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REPORT OF THE REVIEW TEAM

PCARR

PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH

Part 1. **Corporate review of PCARR**

Part 2. **Ex post evaluation for USAID Loan I**

Part 3. **Annexes**

Prepared for PCARR by the
International Agricultural Development Service

November 4, 1980

Dr. J. D. Drilon, Jr.
Director General
Philippine Council for Agriculture
and Resources Research
Los Banos, Laguna
Philippines

Dear Dr. Drilon:

We have the pleasure of submitting herewith the report of the Review Team, requested by PCARR to assess the present status of PCARR.

The Review Team gave its combined attention to the organization and operations of PCARR and to the implementation of USAID Agricultural Loan I. The report is prepared in separate sections covering a) the Corporate Review of PCARR, b) the Expost Evaluation of USAID Loan I, and c) Annexes that relate to the constituent sections.

The Team appreciates the cooperative attitudes and candid observations of the numerous Philippine scientists and officials interviewed during the review. We also appreciate the staff support of PCARR. The contacts and tours were arranged and handled expeditiously and the secretarial services, over a national holiday week end, were excellent.

We trust that the report addresses the critical issues intended to be reviewed and that it will be helpful in the further development of PCARR.

Respectfully submitted,

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Part I

CORPORATE REVIEW

of the

PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH

CORPORATE REVIEW
of the
PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH

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FOREWORD

The Philippine Council for Agriculture and Resources Research (PCARR) has evolved as the national research system over a period of eight years. Substantial resources have been invested by the Government of the Philippines to develop facilities, train manpower, and activate research. The USAID Loan I has been a major support to the development of PCARR in 1975-1980.

In order to evaluate the progress of PCARR in responding to its mandate, and to assess the utilization of the USAID Loan 492-T-039, arrangements were made for the International Agricultural Development Service (IADS) to conduct (a) an expost evaluation of the Loan, and (b) an assessment of the performance and corporate structure of PCARR.

The USAID Loan, known as Agricultural Research Loan I, provided $5.0 million to finance infrastructure, research equipment, manpower training and technical assistance to help improve 4 of the 17 identified research centers of the PCARR Network. The review is to draw substantive conclusions and make recommendations to guide implementation of future projects, particularly USAID Agricultural Research Loan II.

The PCARR Corporate Review is to determine the achievements of PCARR since its establishment, assess the research management system and procedures--particularly the Secretariat vis-a-vis the PCARR scientific network--and provide recommendations for the future with respect to new directions, strategies, organizational arrangements, and management procedures.

It was mutually agreed by PCARR and the IADS that, since the organization and management of PCARR is so interlocked with the developments as supported by USAID Agricultural Research Loans I and II, the assessment should be made by a single review team. However, the report should furnish discrete discussions for each of the two subject areas. The report includes (a) the assessment of the PCARR Corporate Structure and Operations, (b) the evaluation of Agricultural Research Loan I, and (c) annexes that relate to each of the foregoing.

The biodata for the Review Team, composed of 2 Philippine scientists, and 6 foreign scientists identified by the IADS, are shown in Annex I. The schedule of visits and contacts is presented in Annex II.

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I. INTRODUCTION

A. Agricultural Research in the Philippines--1971

1. Presidential Committee Executive Panel

Until 1970 responsibility for agricultural research in the Philippines was spread among many agencies, which were not formally associated.

In recognition of the need to ensure maximum effective use of existing research resources, and to strengthen the national capabilities for generating a steady flow of agricultural technology, Minister of Agriculture, Arturo R. Tanco, Jr., initiated action to improve the national agricultural research capabilities in the Philippines. The Honorable Gerardo Sicat, Chairman of the National Economic Council, was designated as Chairman of the Presidential Committee Executive Panel to develop a national agricultural research system. The Panel, created under Presidential Administrative Order No. 267, designated a Technical Panel to assess current research resources and to formulate an overall program of research for the Philippines.

2. Evaluation and Recommendations of the Technical Panel

The National Agricultural Research System Survey Technical Panel gathered substantial data and information during the year of review, including the observation of agricultural research systems in the United States, Australia and Thailand. This was presented in six volumes covering the various study areas.

The Technical Panel summary report on Evaluation and Recommendations, The Philippine Agricultural Research System, was presented to Chairman Sicat on December 20, 1971. The main feature of the recommendations was the creation of the Philippine Council for Agricultural Research (PCAR), to be linked with the NSDB, DANR, and universities and colleges to serve as the main arm of the government in planning, coordinating and implementing the national agricultural research program.

The Technical Panel report included 28 specific recommendations for strengthening research, together with a proposed organizational structure, and stages for implementation of PCAR. The Report, and the six volumes of information gathered during the year-long study, furnish an excellent resource of in-depth assessments and proposals that continue to have relevance in 1980, almost a decade later. Many of the recommendations have been implemented. Others have not yet received sufficient attention and the Report should be reassessed for guidance in the further strengthening of PCARR.

B. Establishment and Evolution of PCARR

PCAR was established by President Ferdinand E. Marcos on November 10, 1972 by Presidential Decree No. 48. The Decree spelled out the functions and powers of PCAR, the make-up of the Council and the Secretariat, and the provision for research program leaders.

The implementation of PCAR proceeded promptly. The first Agricultural Research Systems Research Congress was held at Los Banos, attended by agricultural scientists from throughout the country, in February 1973. At this time 28 Commodity Research Teams were set up and initial priorities for fields of research were designated. Subsequently, regional planning conferences, sponsored jointly by PCAR and the NEDA regional offices were held to identify critical research needs of the various agricultural regions of the country.

In recognition of the importance of research on mines in the comprehensive research, development and effective use of national agricultural, forest, fishery and mineral resources, Presidential Decree No. 964 was signed on December 29, 1975. This provided for strengthening the system of mines research in PCAR. In addition the name was changed to the Philippine Council for Agriculture and Resources Research (PCARR).

The Decree specified the revised membership of the PCARR Governing Council and authorized the Governing Council to reorganize its Secretariat and research network as necessary to accomplish its functions and objectives.

In order to augment research funds and to accelerate technology transfer, PCARR entered into agreements with a number of funding agencies and technical assistance organizations such as USAID and the international agricultural research centers. To facilitate such arrangements, including the donation of funds for strengthening the national research system, the exchange of research workers and consultants, and residence in the Philippines of scientists of international agencies cooperating in research programs, Presidential Decree No. 1249 was signed on November 25, 1977. Major responsibility for implementing such activities is vested in the International Projects Division of PCARR.

Presidential Decree No. 1502, providing incentives for research personnel and for administrative reforms, was signed by the President on June 11, 1978, but has not yet been implemented.

The foregoing Presidential Decrees furnish the principal framework and authorities for PCARR. They are presented in Annex III.

C. Structure and Functions of PCARR

The organization of PCARR has been adjusted from time to time to meet its changing scope and functions. The current structure is shown in Figure 1.

The mandate for PCARR with respect to the national research system includes the following specific tasks:

1. Define goals, purposes, and scope of research necessary to support progressive development in agriculture, forestry, fisheries and mining for the nation on a continuing basis;

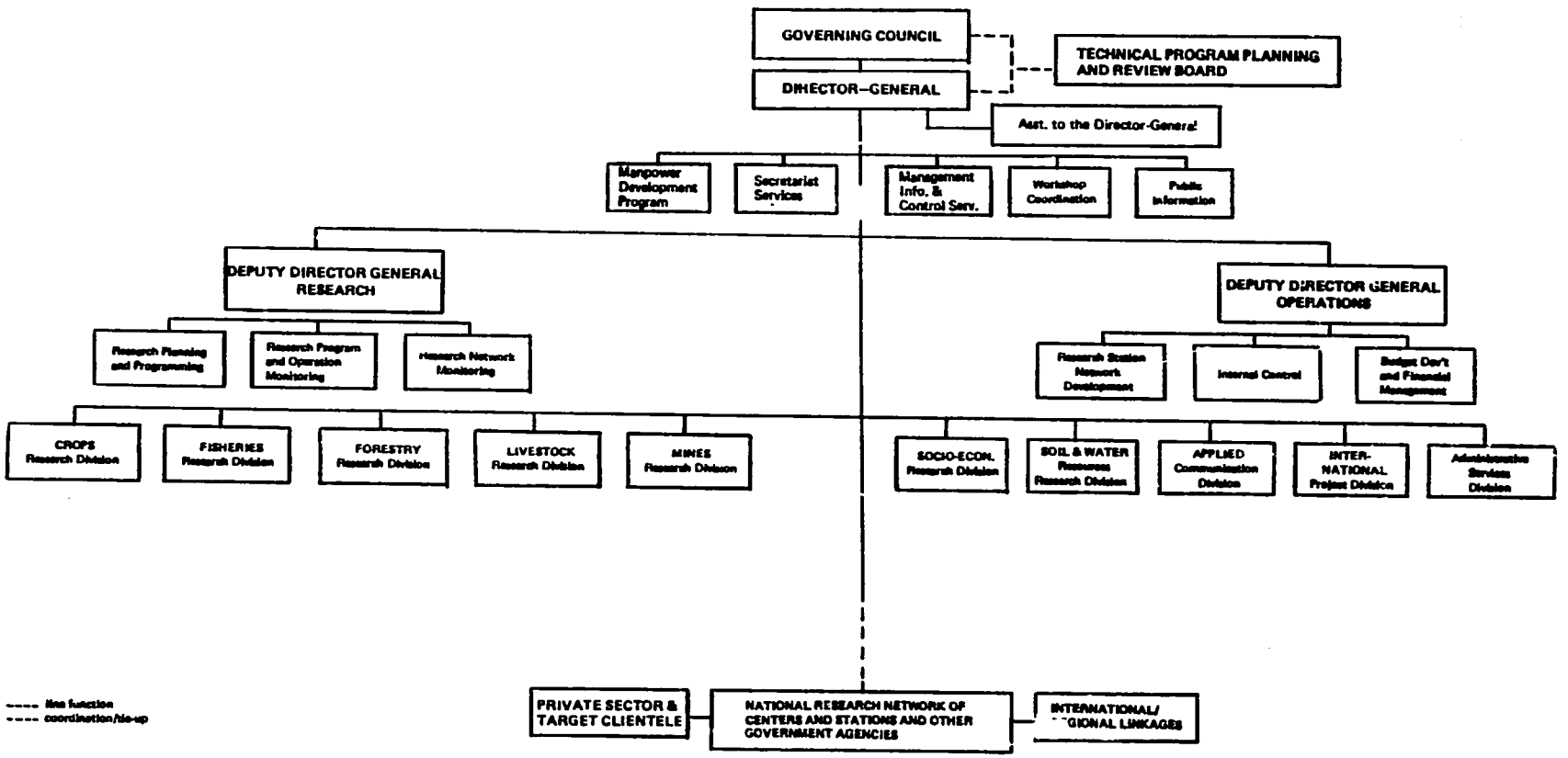


Figure 1. The PCARR Organization

2. Using the basic guidelines of relevance, excellence, and cooperation, develop the national agriculture and resources research program based on a multi-disciplinary, inter-agency, and systems approach for the various component commodities;

3. Establish a system of priorities for agriculture, forestry, fisheries and mining research and provide meaningful mechanisms for updating these priorities;

4. Develop and implement a fund-generating strategy for supporting agriculture and resources research;

5. Program the allocation of all government revenues earmarked for agriculture and resources research to implement a dynamic national agriculture and resources research program;

6. Provide the mechanism for assessment of progress and updating the national agriculture and resources research program;

7. Establish, support and manage the operation of a national network of centers of excellence for the various research programs in crops, livestock, forestry, fisheries, soil and water, mineral resources, and socio-enonomic research related to agriculture and natural resources;

8. Establish a repository for research information in agriculture, forestry, fisheries and mining;

9. Develop a mechanism for full communication among workers in research, extension, and national development;

10. Provide for a systematic program of agriculture and resources research, manpower development and improvement;

11. Provide for appropriate incentives to encourage topnotch research workers to remain working in their respective areas of agriculture and resources research;

12. Enter into agreements or relationships with other similar institutions or organizations, both national and international, in the furtherance of the above purposes.

In relation to these tasks, PCARR has the power and authority to call on any department, bureau, office, agency, state university or college, commodity institute, and other instrumentalities of the government for assistance in the form of personnel, facilities and other resources as the need arises in the discharge of its functions. It also has the authority and responsibility, as part of the scope of its operations, over all government-supported and -funded research on mineral resources except petroleum and other mineral oils.

In order to perform its designated tasks effectively, PCARR exercises two vital powers: (1) the power to review all research proposals in agriculture and natural resources; and (2) the power to recommend research proposals to the Ministry of the Budget for funding.

The second power was bolstered by a policy of the Ministry of the Budget that only research proposals recommended by PCARR will be eligible for government funding.

Complementing these powers is the mandate for PCARR to identify and coordinate the work programs of the national research centers/stations network throughout the country. To activate and strengthen the network, PCARR has launched intensive infrastructure and manpower development programs, aided in part by foreign institutions.

The above mandate and authorities provide the general framework within which the Review Team conducted the assessment of PCARR's performance over the past eight years, and the base for recommendations for the future structure and operations of PCARR.

II. ACHIEVEMENTS OF PCARR, 1972-1980

A. Impact on Philippine Agriculture

1. The National Research System

PCARR has moved ahead vigorously since its establishment in 1972 to set up a national agricultural research system. The Agricultural Research Systems Research Congress of February 1973 brought together the scientists concerned with agricultural development in the Philippines in a manner that let them know that they were to be active participants in the system. The 28 commodity-discipline task forces set up at that time established research objectives, took account of existing research, and identified priority research needs. This process of task force or team review has been sustained in succeeding years to formulate a framework for agricultural research that is responsive to national development priorities and plans.

The performance of PCARR during its first two years was summarized and assessed by USAID in preparing the documentation for USAID Agricultural Research Loan.[3/] The loan paper served to identify the priority locations, facilities and manpower needs of the system, and provided a pattern for the future evolution of PCARR. Proceeding on this base the national research system is continuing to be established in a manner to serve all types of farming regions of the Philippines. The USAID Agricultural Research Loan II will supply additional major external support for the continued growth of PCARR.

Within the framework of the mandate and authorities of the relevant Presidential Decrees, and the policies and procedures set by the Governing Council, PCARR has effectively carried out the tasks for which it is responsible. Experience during the eight years of operation has permitted identification of some limitations in organization, policies and procedures, which are discussed in Chapter III of this report. These are, for the most part, to be expected in a new and growing institution and are subject to adjustment by the PCARR Secretariat and Governing Council.

The Review Team was favorably impressed with the rate of progress and the general impact of PCARR in establishing an effective national research system for the Philippines.

2. Specific Contributions in Improving Technology

The Review Team was confronted with the question (by a senior officer in the Government of the Philippines), "What has PCARR done since its establishment to make an impact on Philippine agriculture?" This most relevant query was put to the PCARR Secretariat staff, with the request that they list the 10 most significant achievements during the 8 years of PCARR's operations. The following were identified:

a. Organized a national research system, that is biased to national development.

b. Developed a national research program for agriculture and natural resources and a network of research centers and cooperating stations to implement such a program.

c. Provided a mechanism for effective utilization of research resources through a working linkage with the Ministry of the Budget in the review and evaluation of project proposals.

d. Provided for the development of research capability initially for ten research centers in terms of manpower, infrastructure and other facilities.

e. Provided a climate for communications among researchers, extensionists and policy makers at the national and regional levels through the commodity teams and the TPPRB and through continuing dialogues and consultations.

f. Catalyzed the establishment of the following research centers:

- Philippine Root Crops Research and Training Center
- Philippine Tobacco Research and Training Center
- Highland Agricultural Research Center
- La Granja Agricultural Research Consortium
- Other consortia

g. Provided a mechanism for tapping reservoirs of technology and funds from international and regional centers and other national research systems for local application.

h. Established a repository for research information in agriculture, forestry, fisheries and mining.

i. Provided a mechanism for the packaging and dissemination of research results through:

- The Philippine Recommends
- the Corps of Subject Matter Specialists
- the Scientific Library Service
- the Print and Audio Visual Outreach

j. Provided a mechanism for the assessment of progress and regular updating of the national research program for agriculture and resources.

The above items are consistent with the mandate and functions of PCARR—a planning and coordinating agency. It "provides mechanisms and climates" for research, as well as support for facilities, staff training, and operating funds. It identifies priorities but must depend on the interest and response of operating research agencies--through projects they offer—to meet priority research needs.

PCARR in the future will measure its contributions to Philippine agriculture largely through the further fine tuning of the above types of activities. PCARR cannot point to specific research achievements because

PCARR does not conduct research. It cannot claim credit. Neither can PCARR be held responsible—or blamed—if the flow of technology is inadequate or a serious disease or pest outbreak occurs which requires emergency research attention.

The responsibility for meeting national needs for agricultural technology rests with those who do the research—UPLB, the La Granja Consortium (LGARC), the Central Luzon (CLARC), Highlands (HARC), Mountain State (MSAC) and Southern Mindanao (SMARC) complexes with their constituent agencies. This responsibility is dispersed in the Philippines in 1980 to an even greater extent than it was in 1971.

The inclusion of the Camarines Sur Agricultural College as the main institution, and the Bicol University College of Fisheries and Bicol University College of Agriculture as participating agencies in the Bicol Agricultural and Resources Research Consortium (BARRC) exemplifies the added dimensions. None of these organizations had a research program in 1971. They are building the basic capabilities at the present time.

The development of facilities, manpower and well-conceived and -managed research programs lies ahead. The time of achievement of a research capability will depend upon the successful integration of the resources required for the implementation of the BARRC system. And the responsibility for furnishing the technology needed in the Bicol, including the Bicol River Basin Development Program (BRBDP), as of 1980, rests with BARRC.

Although PCARR may be limited in identifying its own contributions, the national research system should furnish an accounting, through PCARR, of the returns on the national and foreign investments in the system over the past 8 years. The products of the research should be the major criteria for judging the effectiveness and impact of the system.

B. Assessments by National and External Agencies

1. By National Agencies and Individuals

The Review Team, in its contacts and visits throughout the country during October 14-23, continually asked the question, "Has PCARR been useful?" In most cases the reply was positive, with considerable enthusiasm. The Team encountered no strong negative reactions.

It could be expected that PCARR would be regarded favorably--as an organization that supports development of research facilities and manpower training, and provides funds to research projects. But to counter this is the role of PCARR in determining priorities for areas of research, assessing projects, and releasing funds. These actions might well be regarded as constraints by some agencies and individuals. But the widespread view is that PCARR has been good for the Philippines.

Some specific reactions are of interest. A participating researcher at the La Granja Agricultural Research Center stated that PCARR "had

lifted the curtains that previously hung between the agencies in the immediate area of the Center--the BAI, BPI, UPLB and the Philsucom research station." Staff in some Ministry of Agriculture Regional Offices recognize that the emerging research capabilities will be of substantial benefit in backstopping agricultural development projects.

There are symptoms of concern, however, that must be recognized by PCARR in the continuous adjustment of its research programs and services. It would be desirable to ensure that Ministry of Agriculture Regional Offices are aware of the kinds and locations of research under way. For example, the Ministry Office in Region VI was not aware until recently of the location of the national center for root crops research at ViSCA.

Another evidence of uncertainty about the research and technology emerging from the PCARR system is the tendency for agencies to set up "research" units within their respective organizations. The Agricultural Support Services Project, under appraisal for World Bank support for the Ministry of Agriculture, provides for Regional Integrated Agricultural Research Stations. The Ministry of Agriculture also is considering setting up an Agricultural Research Service or an Agricultural Research Office. Although the Team was advised that this had been discussed or cleared with PCARR, it appeared that no critical assessment had been made with respect to the linkages, or possible duplication, of the RIARS with PCARR-supported stations. The follow-up meetings of Ministry personnel, World Bank appraisal team, PCARR staff, and Review Team members should help clarify the issue and should lead to resolution of it.

The integrated area development projects under the National Council on Integrated Area Development (NACIAD) also should be reviewed more carefully by PCARR. In discussions with staff of the Bicol River Basin Development Project (BRBDP) mention was made of the serious impact of the aphid-borne bunchy top disease of abaca and the need for the BRBDP to move directly to the highest echelons of government to get action on the problem. This suggests that the Bicol Regional Research Council is not yet functioning effectively.

There is need for better mutual understanding of the various steps in technology evaluation and adaptation for application, to determine where the responsibilities and functions should be vested. This will be discussed further in Chapter III, Section F, to identify a more effective role for PCARR in this activity.

2. <u>By External Agencies</u>

Countries of Asia have been in the forefront in the past decade in strengthening their national research capabilities. India took significant actions in 1965 to restructure the Indian Council of Agricultural Research (ICAR). Malaysia set up the Malaysian Agricultural Research and Development Institute (MARDI) in 1969. Indonesia, Pakistan, Bangladesh, Nepal, and other countries in Asia have taken similar steps more recently.

As countries plan their national research systems they study organizations in other nations as patterns. The Review Panel assessing

Philippine research needs and capabilities in 1971 visited Australia, the United States and Thailand. Increasingly in recent years the countries in this area of the world are looking at national research systems emerging in the Asian region. The ICAR and PCARR are high on the list of respected national systems for study, with the organizations in Malaysia and Indonesia also receiving attention. Australia, Bangladesh and the People's Republic of China have sent teams to study the organization and operations of PCARR in the past two years.

PCARR has emerged in the relatively short span of 8 years as a principal model for study by developing nations of Asia and is now linked with 17 international, regional, and national research organizations throughout the world.

III. PCARR OPERATIONS AND MANAGEMENT

A. General Considerations

PCARR is one of the few national agricultural research organizations established in Asia in the past decade that has had continuity of effective support and leadership. Minister of Agriculture, Arturo R. Tanco, Jr., who took the initiative in activating the 1971 review that led to establishment of PCARR, has been in position to interact with the Secretariat of PCARR and to determine policies and guidelines as Vice Chairman of the Governing Council since the national research system was started.

Dr. J. C. Madamba gave vigorous leadership to PCARR during its formative years--in developing program planning and other operating procedures that gained recognition and respect for PCARR in the national institutional structure. These prompt accomplishments led to recognition by USAID of the suitability of PCARR for support through Agricultural Research Loan I.

Dr. J. D. Drilon, Director General of PCARR from April 8, 1978, has furnished leadership through the period that the PCARR operations were intensified and expanded, and the national network of centers and stations was strengthened.

The Review Team, through the extensive contacts and visits as shown in Annex II, has had an opportunity to assess the strengths and contributions of PCARR and also to identify opportunities for improving the national research system. In a rapidly evolving institution there is need for constant adjustment of organization and procedures to fit the emerging system. The Review Team decided that rather than record constraints and offer solutions, a discussion of specific subject areas--as a basis for assessment and recommendations--would be more productive. The following subjects were identified for specific attention:

1. National network of research centers and stations
2. Research program planning and management
3. Manpower training and personnel management
4. Funding and financial procedures
5. Development and application of useful technology
6. Information services
7. The governing and directorate structure
8. Selected issues

A number of the foregoing items are subject to corrective attention or modification by the PCARR Secretariat and some are receiving attention at present. Others, relating to basic policy, organizational and operational factors, will require attention by the Governing Council.

B. The National Network of Research Centers and Stations

The basic guidelines for PCARR have been relevance, excellence, and cooperation, in developing a national agriculture and natural resource research program. One of the necessary steps in accomplishing this goal is to establish, support and manage the operation of a national network of centers and stations for the various research programs in crops, livestock, forestry, fisheries, soil and water, mineral resources, and socio-economics as related to agriculture and natural resources.

1. Initial Proposals for a National Research Station Network

The Technical Panel whose 1971 study led to the creation of PCARR made some specific recommendations regarding research centers or stations. The panel recognized, on the one hand, the necessity of research in the various ecological zones of the country and, on the other hand, the necessity of concentrating field research in a few stations that could be fully supported, both in equipment and manpower.

Their recommendations were based on their observation that the stations of the Department of Agriculture and Natural Resources (DANR) were widely dispersed and too poorly supported to be productive. The panel identified those that should be developed for the National Network. (See Figure 1, page 70, and pages 121-124 of the December 1971 Technical Panel report).

Obviously conditions have changed since 1971 and PCARR would not be expected to be bound by these suggestions. Nevertheless the concept is still sound—establish and maintain only as many stations as can be developed, equipped and staffed in order to make a major contribution to agricultural development.

2. Current Plans for the National Network

In pursuing its mandate of establishing, supporting and managing the operation of a national research facility network PCARR has spearheaded the establishment of a network consisting of four multi-commodity national research centers, seven single-commodity national research centers, eight regional research centers, and 130 cooperating stations located throughout the country, as shown in Figure 2 and Annex IV. The first multi-commodity Agricultural Research Center was established around a strong sugar research program at La Granja (LGARC). The other three multi-commodity centers are located at agricultural universities. Some of these have been strengthened by the USAID Loan I and others are being strengthened by Loan II.

The concept of the regional research centers is to provide more specific information within the various ecological zones of the country. Two of them are located at Bureau of Plant Industry stations and six at

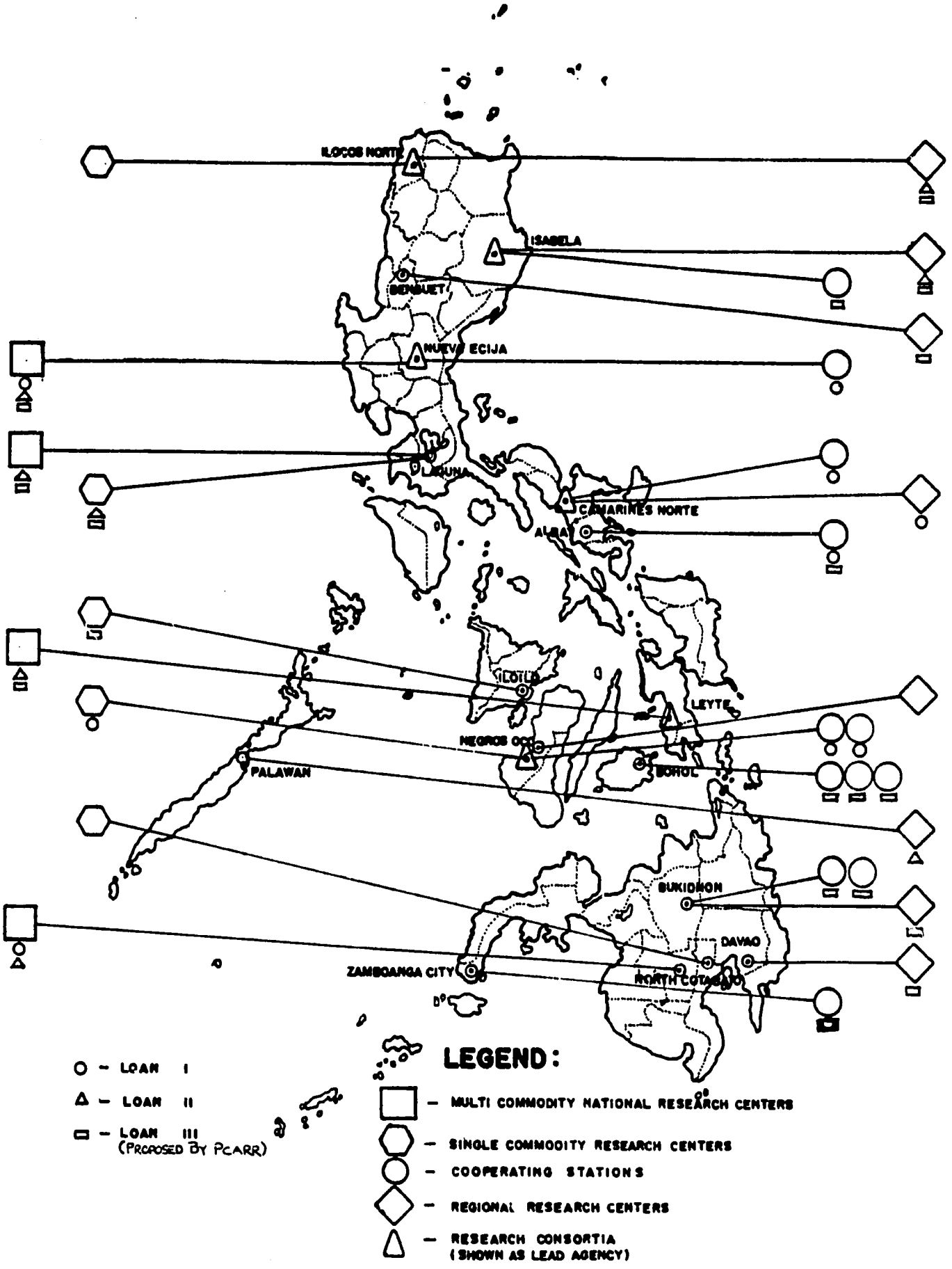


Figure 2. PCARR Network of Agriculture and Resources Research Centers and Stations

agricultural universities. The regional centers would be used for further evaluation, application and adaptation of materials developed at a national headquarters station. The third stage is the work of the 130 cooperating stations where technology is locally evaluated. Using corn breeding as an example, the original breeding and selection work would be done at the national center where adequate facilities and supporting disciplines are available. The selected lines would then be further evaluated at the regional centers to determine how they perform under a different set of edaphic and climatic conditions. Finally, they would be tested at the cooperating stations that are located in important corn growing areas, or where corn is potentially important.

Acting on the assumption that there is mutual benefit in joint efforts, PCARR established several research consortia/centers in 1978. These 10 consortia/centers are listed in Annex IV. The concept is to build a series of satellite stations around a lead institution. After the establishment of the first center at La Granja, the decision was made to make an educational institution the lead agency in all instances. Other members of the consortia/center are research stations in the nearby area that can facilitate joint planning of research, common usage of equipment and, hopefully, furnish a sort of critical mass of scientific manpower.

The format calls for the President or Superintendent of the educational institution to serve as chairman of a research council. The other members are directors of the stations within the consortium and leaders of area development projects in the region. The council meets quarterly and PCARR supports a secretariat. The 10 consortia/centers are in various stages of development.

The La Granja Agricultural Research Center (LGARC) was the first of the Research Centers to be formed. It involved the integration of four contiguous agricultural research units, including (a) the Carlota Stock Farm of BAI, (b) the La Granja Experiment Station of BPI, (c) the La Granja Sugarcane Experiment Station of PHILSUGIN, and (d) the La Granja Research and Training Center of UPLB. LGARC operates under policy guidelines established by the Research Center Coordinating Committee, with the Director of Research and Development of PHILSUCOM serving as chairman. The Center is managed by a Research Coordinator from PHILSUCOM, assisted by heads of the four participating agencies.

Another example of a functioning center/consortium is the Central Luzon Agricultural Research Center (CLARC) with Central Luzon State University (CLSU) as the lead agency. Other members are the Forest Research Institute (FORI), Bureau of Plant Industry rice station (BPI), National Irrigation Administration (NIA), and PCARR.

An example of a consortium in the process of formation is the Highlands Agricultural Research Center (HARC) where the Mountain State Agricultural College (MSAC) is the lead agency and plans call for the inclusion of nearby stations of BPI, BAI and FORI and, hopefully, the Philippine Textile Research Institute. An example of one still in the planning stages is the Southern Mindanao Agricultural Research Center (SMARC) which presently is nothing more than the research arm of the

University of Southern Mindanao (USM). It is expected that BPI, Bureau of Soils, BAI and NIA will become a part of SMARC.

3. Assessment of the Planned Station Network

a. The concept

The PCARR rationale for national centers, be they multi-commodity or single commodity, is a sound one and seems to be working as conceived. Furthermore, the regional centers--for multidisciplinary and multi-commodity research--followed by more localized research at the cooperating stations, is a logical approach to developing a research network. Its purpose should be to evaluate the results from the center of origin, or headquarters station, first in a region, and then in a specific location.

In looking at the large number of projects that PCARR is supporting at the 130 cooperating stations, the Review Team came to the conclusion that some of the funds were being used more for general institution building and less for the support of research. Furthermore the program is too diffuse.

The consortia/center concept seems to be more idealistic than real. The objective of more efficient use of equipment, library facilities, etc., is always worthy of consideration. Furthermore, the idea of joint planning and cooperation between agencies is to be encouraged. But there are several weaknesses in the consortia/center approach. Designating an educational institution as the lead agency is sound only when it has leadership and expertise superior to the other agencies. The Review Team observed cases where this was not so. Also, many of the proposed stations making up the consortia/center are too far apart to be effective in collaboration. Common access to equipment, transportation, etc., can lead to administrative problems unless closely supervised. The success of the concept will depend upon the attitude of the heads of the local research units, the confidence and trust in the council leadership, the cooperation of the participating agencies, and the support of PCARR.

The Technical Panel in 1971 recommended concentrating field research resources in fewer, fully equipped stations. PCARR seems to have done a logical job in establishing national and regional research centers. But the Review Team is concerned by the fragmentation of research at the 130 cooperating stations. Some are federal research stations that are poorly staffed and inadequately equipped. Others are small agricultural colleges (cum high schools), with a poorly trained faculty that is engaged in full-time teaching, with no library, little equipment, an environment not conducive to imaginative research, and no leadership capability for research. The Review Team was sympathetic with the desire of individuals at these institutions to do research, but with limited national resources for continuing operational support the heavy expenditures for institutional development at colleges with no research base cannot be justified.

In many instances the PCARR grants are too small to make an impact on the development of agriculture and natural resources within the area

around the station. PCARR could best achieve its goal of supporting a progressive development in agriculture, forestry, fisheries and mining by continuing to develop the national and regional research centers, and limiting its support to the cooperating stations to programs consistent with the national goals.

b. Expansion of the network

Loan I provided for a crop research laboratory, expansion of the experimental farm and staff housing (10 duplex units and 20 single units) at Central Luzon State University (CLSU) and greenhouse renovation and staff housing at the BPI rice station nearby. The loan also provided for a crop research laboratory, greenhouse, screenhouse, 2 apartment buildings for staff housing, and experimental farm development at the Bicol Rice and Corn Experiment Station (BRCES) and for a soil and water research center; 4 staff housing units and experimental farm development at Camarines Sur Agricultural College (CSAC), all a part of BARRC.

Infrastructure improvements at La Granja Agricultural Research Center (LGARC) included a crop research laboratory, greenhouse, screenhouse, service building, staff housing (10 units) and funds for developing the station farm. Loan I also provided for a crop research laboratory, greenhouse, screenhouse, service buildings, insectary, staff housing (10 units) and funds for developing the farm at University of Southern Mindanao (USM). The Review Team assessment of these major centers/consortia is presented in Annex V.

Loan II will provide for additional infrastructure improvements at USM and CLSU. In addition, the loan includes support for physical improvements at Mariano Marcos State University (MMSU), Isabela State University (ISU), UPLB, Palawan National Agricultural College (PNAC), Visayas State College of Agriculture (VISCA) and the Forest Research Institute (FORI). Not all of these centers were visited by the Review Team, but, of those that were visited, there was a wide range of research capabilities and "climate for research." The funds from Loan I and Loan II would enable PCARR to establish 10 research centers, with varying degrees of excellence.

The team learned that plans for further loan support are being developed by PCARR. The plans would provide for facilities at 17 centers, six of which were included in Loans I and II and 11 additional centers. From discussions the Review Team had with staff in the Ministries of Budget, Agriculture, and Natural Resources it appears that the Government of the Philippines would have difficulty in supporting an increase in programs consistent with infrastructure proposed in the expanded loan proposal. The Review Team therefore, recommends that no additional centers be established beyond those contemplated in Loan I and II, without further careful study of capabilities for adequate funding for effective operations.

c. Integration of station development

In making plans for selection and support for research facilities, care must be exercised to insure that the infrastructure, once built,

can be effectively utilized. The centers must be properly located in the ecological zone, and they must have some degree of livability so that staff can be attracted and held--meaning roads, schools, health services, etc. Furthermore, the facilities--both buildings and equipment--must be suitable for the research. The Review Team observed examples of spacious laboratories, a library and an auditorium that were obviously designed for teaching rather than research. The PCARR Secretariat and Governing Council should reassess the objectives of the station development in such situations.

Timing is also extremely important. Instances were observed where buildings were complete but equipment would not be forthcoming until a new loan was formulated. An integrated approach of developing manpower, building the infrastructure, and program planning must be pursued more effectively.

The Review Team was not certain that sufficient long range planning had been done to insure that manpower training had been synchronized with infrastructure and institutional development. PCARR and the cooperating network institutions are to be congratulated in their support for graduate studies. However, it would be a waste of resources, both physical and manpower, to construct and equip buildings, train people, and have them return home only to find no jobs because of lack of operational funds from the Government.

d. Linkages of centers and stations to regional development agencies

PCARR has logically concentrated on developing regional centers based on ecological conditions. NEDA is organized into 12 political regions. The Ministry of Agriculture is moving toward regionalization in accord with the NEDA regions. Ideally the PCARR regional approaches should be consistent with and should serve those regions set up under the Ministry of Agriculture and the Ministry of Natural Resources.

The Appraisal Team for the Agricultural Support Services project, providing a World Bank loan to enable the Ministry of Agriculture to develop regional integrated agricultural research stations (RIARS) in the 12 regions of the Ministry, was in the Philippines during the same time as the PCARR Review Team. The Appraisal Team did not visit PCARR to discuss the compatibility of the planned RIARS with the PCARR station network. However, the Review Team did discuss this question with the World Bank Appraisal Team, Ministry of Agriculture and USAID personnel, as well as with PCARR and called attention to the need to avoid establishing extraneous, duplicative facilities that would further stress GOP operational budgets.

The chairman of the regional research coordinating committee should be a member of the council for the regional extension testing center and likewise, the director of the regional extension testing center should be a member of the council of the regional research center so that programs developed by the two groups would be complementary and not duplicative. A representative from PCARR should be a member of both councils.

The ultimate goal of research in a mission oriented program such as sponsored by PCARR must be the utilization of the knowledge generated. The key to the success of PCARR will be the linkages of research with action agencies. This includes area developments such as NACIAD and, most importantly, extension.

It is important that channels of communication be developed and maintained between PCARR and NEDA. Currently the agricultural representative on the regional NEDA council is the "regional agricultural minister." He must be assured by all levels of government, including the Minister himself, by NEDA at the national level, and by PCARR, of his important role as a link between research and its users. Information must flow in both directions if research is to serve its expected function in aiding regional agricultural development.

As the Ministry moves toward the regional organization, a logical linkage with research should be through the chairman of the regional research coordinating committees. For example, the chairman of CLARC (who is Director of Research for CLSU) should be a full participant in the formulations of plans in the regional ministerial office. As the 10 regional research centers become realities this arrangement would become more fully functional. In cases where the two do not mesh, some expedient channel must be developed to encourage communication between research and action agencies.

C. Research Program Planning and Management

Among PCARR's functions, the following, in summary, concern its planning and management responsibilities: (a) define the goals, purposes and scope of research; (b) develop a research program based on a multidisciplinary, inter-agency and systems approach; (c) establish priorities for research; (d) program allocations of all government revenue earmarked for agriculture research; and (e) assess progress.

These responsibilities and functions are carried out at the national level, at the regional level, and--through various other institutions--at the local level. They involve cooperation and coordination with a large number of research organizations and sources of funding. For calendar year (CY) 1981, PCARR will be involved with 103 research implementing agencies. In CY 1980 research funds were provided by 48 government agencies, boards, authorities, commissions, and other public institutions. Additional support was provided by foreign governments and agencies such as the International Development Research Centre and USAID, and through international research organizations such as the International Rice Research Institute, the International Potato Center, etc.

The task of defining goals, translating these into research programs, matching programs to research agencies, evaluating progress, and then transfering research results into successful practice is an enormous one. PCARR has made notable progress in these areas since its founding in 1972. Nevertheless, further improvement is possible because needs change, problems change, capabilities to do research change, and the organization itself changes as its capabilities develop and as its experience develops

new perceptions of its role. For all of these reasons, some changes can and should be made in the way PCARR carries out its research planning and management functions.

1. The Planning Process

PCARR has planning responsibility at the national level and at the regional level. The national role has been at the center of PCARR's program from its inception. A regional responsibility has evolved as the nation's research capability has become stronger and more widely distributed, as regional needs have been identified, and as integrated area programs with a need for research have been started.

a. National program development

National development goals. Research programs to meet national needs obviously must be planned on the basis of defined national goals and objectives. These are provided by NEDA in the Five-Year Philippine Development Plan, 1978-82. For the agriculture sector the plan has the following objectives:

Long Range
- the promotion of rural productive employment
- the enhancement of farm household income

Immediate
- improvement of the country's internal capability to produce its basic food and raw material requirements
- maintenance of a stable food supply, particularly of feedgrains
- reserves for food security purposes will be boosted

Minister of Agriculture Arturo R. Tanco, Jr. recently reaffirmed these and identified three areas of concentration for the decade of the 80's. They are agricultural products for fuel (alcohol from sugarcane or cassava, and charcoal from ipilipil), generation of foreign exchange by greater export of agricultural commodities, and improved nutrition for both farm and urban families. ("Agricultural Priorities in the 80's Bared." Philippines Daily Express, pp. 7, Oct. 24, 1980.)

It is worth emphasizing that the emerging need to find renewable sources of petroleum substitutes is a good example of how research aims can change. It also is an example of the need to keep the research establishment flexible enough to respond to such changes.

Translating goals into research programs. Through its staff, its Technical Program Planning and Review Board (TPPRB), its Governing Council (GC) and a large number of Commodity Committees, PCARR has translated the Development Plan into two major "thrusts." These are: agency thrust and commodity research thrust. They are spelled out in detail for CY 1981 in "Framework of the National Research Program--A Summary" 74th meeting GC August 21, 1979.

The seven agency thrusts can be summarized: (1) improve the flow of research results to successful adoption, (2) build stronger linkages

between private and government research, (3) use social sciences to reinforce biological sciences, (4) hasten development of trained manpower, adequate research facilities, and information services, (5) seek more effective methods for technology transfer, (6) improve management of agricultural research to increase efficiency and effectiveness, and (7) develop relations with international and other research systems to enable PCARR to move with the mainstream of world agriculture.

For each of the selected commodities there is a list of long-range thrusts and a list of thrusts for CY 1981. Since they are in the reference cited above, they will not be repeated here but it is useful to list in Table 1 the commodities selected and to indicate the comparative priorities reflected in budget amounts proposed for 1981, 1982, and 1983.

The commodity programs are assigned to the PCARR research divisions which develop for each commodity a detailed list of the research thrusts, activities, objectives, and budget estimates, and identify the research agencies to carry out the work. There are CY 1981 "Framework" volumes for crops, fisheries, soil and water, socio-economics, livestock, forestry and mines. These were reviewed and adopted (for CY 1981) by TPPRB on August 6, 1979, and by GC on August 21, 1979. They provide the master guide for the consideration and approval or rejection of specific project or study proposals submitted by implementing agencies.

PCARR, through its staff, commodity teams, TPPRB and GC, sets three priority categories and one "special" category to which commodities are assigned (Figure 3). In principle, the commodities in priority I should receive 80% of the total funds, those in II, 10%, those in III, 3%, and those in the special category, 7%. As can be seen from Figure 3, the actual distribution in CY 80 was 60.5% in I, 21.2% in II, 5.0% in III and 13.3% in socio-economic and special or emergency.

In principle, all commodities in I are intended to have an equal share of the total for that priority, as would those in II and III. The reason the actual allocations do not fit the principle is that PCARR does not have control over the kind of projects proposed, or over the amount of funds required to carry them out. PCARR can only pick and choose from among projects submitted. While it can quibble about the proposed project budgets it can, in the final analysis, only approve or reject.

For CY 1981 PCARR has indicated the agencies that it believes should implement the research project. But it cannot mandate those agencies to submit the desired project or study proposals. PCARR does exercise control over the research program to the extent that only projects it approves are included in agency budgets for submission to the Ministry of the Budget. To the extent it can provide grants in aid from the funds appropriated to it, PCARR can encourage proposals on projects considered to be of high priority. But for CY 1980 PCARR provided only 30.5% of the agricultural and resources research funds. Other major funding agencies were NSDB, the Bureaus in the Ministries of Agriculture and of Natural Resources, UPLB, and the government commissions and authorities (Figure 4).

Table 1. Budget estimates for CY 1981-1983 by commodity

Commodity	1981	1982	1983
TOTAL	₱161,752,540	₱136,913,870	₱117,445,748
1. Applied rural sociology	4,968,392	4,667,865	3,073,661
2. Aquaculture	6,647,612	5,651,040	6,042,308
3. Bamboo, rattan, fuelwood & other non-timber forest products	3,241,765	2,871,882	2,140,906
4. Beef/chevon	2,400,842	2,498,957	2,444,956
5. Carabeef	1,032,501	848,075	630,378
6. Coconut	4,417,868	3,406,534	2,811,280
7. Corn and sorghum	4,321,692	4,884,681	5,523,034
8. Dairy	5,897,616	3,999,806	2,717,854
9. Farming systems	10,022,793	7,512,111	5.846,713
10. Fiber crops	1,565,972	1,208,032	1,146,741
11. Forage, pasture & grassland	2,387,007	2,023,897	1,535,543
12. Fruit crops	2,896,342	2,480,762	1,596,200
13. Inland waters	4,358,356	4,177,890	4,289,000
14. Legumes	10,360,636	9,901,283	6,732,896
15. Macroeconomics	8,252,609	8,161,123	7,617,630
16. Marine fisheries	8,067,993	6,349,550	3,519,000
17. Metallic mineral resources	8,212,911	6,899,077	5,378,572
18. Non-metallic minerals	1,255,000	1,516,250	1,099,188
19. Ornamental horticulture	2,077,346	1,927,423	1,388,954
20. Parks & wildlife	2,254,000	1,474,444	1,142,527
21. Plantation crops	967,908	853,619	626,092
22. Pork	2,481,644	2,060,825	1,622,776
23. Poultry	2,502,831	2,381,839	2,505,000
24. Pulpwood & paper products & fiberboards	2,270,867	2,227,345	2,076,793
25. Reforestation & forest watersheds	3,457,025	3,057,542	2,661,234
26. Rice	7,865,547	4,754,423	4,761,713
27. Root crops	6,661,714	5,124,481	4,123,259
28. Soil resources	13,765,166	14,039,431	14,511,586
29. Sugarcane	1,600,863	655,403	522,500
30. Timber products	11,822,416	8,464,212	7,075,040
31. Tobacco	2,921,564	2,449,796	1,426,500
32. Vegetable crops	5,600,704	3,751,659	4,035,079
33. Water resources	2,195,038	2,632,613	2,820,835
Emergency Research (2%)	3,000,000	2,000,000	2,000,000

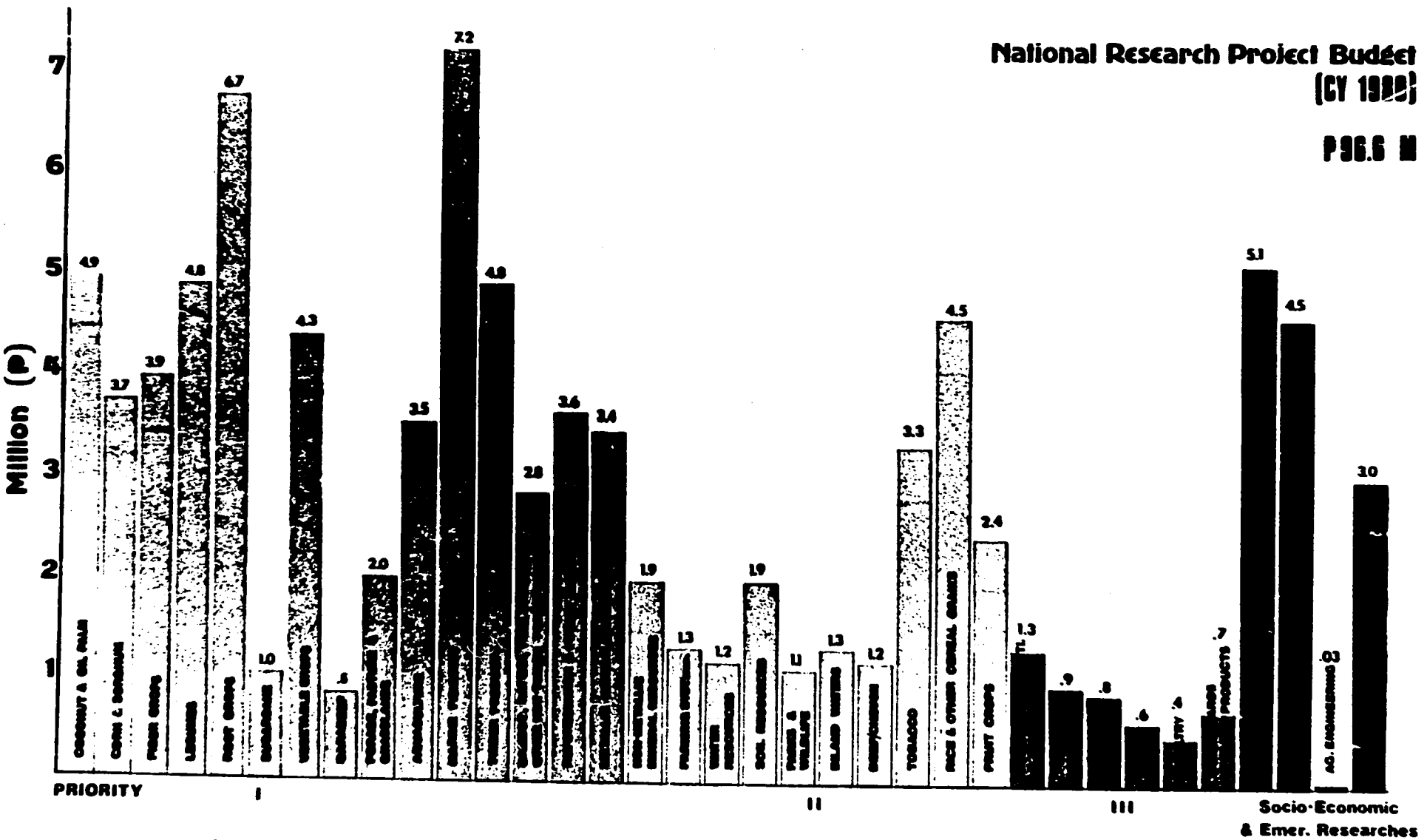


Fig. 3. National Research Project Budget Allocation of Commodities by Priority Ranking

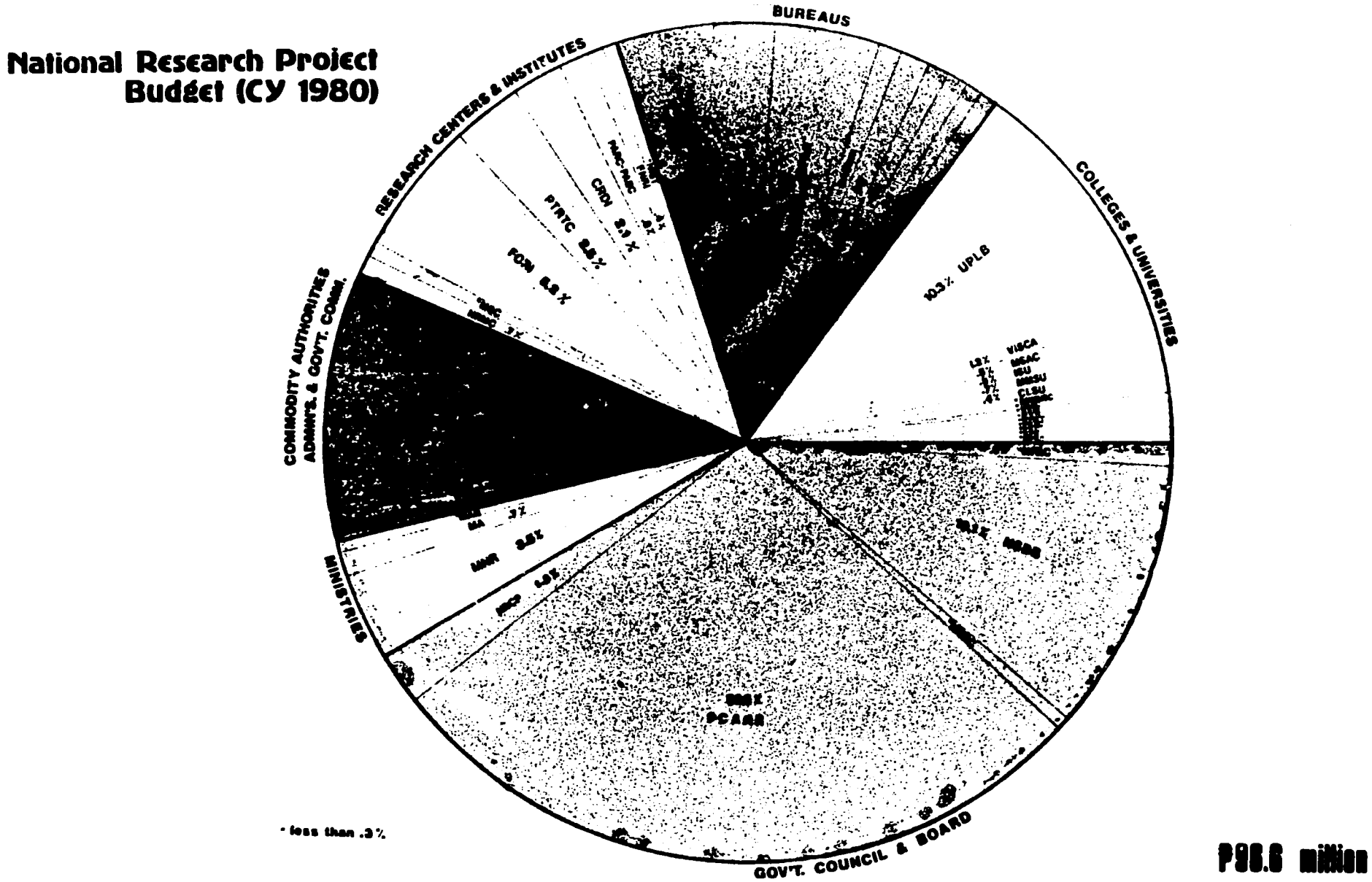


Fig. 4. Distribution of the National Consolidated Research Project Budget (CY 1980) by Source of Fund

The Review Team concludes that for PCARR to effectively set research priorities, to insure that research is done promptly on the basis of the priorities, and to insure that the research is of high quality, it should develop integrated, multidisciplinary programs, assess research capabilities of implementing agencies and assign the programs where they can be done best.

Inter-regional programs. There are integrated regional development programs under the National Council for Integrated Area Development, such as the Bicol River Basin Development Program (BRBDP). There are also a number of national production programs involving several regions that are the responsibility of various agencies. Examples are: Masagana 99 (NFAC), Maisan 77 (NFAC), Coconut Rehabilitation Program (PCA), etc.

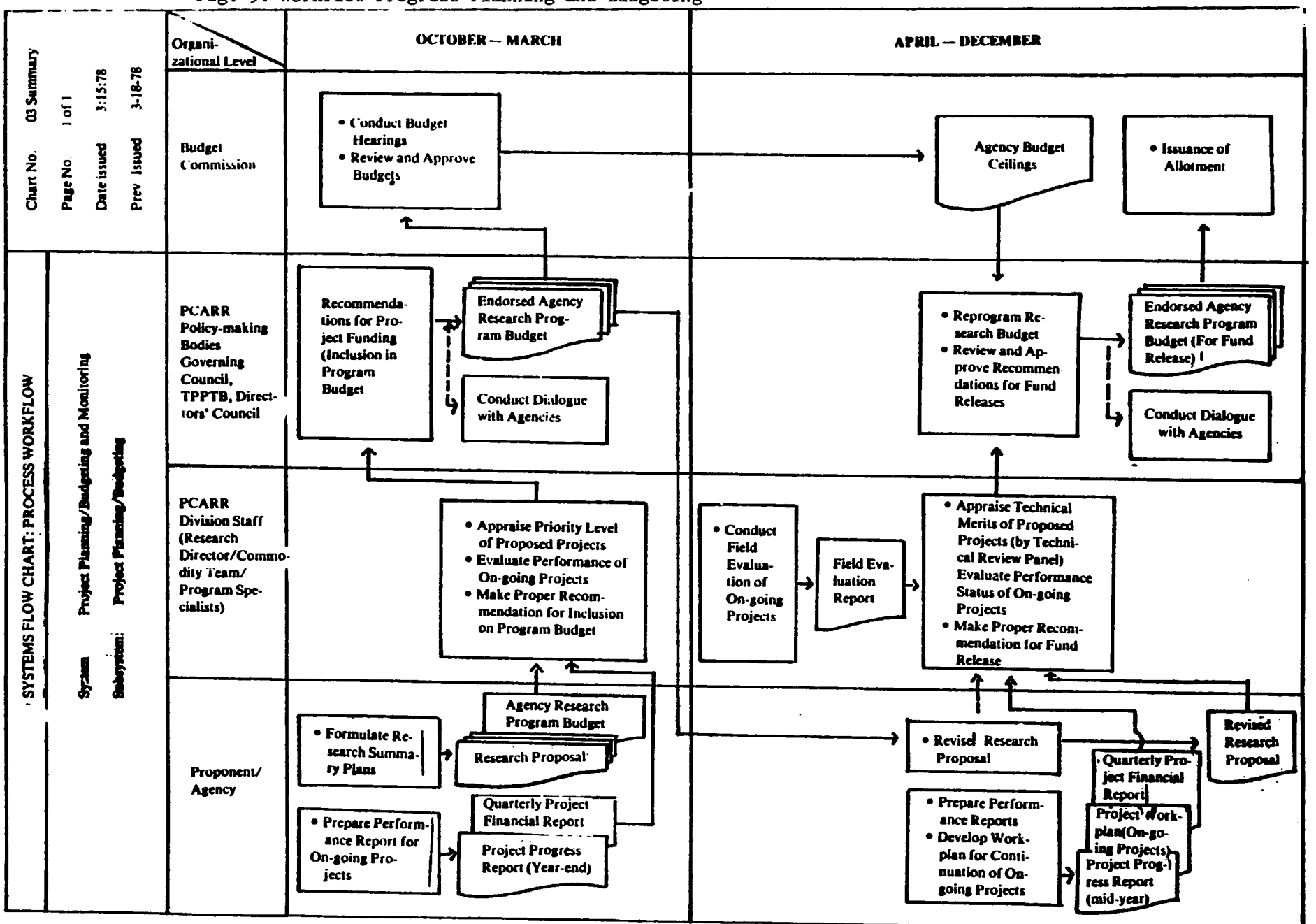
Research is an integral part of all of these, as has been recognized by PCARR in developing its national program and in setting up the regional research centers. At the national level the programs are covered in detail in the Framework Summary for CY 1981. At the regional level, coordination is carried out by participation of the development program staff in the Regional Center Coordinating Committee. An example is BRBDP in the Bicol RCCC. This will be covered more fully below.

Role of the TPPRB. The Technical Program Planning Review Board (TPPRB) was recommended by the Technical Panel in 1971 and was established in PD No. 48. Its members are appointed by the Governing Council (GC) and include representatives of the Ministries of Agriculture, natural resources, and budget and of NFAC, PCARR, NEDA, NSDB, NRCP, universities, agricultural businesses and small farmers. The TPPRB functions were spelled out in 10 items included in the Technical Panel report (pg. 84-85). These include advisory functions to the GC and to the PCARR staff as well as some policy functions, the most important of which are (1) "determine and recommend allocations of grants-in-aid for agricultural research conducted by appropriate universities and colleges and other research agencies," and (2) "define and recommend national priorities for research in agriculture, forestry and fisheries."

As discussed above, TPPRB participates in developing the national research programs. Once the national programs have been approved and announced, research proposals are received by PCARR. TPPRB is involved in the review and approval of these proposals (Figure 5).

A project proposal approved by the PCARR division staff moves to the "PCARR Policy-Making Bodies." It goes first to TPPRB, which usually approves the proposals for inclusion in the program budget. It should be noted here that these proposals are submitted in great detail and, even after review by the PCARR staff, the submission to the TPPRB on December 17, 1979, comprised a stack of papers about half a meter high. Purely as an example, selected at random without any judgment on the merit of the proposal, a copy of the project "Intercropping Sweet Potato with Coconuts in "Gonoy"-Infested Plantation" is attached as Annex VI. TPPRB forwards the approved projects to GC, which approves them for inclusion in the program budget. This approval is sent to the agency from which the proposal was received so that item can be included in its budget for submission to the Ministry of the Budget.

Fig. 5. Workflow-Progress Planning and Budgeting



Suffice it to note here that the proposal is subject to further review after which it is again referred to TPPRB and GC. By this time, however, agency budget ceilings have been set and TPPRB and GC adjust research proposals as necessary to comply with the amounts available. Final approval at this stage means that allotment of budgeted funds can be made to the implementing agency.

This exceedingly complex procedure requires a long lead time (a minimum of 18 months) and uses a lot of time of PCARR staff, commodity teams and technical panels, and thus is expensive. As noted above, it does not insure that projects submitted are consistent with national programs and priorities.

In another section, the role of the GC is discussed and it is recommended that the GC become a policy-making body. For some of the same reasons -- to improve effectiveness and participation -- it is recommended that TPPRB become strictly a program review board and that it delegate project review to the PCARR staff, the Regional Center Coordinating Committee, and the Commodity Teams.

b. Determining regional needs

PCARR now carries its programs to regional levels through the Regional Research Centers and Consortia. Some of these have national responsibility as single commodity national research centers, others are multi-commodity centers, and some are both. They were described in detail in Chapter III, Section B, and the locations are shown in Figure 2.

Regional Research Center Coordinating Committee. Each Regional Center has a Regional Research Center Coordinating Committee (RCCC). This commonly consists of representatives from each of the partners in the Center, s ch as BPI, PHILSUCOM, etc. It may also have representatives from other agencies, and an example is the BRBDP in Bicol, which is represented in the BARRC coordinating committee.

Each center also has a number of Commodity Teams representing competence in specific commodities.

Regional Ministry of Agriculture offices. A recent significant development is the consolidation of functions of the Ministry of Agriculture (MOA) at the regional level. It is intended that there will be a single Director for Agriculture in each of the 12 political regions of the country. The functions of the Bureaus (BPI, BAI, BS, BAEx) will be continued, but will be under the leadership of the Regional Director. Some regions have completed the transition while others have not.

Although the PCARR regions and the MOA regions are not the same--reflecting agroclimatic regions for PCARR and geographical or political regions for the MOA--there is no reason why research cannot be coordinated. This can be done formally, through the RCCC and the Regional Coordinator, and informally by reciprocal visits by the officers concerned. The Review Team concluded, on the basis of visits to Iloilo and Tacloban, that such coordination has been facilitated by the Agricultural Office consolidation.

Regional NEDA offices. National coordination between development and research is achieved in the Governing Council through representation from NEDA, MOA, MNR and MOB. It is equally important to coordinate research with the regional NEDA offices. There is no formal structure for bringing NEDA and PCARR together in the regions. Coordination depends on the interest, concern and response of the individual officers in the regions. Based on visits to NEDA offices in several regions, the team concludes that the communication and coordination ranges from excellent to almost nonexistent.

There were, at one time, Regional Research Congresses organized by PCARR with participation by NEDA offices. These were considered to be useful and it was the consensus of the several NEDA offices visited by the Team that they should be resumed. This does not mean that an extensive "Congress" of the earlier type should be conducted annually, but that effective "problem identification and priority determining" linkages between PCARR and the NEDA Regional Office should be maintained. This might be done through the Regional Research Coordinating Council.

As more emphasis is placed on regional organizations and activities, both by PCARR and line agencies, it is essential that regional coordination be maintained and strengthened. With respect to PCARR programs, the coordination of specific research projects could well be delegated to the regions. Each regional RCC and Regional Coordinator would be responsible for evaluating and approving projects within program guidelines and priorities. Overall supervision would be provided by the PCARR research divisions, but decentralization of project review would relieve the Los Baños officers of a lot of detailed work, reduce travel, speed up the process, and provide more flexibility.

2. Integrated Multidisciplinary Programs

a. Systems approach to planning and management

The Technical Panel evaluation report of 1971 included as its first recommendation the adoption of "...the agribusiness or systems approach in formulating policies and identifying critical problem areas for research." The recommendation continued, "current agricultural research is production oriented and principally consists of many individual lists of work that do not relate to each other. And "a multidisciplinary team approach is essential to identify and investigate critical problem areas of an industry."

Success of the international commodity research institutes (IRRI, CIMMYT, ICRISAT, CIP, etc.)--organized and operated as multidisciplinary centers--has demonstrated the value of the method. Sometimes it has appeared easier to adopt the terminology than to grasp and adopt the concept.

Progress has been made in the Philippines in bringing multiple disciplines to bear on problems in the commodities. Designation of specific institutions as national centers for selected commodities is a move in this direction. Yet, there are other developments that raise caution signals. One is the establishment of the Institute of Plant

Breeding (IPB) in the UPLB. Another example is the National Crop Protection Center (NCPC). Does this suggest that pest control research will be divorced from plant breeding? Or that breeding and pest control may develop in both IPB and NCPC? Still another concern is the scattering of programs, facilities and staff at a number of relatively small stations. Can a small isolated station attain the "critical mass" of research staff necessary to develop and maintain an effective multidisciplinary program?

National and regional integrated programs. It was noted earlier that the PCARR Framework Summary for CY 1981 included reference to national integrated programs. Sixteen production programs and five marketing and storage programs are identified. In some instances, for example the sugarcane development program and the coconut rehabilitation program, it would appear that coordination would be easy and effective. The sugarcane development program and sugarcane research are both the responsibility of PHILSUCOM. The coconut rehabilitation program and coconut research are both the responsibility of PCA.

For national programs like Maisan 77, a responsibility of NFAC, and Grain Post-Harvest Technology Development, a responsibility of NGA, it is not clear how PCARR proposes to respond to the research needs with a multidisciplinary program. The agencies responsible for the development programs are not directly involved in research and since the programs cut across many commodity lines it would appear that a special approach is needed.

The situation is mixed when it comes to the integrated area development projects (see Annual Report for 1978 of the National Council on Integrated Area Development for a list and description of Projects). Based on the descriptions, all of them have agricultural components. Some are very specific. For example, the Mindoro project calls for rodent control over an area of 5,505 ha. and seed production, certification and distribution. The Bicol River Basin Development Program was the only one visited by members of the Review Team. The Program Director of BRBDP is a member of the BARRC coordinating council, so presumably is in a position to communicate research needs.

There is an agreement between PCARR and NACIAD for cooperation and coordinated efforts in research to serve the integrated area development programs. (See Monitor Vol. VIII No. 8, Sept. 1980). This has just been started, but the description is not very specific on how coordinated planning will be carried out. The question is whether the response--through BARRC-RCCC, PCARR (Secretariat, TPPRB, GC), Budget, implementing agencies, etc.--can be prompt enough. The Team members got the impression that BRBDP would not wait if an emergency need arose for research, such as the bunch-top disease of abaca, and, if necessary, would circumvent the lengthy planning, PCARR approval, MOB approval, PCARR reassessment, and fund allocation, etc., processes and move directly to high levels of government to get the urgent research undertaken.

Determining institutional involvement. During most of PCARR's existence the involvement of research organizations in the national program has been determined more by chance than design. Although PCARR

can choose whether to approve a proposed project and can choose whether to make a grant-in-aid, it does not select the institutions that submit project proposals.

The shortcomings inherent in this system have been recognized by PCARR to the extent that institutions, "to be involved in the implementation of the National Research Program for CY 1981," are identified (see Framework Summary pages 51-55). It is not clear however, whether the involvement will be at PCARR's initiative or that of the institution. It is equally uncertain whether receipt of proposals will be limited to the institutions listed. The detailed framework papers for the commodities imply that PCARR can exercise some control, at least to the extent of determining whether an institution will be a "coordinator," a "cross-area participant," or "non-involved." For example, in the priority area of "Prevention and Control of Major Diseases and Parasites" in the Carabeef program, UPCVM is the coordinator, while CLSU, UPLB, NABC, and LDC are not involved. (Obviously, a lot of other institutions will also not be involved.)

Ordinarily, research is assigned to or is funded at those institutions best qualified by location, staff capability, physical facilities, and proven performance to do it. There is an understandable desire to disperse research activities widely in the Philippines and an equally understandable reluctance to concentrate too much activity at a few selected institutions. However, to maintain quality of research, while at the same time walking the tightrope between too much concentration and too much dispersal, PCARR should develop a set of criteria to evaluate institutions. Only those that meet the standards for staff capability, physical facilities, suitable location, and research leadership would be eligible to conduct research under the national program.

b. The research project structure

The PCARR project structure is basically simple but it soon becomes complicated when the implementing agencies, the funding sources, the locations where research is conducted, the projects, and the linkages with cooperating agencies are injected.

Major program thrusts. As described earlier, the major programs are based on "commodities." These are individual crops (rice, root crops, etc.) but also "farming systems," "non-metallic minerals," "macro-economics," etc. These are subdivided into "Research Thrust/Priority Areas," then into "Research Activities/Titles," and then into the working level, which is the "Project." While these appear to provide a hierarchical order on which to base priorities and budgets it is doubtful if, in practice, they do so. The reason is that at the working level--the project--the planning and implementing initiative lies with the agency that submits the proposal, not with PCARR.

Projects. Reference has been made to the Framework for CY 1981 which has been approved by TPPRB and GC. It is also useful to look at what was done in CY 1979. The best source is the "Directory of Researches in Agriculture, Forestry, Fisheries and Mines in the Philippines," Vol. 1, Jan. 1979. This is a computer print-out, by PCARR divisions and

commodities, of the approved, on-going, and completed projects for 1979. (The companion Vol. 2, a print-out by implementing agencies is not available.) It lists the research (project) code, title, and leader, the duration, the implementing agency and location; the source of funds, and the budget requirement for CY 1979. There are 4,236 projects listed: 695 approved, 2,199 on-going, and 1,342 completed.

This is impressive but there are no consolidations by divisions, commodities, implementing agencies, or funding agencies--only the individual listings. Data can be extracted, as shown in Table 2, which summarizes the implementing agency, number of projects, source of funds, and budget requirements for rice and other cereals. Table 3 is a summary of the source of budgetary requirements by funding agencies for the same program. Although this is a small sample of the total list, it does not represent important commodities and reflects a sizeable investment in research.

Two conclusions can be drawn. First, judging by number of projects (80%) or by funds (64%), research in this commodity is concentrated in UPLB and BPI. Second, the two principal funding agencies are BPI and NFAC, with significant amounts from NGA, NSDB, and PCARR. The Review Team believes further analysis of this sort, on other commodities, would be useful in showing where research is being done and where the support comes from. Over time it would indicate the extent of PCARR's role in shaping the research activities.

There is an enormous amount of information produced with respect to projects and budgets, but it seems difficult to find out how the pieces all fit together and how they constitute the whole agriculture and resources research program. Apparently because of the structure and organization, the working research projects are developed by various proponents with little or not guidance and direction from PCARR in line with priority research needs.

A revised approach. The above problem has been recognized by PCARR research division staff and by TPPRB. In conversations, Review Team members were told that the staff recognizes the imbalance between program plans and projects submitted. In addition, the Team reviewed a draft PCARR document, which reviews the problem and suggests a revised system for the formulation and packaging of a national commodity research program.

Regardless of how the problem is resolved and what form the revised system takes, the following principles seem to be important:

a) The basis for planning provided by the priority groups--I, II, III and Socio-Economic and Emergency (S-E E) is sound.

b) The allocation, for planning, of 80% of resources to I, 10% to II, 3% to III and 7% to S-E E is a starting point, but this allocation should be reviewed annually.

c) The current practice of aiming for equal distribution of funds among the commodities within a priority group is unsound and

Table 2. Summary of projects for rice and other cereal grains, CY 1979 (Source: Directory, Vol. 1, Jan. 1979, PCARR, Los Banos)

Implementing agency	Source of funds	No. of projects	Amount of funds (000)	Percent of funds
PAEC	PAEC	8	₱ 49.5	1.2
UPLB	NFAC	12	580.6	
	NCPC	31	123.2	
	NSDB	25	513.7	
	PCARR	1	13.3	
	Total	69	1230.8	29.1
BPI	IRRI	4	0	
	BPI	50	1310.8	
	DSAC	6	154.2	
	Total	60	1465.0	34.6
DSAC	DSAC	3	26.5	0.6
IRRI	PCARR	7	335.8	7.9
BS	NFAC	2	421.4	10.0
MMSU	MMSU	2	127.3	3.0
NGA	NGA	8	539.0	
	PCARR	2	34.4	
	Total	10	573.4	13.6
Grand Total		161	4229.7	100

Table 3. Agency sources of funds for budgetary requirements CY 1979 for projects involving rice and other cereal grains

Source of funds	Amount (000)	Percent
Bureau of Plant Industry (BPI)	₱1310.8	31.0
National Food and Agriculture Council (NFAC)	1002.0	23.7
National Grains Authority (NGA)	539.0	12.7
National Science Development Board (NSDB)	513.7	12.1
Philippine Council for Agriculture and Resources Research (PCARR)	383.5	9.1
Don Severino Agricultural College (DSAC)	180.7	4.3
Mariano Marcos State University (MMSU)	127.3	3.0
National Center for Pest Control (NCPC)	123.2	2.9
Philippine Atomic Energy Commission (PAEC)	49.5	1.2
TOTAL	4229.7	100

should be abandoned. There is no rationale for assuming that commodities such as carabeef, coconut, or marine fisheries should all have identical budget amounts. This is a superficial "resource allocation" without reference to the nature of problems to be solved or the magnitude of a program--geographically as well as in national development objectives.

d) It should be the function of the policy making body, the GC, to set broad priorities through the top-level participation of the members representing the Ministries and other government agencies. The GC also should provide the TPPRB and the PCARR secretariat with guidelines for planning and budgeting.

e) Within the guidelines, the PCARR staff, with the advice of TPPRB, should develop the commodity programs and establish priorities among them.

f) The programs and budget guidelines would then be sent to the Regional Research Centers. Some of the centers have national program responsibility for specific commodities, some have regional responsibility, and all are cooperating stations, so they must be involved in setting regional priorities.

g) At the regional centers, the RCCC, the Regional Coordinator and the commodity teams would develop regional programs and priorities and would identify the implementing agencies to which projects should be assigned. The increasing regionalization--by the Ministry of Agriculture with its regional directors and RIAR's, and by PCARR--emphasize the importance of regional planning and coordination of programs and projects.

h) Regional program plans, guidelines, and implementing agency recommendations would be sent to PCARR for review, coordination and consolidation by investigation leaders and research divisions. Consolidated division programs would be reviewed by the Deputy Director General for Research. He would be responsible for insuring that all programs conformed to priority and budget guidelines for commodities and for regions.

i) Within commodity program and budget guidelines established in PCARR, research division heads would assess research capabilities of implementing agencies and identify those that should be requested to submit projects. The designated research agencies would then prepare project proposals and submit them to the appropriate PCARR research division.

j) PCARR research divisions would evaluate proposals and, within their guidelines, develop a consolidated division proposal for review by the Deputy Director General for Research. He would be responsible for insuring that all proposals conformed to the program plans and budget guidelines.

k) Approval by the DDG-R, and subsequently by the DG, would constitute authority to allocate funds to the implementing

agency. TPPRB should be informed at this stage, and have an opportunity to react to the program plans, but it should not be required to consider the detailed project proposals.

Obviously some projects and programs will have to be revised during the review process in order to conform to program and budget guidelines, but this should be done directly between the PCARR staff and the staff of the implementing agencies. Project proposals should not be required to contain all of the detailed information now included. Itemized details of experimental operations, or of data to be collected and the schedule on which they are to be taken, are not really useful and are irrelevant to the substance of the projects. It is equally pointless to require detailed lists of small supply items to be purchased because it would cost more than the value of the purchases to audit the accounts.

There would be three main advantages of a revised system that would evaluate institutional research capability, both nationally and regionally, and assign projects rather than accept them. First it would permit PCARR to develop integrated programs that would be directed at important high-priority problems and would apply the necessary research resources to solve them. In some ways agricultural research is like a military campaign, the fire should be concentrated on the most critical targets. Second, it would permit PCARR to assign research problems and projects to those institutions best qualified to handle them. Third, it would reduce the time required for program and project review and approval and would thus provide greater flexibility.

The Review Team strongly urges that the program planning, budgeting, priority, and project assignment system be revised along the lines suggested and as have already been discussed by PCARR staff.

3. Role of PCARR in Special Research Programs

Most agriculture and natural resources research is conducted in line agencies within the ministries, and in universities and colleges. Some is done, however, by government-sponsored, industry-supported commissions and authorities, some by purely private enterprises, and some in special laboratories within other institutions. Reference has already been made to the list of institutions to be involved in the implementation of the program for CY 1981 in the "Framework" summary.

a. Commercial product research

Coconut, sugarcane, tobacco, abaca, and cotton are listed in "Framework Summary" CY 1981 as Commercial Crops. They are crops which have traditionally provided important export products. All of them have independent commissions, authorities or institutes that conduct research on the respective crops and commodities. All have commodity teams to advise and consult on research priorities and programs. The Phillipine coconut and sugarcane industries have conducted research programs of their own for many years. Abaca now has the Abaca Industry Development Authority (AIDA), which is assuming responsibility for abaca research.

Coconut. In 1977 coconut products were the single most valuable Philippine export, valued at US$671 million. It is obviously a very important crop and is in PCARR's priority I group of commodities.

Table 4 presents a summary of on-going coconut research in CY 1979 by implementing agencies, funding agencies and funds budgeted. The Philippine Coconut Authority (PCA) had 40 research projects at its three stations and all of the ₱2,958,000 budget was provided by PCA. UPLB had 16 projects funded to the extent of ₱1,683,000, VISCA 29 projects funded at ₱1,056,000, while four other agencies had a total of 31 projects funded at ₱727,000. Eighty percent of the total funding came from PCA (46%) and PCARR (34%), while 46% was used by PCA and 26% by UPLB.

There continue to be coconut problems and one of the national integrated programs is to rehabilitate the coconut industry by replanting with high-yielding hybrids. Coordination is through the commodity team, chaired by a representative of the PCA. It should be noted, however, that although there is a major PCA experiment station at Guinobatan in the Bicol region, PCA has not joined the BARRC. The Review Team concludes that while coconut research will be done at some institutions other than PCA under the PCARR program, and with PCARR support, PCA will continue to be the dominant leader. It will be important for PCARR to maintain liaison with PCA.

Sugarcane. Sugar was the second most valuable export in 1977 at US$466 million. It has long been an important crop and employer of workers. It is in PCARR's Priority I group. According to the Directory of 1979, all on-going sugarcane research was implemented by the Philippine Sugar Commission (PHILSUCOM) at its experiment stations and was funded entirely by PHILSUCOM. The total amount for 89 projects was ₱1,144,000. It is interesting to compare this with the distribution of projects and funds for coconut.

PHILSUCOM is a member of the La Granja Agricultural Research Center (LGARC) along with BPI, BAI, and UPLB. The chairman of the LGARC RCCC is the Director of Research for PHILSUCOM and the Research Coordinator of the Center is also a staff member of PHILSUCOM. The members of the Review Team who visited LGARC were impressed with the cooperation and mutual support among the members of the center. It is well organized and well run and productive; useful research is being done.

It is likely that PHILSUCOM will continue to be the leading member of the consortium at LGARC. It is also likely that PHILSUCOM will continue to take the lead in planning, supporting and doing sugarcane research. PCARR will perform its coordinating function but PHILSUCOM will be the effective director of sugarcane research.

Abaca. Abaca has slipped. At one time abaca products were the major Philippine export. They are now no longer in the top ten. Planted areas and production have declined and rehabilitation of the industry is needed. The Abaca Industry Development Authority (AIDA) has been formed to coordinate this program.

Table 4. Summary of coconut research by projects, implementing agency, funding agency and funds for CY 1979. (Source: Directory, Vol. 1, Jan. 1979, PCARR)

Implementing agency	Funding agency	No. of projects	Amount of funds (000)	Percent
PCA	PCA	40	₱2958	46.1
UPLB	PCARR	11	1521	
	NRCP	2	57	
	PCRDF	1	37	
	UPLB	1	36	
	NSDB	1	32	
	Total	16	1683	26.2
VISCA	PCARR	14	570	
	NSDB	4	218	
	PCRDF	3	200	
	VISCA	7	43	
	NRCP	1	25	
	Total	29	1056	16.5
BPI	BPI	16	567	8.8
FORPRIDECOM	PCARR	7	55	
	FORPRIDECOM	6	31	
	Total	13	86	1.3
TRRC	PCARR	1	13	
	TRRC		9	
	Total		21	0.3
NIST	NSDB	1	53	0.8
TOTAL		116	6424	100

Research is needed to develop new varieties, to control diseases, to develop better fiber extraction methods, and to improve the marketing system. In 1979, there were 15 abaca research projects in the BPI, 14 funded by AIDA, at a total of ₱623,424, and one funded by PCARR, at ₱81,370. There was one project at AIDA at ₱12,322. The Review Team learned that to speed up abaca research responsibility has been transferred from BPI to AIDA. The BPI station at Buang, Albay, has discontinued abaca research. There appears to be a hiatus and even though AIDA joined the BARRC, the Team saw no active program of abaca research.

The Team saw two new laboratory buildings and screenhouses constructed under AID loan I at BUCA for abaca research. They are not equipped, there is no staff, and no research leadership. It will be some time before there will be any useful work. This illustrates a situation that PCARR should be prepared to meet. When an industry, such as abaca, needs research to meet new problems, PCARR should be flexible enough and should maintain the capability to react quickly. Organized agricultural producers and processors are less likely than small farmers to wait patiently until a cumbersome process can, at long last, put research results in their hands.

b. Special institutes

There are two special-purpose institutes within UPLB--the Institute of Plant Breeding (IPB) and the National Crop Protection Center (NCPC). IPB incorporates in one organization all the plant breeding functions formerly dispersed throughout UPLB, while NCPC does the same for pest control.

In the sense that this centralization pulls together workers on common problems it can increase efficiency and productivity. IPB's success in variety development suggests that this can work. But, since these organizations are highly specialized, with their own research staff and facilities, they represent a trend contrary to the goal of fostering multidisciplinary research.

The Review team is concerned that development of central, specialized laboratories such as these will require additional research leaders, research workers, and funds for construction of infrastructure. They compete for these research resources with regional centers and educational institutions that need strengthening. Also each seems to develop its own information services, its own library, its own set of publications, etc., leading to duplication of functions.

This is not to say that there should not be such institutes. Rather, before they are established, there should be a thorough review to determine if they are needed, what the effect will be on existing organizations, and the total cost--not just in terms of money but in research leadership and trained research workers.

4. Research Program Management

It is sometimes easier, and often more attractive and interesting, to build new institutions than to improve existing ones. A strong leader frequently can translate a perceived need into the founding of a new organization. Each such founding, however, creates a demand for a

whole battery of leaders, from the top down. The needs of the Philippines and the resulting establishment of new research organizations, often with overseas encouragement and assistance, has created such a demand. Leadership is the key element in research management and the Review Team has seen both good and bad examples of this in the way PCARR and implementing agency programs are being managed.

a. Importance of leadership and direction

Among human activities, research is one of those that cannot be ordered. Research results require the imagination, skill and effort of trained, dedicated people. Imagination, dedication and effort cannot be taught or called up at will; they can only be directed and led.

b. Technical and professional direction

PCARR, the Bureaus of the Ministries, the Institutes, the Universities and Colleges, the Commission and Authorities all have some units with experienced, capable administrators. Such administrators are providing sound leadership resulting in productive research. Other units, however, are lacking such leadership and the lack is evident in the sometimes low morale and low productivity of the units.

One reason for this imbalance is the rapid rate at which research has grown. The manpower development program, discussed elsewhere, is providing training for increasing numbers of researchers. It obviously is from this group that most research leaders will be drawn. To be prepared for leadership they need research experience, which takes time. And it is evident that the demand has called some researchers to leadership positions before their time.

The establishment of research centers at colleges has placed some centers at institutions that have no tradition of research and have no leaders with research experience. A capable, effective dean of a college or superintendent of a school will not necessarily be a good research leader.

Establishment of research centers, regardless of where located, and construction of research facilities, needs to be in better phase with development of research leaders. The Review Team saw too many instances of new facilities and of new programs where both research leadership and research workers were lacking. The Team believes that the development of the total program of agriculture and resource research will be better served if an effort is made to bring programs, leadership, facilities, and trained manpower together in a phased sequence.

c. Monitoring and evaluating research

It has not been entirely clear how PCARR has interpreted its mandate to "...identify, evaluate and review agricultural research programs." There are many examples of listings of research projects and of listings of results of research reported by the implementing agencies. (See: Directory of Researches in Agriculture, Forestry, Fisheries and Mines in the Philippines. January 1979, Vol. 1, PCARR, Los Banos and Highlights 78, PCARR, 1979 as examples.)

These are useful as far as they go but they do not integrate, summarize and evaluate. There is, in Highlights 78, a tabulation by commodities and priority areas, of approved, on-going and completed research projects. A real evaluation, however, requires a summary showing where the research was done, who did it, how much it cost, and what it produced. There is plenty of detail, perhaps too much detail, in both the Directory and the Highlights 78.

No research director for a program as large as PCARR's can be familiar with the details, nor can he direct and evaluate the control on the basis of details. He must depend on his division heads to summarize, integrate and digest the enormous detail into manageable units that will enable him to know how the resources are being used and what is being produced. Perhaps one reason this is not done is that PCARR staff members at all levels seem to spend too much time in detailed program planning and setting priorities. They may have too little time for evaluation. It was reported that PCARR staff members spend half their time in planning and budgeting.

PCARR should change its monitoring and evaluation system from primarily a bookkeeping, quantitative procedure to one that will permit qualitative evaluation.

d. Limitations of project approval, fund release, and reporting

The process of project implementation and approval, and the detail required in project proposals was discussed previously. It was suggested that the procedure be revised in order to simplify it, to require less staff time, to provide greater flexibility, and to better match projects, programs and implementing agencies.

Funding and financial procedures are discussed in Section E. It is enough to note, with respect to management, that the Review Team was advised of at least two problem areas. First, it was reported that sometimes a project may have been approved by PCARR and be budgeted for funding by the Ministry of the Budget but, that during the implementation of the project, funds may not be released. This could be troublesome in any event, but is especially so if the investigator is not informed as soon as possible of the withholding. Second, it was reported that sometimes, although required quarterly reports were submitted on time, the release of funds supposed to be triggered by the report did not occur. It is not clear where the bottleneck is, but it was indicated that it may be loss of the reports within PCARR.

The Team suggests that if PCARR does not already have one, a log be kept of reports received and action on them. It is not surprising if reports get lost, because the sheer volume under existing reporting requirements is staggering. Chart No. 08, Systems Flowchart: Distribution Grid of Project Performance Reports, in the "Users Manual" August 28, 1979, indicates a total of eight reports for each project. Two are to be filed quarterly, one semi-annually, four annually, and one on completion. The number of copies and distribution of them varies, but in total is very large. So large, in fact that it is doubtful if it would be physically possible to read them.

While reporting is essential, a lot of it should be decentralized. If responsibility for programs and projects can be delegated, as suggested earlier, it should be possible to do the same thing for reports. The project leader should report regularly to his supervisor, who should summarize and brief the reports for his superior officer so that by the time they reach PCARR they are of manageable volume.

As with monitoring and evaluation, the objective should be to change from a quantitative approach to a qualitative one. Such a change in reporting will help to improve evaluation.

D. Manpower Training and Personnel Management

One of the key functions of PCARR as defined in P.D. 48 is to "provide for a systematic program of agricultural research manpower development and improvement." In November 1973, PCARR launched a program to increase and upgrade manpower available for agriculture and resources research through the development of scholarships for degree and non-degree training. Most of the training is in support of and coordinated with the development of the national research network for which PCARR is responsible.

1. Manpower Resources

In the Technical Panel report of December 1971, two tables provide information regarding agricultural research manpower in the country during 1970-71; one by agency group and the other by area of specialization. Surveys conducted by PCARR in 1973 and 1977 provide similar data. Table 5 combines the information from these three surveys to provide comparative data by agency. Since the three studies may not have been structured or conducted in a similar manner, it is likely that some comparisons are not appropriate. Further, the figures do not provide information on scientist man years which probably approximates 50% of the totals. However, the following gross comparisons and trends may reasonably be derived from these data:

a. There has been a substantial increase in numbers of trained researchers, averaging about 9% per year.

b. Universities now have about 50% of all researchers (up from 43% in 1970) although data in a 1975 study show that 49% of their time was devoted to research compared with around 80% in the Ministries.

c. Ministries have increased their research manpower at the B.S. level by about 70%, but there is essentially no change in the small numbers of workers trained at the M.S. and Ph.D. levels.

d. Private researchers appear to have drastically decreased, but this may be due to unknown factors in the survey designs.

e. International agencies were not enumerated in 1970, which causes an inflation of the total 1977 figures in comparison

Table 5. Agricultural and natural resources researchers in the Philippines[1/]
Distribution by agency and academic degree 1970, 1973 and 1977

Agency	B.S.			M.S.			Ph.D.			Total		
	1970	1973	1977	1970	1973	1977	1970	1973	1977	1970	1973	1977
Colleges and universities	367	488	811	292	397	428	143	213	192	802	1098	1431
Ministries of agriculture & natural resources	488	644	830	51	57	60	3	4	5	542	705	895
NSDB	229	135	113	39	22	20	11	14	4	279	171	137
Private sector	113	24	11	14	5	3	24	3	1	151	32	15
Other government agencies	*	76	277	*	24	18	*	2	4	*	102	299
Commodity institutes	97	121	*	4	4	*	*	1	*	101	126	*
International agencies	*	*	165	*	*	64	*	*	40	*	*	269
Total	1294	1488	2207	400	509	593	181	237	246	1875	2234	3046
Change, 1970-1977		+71%			+48%			+36%			+62%	

[1/] Does not reflect scientist man-years.

*Not reported in survey.

Sources: The Philippines Agricultural Research System: Evaluation and Recommendation, 1971, PCARR Manpower Development Program
Manpower Resources in Philippine Agriculture, Fisheries, Forestry and Mines Research, 1978

with 1970. Since they participate in Philippines research projects they are important in the overall research manpower pool.

f. The reduction in NSDB figures is primarily associated with the creation of PCARR.

PCARR continues to provide scholarships for training at all levels. In the last 6 years, an average of 80 scholarships per year were awarded in agriculture and 15 per year in natural resources. Other national and international agencies also support degree training in the Philippines and abroad. This combined manpower training effort, less normal attrition, will allow for a continual build up of trained manpower of from 5 to 10% per year. More importantly, the larger pool of B.S. and M.S. trained personnel is helping to increase the number of viable candidates for Ph.D. level training which is essential for providing the much needed commodity and research center leadership required for a solid agricultural and natural resources network.

Additional data and information regarding PCARR's role in manpower development in 1975 is provided in a paper by Dr. R. V. Valmayor entitled "Manpower Development in the Philippine Agricultural System."

2. Training under USAID Loan I

One of the most significant contributions of USAID Loan I was the training of manpower at advanced degree levels for the four Centers (and some other stations) designated for support. The training was related to the development of physical infrastructure capacity and the program thrusts at these Centers.

Figure 6 shows the number of scholars supported by Loan I in the Philippines and abroad against the total scholarship program of PCARR for 1976-77 to 1979-80 at the Ph.D. and M.S. levels. PCARR also provided support for 34 B.S. degree candidates and cooperated with other agencies in administering scholarships for 94 students in fisheries (mainly at the M.S. level). Nearly all scholars received their degrees at UPLB.

Table 6 shows the distribution of scholars by field of study and degree from each of the four Centers and elsewhere. It is interesting to note that while the scholarships were primarily for the four Centers programmed under Loan I, half of the scholarships were awarded to persons from other organizations.

Data on the actual return of trainees to their designated location are not available, but it is presumed that a high percentage returned due to regulations related to their scholarship. Most scholars are still involved in degree training as shown in Table 7.

The actual implementation of Loan I scholarship awards followed fairly closely to the original schedule, with these notable exceptions. First, only one of a planned eight people went abroad for Ph.D. training since PCARR found it difficult to locate qualified candidates in the early years of the loan. With a greater pool of manpower trained at

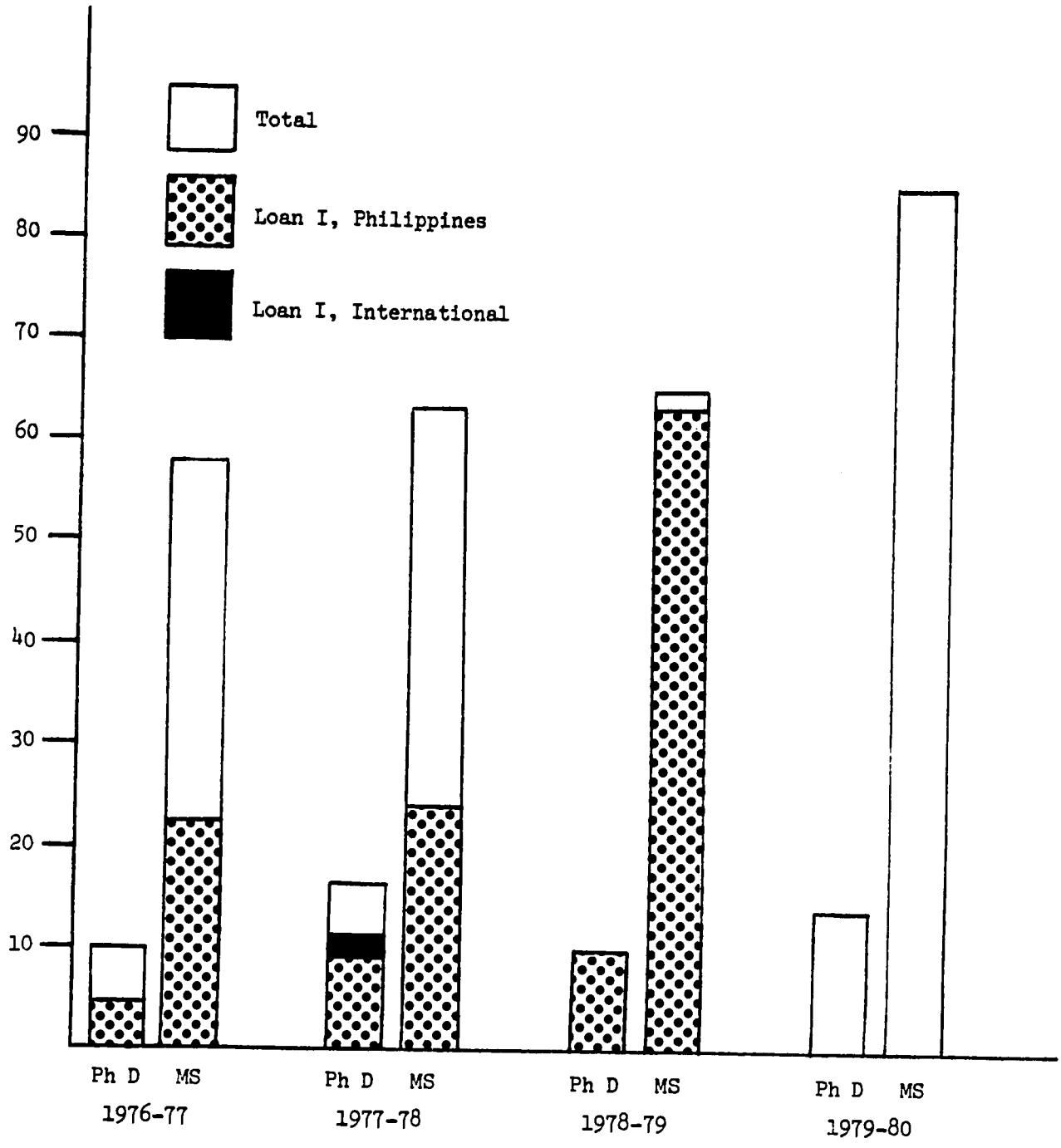


Figure 6. PCARR Manpower Development Program
Degree Training
1976-1980

Table 6. Manpower development, PCARR agricultural research network Loan I scholars (1976-1980)

Discipline	LGARC		SMARC		BARC		CLARC		OTHER		TOTAL	
	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.
Crop production	5	-	8	-	5	2	-	1	11	3	29	6
Crop protection	2	-	5	1	1	1	-	-	8	1	16	3
Physical and chemical sciences	4	-	8	-	1	2	3	-	18	-	34	2
Social sciences	-	-	3	2	-	3	1	2	6	2	10	9
Economics and statistics	-	-	2	1	-	-	-	-	3	-	5	1
Animal sciences	-	-	1	-	-	-	1	-	3	4	5	4
Forestry and fisheries	-	-	-	-	-	-	-	-	7	1	7	1
TOTAL	11	-	27	4	7	8	5	3	56	11	106	26

Table 7. Progress of USAID Loan I scholars as of October 30, 1980

Agency	Thesis in progress			Graduated[1/]			Dropped[2/]			Total		GRAND TOTAL
	M.S.	Ph.D.	Total	M.S.	Ph.D.	Total	M.S.	Ph.D.	Total	M.S.	Ph.D.	
BARC	6	5	11	1	3	4	-	-	-	7	8	15
CLARC	2	3	5	3	-	3	-	-	-	5	3	8
LGARC	2	-	2	8	-	8	1	-	1	11	-	11
SMARC	13	2	15	14	2	16	-	-	-	27	4	31
Others	43	9	52	6	2	8	7	-	7	56	11	67
Total	66	19	85	32	7	39	8	-	8	106	26	132

[1/] Scholars who graduated from the UPLB had returned to their respective mother agencies to apply the knowledge and skills they had acquired and to pay back their mother agencies in terms of government service.

[2/] The scholars were terminated due to poor performance at the graduate level.

the M.S. level at these centers, this problem should be minimized with respect to future training schedules under Loan II. Second, the 24 M.S. slots planned for 1979-80 were incorporated into the 1978-79 group, allowing for earlier completion in relation to the termination of the loan. Third, in anticipation of Loan II, several centers such as VISCA were able to take advantage of training slots not used by the four Centers in Loan I.

International training under the loan was of a non-degree nature with 18 persons involved in refresher courses (average 9 months) and 61 involved in observation tours. Of those who participated in refresher courses, nine were from the PCARR secretariat. Among those going on observation tours, the PCARR secretariat sent five persons.

3. Training under Loan II

Under Loan II, three training awards have been made for Ph.D. degree study abroad, 10 for non-degree training abroad, 103 for M.D. degree study in the Philippines, and 17 for Ph.D. training at Los Banos. The table below shows the number of awards scheduled for each year of the loan:

	1979 1980	1980 1981	1981 1982	1982 1983	Total
Ph.D. International	5	2	-	-	7
Ph.D. Los Banos	31	33	28	-	92
M.S. Philippines	64	66	61	46	237
International refresher courses	14	10	-	-	24
International conferences	16	22	22	11	71

This level of training reflects a considerable increase over Loan I because of the larger number of centers for which support is being provided.

Of concern in the administration of Loan II training are the following:

a. The training slots are not programmed in advance to the individual centers being supported under the loan. This is presumably because of the possible lack of qualified candidates. The result may be poor compatibility of physical plant resources and trained manpower with respect to program needs at the end of the loan period.

b. The large amount of Ph.D. training in-country may tax UPLB's resources and will not produce the diversity of trained manpower needed for a healthy research network. If more were sent abroad, even for coursework only, there would be an opportunity to relate the technical assistance to the research program through the utilization of a joint thesis supervisor.

c. It may be very difficult to find the number of Ph.D. candidates projected, as indicated by the short-fall of 14 Ph.D. candidates for Los Banos training in 1979-80.

d. At this point, it is not possible to determine that trained manpower will be coordinated with the development of physical resources and program development. The availability of equipment and supplies at the time a well trained scientist returns to a center is crucial to the maintenance of an effective research program. The large number of centers being developed will require constant and close management.

e. Those trained under Loan II should be encouraged to become involved in "hands-on" research activities in order to build up confidence and capacity for field research at a higher level of competence than is now present in the region.

4. Manpower development issues

a. Manpower assessment

PCARR currently has data on total agricultural and natural resources manpower available, but this is not related to need as determined by a region, or by a center or consortium. As regional centers are established and plans developed for increasing facilities in line with necessary research programs, manpower planning will become more critical. PCARR should encourage centers and consortia to develop reasonable, phased plans for upgrading (degrees) existing personnel, developing new slots, and meeting in-service training needs. These may then be aggregated at the national level by PCARR and developed into a rolling 5-year manpower development plan. Account should be taken of existing personnel at each site, those currently in training and slated to return, and the disciplinary gaps that make it difficult for the research unit to adequately perform its assigned research tasks. Decentralizing the assessment task has the advantage of allowing the manpower plan to be meshed with regional research needs, facilities and equipment, and program thrusts related to development activities.

b. Manpower training

One of the most valuable contributions of PCARR is the role it is playing in increasing the number and caliber of persons capable of and available for agricultural and natural resources research in the Philippines. The status of manpower resources is even more encouraging when one considers the large number of individuals currently enrolled in advanced degree programs this year. As the size of trained manpower increases, PCARR's next task is to coordinate more closely the selection of scholars

with the development of research centers and consortia. As suggested above, the scholar selection process should be closely tied to a manpower development plan derived from the regions and centers or consortia.

c. International training

Through the use of USAID loan funds and other sources, PCARR has been able to send a few people abroad for training, almost entirely for non-degree programs or observation tours. Since there is virtually only one university for training agriculturalists at the Ph.D. level (the same is true in forestry and fisheries), it would be advisable for a larger portion of Ph.D. candidates to be trained in the U.S., Europe or other Asian countries. Up to this point, it has been difficult to find qualified candidates for certain disciplines. This may soon be corrected as more and more M.S. candidates are trained under the PCARR manpower development program.

To further enhance the possibility of outside training, it is suggested that some of the non-degree funds be used to enroll students in cooperative degree programs between UPLB and universities abroad. PCARR scholars would enroll for a Ph.D. degree at Los Banos, seek admission to a foreign university as a non-degree scholar, and articulate the overseas portion (mainly basic courses) with the course work and thesis to be undertaken at UPLB. When students do fully enroll for a Ph.D. degree abroad, they should be encouraged to conduct their thesis research in the Philippines (if appropriate) on a PCARR priority project.

d. Coordination of research personnel

PCARR has a clear mandate to coordinate the development and maintenance of research manpower for agricultural and natural resources development. As centers and consortia become better established, trained researchers are upgraded and increased in number and research programs grow to meet new national needs, the task of administering manpower development activities and personnel policies for researchers will exceed the capabilities of a committee and a small staff. The Review Team favors a restructuring of PCARR to provide full-time leadership for manpower training and personnel management (see Figure 7, below). The functions of the office would be to manage the manpower training program and to provide guidance on personnel policies for researchers. The tasks under manpower development are as follows:

- Provide leadership for the development of an overall strategy for manpower training--degree and non-degree.

- Cooperate with centers and consortia in developing their manpower plans.

- Assist centers and consortia in identifying candidates for training and in hiring new staff with research capability. This may be accomplished through the maintenance of a roster of those involved in Ph.D. studies in agriculture and natural resources in the Philippines and abroad.

- Develop personnel profiles and standards for various levels of research--basic, applied, verification, demonstration and "subject matter specialist."

- Prepare schedules for levels and numbers of personnel required for tasks and programs at centers and consortia.

- Develop and maintain a mechanism for continuous assessment of needs for in-service training and a roster of training short courses available.

- Coordinate and encourage in-service training for researchers on topics such as: research management, research methodologies, new technology, and statistical computations. One area for training is the use of scientific hand calculators and portable programmable computers.

- Coordinate with PCARR Research Divisions in providing flexible financial support to new researchers who enter the PCARR network and those who return after a period of degree and non-degree training. This is a critical factor in maintaining the espirit de corps and vigor of a research agency.

- Manage the PCARR Scholarship Program.

For personnel policy management, authorization comes from Presidential Decree 864 (Dec. 29, 1975) Section 4, which states, "The PCARR Governing Council is hereby authorized to establish an Agriculture and Resources Research Service which will formulate rules and regulations covering qualifications, recruitment, compensation, performance evaluation, and separation from the service, of all government technical personnel engaged in research-oriented operations in agriculture and natural resources."

While PCARR has implemented honoraria and incentive pay for researchers funded by grants-in-aid, it has not been able to influence the level of remuneration of research workers and leaders in other agencies whose research it monitors.

Presidential Decree 1502 (June 11, 1978) Section 5, provides authorization for researchers in all agencies cooperating with PCARR or NSDB to receive additional remuneration. Section 5 states, "Honoraria of researchers, technical and support personnel, whose assistance may be sought by the Philippine Council for Agriculture and Resources Research (PCARR) or whose services are engaged in research projects monitored and or supervised by the PCARR or the National Science Development Board, shall not be pegged to the basic salary that they receive from their respective agency. The amount of honoraria that may be paid to them directly shall conform with a schedule formulated by the PCARR on the basis of research output and in consultation with the National Science Development Board and related research and educational institutions and approved by the Governing Council."

A set of implementing guidelines for 1502 have been produced for administering P.D. 1502, but these are currently with the Ministry of

the Budget for final approval. When this P.D. becomes operational, and even in the meantime, there are several important tasks in which PCARR should be involved with respect to personnel policies to assure that the Philippines has a first rate agricultural and resources research capability to meet its development goals:

- Maintain a constant review of salary levels of researchers in the system with respect to competitive salary structures in other related public and private agencies.

- Rationalize an honoraria and incentive system consistent with PD 1502 guidelines, but with some attempt to simplify what appears to be a "scattershot" approach. If each task of a researcher becomes a point for additional remuneration, the "incentive" may be for minimal performance of a maximum of tasks. The PCARR Personnel Policy Unit should develop policies that reward quality research.

- Create and maintain a reward system for researchers in non-metropolitan centers and consortia. The research task in the regions is a high priority of PCARR. Good people can be encouraged to remain at the centers if they have some personal amenities and professional stimulation and interaction normally associated with places like UPLB or the UP at Diliman. Housing is one incentive that has been used effectively. As the centers develop, and if they can maintain viable research programs and funding, professional stimulation will be present. Linkages to other commodity research locations and in-service training opportunities will help. A policy issue is whether or not hardship post allowances should be instituted for some centers where it may otherwise be difficult to retain qualified personnel.

- Review and help coordinate salary levels within the PCARR network. Since the centers and consortia often include universities, colleges, bureaus from one or two Ministries, autonomous program units, and even private organizations, it often occurs that personnel receive varying salaries for the same level of research work and responsibility. PCARR can assist in developing standards for all agencies and recommending them to appropriate organizations. A prime need is to reward researchers who have advanced training and experiences, thus encouraging others to improve their skills and levels of education in order to achieve additional remuneration. It is recognized that PCARR is already performing some of the tasks outlined under manpower development and personnel policy management. The main point is to emphasize the need for a strong full-time director and qualified staff to handle this "next generation" challenge for PCARR in its effort to fulfill its mandate.

E. Funding and Financial Procedures

PCARR is in the unusual position of having a budget of its own and of approving or disapproving projects for which funds will be budgeted

to other agencies. The PCARR budget includes its own operating funds plus funds for grants-in-aid which may be allocated to researchers in other agencies to support projects approved by PCARR. The other agencies cannot complete their presentations to the Ministry of the Budget until after PCARR has acted on research proposals submitted to it. PCARR is a sort of "traffic cop," giving a stop or go signal to the projects submitted to it. The signal PCARR gives depends primarily on whether the proposed project falls within the priority and commodity guidelines set by PCARR.

1. Procedures for Setting Priorities

The procedure for setting overall priorities and commodity priorities was discussed in Section C, above. There are four significant points that merit emphasis with respect to budget and funding procedures.

First, PCARR, through its secretariat staff, the commodity teams, and TPPRB, determines the priority class into which each commodity is assigned. It also estimates the amount of funding required to conduct research under these assignments. As described earlier, the amounts actually budgeted and funded may differ drastically from those estimated because PCARR does not control project submission.

Second, the implementing agencies that do the bulk of the research do not know what their budgets for research will be until the MOB has set budget ceilings, following which PCARR decides which projects to approve.

Third, a long lead time is required. For example projects submitted for funding in CY 1981 would have been initiated no later than October 1979 for submission to PCARR no later than November 30, 1979. Even reports required to provide continued funding of on-going projects must be filed and evaluated on the same schedule as new proposals.

Fourth, the long lead time and the detailed specificity of the budget items in project proposals means that there is little flexibility in shifting priorities and budget once the process has started. PCARR does maintain a budget reserve for "emergencies" and the Governing Council may make changes at any time should a new problem arise or a dramatic breakthrough in research be made. Budgeting on a project basis is less flexible than on a programmed basis.

2. Route for Project Submission and Approval

There are two budget routes of funds for research projects; one is through the agency budget and the other is through the PCARR budget. The project submission and approval route is the same for both. MOB will approve research budgets for line agencies only after PCARR has approved the projects to be funded. MOB officers informed the Review Team that this system relieves them of having to judge the worth to the nation of research programs. They like the system because the judgments are made by the PCARR process of review, within priority guidelines.

Projects are initiated by individual research officers in the implementing agencies. They may be the idea of the researcher, they may be suggested to the researcher to support an agency program, or they may be suggested by PCARR. In all cases proposals follow the same route, which was described and illustrated in Section C.

From the standpoint of agency budgeting and management, there are two critical check-points. The first is after project proposals, including budget, have been approved by PCARR. Only after approval can the agency assemble its packages of research for inclusion in its budget submission to MOB. For CY 1981 the time for this was Feb. 15-Mar. 31, 1980. The second is after MOB has held budget hearings and approved agency budget ceilings and transmitted them to PCARR. Programs are then revised to fit budget ceilings and projects within the programs are given final PCARR approval. Only after this step, in Oct.-Nov. 1980 for CY 1981, can agency funds be released.

Thus each implementing agency has two critical points for developing its research budget and shaping its program. Even though it might appear cumbersome, the process enables PCARR to carry out its mandate to coordinate and manage agricultural and resource research within an organized, consolidated national program. The Review Team has suggested, in Section C, that agency representatives on research coordinating committees at PCARR regional centers play a larger role in shaping programs and priorities and that detailed project review and approval be delegated to the PCARR division heads and investigation leaders.

3. Government Commitments

The Government of the Philippines has a very satisfactory record in making good its commitments to provide counterpart funds for station development. As demonstrated in Loan I, all Government counterpart funds were released.

However, the Review Team feels that there is a need to improve planning of Government contributions to station development, not to mention Government commitments to provide additional funds for operating and maintenance expenses. Loan I data show that the total amount allocated for equipment was only 18.65% of the total capital outlay, which is far below the 35% acceptable minimum figure for research laboratories. It was noted that many research buildings under Loan I were completed but are not operational up to the present because of lack of equipment. This could have been avoided if certain standard ratios of equipment costs to capital outlay were observed in planning the station development program.

The ratios of Philippine funds to foreign exchange could also be improved by following World Bank standards. A comparison of USAID loan and Philippine counterpart funds under Loan I are compared with World Bank standards in Table 8.

4. Budget Requirements by MOB

The budget proposals for a particular year are usually prepared 15 months before January of that year. The proposals, after internal review and programming within an agency, are submitted in February of the preceding year to the MOB. Budget hearings (technical level) are conducted with MOB in April-June and consideration of the Appropriation Bill at the Batasan Pambansa is in July-August. This is now the institutionalized budget process of the Government. During this period, the implementing agency must justify its budgetary proposals, especially for foreign-assisted projects that are considered priority by the GOP.

Funds were appropriated to PCARR, as the implementing agency for Loan I. For the 5-year period, PCARR was appropriated the total required funds through active participation in the budget process with MOB. By the end of 1980, it is expected that all facilities will have been completed, all equipment delivered, and much of the manpower trained and returned to the respective research stations. This implies a substantial increase in budget appropriations for research operations and maintenance of research facilities.

Data on increases in operating budgets were available for only two of the research centers involved under Loan I (Table 9) but this will serve to illustrate the problem. The table suggests that recipients of Loan I will have funding constraints in operating their respective stations. Of all the Loan recipient stations, USM may have the most difficulties since the increase of ₱174,000 for its facilities maintenance may not even be adequate to support its current facilities outside of those acquired from the loans. USM has the largest facilities and equipment grant. Furthermore, 11 Ph.D. and 9 M.S. grantees under the manpower development program have just returned and the additional ₱156,000 research budget for 1981 will not be adequate to support this available research manpower.

Similar constraints are expected by loan recipient stations under the supervision of the Ministries of Education, Natural Resources, and Agriculture since budgetary adjustments are made at the Bureau central offices where such research budget requirements have strong competition with other priorities.

To alleviate this situation for 1981, PCARR should consider requesting funding support from other agencies or through PCARR GIA for optimum utilization of the available resources in these stations. For budget requirements starting 1982, PCARR and MOB should jointly provide the leadership and support in securing the necessary budget appropriation.

5. The PCARR Budget

PCARR's position as the lead agency responsible for developing, coordinating, programming and evaluating research programs has been greatly strengthened through the issuance of Presidential Decrees Nos. 48, 864, 1249 and 1502. The first two decrees enabled PCARR to review all research program proposals in agriculture and natural resources and recommend research proposals to the MOB for funding.

Table 8. Comparison of GOP and FOREX under the USAID Loan and the World Bank Loan

Item		USAID Loan I (%)	World Bank (EDPITAF) (%)
Infrastructure	GOP	74.25	70
	FOREX	25.75	30
Equipment	GOP	30.75	10
	FOREX	69.25	90

Table 9. Research budgets for 1980 and 1981

	1980 (000)	1981 (000)	Increase (000)	Increase %
CLSU				
Research and development	₱1,492*	₱2,578*	₱1,086	73
General administration and support services	5,157	6,039	882	25
USM				
Research and development	295	451	156	53
General administration and support services	3,922	4,096	174	4

Note: *Excludes peso counterpart requirements supportive of the Integrated Agricultural Production and Marketing Project (Loan No. 492-T-044).

The Government has demonstrated support by increasing PCARR's budget for its expanded function (Table 10).

Another indication of Government support to PCARR is the provision of ₱10 million for Grants-In-Aid to support priority research activities in its appropriation for 1981. Table 11 indicates that the PCARR Secretariat has maintained an effective current operating expenditures budget of about ₱14 million annually. The increases since 1977 were mainly due to Government commitments on AID Loan I. With the new GIA budget to PCARR of ₱10 million for 1981, it must be able to support its priority thrusts especially in strengthening the regional centers, manpower development, and technical assistance. PCARR should give priority to supporting Loan I recipient stations in their maintenance and operation, and funding the optimum utilization of research manpower resources in these stations. PCARR should also seek adequate budget and funding to provide continuing support to projects already approved.

On PCARR's financial management system, a review of budgetary items may have to be considered. The PCARR Statement of Operations for the Year Ended December 31, 1978 (Table 12), shows almost as much was spent for "Sundry Expenses" as for research grants. The Review Team found that this item includes charges to the project for communications, repairs and maintenance, administrative cost, contingency and other expenses such as transport services for mails, etc., awards and indemnities. Some of these details may be covered under other basic items of expenditures.

6. PCARR Role in Reviewing Foreign Funding

Among others, PCARR is mandated with the following tasks:

a. Develop and implement a fund generating strategy for supporting agriculture and resources research;

b. Program the allocation of all government revenue earmarked for agriculture and resources research to implement a dynamic national agriculture and resources research program; and

c. Enter into agreement or relationships with other similar institutions or organizations, both national and international, in the furtherance of the above purposes.

To perform its designated tasks, PCARR exercises two vital powers:

a. the power to review all research proposals in agriculture and natural resources; and

b. the power to recommend research proposals to the MOB for funding.

The second power was bolstered by a policy of the MOB that only research proposals recommended by PCARR will be eligible for government funding.

Table 10. The PCARR budget, 1972-80

Year	Current Operating Expenses (000)	Fixed Expenditures (000)	Capital Outlays (000)	Total (000)
1972-73	₱ 1,500	₱ -	₱ -	₱ 1,500
1973-74	6,000	-	-	6,000
1974-75	15,000	-	-	15,000
1975-76 (to June 1976)	14,504	150	1,000	15,654
1976 (July-Dec. 1976)	6,998	75	-	7,073
1977	25,818	150	25,979	52,947
1978	27,316	315	37,859	65,773
1979	43,711	414	19,225	63,350
1980	40,941	405	-	41,346

Table 11. Growth of PCARR Current Operating Expenses (COE)

Year	Appropriation		Effective COE (000)
	COE (000)	GOP commitment** (000)	
1973	₱ 4,500	₱ -	₱ 4,500
1974	10,500	-	10,500
1975	14,752	-	14,752
1976	14,252	-	14,252
1977	25,818	10,355	15,463
1978	27,316	14,539	12,777
1979	43,711	28,323	15,388
1980*	40,941	27,293	13,648
1981*	40,627	16,769	23,858

Note: *Based on 1980 and 1981 Appropriations Acts and fixed expenditures of ₱400,000 annually.

**Under AID Loan, thus non-recurring.

Table 12. Statement of operations for the year ended December 31, 1978

Income		
Operating and service income		₱ 161,875.38
Expenditures		
Personal services	₱ 5,968,715.58	
Travelling expenses	749,165.68	
Communication services	153,209.36	
Repairs	148.75	
Freight	20,401.70	
Sundry expenses	6,317,373.86	
Supplies and materials	2,237,283.56	
Rent	57,893.80	
Library books and periodicals	8,912.75	
Grants-in-aid:		
Research grants	7,632,208.49	
Scholarship grants	929,071.42	
Equipment outlay	320,000.00	
Capital outlay	36,650,000.00	
Total expenditures		61,044,384.95
Excess of expenditures over income		(₱60,882,509.57)
Appropriations allotted		61,614,827.00
Closed to surplus		₱ 732,317.43

In view of these authorizations, PCARR established the International Projects Division (IPD) as its principal arm to sustain existing internationally funded projects and to catalyze the development of new projects of local importance and regional/global significance. IPD establishes strong linkages with external funding agencies and international, regional and national research systems to maintain an effective mechanism for fund generation and technology transfer.

IPD will serve as PCARR's coordination center for client generation, formulation and monitoring of project proposals, and evaluation of research projects receiving assistance from international funding institutions. PCARR and MA jointly negotiated the assistance of the World Bank to support a rain-fed agriculture project at Iloilo. PCARR is the implementing agency for AID Loan I and II. PCARR and the International Development Research Centre are collaboratively developing a fast-growing tree species and undertaking an intensive socio-economic survey on small-scale fish farming and municipal fisheries. Through IPD, PCARR also formulates area-specific research programs with NACIAD. PCARR must have a substantial role in the preparation and negotiation of the Research Component of the Agricultural Support Services Projects with IBRD.

PCARR has agreements with the following international, regional and foreign research institutions through IPD:

International Rice Research Institute (IRRI)

International Corn and Wheat Research Center (CIMMYT)

Centro International de Agricultura Tropical (CIAT)

Asian Vegetable Research and Development Center (AVRDC)

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

Southeast Asian Fisheries Development Center (SEAFDEC)

Rubber Research Institute of Malaysia (RRIM)

Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)

International Institute for Tropical Agriculture (IITA)

International Potato Center (CIP)

International Soybean Research Program (INTSOY)

University of Hawaii (UH)

International Fertilizer Development Center (IFDC)

International Potash Institute (IPI)

Bangladesh Agricultural Research Council (BARC)

The Indian Council for Agricultural Research (ICAR)

Malaysian Agricultural Research and Development Institute (MARDI)

PCARR should be the clearinghouse for funding of all foreign assisted agriculture and resources research programs. PCARR can do this through the IPD, with the following directions:

1) Provide initiative and leadership in tapping international sources of funds.

2) Involve or provide assistance to implementing agencies in the preparation of project proposals.

3) Coordinate closely with the recipient agency, NEDA and MOB in discussions on terms of agreement, especially when local counterpart funding is involved.

4) Streamline its mechanism for planning research programs to accelerate consideration of foreign assisted projects.

5) Strengthen staff capabilities to formulate foreign-assisted projects, negotiate them, and monitor, evaluate and coordinate them.

It is essential that linkages of PCARR with implementing agencies or foreign-assisted projects should include the scientists at the working level for project preparation, negotiation, implementation, monitoring and evaluation. The role of the IPD will be discussed further under Section I, Selected Issues.

F. Development and Application of Useful Technology

1. Research for Agricultural Development

The generation of new technology for the production of food and fiber, particularly by small farmers, requires a system involving the producer, change agents, researchers, policy-makers, private industry and educators. Researchers can not stand alone in the process. Technology generation should not be isolated from real needs nor be self-serving for professional researchers.

The research process should be a sequence involving technology generation, local verification, adaptation to existing farm practices and related technologies, dissemination through change agents, and adoption by producers. Researchers are increasingly aware that they must give greater attention to more exact problem identification early in the process, and to the building of technology generation programs from interaction with potential users. This process allows the researcher to become familiar with localized farming practices and to more sharply

focus research design and recommendations. It also permits extension personnel and others who communicate new techniques to potential users to be involved with both farmers and researchers at an early stage.

A critical factor in evaluation and application of improved technology, especially for small farmers, is the process of adapting new techniques to existing farmer practices, resources and economic conditions. This need further emphasizes the importance of the involvement of researchers and extension personnel in the process of problem identification in a farming system context in order to insure farmer acceptance.

The implementation of these concepts of the research process often are in conflict with organizational structures which have specific mandates that compartmentalize the activities of their employees.

2. PCARR's Role

PCARR has an unusual opportunity to influence procedures for technology generation directed at the large number of poor farmers. Under Presidential Decree 48 it can link various groups within and outside of the research establishment. Functions which apply are:

g. Establish and provide support for a national network of centers of excellence for the various commodity research programs by drawing from the facilities of cooperating universities and colleges and other research agencies and linking these closely with selected PCARR research centers and stations;

h. Develop a mechanism for full communication among workers in research, extension, education, and national development;

l. It shall have the power and authority to call on any department, bureau, office, agency, state university or college, commodity institute, and other instrumentalities of the government for assistance in the form of personnel, facilities, and other resources as the need arises in the discharge of its functions.

In fulfilling its mandates, PCARR has established a network of research centers throughout the Philippines. It is assisting in establishing connections between these centers and cooperating stations and is forming consortia between colleges and universities, Ministry of Agriculture personnel and facilities, private industry, autonomous agencies, and special government development programs involved in research. The goal is to bring research closer to the farmers and build a capacity in the regions to be responsive to needs of producers. As consortia begin to function, and include the Bureau stations involved in technology testing and verification, it will be possible to link more directly with the Bureau of Agricultural Extension.

PCARR is moving in the right direction in the organization of the research network. The roles of various parts of the network need to be defined so that the different phases of the research process will be carried out effectively. This means that PCARR should carefully consider the research mandate to the respective research stations and assess

their capabilities, in reviewing proposals for funding. At the same time, PCARR can encourage individuals and stations to become involved in larger, more comprehensive research projects through the budgetary review process or grant-in-aid funding. Deliberately linking local, regional and national projects together will help the development of research programs--rather than collections of small, isolated projects where the implications and validity may be in question.

Better coordination of research planning would increase output and further reduce cost. Including extension personnel in the process would result in further savings and increase effectiveness in the dissemination of research results. PCARR should explore with BAEX the possibility of having "subject matter specialists" assigned by BAEX to research stations and centers in the PCARR network. They should be trained in subject matter as well as in extension methodology. They would play an important role in problem identification with respect to the farming systems of small farmers and could participate in the planning and conduct of trials in farmers' fields. Further, they would serve as an important link to other extension agents through the dissemination and interpretation of research results and the packaging of technology consistent with the needs, management ability, and economic capacity of farmers in their region.

One way PCARR could improve cooperation with BAEX would be to make scholarships for advanced study (M.S. level) available to extension workers, with the understanding that they will be assigned to a station as subject matter specialists.

PCARR has a recognized role in the preparation of materials for dissemination to those to be served by improved technology. The Applied Communications Division (ACD) works with the research divisions and commodity teams to extract usable technology from the research process and publishes it in various forms for use by extension workers and others.

The Review Team commends the publications produced by PCARR such as Technology, Philippines Recommends, the Monitor, Farm News, and others, which help agriculture and natural resources development. The Scientific Literature Service also supports the information needs of researchers and educators throughout the system. PCARR is rapidly converting research data into recommendations, particularly through the Recommends series.

The plans of the ACD to strengthen the communication capacity of the research centers and consortia in performing similar tasks regionally is excellent, particularly where these units can be encouraged to link closely with extension agencies, national development projects and commodity organizations in their region. These units might also assist in establishing appropriate communications between various agencies in the region and farmer groups to encourage wider participation in the problem identification and evaluation phases of the research process. The KABSAKA Project in Iloilo is one example of where this type of communication and interaction has been helpful.

Two research divisions of PCARR could be very helpful in the problem identification and the technology verification and adaptation phases of research: The Farm Resources and Systems Research Division and the Socio-economic Research Division. The commodity teams in the other divisions should consider appropriate linkages with these divisions in assessing, coordinating and monitoring research. This would help to insure that workers conducting verification practices of commodity-oriented research would consider the economic status of potential users, or the existing management capacity in an area.

3. Relating Research to Development Activities

The Philippines has many agricultural and rural development projects. The NFAC production programs for rice and corn (Masagana-Maisan) involving mini-kits, information campaigns, credit, etc., have increased the amount of food that is available. They were based on new technologies and were successful in packaging them for use where resources were fairly good. New programs of NFAC, NACIAD, NIA and others (such as the KABSAKA Project) involve small farmers in areas where resources are more limiting and where economic conditions are poor. Many of these projects depend on validated technology and some are involved in technology verification which meets their requirements.

In some cases these projects may dissipate scarce research manpower and resources in brief and isolated activities. The Review Team feels that the regional research system now being created by PCARR, which is tied to the NEDA regional planning process, and which encompasses the whole research process from problem identification to technology generation to verification to adaptation and testing, should be able to serve the country's production and rural development goals. The links with the extension process suggested in the previous section would ensure that research is relevant to development goals and that technology gets to farmers and others in an acceptable form.

4. The PCARR System and World Bank Projects

The Philippines has two World Bank loans for agricultural extension and agricultural education. These projects strengthen the capacity of the country to disseminate technical information to both users and students. Under both projects, facilities have been installed at some of the universities in the PCARR network that were visited by the Review Team, such as CLSU, USM and ViSCA. Of particular interest are the Philippine Training Centers for Rural Development (PTCRD) which are to be in each of the 12 regions of the country as part of the National Extension Project. These will be utilized for training trainers--mostly extension workers. It will be important for PCARR to encourage researchers to assist in this activity and to involve extension workers in some of the early and final stages of the research process as suggested above. Other more formal linkages between the PTCRD and PCARR may also be appropriate.

The Agricultural Projects Preparation Unit of the Ministry of Agriculture and the FAO/World Bank Cooperative Program has prepared a second Agricultural Support Services Project (ASSP) with an agricultural

research component which is designed to complement the project for extension. The Research Station Development Unit and the International Projects Division of PCARR participated in the early stages of the development of the project and prepared a document on the research component. The content of the project is presented in Report No. APPU-80-001 dated February 8, 1980, Volumes I, II, and III. A World Bank Appraisal Team reviewed the project with the Ministry of Agriculture for three weeks in October 1980.

One of the major premises of the document is:

"For the strengthened extension services to achieve the fullest impact and for the goals of the Food and Nutrition Program to be met, it is necessary that measures be taken to accelerate the generation, testing, adaptation and transference of new and more complex technology."

The main components of the project would be designed to:

"1. Expand agricultural research specifically to resolve bottlenecks affecting prospects for achieving FNP targets;

2. Increase the scale and diversity of cropping systems verification trials so as to provide extension workers with a strong technical basis for their recommendations to farmers;

3. Increase the MOA's capacity to carry out soil surveys to identify potential areas for agricultural development and to provide a basis for the design of development projects;

4. Complete the groundwork necessary for the eventual design of a national soil conservation programme;

5. Increase the Ministry of Agriculture's capacity to fulfill its input distribution, analytical and regulatory functions;

6. Strengthen and institutionalize the MOA's capacity for planning, generation and analysis of statistics and project management;

7. Introduce manpower planning and substantially increase the resources available for staff training at all levels."

The agricultural research component of the project would have three thrusts:

"1. Supplementing the resources available to PCARR for technology generation, to enable it to sponsor additional research on topics of particular relevance to the FNP and the proposed Commercial Crops Project; and building up the field station and laboratory facilities of the UPLB Institute of Plant Breeding, the national research institution considered to have the strongest promise of developing widely applicable new agricultural technologies;

2. Developing the capacity of the MOA (in terms of resources and organization) to mount a major cropping systems trials programme by upgrading up to one research station in each Region to serve as a well-equipped centre, under unified management, at which technologies can be tested under controlled conditions by MOA research and trials staff; and by equipping multidisciplinary teams in each province to operate an expanded programme of trials on farmers' fields;

3. Expanding the applied communications activities of PCARR to enable them to accelerate the flow of recommendations based on research and trials results to the extension services."

The components of the project with respect to research and field trials are as follows:

"1. Developing 11 MOA Regional Integrated Agricultural Research Stations;

2. Technology generation: funding the execution of about 60 research projects directed at resolving problems affecting expanded production of commodities listed as priorities in the Food and Nutrition Plan;

3. Technology verification: setting up and operating a system within MOA for carrying out cropping systems trials on a nation-wide basis;

4. Research-extension linkage; increasing the capacity of PCARR's Applied Communication Department to produce research-based training materials for use of extension staff;

5. Plant breeding: development of about 135 ha. of the IPB/UPLB research and foundation seed production station at Los Banos; provision of farm and laboratory equipment, and incremental costs associated with an expanded research and breeding programme;

6. Development and operation of an MOA Agriculture Research Office."

Sites have already been identified for Regional Integrated Agricultural Research Stations (RIARS) in each of the 12 regions of the country. These would be coordinated by the Ministry of Agriculture regional offices and would allow for some consolidation of various MOA bureau facilities. A PCARR consultant (Manny Vergel) has assisted in identifying the main items required for the development of the stations and a large capital outlay is envisioned (total cost for RIARS is estimated to be ₱79,792,000 over a 5-year period).

Under technology generation, the project would provide a fund (₱45 million) to be administered by PCARR for financing research projects directed at resolving technical problems impeding production or processing of priority commodities. Projects would be submitted by universities, bureaus and institutes in the usual manner.

Under research and extension linkages, facilities would be provided to enable PCARR's ACD central office to expand its output of research-derived training materials.

The Institute for Plant Breeding would receive a substantial amount for facilities, staff training and operating costs for 5 years.

The costs of establishing an Agricultural Research Office (ARO) to manage the MOA-implemented research component of the project would also be provided.

One of the premises of the research portion of the ASSP is that technology generation would be handled by the universities and institutes linked to the PCARR network and that the MOA research program would deal with technology verification through trials on stations and on farmers' fields. On a more positive note and in a further elaboration of ASSP in volume II, it indicates that RIAR stations of MOA would become cooperating stations in the PCARR network and be subject to PCARR monitoring to ensure their compatibility with other components of the national research program. The function of the RIARS would be as follows:

"1. Evaluation of component technologies generated in the national and regional research centers under specific environmental, social and economic conditions;

2. Packaging of the best component technologies into farming systems technologies;

3. Characterization of the environment under which the packaged technologies were evaluated and of soil where on-farm trials in the region are being conducted;

4. Feed forward of technology packages to research staff doing on-farm trials under similar environments;

5. Feed back of evaluation of component technologies to national and regional research centers, both directly to researchers and through their applied communication units."

This information is elaborated in this report because of its large potential impact on the agriculture and resources research system of the Philippines. Since the ASSP is still under review internally, and in the World Bank, the Review Team deems it appropriate to comment on the project in relation to the future role of PCARR. The following issues are crucial:

The research network. PCARR is charged with the responsibility for "establishing and providing support for a national network of centers of excellence for the various commodity research programs" (P.D. 48 Section 6). This process is well under way, with the identification and strengthening of National, Regional and Commodity Centers, and Cooperating Research Stations.

The Review Team encourages PCARR to reestablish linkages with NEDA regional offices, and the regional Ministry of Agriculture offices so they become more fully involved in all phases of the research process. The development of RIARS in each region must be well meshed with the research network planning and development in PCARR. It is conceivable, for example, that a USAID loan facility developed through PCARR and a RIARS facility developed by MOA under the World Bank loan would be at separate locations but in close proximity. Such an occurrence would be less desirable than having them together, but would present no serious problems provided there is effective communications between them. PCARR should to address its full attention to the development of the ASSP loan to foster orderly development of the research network to meet the needs of the farmers and producers of the Philippines.

The PCARR role. The ASSP document tends to restrict the role of technology generation to PCARR, with the suggestion that the MOA Bureaus are better prepared to handle technology verification, adaptation and dissemination. This is not consistent with modern concepts of technology-based agricultural development which recognizes that the research job is not done until the technology is verified and adapted for farmer use. PCARR must be concerned with the full range of research activities, including verification and adaptation, to ensure the linkages which will keep PCARR responsive to farmer needs and to development goals of the Philippines. The development of the RIARS should be fully articulated with the PCARR network and hard choices must be made to avoid unnecessary duplication that will be costly to the Philippines. Further, the RIARS should be closely linked with the PCARR Centers or Consortia so that regional research collaboration and efficiencies can be realized.

Capital development. The development of the RIARS will involve about ₱80,000,000 over a 5-year period. USAID Loan II involves a similar amount for infrastructure (USAID and GOP), and Loan I provided ₱62,000,000. The Review Team is concerned that this level of infrastructure development, spread over many institutions, may commit the Government of the Philippines to a level of operational support that cannot be sustained, leading to the possibility of facilities without program. A strong input by PCARR on network development may serve to redirect the same amount of funds to the development of regional consortia where a critical mass of manpower, equipment and facilities can develop strong, effective and comprehensive programs at the regional level.

Manpower. Through USAID and Government funding, PCARR is providing substantial amounts for manpower development (₱15,552,000 in Loan I and ₱16,237,000 in Loan II). The ASSP project will provide an additional ₱23,500,000 for training, of which an unknown portion will be for researchers. Even if these large amounts can support an initial staff for the units proposed, the leadership and experience for an effective research system at the regional level will still be missing for several years. The proliferation of research stations without close coordination with respect to manpower and the mutual interdisciplinary interaction required to sustain effective programs may dilute scarce manpower and leadership resources for some years to come.

In summary, PCARR is encouraged to develop a meaningful dialogue with the Ministry of Agriculture at the highest level to insure that the long-range plans of PCARR in meeting its mandate to establish a research network will be well articulated with the plans of MOA in utilizing the ASSP support. The general goals of ASSP are laudable and--for the most part--they are also the goals for PCARR.

G. Information Services

1. PCARR Management Information System

PCARR is mandated to establish a repository for research information in agriculture, forestry, fisheries and mining. It is endeavoring to process all research information--continuously collected, updated, and compiled into reports. And as a research monitoring and coordination agency, PCARR needs an effective management information system.

PCARR initiated computerization of its research projects inventory in 1974. In 1975, when PCAR was expanded to PCARR to include Mines Research, it organized a Management Information System (MIS). As part of PCARR's reorganization in 1978, and to insure effective control in the agency's operation, MIS became known as the Management Information and Control System.

PCARR MIS is envisioned to meet the needs of the National Agriculture and Resources Research System composed of the PCARR Secretariat and the network of research centers and stations. The MIS aims to:

- Provide management with relevant and timely information in the proper format as a basis for decision making.

- Equip management with the necessary control on the utilization of the PCARR's resources towards achieving its objectives.

- Strengthen the linkages through a systematic and effective information network among the functional units within PCARR and the research centers as well.

PCARR, as a member of the Agricultural Resource Center (ARC), uses an IBM 370 model 135 to process its systems on a budget allocation-based sharing scheme. The ARC is a non-profit, non-stock computer center established primarily for research, based at U.P. Los Banos, and shared with four other institutions. Its utilization is dependent on the availability of disk space and on-line processing is restricted to scheduled hours. This arrangement has limited inquiry processing and ad hoc requests for reports. PCARR is currently looking into the possibility of acquiring a mini-computer to service its needs.

PCARR is now implementing seven modules under its MIS: Research Management System, Equipment Infrastructure Management System, Manpower Management System, Financial Management System, Scientific Literature Service System, Activity Monitoring System, and Statistical Analysis System.

a. Research Management System

The Research Management System (RMS) provides for a computer-based information storage and retrieval system on research in agriculture, forestry, fisheries and mines, which will be used to generate reports and provide statistics for research program planning, budgeting and monitoring.

The PCARR Research Program Planning Cycle operates along the budget cycle of the MOB. On a two-year cycle, projects are initially submitted every November and approved for implementation the following year. The cycle has two major phases. The pre-authorization planning or research programming phase covers from the time a research proposal is initially submitted and evaluated by the Research Divisions, packaged into a commodity research program, and submitted to the MOB with its budgetary requirements.

As soon as the National Research Program is approved, MOB issues guidelines on budgetary ceiling so that the national research budget can be allocated among the commodity research programs and re-programmed among the individual research proposals through a technical evaluation and budget dialogue.

The RMS generates the following reports through the computer:

- The National Commodity Research Program

- Budget Summaries of the Research Program
  -- by Source of Fund
  -- by Implementing Agency
  -- by Commodity
  -- by Priority Area

- Directory of Research Projects/Studies
  -- by Implementing Agency
  -- by Commodity

- Listing of Research Projects/Studies
  -- by Source of Fund
  -- by Implementing Agency

- Frequency Distribution of Research Studies by Source of Fund

The users of these reports are the Governing Council, the TPPRB, the Secretariat, the Ministries and the MOB.

b. Equipment Infrastructure Management System

The long range objective of the Equipment Infrastructure Management System (EIMS) is to optimize utilization of infrastructure and equipment through an appropriate sharing scheme. EIMS determines the equipment of the research centers and stations, monitors acquisition of this equipment through PCARR-administered foreign loans such as AID Loans I and II and evaluates effective utilization of this equipment. It provides also a good basis for planning equipment requirements as well

as facilitating report preparation for submission to financing institutions like USAID and government bodies like NEDA and MOB.

EIMS primarily provides services to the Office of Deputy Director General for Operations (DDG-O) in the planning, implementation, monitoring and evaluation of station network development activities. EIMS deals only with equipment and infrastructure components of the network. Other components are considered in other MIS modules.

EIMS starts with a survey of research centers and stations, which project their total requirements on an annual and five-year basis. Simultaneously, a survey of infrastructure and equipment resources available in the centers and stations is undertaken every 3 years and updated annually. With the surveys of requirements and availability the DDG-O evaluates the overall development requirements and prepares the development plan for submission to funding agencies such as USAID.

When funds are made available, specifications for infrastructure to be constructed are agreed upon by the engineering and architectural staff of both PCARR and the research center/ station. Construction of priority structures starts once the master plans are approved. Monitoring of infrastructure projects uses ghants-charts and PERT/CPM models comparing the proposed schedule vis-a-vis the actual and comparison of contract values and percentage accomplishments. Data is obtained through regular field inspection of the research center/station by the Project engineer.

The implementation phase of the equipment component covers equipment acquisition and delivery to the respective center/ station. PCARR makes use of bidding procedures in the selection of suppliers, and procurement is mainly through the contracted suppliers.

To date, computer processing has been limited to handling of the Resources Survey Results and compilation of the equipment acquisitions' data for USAID Loans I and II.

c. <u>The Manpower Management System</u>

The Manpower Management System (MMS) provides for an accurate appropriation of the available research manpower resources in the country, determining its location, distribution and specialization. The system thereby provides bases for establishing an effective manpower development program and formulating policies on research manpower. Statistics on supply and demand patterns, training needs and manpower requirements may also be made from the system.

The Manpower Development Program is managed by the Manpower Program Development Unit (MPDU) under the ODG. Every three years, a national survey is conducted to inventory the available manpower resources. Survey forms are provided to the researchers through the Research Coordinating Councils (RCC) and personally collected by survey teams from the research stations. Results of the 1977 Survey indicate the distribution of researchers by agency and degree of training, research discipline and commodity assignment.

Annually, the research centers/stations are required to submit their manpower requirements in terms of manpower projections based on degree, discipline and commodity specialization. Based on the inventory and projected manpower requirements, the MPDU develops the five-year manpower development program updated annually. The program indicates the priorities for scholarship grants and training opportunities following station/ commodity assignments. Once the priorities have been established, the MPDU undertakes the selection of the scholars and training grantees.

Actual implementation of the scholarship program commences at the start of the school year. The scholar is required to sign a contract wherein he is advised of his responsibilities. Part of his responsibility is the submission of regular reports to the MPDU. At the start of the year, a letter of award to each scholar is released by the MPDU. For the conduct of a thesis, the proposal is first submitted to PCARR for evaluation and approval. Once approved, funds for thesis support are released to the scholar. The MPDU maintains a monitoring chart showing planned activity and expenditure versus actual activity and expenditure per scholar.

At present, only the surveys conducted in March 1977 have been fully computerized. The August 1979 survey results are being processed.

The main user of this system is the MPDU. For the outside users, the system has generated the Manpower Resources Directory for 1978 and for 1980 (which will be released in November).

d. Financial Management System

The Financial Management System (FMS) aims to provide an analysis of PCARR's financial expenditures and an effective system of monitoring resource utilization. The feasibility of computerizing PCARR's budgeting, accounting and auditing processes was studied in 1979 but continuation of the manual system of information handling was recommended. By the end of 1979, financial reports presenting tables or expenditure analysis, cash management and the like were being made available.

e. Scientific Literature Service System

The Scientific Literature Service System (SLSS) provides a more systematic method of disseminating information selectively. As an initial activity, a survey was conducted by the Library staff to study PCARR subscribers' preferences and library practices. Simultaneously, the MICS staff studied the improvement of the addressing of PCARR's publications. The computer system design and programming was completed and turned over to the ACD in October 1979. Initially, the system used stick-on address labels sorted and printed by means of the computer. The PCARR Monitor was the first publication to try the new SLSS technology--replacing the manual addressing machine which required a longer time for sorting subscribers and publication--and sped up actual labeling of addresses on PCARR publications for release.

f. Activity Monitoring System

The Activity Monitoring System (AMS) aims to compile information on the projected activities of the PCARR Secretariat and the national network of research centers/stations; and to monitor these activities, provide the necessary support, and check deviations and problems encountered in the actual implementation.

The program of activities includes the Commodity Workshops, Team Meetings, National or Regional Congresses, Planning Workshops, Linkage Conferences with Media, Extension Agencies, and Resource Surveys or Field Visits.

g. Statistical Analysis System

The Statistical Analysis System (SAS) module provides for assistance in statistical analysis and computer processing of PCARR scholars' theses, thesis grantees and researchers. Whenever necessary, the MICS staff assists the user in programming and input preparation.

h. Need for an integrated management information system

As stated by the Review Team in other sections of this report, there is a need to streamline PCARR's research program planning and budgeting system. More emphasis should be given to maintaining and strengthening regional organization and activities. Planning, programming and review should be decentralized and the roles of the GC, TPPRB and Secretariat should be redefined to strengthen the decision-making process. Changes in the planning and monitoring reports are therefore expected.

The Review Team also recommends more program-oriented development and management of research manpower, infrastructure and equipment. This would mean also decentralization of the task of assessing manpower, allowing the manpower plan to be meshed with regional research needs, facilities and equipment, and program thrusts. The restructuring of the Manpower Development Program Administration in lieu of the present Committee and small MPDU may have to be considered. Furthermore, an incentives program would also be a component of the manpower development program.

In view of the above considerations, the PCARR-MIS should be redirected to cope with the rapidly expanding production and accumulation of information and knowledge. The proposed improvements on PCARR structure would change decision centers and action points. The MIS should therefore evolve an adaptive feedback mechanism wherein information requirements of policy makers, technical personnel and administrators are clearly specified.

In this regard, PCARR should undertake both a short term and long term development of its MIS. PCARR should initiate now the following steps for the redirection of its MIS:

- Develop a Technology Verification and Application Monitoring System (TVAMS) which could be part of the current RMS;

- Consider sharing time on computers outside of ARC. It might also consider acquiring its own mini-computer or reducing the number of computer runs required for "updating."

- Improve the planning and reporting system in view of the proposed changes in PCARR structure; and

- Raise the capability of the MICS through staff development and acquisition of hardware.

In the long term, PCARR should aim to develop an integrated MIS, which would give many benefits such as economy, efficiency, effectiveness and control. It should integrate RMS, EIMS, MMS, FMS, TVAMS and other systems into a single system capable of use from a common data bank, programmed decision orientation and conversational computing.

2. The Applied Communications Division

The Applied Communications Division was created in 1979 as a service unit of the PCARR secretariat to provide scientific information in understandable form to the research network and to the extension and communications units linked to the network. Its stated aims are (1) to "establish inter-institutional cooperative linkages and joint programs" in applied communications, (2) to "assist national and regional research centers and consortia to organize Applied Communications Units (ACU) and in the initial implementation of such programs," (3) to train applied communication personnel, and (4) to create a system of effective communication between ACU's for exchange of experience expertise, etc.

The ACD comprises seven groups or offices:

a) Director's Office (program planning)

b) Sub-network Secretariat (training programs and monitoring ACU network)

c) Print Media Outreach and Publications

d) Printing and Duplicating Services

e) Communication Prototype Development

f) Audio-visual Services

g) Scientific Literature Services and Circulation

The Division provides essential services to the Secretariat and other Divisions through its technical editing, printing and audio visual sections. It also promotes and advises on the communication function of the research network. The Scientific Literature Service (SLS) has been in operation from the inception of PCARR and has now been broadened to include the applied functions and other areas such as the library and information retrieval. A particularly valuable service is being provided through the communication prototype development and testing concept.

The communication of research results is a basic function of the Bureau of Extension but the Bureau and other units usually need help in interpretation and application of research information. The involvement of research workers in technology verification and in interpretation of results has enormous value for development as has recently been demonstrated in rice through to collaboration of IRRI and the Ministry in Masagana 99. The effect can be further developed and institutionalized with collaboration of extension specialists research and the communication programs such as performed by the ACD. The Team generally encourages this activity and fully supports the concept. The ACD is alert to the danger of implementing programs that will replace or divert the activities of the implementing agencies. Some difficulty will naturally be encountered in drawing the line between assistance to other agencies and direct involvement with farmers. But it is better to err on the side of involvement rather than to withdraw. Funding limitations will require care in selection and management of testing and development activities.

H. The Governing and Directorate Structure

1. The Governing Council

The Governing Council of PCARR is designated in the Presidential Decree No. 864, dated December 29, 1975, as follows:

1) The Chairman, National Science Development Board, Chairman.
2) The Secretary of Agriculture, Vice-Chairman
3) The Secretary of Natural Resources, Vice-Chairman.
4) The Budget Commissioner.
5) A Representative of the National Economic and Development Authority.
6) The President, Association of Colleges of Agriculture of the Philippines.
7) The Chancellor, University of the Philippines at Los Banos.
8) The PCARR Director General.
9) Two outstanding leaders in the producers' and business sector of agriculture and natural resources to be appointed by the President of the Philippines upon recommendation of the PCARR Governing Council.

The above Decree, and the original Decree No. 48 of November 10, 1972, which established PCARR, include directives to the Governing Council but do not define the role of the Council vis-a-vis the Technical Program Planning and Review Board (TPPRB) or the Secretariat. The makeup of the Council follows closely the recommendations of the Technical Panel in their report The Philippine Agricultural Research System of December 20, 1971 (page 82). It seems reasonable to assume that the functions of the Governing Council would be those stated in that report, as follows:

1. Provide for a continuing evaluation of the national research program for agriculture, forestry and fisheries.

2. Formulate policies and issue rules and regulations on the administration of the program.

3. Approve biennial budget allocations to support national agricultural research program which are funded fron government revenues and tax levies.

4. Determine operational procedures regarding appointment, promotion and termination of appointments of research personnel supported by government funding for agricultural research.

5. Establish the overall pattern of operation of the national agricultural research program.

A review of the agenda and minutes of the Governing Council indicate that an abundance of detail is presented to the Council members for information or action. The situation has improved recently, but the type of the agenda, together with a monthly meeting schedule, is an excessive drain on the time of busy people.

It is important that the PCARR Governing Council should continue to have members at high levels in the Government, including the Minister of Agriculture, Minister of Natural Resources, and others. In view of the importance of agriculture, the stature of the Governing Council of PCARR should remain at the current high level. This would be facilitated by reducing the meeting schedule from monthly to quarterly and by presenting issues to the Council consistent with its role as a policy making body concerned with effective operation and administration of PCARR, with assessment of the overall research program, budget approvals, and personnel management procedures. The operational aspects, under Council guidelines, should be delegated to the PCARR Secretariat. The Review Team feels that these changes would ensure greater participation by the designated Council members rather than their deputies.

2. The Technical Program Planning and Review Board

Presidential Decree No. 48, states:

"For the purpose of ensuring quality, competence, and effectiveness of the technical commodity research programs of PCAR, a Technical Program Planning and Review Board composed of top quality technical men, is authorized to be constituted to assist the PCAR Director General. The members of the PCAR Technical Program Planning and Review Board shall be appointed by the Council."

The TPPRB has 28 members:

Members

Dr. J. D. Drilon, Jr., Chairman
Dr. Edgardo C. Quisumbing, NFAC, Vice-Chairman
Dr. Cledualdo B. Perez, Jr., NRCP, Vice-Chairman
Dr. Celso Roque, NRMC
Dr. Edilberto D. Reyes, UPLB

Asst. Sec. Jesus Beringuela, MOB
Mr. Teodoro Ela, NEDA
Ms. Lydia G. Tansinsin, NSDB
Mr. Rodolfo Madrid, MA
Mr. Jesus Valerio, MNR
Dean Rogelio O. Juliano, UPCF
Dr. Meliton U. Ordillas, UPS
Dr. Jorge Davide, Private Sector
Dr. Irineo L. Domingo, Private Sector
Mr. David D. Gorrez, Private Sector
Mr. Venancio Galario, Private Sector
Dr. Eduvigis B. Pantastico, PCARR
Dr. Raymundo S. Punongbayan, PCARR
Dr. Alfonso N. Eusebio, PCARR
Dr. Filiberto S. Pollisco, PCARR
Dr. Amado R. Maglinao, PCARR
Dr. Aida R. Librero, PCARR
Dr. Elvira O. Tan, PCARR
Dr. Rogelio V. Cuyno, PCARR
Ms. Carol M. Yorobe, PCARR
Dr. Ponciano A. Batugal, PCARR
Dr. Crisanto Escano, PCARR
Dr. Ramon V. Valmayor, PCARR, Board Secretary

Secretariat

Ms. Cristina U. Ragual, PCARR
Ms. Elizabeth M. Mulimbayan, PCARR

The membership of the TPPRB as proposed in the Technical Panel Report of December 1971 was to be as follows:

Chairman	Executive Director, PCAR
Vice Chairman	Executive Director, NFAC
Member	Chairman, Agricultural and Forestry Division, NRCP
Member	Chief, Division of Agricultural and Natural Resources Research, NSDB
Member	Chief, Plans and Programs Services, DANR
Member	Director, Crops Research Division, PCAR
Member	Director, Fisheries Research Division, PCAR
Member	Director, Forestry Research Division, PCAR
Member	Soils and Water Research Division, PCAR
Member	Socio-Economic Research Division, PCAR
Member	Three research directors from universities and colleges
Member	Three representatives from the agricultural business sector preferably doing research work for industry planning

When the above membership was proposed it was recognized that that a board of 16 persons would be larger than desirable for effective functioning. The current membership of 28 persons cannot be expected to furnish in-depth and valid assessments in carrying out the functions and responsibilities of the TPPRB. The Board should be reduced, with PCARR staff serving as resource persons and not as members of the Board.

The functions of the TPPRB, as noted in the Technical Panel Report of December 20, 1971, were to be as follows:

1. Advise the Director General of PCAR on the formulation and review of the national agricultural research program.

2. Define and recommend national priorities for research in agriculture, forestry and fisheries.

3. Review PCAR biennial budgets and recommend appropriate action to Governing Council.

4. Determine and recommend allocations of grants-in-aid for agricultural research conducted by appropriate universities and colleges and other research agencies.

5. Determine and recommend guidelines in the employment and use of national agricultural research resources such as manpower, facilities and funding.

6. Determine and recommend policies and guidelines for staff development of research personnel in PCAR research centers, universities and colleges, and other research agencies.

7. Furnish guidance in the development of research facilities and major items of specialized equipment.

8. Advise on the procedure for evaluating the capability of research staff.

9. Advise on library, documentation services, and publication of PCAR research materials.

10. Maintain liaison with external organizations in the public and private sectors and maintain contact with agricultural research needs.

It should be noted that PD No. 48 states that the TPPRB--"composed of top quality technical men, is authorized to be constituted to assist the PCARR Director General." This relationship to the Director General and the Governing Council should be clarified in the organization and operations of PCARR. The TPPRB should be responsive to its Chairman, the Director General of PCARR, who in turn furnishes the linkage with the Governing Council, of which he is a member.

The role of the TPPRB, as it operates at the present time, is discussed in Section C of this Chapter, with respect to research program planning and management. The massive flow of paper through the TPPRB--enroute to the MOB for projects to be submitted by the respective agencies in their budgets, and again after budget ceilings have been set--is a cumbersome process and expensive in terms of staff time of the TPPRB, PCARR Secretariat, commodity teams, and technical panels. (See Figure 5 and Annex VI.) The efficiency of PCARR would be increased substantially if the TPPRB would serve in its intended role as a policy

and procedures board, with details of operations delegated to the PCARR Secretariat. The revision of research management to a program process, rather than a project-submission process would enable the TPPRB to carry out effective review of research that is not now possible because of the massive paper load.

3. The Secretariat

The organization of PCARR has been modified through the years as the scope of activities has changed (the current structure is shown in Figure 1). Section 5 of Presidential Decree No. 864 states, "The PCARR Governing Council is authorized to reorganize its Secretariat and Research Network by creating, consolidating or integrating as many divisions and research stations as may be necessary to accomplish its functions and objectives."

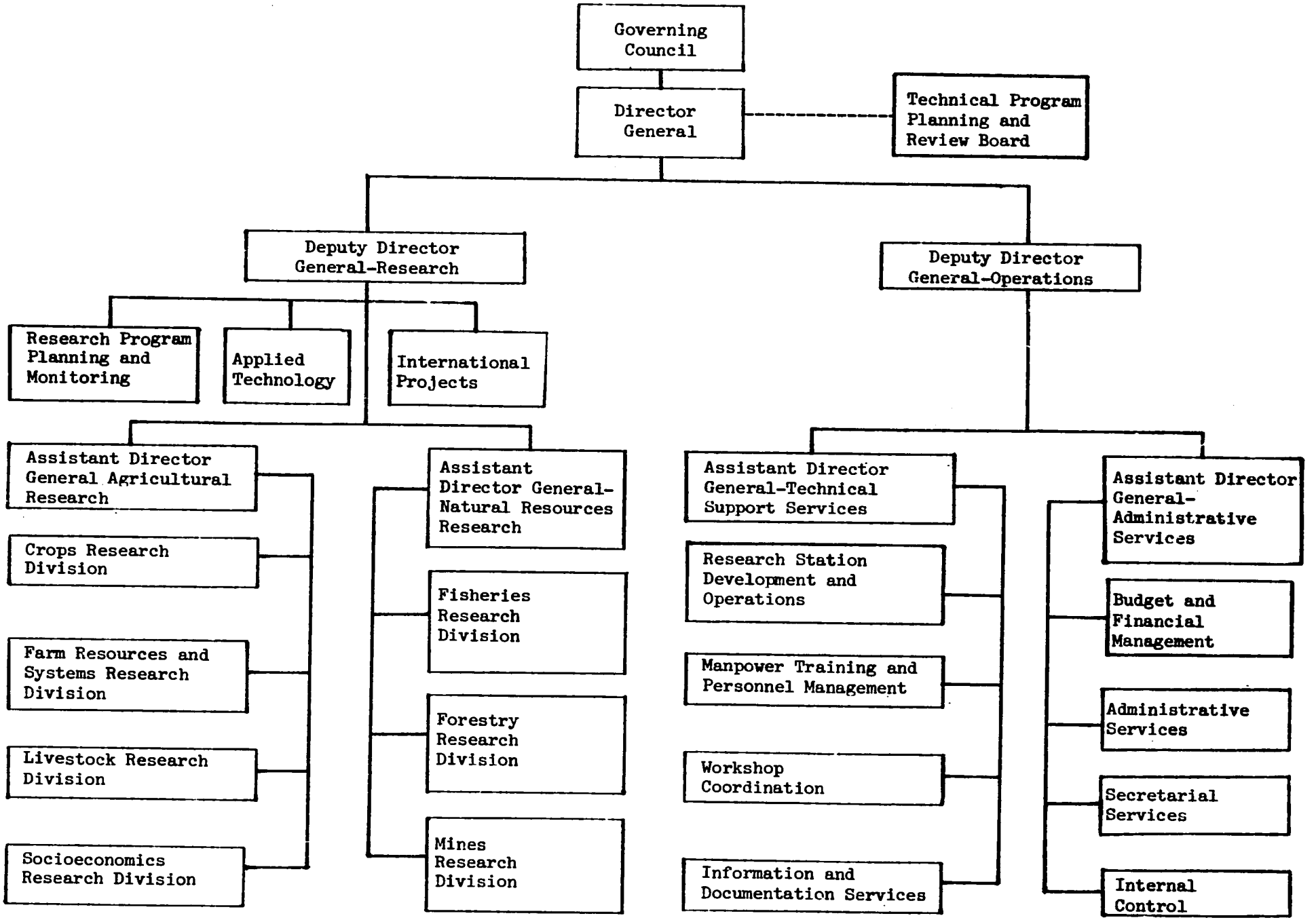
Although mines research was added to PCARR through Presidential Decree No. 864 no change was made in the top Secretariat staff for leadership for natural resources research--including forestry, fisheries, and mines.

The PCARR organization chart shows that the Deputy Director General for Research is a staff officer. Line authority for the seven research divisions (crops, fisheries, forestry, livestock, mines, farm resources and systems, and socio-economics) and the three service divisions (applied communications, international projects, and administrative services), together with responsibility for the national research center and station network, manpower development, workshop coordination, public information and some other activities (17 in all) extend as a line function of the Director General. This organization structure deserves careful study and modification.

In view of the responsibility of PCARR for research and technology development for the Ministry of Agriculture and the Ministry of Natural Resources, and the substantial work load under USAID Loans I and II, it would seem appropriate to consider an organization structure as presented in Figure 7. The proposed organization would delegate the line authorities and responsibilities in a manner to permit a degree of direction and supervision of research not now possible--and not now being done in PCARR.

The staff offices under the Deputy Director General for Research, (a) Research Program Planning and Monitoring, (b) Applied Technology, and (c) International Projects, could be integrated with the related Research Divisions. The relationship of the Research Program Planning and Monitoring Office is self-evident. The Applied Technology Office (currently the Applied Communication Divison) would become less concerned with public relations or communication and more concerned with technology verification, adaptive research, and the development of effective linkages with extension and area development programs. The positioning of the International Projects Office under the Deputy Director General-Research would help to ensure that the functions of this office would be appropriately tied to the respective research divisions.

Figure 7 PROPOSED PCARR ORGANIZATION



The designation of an Assistant Director General-Agricultural Research and an Assistant Director-Natural Resources Research would provide line authority and responsibility for these two defined responsibilities of PCARR. It is recognized that the natural resources research programs are still substantially below the levels of complexity and funding of agricultural research. But this reflects the need for good leadership in formulating productive research in the natural resources problem areas.

4. Research Divisions

The research divisions should be headed by senior agricultural scientists with experience and stature in accord with their national responsibilities. The same holds true for the assistant directors for divisions requiring such posts.

The research divisions have a varying conglomerate of units concerned with manpower development, project development, workshop coordination, technology packaging, and research commodity programming and monitoring, in addition to their principal function in coordinating the commodity teams. It would appear that these functions could be consolidated and streamlined with a substantial saving in trained manpower resources.

5. Investigation Leaders

The Review Team studied the program planning procedures handled through the present commodity teams headed by "Team Leaders." This is discussed in detail in Section C, above. The Team Leaders are essentially conveners of the teams or committees concerned with the given commodity or subject area. They have little authority or responsibility for the performance of research--for seeing to it that a professional job is done in carrying out a project. They have no authority--hence no responsibility--for a total program of rice research or for farming systems research for a selected area, etc. PCARR, as it is now structured and operating, cannot be held responsible for a continued absence of "impact-making technology" from the national agricultural research system.

This, in turn, means that the Minister of Agriculture or the Minister of Natural Resources cannot hold any office or organization responsible for these functions.

The Review Team was told in a number of instances that PCARR "monitors" visiting field research projects were frequently fresh Ph.D.'s, with less experience in research than the scientists conducting the research that was being monitored. Unless the staff of the agency responsible for research program planning, budget review, and research allocation has and holds the respect of the research community it serves, the agency will not survive. The PCARR leadership and the Governing Council must assess this situation promptly, and seriously.

The Team Leaders should be replaced by full time "Investigation Leaders" with the training, experience and stature--together with authority for program planning, supervision and evaluation--that will

enable the Ministry of Agriculture, the Ministry of Natural Resources, and other agencies of the government concerned with agricultural research and development to fix responsibility for the performance of the national research system. This should be fixed at the Investigation Leader level, for research programs, and progress upward through the Secretariat structure.

6. Technical Support Services

As mentioned above, numerous functions that are scattered throughout the various divisions should be consolidated. As shown in Figure 7 responsibility for (a) research station development and operations, (b) manpower training and personnel management, (c) workshop coordination, and (d) information and documentation services should be placed under an Assistant Director General for Technical Support Services. Research station development and manpower training, supported under USAID Loans I and II, require more attention and guidance than is being given by PCARR at the present time.

A capability in personnel management is essential if PCARR is to set up a viable and credible "Agriculture and Resources Research Service" to formulate rules and regulations covering qualifications, recruitment, compensation, performance evaluation, and separation from service, of all government technical personnel engaged in research-oriented operations in agriculture and natural resources (as stated in Section 4 of Presidential Decree No. 864). This will be essential if salaries are to be equalized to a degree that will enable government agencies to attract and hold competent research scientists.

The coordination of workshops should be a centralized function serving the various divisions. Likewise, it should be possible to realize substantial savings if information and documentation services of PCARR were consolidated.

The foregoing functions require supervision from a person with a scientific background as the Assistant Director General for Technical Support Services.

I. Selected Issues

The Review Team considered a number of factors or issues that should receive attention in the further strengthening of PCARR operations and management. These are important but not of sufficient complexity to justify the full discussions presented for the preceding items.

1. Full Time Employment Policies

PCARR is a large organization with a 1981 budget of ₱63,000,000 and 374 employees. The functions as discussed in other sections of this report are large and suggestions have been made for expansion of some of them.

The Review Team is aware of the fact that some of the key people in PCARR are wearing more than one hat. Some divide their time between PCARR and the UPLB. Others have additional duties in other institutions or agencies. Furthermore, some have two titles (and duties) within PCARR itself. The Team is fully conscious of the reason for some of these dual arrangements -- a shortage of trained and experienced personnel. One person stated it succinctly when he said he would rather have part time competence than full time incompetence! Obviously the Team could not disagree with this philosophy.

Nevertheless, if PCARR is to fulfill its role as stated in the decree that created it, then it must move toward acquiring and maintaining a competent staff on a full time basis. Not only are they needed as key individuals within their particular jobs but also in terms of institutional loyalty and stability. PCARR personnel must be led to believe that they have the greatest job in the Philippines and that they work for an organization second to none in terms of importance and prestige.

There is also a potential conflict of interest in the roles of some of the employees. Operating as a program organizer and fund distributor on the one hand, and as the head of an independent agency on the other, sets a dangerous precedent. An example is the dual role of the Forestry Research Director (PCARR) and Director of FORI. Although the Team had no complaints from other forestry institutions the potential is there for discrimination. The Director of FORI called this to the attention of the Team.

PCARR has a tremendous investment in manpower training that should pay dividends in accelerated research within the Philippines. Hopefully this gain in manpower competence will result in a better trained, full-time staff within its own ranks as well as in the regional centers and cooperating stations. But this manpower, and the research station network that is being developed, will not furnish the essential steady output of improved technology unless there is competent and full-time, fully-committed leadership to insure the effective direction and use of these resources. This is the conviction of the Review Team and hopefully the goal of PCARR.

2. The International Projects Division

The International Projects Division of PCARR has two principal functions:

1) To seek international funding in support of the national research system.

2) To harness new knowledge and technologies from international research centers and other national research systems for national development.

Recently, a third responsibility has been assumed in research project formulation and technology packaging for socio-economically depressed areas.

a. Method of operation

The IPD currently has or is negotiating relationships with 17 international research centers, universities or national institutes (see E. Funding and Financial Procedures). The IPD also is the PCARR contact point for research aspects of development projects funded through international lending and bilateral donor agencies such as IBRD, USAID, Canadian IDRC, GTZ, DSE, etc.

The IPD organizes conferences with international technical assistance agencies and research centers and has recently convened workshops or conferences on the winged bean, potato research, fruits and vegetables. These conferences tend to enhance both the international reputation of Philippine science and to broaden the experience and expertise of local scientists.

IPD functions as a coordinator and catalyzer between the national and international agencies but must resist the temptation to become an operating agency itself and to infringe upon responsibilities that should more properly come within the research divisions or other units of PCARR.

b. Other activities

In addition to the undertakings discussed above, IPD assists in the formulation of research programs for the integrated area development projects which are organized under the National Council on Integrated Area Development (NACIAD), through a memorandum of agreement. IPD is currently coordinating research in two projects which are funded by international agencies: the Cagayan Integrated Agricultural Development Project (CIADP), and the Samar Integrated Rural Development Project (SIRDP). The IPD also is developing research proposals for Palawan and Zamboanga del Sur.

The justification for IPD monitoring derives both from the international donor involvement and the existence of a research component in some of the above projects.

IPD and PCARR have correctly strengthened the foregoing research components in consultation with NACIAD and various implementing agencies such as ministry bureaus, universities and established research institutes. But the team has serious questions about the wisdom of IPD's extensive involvement in IADP projects per se, unless this is done with and through the research divisions of PCARR and not independently by the IPD.

A question remains about the maintenance of quality research with the proliferation of projects in development areas where the research institutions are necessarily weak. The implementing agencies in most cases will need a long period of staff and facilities development, which will tend to run beyond the current planned duration of funding for the respective projects. It is clear that a strong case can be made for imported technical assistance and for incentives to attract better staff to these areas.

c. Technology packaging for countryside development

Another IPD activity being currently developed in support of the IADP projects is the Technology Packaging program in collaboration with the Applied Communications Division. The objective of the project is to produce "Technoguides" for the provinces in which NACIAD projects have included research activities. The intent is to "formulate and test in farmers' fields unified technology recommendations" which will eventually become extension publications and training manuals for several agencies.

The Review Team views this as an appropriate activity for the IPD. In addition, the IPD involvement in research "coordination" in the IADP's is only justified by that Division because of the foreign source of funds.

The matter of responsibility for technology evaluation, and development of linkages with extension and area development programs, has been reviewed in Section H, above, in relation to a proposed reorganization for PCARR. These functions should be handled by the proposed Applied Technology unit, as shown in Figure 7.

IV. RECOMMENDATIONS FOR FUTURE DIRECTIONS FOR PCARR

In arranging for the assessment of the corporate structure and operation of PCARR it was expected that the Review Team should furnish (a) recommendations on a plan for PCARR for the next five years--in terms of new directions, approaches/strategies, organizational arrangements and management procedures--to enable PCARR to respond more favorably to its mandate, and (b) recommendations on a suitable research management system.

The Review Team pursued the study of PCARR with the foregoing mandate in mind. However, in considering recommendations it did not seem feasible for the Team to prescribe "a suitable research management system." There are too many interacting factors involved and it is desirable for PCARR to adjust and adopt as requirements and opportunities change in the future. The recommendations of the Review Team are based on the subjects discussed in Chapter III. These cover the organizational structure of PCARR as well as the key components in operations and management. The application or implementation of any of the recommendations--or combinations of them--would serve to improve the ability of PCARR to respond more favorably to its mandate.

The recommendations are placed under the respective subject headings of Chapter III to facilitate identification with specific issues or factors.

National Network of Research Centers and Stations

Recommendation 1. There is confusion in the terminology between regional research centers (8 as currently defined) and the 10 research consortia/centers. The designation of the centers, consortia, and stations in the National Network should be clarified.

Recommendation 2. Funds under future loans should be used primarily to support existing or contemplated research programs rather than building infrastructure at additional locations. The development of centers or stations should be consistent with the Government's ability to budget for their continued operations.

Recommendation 3. PCARR should concentrate research in its national and regional network and should utilize the cooperating stations only when needed to evaluate locally the research conducted at the centers. Supporting 274 projects at 129 cooperating stations leads to excessive fragmentation.

Research Program Planning and Management

Recommendation 4. PCARR should develop strong national priority commodity programs through the mechanism of local problem identification, regional priority assessment (with NEDA and the research center leaders), and then national organization, evaluations, and recommendation for funding through the Research Divisions and TPPRB. The Research Divisions and investigation leaders would then be able to initiate, review and assign

projects to implementing agencies with minimum review by the TPPRB under the general responsibility of the Director General and the Governing Council.

Recommendation 5. In order to set effective research priorities, insure that research is done promptly in conformance with the priorities, and insure that the research is of high quality, PCARR should assess research capabilities of implementing agencies and then assign projects to those places where they can be done best.

Recommendation 6. To carry out this assessment, PCARR should develop a set of criteria by which the research capabilities of implementing agencies can be evaluated. The criteria should be used to establish standards for research leadership, staff capability, physical facilities and equipment, and the suitability of the location.

Recommendation 7. Regional program planning and coordination should be strengthened through the PCARR regional centers, the regional center coordinating committees, the regional center coordinator, and regional commodity committees. The regional Executive Director of NEDA and the regional Director of MOA should be made members of the RCCC.

Recommendation 8. The gap between research needs of the integrated national and regional programs and the programming of research by PCARR to meet these needs must be bridged. PCARR should develop a specific proposal to provide a better means of coordinating research plans with needs of the several integrated programs of national and regional development.

Recommendation 9. Research resources should be applied to high-priority problems. Efforts should not be dissipated in numerous unrelated small projects at scattered institutions of varying capabilities.

Recommendation 10. PCARR should develop greater flexibility in its system of program planning, establishing priorities, and budgeting and project system. It should be capable of responding promptly to research problems of small farmers, producers of plantation crops and producers of important export crops.

Recommendation 11. PCARR should review the effect on national research capability and productivity of the establishment of special research institutes. Such review should consider the effect of such institutes on multidisciplinary research programs, on availability of trained manpower, and on availability of experienced research leaders and administrators.

Recommendation 12. The establishment of research centers and stations should not outpace the development of capable research leaders. A station with land, buildings, equipment and even research staff will be ineffective without strong leadership and direction.

Recommendation 13. PCARR should improve its research monitoring and evaluation system to provide information on which qualitative judgments can be made. PCARR Secretariat should consolidate reports in contrast to the current massive listings of individual project data. In developing this system PCARR needs top-rate, full-time investigation leaders (see recommendation 37).

Recommendation 14. PCARR should continue to cooperate with, support, and seek the advice of the research programs of commodity commissions and authorities such as PCA, PHILSUCOM, AIDA, etc.

Manpower Training and Personnel Management

Recommendation 15. PCARR should appoint a full time qualified person for manpower training and personnel management, to provide leadership for this increasingly important component of the organization's responsibilities. The administrator and staff of this unit would be responsible for (1) the management of a manpower development program for the network and (2) developing an Agriculture and Resources Research Service, as specified in PD 864, to improve procedures and employment conditions for research personnel.

Recommendation 16. Priority attention should be given to the improvement of salaries for researchers to reflect levels of education and experience. For the regional centers PCARR must take the lead in providing attractive living and working conditions for researchers.

Recommendation 17. PCARR should encourage centers and consortia to develop reasonable, phased plans for upgrading (degree) existing personnel, developing new positions, and meeting in-service training needs. Nominations for scholarships should come from the directors of centers and consortia and be directly tied to plans for the development of their research units.

Recommendation 18. A larger portion of Ph.D.'s should receive their degree training--or at least a year of course work--at universities in the U.S., Australia, New Zealand, Europe or other Asian countries, in order to diversify the researcher pool.

Funding and Financial Procedures

Recommendation 19. The program priority ranking and budget allocation should include consideration of regional priorities and requirements.

Recommendation 20. In the negotiation and monitoring of foreign assisted projects, PCARR and the Government implementing agency should closely coordinate with the MOB to insure that local counterpart funds and loan proceeds are provided for in the agency's annual budget appropriation. The Government should also commit the provision of budget for maintenance and operation even after the Loan agreement period.

Recommendation 21. The PCARR Grants-in-Aid (GIA) budget should give priority support to the strengthening of regional research centers, especially Loan I-recipient stations and those researchers who have completed their advanced training and have returned to their respective research institutions. It is important that staff who have just returned from graduate training be given research support immediately after having completed their studies.

Recommendation 22. PCARR should be the clearinghouse for funding all foreign assisted agriculture and resources research programs. The

linkage of PCARR with implementing agencies on foreign assisted project preparation, negotiation, implementation, monitoring and evaluation should involve the scientists at the working level.

Recommendation 23. Future loans for station development should have enough provision for foreign exchange to purchase important scientific equipment that must be imported. This is necessary to make every research laboratory operational.

Recommendation 24. PCARR should take the lead in developing priority research programs, the funding of which must be presented to MOB under separate KBI's rather than a single-lump sum amount for GIA.

Recommendation 25. Research program budgeting and funding through research centers should be under PCARR leadership in cooperation with the Regional Development Councils (RDCs), the regional offices of NEDA and the line agencies, and must be entered into the budget as KBIs for the regions concerned.

Development and Application of Useful Technology

Recommendation 26. PCARR is urged to address its full attention to the development of the Agricultural Support Services Project II proposed for World Bank funding. This is particularly important with respect to the orderly process of research network development, to meet the needs of farmers and producers in the Philippines.

Recommendation 27. It is recommended that PCARR explore the possibility of having BAEx staff assigned as subject matter specialists to research stations and centers in the network to improve the process of problem identification, the interpretation of results and the packaging of technology. Subject matter specialists might be given the same type of rewards in terms of scholarships and incentives as offered to researchers.

Recommendation 28. The farming resources and systems research and the socio-economics research divisions of PCARR are encouraged to work more closely with the commodity oriented units (and vice versa) in order that research projects dealing with small farm units may be better designed and packaged.

Information Services

Recommendation 29. PCARR should improve upon its capabilities in information management by evolving an integrated system of current modules. The system should be designed as a repository for research information that can be assembled in assessing the qualitative and quantitative aspects of research in the national research system.

The Governing and Directorate Structure

Recommendation 30. The Governing Council should continue to have members of high levels in the Government, including the Minister of Agriculture, Minister of Natural Resources, and others. The meetings of the Council should be reduced from a monthly to a quarterly basis. Issues presented

to the council should be consistent with its role as a policy making body concerned with effective operation and administration of PCARR, assessment of the overall research program, budget approvals, and personnel management procedures.

Recommendation 31. The Technical Program Planning and Review Board (TPPRB) should be reduced to no more than 15 or 16 members (from the present 28). The PCARR staff should continue to serve as resource persons and not as members of the Board.

Recommendation 32. The TPPRB was intended to be constituted to assist the Director General of PCARR. The Board should be responsive to the Director General, its Chairman, who will in turn furnish the linkage to the Governing Council, of which he is a member. The TPPRB should serve in its intended role as a policy and procedures Board, with details of operations delegated to the Secretariat.

Recommendation 33. The Secretariat of PCARR should be reorganized as shown in Figure 7, page 181, to establish line and staff functions capable of directing and managing the national research system.

Recommendation 34. There should be an Assistant Director General-Agricultural Research, and an Assistant Director General-Natural Resources Research to furnish identity and leadership for these two responsibilities of PCARR. The research divisions for the two areas of activities would come under the respective Assistant Directors General. This would provide for greater attention to natural resource research which is currently lagging in PCARR--particularly in Mines research.

Recommendation 35. The Research Divisions should be headed by full-time senior scientists with experience and stature in accord with their national responsibilities. The same holds true for assistant directors for divisions requiring such posts.

Recommendation 36. Full-time "investigations leaders," with the training, experience and stature to give meaningful direction to the planning, execution, and evaluation of research programs should be designated in place of the team leaders now functioning in PCARR.

Recommendation 37. Highly trained research scientists are still a scarce commodity in the Philippines and an unacceptably high proportion of their time is devoted to administrative detail and paperwork. There is urgent need for technical leadership and guidance in the field and laboratory from these skilled and experienced scientists and PCARR needs to find mechanisms for this kind of impact on research production.

Recommendation 38. An Assistant Director General for Technical Support Services should be appointed, under the Deputy Director for operations, to give leadership to (a) research station development, (b) manpower training and personnel management, (c) coordination of workshops, and (d) consolidated information and documentation services.

Selected Issues

Recommendation 39. PCARR must employ competent, full time staff for the Secretariat positions, from the Director General through the research divisions and staff offices. This is essential if the expanding manpower and station resources are to work effectively -- commensurate with the heavy investments made in these establishments and requirements for future operations.

Recommendation 40. The functions of the International Projects Division should be reviewed to insure that it is not transcending the role it should fill nor encroaching on research and related functions that best should be handled by other divisions and offices of PCARR.

Part 2

EX POST EVALUATION

for

USAID Loan I (492-T-039)

EX POST EVALUATION
for
USAID Loan I (492-T-039)

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SUMMARY

1. The USAID Loan I report is incorporated with the over-all report on the Corporate Review of PCARR, although it is written so that it can be used alone.

2. The report addresses the following major topics:

a) Status of Loan supported institutions
b) Implementation and management of research programs
c) Quality of research supported under Loan I
d) Manpower training and management
e) Planning for future loans

3. The Review Team found that the buildings, irrigation and water systems, staff housing and general research farm improvements provided under Loan I were badly needed and now have a potential for greatly enhancing the research output of these centers. The major current needs for productivity in research are for supplies and operating funds.

4. The full utilization of the loan and accelerated programming of Loan II are remarkable achievements for the PCARR staff and demonstrate the effective cooperation and helpful work by USAID staff.

5. It was noted that PCARR sometimes had difficulty coordinating and supervising the allocation of resources among physical infrastructure, equipment and manpower development and in selection and installation of equipment.

6. Several policy issues were raised regarding the allocation of resources within the four centers:

a) The early decision to identify and strengthen an educational institution as the lead agency has many advantages, but it did not effectively build on existing strengths.

b) The investment in physical resources cannot pay dividends without strong attention to research leadership early in the program.

7. The production of research results is very considerable at the centers which had a history of research, but those that are relatively inexperienced in research are not yet making significant contributions.

8. The research agenda is characterized by a catalog of some 6000 research projects, but there is insufficient evidence that these add up to <u>programs</u> with potential for significantly affecting national or regional production at an early date. Recommendations are made by the Review Team for greater direction and concentration of effort to hasten the impact on production.

9. The quality of research activity is spotty. Some fields are highly productive of research information, while others are of observational value at best. In very few places is laboratory research very active and even fewer are intimate adjuncts to field research.

10. Dissemination of research results is weak. PCARR does a good job of summarizing and disseminating the information that comes to it, but it cannot compensate for inadequate analysis and reporting at the sources of information.

11. The linkage of research results with off-station trials and with extension specialist preparation is weak and should be strengthened.

12. The implementation of manpower training under the loan followed the original schedule fairly closely and is making a significant contribution to the research capability in the country.

13. The aggressive and successful manpower training program that is currently underway will require early positive action on salary and other incentives if this manpower is to be kept in productive roles in research. Several recommendations are made in this respect.

14. The Team made several observations and recommendations regarding future loans.

a) The centers that are supported under Loans I and II should be further strengthened and supported in future loans before adding new centers to the support program. This is particularly important in view of the slow rate at which operational funding by GOP is increasing and the dim prospects for greater increases by MOB.

b) Future loans for the PCARR network should take into account plans now underway by the Ministry of Agriculture to establish Coordinated Agricultural Research Stations in each of the 12 political regions of the Philippines.

c) Future loans should be very sensitive to the emerging regional thrusts in order to avoid the development of technologies for which there is no absorptive capacity in the regions.

d) The rapidly changing economic situation in the world and in the Philippines requires changes of direction in all sectors. The responsiveness of PCARR will be critical and the intimate cooperation of USAID in adjusting loan program requirements is essential.

I. INTRODUCTION

A 5-year loan made by the USAID to the Government of the Philippines in 1975 and implemented by PCARR, has assisted in the development of agricultural and natural resources research capacity in four regions of the Philippines. This report is an evaluation of the effectiveness of the implementing agency in achieving the goals it established for the use of the funds for the full period of the loan. The review includes sections on the status of the four loan supported institutions, the implementation and management of research programs at these institutions, and the qualitative aspects of research started and supported under Loan I. A final section deals with the application of the review to the current and possible future loans from USAID.

A. Background

The importance of agriculture to the economy of the Philippines is well documented, as is the rapid increase in population which places continual pressure on the supply of basic commodities like rice and corn. (See Loan I Project Paper.) In view of the critical food needs of the population and the need to further develop the economy of the country to meet other basic human requirements, the Philippines launched an effort to improve its capability to conduct agricultural research and train agricultural researchers.

In the early 1960's, the Ford Foundation, Cornell University and the World Bank assisted the University of the Philippines at Los Banos in developing a capacity to provide graduate training at the MS and, in many areas, the Ph.D. levels. This allowed the Philippines to increase the manpower available for agricultural research and, at the same time, focus on problems facing the Philippines.

With increased pressures for research and the opportunity for additional trained manpower, the Government of the Philippines created an Executive Panel in February 1971 to "develop a national agricultural research system" with the assistance of USAID, the F.F., A/D/C and NFAC. Four significant findings (as reported on page 12 of the Loan I project paper) are as follows:

1. Although a substantial amount of funds was being allocated by government for agricultural research, the useful research was limited and was having little impact on the agriculture sector.

2. There was inadequate planning and coordination at the national level. Research projects and programs were not necessarily related to national goals nor to plans for agricultural development.

3. Research resources were highly fragmented as were the allocation of budgets. Funds were allocated to large numbers of discrete, unrelated and frequently overlapping activities. There was also a substantial diversion of appropriated funds to uses other than for the support of research for which they were budgeted.

4. Research was highly personalized in that activities were undertaken in accordance with the individual's personal interest rather than in support of planned programs designed to further national development.

As a result of their findings, the Technical Panel of the Executive Panel recommended the establishment of the Philippine Council for Agricultural Research (PCAR). (See the Philippine Agricultural Research System, Evaluation and Recommendation. December 20,1971.) This was accomplished in November 1972 by Presidential Decree No. 48. PCAR was later changed to the Philippine Council for Agriculture and Resources Research (PCARR) under P.D. 864 which added responsibility for mines research and set forth the following functions and powers of PCARR:

a) Define goals, purposes, and scope of research necessary to support progressive development of agriculture, forestry, fisheries and mining for the nation on a continuing basis;

b) Using the basic guidelines of relevance, excellence, and cooperation, develop the national agriculture and resources research program based on multi-disciplinary, inter-agency, and systems approach for the various component commodities;

c) Establish a system of priorities for agriculture, forestry, fisheries and mining research and provide meaningful mechanisms for updating these priorities;

d) Develop and implement a fund-generating strategy for supporting agriculture and resources research;

e) Program the allocation of all government revenue earmarked for agriculture and resources research to implement a dynamic national agriculture and resources research program;

f) Provide the mechanism for assessment of progress and updating the national agriculture and resources research program;

g) Establish and provide support for a national network of centers of excellence for the various research programs in crops, livestock, forestry, fisheries, soil and water, mineral resources, and socioeconomic research related to agriculture and natural resources;

h) Develop a mechanism for full communication among workers in research, extension, education, and national development;

i) Establish a repository for research information in agriculture, forestry, fisheries and mining;

j) Provide for a systematic program of agriculture and resources research manpower development and improvement;

k) Provide for appropriate incentives to encourage topnotch research workers to remain working in their respective areas of agriculture and resources research, and

1) Enter into agreement or relationships with other similar institutions or organizations, both national and international, in the furtherance of the above purposes.

Two factors were important in setting the stage for the scope and objectives of the first loan for USAID to support PCARR activities. First, the objectives of the 1974-77 Four-Year Development Program for the agricultural sector were defined as follows:

1. Increased food production so as to achieve self-sufficiency in the basic food plants--rice and corn and also livestock and fish products.

2. Acceleration of the agrarian reform program of land transfer and distribution, and expansion of services to new landowners.

3. Expansion of exports and import substitution.

4. Conservation and development of forestry resources.

Second, PCARR conducted a number of internal reviews and evaluations of the research needs and organizational requirements. It also invited A. H. Moseman, Rockefeller Foundation Consultant, to conduct a detailed review of the first 18 months of PCARR's activities.

As a result of these two activities, and at the request of NEDA, USAID conducted a study of the feasibility of extending a loan to support the agricultural research program of the Government of the Philippines. In preparation for the loan, PCARR developed a program for development of research over a 7-year period. The plan called for the establishment of a national network of agricultural research centers and experiment stations to conduct research relevant to the various regions of the Philippines.

B. Scope and Objectives of the Loan

In May 1975, USAID approved a $5,000,000 loan for PCARR covering the five year period, 1975-1980. The request included $2,240,000 for infrastructure (research buildings, housing, utilities and land development), $1,160,000 for equipment, $1,000,000 for manpower development, $303,000 for technical advisory services and $250,000 for library materials.

The primary objective of the loan project is "to develop and improve the agricultural research capability of four major research centers: Central Luzon Agricultural Research Center, Bicol Agricultural Research Center, La Granja Agricultural Research Center, Southern Mindanao Agricultural Research Center." Hence, the main point for evaluation of the loan is how much improvement has been made in the capacity to conduct agricultural research at the regional level.

A secondary objective of the loan is to strengthen the leadership role of PCARR in the administration and management of agricultural research resources. The point for evaluation is the extent of PCARR's

ability to carry out its mandate under a system of regional centers combining the talents and resources of Ministry agencies and educational institutions.

The loan document specifies that the ultimate beneficiaries of the project are to be small farmers, i.e. the 80% of the farmers in the country with less than 5 hectares. The project paper states that "on a longer term basis, the benefits will be measurable in terms of new or improved production technology--new varieties, disease, insect and weed control practices, soil fertility and water management practices and cropping systems--adapted to the needs of small farmers." The combined resources to be strengthened by the loan must have the capability of "planning and carrying out the research mission and (be) able to translate the results in a form agents of extension, supervised credit, agrarian reform and cooperatives can use for assisting the small farmer in improving his productivity."

II. STATUS OF LOAN SUPPORTED INSTITUTIONS

A. Infrastructure

The evaluation team visited each of the four agricultural research centers funded under the loan. A summary of the facilities and programs of each center is given in Annex V and the comments here are directed toward the general research capability that has been generated under PCARR leadership. The report of the Joint GOP-USAID Evaluation team (updated as of September, 1980) has documented the physical status of the building program and the completion of the training program, and that report should be consulted as an adjunct to that report.

The Review Team found that the buildings, irrigation and water systems, the staff housing and general research farm improvements (provided under Loan I) were badly needed and have now provided potential for greatly enhancing the research output of these centers. In most of the Centers there was adequate land available for research, but those other facilities needed for research were sparse. These four centers now have a reasonable physical base for their research activities and their major needs now are for manpower, supplies and operating funds.

B. Utilization of Facilities

The Joint GOP-USAID Evaluation of the USAID Loan I (492-T-039) of September 1980 was available to the team on its arrival in October 1980. The team also examined the quarterly reports made for loan expenditures and a number of other related documents.

Despite the initial difficulties in release of fund advances and the delay in implementation of 16 months, the loan funds have been fully utilized ahead of schedule.

Infrastructure funds have been 100% committed and the physical facilities are all in place. Not all facilities are in use however, owing to programming of equipment and staff training for later loans when funding proved insufficient for all activities to be coordinated. The Animal Science Laboratory at USM, for example, was occupied as office space but the laboratory equipment and other furnishings were not programmed until Loan II. While this facility is listed as functional, it does not yet have electrical service. At USM the Crop Science laboratory was completed and equipment ordered but has not yet arrived. At BUCF and BUCA the buildings, fish ponds, and greenhouses are completed but no provision has yet been made for equipment and they are standing idle.

These programming problems aside, the full utilization of the loan and the accelerated programming of Loan II are remarkable achievements for the PCARR staff and demonstrate the effective cooperation and helpful work by USAID staff. The prompt reporting and full utilization of these loans is a most creditable USAID experience and reflects both flexibility in the institutions and excellent administrative skill.

The completion of the present review and evaluation will bring Loan I to a close with 100% utilization in all categories except for a few delays in delivery of goods procured abroad which are in transit or have been delayed in manufacture. The training funds and technical assistance categories are also fully utilized.

C. Policy Issues

Several policy issues were raised regarding the allocation of resources within the Centers and it is hoped they can be taken into consideration in the further development of research capabilities under Loan II and any further support.

First, a decision had to be made in the allocation of resources whether to build on existing strength and good physical installations or to strive for more equitable distribution from geographical and political considerations. There was a strong research base already in existence at LGARC and the additional investment has the potential for making this an excellent research center in which a critical mass is achieved in terms of technical personnel and the supporting systems of waters, power and housing. There is an air of research activity that is strongly mission-oriented and that has potential for high payoff in the commodities for which they are responsible.

The same general comments can be made about CLARC, although the facilities of participating agencies are somewhat more dispersed.

This is contrasted to BARRC where the resource investment was scattered widely in areas that had little previous research background or orientation. Obviously there will be very little interaction between the three sites where infrastructure investment was made because of their physical separation. There is no provision for overall leadership or direction, and even when such is attempted the geographical dispersion will make the achievement of impact research very problematic.

Second, research leadership and stimulation is badly needed where productive research must still come from inexperienced or inadequately trained personnel. It is not enough to have an overall research agenda established by PCARR at its central headquarters. It may not even be enough to have a coordinating chairman who presides over committee decisions on allocation of land and greenhouse space at a center. The investment in physical resources cannot be expected to yield high dividends unless there is concurrent or imminent investment in research leadership at the centers. The visit to ViSCA, for example, demonstrated the tremendous efficiencies that can be realized from investment in good leadership early in the program. This leadership is seriously lacking in one or more of the four centers.

Third, a policy was adopted to identify a college of agriculture as the lead institution in each Center, and this was followed in three of the four centers funded under Loan I. There are many advantages that may accrue to a research program by following this policy. The benefits will only be realized, however, if special care is taken to assure that the lead institution is strong enough to exercise leadership. In one or more of the four centers that institutional strength in research is so weak as to compromise the returns on investment to date. These should be stregthened as soon as possible.

D. The Role of PCARR in Supervising Infrastructure Installations

The overall location of facilities seems to be well chosen and the quality of construction, installations and equipment is generally serviceable and in keeping with programs and apparent needs. There are, owever, a few instances where elements of the infrastructure were designe far beyond the needs of programs in the foreseeable future and where equipment was ordered and delivered that was completely out of character with program projections. In a few places the buildings were completed but no equipment is on hand or projected to permit the utilization of the investment. Buildings standing vacant for want of equipment and supplies, or expensive equipment sitting idle for lack of spare parts or chemical supplies is a sign of inadequate coordination. The function of PCARR is to coordinate the investments in infrastructure with program needs and their agressive assistance will be required in the implementation of future loans.

III. IMPLEMENTATION AND MANAGEMENT OF RESEARCH PROGRAMS

The loan has provided substantial assistance to the development of infrastructure in the four research centers, has provided badly needed equipment for the fields and laboratories, has assisted with manpower development for better research quality, and has provided technical assistance in a number of areas. These activities all help set the stage for research programs to develop. The design and operation of research programs is not directly addressed by the loan but remains the responsibility of the research workers in the institutions and agencies

receiving the support, in collaboration with the commodity team leaders and PCARR.

A. Research Operations

It is clear that the policy of building strong research institutions is the major intention of the loan and great progress is being made in the programmed development and categories of support. The production of research results is not yet in abundant evidence but will presumably flow from the research centers at an accelerating rate as more and better facilities and manpower are applied to the task. The potential of the four centers receiving support varies substantially from one to another for reasons related to research leadership, infrastructure design, equipment use, and availability of the research to farm problems. (See the summary description of the four centers in ANNEX V.)

A marked contrast exists between the Central Luzon Agricultural Research Consortium (CLARC) and Southern Mindanao Agricultural Research Complex (SMARC). Similar contrasts are evident between BARC and LGARC.

CLARC is a true consortium in that it consists of the university (CLSU), an agency center (BPI-Maligay Rice Research and Training Center), the Freshwater Aquaculture Center, the National Carabeef Research Project, a Technology Packaging Center and a Food Processing Research Unit. This consortium has substantial size and diversity of activity, a large budget, over 25 Ph.D. scientists and other trained staff. The coordination of common services has begun with the motorpool being jointly operated. A coordinating committe meets once each quarter to review progress.

LGARC can be called a true Center since the four cooperating agencies have adjoining field resources and enjoy common service facilities, housing, library, etc.

The SMARC is based at the University of Southern Mindanao (USM) where an older institution (MIT) was recently upgraded to university status. The center at Kabacan has not yet developed strong communication or linkage with other research stations in the region. Good experimental work is being conducted at USM and the new facilities provided under the loan are needed, but it will be some years until the staff and equipment catch up with the buildings.

BARRC selected an unchartered agricultural college as the lead institution even though it has no background or orientation in research. It is well located with respect to BPI and BRBDP facilities but it will require dramatic improvement in research capability to serve the lead role. The facilities of BUCA and BUCF are so far removed physically from the lead institution and the research personnel and support resources are so sparse as to cast doubt on their eventual contribution to the BARRC.

B. Research Leadership

Research institutions are generally only as strong as the staff who perform the research. It is especially important to identify and develop research leadership. The critical position is usually the director of research or the President of the institution who can present the case for support to the outside world, political leaders and competitors. He must also have a clear idea of the research needs and development goals of his region, the tasks of his institution, and be able to convince his staff that these needs and goals are important to them as individuals. It is clear to the Team that the cadre of quality leaders at this level is limited and that some programs are being funded at centers where leadership is weak or lacking.

C. Continued Support

A steady and consistent flow of funds into the national research system is essential to the success of agricultural research even when individual experiments are of the applied kind and of short duration. The team observed the many new and good quality research buildings now completed and occupied as a result of loan support. During the 5 year period over ₱80,000,000 has been added to the value of the research physical plant and equipment. Under the accelerated schedule for Loan II, an additional ₱98,000,000 in research infrastructure and equipment will be in place by the end of 1982. Using the 5% rule-of-thumb for maintenance and repair, the addition to the research budget for maintenance alone will be (5% of ₱178,000,000 = ₱8,400,000) nearly 10% of the 1980 National Consolidated Research Project Budget (CY 1980) of ₱96.6 million.

The team was not given assurance from the MOB that this level of increase in research funding could be expected in real terms. In fact it seems that research operations in the near term may not increase substantially despite added staff positions and normal salary increments. It is recommended that added attention be paid to the funding of the full operating costs of the new research system and in maintaining the value and utility of the investment. As loan funds expire, it would appear the research operations budgets should at least double to ₱200,000,000 by 1986 (in 1980 pesos).

IV. QUALITY OF RESEARCH SUPPORTED UNDER LOAN I

A. Planning Research

The specific items covered under Loan I were for physical facilities and manpower development. There was little provision for direct support of research activities. It is reasonable to expect, however, that at the end of five years of investment there should be a perceptible influence on the actual research activities. Some positive influences were, in fact, observed by the team.

The most visible and important influence observed is the strong effort by PCARR to identify, catalog and analyze the total research activities being funded through the many agencies of GOP. This is now accomplished and the resulting information is being used in a variety of ways to gain greater efficiency and impact from the research investments. The full listing of over 6,000 research projects gives PCARR the management information necessary to coordinate the scattered research programs and to begin to eliminate duplication of effort and to reduce effort on items of less importance to national and regional development.

PCARR has had a tremendous impact on the research system. It has stimulated researchers to more productive efforts, it has in many ways welded them together as teams who know what each other is doing, and it has effectively administered a manpower training and upgrading program. All of these activities provide perceptible impact on the actual research activities in the field. In almost every region visited by the Review Team there were very positive and productive results from Loan I investments in infrastructure and manpower improvement.

One question which arose as the Team reviewed the quality and quantity of research underway was whether the vast array of small projects actually totalled up to the production of impact programs of research.

A review of the catalog of 6,000 research projects gives the impression that the research agenda is formed by making a collection of individual research projects, with the hope and expectation that in the aggregate they will add up to an impact research program. The formation of Commodity Research Teams is designed to alleviate this concern, but these teams can only exercise influence in rather passive ways. These teams obviously spend a great deal of time reviewing research plans and proposals and comparing them with over-all national priorities. They do not, however, have much authority or leverage to direct research efforts. They can only react to the individual initiatives of the researchers.

It is clear that PCARR has veto power over research proposals since MOB requires PCARR's approval for inclusion of programs in the research budget. This, however, converts the operation into one of negative control rather than productive, positive, technical leadership. PCARR is restricted by decision of the Governing Council to a coordinating role, but the team feels that this role can accommodate a much stronger element of technical leadership without violating its basic mandate. Such leadership becomes increasingly essential as the manpower development program adds greatly improved scientific talent.

B. Review and Monitoring by PCARR

PCARR not only has responsibility for review and monitoring of research proposals but also reviews and monitors research results. The major effort in this respect is performed by the Research Consortium Coordination Committee teams that are organized at the regional level. These teams are well formed in three of the four Agricultural Research Centers funded under the Loan I. They meet annually to review proposals and at the same time review results of the past season. As the system

gets fully implemented this should provide adequate screening and surveillance of research results. The regional teams that are working on farming systems have immediate access to research results through participation in the regional commodity review teams.

C. Quality of Field and Laboratory Experiments

Those locations which have a history of field research showed a quite high quality of field experimentation. The locations that are relatively new in the business tend much more toward observational plots and are learning to grow the crops under study. Much more disappointing, however, is the general low level of productive laboratory research. Few labs give evidence of having exciting and productive lines of inquiry going on. They are poorly supplied with chemicals, glassware, and other essential supplies. Even fewer labs indicated they are members of a total research team that is attacking a highly important agricultural problem. Sophisticated new equipment acquired under the loan was seldom exhibited as a hardworking and important element in an urgent research exercise. It is hoped that PCARR can be more aggressive in exploiting these investments as essential adjuncts to ongoing research, rather than allowing them to merely satisfy the curiosity of the lab technician.

D. Quality of Research Reporting and Output

The research reporting system supported under the Loan is not clearly defined and not clearly evident to the team. The research review and monitoring or evaluation, as stated above, is a function of PCARR and is conducted by the commodity teams within the research divisions at their regular (approx. monthly) meetings.

The full reporting of research results is not a function of the PCARR Secretariat but belongs to the research workers, study leaders and project leaders who conduct or supervise the research at each of the component institutions. In most cases research results are reported in scientific papers and journal articles (e.g. MSAC Research Journal).

Research results are reported to PCARR as a Research Project Report (PARRS Form for budget information) by the Program Coordinator. These reports include results at all locations included in funded projects and may be complete data reports (e.g. All-Philippine Coordinated Vegetable Evaluation Trials, 1978-79. 112 pp), or more brief. These reports include budget information, minutes of the advisory committee meetings and problems identified for action (both administrative and scientific), a full list of personnel participating and other matters.

The results of the annual commodity team reports are abstracted, summarized and reported by the research divisions in the annual PCARR Highlights. This report brings together research results in brief and readable form with most of the technical information retained. It does not report details of methods or analysis of data. Highlights lists titles of the projects approved in each commodity during the year.

Research project summaries are also used, along with previously known facts and practices, to produce the extension information series called "Philippines Recommends" for each commodity. This useful publication summarizes and collates all current information on farming practices for a commodity including varietal choices, fertilizer and soil tillage information, pest control, irrigation, harvest, processing and marketing recommendations. The Philippines Recommends is directed at extension specialists and teaching institutions but is not directly useful as an extension document for farmers.

In addition to the Highlights, PCARR publishes a number of general bulletins and papers (e.g. Data Series on Coconut Statistics in the Philippines, 1980. Socio-economics Research Division, 177 pp.). Seminar and Workshop Proceedings, Budget estimates, Governming Council meeting minutes, an annual National Program Framework, various brochures and mimeos.

PCARR also publishes the result of its Management Information and Control System as a "Directory of Researches in Agriculture, Forestry, Fisheries and Mines in the Philippines." This 800 page volume lists all research projects by title, duration, implementing agency, source of funds and budget requirement. It is a basic coordinating and management compendium but does not report results. The MICS staff also publishes a "Manpower Resources in Philippine Agriculture, Fisheries, Forestry, and Mines Research, 1978." This document lists each researcher by discipline, degrees, position, commodity and per cent time devoted to research.

The Scientific Literature Service of PCARR published Volume 1 of the "Abstract Bibliography of Researches in Agriculture, Forestry and Fisheries in the Philippines" in 1979. This activity of the Applied Communication Division presents abstracts of principal completed research projects from 1972-1977 in a brief form for research workers and administrators. The SLS also makes copies available of the complete papers or project reports to workers who are interested in more information. Abstracts in this volume number 410 and Volume 11 is in preparation for the years 1978 and 1979.

The PCARR reporting system and the resources devoted to the task by the Secretariat are one of the great strengths of the Institution. The massive amounts of paperwork, both published and informal, presented a formidable task for the Review Team to cover and too little time was available to digest all the information available. In spite of the large number of publications available in PCARR, the Team had difficulty finding research papers and evidence of the research output in the national centers or cooperating stations. In some cases journals are not published, and although it may not even be the best evidence of research productivity, research is not complete until it is reported.

The PCARR Highlights of annual research results is a starting point for the application of research to farm problems. The team sought evidence of the application of research from technical papers, extension publications, farmer trials and packages of technology. Papers and journals were sometimes hard to find, but most centers had some activities directed toward putting research into practice. The "Technopack" offices

at CLSU and ViSCA, for example, were preparing extension literature in the local language for use by extension workers. Socioeconomic research was directed at understanding farmer needs and reaction to technology. The FAC was offering a short course for extension workers and the BPI station at Bago-Oshiro was conducting a workshop at the time of the Team's visit. The KABSAKA Project is primarily directed at delivering a new upland farming technology package to farmers through demonstration and education following applied research.

In spite of the above examples, the team generally felt that the evidence of research output was weak. It was difficult to find applied results that were linked to off-station trials. A demonstration farm at CLSU was located on the campus, which permitted close observation but limited the access of farmers and extension workers to the technology. The linkage with extension seemed to be recognized as important, but in practice few visits by extension workers to the research centers were recorded.

A policy decision is needed to resolve the question of who is to train extension workers and who is best equipped to direct commodity extension specialists. Then it may be easier to persuade extension workers to visit research centers and undergo special training, or to get research workers involved more closely in research verification through farmers' field tests in cooperation with extension workers.

V. MANPOWER TRAINING AND MANAGEMENT

A. Manpower Resources

The 1971 Technical Panel report "The Philippine Agricultural Research System: Evaluation and Recommendations Vol. I" provides information regarding agricultural research manpower in the country during 1970-71. Surveys conducted by PCARR in 1973 and 1977 provide similar data. Table 1 combines the data of these threee surveys to provide comparative data by agency. The three studies were not structured or conducted in a similar manner and, therefore, it is likely that some comparisons are not appropriate. However, the following gross comparisons and trends may reasonably be derived from these data:

- There has been a substantial increase in numbers of trained researchers, averaging about 9% growth per year.

- Universities now have about 50% of all researchers (up from 43% in 1970) although the data in a 1975 show that 40% of their time was devoted to research compared to around 80% in the Ministries.

- Ministries have increased their research manpower at the B.S. level by about 70%, but there is essentially no change in the small numbers of workers trained at the M.S. and Ph.D. levels.

Table 1. Agricultural and natural resources researchers in the Philippines[1/]
Distribution by agency and academic degree 1970, 1973 and 1977

Agency	B.S.			M.S.			Ph.D.			Total		
	1970	1973	1977	1970	1973	1977	1970	1973	1977	1970	1973	1977
Colleges and universities	367	488	811	292	397	428	143	213	192	802	1098	1431
Ministries of agriculture & natural resources	488	644	830	51	57	60	3	4	5	542	705	895
NSDB	229	135	113	39	22	20	11	14	4	279	171	137
Private sector	113	24	11	14	5	3	24	3	1	151	32	15
Other government agencies	*	76	277	*	24	18	*	2	4	*	102	299
Commodity institutes	97	121	*	4	4	*	*	1	*	101	126	*
International agencies	*	*	165	*	*	64	*	*	40	*	*	269
Total	1294	1488	2207	400	509	593	181	237	246	1875	2234	3046
Change, 1970-1977		+71%			+48%			+36%			+62%	

[1/] Does not reflect scientist man years

*Figures not reported in survey

Sources: The Philippines Agricultural Research System: Evaluation and Recommendation, 1971, PCARR Manpower Development Program
Manpower Resources in Philippine Agriculture, Fisheries, Forestry and Mines Research, 1978

- Private sector researchers are shown to have drastically decreased, but this may be due to unknown factors in the survey design.

- International agencies were not enumerated in 1970, which causes an inflation of the total 1977 figures in comparison with 1970. Since they participate in Philippines research projects they are important factors in the overall research manpower pool.

- The reduction in NSDB figures is primarily associated with the creation of PCAPR.

PCARR continues to provide scholarships for training at all levels. In the last 6 years, the average number of scholarship awards was 80 per year in agriculture and 15 per year in natural resources. Other and international agencies also support degree training in the Philippines and abroad. This combined manpower training effort, less normal attrition, will allow for a continual build up of trained manpower of from 5 to 10% per year. More importantly, the larger pool of B.S. and M.S. trained personnel is helping to increase the number of viable candidates for Ph.D. level training which is essential for providing the commodity and research center leadership required for a solid agricultural and natural resources network.

B. Training Under USAID Loan I

One of the most significant contributions of Loan I from USAID was the training of manpower at advanced degree levels for the 4 centers (and some other stations) designated for support. The training was related to the development of physical infrastructure capacity and the program thrusts at these centers.

Figure I shows the number of scholars supported by Loan I in the Philippines and abroad against the total scholarship program of PCARR for 1976-77 to 1979-80 at the Ph.D. and M.S. levels. PCARR also provided support for 34 B.S. degree candidates and cooperated with the other agencies in administering scholarships for 94 students in fisheries (mainly at the M.S. level). Nearly all scholars received their degrees at UPLB.

Table 2 shows the distribution of scholars by field of study and degree from each of the 4 centers and elsewhere. It is interesting to note that while the scholarships were primarily for the 4 centers programmed under Loan I, half of the scholarships were awarded to persons from other organizations.

Data on the actual return of trainees to their designated location are not available. There are rather stringent regulations related to their scholarship as a means of forcing them to return to their post. Most scholars are still involved in degree training as shown in Table 3.

The actual implementation of Loan I scholarship awards followed fairly closely to the original schedule with three notable exceptions. First, only one of a planned 8 people went abroad for Ph.D. training

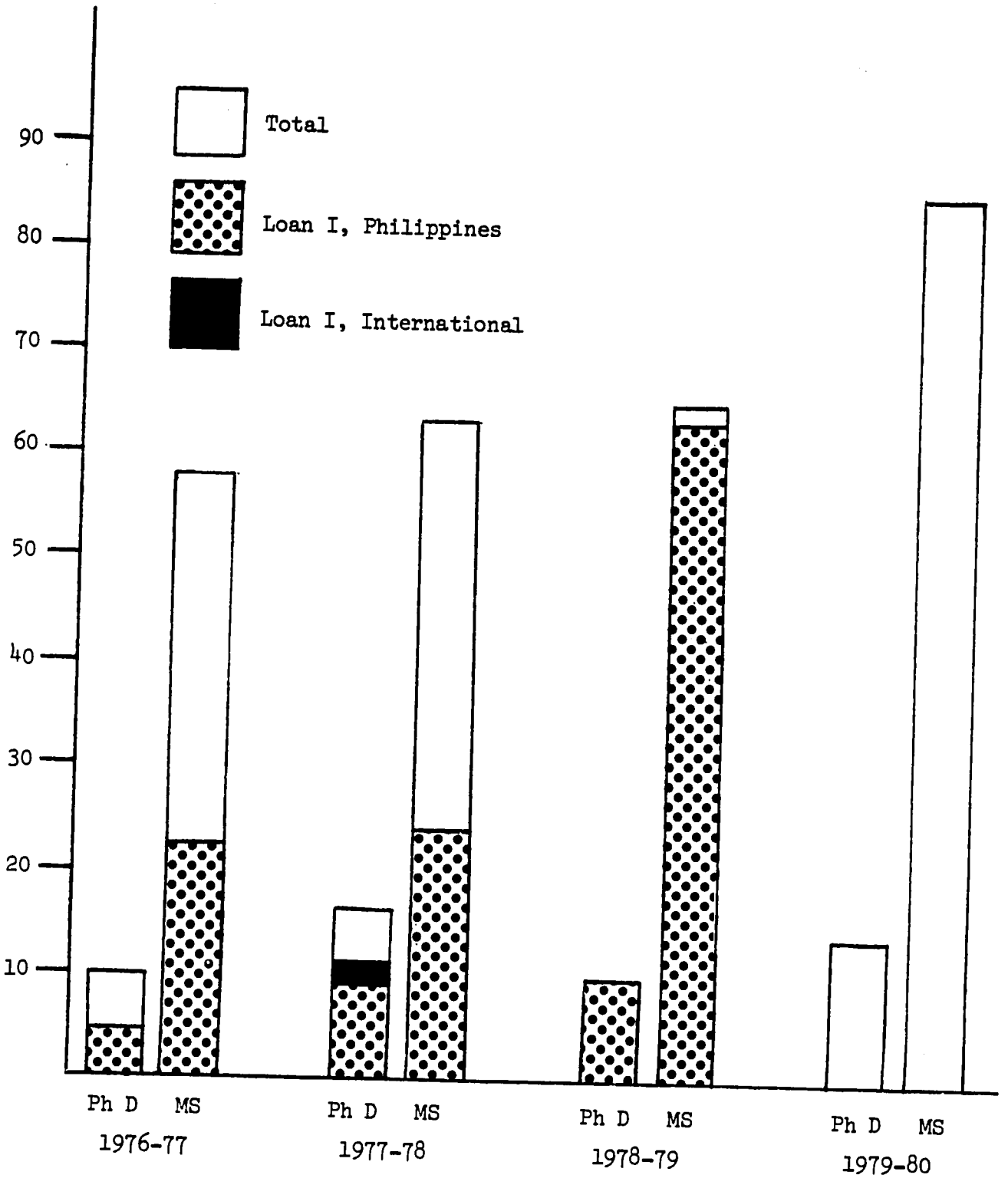


Figure 1. PCARR Manpower Development Program
Degree Training
1976-1980

Table 2. Manpower development, PCARR agricultural research network Loan I scholars (1976-1980)

Discipline	LGARC		SMARC		BARC		CLARC		OTHER		TOTAL	
	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.
Crop production	5	-	8	-	5	2	-	1	11	3	29	6
Crop protection	2	-	5	1	1	1	-	-	8	1	16	3
Physical and chemical sciences	4	-	8	-	1	2	3	-	18	-	34	2
Social sciences	-	-	3	2	-	3	1	2	6	2	10	9
Economics and statistics	-	-	2	1	-	-	-	-	3	-	5	1
Animal sciences	-	-	1	-	-	-	1	-	3	4	5	4
Forestry and fisheries	-	-	-	-	-	-	-	-	7	1	7	1
TOTAL	11	-	27	4	7	8	5	3	56	11	106	26

Table 3. Progress of USAID Loan I scholars as of October 30, 1980

Agency	Thesis in progress			Graduated[1/]			Dropped[2/]			Total		GRAND TOTAL
	M.S.	Ph.D.	Total	M.S.	Ph.D.	Total	M.S.	Ph.D.	Total	M.S.	Ph.D.	
BARC	6	5	11	1	3	4	-	-	-	7	8	15
CLARC	2	3	5	3	-	3	-	-	-	5	3	8
LGARC	2	-	2	8	-	8	1	-	1	11	-	11
SMARC	13	2	15	14	2	16	-	-	-	27	4	31
Others	43	9	52	6	2	8	7	-	7	56	11	67
Total	66	19	85	32	7	39	8	-	8	106	26	132

[1/] Scholars who graduated from the UPLB had returned to their respective mother agencies to apply the knowledge and skills they had acquired and to pay back their mother agencies in terms of government service.

[2/] The scholars were terminated due to poor performance at the graduate level.

since PCARR found it difficult to locate qualified candidates in the early years of the loan. With a greater pool of manpower trained at the MS level at these centers, this problem should be minimized with respect to future training schedules under Loan II. Second, the 24 M.S. slots planned for 1979-80 were incorporated into the 1978-79 group, allowing for earlier completion in relation to the termination of the loan. Third, in anticipation of Loan II, several centers such as ViSCA were able to take advantage of training slots not used by the original 4 centers.

C. Training Under Loan II and Future Support

Training under Loan II is currently underway with three awards made for Ph.D. degree study abroad, 10 awards for non-degree training abroad, 103 awards for MS degree study in the Philippines, and 17 for Ph.D. training at Los Banos. The table below shows the number of awards scheduled for each year of the loan:

	1979-80	1980-81	1981-82	1982-83	Total
Ph.D. International	5	2	-	-	7
Ph.D. Los Banos	31	33	28	-	92
M.S. Philippines	64	66	61	46	237
Refresher Courses, International	14	10	-	-	24
Conferences, International	16	22	22	11	71

This level of training reflects a considerable increase over Loan I because of the increase in number of centers for which support is being provided and the expectation that more viable candidates will be available. Planning for future support for training has not yet begun, but it may relate primarily to the needs of several other centers and cooperating agencies scheduled for support.

The Review Team has several concerns regarding the administration of Loan II training:

First, the training slots are not allocated in advance to the individual centers being supported under the loan and this could result in poor compatibility of program needs, physical plant resources and trained manpower at the end of the loan period.

Second, the large amount of Ph.D. training in-country may tax existing resources at UPLB and will not produce the diversity of trained manpower needed for a healthy research network. In order to alleviate this problem it would be useful to emphasize even more the practice of

sending Ph.D. candidates abroad for a full year of course work. It is also possible that more of the technical assistance provided under the Loans should be used to bring in joint supervisors of Ph.D. theses on short term assignments. This would help dilute the inbreeding effects that are inherent in the present system.

Third, it may be very difficult to find the number of Ph.D. candidates projected, as indicated by the short-fall of 14 Ph.D. candidates for Los Banos training in 1979-80, but the increasing supply of good B.S. graduates from CLSU and VISCA give reasons for optimism.

D. Personnel Management Policies

The major investment that is being made in manpower training can only be justified on the basis of anticipated increases in the quantity, and quality of research produced. The training program is a necessary first step in the process, but training alone does not guarantee the desired results. The trained personnel must be continually managed, guided and stimulated if they are to realize their full potential.

The Review Team feels strongly that the aggressive and successful manpower training program that is currently underway will require positive action on personal incentives in the near future. The Team has a number of concerns in this respect.

1. One effect of giving a staff member more training is to make him more mobile. It is very difficult to impose enough restrictions on a highly trained person to force him to remain at his sponsoring institution and be productive if he feels inadequately rewarded. Effective research is the product of the mind and the imaginative spirit; it is not possible to achieve highly productive performance through coercion. Therefore, the research system must find a way to stimulate researchers in meaningful ways. There is some intimation that a separate salary scale might be established for agricultural research staff. The team recommends that USAID support such a move.

2. The practice of paying honoraria to staff who are funded through grant-in-aid projects is one way of providing supplementary salary to energetic and productive researchers. The Team saw much evidence of the stimulative effect of this approach. The Team also saw several disadvantages to the system, especially where Bureau employees are eneligible for the additional pay. This tends to provoke antagonistic rather than cooperative feelings within the system.

3. Staff members who are permitted to receive honoraria are justified on the basis of performing additional research on top of a normal full load. Therefore, they are limited in the number of extra projects they can carry. If these programs are administered realistically, it means that much of the total research is carried on an "overload" basis. This procedure cannot be defended as a long-term solution to the problem.

4. There is an enormous concentration of scientific talent in the Manila/Los Banos area. But much of the productive regional research

must be conducted in and around regional centers such as those supported under the Loan. It is quite difficult to attract good talent away from Manila/Los Banos area for several reasons. The amenities of schools, housing, social interaction, etc., are less attractive. This is being resolved substantially by the loans. There are, however, the additional advantages of great opportunities for "moonlighting" employment and for participation in activities that provide honoraria that do not exist in the regional centers. It is suggested that PCARR may have to devise a system of "hardship post" allowances to compensate for the "opportunity costs" of living away from Manila.

5. A salary policy also needs to make provision for advancement of scientists to the same salary levels that are available to administrators. Many able and productive scientists now hold administrative jobs, and often more than one, in order to gain the rewards they need for family support. There is a scarcity of well trained scientists actually performing research, even though this is the point of ultimate payoff.

6. Many rewards other than salary are important to scientists and the level of cultural and social amenities in the community are critical. Schooling for children is especially important to educated people and the adequacy of local schooling is being improved in some locations. Other services such as health care, transportation, housing and access to a community of congenial people are all important.

7. Presidential Decree 1502 (June 11, 1978) Section 5 provides authorization for researchers in all agencies cooperating with PCARR or NSDB to receive additional remuneration. It specifies that "the amount of honoraria that may be paid to them directly shall conform with a schedule formulated by the PCARR on the basis of research output and in consultation with the National Science Development Board and related research and educational institutions, and approved by the Government Council." A set of implementing guidelines have been developed for P.D. 1502 but MOB has not released them yet.

The Team suggests that PCARR take the inititative in the amendment and release of guidelines as a move toward resolving the above concerns.

VI. PLANNING FOR FUTURE FUNDING

The principal of regionalizing agricultural and natural resources research in the Philippines is well established and endorsed by the Review Team. It offers the opportunity to focus research on the problems of particular ecological zones and develop local capability to address these problems on a continuous basis while still observing the overall national priorities established by PCARR.

The decision to build a research system based on commodities was made early in the existence of PCARR and will undoubtedly be continued. The increased emphasis on developing national and regional centers adds a significant dimension, the most important implication of which is the

requirement for comprehensive program development within each center. Therefore, the problems and challenges of regional program development provide a logical focal point for future USAID loans to PCARR. The Review Team suggests that there are several important issues that should command USAID's attention as these programs develop.

A. Relation of Research Capability to National and Regional Goals and Priorities

It is understood that the new 5-year development plan will include a section on science and technology. Each region will address this area through NEDA regional offices with information being coordinated through NSDB. This allows for the building of agricultural research priorities from the local to the national level. More importantly, it offers the opportunity to develop agricultural research programs to mesh with on-going and planned regional development activities and infrastructure development such as market and processing facilities, new land development, highway construction, etc. Hopefully, this will allow some regional priorities for research to be funded even when they do not exactly correspond with national priorities.

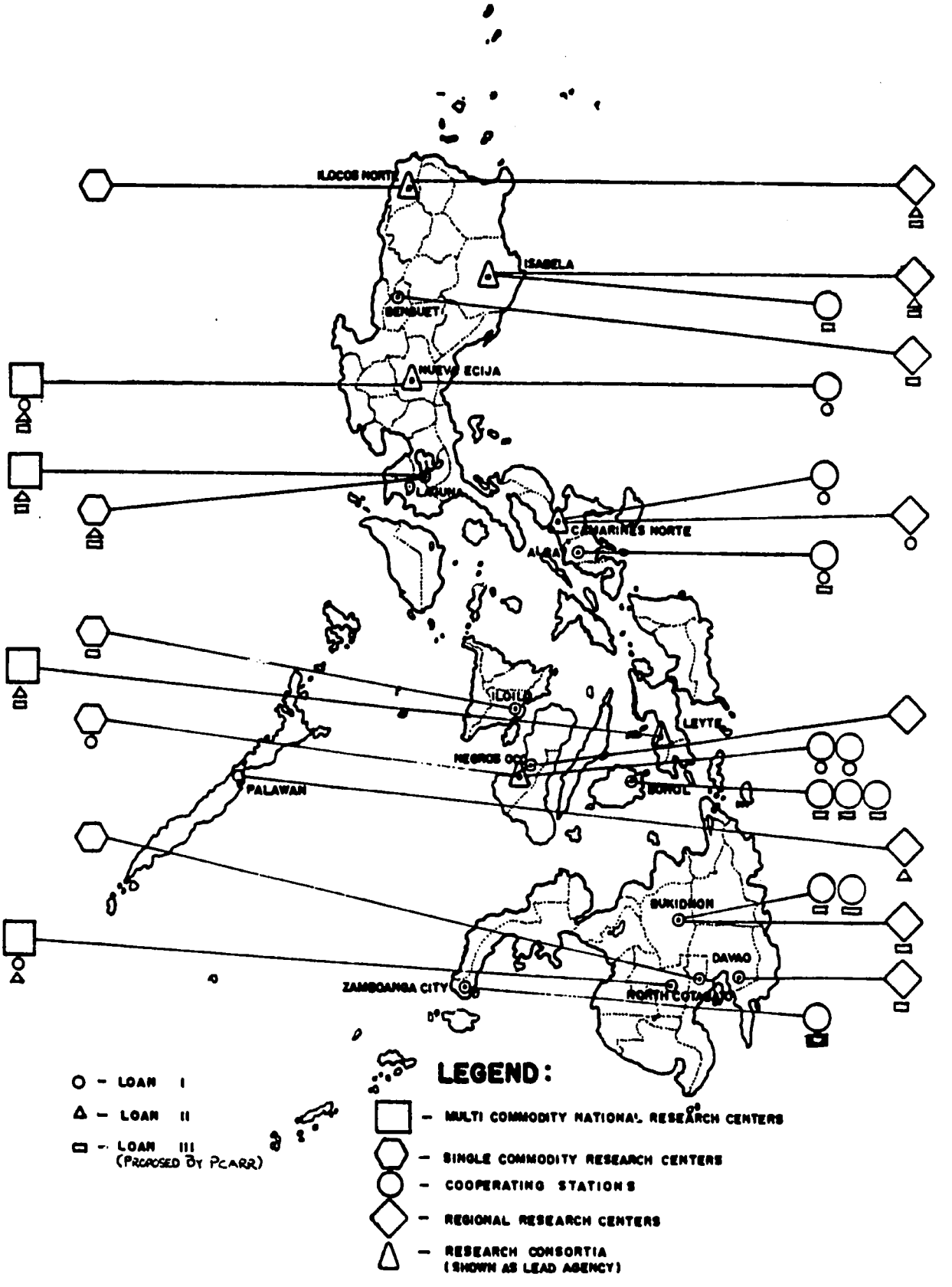
Future loans for agricultural research should continue to be very sensitive to overall regional development thrusts in order to avoid the development of technologies for which there is no absorptive capacity utility in the region. The Review Team understands that consideration is being given to altering the mandate for PCARR and it may be advisable to await actual implementation of further Loans until such changes are finalized and the potential points of impact become clearer.

B. Support for New Centers vs. Existing Centers

PCARR has developed an extensive network for national, regional and single commodity research centers. (These are listed in Table 4 and shown on the accompanying map for Loans I and II.) Loans I and II have provided substantial amounts for infrastructure, equipment and manpower at 10 centers (4 national, 4 regional and 2 commodity centers). PCARR, through the loan funds and matching support by the GOP, has developed a vast research network which will require a large continuing commitment of funds for operations and personnel.

PCARR is developing plans for further support, under what is termed Loan III, for continued development of 3 national, 2 regional, and one commodity center and new support for 3 additional regional centers, one commodity center, and 6 cooperating stations.

The amount of infrastructure and manpower developed must be consistent with the ability to maintain and finance effective regional and national programs. The Review Team believes it is doubtful that continued support for this extensive proposed additional network can be maintained from GOP sources. It is recommended that the emphasis of future funding be on the strengthening of programs at existing centers and that the establishment of additional stations to support commodity research be reas-



PCARR Network of Agriculture and Resources Research Centers and Stations

Table 4. Institutions supported under USAID loans

Institution	Location
Loan I	
I. CLARC	
a) Central Luzon State University (CLSU)	Munoz, Nueva Ecija
b) Maligaya Rice Research and Training Center (BPI-MRRTC)	Munoz, Nueva Ecija
II. BARC	
a) Bicol Rice and Corn Experimental Station (BPI-BRCES)	Pili, Camarines Sur
b) Camarines Sur Agricultural College (CSAC)	Pili, Camarines Sur
c) Bicol University College of Agriculture (BUCA)	Guinobatan, Albay
d) Bicol University College of Fisheries (BUCF)	Tabaco, Albay
III. LGARC	
La Granja Agricultural Research Center	La Granja, La Carlota City
IV. SMARC	
Southern Mindanao Agricultural Research Center	Kabacan, North Cotabato
V. NARC	
Economic Garden	Los Banos, Laguna
Loan II	
A. Multi-Commodity National Research Centers	
1. Central Luzon State University (CLSU)	Munoz, Nueva Ecija
2. University of the Philippines at Los Banos (UPLB)	College, Laguna
3. Visayas State College of Agriculture (ViSCA)	Baybay, Leyte
4. University of Southern Mindanao (USM)	Kabacan, North Cotabato

B. Single-Commodity Research Center

1. Forest Research Institute (FORI)	College, Laguna

C. Regional Research Centers

1. Mariano Marcos State University (MMSU)	Batao, Ilocos Norte
2. Isabela State University (ISU)	Cabagan and Echague, Isabela
3. Palawan National Agricultural College (PNAC)	Aborlan, Palawan
4. PCARR Secretariat	Los Banos, Laguna

Loan III (proposed by PCARR)

1. Forest Research Institute (FORI)	College, Laguna
2. Bureau of Fisheries and Aquatic Resources (BFAR)	Navotas, Metro Manila
3. Mariano Marcos State University (MMSU)	Batao, Ilocos Norte
4. Mountain State Agricultural College (MSAC)	La Trinidad, Benguet
5. Isabela State University (ISU)	Cabagan and Echague, Isabela
6. Central Luzon State University (CLSU)	Munoz, Nueva Ecija
7. University of the Philippines at Los Banos (UPLB)	College, Laguna
8. University of the Philippines-Iloilo (UP-Iloilo)	Iloilo
9. University of the Philippines-Tacloban College of Fisheries (UP-Tacloban)	Tacloban
10. Central Mindanao University (CMU)	Musuan, Bukidnon
11. Mindanao Regional School of Fisheries (MRSF)	Zamboanga City
12. Bureau of Soils	(Bukidnon)
13. Bureau of Plant Industry	(Bohol) Davao Isabela
14. Bureau of Animal Industry	Bohol Bukidnon Bohol
15. a) Bicol University College of Agriculture (BUCAO b) Bicol University College of Fisheries (BUCF)	Guinobatan, Albay Pili, Camarines Sur
16. Visayas State College of Agriculture (ViSCA)	Baybay, Leyte
17. Philippine Council for Agriculture and Resources Research (PCARR)	Los Banos, Laguna

sessed to ensure that the eventual network can be operated and maintained within available GOP resources.

The Review Team recognizes the political pressures that must be faced in deciding whether to support additional stations. These pressures seldom are related to overall national or regional priorities. If PCARR is to successfully defend its commitments to priority programs it must develop a firm set of criteria by which its decisions are made. These criteria should include the availability of operational support, technical manpower, suitable land and facilities and other budgetary constraints, in addition to satisfying the national and regional priorities and ecological representation.

Two areas which might receive proportionally more funding are (1) technical assistance and advisory services for program development, and (2) the establishment of stronger research support for ecologically-based field trials, cooperation with farmers in research, and linkage to the extension service, including provision for posting subject matter specialists at the Regional Research Centers and Cooperating Stations.

It should be noted that Loans I and II concentrated on agriculture and fisheries, giving some minimal support in forestry, but none in mines. Therefore future funding may consider at least the energy aspects of the mines responsiblity while PCARR seeks broader mines support from other sources.

C. Coordination With Other Ministry of Agriculture Efforts

Future funding for the PCARR network should take into account plans now underway by the Ministry of Agriculture to establish Regional Integrated Agricultural Research Stations in each of the 12 political regions of the Philippines. The Ministry is seeking the assistance of the World Bank in bringing the various Bureau's facilities together by strengthening one in each region. PCARR's Agricultural Research Centers are, for the most part, built around Universities and Agricultural Colleges in various regions--often ecologically based in scope of research. These two developments could result in confusion with respect to research responsibilities, unnecessary duplication with respect to facilities and manpower, and high costs with respect to operations and personnel. Coordination will be required and future loan negotiations should consider where PCARR support will be required in view of these new developments.

D. Interaction Between USAID and PCARR

In view of USAID's positive commitment to long term support of agricultural research and because of the requirement that research have an impact on small farmers, there appears to be a need for continuous interaction with PCARR as it helps develop the agricultural and natural resources research network. The rapidly changing economic situation in the world and the Philippines requires changes of direction in all sectors. As needs change, the responsiveness of PCARR is critical and the cooperation of USAID in adjusting loan program requirements is

essential. One possible approach is for USAID to assign a consultant to work with PCARR on a regular basis.

E. Minimum Standards in Providing GOP Counterpart Funds

The ratio of GOP equipment funds to GOP capital outlay in Loan I is very low (8.6%) compared to internationally accepted minimum standards of 35% for laboratory buildings. GOP contributions to the total cost of infrastructure and equipment were quite high (74.25% for Loan I and 30.75% for Loan II). In education projects supported by the World Bank in the Philippines GOP contributed less (70% for infrastructure and 10% for equipment). It is recommended that future loans follow standards similar to these in order to commit more of the foreign exchange for items which must be imported, such as scientific equipment needed to make the research buildings operational.

F. The Need for Maintenance and Operation Expenses in Future Loans

The need for additional Maintenance and Operation Expenses (MOE) should be specified in negotiating future loans. This will serve as a guide to the Ministry of Budget in planning MOE needs after completion of the construction and acquisitions of scientific equipment. An accepted minimum standard for maintenance and repair of 5% of capital costs for structures and equipment would put the approximate increase in MOE budget at ₱4.1 million for Loan I and ₱4.9 million for Loan II investment.

Part 3

ANNEXES

ANNEX I
MEMBERS OF THE REVIEW TEAM AND TERMS OF REFERENCE

Philippine Members	Expatriate Members
F. A. Bernardo	R. L. Cushing
Jesus Valerio	R. L. Lovvorn
	J. C. Moomaw
	J. A. Rigney
	L. W. Zuidema
	A. H. Moseman

F. A. Bernardo is at present the President of the Visayas State College of Agriculture in Baybay, Leyte, Philippines. For some time, he served as Deputy Director General for Programs and Operations of the Philippine Council for Agricultural Research (now PCARR); Dean of the UPLB College of Agriculture, and Director of the Graduate Studies of the same institution.

Among his outstanding achievements are: the systematic organization of the UPLB Graduate School, major role in the founding ana continued leadership in the Asian Association of Agricultural Colleges and University (AAACU), establishment of the Philippine Root Crops Research and Training Center (PRCRTC) and the Regional Coconut Research Center (RCRC) in Baybay, Leyte and the development of the Visayas State College of Agriculture (ViSCA) from a small teacher training school into a major agricultural complex in the Philippines. He also organized and chaired six international conferences that dealt with vital issues in agricultural instruction, research and extension.

At present, Dr. Bernardo is serving as Research Coordinator of the Visayas Coordinated Agricultural Research Program (VICARP). He has given many lectures in national and international seminars on research management and institution building and has published 44 technical papers in various research journals and periodicals.

Early in his career, he was a recipient of the TOYM (Ten Outstanding Young Men) Award for his researches in genetics and breeding work for improved varieties of coconut and abaca. Lately, he received from President Ferdinand E. Marcos the Pro Patria Award for his leadership in agricultural research.

Jesus D. Valerio is a Fellow, Development Academy of the Philippines (DAP) and Chief, Planning Services, Philippine Ministry of Natural Resources (MNR). He was educated at the University of the Philippines in Mathematics and Industrial Engineering; trained in Public Enterprise Management at Harvard University; and awarded a fellowship on Project Management by Asian Productivity Organization at Singapore. As Fellow of DAP, he was involved in major rural development efforts as Deputy Director, Natural Resources Development Department (1978); Program Director, Fishery Resources Management Program (1976-77), now a model for the Philippines' "Biyaya ng Dagat" Program; Project Director, MNRDAP Mindoro Integrated Rural Development Program (1975); Systems and Programs Coordinator, Task Force on Human Settlements (1974), now the Ministry of Human Settlements. These positions carried also the responsibilities of planning and administration of agriculture and resources research. Prior to joining DAP, he was Operations Research Analyst, Greater Manila Terminal Food Market (GMTFM) (1969-70) now FTI, and Industrial Engineer, Philippine Airlines (1971-72). He also provided consultancy services to the Responsible Parenthood Council (RPC) in 1972 and the Ministry of Local Governments and Community Development as Director, Operations Control Center (1972-73). As Chief, Planning Services, MNR, he is responsible for the management of planning systems of all offices under MNR. Valerio participates as a member of the Philippine Panel in the Food and Agriculture Organization (FAO) committee/council/experts meetings on agriculture, forestry,

fisheries, agrarian reform and rural development, and technical cooperation among developing countries. He participates also in the ASEAN Committee on Food, Agriculture and Forestry (COFAF) activities an experts' meetings and as a Steering Committee Member, ASEAN Timber Standardization Project.

Robert L. Cushing is Vice President for Administration and Secretary of the Hawaiian Sugar Planter's Association. He was born April 12, 1914 and was reared on a farm in central Nebraska. He was educated at the University of Nebraska and the University of Minnesota, specializing in agronomy and plant breeding. He did agronomic and plant breeding research at the Nebraska Agricultural Experiment Station for 5 years, then joined the faculty in the Department of Plant Breeding at Cornell University where he taught general genetics for 6 years. Cushing left Cornell to become an agriculturalist with the then Hawaiian Pineapple Co. (now the Dole Co.). He left there to become Director of the Pineapple Research Institute of Hawaii and later was elected President of the Institute and President of the Pineapple Growers Association of Hawaii. In 1963 he resigned those positions to become Director of the Experiment Station of the Hawaiian Sugar Planter's Association and later was also elected Vice President and Secretary of the Association. In 1979 Cushing retired as Director of the Experiment Station but has continued as an officer of the Association. He served 2 terms as a member of the Board of Regents of the University of Hawaii. He has consulted on national research management and operations in Malaysia, Bangladesh and Indonesia.

Roy L. Lovvorn has been a consultant on international agricultural development since retirement in 1976. His professional experience includes research on forage crops and weed control at North Carolina State University and the U.S. Department of Agriculture. His research management experience consists of 14 years as Director of Agricultural Research at North Carolina State University, a post that carried research responsibilities in agriculture, forestry, fisheries and home economics. From 1969 to 1976 he was Administrator of the Cooperative State Research Service, U.S. Department of Agriculture, an agency charged with the responsibility of administering federal funds in support of agricultural, forestry and human nutrition research at the Land Grant Universities, and of developing cooperative relationships between them and the research agencies within the Department of Agriculture. International activities include the following: a member of the third Joint Indo-American team for evaluating research needs in India; participated in workshops on Science and Technology for Development in Brazil and Egypt sponsored by the National Academy of Sciences and their respective country counterparts; a member of the Joint U.S.-USSR Committee on Agricultural Research; participated in research reviews in Western Samoa, Guam, Indonesia, Pakistan, Panama and Liberia. He is a fellow of the American Society of Agronomy and the American Association for the Advancement of Science, and an honorary member of the American Home Economics Association.

James C. Moomaw is Program Officer for Southeast Asia with the International Agricultural Development Service, New York, USA. He has been employed by the Rockefeller Foundation for nineteen years. Before joining IADS he served as the Director of the Asian Vegetable Research and Development Center in Taiwan. He worked in Africa before that, as a rice agronomist, leader of the farming systems program, and director of outreach programs at the International Institute of Tropical Agriculture in Ibadan, Nigeria. From 1961 until 1969 he was agronomist at the International Rice Research Institute in Los Baños, Philippines, and for the last two years was project leader of the IRRI/Ford Foundation/Ceylon Rice Research Project with the Central Agricultural Research Institute in Peradeniya, Ceylon. Before joining the Rockefeller Foundation, Dr. Moomaw was an assistant agronomist in the College of Tropical Agriculture, University of Hawaii doing research on tropical pastures and forage crops. During that period he spent one year in Kenya as a Fulbright Advanced Research Scholar conducting an ecological survey of the Coast Province of Kenya.

Dr. Moomaw earned the Ph.D. degree in Botany at Washington State University, the M.S. degree in Forestry at the University of Idaho and a B.A. degree from Carleton College, Northfield, Minnesota in 1949.

Jackson A. Rigney is Dean for International Programs at North Carolina State University. He was born (1913) and reared on an irrigated farm in New Mexico and studied agronomy at N.M. State College. He majored in plant breeding in graduate school at Iowa State College. After serving on the faculty of West Virginia University for 2 years he moved to North Carolina State University in 1938 and has been employed continuously by that institution up to the present time. His initial role at NCSU was in crops teaching and soybean research. He moved into Experimental Statistics in 1943 and served as department head for 13 years. He served as team leader of NCSU's technical assistance program in Pery for 2 1/2 years and directed the program from Raleigh for 3 more years. He was appointed Dean for International Programs in 1968 and has continued in that position except for a brief term as Acting Chancellor of the University. Dean Rigney has served on a large number of evaluation and survey teams, primarily in Latin America and Asia. He served as Overseas Researcher for 2 years, based in India, on a USAID supported project studying the technical assistance process. He was co-chairman of a "travelling seminar" that culminated in the formation of the Asian Association of Agricultural Colleges and Universities. He has published numerous articles and one book on institution building and the role of technical assistance.

Larry W. Zuidema is currently the Associate Director of the Program in International Agriculture at Cornell University where he is responsible for an educational program in International Agricultural Development and the administration of several of Cornell's international programs. From 1970-73, he was Senior Program Officer of the Food Institute at the East-West Center in Hawaii. His prime responsibilities were to coordinate the educational programs of U.S. and Asian scholars in agriculture and develop research and training linkages between the Center and Asian countries. For seven years prior to 1970, he provided the Cornell University coordination for the University of the Philippines College of Agriculture-Cornell University Graduate Education Program (UPCO) at Los Banos sponsored by the Ford Foundation. He is currently a member of the Training Committee of the International Science and Education Council (a joint university/ USDA organization) and President of the Association of United States University Directors of International Agricultural Programs (AUSUDIAP). Recent international activities include the conduct of an agricultural manpower assessment for the Government of the Republic of Cameroon under the sponsorship of USAID, the planning of a rural development participation project on agricultural water needs and utilization in Botswana under a Cornell/USAID cooperative agreement, and assessments of agricultural projects and programs in the Philippines and Thailand for Peace Corps volunteers.

Albert H. Moseman, Representative, International Agricultural Development Service, has studied national agricultural research systems of Asia since 1950 when he served as the research specialist on the three-man team sent by the U.S. Department of State to review potential cooperative support under the then-pending legislation for Point IV (now USAID). The visit to 11 countries included time in the Philippines in April 1950. As Director of Agricultural Sciences in the Rockefeller Foundation, 1960-65, Dr. Moseman was involved in the planning and establishment of IRRI. He also arranged for RF support for the review of UPCA facilities that led to the World Bank loan for developing the campus for the College (now UPLB). In 1971 he served as a Consultant to the Technical Panel that recommend that PCARR be established. Subsequently, he consulted with the PCARR as its organization and operations evolved, and with USAID preparatory to planning of USAID Loan I. Dr. Moseman has been involved in the design of the national research organizations of India, Pakistan, Bangladesh, Nepal, Malaysia, Indonesia, Thailand, the Sudan, and Brazil. He has served as Director of Crops Research of the U.S. Department of Agriculture, as Assistant

Administrator for the Office of Technical Cooperation and Research--later, the Technical Assistant Bureau--of USAID(1965-67), and as an Associate of the Agricultural Development Council (1967-73). His publications include the ADC monograph, Building Agricultural Research Systems in the Developing Nations (1970).

PCARR Staff Support to the IADS Team

Overall Coordinator:
Dr. Ponciano A. Batugal--Director, International Projects Division

Coordinator for PCARR Corporate/Management Review:
Dr. Eduvigis B. Pantastico--Deputy Director General for Operations

Coordinator for Loan I Ex Post Evaluation:
Dr. Ramon V. Valmayor--Deputy Director General for Research

Secretariat Support

Eduardo (Ed) Queblatin--Chairman
Arsenia (Nenette) Raymund--Liaison with USAID
Nora Valera (ODDG-R)--Liaison for PCARR Management Review
Teresita (Tessie) Abella (ODDG-O)--Liaison for Loan I Review
Ephraim Leomo (ACD)--Liaison for Communication
Shirley Ibay (ODDG-O)--Secretary
Myrna Davao (MARC)--Secretary

Republic of the Philippines
PHILIPPINE COUNCIL FOR AGRICULTURE & RESOURCES RESEARCH
Los Baños, Laguna, Philippines
Tel. Nos. 2308, 2540, 2269; 2375; 2469
OFFICE OF THE DIRECTOR GENERAL

REQUEST TO ESTABLISH THE TEAM

16 May 1980

Dr. Colin McClung
President
International Agricultural Development Service
1133 Avenue of the Americas
New York, New York 10036
USA

Dear Dr. McClung,

As you know, we are currently implementing a PCARR-USAID research capability development program. The first loan amounting to US$ 5 million will end in December 1980. This loan has a Technical Assistance component which may be of interest to IADS. This Technical Assistance program consists of hiring appropriate scientists who will backstop us in the initial implementation of our research capability development program while our scientists are undergoing advanced training.

In connection with this loan, PCARR would like to engage the services of a consulting group to undertake one, a review of PCARR-USAID Loan I and tow, a PCARR corporate review. The terms of reference for these two activities are attached for your consideration. In connection with the Loan I evaluation we are attaching a list of our suggested consultants for your corporate review. The terms of reference for both engagements are attached for your reference.

Knowing IADS' interest and capability to undertake this kind of review, may I invite your organization to submit a proposal for undertaking this work. Since the deadline for Loan I is on December 23, 1980, we would like to indicate that the review and final payment for your services be made before then. Commitment for both review should however, be made before June 23, 1980.

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If your organization is interested in this project, I would appreciate if you could cable your response. We would then process the papers so that commitment can be made on or before June 23, 1980.

With best regards.

Very truly yours,

(SGD.) J. D. DRILON, JR.
Director General

TERMS OF REFERENCE

A. PCARR Corporate Review

1. Background and Purpose

The worth of a public institution can often be measured by its (a) contribution to public welfare, (b) responsiveness to changing needs and demands over time, (c) ability to influence its environment, and (d) setting of standards or criteria of performance to guide the behaviour of its staff and constituents.

PCARR has been mandated to guide and monitor the national research system in its effort to provide scientific information to support and stimulate national development through problem-oriented research in agriculture and natural resources.

In order to determine PCARR's responsiveness to its mandate, a review of its accomplishments is in order. This review, to evaluate the accomplishments of PCARR for the past 7 years, shall be conducted by an external team to be designated by PCARR. Members of the team shall be experienced in reviewing plans and programs of research institutions in developing countries. The team will be supported by professionals from the national research system who could reflect the past and current philosophies and projects of PCARR.

2. Role of the Review Team

The Review Team shall:

1) Undertake to document PCARR's achievements over the past 7 years in line with its mandate.

2) Determine the value of PCARR's achievements, considering effectiveness, efficiency, integration, organizational health, impact, and capacity to perform for the future and adaptiveness.

3) Review the research management system and procedures, particularly the operation of the Secretariat vis-a-vis the PCARR scientific network.

4) Identify and suggest possible solutions for institutional and organizational constraints which have served as impediments in the attainment of PCARR's mission and goal.

5) Identify perceptions of research agencies, agricultural policy makers, administrators, and leaders in the sector, with respect to PCARR's performance.

6) Develop and recommend a plan for the next 5 years in terms of new directions, approaches/strategies, organizational arrangements, and management procedures.

7) Submit a report on the outcome of its review.

3. Assessment and Recommendations

After examination of all pertinent information, the team shall submit a report to PCARR containing its recommendations for a work plan for the next 5 years in terms of new directions, approaches/strategies, organizational arrangements and management procedures. The report shall cover the following:

I. Introduction

II. PCARR's Achievements for the Past Seven Years

III. Research Management System and Procedures

- operation of the Secretariat vis-a-vis the PCARR Scientific Network

IV. Institutional Constraints of PCARR

V. PCARR's Performance, as perceived by external agents (i.e. research agencies, agricultural policy makers, administrators and leaders in the agricultural sector)

VI. Recommendations on A Plan for PCARR for the Next Five Years

- in terms of new directions, approaches/strategies, organizational rearrangements and management procedures

- how PCARR can respond more effectively to its mandate

VII. Recommendation on a Suitable Research Management System

B. The Loan I Ex Post Evaluation

1. Background and Purpose

AID Loan 492-T-039, known as the Agricultural Research Loan I, provided $5.0 million to partially finance infrastructure, research equipment, manpower training and technical assistance to help improve and develop the research capability of 4 of the 17 identified research centers of the PCARR network. The Philippine Council for Agriculture and Resources Research (PCARR) is the implementing agency.

The project, implemented in 1975, will be completed in December 1980, at which time all loan funds shall have been committed and obligated. Significant progress has been made as a result of the project to upgrade facilities and manpower of the recipient centers. Likewise, substantial research programs are underway in the commodities assigned under the priorities established with their participation. Development of those activities planned for the centers are almost complete, but it is recognized that development will continue to evolve over several years as staff gain more experience and additional needs are addressed.

A joint USAID-Local Counterpart Evaluation Team was organized in the fourth year of the implementation. The evaluation was limited, however, to assessment of the progress of implementation and to identification of constraints to implementation. Recommendations also were given by the team as to measures to eliminate and/or minimize the constraints. By and large, this methodology was limited to measurements of actual progress versus the original timetable, and cost estimates and project budget.

Upon completion of the project, it is imperative that an ex post evaluation of the project be conducted so as to be able to draw substantive conclusions and make recommendations of significance for future projects, particularly, Agricultural Research Loan II. This evaluation will be conducted by an external team experienced in planning, development and administration. The PCARR Secretariat will provide the necessary expertise and assistance in the evaluation process.

Specifically, the objective of the evaluation shall be to review and evaluate the project through an in-depth overall assessment of implementation, with emphasis on attainment of project purpose and goals given the long term nature of research. After a thorough evaluation, the team shall make recommendations for a more effective implementation of similar programs in the future.

2. Role of the Review Team

In attaining the objectives of the evaluation, the team shall conduct the review through methods deemed appropriate for the project which shall include, but not be limited to, the following activities. Specifically, the Evaluation Team shall:

1) Review all pertinent documents covering project agreements, contracts, reports, memoranda, annual reports, communication, and other papers relevant to the project.

2) Schedule interviews covering assignments, relationships, and responsibilities to the project of center personnel and officials at the local, regional and national levels having an input directly or indirectly to the project.

3) Visit and inspect project sites and other agencies involved with the project.

4) Review and evaluate the project through an in-depth overall assessment of implementation, emphasizing attainment of project purpose and goals, given the long term nature of research results.

5) Prepare and submit a report to PCARR specifically stating:

   a) its observation, comments and evaluation on the planning and implementation of the project.

   b) its recommendation on how a similar project can be more effectively implemented in the future.

6) Do such other things as may be necessary during the course of the evaluation.

3. Report

After the evaluation process, the team shall submit a final report to PCARR reflecting the team members' efforts, findings, observations and recommendations toward the attainment of the objectives of the evaluation. Details as to given report format prior to reproduction and distribution and other actions needed to meet necessary regulations shall be discussed upon arrival of the team members in the country. (On arrival of the team in the Philippines it was advised that no particular format or outline of the report was required to be followed.)

ANNEX II
SCHEDULE AND CONTACTS

October
9 (Thurs.) Arrival of Team Leader

10 (Fri.) Arrival of Team Members

11 (Sat.) Briefing on Schedule of Activities:

Terms of Reference in PCARR by:

Dr. J. D. Drilon, Jr., PCARR Director General
Dr. Ramon V. Valmayor, PCARR ODG-R
Dr. Eduvigis B. Pantastico, PCARR ODG-O
Dr. Ponciano A. Batugal, Director, International Projects Division-PCARR

Welcome Luncheon hosted by PCARR Director General

13 (Mon.) Meeting with PCARR Secretariat including:

Dr. J. D. Drilon, Jr., PCARR Director General
Dr. R. V. Valmayor, PCARR Deputy Director General for Research
Dr. E. B. Pantastico, Deputy Director General for Operations
Dr. A. Eusebio, Director, Livestock Research Division
Dr. C. Escano, Asst. Director, Crops Research Division
Dr. F. Pollisco, Director, Forestry Research Division
Dr. E. Tan, Director, Fisheries Research Division
Dr. A. Maglinao, OIC, Farm Resources & Systems Res. Division
Dr. R. Cuyno, Director, Applied Communications Division
Dr. P. Batugal, Director, International Projects Division
Mrs. C. Yorobe, OIC, Administrative Services Division

14 (Tues.) Meeting with UPLB including:

Dr. Emil Javier, Chancellor, UPLB
Dr. Edilberto Reyes, Director of Research, and other top officials of UPLB

Later visited Institute of Plant Breeding and National Crop Protection Center

Luncheon hosted by Chancellor Javier

Meeting with Dr. Filiberto Pollisco, Director, Forest Research Institute

GROUP A (Valerio, Lovvorn, Moomaw, Zuidema) Field Tour

15 (Wed.) to 16 (Thurs.)

Meeting with Central Luzon State University officials including:

- Dr. Amado Campos, President
- Dr. Filomena Campos, Director of Research (also Research Coordinator, Central Luzon Agricultural Research Center, CLARC)
- Dr. Catalino dela Cruz, Director, Freshwater Aquaculture Center (FAC)
- Mr. L. C. Cruz, Director, National Carabeef Research Center
- Dr. Fermina Rivera, Assistant Director, Research & Development Center

Meeting with Mr. Teofilo Eugenio, Director of Maligaya Rice Research and Training Center (MRRTC)

Dinner hosted by CLSU President Campos

17 (Fri.)

Meeting with Mountain State Agricultural College (MSAC) officials including:

- Dr. Satunino Ocampo, Jr., Vice-President
- Dr. William Dar, Research Coordinator, Highland Agricultural Research Center (HARC)

Meeting with Conifer Research Center officials including Mr. Levi Florido, Mr. Cesar Orallo, Mr. Egidio Costales

18 (Sat.)

Meeting with MSAC Agroforestation Project Director, Mr. Benjamin Dimas

Return Trip to Manila

19 (Sun.)

Leave Manila for Davao City

20 (Mon.)

Meeting with University of Southern Mindanao officials including:

- Dr. Jaman Imlan, President (also Research Coordinator, Southern Mindanao Agricultural Research Center (SMARC)
- Dr. Juan Soria, Asst. Director of Research

Luncheon hosted by President Imlan

21 (Tues.)

Meeting with Mr. Nerius Roperos, Manager of Twin Rivers Corporation

Meeting with NEDA Region XI, Officer In Charge, Mr. Delvallon

22 (Wed.)

Meeting with Philippine Coconut Authority (Bago-Oshiro) Manager, Mr. Romero C. Blancaver

Meeting with Bureau of Plant Industry-Davao Experiment Station officials including:

- Mr. Luis Petrache, Superintendent
- Mr. Pablo Piatos, Jr., Regional Farm Supervisor

Return to Manila and Los Banos

GROUP B (Bernardo, Cushing, Moseman, Rigney) Field Tour

14 (Tues.) Meeting with SEAFDEC Officials including:

Dr. Joseph C. Madamba
Dr. Veranda Pal Singh
Dr. Thomas Flores
Dr. Ralph Rodriguez
Dr. Ed Tayengco
Mrs. Ravena
Miss Candy Ravena

15 (Wed.) Meeting with SEAFDEC officials including:

Dr. Kunio Katsutan, Acting Department Chief, SEAFDEC
Dr. Jesus Juario, Program Leader for Milkfish Production
Mrs. Jurgene Primavera, Program Leader for Crustacean Hatchery

Meeting with UPCF-BAC including:

Chancellor Dionisia Rola, UP Visayas
Prof. Virgilio Doresa
Prof. Norma Porte
Prof. Ida Siason
Dr. Veranda Pal Singh

Meeting with M.A., Region VI, BPI, KABSAKA, NEDA Region VI including:

Dir. Romeo V. Aquino, Regional Director, Ministry of Agriculture Region VI
Dir. Antonio Adriano, Asst. Director for Crops
Mr. Vicente Majadocon, Regional Planning Officer
Mr. Guillermo Pales, Head Research Coordinator, MA
Mr. Pablo Guimban, Specialist I, Acting Specialist Director
Mr. Baltazar Lustria, Rice and Fish Coordinator, MA
Mr. Paul Sotomil, Kabsaka representative

Meeting with NEDA Region VI

Atty Alex G. Umadhay, Director-Regional Executive

Meeting with Dr. Joseph Madamba and
Mr. Ruperto (Tito) Angudong, Fish Farming--Private Sector
Mr. Julius P. Sarria, Fish Farming--Private Sector

16 (Thurs.) Meeting with Victorias Milling Company including:

Mr. Juanito N. Gibe, Head Administrator
Mr. Virgilio Flores, Head of Development
Dr. Antonio P. Tianco, Director of Sugarcane Research and Extension
Rodolfo C. Mesa, Department Head, Extension Service Department

Meeting with VICMICO--Alcogas Plant Distillery

Mr. Nilo A. Florcruz, VICMICO Alcogas Coordinator

17 (Fri.) Meeting with LGARC, PHILSUCOM, Cojuanco Coconut Farm including:

Dir. Rodolfo Medina, Philsucom Director for Research and Development
Dr. Vicente G. Dosado, Philsucom Scientist III
Department Head of Agronomy
LGARC Research Coordinator
Atty. Romeo Palomares, Philsucom Asst. Dir. for Research and Development for Visayas and Mindanao
LGARC Asst. Research Coordinator for Sugarcane
Dr. Dominador B. Pena, Jr., Bureau of Animal Industry Superintendent (BAI)
LGARC Asst. Research Coordinator for Livestocks
Mr. Isidro S. Domingo, BPI, Bureau of Plant Industry Station Superintendent, LGARC Asst. Research Coordinator for Crops
Mr. Rodolfo Payson, UPLB-CA La Granja, Station Manager
LGARC Asst. Research Coordinator for Root Crops
Mr. Justino J. Walawala, UPLB-CA La Granja, Asst. Station Manager
Dr. Bienvenido R. Estioko, Philsucom, Scientist II and Department Head of Crop Protection
Mr. Ernesto Lapastora, Philsucom, Department Head for Sugarcane Breeding
Mr. Francisco E. Mercado, Philsucom, Department Head of Farm Engineering
Mr. Felipe T. Aala, Philsucom Research and Development Consultants
Mr. Nicolas L. Meneses, Jr., Philsucom, Chief Internal Auditor
Mr. Joel Martinez, PCARR Resident Engineer
Ms. Teresita S. Jereza, Philsucom, Crop Protection
Ms. Melanie C. Alba, Philsucom, Entomologist III

Meeting with Cojuanco Coconut Farm officials including:

Mr. Juanito Savillo, Farm Manager
Mr. Marcelo Jereos, Resident Manager

18 (Sat.) Meeting with ViSCA including:

Dr. Samuel S. Go, Vice President for Administration
Dr. Emiliano N. Bernardo, Director of Instruction
Dr. Celedonio Gapasin, Director of Extension
Dr. Dely P. Gapasin, Head and Associate Professor, Department of Plant Protection
Dr. Lung Ty, Regional Coconut Research Center (RCRC) Acting Director
Mr. Federico G. Villamayor, Asst. Head, Cassava Section and Asst. Professor
Mr. Federico Monsarat, Superintendent, Income Generating Project

19 (Sun.) Meeting with ViSCA officials including:

Dr. Camili Alino, President, Cebu State College
Mrs. Asuncion A. Alino, Supervisor, Ministry of Education and Culture (MEC), Mandawe City
Mr. Reynaldo R. Javier, Asst. Professor, Agronomy and Soil Science
Ms. Marichu Mecina, Visayas Coordinated Agricultural Research Program (VICARP) Research Assistant

20 (Mon.) Meeting with NEDA Region 8, Leyte Sab-A Basin Development Authority (LSBDA), M.A. Region 8 including:

Dir. Lindy C. Morrell, Regional Executive Director
Dr. Rufino D. Ayaso, Jr., Regional Director
Miss Rowena M. Suyom, M.A. Secretary
Conchita P. Cosip, Senior FMT-MA Region 8

21 (Tues.) Meeting with NEDA Region 5 including:

Dir. Alberto B. Olaguer, Regional Executive Director, Region No. 5

Meeting with BUCFincluding:

Dean Geronomo Lavilla, Dean of Fishery (BUCF)
Hiroki Eda, Researcher, Japan Overseas Cooptation Volunteer (JOCV)
Mrs. Ma. Elnora B. Rinon, Asst. Professor and Member of Research Staff
Ms. Josefina B. Cano, Asst. Professor/Res. Staff

Meeting with AES Superintendent

Mr. Domingo B. Protacio

Meeting with CSAC Officials including:

Mr. Alvaro R. Rabina, Superintendent CSAC and Chairman, Research Center Coordinating Center (RCCC)

22 (Wed.) Meeting with BEST (formerly BRCES)

Dr. Eugenio S. Sabalvoro, Supervising Agronomist and Superintendent of BRCES
Plant Research Coordinator, BPI

Meeting with BARRC including:

Dr. Ciriaco Divinagracia, Research Coordinator, BARRC
Mr. Arthur Estrella, Research Assistant, BARRC
Mr. Jose C. Ronda, Provincial Abaca Development Office/Abaca Industry Development Authority (PADO/AIDA)
Mr. Ceferino Tolentino, Bicol University College of Agriculture (BUCA) Assistant Professor
Mr. Limneo C. Marvaja, Bicol University College of Fishery (BUCF) Marine Fishery Instructor
Col. Camilo A. Balisnomo, Bicol River Basin Development Program (BRBDP) Program Director
Mr. Perfecto J. Bragais, Jr., BRBDP Program Planning Department Asst. Deputy Director

Meeting with BRBDP including:

Col. Camilo A. Balisnomo, Program Director
Engineer Felizardo A. Alarkon, Jr., Acting Deputy Director for Planning
Mr. Perfecto J. Bragais, Jr., Program Planning Department, Asst. Deputy Director

Meeting with PCA-ARC

Mrs. Esther P. Pacumbaba, Science Research Supervisor
Ms. Gertrudis G. Buenaflor, Science Research Associate
Ms. Julita S. Imperial, Viro-Biochem, Science Research Supervisor

Meeting with BUCA

Mr. Ceferino Tolentino, Assistant Professor
Mr. Antonio T. Tango, Assistant Professor, Agricultural Education
Mr. Manuel T. Rivera, Acting High School Principal

23 (Thurs.) Meeting with BU

President Aquilino P. Bonto (Judge), President, BU
Mr. Ramon S. Salire, Extension BU
Mr. Sid Zamuco, Coordinator, Outdoor Recreation Research Center, Forest Research (ORRC) Institute, Legaspi City

Meeting with Mr. Roberto Virtucio, Superintendent of BPI Economic Garden, Los Banos (Moomaw & Lovvorn)

Luncheon Meeting with Governing Council and TPPRB Members

Meeting with Minister Magno, NSDB Chairman (Rigney, Valerio, Zuidema, Lovvorn)

Meeting with Ministry of Agriculture (NFAC) (Quisumbing) (Moseman, Cushing, Bernardo, Moomaw) and World Bank Appraisal Team for Agricultural Support Services Project (ASSP) (David Parberry, John Coulter)

24 (Fri.) Meeting with Ministry of the Budget including:

Mr. Raymundo Toma, Chief Budget Specialist, Budget Operations Office I (In Charge of PCARR)
Mr. Vidal Pascasio, Director, Budget, Technical Services
Atty. Maximo Domingo, Director Budget Operation Office I
Mr. Vidal Aguas, Chief Budget Specialist, Special Projects
Ms. Nora Oliveros, Specialist In-Charge of PCARR Special Projects
Mr. Daniel de Leon, Representative from Office of the Minister

Meeting with United States Agency for International Development including:

Dr. Dennis Barett, Deputy Mission Director
Dr. Ralph Edward, ORAD, Chief
Dr. Everett Headric, ORAD, Deputy Chief

25 (Sat.) Team Meeting

26 (Sun.) Team Meeting

Meeting with Mr. David Parbery, Coordinator of Appraisal Team for the Agricultural Support Services Project (ASSP) loan, World Bank (Zuidema)

27 (Mon.)	Meeting with Ministry of Agriculture including: Mr. Arturo Tanco, Minister Mr. Manuel Lim, Deputy Minister Ms. Jo Salvana, Asst. Secretary Dr. Eduardo Quisumbing, NFAC Asst. Director Mr. Domingo Panganiban, BPI Director Mr. Emiliano Gianzon, BPI Deputy Director (Moseman, Lovvorn, Zuidema, Valerio)
28 (Tues.)	Meeting with Ms. Lydia Francisco, Research Director, Bureau of Soils (Cushing and Moomaw)
	Meeting with Dr. Salvador Escudero, Director, Bureau of Animal Industry (Moseman, Valerio and Rigney)
	Meeting with Dr. S. C. Hsieh, Director, Agriculture and Rural Development Department, ADB (Moomaw & Zuidema)
	Meeting with Dr. Martin Billings, Project Officer USAID (Zuidema & Lovvorn)
	Luncheon hosted by Mr. Domingo Panganiban, Director, Bureau of Plant Industry
	Meeting with Mr. Jose J. Leido, Jr., Minister of Natural Resources
29 (Wed.)	Meeting with Mr. Eduarco Corpus, Assistant Director General, NEDA (Moseman, Moomaw, Cushing and Valerio)
	Meeting with Director Benjamin Gaon, Project Director and Mr. Israel Carlos, Chief Planning Services, NACIAD (Moseman, Valerio, Cushing and Moomaw)
	Meeting with Dr. Arturo Gomez, Head, Department of Agronomy, UPLB and Team Leader, Farming Systems (Zuidema and Moomaw)
	Meeting with Dr. Celso B. Lantican, Dean, College of Forestry UPLB (Valerio and Lovvorn)
30 (Thurs.)	Team Preparation of Report
31 (Fri.)	Team Preparation of Report
November 1 (Sat.)	Team Preparation of Report
2 (Sun.)	Team Preparation of Report
3 (Mon.)	Team Preparation of Report
4 (Tues.)	Team reported to the PCARR Secretariat
5 (Wed.)	Team reported to USAID officials and Ministry of Agriculture, Messrs. Edwards, Headrick, Mahoney, Foti, Rice, and Quisumbing
6 (Thurs.) 7 (Fri.)	Team members departed from Philippines

ANNEX III
PRESIDENTIAL DECREES RELATED TO PCARR

A number of Presidential Decrees related to PCARR have special relevance to the development of PCARR, including the following:

P.D. No.	Subject	Date
48	Establishing PCAR	November 10, 1972
864	Adding Mines Research to PCARR	December 29, 1975
1249	Facilitate International Support and Cooperation	November 25, 1977
1502	Incentives for Research Personnel and Administrative Reforms	June 11, 1978

The above have been referred to by the Review Team and furnish the base for assessing the structure and operations of PCARR.

MALACANANG
Manila

PRESIDENTIAL DECREE NO. 48

ESTABLISHING THE PHILIPPINE COUNCIL FOR AGRICULTURAL RESEARCH

WHEREAS, agricultural growth, which embodies the development of our farm, forest, and fishery resources, is a matter of national concern;

WHEREAS, in order to attain the national goals in agricultural growth and development, research is necessary to determine the alternative means of achieving these goals or to identify the best means among the alternatives;

WHEREAS, agricultural research, which includes forestry and fisheries, is a systematic method of joining and applying knowledge efficiently not only to the biological, physical, and economic phases of producing, processing, and distributing farm, forest, and fishery products, but also in improving consumer health and nutrition, as well as the social and economic aspects of rural living;

WHEREAS, the application of better agricultural technology arising out of research would directly benefit not only the rural population which comprises two-thirds of the total Philippine population, but also a major segment of the urban sector;

WHEREAS, the national agricultural research program must not only be sensitive to the current needs of an advancing and developing agriculture but should also be forward-looking if it is to make most effective use of available money and manpower;

WHEREAS, to effectively implement the national agricultural research program, it is necessary to develop a research capability in terms of manpower, facilities, funding and programs;

WHEREAS, in integrated fashion, the Philippine Government has initiated and implemented two closely-related studies for the purpose of reviewing the existing national agricultural research operations and developing a responsive and effective national system for agricultural research;

WHEREAS, there is an urgent need for a coordinating agency that will oversee, unify, and integrate the planning, administration, and implementation of the government's agricultural research program;

NOW, THEREFORE, I, FERDINAND E. MARCOS, as Commander-in-Chief of all the Armed Forces of the Philippines, and pursuant to Proclamation No. 1081, dated September 21, 1972, and General Order No. 1 dated September 22, 1972, as amended, in order to effect the desired changes and reforms in the social, economic, and political structure of the country, do hereby create the Philippine Council for Agricultural Research (PCAR) with the following major functions and powers:

a) Define goals, purposes, and scope of research necessary to support progressive development of agriculture, forestry, and fisheries for the nation on a continuing basis;

b) Using the basic guidelines of relevance, excellence, and cooperation, develop the national agricultural research program based on a multidisciplinary inter-agency, and systems approach for the various component commodities;

c) Establish a system of priorities for agriculture, forestry, and fisheries research and provide meaningful mechanisms for updating these priorities;

d) Develop and implement a fund-generating strategy for supporting agricultural research;

e) Program the allocation of all government revenue earmarked for agricultural research to implement a dynamic national agricultural research program;

f) Provide the mechanism for assessment of progress and updating the national agricultural research program;

g) Establish and provide support for a national network of centers of excellence for the various commodity research programs by drawing from the facilities of cooperating universities and colleges and other research agencies and linking these closely with selected PCAR research centers and stations;

h) Develop a mechanism for full communication among workers in research, extension, education, and national development;

i) Establish a repository for research information in agriculture, forestry, and fisheries;

j) Provide for a systematic program of agricultural research manpower development and improvement;

k) Provide for appropriate incentives to encourage topnotch research workers to remain working in their respective areas of agricultural research; and

l) It shall have the power and authority to call on any department, bureau, office, agency, state university or college, commodity institute, and other instrumentalities of the government for assistance in the form of personnel, facilities, and other resources as the need arises in the discharge of its functions.

For administrative purposes, the Philippine Council for Agricultural Research is attached to the Department of Agriculture and Natural Resources.

The Council shall be composed of the following officials:

1. The Chairman, National Science Development Board . . . . . Chairman

2. The Secretary of Agriculture and Natural Resources . . . . Vice Chairman

3. The Budget Commissioner

4. A Representative of the National Economic and Development Authority

5. The President, Association of Colleges of Agriculture of the Philippines

6. The Chancellor, University of the Philippines at Los Banos

7. One outstanding leader in agricultural business to be appointed by the President upon recommendation of the PCAR Governing Council

The policies and guidelines formulated by the Council shall be implemented by a Secretariat headed by Director General who shall be assisted by two Deputy Director Generals, technical research directors, and commodity research program leaders who

shall be designated by the Council and composed of personnel assigned and/or detailed to PCAR from the different departments, bureaus, state universities or colleges, commodity institute, offices, agencies, and other instrumentalities of the government.

The basic planning and coordination of the national agricultural research program shall rest on the various Commodity Research Planning and Implementation Teams. The Composition of these Teams shall be determined on an interdisciplinary basis with the guiding principle that the best possible expertise in the country should be drafted into these Teams irrespective of what agency they came from.

For the purpose of ensuring maximum quality, competence, and effectiveness of the technical commodity research programs of PCAR, a Technical Program Planning and Review Board composed of top quality technical men, is authorized to be constituted to assist the PCAR Director General. The members of the PCAR Technical Program Planning and Review Board shall be appointed by the Council.

The Philippine Council for Agricultural Research is authorized to pay honoraria and to make research grants.

Selected field stations, personnel, facilities, and funds of the Department of Agriculture and Natural Resources, as may be later identified by the Council with the concurrences of the Secretary of Agriculture and Natural Resources, are hereby transferred to the operational control of the Council.

Research personnel, facilities, and other research resources which belong to universities, colleges, and commodity institutes shall be harnessed on a contract basis in support of the PCAR agricultural research program. Where needed, such research resources would likewise be available for development assistance as determined by the PCAR Governing Council.

The Council is hereby directed to develop appropriate rules and regulations governing technical personnel, accounting and auditing procedures for research funds, and research program budgeting. When approved by the Council, such rules and regulations mentioned above shall carry the force of law.

The Council shall formulate the national long term and annual programs in agricultural research. All government revenue earmarked for agricultural research (including research in forestry and fisheries), whether coming from regular budget appropriations or tax levies on specific commodities, or from the National Science Development Board, should be programmed by the Philippine Council for Agricultural Research. Beginning July 1, 1973, no funds earmarked from agricultural research shall be released by the Budget Commission or other funding agencies for research activities in PCAR research centers and stations, universities, colleges, and other research agencies unless these were integrated as a part of the national agricultural research program. However, a small reserve should be set aside to provide for contingency allocations to finance research covering immediate problems of an emergency nature that might arise during a given year.

The Council is hereby authorized to draw from and negotiate for funds, not otherwise specifically allocated, of the National Economic Council, National Food and Agriculture Council, National Science Development Board, Department of Agriculture and Natural Resources, agricultural institutions, and all other possible fund sources, for the establishment, operational and program expenses of the Philippine Council for Agricultural Research.

All income and revenue that shall accrue from operations of PCAR research program shall be considered as automatic appropriations for subsequent PCAR activities.

The Council shall submit to the President periodic reports of its activities.

All acts, parts of acts, executive orders, ordinances, rules and regulations which are inconsistent with the provisions of this Presidential Decree are hereby repealed, amended, or modified accordingly.

Done in the City of Manila, this 10th day of November in the year of our Lord, nineteen hundred and seventy-two.

(SGD.) FERDINAND E. MARCOS
President of the Philippines

By the President:

(SGD.) ALEJANDRO MELCHOR
Executive Secretary

MALACANANG
Manila

PRESIDENTIAL DECREE NO. 864

AMENDING P. D. 48 TO EXPAND THE FUNCTIONS OF THE PHILIPPINE COUNCIL FOR AGRICULTURAL RESEARCH TO INCLUDE MINES RESEARCH, AND CHANGE ITS NAME TO PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH

WHEREAS, the development and growth of our farm, forest and fishery, and certain mineral resources is a matter of national concern;

WHEREAS, research is necessary to determine the alternative means of achieving national goals in the development of our agricultural and natural resources or to identify the best means among the alternatives;

WHEREAS, mines are a natural resource which is one of the top foreign exchange earners of the country;

WHEREAS, there is a need to wisely utilize this exhaustible resource;

WHEREAS, mines research is best done in relation to agricultural, forestry, and fisheries resources in order to consider their combined effects in maintaining a favorable ecological balance;

WHEREAS, there is a need to strengthen the system and capability for mines research in the country; and

WHEREAS, this can best be done through the existing body which now monitors, coordinates, and manages all research in agriculture, forestry, and fisheries in the country;

NOW, THEREFORE, I, FERDINAND E. MARCOS, President of the Republic of the Philippines, by virtue of the powers vested in me by the Constitution, do hereby decree and order the following:

SECTION 1. The name of the Philippine Council for Agricultural Research, established under P.D. 48, is hereby changed to the PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH, hereinafter referred to as PCARR, with the following functions in addition to those stipulated in P.D. 48;

a) Have authority and responsibility, as part of the scope of its operations, over all government-supported and funded research on mineral resources except petroleum and other mineral oils.

b) Establish, support and manage the operation of a national network of centers of excellence for the various research programs in crops; livestock; forestry; fisheries; soils; waters; and mineral resources; and socioeconomics research related to agriculture and natural resources; and

c) Enter into agreements or relationships with other similar institutions or organizations, both national and international, in furtherance of the above purposes.

SECTION 2. The PCARR Governing Council shall be composed of the following officials:

1. The Chairman, National Science Development Board, Chairman;

2. The Secretary of Agriculture, Vice-Chairman;

3. The Secretary of Natural Resources, Vice-Chairman;

4. The Budget Commissioner;

5. A Representative of the National Economic and Development Authority;

6. The President, Association of Colleges of Agriculture of the Philippines;

7. The Chancellor, University of the Philippines at Los Banos;

8. The PCARR Director General;

9. Two outstanding leaders in the producers' and business sector of agriculture and natural resources to be appointed by the President of the Philippines upon recommendation of the PCARR Governing Council.

SECTION 3. The PCARR employees shall be exempt from the scope and coverage of the Wage and Position Classification Office (WAPCO).

SECTION 4. The PCARR Governing Council is hereby authorized to establish an Agriculture and Resources Research Service which will formulate rules and regulations covering qualifications, recruitment, compensation, performance evaluation, and separation from the service, of all government technical personnel engaged in research-oriented operations in agriculture and natural resources.

SECTION 5. The PCARR Governing Council is authorized to reorganize its Secretariat and Research Network by creating, consolidating or integrating as many divisions and research stations as may be necessary to accomplish its functions and objectives.

SECTION 6. All acts, parts of acts, executive orders, decrees, ordinances, rules and regulations, which are inconsistent with this Presidential Decree are hereby repealed, amended, or modified accordingly.

SECTION 7. This Decree shall take effect upon its promulgation.

Done in the City of Manila, this 29th day of December, in the Year of Our Lord, Nineteen Hundred and Seventy-Five.

(SGD.) FERDINAND E. MARCOS
President of the Philippines

BY THE PRESIDENT:

(SGD.) JACOBO C. CLAVE
Presidential Executive Assistant

MALACANANG
Manila

PRESIDENTIAL DECREE NO. 1249

GRANTING AUTHORITY AND INCENTIVES TO THE PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH IN ITS GENERATION OF FOREIGN FUNDING FOR RESEARCH

WHEREAS, the Philippine Council for Agriculture and Resources Research (PCARR) as created by Presidential Decree No. 48 to provide a systematic approach in the planning, administration, and implementation of the government's agriculture and resources research program;

WHEREAS, to effectively implement the national agriculture and resources research program, it is necessary to develop research capability in terms of manpower, facilities, funding and programs;

WHEREAS, PCARR was mandated to develop and implement a fund generating strategy for supporting agriculture and resources research;

WHEREAS, to augment research funds and to accelerate technology transfer in research, PCARR has entered into agreements with funding agencies and international research centers such as USAID, the International Potato Center, (CIP), Centro Internacional de Meyramiento de Maiz y Trigo (CIMMYT), Centro Internacional de Agricultura Tropical (CIAT), the International Soybean Research Program (INTSOY), the Rubber Research Institute of Malaysia (RRIM) and other similar agencies;

WHEREAS, in order to encourage funding agencies and international research centers to enter into cooperative agreements or relationship, PCARR should provide appropriate incentives to encourage donation of research funds and facilitate the exchange of researchers, scientists, and consultants between PCARR and these international agencies;

NOW, THEREFORE, I, FERDINAND E. MARCOS, President of the Philippines by virtue of the powers vested in me by the Constitution do hereby decree and order that :

SECTION 1. The Philippine Council for Agriculture and Resources Research will plan and implement a fund-raising program to augment local research funds by entering into appropriate and beneficial agreements with international funding and research centers.

SECTION 2. Scientists and staff members of international agencies/organizations may be invited to participate in PCARR-sponsored research projects, workshops, conferences and symposia;

SECTION 3. Scientists and staff members of PCARR and agencies engaged in agricultural research are exempted from government restrictions on travel abroad and travel tax for purposes of advanced studies, observation trips to agricultural universities, institutes and research organizations with similar functions and attendance in scientific symposia and conferences;

SECTION 4. Items of equipment and supplies including but not limited to construction materials, laboratory supplies, fixtures, scientific equipment, machinery, household, office and laboratory furnishings and vehicles imported by PCARR or by representatives of international agencies/organizations in consultation with PCARR will be exempt from payment of customs duty or other tax;

SECTION 5. In the event which necessitate the residence in the Philippines of scientists or staff members of international agencies in connection with cooperative research agreement with PCARR, the appropriate offices/departments of the Philippine government shall:

a) expedite entry of said scientists and staff members to the country;

b) exempt from all forms of taxes and import duties and other imposts on any personal and household effects, goods and supplies for personal and family use of foreign scientists and staff members provided these are re-exported upon the termination of their stay in the country;

c) exempt these scientists and staff members from payment of Philippine income tax and other taxes accorded to expatriate scientists paid by international organizations;

d) effect the free movement of germplasm into the country as may be required for the cooperative research programs with international agencies subject to normal quarantine procedures required to avoid the introduction of pests and diseases.

SECTION 6. All laws, parts of acts, executive orders, decrees, ordinances, rules and regulations which are not consistent with this Decree are hereby repealed, amended or modified accordingly.

SECTION 7. This Decree shall take effect immediately.

DONE in the City of Manila, this 25th day of November, in the year of Our Lord, nineteen hundred and seventy-seven.

(SGD.) FERDINAND E. MARCOS
President of the Philippines

By the President:

(SGD.) JACOBO C. CLAVE
Presidential Executive Assistant

PRESIDENTIAL DECREE NO. 1502

PROVIDING FOR INCENTIVES AND ADMINISTRATIVE REFORM TO PROMOTE EFFICIENCY AND PRODUCTIVITY OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH

WHEREAS, the Government has set among its goals the self-sufficiency of the country in its food requirements and the full development of its scientific resources;

WHEREAS, through research in agriculture, natural resources, industry, science and technology, the means to achieve these goals could be best identified;

WHEREAS, it is necessary that research in agriculture, natural resources, industry, science and technology, be afforded utmost encouragement and divorced from restraints;

WHEREAS, the more of scientific and technological research underscore the urgent need for administrative reforms and a system of incentives that will stimulate the country's scientists and technologists towards more creative, fruitful and satisfying research activities and thereby accelerate the attainment of self-sufficiency of the country's food requirements and the full development of its industrial potential.

NOW, THEREFORE, I, FERDINAND E. MARCOS, President of the Republic of the Philippines, by virtue of the powers vested upon me by the Constitution do hereby order and decree the following:

SECTION 1. Hiring of retired scientists and technical personnel. An employee retired under any exisiting law who, in the judgment of either the governing board of a research agency or the research agency head, possesses technical qualifications and the capability to undertake specific scientific research activities, may be hired on contract basis without refunding the unexpired portion of the gratuity and accumulated leave benefits received by him from the government.

SECTION 2. Hiring through contract of other research project personnel. For purposes of undertaking scientific and technological research activities that are by nature highly technical and essentially temporary, other qualified persons may be hired on contract basis for assignment in research projects.

SECTION 3. Exemption from Civil Service rule on nepotism. The appointment of research personnel to positions of research assistant and upwards shall not be covered by the civil service rule on nepotism in consideration of the highly technical nature of these positions.

SECTION 4. Sabbatical leave privilege of scientists. Any scientist, who in the judgement of the governing board of a research agency is entitled to sabbatical leave, may be granted such leave upon application under the terms and conditions that may be promulgated by the governing board.

SECTION 5. Honoraria of researchers, technical and support personnel. Honoraria of researchers, technical and support personnel whose assistance may be sought by the Philippine Council for Agriculture and Resources Research (PCARR) or whose services are engaged in research projects monitored and/or supervised by the PCARR or the National Science Development Board, shall not be pegged to the basic salary that they receive from their respective agency. The amount of honoraria that may be paid to them directly shall conform with a schedule formulated by the PCARR on the basis of research output and in consultation with the National Science Development Board and related research and educational institutions and approved by the Governing Council.

SECTION 6. Payment of hardship and/or hazard allowance. Hardship and/or hazard allowance may be paid to research, technical and supportive personnel who are engaged in research that cause hardship and/or hazard to health and life, in amounts predetermined by the research agency concerned.

SECTION 7. Travel expenses of research agency teams and other authorized personnel. Duly receipted actual expenses for lodging of researchers, research team members, and other authorized personnel doing or evaluating research projects outside their official stations may be reimbursed to them upon application subject, however, to the availability of funds. Expenses for subsistence incurred by them shall be reimbursed at rates prevailing in the particular locality as may be certified by the Commission on Audit.

SECTION 8. Travel insurance of researchers and technical personnel. Premiums for the individual accident insurance of researchers and technical personnel of research agencies traveling by air, water, and land transportation, may be paid at government expense; provided that the amount of the individual accident insurance does not exceed ₱100,000 and the purpose and duration of the trip has the prior approval of the research agency head or his duly authorized representative.

SECTION 9. Purchase of locally produced or manufactured articles. When the price of locally produced or manufactured articles is from 10% to 20% lower than that listed in the NACIDA price lists, purchases of these articles may be made from the sources offering the lower prices.

SECTION 10. Exemption from ban on the purchase of equipment. Procurement of scientific equipment and necessary accessories needed for research in science and technology, in agriculture, forestry, fisheries, mineral resources, in industry and engineering and other related fields, except petroleum and other mineral oils, may be exempted from any ban, provided that the need for the equipment and accessories to be purchased has been evaluated and certified by either the PCARR or the NSDB.

SECTION 11. Procurement of supplies, materials and equipment without the benefit of public bidding. Supplies, materials, and equipment in amounts not exceeding ₱5,000, in each case, may be purchased without the benefit of public bidding, when these are urgently needed for research projects that are certified as included in the priority listing of the national agricultural research program established by PCARR pursuant to the Presidential Decree No. 48, as amended, or by NSDB for use in industrial research and other research areas not covered by PCARR. When purchases of similar urgency and falling within the same priorities are made from reputable and duly licensed manufacturers, in the case of supplies, materials, and equipment of Philippine-make or origin or from exclusive distributors or agents in the Philippines, in the case of imported supplies, materials, and equipment, the requirement of public bidding may be waived where the amount of the purchase is more than ₱5,000.

SECTION 12. Deposit of government funds for research activities. Grants of financial assistance made by PCARR for researches in agriculture, forestry, fisheries, and mineral resources, except petroleum and other mineral oils, pursuant to PD No. 48, as amended, or NSDB for industrial and other research areas, may be released to the researchers and deposited with the Philippine National Bank or its branches or with rural banks or other private commercial banks where there are no branches of the Philippine National Bank or rural banks nearest the locale of the research projects.

SECTION 13. Purchase of Large Cattle. Large cattle, including carabaos, horses, mules, asses and other members of the bovine family to be used in research work may be procured without the intervention of the Bureau of Animal Industry, provided that the agency engaged in the research is properly authorized to conduct such research by reason of its acknowledged capability.

SECTION 14. Construction and/or repair of infrastructures and other facilities for research. Infrastructures and other facilities for research in agriculture, forestry, fisheries and mineral resources, except petroleum and other mineral oils, to be constructed and/or repaired in research centers included in the PCARR research network in the country or by the NSDB, irrespective of the source of funds, shall be carried out by or under the control and supervision of the PCARR, or the NSDB; in particular sections 1901 and 1917 of the Revised Administrative Code, as amended, shall not apply to any such construction and/or repairs.

All acts, parts of acts, executive orders, rules and regulations which are inconsistent with the provisions of this Presidential Decree are hereby deemed repealed, amended, or modified accordingly.

Done in the this day of in the year of our Lord, nineteen hundred seventy-seven.

FERDINAND E. MARCOS
President
Republic of the Philippines

By the President:

JACOBO C. CLAVE
Presidential Executive Assistant

ANNEX IV
NATIONAL NETWORK OF RESEARCH CENTERS AND STATIONS
(As of the 83rd GOVERNING COUNCIL MEETING on 28 May 1980)

A. MULTI-COMMODITY National Research Centers

1. Central Luzon State University (CLSU), Munoz, Nueva Ecija
2. University of the Philippines at Los Banos (UPLB), College, Laguna
3. Visayas State College of Agriculture (ViSCA), Baybay, Leyte
4. University of Southern Mindanao (USM), Kabacan, North Cotabato

B. SINGLE-COMMODITY Research Centers

1. Forest Research Institute (FORI), College, Laguna
2. Forest Products Research and Industries Development Commission (FORPRIDECOM), College, Laguna
3. Philippine Sugar Commission (PHILSUCOM), La Granja, La Carlota City
4. Philippine Coconut Authority (PCA), Bago Oshiro, Davao City
5. Philippine Tobacco Research and Training Center (PTRTC), MMSU, Batac, Ilocos Norte
6. Cotton Research and Development Institute (CRDI), MMSU, Batac, Ilocos Norte
7. University of the Philippines in the Visayas (UPV)*, College of Fisheries, Miag-ao and Leganes, Iloilo

C. REGIONAL Research Centers

1. Mariano Marcos State University (MMSU), Batac, Ilocos Norte
2. Isabela State University (ISU), Cabagan and Echague Campuses, Isabela
3. Mountain State Agricultural College (MSAC), La Trinidad, Benguet
4. Palawan National Agricultural College (PNAC), Aborlan, Palawan
5. Camarines Sur Agricultural College (CSAC), Pili, Camarines Sur
6. La Granja Experiment Station, Bureau of Plant Industry (BPI), La Granja, La Carlota City
7. Central Mindanao University (CMU), Musuan, Bukidnon
8. Davao Experiment Station, Bureau of Plant Industry (BPI), Bago Oshiro, Davao City

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*The identified National Research Center. Until the UPV becomes operational, the bureau of Fisheries and Aquatic Resources (BFAR) Central Fisheries Research Laboratory in Metro Manila and the University of the Philippines Brackishwater Aquaculture Center (UP-BAC) at Leganes, Iloilo are the interim centers for Marine Fisheries and Aquaculture (brackishwater pond culture), respectively; the BFAR Central Laboratory shall then continue to function as a Regional Research Center.

LIST OF RESEARCH CONSORTIA/CENTERS
(As of 30 July 1980)

1. Bicol Agriculture and Resources Research Consortium (BARRC)

RCC Chairman: Supt. Alvaro Rabina, CSAC
Res. Coordinator: Dr. Ciriaco Divinagracia, CSAC

Member Agencies:

a. Camarines Sur Agricultural College, (CSAC)*, San Jose, Pili, Camarines Sur
b. Bureau of Plant Industry (BPI), San Agustin, Pili, Camarines Sur
Bureau of Plant Industry (BPI), Buang, Tabaco, Albay
c. Bicol University (BU), Legaspi City
Bicol University (BU), Guinobatan, Albay
Bicol University (BU), Tabaco, Albay
d. Bureau of Soils (BS), Region V, Naga City
e. Bicol River Basin Development Program Office (BRBDPO), San Jose, Pili, Camarines Sur
f. National Economic and Development Authority (NEDA), Region V, Legaspi City
g. Abaca Industry Development Authority (AIDA), Guinobatan, Albay
h. Forest Research Institute (FORI), Legaspi City
i. Philippine Council for Agriculture and Resources Research (PCARR), Los Banos, Laguna

2. Central Luzon Agricultural Research Center (CLARC)

RCC Chairman: Pres. Amado C. Campos, CLSU
Res. Coordinator: Dr. Filomena F. Campos, CLSU

Member Agencies:

a. Central Luzon State University (CLSU)*, Munoz, Nueva Ecija
b. Forest Research Institute (FORI), Carranglan, Nueva Ecija
c. Bureau of Plant Industry (BPI), Munoz Nueva Ecija
d. National Irrigation Administration (NIA), Munoz, Nueva Ecija
e. PCARR

3. Cagayan Valley Integrated Agricultural Research System (CVIARS)

RCC Chairman: Pres. Felipe Cachola, ISU
Res. Coordinator: Dr. Toribio Adaci, ISU

Member Agencies:

a. Isabela State University (ISU)*, Cabagan, Isabela,
Isabela State University (ISU)*, Echague, Isabela
b. Bureau of Plant Industry (BPI), Ilagan, Isabela
Bureau of Plant Industry (BPI), San Mateo, Isabela
c. Philippine Tobacco Administration (PTA), Ilagan, Isabela
Philippine Tobacco Administration, Tumawini, Isabela

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*Lead agency

d. National Irrigation Administration (NIA), Agricultural Development Division, Echague, Isabela
National Irrigation Administration (NIA), MRMP Service Areas in Isabela and Quirino
e. Philippine Council for Agriculture and Resources Research (PCARR), Los Banos, Laguna

4. Highland Agricultural Research Center (HARC)

RCC Chairman: Pres. Bruno Santos, MSAC
Res. Coordinator: Dr. William Dar, MSAC

Member Agencies:

a. Mountain State Agricultural College (MSAC)*, La Trinidad, Benguet
b. Philippine Council for Agriculture and Resources Research (PCARR), Los Banos, Laguna

5. Ilocos Agricultural Research Center (ILARC)

RCC Chairman: Pres. Consuelo Blanco, MMSU
Res. Coordinator: Atty. Ambrosio Blanco, MMSU

Member Agencies:

a. Mariano Marcos State University (MMSU)*, Batac, Ilocos Norte
b. Cotton Research and Development Institute (CRDI), Batac, Ilocos Norte
c. Philippine Tobacco Research and Training Center (PTRTC), Batac, Ilocos Norte
d. Philippine Council for Agriculture and Resources Research (PCARR), Los Banos, Laguna

6. La Granja Agricultural Research Center (LGARC)

RCC Chairman: Mr. Rofolfc Medina, Director for Research, PHILSUCOM, Q.C.
Res. Coordinator: Dr. Vincente Dosado, BPI, La Granja

Member Agencies:

a. Bureau of Plant Industry (BPI), La Granja, La Carlota City
b. Bureau of Animal Industry (BAI), La Granja, La Carlota City
c. University of the Philippines, Los Banos, College, Laguna
d. Philippine Council for Agriculture and Resources Research (PCARR), Los Banos, Laguna

7. Northern and Central Mindanao Coordinated Agriculture and Resources Research Program (NOCEMCARRP)

RCC Chairman: Pres. Isabelo Alcordo, CMU
Res. Coordinator: Dr. Lamberto Boloron, CMU

Member Agencies:

a. Central Mindanao University (CMU)*, Musuan, Bukidnon
b. Philippine Council for Agriculture and Resources Research (PCARR), Los Banos, Laguna

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*Lead agency

8. Palawan Agricultural Research Center (PARC)

RCC Chairman and Research Coordinator: Pres. Miguel Palao, PNAC
Asst. Res. Coordinator: Prof. Antonio Palao, PNAC

Member Agencies:

a. Palawan National Agricultural College (PNAC)*, Aborlan, Palawan
b. Philippine Council for Agriculture and Resources Research (PCARR), Los Banos, Laguna

9. Southern Mindanao Agricultural Research Center (SMARC)

RCC Chairman and Research Coordinator: Pres. Jamin Imlan, USM
Asst. Res. Coordinator: Dr. Juan Albert Soria, USM

Member Agencies:

a. University of Southern Mindanao (USM)*, Kabacan, North Cotabato
b. Philippine Council for Agriculture and Resources Research (PCARR), Los Banos, Laguna

10. Visayas Coordinated Agricultural Research Program (VICARP)

RCC Chairman and Research Coordinator: Pres. Fernando A. Bernardo, VISCA
Asst. Res. Coordinator: Dr. Marianito R. Villanueva, VISCA

Member Agencies:

a. Visayas State College of Agriculture (VISCA)*, Baybay, Leyte
b. Bureau of Plant Industry (BPI), Ubay, Bohol
   Bureau of Plant Industry (BPI), Mandaue, Cebu
   Bureau of Plant Industry (BPI), Abuyog, Leyte
c. Forest Research Institute (FORI), Babatngon, Leyte
d. Bureau of Animal Industry (BAI), Ubay, Bohol
   Bureau of Animal Industry, Sugod, Southern Leyte
   Bureau of Animal Industry (BAI), Kananga, Leyte
e. Philippine Council for Agriculture and Resources Research (PCARR), Los Banos, Laguna

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*Lead agency

ANNEX V
DESCRIPTIONS OF THE FOUR AGRICULTURAL RESEARCH CENTERS/CONSORTIA FUNDED UNDER LOAN I

The Review Team split into two groups and each sub-group visited two of the four Agricultural Research Centers that were funded under USAID Loan No. 492-T-039. The full descriptions for BARRC, CLARC, LGARC and SMARC are presented here and are referenced in appropriate sections of the Ex Post Loan Evaluation Report and the PCARR Corporate Review Report.

BICOL AGRICULTURE AND RESOURCES RESEARCH CENTER

The Bicol Agriculture and Resources Research Center was established in 1976 to include all of the agriculturally related agencies in the Bicol region. It was expanded in 1978 to include forestry and fisheries. The present composition of BARRC includes 9 agencies:

BPI	Bureau of Plant Industry (with 2 stations)
CSAC	Camarines Sur Agricultural College
BU	Bicol University (with 3 college campuses)
BS	Bureau of Soils
BRBDP	Bicol River Basin Development Program
NEDA	National Economic and Development Authority
AIDA	Abaca Industry Development Authority
FORI	Forest Research Institute
PCARR	Philippine Council for Agriculture and Resources Research

The objective of BARRC is "to integrate and coordinate the research activities and operations of experiment stations of member agencies presently managed and operated independently of one another under the umbrella of a cooperative management system in respect of their research organizations and resources involving crops, livestock, soil and water, socio-economics, fisheries and forestry."

The management of BARRC is effected under policies and guidelines established by a 9-member Research Consortium Coordinating Committee which is chaired by the member from the lead institution. Following the overall-policy established by PCARR, an educational institution was to be selected as the lead institution, and Camarines Sur College of Agriculture was selected for this role. PCARR provides the research coordinating secretariat to BARRC.

Loan I Projects and additional infrastructure

The physical facilities available to BARRC are widely scattered over the Bicol region as shown on the accompanying map of the area. This caused the allocation of Loan I additions to the infrastructure to be rather widely dispersed also. The allocations of USAID and GOP counterpart funded facilities were as listed below. All of them have now been completed.

USAID Loan Funded

Location	Item	Cost (₱)
BPI (BEST)	Crop Research Laboratory	1,205,200
	Greenhouse	131,822
	Screenhouse	80,977
	6 units staff houses (3-BR)	484,944
	2 units staff houses (3-BR)	222,000
	water system improvement	283,470

Location	Item	Cost (₱)
CSAC	Soil & Water Research Bldg.	1,425,508
	Site Development Experimental Farm	501,024
	8 units staff houses (2-BR)	646,554
GOP Counterpart Funded		
BPI (BEST)	Administration Bldg.	341,277
	Headhouse	372,769
	Greenhouse	130,852
	Screenhouse	76,931
	Service Bldg.	340,582
	3 units staff houses (3-BR)	266,130
	Housing development and renovation	375,000
CSAC	Service Bldg.	333,835
	Power/Water utilities	650,280
	1 unit staff house (3-BR)	123,764
	1 unit Opt Bldg. (4-DR)	282,180
	Farm Water Management Bldg. (dorm)	580,210
	Office/and/Library	1,794,478
BUCA	Experimental Farm Development	468,886
	2 screenhouses	153,861
	2 greenhouses	261,704
	Abaca Processing	209,467
	Headhouse	222,772
BUCF	Farm Development Utilities	278,095
	Fish Research Laboratory	1,429,550

The facilities of BUCF and BUCA are widely separated from each other and from the central set of facilities of BEST and CSAC at Pili. This makes coordination more difficult and it precludes the possibility of achieving the critical mass concentration of scientific staff and support systems at the two outlying agencies (BUCA and BUCF). In fact, there is reason to question whether the investments at these two locations have any appreciable likelihood of yielding acceptable returns. They certainly will not in the forseeable future.

The research institutions at Pili have access to adequate land for agricultural research and the water systems being installed will greatly facilitate research activities there.

Research Program

The research program of the area seems to be largely confined to the planning stage. BEST is conducting a number of rice experiments that look good in the field. The Bicol River Basin Development Program conducts a continuing series of feasibility and evaluation studies. They also have several socio-economic studies underway which could serve as guides for production research.

The BARRC report speaks of much coordination, but there appears to be a minimum of actual research being performed.

Regional research commodity teams have been organized, for 27 different commodities. These teams include representatives from each participating agency. It was not possible to assess the actual functioning of these teams but they are expected

to develop a 5-year research agenda for each commodity. This has the appearance of "overkill" coordination.

Manpower

BARRC has formulated an 8-year manpower development program for 1976-1983. A list of scholars has been produced showing the degrees they will be seeking and the fields of study. This is an excellent projection for planning purposes. The distribution by agencies and the success rate is listed below:

Agency	Projected number of scholars		Number ongoing or graduated	
	M.S.	Ph.D.	M.S.	Ph.D.
CSAC	9	5	6	5
BUCA	3	2	1	1
BUCF	6	-	4	-
BEST	2	1	1	1
BS	4	-	3	-
BRBDP	2	1	1	1
Aden	1	-	1	-
AIDA	2	-	2	-
Total	29	9	19	8

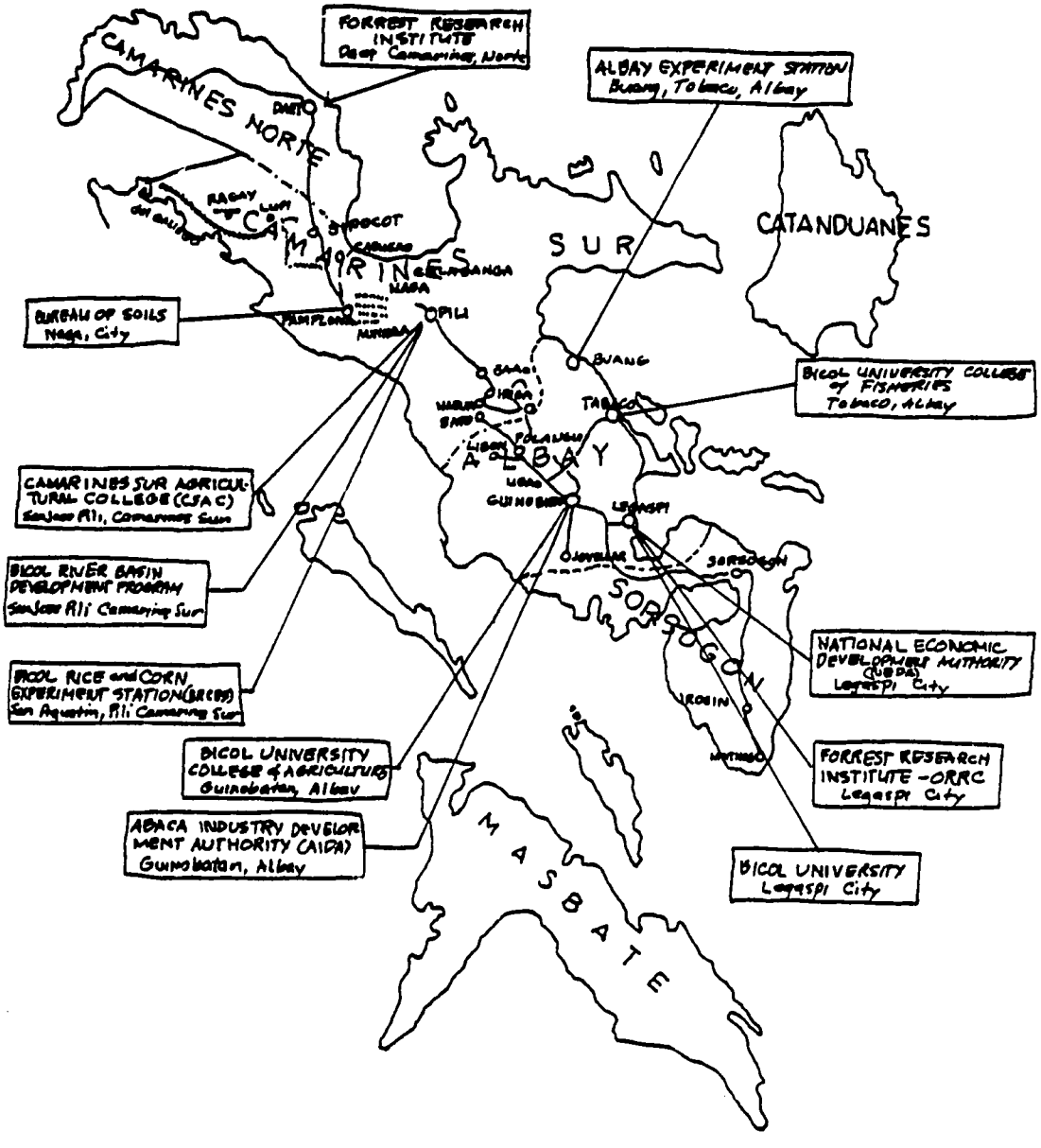
The difference between the projected and completed numbers represent dropouts who did not start or did not complete their degree program. When all of the scholars complete their programs there could be an excellent nucleus for research--if they are properly assigned and supported. Since no overall research plan was available to us, it was not clear whether there is good agreement between program needs and the manpower training being scheduled. There were a few instances such as the BUCF where there was an obvious mismatch between program needs and staff training being supported, but an overall judgment cannot be made by the Review Team at this stage.

Observations by The Review Team

The concentration of support at the adjoining agencies at Pili provides the basis for developing an effective Agricultural Research Center. The land and the buildings of CSAC and BEST will be quite adequate. There is a strong question, however, whether the designated lead institution can develop leadership capability fast enough to keep up the momentum of this Center. CSAC has developed its good reputation on a very practical and efficient high school program and a very pragmatic but less technically sophisticated college program. There is no heritage of research activity and therefore no real climate for research leadership. The college will have to alter its character rather drastically to fulfill its new role. The Team questions the wisdom of CSAC abandoning its present useful role and of attempting the long and difficult task of building a research orientation here. PCARR will have to interject a rather heavy helping hand to make this a success, and that help must include adding research leadership.

The Team also noted that CSAC is directly under the Bureau of Higher Education in the Ministry of Education and Culture. As a school under this Bureau, its funds and programs are subject to the approval and endorsement by the Bureau and MEC to MOB for funding. The salary scale of the school follows the low salary scale for all schools under the MEC. If CSAC is to provide the leadership in research for the region, it must be assisted to obtain a charter so that it can operate as an autonomous and more dynamic educational and research institution.

BARRC NETWORK OF COOPERATING STATIONS



CENTRAL LUZON AGRICULTURAL RESEARCH CONSORTIUM

The Central Luzon Agricultural Research Consortium was formed in 1978 from the association of research institutes and agencies in the area around Central Luzon Agricultural College (now University) beginning about 1970. The present composition of CLARC includes:

CLSU	Central Luzon State University including the Research and Development Center and the Tech-Pack Project
BPI	Maligaya Rice Research and Training Center
IAMPP	Integrated Agricultural Marketing and Processing Project (BAEcon and BAEx with USAID/KSU)
FAC	Freshwater Aquaculture Center
NCRP	National Carabeef Research Project
FORI	Forest Research Institute
UPRIIS	University of the Philippines Research Institute on Irrigation Systems (with National Irrigation Authority)
NEDA	National Economic and Development Authority
PCARR	Philippine Council for Agriculture and Resources Research

The CLARC was formed to integrate and coordinate research activities and support operations of member agencies presently managed and operated independently.

The management of CLARC is the responsibility of a research coordinating council which meets quarterly under the chairmanship of the President of CLSU, the lead institution. The over-all policy is that established by PCARR and PCARR provides some staff for monitoring and accounting.

Loan I Projects and additional infrastructure

The physical facilities of CLARC are concentrated near CLSU, except for the Maligaya Rice Center and the National Carabeef Research Project.

USAID Loan Funded

Location	Item	Cost (₱)
CLSU	Crop research laboratory	1,312,948
	Twenty staff houses	1,278,180
	Site development, 23 ha. Experimental farm	249,786
Maligaya Rice Research and Training Center	4 staff houses	255,636
	Screenhouse	69,000

GOP Counterpart Funded

CLSU	1 Greenhouse/1 Screenhouse	206,000
	Utilities development	321,000
	4 Apartment units	1,152,800
	Headhouse	297,000
	Service Building	1,495,449

Location	Item	Cost (₱)
	Field Structures:	
	Corrals	79,369
	Silos	29,500
	Haybarn	44,500
	Feedlot	69,369
	Laborer's Quarters	49,500
	Utilities	195,500
	Carabeef Field Research	241,901
	Forage and Pasture Office Development	194,500
	Inland Fisheries Expansion	138,039
	12 staff houses	852,771
	Farm Shop Bldg.	319,000
Maligaya Rice Research and Training Center	Crop Research Laboratory Renovation	228,676
	Entom./Path. Laboratory Renovation	259,500
	Greenhouse	29,059
	Dormitory	496,000
	Total	9,864,964

The NCRC is located about 65 kilometers from CLSU as it is necessary to place it in an appropriate area of sloping land suitable for pasture development. The MRRTC has been conducting rice research, formerly as the Maligaya Experiment Station, since 1931 and has been a principal cooperator with IRRI since 1963. The training of extension workers was begun in 1965 and in 1972 a pilot seed-processing plant was built to handle seed rice grown on the station.

The Freshwater Aquaculture Center was established in 1970 and expanded its facilities in 1976 with a P.L. 480 grant and in 1977 with a grant from PCARR. The work is also supported by grants from the Rockefeller Foundation and from the International Center for Living Aquatic Resources Management (ICLARM).

Research Program

The research program is varied and of different levels of sophistication for a variety of reasons. The Consortium leadership seems well placed in the experienced and energetic combination of Dr. and Dra. Campos. The team found it difficult, however, to get staff opinion or discussion owing to the articulate and dominant personalities of the two leaders.

As a multi-commodity National Research Center, CLARC has national responsibility for: (1) Ranch Carabeef, (2) Ranch Beef/Chevon, and (3) Freshwater Aquaculture. CLARC has regional responsibility for 11 commodities: (1) Fiber Crops (cotton and sericulture), (2) plantation crops (sunflower), (3) vegetable crops, (4) Dairy, (5) Poultry, (6) Farming Systems, (7) Soil Resources, (8) Agricultural Engineering, (9) Applied Rural Sociology, (10) Macroeconomics, and (11) Water Resources.

The Maligaya Rice Research and Training Center is a cooperating station for (1) Rice and other cereals and (2) Agricultural Engineering, which are both led nationally by UPLB.

Resident national commodity Team Leaders are Dra. F. Campos (Fiber crops), Dr. R. Guerrero (Freshwater Aquaculture), Dr. C. de la Cruz (Inland waters), Dr. A. N. Eusebio (Carabeef and also PCARR Livestock Research Division Director).

Research output was difficult to assess at CLSU. The team was shown a number of demonstrations (Model Farm and Biogas generation), the Technopack Division with publications, and some economics research in progress. Field research was nowhere evident (partly because we were there between seasons) except for some newly planted cotton and a few vegetable plots. Laboratories were well organized and in excellent order but few people were actively engaged in research at the bench.

The Freshwater Aquaculture Center had an exciting and well directed program with both research and training activities in evidence. The new facilities appeared to be well utilised.

The Carabeef Research Center was so new that one might expect to see less work on pasture and animal development than was in fact shown.

The Maligaya Rice station has had many additions to its physical facilities in recent years and much activity is concentrated on the seed production and processing function and training, with probably too little attention paid to field research and testing. It was concluded that part of the low level of research output reflects a dependence of the Philippine rice research program on the direct and readily available output of the International Rice Research Institute.

Manpower

CLARC did not discuss a consolidated manpower development plan but three of the four institutions visited had developed plans and implemented portions of them under Loan I.

Staff listed by training level and status for research staff:

	CLSU/FAC/CRC etc.	MRRTC
Ph.D.	22	0
M.S.	51	7
BS/BA	55	21
Total	128	28 (42 including seed farm staff)
No. being trained	25	5

CLSU offers its own M.S. degree in selected areas and is expanding the offering as trained staff return.

Observations of the Review Team

Progress is being made in developing an effective research consortium based at Munoz, Nueva Ecija. The group of institutions is being strengthened and most of the units are growing rapidly. The FAC and the NCRC have important roles to play in national development and have evidence of new technology on the way to application. The rice-fish culture system is ready for extension and is being taught. New fish and shrimp species and management practices are being developed. The Carabeef Center has pastures of Ipil-ipil and perennial stylo in grass combinations that are ready for grazing trials. CLSU has made substantial contributions to cotton and sunflower production technology.

Integration and coordination of common services has begun with a central motor pool and other systems may follow. Research coordination appears to be effective and strong leadership is clearly in evidence. Some of the units were not observed and appear to be minor partners (FORI and UPRIIS), or reluctant collaborators.

In its short visit the Team had difficulty in identifying research output at the University itself and in finding field evidence of the application since there was no time to visit farmers' fields. One potential problem was observed in the large and complex building designated as a Food Processing Center which appeared to have no regular program development or staff compliment. Although the building was completed it appeared to be unused. This project however was not directly within the terms of reference of the team.

LA GRANJA AGRICULTURAL RESEARCH CENTER

Introduction

La Granja Agricultural Research Center was the first of the network of Research Centers to be established. It is formed by the integration of four geographically contiguous agricultural research units:

BAI	The Carlota Stock Farm
BPI	The La Granja Experiment Station
PHILSUCOM	The La Granja Sugarcane Experiment Station
UPLB	The La Granja Research & Training Center

LGARC operates under policy guidelines set up by the Research Center Coordinating Committee, with the Director of Research and Development of PHILSUCOM serving as chairman. The Center is managed by a Research Coordinator from PHILSUCOM assisted by heads of the three other participating agencies.

While each of the member agencies has its own research agenda, they enjoy the excellent infrastructure and service facilities that are common to all of them. Recent improvements in water and power supply, school facilities and housing have demonstrated the merits of this coordinated approach to establishing and maintaining a research environment that is conducive to efficient productivity. The GOP, PCARR and USAID are to be complimented on the excellence of this move.

Loan I Projects

The additions to the LGARC from USAID Loan I funds are all completed and include the following:

Crop Research Laboratory	₱1,426,767
Greenhouse	137,854
Screenhouse	101,673
Site developing experimental farm (60 has.)	1,474,312
Twenty units 2-BR staff houses	1,488,125
Site developing water system	1,613,586

The GOP Counterpart funded portion is not totally completed, but progress is good. It includes:

	Cost (₱)	% Complete
Beef/Carabeef/Swine Lab	1,302,838	40
Greenhouse	167,300	100
Screenhouse	85,700	100
Headhouse	323,026	92
Service facilities	1,293,538	60
8 units 3-BR staff houses	889,200	100
3 units 4-BR apartments	633,000	79
Guesthouse	317,410	79

Administration/Library/Workshop	1,815,013	100
Livestock field structure	327,734	100
Housing area development	850,415	80
Site development adm./Lib. Building	204,200	80
Irrigation Reservoir	336,680	35

These additions are well coordinated with other facilities that were already in place and include 12 ha. for research on upland crops, 55 ha. pasture land, 10 ha. for production of forage and legume feed, and 77 ha. for sugarcane research. There is an agrometeological station equipped by PAG-ASA. The entire set of facilities provides an atmosphere of active and productive research. There are no major deficiencies that are now apparent in this excellent facility.

Research Program

LGARC is the National Research Center for sugarcane and a regional center for legumes, vegetable crops, corn, sorghum, and farming systems. It is a cooperating station in swine feeding and management, beef production, and chevon and carabeef feedlot fattening.

The sugarcane research program is very active and productive. It is heavily oriented to breeding for disease resistance and in studies on control of diseases of sugarcane.

The plant industry research program is reporting useful results on soybean varieties, innoculation and management, corn fertilization and in multiple cropping systems.

The center reports a large number of experiments underway and a reasonably adequate support budget (₱27,809,000). The general impression of the team of the quality and vigor of the research was most favorable. And the investment in infrastructure under the loan is sound.

Manpower

LGARC has assembled a critical mass of scientific and technical personnel. Furthermore, the professional environment and the social amenities available to their families give LGARC an excellent likelihood of being able to attract and retain scientists in productive positions for reasonable periods.

The total professional manpower concentrated at the station and the additional expressed needs are:

Level	1979	Added requirement
BS	190	132
MS	35	68
Ph.D.	14	20

This represents an ambitious training program for this one center when viewed against the total training provided under Loan I. It will require very aggressive recruiting and encouragement from management. The environment for professional work and for family living is excellent. However, the low salary structure and the few opportunities for honoraria in this field location are constraints.

Observations by the Review Team

The Team gained a very favorable overall impression of LGARC. The infrastructure that has been created is good, the research facilities are excellent, and the general administrative arrangement seems to be working very well.

The Team was puzzled by the very slow development of research in Animal Industry. This aroused concern because it suggested a reluctance on the part of BAI to become involved in this cooperative venture. The Director of BAI in Manila assured us, however, that the slow pace of involvement is related only to his ability to find and attract competent research personnel. He is reluctant to commit scarce resources until he is assured that the research leadership has potential for real impact.

SOUTHERN MINDANAO AGRICULTURAL RESEARCH CENTER

Introduction

The Southern Mindanao Agricultural Research Center at present consists only of the research arm of the University of Southern Mindanao. It is contemplated that once the organization is formalized the following will be members:

University of Southern Mindanao
BPI Experiment Station
BAI Experiment Station
Bureau of Soils
National Irrigation Administration
Philippine Council for Agriculture and Resources Research

The Center is under the general supervision of the President of the University, Dr. Jaman Imlan. The day to day operations are handled by Dr. Juan A. Soria, Assistant to the President and Assistant Research Director.

Loan I Projects

The additions to the SMRC from USAID Loan I funds are all completed and include the following:

Item	Cost (₱)	% Completed
Crop Research Laboratory	1,720,000	100
Greenhouse	110,000	100
Screenhouse	85,000	100
Service Building	430,000	100
Insectary	125,000	100
Experimental farm development	2,736,561	100
20 units (2-BR) staff houses	1,470,194	100

All of the above are functional except the Crops laboratory for which equipment is on order and expected by the end of October.

The GOP Counterpart funded portions are as follows:

Item	Cost (₱)	% Completed
Greenhouse	118,755	100
Screenhouse	96,800	100
Headhouse	327,824	100
Service building	380,000	100
Additional farm development	2,490,645	100
5 units (3-BR) staff houses	642,000	100
13 units (2-BR) staff houses	1,439,000	100
4 units (4-BR) apartments	1,243,240	100
Guest house	336,850	100
Animal Research Laboratory	1,400,000	100

The buildings have all been completed but equipment for the animal laboratory is dependent upon Loan II. These are major additions to the university facilities because before their construction there were essentially none. Except for the delay in equipping the animal laboratory the other facilities will soon be in full usage.

Research Programs

SMARC is the designated National Research Center for fiber crops, fruit crops, plantation crops, and corn and sorghum. But in reality the corn, sorghum, and rubber projects are the only ones functioning as such. There is an excellent field lay-out for corn and sorghum and the Team was impressed with what they saw. There is some work on fiber and fruit crops, as well as interesting research on rubber, coffee and cacao.

SMARC is also a cooperating station for carabeef (small farm operation), beef/chevon, pork, poultry, farming systems, soil resources, water resources, aquaculture (freshwater culture), inland waters (freshwater swamps), macroeconomics, applied rural sociology, root crops, legumes, rice and other cereals and sugarcane. Although the USM staff felt PCARR had been helpful through the PCARR grant-in-aid program they did not see that PCARR had been instrumentalin increasing their level of funding from the Ministry of Budget.

Manpower

The PCARR manpower training is having a significant impact on the USM faculty and staff. Thirty nine have been sent to UPLB for graduate training and 80% have returned to USM. They now have 11 Ph.D. faculty members and 9 of them were trained at UPLB under the PCARR scholarship program. The President reported that 5 or 6 are sent each year to UPLB for graduate training. Some of these are already members of the faculty and some are selected from promising seniors. There are now 7 vacancies but the 1981 budget provides for 67 new positions, mostly at the B.S. level.

The USM staff, by training level, is as follows:

Ph.D.	4
M.S./M.A.	24
B.S./B.A.	59
Number being trained	24

The present budget is ₱13,000,000, of which ₱1,000,000 comes from income. The 1981 budget will be ₱24,000,000. Funding seems to be the main constraint, with special needs in animal science and plant science. Seventy-two faculty members are engaged in some research. Faculty salaries are 20% less than at UPLB and so the USM has difficulty in attracting and keeping staff, except as they recruit from their own students.

Observations of the Review Team

The Team was impressed with USM-SMARC. The USM has a capable President and Assistant Director for Research. The faculty is improving with the return of PCARR scholars. Although salaries are low, the new faculty houses will aid in attracting faculty. The Team was concerned that all of the advanced training is being done at UPLB. It would be desirable to send some trainees overseas.

USM has a good research farm with experiments in progress laid out according to acceptable experimental design. The corn research is impressive and the plantation crops research is interesting. There is need for more contact with rubber researchers outside of the Philippines. The new buildings are impressive and will be functional

when equipped. It is unfortunate that equipment for the animal building is not now available.

SMARC as a consortium is only a dream of the future. The Team had no way of assessing its potential beyond USM. However, the Team questions the wisdom of PCARR support of 15 projects on a "regional/cooperating station" basis, in addition to the national responsibilities for the four commodities assigned to the USM, in view of the limited manpower and resources available to undertake these studies. It represents, in our view, a dispersion of meager resources beyond reasonable expectation of returns on investment.

ANNEX VI
PCARR PROCEDURES FOR PROJECT REVIEW AND APPROVAL

The assessment of research proposals submitted for review and approval through the PCARR mechanism is a time-consuming process, involving much staff time, and concern with many minute details. The examples presented, chosen at random, illustrate why up to 50% of PCARR staff time is devoted to this process and to a similar paper assessment of research under way.

This review by teams of committee assessors should be replaced in large part by designation of an "Investigation Leader" with the background of knowledge of the program area to furnish basic evaluation, calling on selected associates for such detaled or specific judgments as needed.

Farming Systems
Priority #3

SUMMARY OF RESEARCH PROPOSAL

I. TITLE: Intercropping Sweet Potato with Coconuts in "Gonoy"-Infested Plantation

II. PROPONENT/AGENCY: Palawan National Agricultural College

Study Leader: Anselmo Q. de la Cruz

III. COOPERATING AGENCY: None

IV. OBJECTIVES:

1. To determine the yield of different sweet potato varieties under coconut trees in "hagonoy"-infested area.

2. To determine the monthly population of C. odorata and other weed species in the experimental area.

3. To determine the effect of planting sweet potato on the nut yield of coconut and on the soil chemical properties.

V. DURATION: 3 years

VI. BUDGETARY REQUIREMENT:

Source of Fund: PNAC

ITEM	YEAR 1	YEAR 2	YEAR 3	TOTAL
1. Personal Services	6890	6890	6890	20,670
2. Maintenance/Operating Expenses	8135	8135	8135	24,405
TOTAL	15025	15025	15025	45,075

EVALUATION OF RESEARCH PROPOSAL

I. TITLE: Intercropping Sweet Potato with Coconuts in"Gonoy"-Infested Plantation

II. PROPONENT/AGENCY: Palawan National Agricultural College

III. PROSPECTIVE PROJECT/STUDY LEADER(S):

Name	Designation
Anselmo Q. de la Cruz	Instructor

IV. GENERAL INSTRUCTIONS: Attention: Dr. A. Carpena, and
Dr. J. T. Carlos, Jr.

Kindly evaluate the attached research proposal from Palawan National Agricultural College. This falls under priority #3 of the Farming Systems commodity.

(SGD.) AMADO R. MAGLINAO
OIC, SWRRD, PCARR

V. REVIEW PANEL REPORT:

The proposal has been modified to incorporate the varieties of sweet potato which have been screened under shade. Additional treatments were included to increase the information that will be gathered. The proposal has also been checked with coconut commodity to assure that it is not duplicating any on-going project. The revised proposal should generate informations that will benefit the small farmers.

(X) Recommended for approval

(SGD.) A. CARPENA
Consultant

(SGD.) J. T. CARLOS, JR.
Consultant

(SGD.) A. A. GOMEZ
Team Leader

RECOMMENDING FOR APPROVAL:

J. D. DRILON, JR.
Director General

APPROVED:

MELECIO S. MAGNO
Chairman, PCARR Governing Council

Form No. : P-1

Page No. : 1 of 6

Philippine Agriculture and Resources Research System

RESEARCH PROPOSAL*

Prepared by: (A)
Name A.Q.DELA CRUZ
Revised Date
Original Date

To be filled up by PCARR	(B) Proposal Processing Code (PPC)	YR	MO	NO.	Research Monitoring Code (RMC)	CG	IC	YR	PG	PJ	SDY

BASIC INFORMATION

Research Title (C) ☐ Program ☐ Project ☒ Study

INTERCROPPING SWEET POTATOES WITH COCONUTS IN "GONOY"-INFESTED PLANTATION

Commodity/Research Priority Area and Rank (D)

Farming Systems/Survey & Data Collection (Coconut-based farming systems) Priority Rank # 3

Proponent Agency: (E)

Palawan National Agricultural College

Research Leader/Designation/Mailing Address

Mr. Anselmo de la Cruz
Instructor, Palawan National Agricultural College
Aborlan, Palawan

Implementing Research Station/Unit

Cooperating Agencies (if any): (F)

None

WORK PLAN SUMMARY

Planned Life of Project (in months) : (G) 36 mos.

Planned Start Date: January 1980

Planned Completion Date: December 1982

Studies or Major Activities** (H)	Duration (months)	Remarks
1. Selection and survey of the experimental area	3 weeks	
2. Collection, preparation and analysis of soil samples	3 weeks	
3. Layout of experiment, planting and fertilization of sweet potato intercrop	2 weeks	
4. Data collection, analysis and report preparation	10 mos.	

*Fill up this form on a study basis. For example, for a project consisting of 3 studies, 3 sets of pages 1 to 6 must be accomplished. For the project, summarize information in pages 1 and 2 of this form.

**For the project information summary, list down the study titles. For a specific study, list down the major research activities for the whole duration of project implementation, e.g., field preparation, data collection, data analysis and report writing.

IMPORTANCE/SIGNIFICANCE:

Coconut (Coccus nucifera, L.) is one of the most important crops in the Philippines. Today, the coconut industry assumes a very prominent role in the economic development of the country. More than 2.28 million hectares or 21 percent of the total cropland is devoted to coconut. The industry makes up about 20 percent of the country's exports and supplies almost 70 percent of the coconut products traded in the world market. In 1977 alone, the coconut products topped all export items of the country in foreign exchange with the combined income of almost $672 million (PCARR Monitor, 1978).

Although the coconut contribution to our world trade has gone up, there are still problems that beset the industry. Low productivity in our coconut has been attributed to poor management, high prices of chemical products, sporadic occurrence of pest problems, lack of capital and very meager technical assistance.

Another serious problem confronting coconut plantation especially in Southern Philippines, particularly, Mindoro, Palawan, Sulu and Zamboanga is the infestation of a weed species commonly called "hagonoy" (Chromoplaena odorata). This weed has been found to depress growth and reduce yield considerably and it is regarded as a heavy feeder of nutrients.

In view of the shortcomings, this experiment aims to find possible ways and means of utilizing the vast areas under coconut plantation for profitable endeavors.

REVIEW OF LITERATURE:

In the Philippines, the application of fertilizer around the coconut trees corrected the yellowing malady and improved the fruiting capacity of the trees. Yield increases due to each element were 22, 11 and 9 nuts per tree per year for nitrogen, phosphorus and potassium, respectively (Felizardo and Galvez, 1961). Similarly, an increase of 83 percent and 69 percent in terms of nuts and copra yields, respectively, was realized by the fertilization of low yielding trees in Pagbilao, Quezon (Felizardo, 1972).

In Davao, the Laguna tall coconut was induced to flower in 42 months after transplanting instead of the usual 6 to 7 years, by the application of ammonium sulfate and potassium chloride fertilizers (Mendoza and Prudente, 1972). The same fertilizer combination at the rate of 1.5 kg ammonium sulfate and 1.7 kg potassium chloride per tree per year effected an increase of 147 percent in copra yield over the control.

In another experiment involving the newly transplant coconut seedlings, N plus KCl fertilizers resulted in palms with longer leaves and appreciably stouter trunk than the control (Mendoza and Prudente, 1972).

Inland areas can be profitably planted to coconuts through proper fertilization and improved cultural management practices (Magat, et al, 1974). Recent results showed significantly more nuts with thicker, heavier meat and more copra per tree when applied with KCl, either with N or N-P than those palms without KCl.

Potassium application is indispensable for normal growth and development of young palms and high copra production of bearing plants. Records showed that a gain in production of more than a metric ton copra per hectare is realized with an annual application of 1.5 kg KCl per tree (Freemond, 1966; Coonan, 1974).

A recent investigation recommends the fertilization rate of 60-80: 30-90: 120-180 kg N, P_2O_5 and K_2O, respectively. This recommendation, if followed, would

in most cases produce respectable yield (Zamora, et al, 1977). On the other hand, the application of reasonable rates (kg/ha) are: N, 30-90, P_2O_5, 25-50 and 120-200 K_2O depending upon the soil types and planting seasons (Cheng and Li, 1970).

Fertilization of sweet potato fields depends on the results of soil analysis, rainfall and the individual grower operations. Generally, it is recommended that 108-132 kg/ha of N be applied; about 36 kg/ha at preplant, 48 kg/ha sidedressed at the last cultivation, and 24 kg/ha broadcast 4-5 weeks later. Phosphorus is required at about 72 kg/ha and should be applied at preplant. Potassium is required at about 100 kg/ha, 36 kg of which is applied at preplant and the remainder sidedressed at the last cultivation (Wilson, et al, 1976).

Aycerdo (1974) demonstrated that relay planting of tomatoes, cabbages, bush sitao and sweet potatoes as early as 20 days before harvest did not reduce yield or alter the other horticultural characters of sweet corn, the main crop. In general, the yield of the relay crops were not affected, but the crops matured later than their corresponding monocrops. The delay in maturation was attributed to shading of the young relay crops by the main crop. The relay crops received about 35 per cent of the prevailing solar radiation.

OBJECTIVES:

1. To determine the yield of sweet potato varieties under coconut trees.

2. To determine the monthly population of C. odorata and other weed species in the experimental area.

3. To determine the effect of planting sweet potato on the nut yield of coconut and on the soil chemical analysis.

PROCEDURE/METHODOLOGY:

The experimental area will be plowed twice with the use of the tractor. Harrowing will follow immediately after each plowing to pulverize the soil.

After land preparation, establishment of ridges will follow by the use of native plow. The height of the ridge should be at least 30 cm from the ground level and set at one meter apart.

Tip cuttings of each of the varieties (5 local varieties, 5 shade tolerant and 5 AVRDC varieties) will be used as planting materials. They will be planted on the ridges in a distance of 30 cm between hills.

The rate of fertilizers to be applied will be based from the result and recommendation of the analysis collected before the start of the experiment. The application of fertilizer will be, one-half before planting and another one-half on or before 30 days after planting. It will be broadcast uniformly during the last harrowing. The second application will be side or topdressed 10 cm away from the base of the plants.

Weeds will be controlled by handweeding and the area will be weeded once only when the plants will be at least 30 days old.

Pest control will be employed using malathion or any available insecticides. Recommended dosage will be followed.

The crops will be harvested mechanically by the use of the native plow at maturity.

Experimental design

Split plot design will be used in the experiment. An area of 1200 square meters excluding alleys will be replicated thrice. Each replication will be divided into three main plots (fertilizer levels). There will be 15 sub-plots (varieties) in every main plot. Twelve coconuts will be included and be used as samples for each main plot. Plot size will be 32 square meters.

Treatments

Main plots

1. F_0 - control
2. F_1 - recommended rate
3. E_2 - higher than recommended rates

Sub-plots

Fifteen (15) sweet potato varieties.

Data to be gathered

1. Fresh weight in kg of the tubers (yield per plot). Border plants will be excluded.
2. Weight of fresh vines in kg per plot. Border plants will be excluded.
3. Monthly counting of C. odorata and other weed species. The collection will be based from 2 meter quedrat per plot.
4. Monthly measurement of the vines based from ten sample plants.
5. Number of harvested nuts per fertilizer level. Harvesting will start after one year of experimentation and 45 days thereafter.
6. Weight of copra per fertilizer level. Drying will be done by conventional drying method.
7. Thickness of the fresh meat per fertilizer level. Ten coconuts will be measured by the use of caliper.
8. Length of the leaves from the base to the tip. Two (2) fully expanded leaves per tree will be measured at the end of each cropping.
9. Position of the leaves. This will be taken by measuring the angle between midrib (horizontal) and the trunk (vertical).
10. Soil analysis before the start of the experiment and at the end of each cropping season (organic matter, total N, P, K, and pH).

BIBLIOGRAPHY:

Aycardo, H. B. 1974. Relay cropping of sweet corn with other vegetable crops. Unpublished M.S. thesis, UPLB, Philippines.

Cheng, C. and L. Li. 1970. Sweet potato production in Taiwan. Tropical Root and Tuber Crops Tomorrow. Vol. II. College of Tropical Agriculture, Univ. of Hawaii. pp. 5-7

Cooman, P. and R. Oche. 1976. Profitability of mineral fertilizers on coconut palms in South Eastern Ivory Coast conditions. Oleageneux, 31:8-9, 375-382.

Felizardo, B. C. 1972. Response of coconut trees to different cultural and management practices. Paper presented to the Second ASEAN Soil Science Conference. Jakarta, Indonesia.

Felizardo, B. C. and L. L. Galvez. 1961. Fertilizer hike yield of yellowing coconuts. Agric. Los Banos I (1):17-19.

Freemond, Y., R. Ziller and M. de Nuce de Lanothe. 1966. The coconut palm. IRHO, Paris and IPI, Berne, Switzerland.

Magat, S. S.,.A. M. R. Mendoza and R. L. Prudente. 1974. Continuous fertilization on coconut palms from initial bearing to full bearing grown under the residual reddish-brown clayey soil of Davao. CSSP Proceedings of the 5th Scientific Meeting. Univ. of Nueva Caceres, Naga City. May 16-18, 1974.

Mendoza, A. M. and R. L. Prudente. 1972. Fertilization studies on coconut at the Philippine Coconut Research Institute. Symposium National Science and Technology Week, July 10-16, 1972.

Wilson, L. G., C. W. Averde and H. M. Covington. 1976. Sweet potato production, handling, curing, storage and marketing in North Carolina. Proc. 4th Symp. Soc. Trop. Root Crops. CIAT, Bali, Columbia, 1-7 August 1976.

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ANNUAL ACTIVITY SCHEDULE: for CY 1980 1/

No.	Activity Description	Date: Planned Start	Date: Planned Complete	Duration Weeks
1	Selection and survey of the experimental area			3 wks.
2	Collection, preparation and analysis of soil sample			3 wks.
3	Layout of experiment, planting and fertilization of sweet potato intercrop			1 week
4	Data collection, analysis and report preparation			10 mos. (continuous)

Schedule Network (Months): 1 2 3 4 5 6 7 8 9 10 11 12

ANNUAL LINE ITEM BUDGET: for CY ____ (M)

Period	Source of Funds \ Item	Personal Services: Additional Hires: Salaries	Wages	Others 2/	Honoraria 3/	Sub-Total	Maintenance Operation: Travel	Supplies/ Materials	Sundry	Sub-Total	Equipment	Capital Outlay	Total
First Quarter	PNAC	–	1742	–	–	1742	1,650	1,840	1,480	4,970	–	–	6,712.00
Second Quarter	PNAC	–	1716	–	–	1716	–	–	160	160	–	–	1,876.00
Third Quarter	PNAC	–	1716	–	–	1716	1,650	–	1,195	2,845	–	–	4,561.00
Fourth Quarter	PNAC	–	1716	–	–	1716	–	–	160	160	–	–	1,876.00
TOTAL		–	6890	–	–	6890	3,300	1,840	2,995	8,135.00	–	–	15,025.00

4-8-79

1/ Refer to the breakdown of major activities to be undertaken during the first year of implementation. Example: survey and preparation of area layout, fencing, planting, harvesting, etc. (Please refer to Annex B of the User's manual for guidelines as to activity breakdown) A bar chart of PERT/CPM network can be prepared based on the annual activity schedule.

2/ Includes state insurance, medical and other allowance for additional hires

3/ Payable to researchers.

PARRS Form No. : P-1
Page No. : 4 of 8

BUDGET SCHEDULE 1 — PERSONAL SERVICES for CY 1980 (N)

Additional Hire (Position) (N-1)	Salary per Mo. Wages per Day (N-2)	No. of Persons (N-3)	No. of Mos. (Days) (N-4)	Amount (N-5) 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Total (N-6)
Contractual laborer	13/day	2	265	1742	1716	1716	1716	6,890.00
— State Insurance, Medicare and Other Allowances 1/								
— Honoraria 2/								
TOTAL (N-6)				1742	1716	1716	1716	6,890.00

BUDGET SCHEDULE 2 TRAVELLING EXPENSES (O)

Period (O-1)	Destination and Purpose of Visit (O-2)	Mode of Transport (O-3)	No. of Persons (O-4)	No. of Trips (O-5)	Trans. Expenses (O-6) Rate Per Trip	Amount	Allowances and/or Per Diem (O-7) No. of Days/Trips	Rate Per Day	Amount	Total (O-8)
1st Qtr.	UPLB- soil analysis; data analysis (computer)	Plane	1	2	700	1,400	5	25	250.00	1,650.00
2nd Qtr.										
3rd Qtr.	UPLB - soil analysis; data analysis (computer)	Plane	1	2	700	1,400	5	25	250.00	1,650.00
4th Qtr.										
Total (O-8)						2,800			500.00	3,300.00

1/ Pertains to additional hires; posted in the quarter's applicable.

2/ Payable to researchers; posted in quarter's applicable.

4-8-79

PARRS Form No. : P-1
Page No. : 5 of 8

BUDGET SCHEDULE 3 — SUPPLIES AND MATERIALS (P)

Item (P-1)	Description (P-2)	Quantity (P-3)	Unit Cost (P-4)	Amount (P-5) 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Total (P-6)
Fertilizer	14-14-14	5 bags	90/bag	450	-	-	-	450.00
	Urea (45%)	4 bags	96/bag	384	-	-	-	384.00
	Muriate of potash (60%)	3 bags	75/bag	225	-	-	-	225.00
Insecticide	Malathion/Thiodan	6 quarts	45/quart	270	-	-	-	270.00
Sack		50 sacks	5/sack	250	-	-	-	250.00
Record book		2 pcs.	10/pc.	20	-	-	-	20.00

(continuation is on next page)

BUDGET SCHEDULE 4 — SUNDRY ITEMS (Q)

Item (Q-1)	Amount (Q-2) 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Total (Q-3)
Communication	-	-	-	-	-
Computer fee	500	-	500	-	1,000.00
Others: Soil analysis	175	-	175	-	350.00
Administrative Cost (5% of project cost before contingency) 1/	353	145	261	145	904.00
Contingency (10% of maintenance/operating expenses including administrative costs)	452	15	259	15	741.00
TOTAL (Q-3)	1480	160	1195	160	2,995.00

BUDGET SCHEDULE 5 — EQUIPMENT AND CAPITAL OUTLAY (R)

Item	Quantity (R-3)	Unit Cost (R-4)	Amount (R-5) 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Total (R-6)
TOTAL (R-6)							

(R-7)

BUDGET SCHEDULE 3 - SUPPLIES AND MATERIALS

I T E M	DESCRIPTION	QUANTITY	UNIT COST	A M O U N T				TOTAL
				1st Q	2nd Q	3rd Q	4th Q	
Bond paper	Mongol	2 reams	24/ream	48	-	-	-	48.00
Pad paper		2 pads	3/pad	6	-	-	-	6.00
Labeling materials		-	-	150	-	-	-	150.00
Pencil		1 dozen	7/dozen	7	-	-	-	7.00
Pentel pen		1 dozen	30/dozen	30	-	-	-	30.00
				1840	-	-	-	1,840.00

I. RESEARCHER CODE (File do not fill up)

INSTRUCTIONS FOR FILLING UP
1. PRINT OR TYPE ALL ANSWERS
2. DO NOT FILL UP SPACES INTENDED FOR CODES.
3. IF ALLOTED SPACE IS NOT ENOUGH USE ANOTHER SHEET OF SAME FORMAT.

SURNAME: DELA CRUZ
FIRST NAME: ANSELMO
MIDDLE NAME: QUIJANO

II. A. DATE OF BIRTH
Code: 1 1 5 4 3 — Jan. 15, 1943

B. PLACE OF BIRTH
Code: Bulungao, Pangasinan

C. SEX (Check appropriate box)
[X] Male [ ] Female

D. CIVIL STATUS (Check appropriate box)
[ ] Single [ ] Separated / Divorced
[X] Married [ ] Widow/er

E. CITIZENSHIP
[1] Code: Filipino

F. PRESENT ADDRESS
PNAC, Aborlan, Palawan
Code:

G. PRESENT POSITION/TITLE
Instructor
Code:

H. INSTITUTION/OFFICE/UNIT
P N A C
Code:

I. LOCATION OF INSTITUTION/OFFICE
Aborlan, Palawan
Code:

J. % TIME DEVOTED TO
research: 50 — res.adm.: — teaching: 50 —

K. NUMBER OF PUBLICATIONS
Technical:
Popular:

L. SIGNATURE
(SGD.)

III. ACADEMIC BACKGROUND

LEVEL	A) Name of School	B) Location	C) Degree	D) Major Field	E) Minor Field	F) Date Graduated	CODES A	B	C	D	E
1. High School											
2. Certificate /College											
3. Masteral	UPLB	Los Baños, Lag.	MS	Crop Physiology	Soils	Oct., 1979					
4. Doctoral											

IV. OTHER AWARDS/DISTINCTIONS RECEIVED (Include honorary degrees and socio/civic awards)
1. PCARR Scholar (1976–1978)
2.

V. MEMBERSHIP IN PROFESSIONAL/SCIENTIFIC AND HONOR SOCIETIES
1.
2.

VI. RECORD OF TRAINING, SEMINAR, STUDY AND SCHOLARSHIP GRANTS RELEVANT TO PROPOSED RESEARCH WORK

Title/Description		Place of Training	Inclusive Dates From	To	Total No. of Hours
1. Root Crops Training Program		PNAC, Aborlan, Palawan	2-1-76	2-14-76	14 days
2. Audio-Tutorial System Learning and Teaching Process		UPLB	5-2-79	5-4-79	3 days

VII. RESEARCH EXPERIENCE (INCLUDE ON GOING & COMPLETED RESEARCH WORK RELEVANT TO PROPOSED RESEARCH WORK)

A. DISCIPLINE	B. COMMODITY	INCLUSIVE DATES	NO. OF ON GOING PG L	PG C	PJ L	PJ C	SDY L	SDY C	NO. OF COMPLETED PG L	PG C	PJ L	PJ C	SDY L	SDY C	CODES A	B
Crops	Root Crops															
	Rice															

PG Program, PJ Project, SDY Study, L Leader, C Co-worker, Co Cooperator

Republic of the Philippines
PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES
RESEARCH Los Banos, Laguna, Philippines

13 June 1979

Dr. Azucena Carpena
Department of Agronomy
UPLB-CA, College, Laguna

Dear Dr. Carpena:

Enclosed is the revised research proposal of Mr. Anselmo de la Cruz entitled "Yield of Sweet Potato Varieties Under Coconut Trees" which you have evaluated. Kindly review if your comments/ suggestions are satisfied and incorporated in the revision.

For your reference, we are attaching a copy of the original proposal, comments/suggestions of the Technical Review Panel and the summary of discussion during the en banc evaluation.

If the revision is alright with you kindly indicate your approval.

Thank you for your usual cooperation.

Very truly yours,

(SGD.)
AMADO R. MAGLINAO
Officer-in-Charge

Attachment: a/s

Republic of the Philippines
PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH
Los Banos, Laguna, Philippines

13 June 1979

Dr. Juan T. Carlos, Jr.
Department of Horticulture
UPLB-CA, College, Laguna

Dear Dr. Carlos:

Enclosed is the revised research proposal of Mr. Anselmo de la Cruz entitled "Yield of Sweet Potato Varieties Under Coconut Trees" which you have evaluated. Kindly review if your comments/ suggestions are satisfied and incorporated in the revision.

For your reference, we are attaching a copy of the original proposal, comments/suggestions of the Technical Review Panel and the summary of discussion during the en banc evaluation.

If the revision is alright with you kindly indicate your approval.

Thank you for your usual cooperation.

Very truly yours,

(SGD.)
AMADO R. MAGLINAO
Officer-in-Charge

Attachment: a/s

Answers to comments/suggestions of the consultants on the proposed study, "Yield of Sweet Potato Varieties under Coconut Trees"

1) The proposed study was checked from the coconut commodity and there is no duplication as far as the on-going researches is concerned.

2) The proposed study was revised. These include introduction, review of literature and methodology. All the suggestions were fully discussed.

3) Data to be gathered for the coconut were included in the revised study like: harvested wt/year, wt of copra per fertilizer level (main plot), thickness of fresh coconut meat, length of the leaves and the position of the leaves.

4) The number of coconuts to be used for the experiment will be 12 instead of 18 coconuts per main plot (fertilizer level).

5) The fertilizer levels (main plots) will be based from the result and recommendation of the soil analysis. These are as follows: control (F_0), recommended rate (F_1) and greater rate than the recommended rate (F_3).

6) Test materials of sweet potato varieties were changed to the following:

   a. Five (5) local varieties
   b. Five (5) shade tolerant varieties
   c. Five AVRDC varieties

7) The proposed study will be conducted for three (3) years instead of 2 years.

(SGD.)
ANSELMO Q. de la CRUZ

SUMMARY OF DISCUSSION
7 May 1979

RE: Evaluation of research proposal "Yield of Sweet Potato Varieties Under Coconut Trees"

1. Change varieties to those tested by Dr. Carpena of UPLB under shade.

2. Verify with the on-going projects of VISCA for possible duplication.

3. There should be 18 trees/treatments.

4. Soil analysis data should be used to determine fertilizer treatment. The treatments should consist of two levels of fertilizer (0-60-90) and a control using native variety.

5. The proposed duration should be increased to three years to show the full effect of the treatments on coconut yield and copra content.

Republic of the Philippines
PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH
Los Banos, Laguna, Philippines

19 April 1979

Pres. Miguel Palao
Palawan National Agriculture College
Aborlan, Palawan

Dear Pres. Palao:

To facilitate the revision of proposals included in the National Commodity Research Program for CY 1980, we would like to meet the various proponents from the Palawan National Agriculture College and their corresponding consultants as per attached schedule at the PCARR Conference Room, PCARR Headquarters, Los Banos, Laguna.

We are attaching the comments and suggestions of the Technical Review Panel who evaluated the different proposals for the consideration of the various proponents. May we also request the proponents to bring their written answers/reactions to these comments.

Thank you for your usual cooperation.

Very truly yours,

(SGD.)
AMADO R. MAGLINAO
Officer-in-Charge

Attachment: a/s

cc: Mr. Anselmo de la Cruz
Mr. Celestino Morito

Republic of the Philippines
PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH
Los Banos, Laguna, Philippines

16 April 1979

Dr. Azucena Carpena
Department of Agronomy
UPLB-CA, College, Laguna

Dear Dr. Carpena:

To facilitate the revision of proposals included in the National Commodity Research Program for CY 1980, we would like to meet the various proponents and consultants as per attached schedule at the PCARR Conference Room, PCARR Headquarters, Los Banos, Laguna.

We will appreciate your attendance to this meeting. Thank you very much.

Very truly yours,

(SGD.)
AMADO R. MAGLINAO
Officer-in-Charge

Attachment: a/s

Republic of the Philippines
PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH
Los Banos, Laguna, Philippines

16 April 1979

Dr. Juan T. Carlos, Jr.
Department of Horticulture
UPLB-CA, College, Laguna

Dear Dr. Carlos:

To facilitate the revision of proposals included in the National Commodity Research Program for CY 1980, we would like to meet the various proponents and consultants as per attached schedule at the PCARR Conference Room, PCARR Headquarters, Los Banos, Laguna.

We will appreciate your attendance to this meeting. Thank you very much.

Very truly yours,

(SGD.)
AMADO R. MAGLINAO
Officer-in-Charge

Attachment: a/s

DEPARTMENT OF HORTICULTURE
Office of the Chairman

22 March 1979

Dr. Senen M. Miranda
Director, Soil and Water
Resources Division
PCARR, Los Banos, Leguna

Dear Dr. Miranda:

Herewith are my comments/suggestions on the proposed project "Yield of Sweet Potato Varieties Under Coconut Trees".

1. This proposal may need to be checked against the on-going projects at VISCA, for possible duplication.

2. There is a lot to be done in matters of utilizing the area under coconut and this is one of the possibilities with a lot of promise.

3. The c.v. for coconut populations ranges from 12 samples among the dwarf populations to 18 among the trees before stabilization. One palm per plot will not really mean much for purposes of attaining the objective with respect to coconut yield.

4. The soil analysis data prior to planting should probably be used to determine the quality and quantity of fertilizer to be applied, considering a compromise on the requirements of sweet potato and coconut. A 60-90-60 fertilizer may not exactly reflect the kind needed. It is not the rate either.

5. The proposal, as well as the proposed procedures, needs rationalization.

6. The proposed duration (24 months) may be insufficient to show the full effect of the treatments on coconut yield.

7. Other data than coconut yield may be needed, such as changes in leaf area (canopy) which affects light available to the catch crop, etc.

8 It is assumed that the proposal has a control.

9. A planting plan may be in order.

10. It might be better to introduce another variable, say fertilizer level, to maximize on the inputs of the project.

Thank you for passing on the proposal to me.

Very truly yours,

(SGD.) J.T. Carlos, Jr.
Chairman

Comments on the Research Proposal Entitled
"Yield of Sweet Potato Under Coconut Trees"

1. Since no bio-data are attached to the proposal, the undersigned will not be able to determine the research capabilities of the proponents.

2. One study leader would be sufficient if the proposal is approved.

3. Considering the fact that there are many areas in the Philippines planted with coconuts, any studies that would help increase income derived from coconut plantations would be of economic importance and relevant. The proposed study, however, may just be a repetition of studies being conducted in other places. Sweet potato-coconut intercropping studies are being conducted at VISCA (Ly Tung of VISCA, personal communication) and UPLB (the Horticulture Dept. often requests sweet potato cuttings from the undersigned for planting under coconuts). The undersigned has conducted several seasons of sweet potato yield trials under partial shade (the source of the shade is an artificial structure but the amount of shading is about the same as that obtained under coconuts, that is, about 40%).

4. The budget requested is reasonable.

(SGD.)

AZUCENA L. CARPENA
Consultant

RESEARCH TITLE: Yield of sweet potato varieties under coconut trees

PROPONENT: Anselmo de la Cruz

COMMENTS:

a) High priority on study 1 and 2.

b) The other studies can go to either sweet potato commodity or swine commodity.

(SGD.)

ARTURO A. GOMEZ

ANNEX VII
REFERENCES

1. Lantican, Ricardo M. Agricultural Research in the Philippines. Paper presented in the Seminar on National Agricultural Research Systems in Asia. Agricultural Development Council, New York. 1971.

2. The Philippine Agricultural Research System: Evaluation and Recommendations. Report of the Technical Panel to Chairman Gerardo Sicat, Chairman of the National Economic Council and Chairman of the Presidential Committee Executive Panel. December 20, 1971.

3. Madamba, J. C. The First Two Years of PCARR. Second Anniversary Symposium. UPLB Campus, Los Banos, Laguna. 1974.

4. PCARR. Descriptive Brochure. Undated (after 1978).

5. PCARR. Vegetable Crops: National Program of Research. PCARR Crops Research Division. Undated (about 1975).

In addition to the above, reference material is noted in the text of the report for specific issues discussed.