 consultants, facility planning will have sufficient capacity to coordinate with some expansion of staff without interference with PhilRice activities.

On the project site, there still remain some MRRTC facilities that were transferred to PhilRice last year. The field survey found that most of these facilities have termite damage, from eaves or window frames outside to door frames, walls and ceilings inside. Though it is highly important to utilize existing facilities as much as possible, restoration of these facilities is not recommendable. The reasons are --

a) Inspections show that termite damage can easily be expected to disperse to most parts of the buildings. Even though all the surface materials are removed and repaired completely, termites are seldom completely exterminated. They may reappear in a few years.

b) Water leakage through the roofs and a peeling-off of exterior concrete walls were observed in quite a few places. It was not certain whether these were the result of termite damage or structural deterioration, but in any case repairs are needed.

For these reasons, it is recommended that utilization of the existing facilities be entrusted to PhilRice and grant aid be applied to the construction of new facilities.

(2) Headhouse/Greenhouse/Screenhouse & Phytotron

The request for facilities included 28 houses for four program thrusts of variety improvement, plant and fertilizer management, integrated pest management and rice farming systems, 24 greenhouses for plant cultivation and 2 phytotrons; 54 houses in total.

The greenhouse size is determined according to the following conditions:

a) Greenhouses shall be used only for research subjects continuing at present.
b) Only the minimal required number of houses are to be provided due to high operation and maintenance costs.
c) Houses shall be used in common among the sections.

Construction of screenhouses is entrusted to the Philippines because it is rather simple, with only wire nets on steel frames. Phytotrons will not be built because they require high maintenance cost.

(3) Improvement of Experimental Farm

The request was for reconstruction of all the canals for the experimental farm of about 70 hectares located on the east of the project site, installation of a fence to keep out animals, construction of an embankment and a ditch to hold rain water flowing from the north side, as well as the restoration and extension of the earth pipe in the creek on the southeast of the site.

The existing experimental farm used by the MRRTC has a small thin concrete (5 cm thick) ditch which often breaks. It does not have sufficient drainage capacity for the experimental farm. A main drainage ditch is to be constructed to assure sufficient drainage capacity to maintain equal fertility of the farm soil. It is agreed upon that construction and repair of the fence, embankment, ditch, and sluiceway will be entrusted to the Philippines.

(4) Equipment

The total amount of equipment numbers about 700 pieces composed of equipment for laboratories, audio-visual use, the experimental farm, office use, machine maintenance, transport, etc.

The type of the equipment will be selected according to the conditions below.

a) The equipment will be selected for use in continuing research. That for the research being planned is not considered.

b) The types shall be chosen considering the supply of spare parts and maintenance situation in the Philippines so that there will be no trouble in the operation and maintenance by the Filipino workmen.

c) A minimum amount of equipment for VCR editing will be provided for production of training materials.

d) Printing equipment will be so selected as to be sufficient to prepare a record of research results for promotion and training materials.

e) Balances, microscopes and cameras are requested to be used in common among the program sections.

f) Computers are to be installed in each program section. They will not have a central host control system.

g) The equipment for the experimental farm and for post-harvest engineering is only what is needed to supplement existing equipment.

h) Equipment required for the repair and maintenance of vehicles and farm machinery is provided.

i) The required number of vehicles for transport will be provided after thorough investigation of their purposes.

(5) Research Program

The following research subjects per program were proposed by PhilRice (except for technology transfer).

a.	varietal improvement	15 subjects
b.	planting & fertilizer management	6 subjects
c.	integrated pest management	11 subjects
d.	rice-based farming systems	6 subjects
e.	rice engineering & mechanization	8 subjects
f.	rice chemistry & food science	6 subjects
g.	social science & policy research	10 subjects
	T o t a l	62 subjects

Among these subjects, those most needed presently in the Philippines will be given the highest priority, considering the current number of the PhilRice staff. The subjects to be incorporated in this project shall conform to the following criteria:

1. Subjects as to development of applied technology and dissemination methods;
2. Subjects specific to the Philippine conditions which the IRRI has not been concerned with; and
3. Research being undertaken already.

The subjects requiring precision instruments or complicated analyzers, etc. shall be excluded, but those not yet proposed though regarded necessary shall be included instead. Based of these considerations, the following subjects are to be involved in this project.

a.	varietal improvement	12 subjects
b.	planting & fertilizer management	6 subjects
c.	integrated pest management	4 subjects
d.	rice-based farming systems	2 subjects
e.	rice engineering & mechanization	6 subjects
f.	rice chemistry & food science	3 subjects
g.	social science & policy research	3 subjects
	T o t a l	36 subjects

Details of each research subject are as mentioned below.

a) Varietal Improvement

1. Varietal improvement

a. Collection and preservation of rice germplasm

b. Evaluation, documentation and utilization of rice germplasm

Collecting and assorting insect and disease resistant, high yielding, widely adaptable germplasm with good grain quality. These elements are expected in traditional varieties grown in rural areas.

2. Upland rice improvement

a. Observation nursery for miscellaneous upland rice collections

b. Upland rice hybridization and progeny selection

c. Upland rice preliminary testing

Introducing and developing upland rice adaptable to specific major agronomical conditions to improve such characteristics as early maturing, small tillers, heavy panicle type, insect and disease resistance, lodging resistance, and drought resistance.

3. Rainfed lowland rice improvement

a. Observation nursery for miscellaneous rainfed lowland rice collections

b. Rainfed lowland rice progeny selection

c. Rainfed lowland rice preliminary performance test

Selecting and introducing varieties from among traditional ones with good grain quality, and resistance against environmental stresses.

4. Irrigated lowland rice improvement

a. Observation nursery for irrigated lowland rice cultivars

b. Hybridization and selection in segregating generations

c. Preliminary yield trial of irrigated lowland rice cultivars

d. Response to low levels of nitrogen input

Developing rice varieties that will perform satisfactorily under low levels of farm input. Selecting a maternal type with high density grain setting, resistance against diseases like sheath blight, bacterial leaf spot, viruses, and resistance against insects like stemborers, and green leafhoppers.

5. Development of rainfed lowland rice cultivars adapted for drought-prone and/or flood-prone areas
   a. Observation nursery
   b. Selection in segregating generations
   c. Preliminary yield trial of rainfed lowland rice in drought- and flood-prone areas

There are 920,000 ha of rainfed lowland rice fields of which 42% is in flood-prone areas with water seepage of 30 to 100 cm deep, and 58% is scattered in drought-prone areas. Research programs to develop technology for high productivity in adverse environment are an urgent necessity, and are given priority over other rice varietal improvement programs.

6. Development of rice cultivars adapted to adverse soil conditions
   a. Observation nursery for rice cultivars in saline soils
   b. Field evaluation of tissue culture derived from salt tolerant lines
   c. Hybridization and selection in segregating generations
   d. Preliminary yield trial

Selecting varieties tolerant to adverse environment from among introduced collections, and defining saline resistance of tissue cultures to develop adaptable characteristics. There are 400,000 ha of saline areas of which only 100,000 ha are used for rice production, and 500,000 ha of sulfide acid areas. These areas cause low rice productivity of the Philippines.

7. Utilization of tissue culture technology for rice
   a. Anther culture (by pollens)
   b. Embryo culture (by seed embryos)
   c. In-vitro selection for stress

Utilizing tissue and cell cultures to expand variation probability of favorable characteristics and to select segregating generation in a short period. Laboratory experiments to develop methods to create haploid chromosome complement, optimum cultivation conditions, protoplast fusion and its verification and to select saline-resistant lines.

8. Screening rice lines/varieties for insect resistance
   a. Screening for green leafhopper resistance
   b. Screening for brown planthopper resistance
   c. Screening for stemborer resistance

Collecting and introducing selections with resistance against insects like brown planthoppers (ecotype 1, 2, 3), stemborers and green leafhoppers, and testing to find favorable varieties.

9. Screening rice lines/varieties for disease resistance
   a. Field screening and evaluation
   b. Induced method of screening and evaluation
   c. Modified method of screening and evaluation

Screening and evaluation under modified or field conditions for resistance against rice blight, bacterial leaf spot, sheath blight, rice tungro virus, grassy stunt and ragged stunt viruses. Field screening for resistance against other diseases.

10. Grain quality test of rice lines/varieties
   a. Milling potential and physical attributes of rice entries in field performance test
   b. Physico-chemical properties of rice entries in the field performance test
   c. Cooking parameters of rice entries in the field performance test and sensory evaluation of all promising entries

Defining milling potential and physico-chemical properties of rice entries of which productivity verification is conducted to clarify interrelations of quality evaluation factors.

11. National cooperative rice performance test
    a. Screening for disease resistance
    b. Screening for insect resistance
    c. Grain quality test

Collaborative test with the IRRI and UPLB for final verification before submitting to the seed board the varieties recommended for dissemination. Target varieties are classified into upland rice, lowland rice, irrigated lowland rice, direct-seeded or transplanted rainfed lowland rice, and are tested as to their yield, resistance against pests, grain quality, etc.

12. Basic seed production of recommended/popular rice varieties
    a. Basic seed production of recommended/popular rice varieties
    b. Further seed increase of seed board approved and popular rice varieties

Producing a pure variety with good grain quality for steady seed production procedures from breeder seed, original seed, registration and certification.

b) Planting and Fertilizer Management

1. Cultivation technology for steady rice production on farms
    a. Analyses of low productivity causes
    b. Countermeasures to sustain steady productivity

2. Characterization and classification of the rice growing environments
    a. Identification of production constraints in lowland rice
    b. Characterization and amelioration of micronutrient problems

3. Integrated nutrient management for rice under irrigated and rainfed conditions
    a. Soil and fertilizer management for suitable production
    b. Evaluation of green manure species under various rice agronomical environment in the Philippines
    c. Screening and evaluation of lowland rice varieties for suitability to intensive cropping

d. Yield response of selected lowland rice varieties for fertilization under different agro-climatic conditions

e. Dry seeding of rainfed rice

Developing technology to raise efficiency of response to fertilizer input, establishing the optimum nutrient management under various conditions, evaluating effectiveness of green manure, selecting varieties for intensive cropping and testing their response to fertilizer input

4. Crop establishment for better stand and yield of rainfed rice

a. Delayed transplanting of lowland rice under rainfed conditions

Evaluating planting technology for better stands under dry seeding conditions and influence of delayed transplanting of lowland rice under rainfed conditions

5. Utilization of urea super granules for transplanted rice

a. Field experiment at the PhilRice branch stations

6. Field testing of different fertilizer materials

a. Field evaluations and demonstrations of liquid fertilizer

b. Evaluation of the long term effects of organic fertilizer

c) Integrated pest management

1. Participatory verification and adaptation of component technology for IPM in lowland rice specific production regions

a. Verification of nationally packaged economic threshold levels for insects and pests

b. Development of location specific rodent pest management

c. Varietal characteristics affecting pest/natural enemy fluctuation

2. Population dynamics and insect-resistant rice varieties

a. Seasonal fluctuation of natural enemies of stemborers

b. Yield loss due to stemborers

3. Monitoring of biological end environmental impact of pesticides
   a. Development of rapid field method for pesticide residue analysis
   b. Determination of re-entry period for farmers in treated rice fields
   c. Effect of commonly used pesticides on the natural enemies of lowland rice pests

4. Development of control technology on irrigated/upland rice
   a. Chemical control technology on irrigated lowland based economic thresholds for rice insects and pests
   b. Timing of insecticide application against stemborers based on day of egg hatching
   c. Timing of insecticide application against stemborers during the critical growth stages of rice

d) Rice-based farming systems
   1. Upland rice farming systems
      a. Cropping pattern trials in upland rice areas in Batangas
      b. Fertilizer management in upland rice areas
      c. Upland rice-based farming systems at the UPLB
      d. Crop residue incorporation in various upland rice-based cropping systems
      e. Comparative effects of organic and inorganic cropping patterns
      f. Fertilizer application in upland rice-based farming systems
      g. Dynamics of insect pest and predator populations in various rice-based cropping patterns

   2. Irrigated lowland rice-based farming systems
      a. Utilization of existing dikes in rice paddies for upland crop production

e) Rice engineering and mechanization
   1. Comprehensive evaluation of rice machinery and equipment
      a. Study of rice machinery and equipment in the Philippines

b. Utilization of rice machinery and equipment in the Philippines
c. State of rice mechanization in the Philippines; research, development, extension and training

2. Development and improvement of rice machinery and equipment
   a. Development of upland rice machinery and equipment
   b. Improvement and adaptability test of rice transplanter
   c. Development and improvement of deep placement fertilizer application
   d. Steam as an alternative source of power for rice milling in the Philippines
   e. Bulk handling of rice grains in the humid tropics

3. Rice production machinery and equipment technical verification and assessment
   a. Rice production machinery and equipment technical verification and assessment

4. Rice production machinery and equipment dissemination and utilization
   a. Rice and rice-based irrigation machinery and equipment dissemination and utilization
   b. Land preparation machinery and equipment dissemination and utilization
   c. Seeding, plant protection and maintenance machinery and equipment dissemination and utilization

5. Rice post-harvest machinery and equipment dissemination and utilization
   a. Introduction of the mechanical rice harvester/reaper to village organizations
   b. Adoption of the UPLB improved village rice mill
   c. Adoption of the mechanical rice dryer

6. Development of small size water reservoir technology
   a. Collaborative research work with the IRRI staff

b. Trial of installing small reservoirs in rainfed and irrigated fields
c. Adoption of the mechanical rice dryer

f) Rice chemistry and food science

1. Rice grain quality improvement research in support of the varietal improvement program
   a. Quality evaluation of traditional and new rice varieties

2. Rice food product development and diversification of rice and rice flour
   a. Improvement of bihon quality

3. Improvement of design and testing of processing equipment for rice and rice-based food products
   a. Survey and documentation of traditional processing equipment
   b. Evaluation, testing and improvement of traditional processing equipment

g) Social science and policy research

1. Regular monitoring of rice farming household during the dry and wet seasons
   a. Socio-economic survey/analyses of rice farming household
   b. Survey/analyses of rice farmers' conditions and rice production during wet season
   c. Survey/analyses of rice farmers' conditions and rice production during dry season

2. Socio-economic conditions of rice farmers
   a. Socio-cultural characteristics of rice farmers
   b. Social organization of farm units
   c. Technological levels of farms

3. Annotated bibliography of social science research related to rice
   a. Social area delineation of farming conditions
   b. Social science literature on rice

c. Inventory of economic research on rice

(6) Training Program

According to the request, the average number of annual trainees was about 1,500 in 40 courses. As to the training facilities, eight training rooms for 50 persons each and one assembly room for 200 persons were requested. The following considerations shall be taken into account in order to rearrange the requested program into a feasible one within the number and capability of the present staff members.

1. Courses shall be established according to the skills of the trainees
   - The purpose and scope of training as well as the skills of the trainees shall be considered.

2. The training period shall not be too long depending on the subjects so that the training may not interfere with the trainees' life.
   - The farmers' training courses need to be scheduled in the farmers' off-season.

3. Each course shall be scheduled to avoid overlapping for the purpose of efficient facility utilization.
   - The extensionists' and other courses scheduled in the busy farming season shall be carried out so that directly related courses may not use one facility simultaneously.

4. Classes will be so formed as to achieve the most effective and efficient training results.
   - The optimum number of trainees in one class is about 30 considering practical training in the experimental farm and the capacity of training equipment.

The requested training programs, target people of training and training periods in the past are listed in the following pages.

a) Target people of training

TABLE 3-7 TRAINING CLIENTELE

Training Program	Clients	Total Number of Participants
1. Farmers' training	Outstanding farmers/ farmer-leaders	43,000
2. Extensionists training	Agronomical production technicians	13,000
3. Specialized Courses	- Subject matter Specialists	500
	- Trainers	250
	- Middle-level supervisors	3,000
	- Researchers	5,000
	- Seed growers	1,500
4. Institutional Workshops	- Dept. of Agriculture (DA regional directors)	12
	- Assistant regional directors	36
	- Provincial agricultural officers	77
	- Network program leaders	36

For farmers, PhilRice will bear all the training costs including travelling expenses. As to the costs for other trainees, travelling expenses will be paid by the organizations or institutions that the trainees belong to, and PhilRice will bear food and living expenses during the training.

As the central experiment station is located in one of the leading rice cropping areas in the Philippines, many farmers live nearby who are regarded as the target people of technology transfer. The population of the farmers around the station is as listed below:

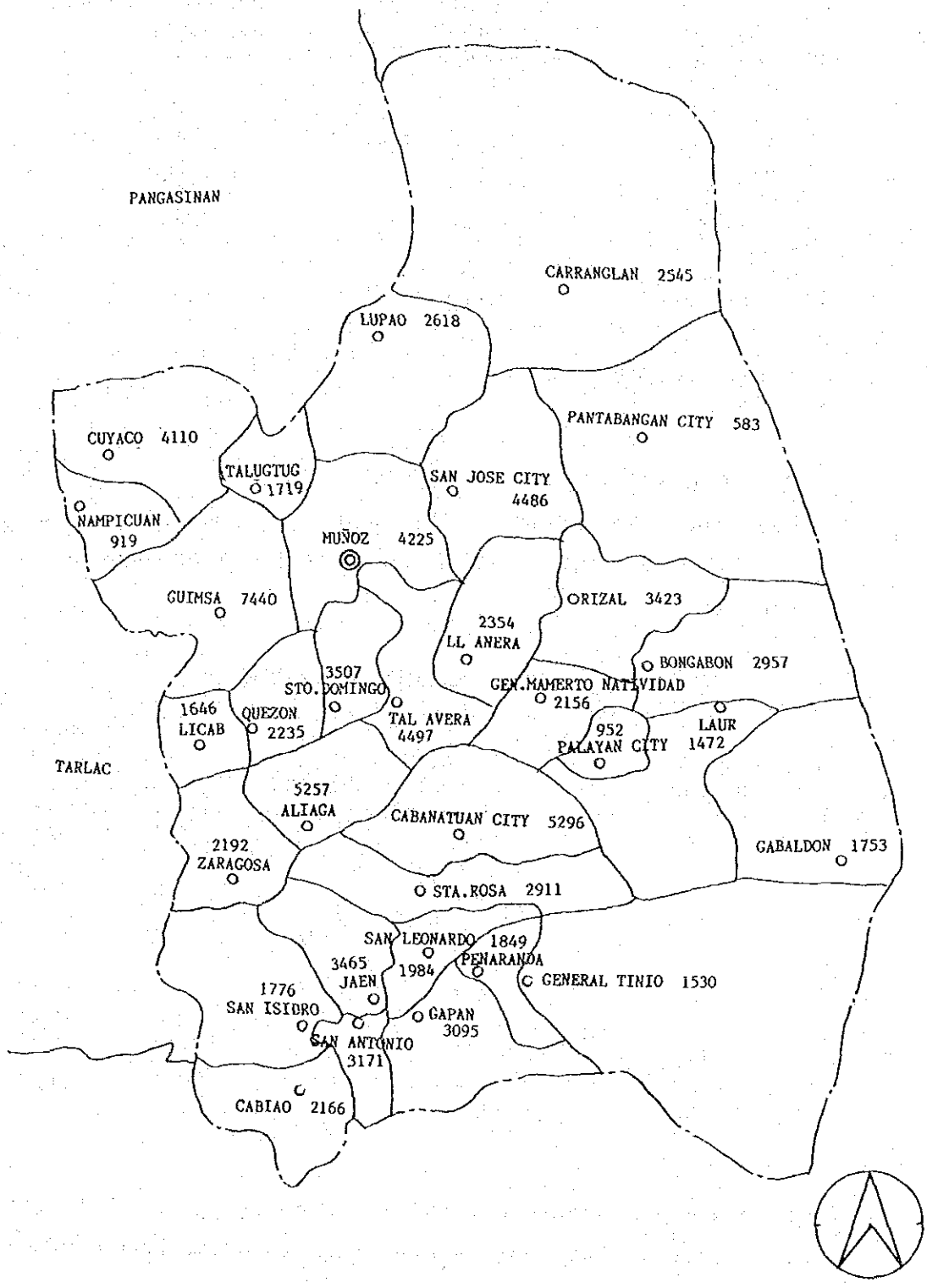


FIGURE 3-3 REGION III - NUEVA ECIJA

TABLE 3-8 POPULATION OF NEARBY FARMERS

Town	No. of Farms/ Farmholders°	Relative Distance from MRRTC
Muñoz	4,225	4
San Jose City	4,486	16
Lupao	2,618	35
Talugtog	1,719	15
Guimba	7,440	20
Sto. Domingo	3,507	22
Talavera	4,497	24
Llanera	2,354	20
Cabanatuan	5,296	40

° Based on 1980 Census

b) Past Training Achievements and Future Plan

Last year, PhilRice held training in 14 workshops with 797 participants. The total training period accounted to 2,484 man/days.

TABLE 3-9 PAST TRAINING ACTIVITIES

Qtr	No. of Training Workshops Conducted	Number of Individuals	Percent	Man-days	Percent
1	4	203	25	546	22
2	5	423	53	846	34
3	1	25	4	125	5
4	4	146	18	967	39
Total	14	797	100	2,484	100

These training courses cost 489,197 pesos (approx. 3.2 million yen). The training cost is appropriated in the annual budget of the DA and PhilRice.

TABLE 3-10 PHILRICE INVESTMENT BY AGENCY

Agency	Number of Individuals	Cost	Percent
Department of Agriculture	415	P 254,722.85	52
State Colleges/Universities	183	112,323.57	23
PhilRice	51	31,303.29	6
Farmer Leaders	128	78,565.12	16
Private Sectors	11	6,758.13	2
Other Agencies	9	5,524.11	1
T O T A L	797	P 489,197.07	100

TABLE 3-11 FIVE-YEAR TRAINING PROGRAM

PROGRAMS	YEAR I (1990)			YEAR II (1991)			YEAR III (1992)			YEAR IV (1993)			YEAR V (1994)			TOTAL	
	No. of Training Courses	Average Length of Training	Tot.No.of Individuals Trained (NOI)	No. of Training Courses	Average Length of Training	Tot.No.of Individuals Trained (NOI)	No. of Training Courses	Average Length of Training	Tot.No.of Individuals Trained (NOI)	No. of Training Courses	Average Length of Training	Tot.No.of Individuals Trained (NOI)	No. of Training Courses	Average Length of Training	Tot.No.of Individuals Trained (NOI)	No. of Training Courses	No. of NOI
1. Integrated Nutrient Management	2	4 Months	60	2	4 Months	60	2	4 Months	60	2	4 Months	60	2	4 Months	60	10	300
2. Rice Varietal Improvement	11	1 Month	300	8	6 Weeks	210	11	3 Months	280	10	2 Months	250	9	3 Months	230	49	1,270
3. Planting and Fertilizer Mgt.				1	3 Months	25				1	3 Months	25				2	50
4. Rice Farming Systems	3	6 Weeks	85	1	6 Weeks	110	2	1 Month	60	4	6 Weeks	110	4	6 Weeks	110	17	475
5. Rice Engineering and Mechanization	5	6 Weeks	135	6	6 Weeks	165	7	2 Months	180	7	2 Months	180	7	6 Weeks	180	32	840
6. Rice Chemistry and Food Science				2	2 Weeks	40	1	2 Weeks	25	1	2 Weeks	20	1	2 Weeks	20	5	105
7. Social Science and Policy Research	7	1 Month	60				2	1 Month	60				2	1 Month	60	6	180
8. Technology Transfer	15	2 Months	730	11	2 Weeks	660	15	2 Months	750	8	2 Weeks	510	14	2 Months	730	64	3,380
9. Office of the Director	3	1 Week	180	3	1 Week	180	3	1 Week	180	3	1 Week	180	3	1 Week	180	15	900
TOTAL	47		1,550	37		1,450	43		1,595	36		1,335	42		1,570	200	7,500

Average Training Courses to be conducted/year : 40 Training Courses
Average Number of Individual to be trained/year : 1,500 Individuals

95 % of the courses will be center based, hence the training center will be fully utilized.

3-2-5 Necessity of Technical Cooperation

The Government of the Philippines has requested project-type technical cooperation of the Government of Japan through the Japanese Embassy to the Philippines.

Sixteen Japanese experts are requested with the first and second priority as shown below. Technical cooperation period is one to five years, 41 years for a cumulative total. As a rather new institution just four years old, PhilRice does not seem to have a lot of experience. Few researchers are able to discuss with those of the IRRI or other agencies on an equal level, though it is definitely expected that they will take the leading role in rice research. Thus, technical cooperation in several stages is recommended to secure better results from the grant aid and the smooth operation of PhilRice after the grant (table 3-12).

3-2-6 Principles of Cooperation

This project needs consideration not only from technical but from socio-economic aspects as well. Grant aid shall be used not only to design and construct facilities or install equipment, but also to become really effective through an understanding what is required to sustain self-sufficiency in rice production to cope with future population increase, and thus involves formulation of future research programs and training systems with long-term objectives. PhilRice will make a new start at Muñoz for accomplishment of its objectives to coordinate R & D activities between Philippine rice research institutions and the IRRI, as well as to transfer technology that PhilRice has developed. For implementation of this project, Japan's grant aid shall be provided according to careful examination of its effects, feasibility, and capability of the Government of the Philippines. The original request was based on the staff allocation plan for 1992. However, it seems most appropriate to estimate the floor areas should be on the present facility and equipment requirements aiming at steady growth of the organization in the future. The outline and basic design of the project

TABLE 3-12 REQUEST FOR TECHNICAL COOPERATION

Experts	No.	Duration	Priority
1. Team Leader/Varietal Improvement Expert	1	5 years	1
2. Germplasm Collection and Maintenance Expert	1	1 year	2
3. Planting and Production Management Expert	1	3 years	1
4. Climate and Plant Type Relations Expert	1	2 years	2
5. Soils and Fertilizer Experts	2	2 years	1
6. Integrated Pest Management Expert	1	5 years	1
7. Farm Mechanization/Post-Harvest Expert	1	3 years	1
8. Experiment Station Development and Farm Tools/Equipment Expert	1	2 years	2
9. Agricultural Economics/Farm Management/Policy Experts	2	2 years	1
10. Cooperative/Marketing/ Extension Expert	1	5 years	1
11. Computer Programmer and Management Expert	1	2 years	2
12. Library and Documentation Expert	1	2 years	1
13. Audio-visual and Publication Expert	1	2 years	2
14. Project Coordinator	1	5 years	1
T o t a l	16	41 years (priority 1 = 32 years, priority 2 = 9 years)	

will be drafted based on these criteria. It is recommended that the original request from the Government of the Philippines be partially modified as mentioned in the review of requested facilities and equipment and in the details of the project.

3-3 Implementation Plan

3-3-1 Executing Agency and Operational Structure

The implementing organization of the project is PhilRice under the DA. The temporary headquarters is at Los Baños, where the director and staff of 89 work on research and development using a 7-hectare experimental farm. The experimental farm at Muñoz covers 70 hectares, where 58 staff members work.

After the completion of the project, the central experiment station, branch stations and research centers will provide the following services as detailed below.

(1) Central Experiment Station

Constructed in Muñoz, Maligaya, this station will function as the PhilRice headquarters. With its R & D and training facilities, it will conduct basic and applied research and studies.

(2) Branch Stations

Under the administrative and engineering management of PhilRice, four branch stations in the rice crop areas will conduct varietal improvement, planting and fertilizer management, and integrated pest management. They are not concerned with other programs in principle, but they may expand their services when the facilities are renovated.

a) Cagayan Valley Experiment Station (CVES)
b) Bicol Experiment Station (BES)
c) Visayas Experiment Station (VES)
d) Mindanao Experiment Station (MES)

(3) Regional Research Centers

They have a broad range of research activities and are the seat of PCARRD's consortium network. They conduct R & D studies applicable to regional needs. These centers are state colleges and universities which have the capability to undertake research and technology transfer.

(4) Cooperating Stations

They will conduct verification, adoption and pilot/demonstration projects.

3-3-2 Implementation Plan

(1) Operational Structure

The total number of staff in 1989 is 210. They are positioned as follows:

Department	No. of staff
Office of the Director	6
Administration Department	
Finance	15
Administrative services	6
General services	19
Program Department	
Varietal improvement dept.	31
Planting & fertilizer mgt. dept.	13
Integrated pest mgt. dept.	16
Rice farming systems dept.	12
Rice engineering system dept.	19
Rice chemistry & food science dept.	20
Social science & policy research dept.	14
Develop. & collab. research dept.	14
Technology transfer dept.	25
T O T A L	210

(includ. vacant positions)

The following pages show detailed positions and the number of staff in 1989, and the staff allocation schedule till 1992.

(2) Staff Allocation Program

The staff allocation program to be considered in calculating the floor area is based on the number of staff in 1989 including the 43 positions which are vacant at present.

PHILRICE STAFF ALLOCATION PLAN

1989		1990~1992			
Department	No. of Staff	Department	1990 Staff	1991 Staff	1992 Staff
(I) OFFICE OF THE DIRECTOR	Existing 4 Consultant 1 Vacant (June) 1	(I) OFFICE OF THE EXECUTIVE DIRECTOR	9	9	9
(Administrative/Support Services)	Existing 2	(II) FINANCE AND ADMINISTRATIVE DEPARTMENT	2	2	2
ⓐ Administrative Support Serv.	Existing 8	ⓐ Accounting Division	9	9	9
	Existing 1	ⓑ Budget Division	4	4	4
	Existing 4	ⓒ Cash Division	5	5	5
	Existing 2 Vacant (Oct.) 1	ⓓ Personnel and Legal Division	5	5	5
	Existing 2 Vacant 1	ⓔ Record Division	5	5	5
		(III) GENERAL SERVICES DEPARTMENT	1	2	2
	Existing 5	ⓐ Supply and Property Division	7	8	8
	Existing 9	ⓑ Motor Pool and Farm Operation Division	10	10	10
	Existing 5	ⓒ Buildings & Grounds Division	6	9	9
		ⓓ Housing & Food Services Div.	2	4	4
		ⓔ Visitors and Conferences Services Division	2	3	3
TOTAL ADMINISTRATIVE SUPPORT	46		80	90	92

Department	No. of Staff	Department	1990 Staff	1991 Staff	1992 Staff
		OFFICE OF THE DEPUTY DIRECTOR FOR RESEARCH			
		SEED PRODUCTION & SEED HEALTH UNIT	6	6	6
	Consultant 1 Existing 1 Vacant (June) 1	(IV) PLANT BREEDING DEPARTMENT	2	2	2
ⓐ Varietal Improvement Division	Consultant 1 Existing 10 Vacant (June) 1 Vacant (Oct.) 1	ⓐ Genetics & Biotechnology Division	14	14	14
	Consultant 2 Existing 12 Vacant (June) 1	ⓑ Plant Breeding Division	13	15	15
	Consultant 1	(V) AGRONOMY AND SOILS DEPARTMENT	1	2	2
ⓑ Crop Management Division	Existing 4 Vacant (Oct.) 1	ⓐ Agronomy Division	7	7	7
	Existing 2 Vacant (June) 1	ⓑ Soils Division	4	6	6
	Existing 4	ⓒ Physiology & Nutrition Division	6	7	7
	Consultant 1	(VI) RICE ENGINEERING DEPARTMENT	1	2	2
ⓒ Rice Engineering Division	Existing 6 Vacant (June) 3 Vacant (Oct.) 2	ⓐ Mechanization Division	12	13	13
	Existing 7	ⓑ Irrigation & Drainage Div.	8	9	9

Department	No. of Staff	Department	1990 Staff	1991 Staff	1992 Staff
	Consultant 1	(VII) CROP PROTECTION DEPARTMENT	1	2	2
	Existing 3 Vacant (June) 2 Vacant (Oct.) 2	ⓐ Biological Control Division	9	10	10
	Consultant 1 Existing 5 Vacant (June) 1	ⓑ Chemical Control Division	8	10	10
	Consultant 1	(VIII) FARMING SYSTEMS DEPARTMENT	1	2	2
ⓓ Rice Farming Systems Division	Existing 6 Vacant (June) 1 Vacant (Ocr.) 2	ⓐ Rice/Crops Division	10	11	11
	Existing 2	ⓑ Rice/Livestock/Fish Division	6	8	8
	Consultant 1	(IX) RICE CHEMISTRY AND FOOD SCIENCE DEPARTMENT	1	2	2
	Consultant 2 Existing 4 Vacant (June) 4	ⓐ Rice Chemistry Division	10	10	10
	Consultant 1 Existing 6 Vacant (June) 1 Vacant (Oct.) 1	ⓑ Food Science Division	9	10	10
	Consultant 1	(X) SOCIAL SCIENCE AND POLICY RESEARCH DEPARTMENT	1	3	3

Department	No. of Staff	Department	1990 Staff	1991 Staff	1992 Staff
ⓔ Social Science and Policy	Existing 6 Vacant (Oct.) 3	ⓐ Socio-Economics Division	11	11	11
	Consultant 1 Existing 2 Vacant (Oct.) 2	ⓑ Policy Research Division	6	8	8
ⓐ Development Planning and Monitoring Office	Existing 4 Consultant 1	ⓐ Development Planning and Monitoring Office	5	7	8
ⓑ Collaborative Program Office	Consultant 1 Vacant (June) 4 Vacant (Oct.) 4	ⓑ Collaborative Program Office	8	9	9
TOTAL RESEARCH	139		149	172	172
TRAINING & COMMUNICATION DEPARTMENT	Consultant 1	TECHNOLOGY TRANSFER	2	3	3
ⓐ Technology Development Division	Consultant 1 Existing 6 Vacant (June) 2 Vacant (Oct.) 1	ⓐ On-Farm Technology Development Department	2	2	2
		① On-Farm Adaptation Div.	8	8	8
		② On-Farm Verification Div.	10	10	10
		③ Pilot Training/Demonstration Div.	5	7	7
	Existing 2	ⓑ Training and Human Resource Department	2	2	2
		① Curriculum Development Div.	11	13	13
ⓑ Training Division	Consultant 1 Existing 6	ⓒ Training Division	9	14	14

Department	No. of Staff	Department	1990 Staff	1991 Staff	1992 Staff
ⓒ Communication/Documentation Div.	Existing 5	ⓓ Communication Department ① Print/Publication Div. ② Audio-Visual Div. ③ Broadcast Div. ④ Library Documentation Center	0 8 9 5 5	1 8 9 7 7	1 8 9 7 9
TOTAL	Existing 146 Consultant 21 Vacant (June) 23 Vacant (Oct.) 20		305	353	355

3-3-3 Location and Conditions of the Project Site

(1) Project Site

The project site is located 142 kilometers northeast of Manila on Route 5. It is located between Muñoz and Talavela in Nueva Ecija.

The entire compound is irregularly rectangular, about 800 m wide on the north-south axis and 1,200 m long on the east-west. The total area including the experimental farm is 98 hectares, and about 5 hectares in the south of the grounds along Route 5 has been secured by PhilRice as the project site. There are 12 buildings next to the project site.

Situations of existing buildings

a) Administration Building (termite damage, water leakage through the roof)
b) Garage
c) On-farm Trial Building (Owned by the Region)
d) Conference Hall (termites, water leakage)
e) Canteen (obsolete and closed)
f) Seed Quality Control Building (owned by the regional govt.)
g) Seed Processing Plant (roof blown off by typhoons)
h) Motor Pool/Engineering Building (termites)
i) Crop Protection Building (termites, water leakage)
j) Regional Crop Protection Building (owned by the regional govt.)
k) Agronomy Department (termites, water leakage)
1) Greenhouse (damaged by typhoons, out of use)
m) Dormitory (west side of Route 5)
n) Bunkhouse (west side of Route 5)

The 70 hectares of the PhilRice experimental farm have about a 2-meter gradient from west to east. As the ground of the project site is about 1.0 to 1.5 meters lower than Route 5, and 0.5 to 1.0 m lower than the NIA irrigation canal, provision needs to be made for water to be efficiently drained off from the site ground.

The surrounding area is one of the great rice growing areas in the Philippines. As there is only a vast plain with no obstructive terrain, this area has often suffered from damage by typhoons.

Since the NIA irrigation drainage canal may overflow or rain water may flow into the project site from the north experimental farm during heavy rains, proper countermeasures shall be provided.

The project site used to be a farm, however, as the bedrock lies about 1.5 to 2.5 m below the ground, there seem to be no problems in constructing one- to three-storey buildings.

The existing buildings suffer from serious termite damage. There are also a lot of birds indigenous to the rice crop area.

(2) Infrastructure

a) Water supply system

There is no water supply system, but PhilRice has two wells and uses them for irrigation and general purposes. Their capacity is only sufficient for present use. Two more wells need to be dug for this project.

b) Drainage system

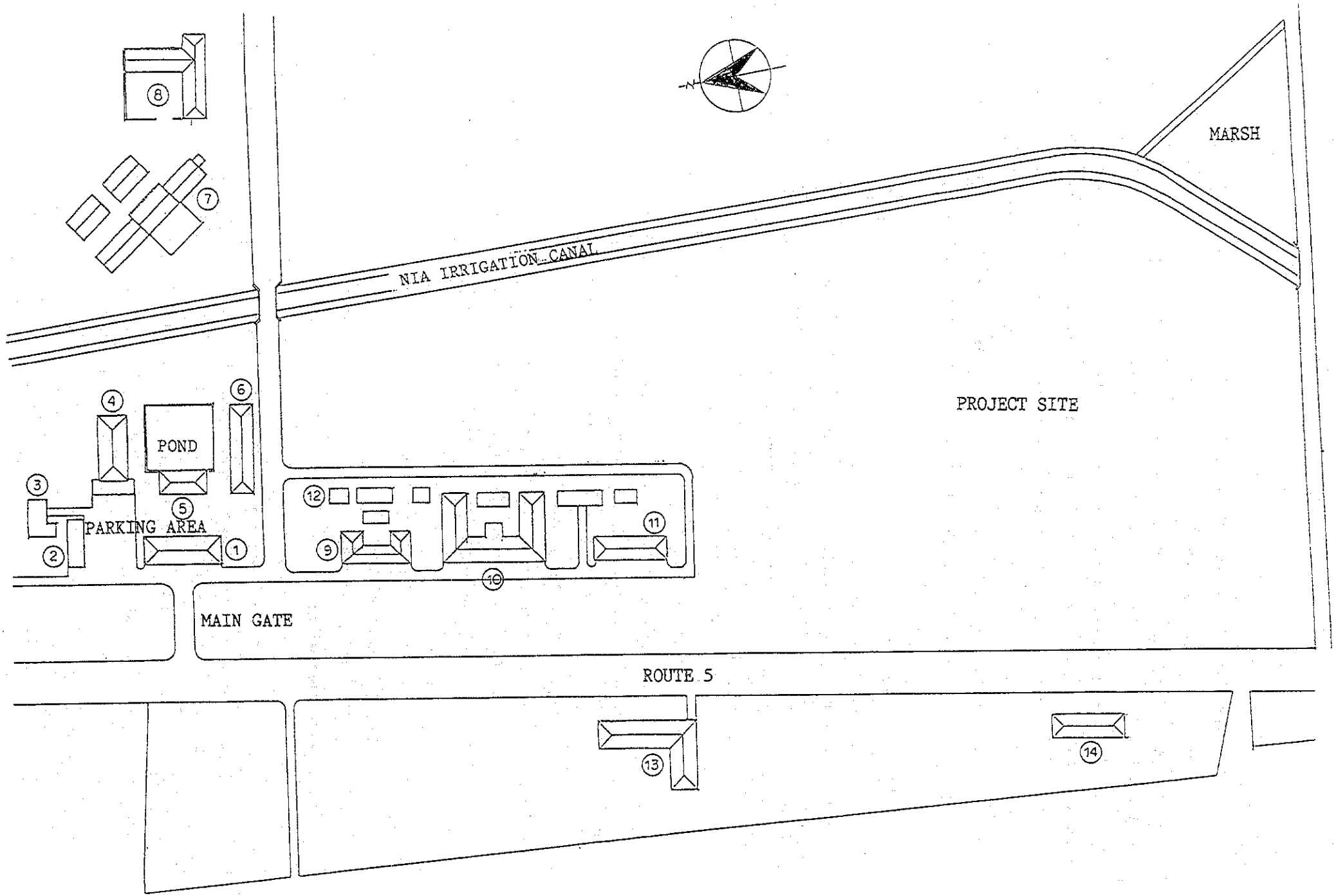
No drainage piping system exists. Drainage water is to be discharged into the NIA irrigation canal.

c) Power supply system

An electric power line (13.2 kv/7.6 kv, 3-phase, 3-wire, 60 Hz) of the Nueva Ecija II Electric Corporation Inc. runs to the PhilRice compound. A voltage variation of around $\pm$ 10% can be expected.

d) Telephone system

There is no telephone service to PhilRice yet. It has been applied for at the liaison office of PLDT in Muñoz.


MARSH
NIA IRRIGATION CANAL
PROJECT SITE
POND
PARKING AREA
MAIN GATE
ROUTE 5
1
2
3
4
5
6
7
8
9
10
11
12
13
14

3-3-4 Outlook for Facilities and Equipment

The following list shows the requested facilities and equipment and those to be provided by grant aid.

List of Floor Areas

Departments & Facilities	Requested Area (m^2)	Design Area (m^2)
Varietal improvement	1,460.0	650.25
Planting and fertilizer management	910.0	278.25
Integrated pest management	1,340.0	330.50
Rice-based farming systems	780.0	133.50
Rice engineering & mechanization	1,130.0	117.0
Rice chemistry & food science	680.0	323.25
Social science & policy research	680.0	78.75
Commonly used test rooms, etc.	requested by each program section	300.0
R & D, collaborative research projects	202.5	146.25
Technology transfer	1,220.0	709.5
Administration	1,050.0	246.75
Common space (corridors, stairs, etc.)	620.0	2,310.0
T O T A L	11,250.0	5,624.0

Note: As it was originally requested that an individual building be built for each program section, space for corridors or stairs was included in the floor area of each section.

Departments & Facilities	Requested Area (m^2)	Design Area (m^2)
Generator House		135.0
Field Service Building	2 bldgs. 1,800.0	1 bldg. 900.0
Greenhouse	9 houses 1,800.0	7 houses 1,280.0
Screenhouse	10 houses 2,000.0	Construc. by Philip. side
Headhouse	9 houses 450.0	1 house 416.0
Training Dormitory (for 90 trainees, 5 guest rooms, canteen)	2,300.0	1,682.2
Auditorium	600.0	canceled
Staff housing	1,900.0	Arranged by Philip. side
T O T A L	22,100.0	10,037.2