

付 属 資 料

付屬資料-- 1 討議議事録


THE RECORD OF DISCUSSIONS
BETWEEN THE JAPANESE IMPLEMENTATION SURVEY TEAM
AND THE AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE REPUBLIC OF THE PHILIPPINES
ON THE JAPANESE TECHNICAL COOPERATION FOR
THE DIVERSIFIED CROPS IRRIGATION ENGINEERING PROJECT

The Japanese Implementation Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Yuji Sakamoto, visited the Republic of the Philippines from May 19 to May 30, 1987, for the purpose of working out the details of the technical cooperation program concerning the Diversified Crops Irrigation Engineering Project.

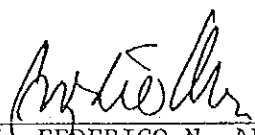
During its stay in the Republic of the Philippines, the Team exchanged views and had a series of discussions with the Philippine authorities concerned in respect of the desirable measures to be taken by both Governments for the successful implementation of the above mentioned project.

As a result of the discussions, both parties agreed to recommend to their respective Governments the matters referred to in the document attached hereto.

Manila, May 28, 1987



MR. YUJI SAKAMOTO
Leader
Implementation Survey Team
Japan International Cooperation
Agency, Japan



ATTY. FEDERICO N. ALDAY, JR.
Administrator
National Irrigation Administration

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THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN BOTH GOVERNMENTS

1. The Government of Japan and the Government of the Republic of the Philippines will cooperate with each other in implementing the Diversified Crops Irrigation Engineering Project (hereinafter referred to as "the Project") for the purpose of development of irrigation engineering for diversified crops in the Philippines and thus contributing to the promotion of diversified crops production and agricultural development of the Philippines.
2. The Project will be implemented in accordance with the Master Plan which is given in Section I of the Annex.

II. DISPATCH OF JAPANESE EXPERTS

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense services of the Japanese experts as listed in Section II of the Annex through the normal procedures under the Colombo Plan Technical Cooperation Scheme.
2. The Japanese experts referred to in Paragraph 1 above and their families will be granted in the Republic of the Philippines the privileges, exemptions and benefits no less favourable than those accorded to experts of third countries working in the Republic of the Philippines under the Colombo Plan Technical Cooperation Scheme.

III. PROVISION OF MACHINERY AND EQUIPMENT

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Section III of the Annex through the normal procedures under the Colombo Plan Technical Cooperation Scheme.
 2. The Equipment will become the property of the Government of the Republic of the Philippines upon being delivered c.i.f. to the Philippine authorities concerned at the ports and/or airports of disembarkation, and will be utilized exclusively for the implementation of the Project in consultation with the Japanese experts referred to in Section II of the Annex.
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IV. SPECIAL MEASURES TO BE TAKEN BY THE GOVERNMENT OF JAPAN

For fostering the smooth promotion of the Project, in accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to supplement a part of expenditures in the local cost for the execution of the improvement of the physical infrastructure of the Project such as construction work of trial farm and so on, when the necessity arises.

V. TRAINING OF PHILIPPINES PERSONNEL IN JAPAN


1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to receive at its own expense the Philippines personnel connected with the project for technical training in Japan through the normal procedures under the Colombo Plan Technical Cooperation Scheme.
2. The Government of the Republic of the Philippines will take necessary measures to ensure that the knowledge and experience acquired by the personnel from technical training in Japan will be utilized effectively for the implementation of the Project.

VI. SERVICES OF PHILIPPINE COUNTERPART AND ADMINISTRATION PERSONNEL


1. In accordance with the laws and regulations in force in the Republic of the Philippines, the Government of the Republic of the Philippines will take necessary measures to secure at its own expense the necessary services of Philippine counterpart and administrative personnel as listed in Section IV of the Annex.
2. The Government of the Republic of the Philippines will allocate the necessary number of suitably qualified personnel corresponding to each Japanese expert to be dispatched by the Government of Japan as specified in Section II of the Annex for the effective and successful transfer of technology under the Project.

VII. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE REPUBLIC OF THE PHILIPPINES

1. In accordance with the laws and regulations in force in the Republic of the Philippines, the Government of the Republic of the Philippines will take necessary measures to provide at its own expense:
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- 1) Land, buildings and facilities as listed in Section V of the Annex;
 - 2) Supply or replacement of machinery, instrument, vehicles, tools, spare parts and any other materials necessary for the implementation of the project other than those provided through JICA under Section III of the document;
 - 3) Transportation facilities and travel allowance for the official travel of Japanese experts within the Republic of the Philippines and
 - 4) Suitably furnished accommodations for the Japanese experts and their families.
2. In accordance with the laws and regulations in force in the Republic of the Philippines, the Government of the Republic of the Philippines will take necessary measures to meet:
- 1) Expenses necessary for the transportation of the Equipment within the Republic of the Philippines as well as for the installation, operation and maintenance thereof;
 - 2) Customs duties, internal taxes and any other charges, imposed on the Equipment in the Republic of the Philippines and
 - 3) All running expenses necessary for the implementation of the Project.

VIII. ADMINISTRATION OF THE PROJECT

1. The Administrator of National Irrigation Administration (hereinafter referred to as "NIA") will set up the Project in the NIA organization as shown in Section VII of the Annex and bear overall responsibility for the implementation of the Project.
 2. The Project Manager, equivalent grade of Department Manager, to be appointed by the NIA Administrator, will be responsible for the administration and managerial matters of the Project.
 3. The Japanese Team Leader will provide necessary recommendation and advice on technical and administrative matters concerning the implementation of the Project to the Project Manager.
 4. The Japanese experts will give necessary technical guidance and advice to the Philippine counterpart personnel on matters pertaining to the implementation of the Project.
 5. For the effective and successful implementation of the Project, a Joint Committee will be established with the function and composition as referred to in Section VI of the Annex.
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IX. CLAIMS AGAINST JAPANESE EXPERTS

The Government of the Republic of the Philippines undertakes to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Republic of the Philippines except for those arising from the willful misconduct or gross negligence of the Japanese experts.

X. MUTUAL CONSULTATION

There will be mutual consultation between the two Governments on any major issues arising from, or in connection with this Attached Document.

XI. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be five (5) years from the date of signing of the Record of Discussion. However, there will be a general review by the Joint Committee on the progress of the implementation of the project during the third year of the cooperation period in order to assess whether the term of cooperation should be modified for the successful implementation of the Project.

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A N N E X

I. MASTER PLAN

1. Objective of the Project
The Project will be carried out for the purpose of development of irrigation engineering for diversified crops in the Philippines, thus contributing to the promotion of diversified crops production and agricultural development of the Philippines.
2. Activities of Japanese Technical Cooperation
The following activities concerning diversified crops irrigation engineering will be carried out in the Project in the existing irrigation systems for the paddy field.
 - 1) To collect and analyze data and information.
 - 2) To conduct field studies on establishment of appropriate irrigation methods, diversified crops cultivation techniques and others.
 - 3) To prepare technology criteria.
 - 4) To conduct technical training for technical staff members of NIA.
3. Project Sites
 - 1) The Main Project Office NIA Headquarters in Quezon City
 - 2) The Trial Farm of about 3 ha San Rafael, Bulacan
 - 3) The Field Office/Laboratory San Rafael, Bulacan
 - 4) The Soil and Water Laboratory NIA Soil and Water Laboratory in Munoz, Nueva Ecija
 - 5) The Training Center NIA Training Center in San Rafael, Bulacan

II. JAPANESE EXPERTS

1. Team Leader
 2. Coordinator
 3. Experts in the field of:
 - 1) Irrigation engineering (Planning criteria)
 - 2) Irrigation engineering (Design criteria)
 - 3) Irrigation engineering (Water management)
 - 4) Agronomy
 - 5) Pedology
 - 6) Irrigation engineering (Training)
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- Note: a) One expert may cover more than one field.
b) Short-term experts in other related fields may be dispatched when necessity arises, for the smooth implementation of the Project.

III. ITEMS OF EQUIPMENT

1. Equipment and instruments of irrigation and drainage for use in trial farm
2. Agricultural machinery and equipment and their spare parts
3. Laboratory equipment for soil analysis
4. Books and teaching materials including audio-visual aids
5. Vehicles
6. Other equipment and materials mutually agreed upon as necessary

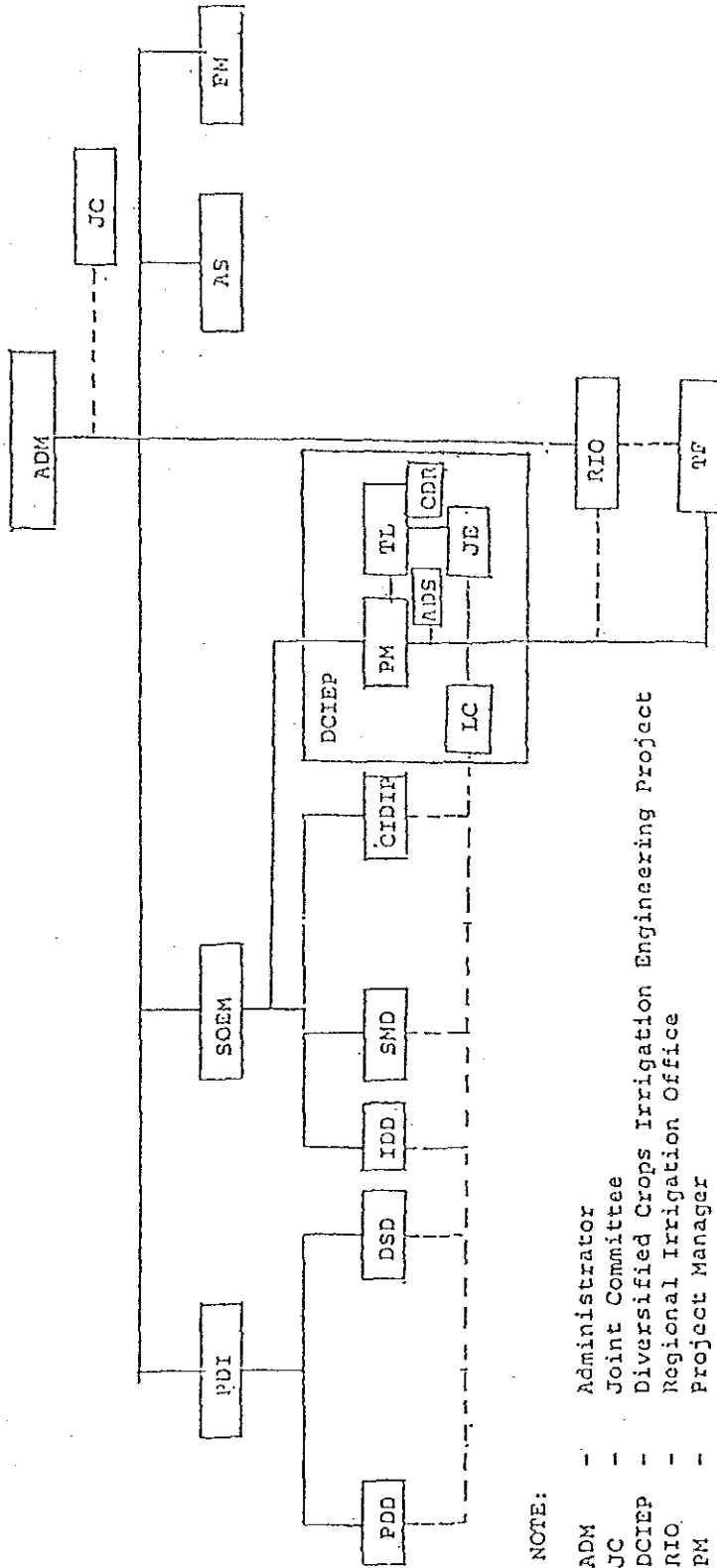
IV. LIST OF PHILIPPINE COUNTERPART AND ADMINISTRATIVE PERSONNEL

1. Project Manager
2. Counterpart personnel in the field of:
 - 1) Irrigation engineering (Planning criteria)
 - 2) Irrigation engineering (Design criteria)
 - 3) Irrigation engineering (Water management)
 - 4) Agronomy (Diversified crops cultivation)
 - 5) Pedology
 - 6) Irrigation engineering (Training)
 - 7) Field management
3. Administrative personnel
 - 1) Administration
 - 2) Accounting
4. Other necessary supporting staffs

V. LIST OF LAND, BUILDING AND FACILITIES

1. The Main Project Office NIA Headquarters in Quezon City
 2. The Trial Farm of about 3ha San Rafael, Bulacan
 3. The Field Office/Laboratory San Rafael, Bulacan
 4. The Soil and Water Laboratory NIA Soil and Water Laboratory in Munoz, Nueva Ecija
- /s/

VII. ORGANIZATIONAL CHART



NOTE:

- ADM - Administrator
- JC - Joint Committee
- DCIEP - Diversified Crops Irrigation Engineering Project
- RIO - Regional Irrigation Office
- PM - Project Manager
- TL - Team Leader
- JE - Japanese Expert
- LC - Local Counterpart
- TF - Trial Farm
- ADS - Administrative Staff
- CDR - Coordinator

DIVERSIFIED CROPS IRRIGATION ENGINEERING PROJECT
PROPOSAL FROM NIA

A. ORGANIZATION AND STAFFING

A.1 JICA TEAM

The various experts shall be assigned long-term or short-term and on a continuous or staggered basis depending on the needs for their services.

The team shall be supported by a local staff to include clerks, typists, and drivers.

A.2 LOCAL COUNTERPARTS (Central Office-based)

The technical staff who shall work together with the experts shall be drafted primarily from PDD and SMD, and depending on the needs, from other units of NIA. Individual assignments shall be on full-time or part-time (concurrently with present jobs) basis, also depending on the needs for their services.

For clerical and typing needs, the counterpart staff shall avail of the services of PDD & SMD clerk/typist or if necessary permanent clerks/typists and drivers shall be assigned.

A.3 TRAINING CENTER

The project could make use of any of the existing NIA Training Centers: the NIA National Training Center in San Rafael; the Water Management Training Centers; Regional Training Centers

and the NIA (LBDP-II)-MAF Training Center of the LBDP II Vegetable Component. A Training officer/coordinator would be assigned to arrange for the training needs of the project. Training staff who shall act as Secretariat during trainings and to complement the existing staff of the Centers would also be assigned if necessary.

A.4 SOILS & WATER LABORATORY AND CENTRAL NURSERY

The existing staff of the NIA soils and water laboratory shall be employed in this project. Whenever necessary, additional staff shall be hired so as not to jeopardize other activities of the SWL.

A.5 TEST FARMS & NURSERY

NIA shall provide the necessary Organization to manage the Test Farms and shall include a Farm Manager, Research Assistants knowledgeable on irrigation and diversified crops production, equipment operators and laborers. The required labor for day-to-day operations shall be permanent while seasonal labor requirement shall be hired.

A.6 STUDIES ON THE EXISTING SYSTEMS

Project activities/undertakings on the other national irrigation systems shall be in coordination with the concerned NIA Staff in the Regional Irrigation Offices and Systems/Project Offices.

B. FACILITIES AND EQUIPMENT

B.1 OFFICE

The JICA Team and Local Counterparts shall be provided adequate office space at NIA Central Office in Quezon City. The office shall be furnished with tables & chairs, and telephone facilities.

It is requested that the following facilities for use in the office would be procured by the Project:

- a) Filing & Storage Cabinets
- b) Typewriters
- c) Copying machine
- d) Drafting equipment
- e) Portable airconditioners/electric fans
- f) Other necessary office equipment and supplies not available locally.

B.2 TRAINING CENTER

The NIA-National Training Center in San Rafael, Bulacan is recommended to be used. The Project, however, should provide necessary training supplies and counterpart funds for the proper upkeep and maintenance of Training Center and its facilities.

If necessary, it is requested that the project would procure additional equipment to complement those that are now available.

It is also requested that the Project shall sponsor staff training and observation tours in Japan for personnel engaged in this project. Subjects shall include Diversified Crops Irrigation Planning, Design, Operation, and maintenance.

B.3 SOILS AND WATER LABORATORY

It is recommended that the NIA Soils & Water Laboratory in Muñoz would be used for Specialized Analyses. Routine analyses (e.g. Screening & Fertility tests) could be done in the Test Farms with the use of Portable or Handy apparatus.

It is requested that other necessary equipment not available in the laboratory or to replace the old and non-operational units would be procured by the Project; including the portable equipment for use in the field (Test Farms).

B.4 FIELD OFFICE AND TEST FARM FACILITIES

The field offices for the Experts and counterparts would be established at LBDP II in Tanza Cavite and AMRIS in San Rafael, Bulacan. The existing project & systems' office building would be refurnished and provided with tables and chairs. Along with these sites, other areas to be identified later would be considered for the establishment of Test Farms.

It is requested that the following facilities for the test farms would be constructed/provided by the Project; within the limits of funds provided for under this particular project-type technical cooperation.

1. FARM HOUSE with the following features:

- a) Working room for Farm Technicians
- b) Sleeping quarters with kitchen-dining room
- c) Farm equipment/machinery shed and storage room
- d) Seedling nursery

2. IRRIGATION EQUIPMENT

- a) Complete sets of irrigation equipment for DRIP or TRICKLE irrigation; SPRINKLER SYSTEM; and for FURROW irrigation.

- b) Agro-hydro-meteorological equipment (For the 12 Regions)
- c) Field Measuring devices like soil moisture meters, tensionometers, etc.

3. FARMING EQUIPMENT & IMPLEMENT

- a) Four-wheel or Hand tractors including complete attachments
- b) Fertilizer applicators
- c) Hand sprayers
- d) Other hand tools
- e) Other facilities necessary in operating the farm

4. SERVICE VEHICLES

- a) For the Team and Local Counterparts (Cars, Jeeps)
- b) For the Test Farms (Jeeps, Pick-ups)

5. COMPUTER FACILITIES FOR THE PROJECT

- a) To add one (1) megabyte to the existing one (1) MB CPU of the VAX 11/750 computer system at NIA Head Office to accommodate the computer needs of the Project.
- b) To add 6 units microcomputers for the NIA Regional Offices to facilitate data collation and analyses in the Regions.
- c) Softwares to complement these new available and developed to suit the needs of the Project.

NOTE:

Along with this Technical Assistance package, a separate request for complementary Grant-in-Aid is being considered by NIA, for the construction of a building at NIA Headquarters in Quezon City. Initially, the building is envisioned to house or accommodate the Soils and Water Laboratory; Training-Conference-Rooms; JICA-Study Group Offices; and Dormitories.

As soil samples (and water samples) are coming from all the Regions nationwide, it is more convenient to have the SWL at Quezon City. An ideal space for offices of the Study Group would be provided. The consideration of same request for the particular Project shall, however, not jeopardize earlier grants-in-aid requested for other priority projects of NIA.

DIVERSIFIED CROPS IRRIGATION ENGINEERING PROJECT

- I PROPOSED AREA: The project covers all over the country
- II EXECUTING AGENCY: NATIONAL IRRIGATION ADMINISTRATION (NIA)
- III OBJECTIVES:

GENERAL OBJECTIVES:

1. To investigate/determine the most appropriate and economical irrigation method/techniques, water requirement, and tertial development for diversified crops production.
2. To develop design criteria/standards and come up with a comprehensive recommendations in developing diversified crops irrigation project/systems.
3. To study necessity and possibility of diversified crops irrigation with the objective of utilizing more efficiently available water resources and land resources, and come up with a comprehensive diversified crops irrigation projects/systems.
4. To train planners, designers and prospective O & M staff of systems/projects planned and designed for diversified crops irrigation.

SPECIFIC OBJECTIVES:

1. To test the applicability (engineering & economics) of the various methods of irrigating the more important diversified crops under different soils and agro-climatic environment in conjunction with improved crop cultural and management practices and recommended cropping patterns.

2. To determine the optimum amount of irrigation application and water requirements under different stages of plant growth, necessary to attain maximum crop yields.
3. To prepare a detailed criteria and standards, based on results of studies and experiments, in the planning, design and O & M of irrigation facilities for diversified crops, suited to the needs of the different soils and agro-climatic zones.
4. To develop an irrigation suitability guide for various diversified crops in the different regions (existing irrigation systems) of the country.
5. To determine other requisites in the successful irrigation of various diversified crops.
6. To develop training modules (learning-by-doing) for planners, designers, and O & M engineers in diversified crops irrigation.

IV BACKGROUND:

With the attainment of self-sufficiency in rice, the government placed more emphasis on the production of the other important crops. Improvement of the quality and the quantity of the diversified crops, such as corn, cotton, sugarcane, vegetables, other grains and feeds, would promote the exportation and reduce the importation, bring great benefits not only to farmer but also to the country.

As the country is composed of many small islands, water resources are hard to develop at low cost because the

rivers do not have large catchment areas and it is difficult for an irrigation project to have a large benefited area correspond to the construction costs. Under such natural conditions, the importance of the cultivation of low-water-requirement crops particularly during the dry season would be higher.

On the other hand, one major thrust of the Agency is maintaining viability in the operations of the irrigation systems. The introduction of the innovative measures to increase benefits through the attainment of higher irrigation cropping intensity in the limited water resources the introduction of diversified crops making higher profit, and the reduction of operating costs are foremost among its strategies. With adequate support from the government, a shift to these diversified crops would increase farm productivity and improve the welfare of the farmers.

The project would promote crops diversification and contribute to the improvement of cropping intensities in the existing irrigation systems; as well as generate valuable information for the development and operation of diversified crops irrigation projects.

As this is NIA's first attempt of diversified crops irrigation engineering activities, NIA needs technical assistance in this field. Probable source of assistance is Japan which is advance in agricultural development.

V. SCOPE OF WORKS :

1. Collection, analysis, arrangement of the nationwide necessary data.

1.1. Collection of the existing data;

The following existing data are collected

- a) Natural conditions; climate, topography, soils, geology.
- b) Hydrology
- c) Socio economy, farming; planted crops, marketing, labor, farmers' intention.
- d) Recommendable institutes, documents, concerned.
- e) Inventory of existing national irrigation systems.

1.2. Field/laboratory investigation

The test farms (a few farms every region) will be selected from existing experimental stations/private farmers planted with diversified crops

- a) Soil analysis; grading, real specific gravity, apparent specific gravity, pF-moisture ratio curve.
- b) Soil water constant; moisture holding capacity after 24 hours, depletion of moisture content for optimum growth.
- c) Consumptive use,; effective soil layer, important soil layer for growth, soil moisture extraction pattern, water balance survey.

Climate; pan evaporation, sunshine volume and hours, humidity, temperature, wind velocity, rainfall.

- e) Terminal irrigation facilities; intake rate, water application efficiency, water distribution coefficient.

f) In order to implement the investigation of terminal irrigation facilities, water application efficiency, water distribution coefficient in each irrigation method, test farms will be constructed in the service areas of Angat-Masim River Irrigation System, Central Luzon Ground Water Irrigation Project, and Second Laguna De Bay Development Project.

Facilities of Furrow irrigation; drip irrigation; and sprinkler irrigation, and necessary equipment for observation will be set on each test farm.

The test farms will be managed by NIA in cooperation with the farmers.

1.3. Analysis and arrangement of the data

The data and the results of the investigation will be made analysis and arrangement with upgrading the NIA computer system and micro film system.

1.4. Supply of experimental equipments and training for data collectors and investigators.

Laboratory tests and training for investigators are carried out at the NIA Training-Center in Cabanatuan, San Rafael and Cavite.

2. Development of design criteria and standard

2.1 Appropriate methods of irrigation

2.2 Design criteria : It may be necessary to show standard/basic values which are attained from investigations on the fields or in the laboratories. The investigations and the training for the investigators are executed at the NIA training centers, agricultural experiment stations/or existing fields. Soil physical experiment is executed in the Muñoz Training Center.

2.3 Standards of the irrigation facilities, installation and operation.

3. Application to study results to several systems.

TEAM COMPOSITION AND OFFICE :

The main office of the project will be established at the NIA Central Office, Quezon City.

The team is composed by a team leader (irrigation engineer), an irrigation engineer, an O & M engineer, a soil specialist, an agronomist who is engaged to collect the data, an agro-economist who is engaged to collect the data and to application. and a coordinator.

VII WORK SCHEDULE :

	I	II	III	IV	V
1. Preparation	_____				
2. Data Collection		_____			
3. Field Survey		_____			
4. Standard/Criteria			_____		
5. Application				_____	
Team Leader	_____	_____	_____	_____	_____
Irrigation Engineer	_____	_____	_____	_____	_____
O & M Engineer	_____	_____	_____	_____	_____
Soil Specialist	_____	_____	_____	_____	_____
Agronomist	_____	_____	_____	_____	_____
Agro-economist	_____	_____	_____	_____	_____
Coordinator	_____	_____	_____	_____	_____

MINUTES OF DISCUSSIONS

BETWEEN

PROJECT IDENTIFICATION STUDY TEAM OF JICA

AND

THE NATIONAL IRRIGATION ADMINISTRATION

DIVERSIFIED CROPS IRRIGATION ENGINEERING PROJECT

MINUTES OF DISCUSSIONS

In response to the request from the Government of the Republic of the Philippines for cooperation in the Diversified Crop Irrigation Engineering Project; the Government of Japan, through the Japan International Cooperation Agency dispatched to the Philippines the Project Identification Study Team, headed by Mr. Yusuke Suematsu for the above-mentioned project from September 26 to October 6, 1985.

The team had series of discussions with the representatives of the National Irrigation Administration and other related organizations of the Government of the Philippines to study details of the proposal and exchange opinions on the project. The Team also made field trips to various sites where establishment of such facilities as test farms, laboratory and training centre for the project was proposed by NIA.

1. (1) In the discussions NIA explained that this project had been planned in accordance with the policy of the Government of the Philippines for promotion of Crop Diversification and that primary objectives of the Project are to investigate the most appropriate methods of diversified crop irrigation for the Philippines and to establish standard for planning and designing of irrigation facilities for Crop Diversification.
- (2) NIA noted that such facilities as the head office, 3-4 test farms and field offices, a test laboratory and a training centre would be necessary for the implementation of the project and that NIA was considering to establish in near future "Diversified Crop Irrigation Engineering Centre" in Manila - the centralized facility.

for the project. However, NIA explained its intention to utilize existing facilities in the initial stage of the project in order to start the project as soon as possible and proposed to use the following sites as the initial locations for the necessary facilities.

- (a) the head office - in the NIA Headquarters
- (b) test farms and field offices - (i) in LBDF II Project Site
(ii) field office in the NIA Regional Headquarters in San Rafael and a test farm in the vicinity.
- (c) test laboratory - in the NIA soil and water laboratory in Muñoz
- (d) training centre - in the NIA Training Centre in San Rafael

(3) NIA further suggested that it was considering to submit a request for Japanese Grant Aid for construction of the "Diversified Crop Irrigation Engineering Centre" in the NIA Headquarters compound.

(4) NIA also requested that test irrigation facilities and other necessary equipment would be provided by JICA in the Project.

2. (1). The Study Team informed NIA that, as a result of the study, the Team could have fully understood the background and the content of the proposal and the aim of the project. The Team promised to convey the study result and the necessity of the project to the authorities concerned of the Government of Japan for further consideration.

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(2) The Team agreed to locate the head office of the Project in the NIA Headquarters and requested NIA to provide an appropriate office which is suitable for office activities by Japanese experts and local counterparts if the project would be started.

(3) The Team noted that, in the selection of location of test farms, such factors as following should be taken into consideration.

1. Dominant soil types
2. existence of an office of NIA in the vicinity for management of the test farm and field office
3. Nearness to the head office
4. availability of water for irrigation

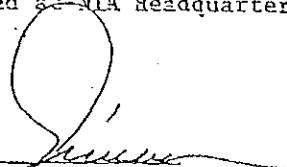
(4) The Team informed NIA that JICA is planning to dispatch a follow-up survey mission after this study in order to collect more information and data necessary for further study on formulation of the project including those factors mentioned in 2-(3) above. The Team, therefore, suggested that final locations of the test farms would be determined based on the findings of the follow-up mission.

(5) As for the suggestion by NIA concerning request for Grant Aid, the Team explained that they were not in the position to discuss the matter as they had been dispatched to study the possibility of Project Type Technical Cooperation. The Team pointed out that NIA should make another request through proper channel if NIA reached decisions to submit such Grant Aid request. However,

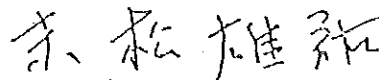
the Team noted that it would report NIA's suggestion to the authority concerned of the Government of Japan.

October 5, 1985

Signed at NIA Headquarters in Manila



AVELINO S. RIVERA
Department Manager
Project Development Department
National Irrigation Administration



Mr. YUSUKE SUEMATSU
Team Leader of the Project
Identification Study Team
for the Diversified Crop
Irrigation Engineering
Project

付属資料-4 サマリーレポート(英文)

THE SUMMARY REPORT
ON
ONE-MONTH SURVEY
FOR
DIVERSIFIED CROPS IRRIGATION ENGINEERING PROJECT
IN
THE REPUBLIC OF THE PHILIPPINES

October, 1986

The One-month Survey Team

Japan International Cooperation Agency (JICA)

I. Introduction

With the attainment of self-sufficiency in rice, the Government of the Republic of the Philippines placed more emphasis on the production of non-rice crops. For this crop diversification strategy, the Government proposed a technical assistance project called Diversified Crops Irrigation Engineering Project (DCIEP) with a responsible organization of the National Irrigation Administration (NIA) to the Government of Japan on May 29, 1984. Four general objectives of the project were stated: 1) to investigate/determine the most appropriate and economical irrigation method/techniques, water requirement, and tertiary development for diversified crops production, 2) to develop design criteria/standards and come up with comprehensive recommendations in developing diversified crops irrigation project/systems, 3) to study necessity and possibility of diversified crops irrigation with the objective of utilizing more efficiently available water resources and land resources, and come up with a comprehensive diversified crops irrigation projects/system and 4) to train planners, designers and prospective O & M staff of systems/projects planned and designed for diversified crops irrigation.

The importance of the proposal was fully understood with the study made by the Project Identification Study Team dispatched on September, 1985 under the leadership of Mr. Suemastu. In the Minutes of Discussions signed on October 5, 1985, it was suggested that the next step for commencement of the project be dispatch of a follow-up survey mission for further study on formulation of the project. Acting upon this suggestion, the Government of Japan, through the Japan International Cooperation Agency (JICA), dispatched two specialists for one month.

The one-month survey team conducted field investigation and discussions with the staffs related to DCIEP from August 20, 1986 to September 18. The preliminary summary of the one-month survey was presented at the conference held on September 16-17, 1986, with all the responsible officials in NIA. Several comments/suggestions were made by

NIA staffs. The discussion summary shown in Chapter V was reported to the responsible officials of the Japanese government.

II. SURVEY MEMBERS

Name	Speciality	Title & Organization
Noriaki Shioziri	Agronomy	Deputy Head Resources Division, Kinki Regional Bureau, Ministry of Agriculture, Forestry & Fisheries
Hideyuki Kanamori	Irrigation & Drainage	Development Specialist, Institute for International Cooperation, Japan International Cooperation Agency (JICA)

III. OBJECTIVES

To execute supplemental study, especially from technological viewpoints, for provision of basic data to formulate the project.

To discuss the implementation structure for promotion of mutual understanding.

IV. ACTIVITIES

Three main activities were carried out:

- 1) offering a questionnaire and studying the answers,
- 2) site reconnaissance and investigation, and

- 3) discussion with engineers and officers of the related organization to DCIEP.

A list of the engineers and officers with whom discussions were held during the survey are shown in Appendix A. Details of the survey activities are described in the work schedule shown in Appendix B.

V. SURVEY RESULT SUMMARY

1. PROJECT BACKGROUND

1.1. Study on Food Demand and Supply

A study called "Study on Food Demand and Supply and Related Strategies for Developing Member Countries" (Phase I) was conducted from February 1983 to May 1984 with the technical assistance of the Asian Development Bank (ADB), being undertaken jointly by the International Food Policy Research Institute (IFPRI) and the International Rice Research Institute (IRRI). The study had operational aspects of satisfying future food consumption requirement and of developing suitable approaches and methodologies for use in analysis and determination of optimum strategies for agricultural development. The Philippines was used as a case study to develop a methodology by which to analyze other countries.

The study included analysis for the Philippines with the following findings:

- 1) The results of projections for rice consumption indicate that even with the full completion of on-going and planned irrigation investments by NIA, the Philippines is likely to return to a modest deficit in the late 1980's, which will gradually increase through 2000. The results for corn indicated that despite projected growth in corn yields higher than past trends, a rapidly growing supply/demand deficit is projected, primarily due to growth in demand for corn for livestock feed.

2) The analysis by sensitivity tests of the projected combined deficit for rice and corn indicates that it will be difficult to eliminate the combined deficit. However, if corn displaces the dry season irrigated rice, rapid growth in HYV corn technology could reduce the corn deficit by 1.2 million metric tons but increase the rice deficit by 677,000 metric tons, the displacement of the dry season rice thus offsetting half the gain in corn production.

3) Generation long term surpluses in rice are potentially costly. One alternative for dealing with potential sustained rice surpluses suggests a shift of the excess capacity in irrigation out of rice and into production of corn or other crops such as cotton or soybeans.

Based on these findings, "Diversified Irrigated Agriculture" was suggested for the shift of excess irrigation capacity. This suggestion included two forms: direct conversion of rainfed rice cultivation into corn or other crops, or conversion of rainfed rice cultivation into other crops. It was also suggested that the conversion of the dry season irrigated cultivation from rice to corn or other crops requires improved management in irrigation systems.

1.2. Crop Diversification Study

In May 1984, based on the findings of the Phase I study, ADB proposed further technical assistance for the follow-up study (Phase II) to the Governments of the Philippines and Indonesia. Both Governments accepted the proposal. In the Philippines, the ADB has been conducting the assistance for phase II study for two years starting from January 1985. The main objectives of the Phase II study are to assist in developing plans to help meet the goals of self-sufficiency in rice and corn, and in diversification of agricultural production in different irrigated and rainfed regions of the Philippines. There are three major components: 1) to provide prescriptions for effective Government pricing policy and intervention in support of agricultural production objectives, 2) to regionalize the findings of the Phase I study to reflect the Philippines's highly variable resource endowments, and 3) to develop a practical technology for irrigation to achieve crop diversification.

The ADB again entrusted IFPRI to continue items 1) and 2). Item 3) was undertaken by the International Irrigation Management Institute (IIMI) established in Sri Lanka in May 1983, whose ultimate goal is to enhance independent national competence to improve irrigation performance with special emphasis on irrigation management. IIMI has conducted the study in cooperation with NIA.

IFPRI is going to submit the final report in November 1986, and IIMI in December.

1.3. IIMI Second Phase Study Draft

The IIMI implementation period was for 22 months, starting in February 1985. Because this period covered only one dry season, extension of the study into the second phase has been discussed, covering three dry seasons. The second phase is expected to be implemented for 30 months starting from January 1987. The components of the second phase will be similar to the first one, focusing primarily on irrigation management for crop diversification with a view to assessing the socio-economic and technical feasibility of varied crop rotations in different soil conditions, particularly the cultivation of irrigated non-rice crops following rice irrigated in the wet season. The second phase will examine: 1) the constraints to crop diversification; 2) ways in which the management of irrigation can overcome these constraints thereby promoting crop diversification; 3) agronomic and economic management alternatives converting puddled to upland soil condition in producing various crops; 4) assess O & M institution building requirements necessary in developing and managing irrigated crop diversification; 5) assess existing irrigation management for crop diversification technology and its feasibility for adoption. The primary sites will be located at the Allah River Irrigation Project and Second Laguna Bay Irrigation Project (including Cavite), and the secondary sites will be located at the Talavera River Irrigation System (near Muñoz), Laoag-Vintar Irrigation System and Tarlac-San Miguel-U'Donnel River Irrigation System.

1.4. Other Related Study Activities

Although crop diversification is not stated as the main study objective, several organizations have conducted this study as a related study to their main items. The Ministry of Agriculture and Food (MAF) has studied crop diversification in the program of Crop Intensification. IRRI has partly studied this item in the Multiple Cropping Department and Water Management Department. The World Bank has conducted one study called Sugar Lands Diversification Study. The UP Los Banos has studied water requirements of rice and non-rice crops. The Agricultural Promotion Center (APC) Project has studied non-rice crops to define the growing period of each crop, although rice crop cultivation is focused as the main study. Details of the related study activities are shown in Appendix C.

2. BASIC CONCEPT OF DCIEP ACTIVITIES

2.1. DCIEP Proposal

In May 1984, when the ADB submitted the Phase II study proposal, NIA submitted another proposal for introduction of diversified irrigated agriculture under the title of DCIEP. In addition to the self-sufficiency of non-rice crops, the proposal stated two other aspects for diversification, i.e. to reduce high development costs in small island areas by cultivation of low-water-requirement crops particularly during the dry season, and to maintain viability in the operations of the irrigation systems by attainment of higher irrigation cropping intensity, reduction of operating costs and making higher profit. The project was expected to promote crop diversification and contribute to the improvement of cropping intensities in the existing irrigation systems; as well as generate valuable information for the development and operation of diversified crop irrigation projects.

2.2. Discussion Regarding DCIEP Activities

In the environment where many study activities related to crop diversification have already been conducted, commencement of DCIEP is planned in the next year. To efficiently cooperate with the formerly started activities, the definition of DCIEP study was required. Especially study overlap between the proposed DCIEP study and IIMI study was suggested to be discussed for similar study items included in the objectives. In a meeting of the responsible staffs in ADB, IIMI, NIA and our team, the possibility of study overlap was discussed. It has been understood among the members that the DCIEP's main subject in crop diversification is defined as the study from engineering aspects, i.e. formulation of technology criteria based on research/experimental study results, mainly for secondary level approach and system level approach. However, IIMI study is from farm management level aspects. The secondary approach means to introduce innovative measures into improvement of the existing facilities/land by conducting mainly secondary canal or higher level civil work. The system level approach means to introduce innovative measures into development of the proposed area to be applicable to crop diversification. Further, the primary purpose of DCIEP has been defined to be technology transfer through the activities of formulating criteria and carrying out research/experimentation.

2.3. Definition of Diversified Crop Irrigation Engineering (DCIE)

It has been understood that DCIE is defined as a development activity to formulate innovative measures in engineering for improvement of existing facilities/land on mainly the secondary or higher level, as well as for development of the proposed area in the manner of establishing applicable farms to both rice and non-rice crop production. For the study base of DCIE, research/experimental activities are required in the DCIEP study. Further, all the related study aspects are included in DCIEP study for the secondary definition to complement other

related studies, which include agro-socio-economical aspects, water management aspects and others.

3. Discussion of the Proposed Cooperation Activities.

The proposed cooperation objectives are summarized into three subjects, i.e. Diversified Crop Irrigation Study, Technology Criteria Formulation and Diversified Crop Irrigation Training.

3.1. Diversified Crop Irrigation Study

3.1.1. Establishment of Test Farms.

It is desirable that two test farms, including a research farm and experimental farm, be established. The first is intended to conduct basic research for formulation of planning/design criteria, and the second is to experiment the suggested planning/design criteria by conducting crop diversification irrigation-farming technology on the designed farm. Thus, it is recommended that the experimental farm be established after sufficient progress of the former research to enable carrying out of the experiment. The results of this research and experimental work will establish the base of formulating technology criteria and training modules.

3.1.2. Research Farm Study Items and Contents

On the farm, research of the following items/contents should be conducted for main non-rice crops.

1) Irrigation factors to calculate water requirements: The related items to the figures/factors shown in Figure 1. are studied in this item. For soil moisture characteristics, research activities are conducted on the different regions to study the typical soil type.

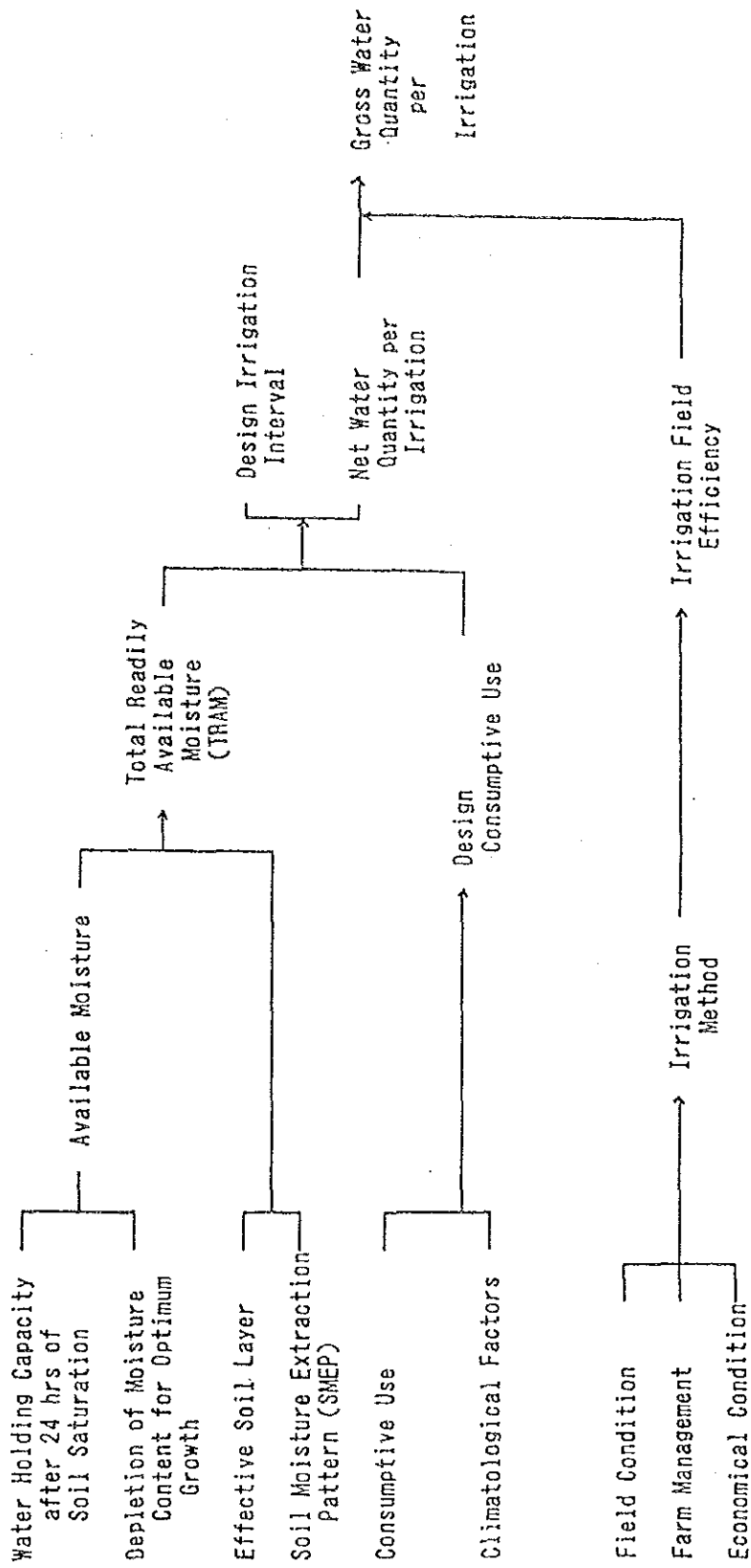


Figure 1 Calculation Flow of Field Irrigation Water Requirements

- 2) Irrigation Methodology: The irrigation water distribution coefficient, irrigation efficiency and other factors for the proposed irrigation methods (furrow, border irrigation, etc.) are studied.
- 3) Optimum Soil Moisture Contents for Crop Growing: The contents are studied for major non-rice crops by preparing test fields having different initial soil moisture suction.
- 4) Field Condition and Cultivation Methods: Applicability of various field conditions and cultivation methods for diversified crop irrigation are studied.
- 5) Climatological Observation: Observation of temperature, rainfall, sunshine duration, pan evaporation and other related climatological factors are conducted.

3.1.3. Experimental Farm Study Items and Contents

The following experimental activities are desirable to be carried out after sufficient progress of the former research to enable commencement of the experiments.

- 1) Soil Survey: Profile and soil analysis (three phase distribution, particle size analysis, etc.)
- 2) Soil moisture survey and observation of changing soil moisture contents.
- 3) Water use survey: Measuring and recording irrigation quantity, etc.
- 4) Agronomical survey: Fertilizer use, insecticide use etc.
- 5) Production survey: Growing condition, yield, quality, etc.

- 6) Farm management Survey: Gross income, farm expenditure, work hours, O & M expenses, etc.
- 7) Others: marketing research, etc.

3.2. Technology Criteria Formulation

At present, one design guide and one manual have been compiled for design of civil structures based on USBR Standards and Criteria, i.e. "Design Guides and Criteria for Irrigation Canals, O & M Roads, Drainage Channels and Appurtenant Structures" and "Design Manual for Diversion Dams, Canals, and Canal Structures". For concrete structures, the ACI Code of the US is still applied.

Criteria formulation conducted with systematical feedback. The NIA conducts feedback activities by involving the planners and designers in the implementation /construction of the projects up to completion and operation. Further, feedback is provided by construction and U & M staff to the planners and designers through field visits and interaction. However, feedback with experimental work such as hydraulic model experiments has not been conducted, although only large dam structures are examined by entrusting the model experiments to the National Hydraulic Research Center.

Practice of DCIE can be completed with various supplemental activities, i.e. installation of water regulation and water conveyance facilities, preparation of O & M plan, system analysis and other activities. For these supplemental items, provision of the related criteria is required to implement the formulated DCIE criteria. However, at present, only two criteria including one design guide and one manual have been provided, and systematical feedback by experimental work, especially hydraulic model experiments, has not yet been conducted. Therefore, provision of the supplemental criteria is desirable to be included in this cooperation program. The final decision for adoption of these supplemental activities should be made

according to applicable facilities and equipment, budgetary conditions etc.

3.3. Diversified Crop Irrigation Training

The NIA has vast experience in rice irrigation. But, only limited experience in non-rice crop irrigation. The designed water requirements for non-rice crops have not been examined through research activities.

All the training courses are proposed and conducted by the concerned department/office through coordination with the Training and Development Division (T.D. div.) under the Personnel and Records Management Department. The T.D. div. reviews the submitted proposal, schedules dates for implementation and facilitates administrative support for managing the training. Then the department/office implements the training. When these procedures are identified with the standard process description shown in Figure 2, it is found that at least two procedures are to be supplemented, i.e. 10) Making Aids and Trial and 14) Evaluation. The reasons why these are not included are due to lack of equipment as well as technology.

The proposed activity in DCIEP is development of training modules for DCIE. However, the existing level of non-rice crop irrigation and training course development shows the necessity of supplemental cooperation activities. Before practicing training with the developed DCIE training modules, the related basic knowledge on non-rice crop irrigation is desirable to be introduced from Japan's experience. Further, reinforcement of existing training is desirable to be made by introducing training equipment and technology. The final decision for adoption of these supplemental items in this cooperation program should be made according to available facilities and equipment, budgetary conditions, and others.

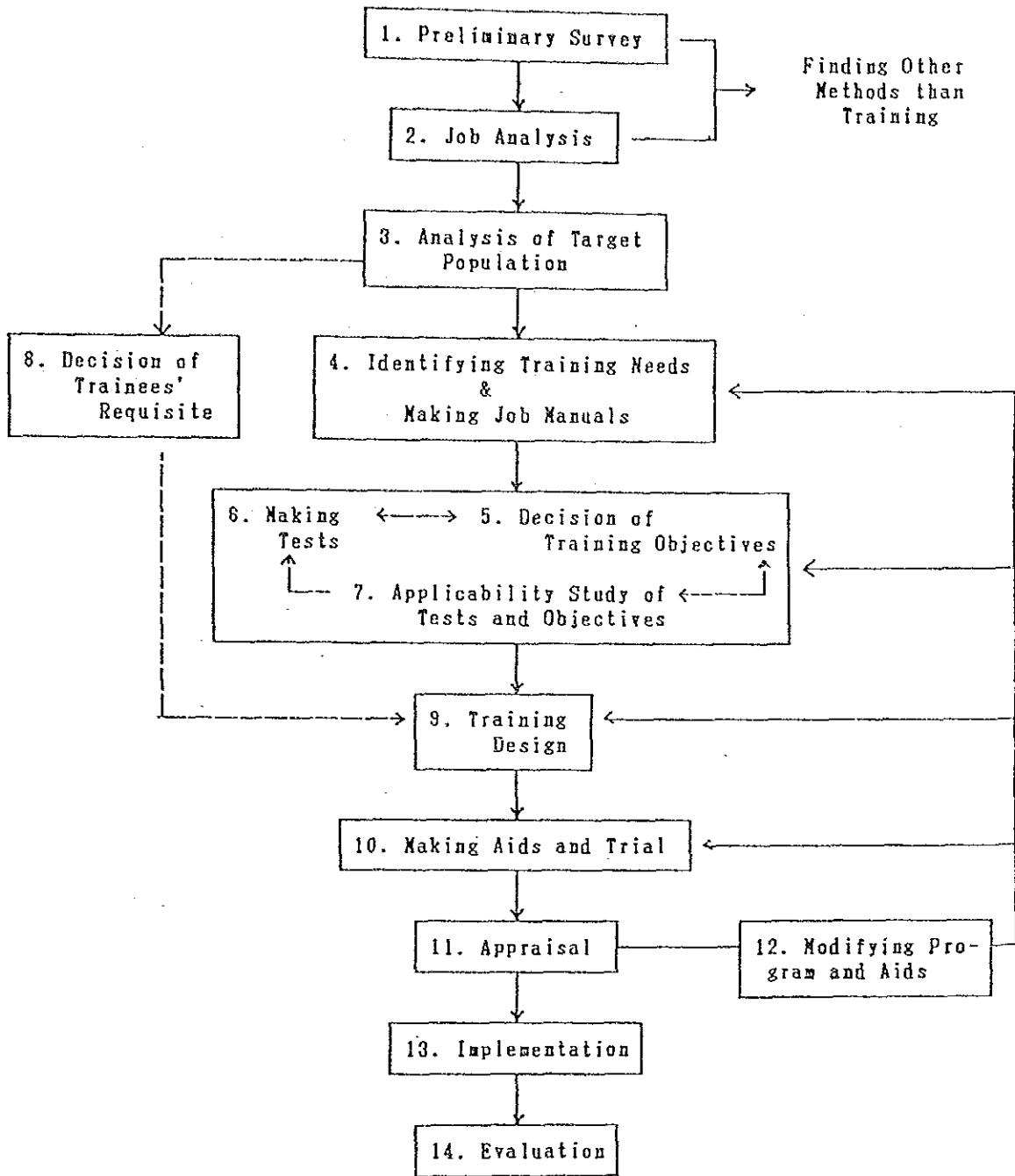


Figure 2 Process of Developing Training Modules

4. TEST FARM SITE INVESTIGATION SUMMARY

The proposed four places, including six sites, have been investigated. In the minutes of discussions, the following four items are suggested to be considered for site recommendation:

- 1) Soil texture (Dominant soil type).
- 2) Water resource availability (Availability of water for irrigation).
- 3) Accessibility to head office (Nearness to the head office.)
- 4) Convenience availability (Existence of an office of NIA in the vicinity for management of the test farm and field office).

In addition to the above, the following two items are included in this investigation.

- 5) Land ownership.
- 6) Existing land use.

Along with these items, the results of investigation are summarized below and in Table 1.

4.1. Cavite

4.1.1 Proposal Site 1. (in the NIA project office compound)

The total area is 2.5 ha, and the usable area is estimated to be 2 ha. This site is located in the NIA project office compound.

- 1) Soil texture: Clay Loam with some fine gravel
- 2) Water resource availability: New tube well with a pumping facility should be provided.

Table 1. TEST FARM SITE INVESTIGATION SUMMARY

ITEM	PLACE	CAVITE		SAN RAFAEL		MUÑOZ	TARLAC
		SITE 1	SITE 2	SITE 1	SITE 2		
1. SOIL TEXTURE		C.L. (few fine Gravel)	C.L.	S.C.L	C.L	C.L. & C or H.C	S.C.L. to S.C.
2. WATER RESOURCE AVAILABILITY		Tube Well	Irrigation Canal	The North Main Canal	Irrigation Canal	Irrigation Canal	Canal & Pump
3. ACCESSIBILITY		64 km to N 164 km to M		51 km to N 100 km to M		151 Km to N	150 km to N 61 km to M
4. CONVENIENCE		MAF Training Center & Dormitory		Research Station Building National Training Center		Labo. or/and Training Center	Project Office & Official Residence
5. LAND OWNERSHIP		NIA	Farmers	Farmers	Farmers (many tenants)	CLSU	Farmers
6. EXISTING LAND USE		MAF Research	Rice Vegetables	Rice Vegetables	Rice	Rice	Rice, corn & Vegetables
NOTE		1) New tube well 2) MAF Research	High Terrace Fields	Good Soil No Lease A.C	Easy M.C.. No Lease A.C.	Drainage Difficulty	Lump Sum payment

NOTE: N - NIA Quezon City Head Office, M - Munoz, A.C. - Agreement Confirmation, W.C. - Water Control.

3) Accessibility to head office: The distance is 64 km (via the Manila-Cavite coastal road) and about a 2 hr trip is required. The road condition is partly rough. The distance to Muñoz is about 64 km.

The area could also be reached via the South Express way, and would take about 1¹/₂ hr to negotiate the 69 km distance (Exit Carmona Interchange.)

4) Convenience availability: The NIA compound includes the MAF vegetable training center. One room of the center spacing 4.4 m x 4.4 m = 19.4 sq.m is proposed for the DCIEP site office, and one bed room of the center dormitory is proposed for experts' overnight stay.

5) Land ownership: NIA-leased Property.

6) Existing land use: The farm has been used by MAF for testing new vegetable varieties. When visited, the farm was idle before the next test, and covered with grass.

Note: The capacity of the existing tube well is not enough, and a new tube well is suggested to be provided. Further, coordination of DCIEP research activities with the MAF vegetable research will be required.

4.1.2. Proposed Site 2. (Farmers' land)

The site is located about 1 km from the project office. There are high-terrace fields. The suitable test farm size can be selected from the existing fields. Regarding investigation summary, along with the items, except 2), 5) and 6), all other conditions are as for the proposed Site 1. The 2), 5) and 6) are described below.

2) Water resource availability: Water can be drawn from the irrigation canal.

5) Land Ownership: Existing fields are farmers' private land, and it has been reported that they are willing to lend their farms for DCIEP with rent.

6) Existing land use: In the wet season rice is cultivated, and in the dry season vegetable growing is partly conducted.

Note: High terrace fields may push up consolidation costs for the test farm.

4.2. San Rafael

4.2.1. Proposed Site 1 (beside the National Training Center)

The proposed site is located at only 140 m from the National training center, and 6 km from the Region III office. The test farm size can be selected from the existing 10 ha area.

- 1) Soil texture: Silty Clay Loam
- 2) Water resource availability: The site is located along the north main canal of the Angat and Maasim Rivers Irrigation System, and thus, it is easy to draw water from the canal by pumping. The deep main canal brings another benefit into drainage condition by lowering ground water table.

Further a new main canal for the area has been proposed to supply water by gravity.

- 3) Accessibility to head office: The site is 51 km from NIA-Quezon City Head office, and could be reached in one hour on a good road. The distance to Muñoz is about 100 km.

- 4) Convenience availability: A vacant research station building with about 80 sq.m. floor area (8.5 m x 9.5 m) is proposed for the office, which is 8 km from the site. A guest room of the National Training Center located only 140 m from the site is proposed for experts' overnight stay.

- 5) Land ownership: The area is owned by several farmers, and cultivated by many tenants.

- 6) Existing land use: High land area of about 3 ha is used for growing okra, eggplants, pumpkin and others, although the remaining low land area of about 7 ha is used for rice.

Note: The soil condition and drainage condition are very suitable for test farming. However, willingness of owners and tenants to lease their land has not yet been confirmed except for one owner.

4.2.2. Proposed Site 2. (Mr. Villangca's farm)

The proposed farm having 9 ha is owned by one farmer called Mr.

Villangca. The farm and the upper several farms form one block surrounded with a national road and an un-used railway bank line. The whole block with a total area of 19 ha has finally been recommended because it is independent from the outside water level and easy to control the inside water supply. The site location is 2 km from the NIA Region III office:

- 1) Soil texture: Clay Loam.
- 2) Water resource availability: Irrigation water is drawn from the main canal by pumping (Buenavista Pump).
- 3) Accessibility to head office: Same as site 1.
- 4) Convenience availability: The vacant research station building is proposed for the office, which is located only 500 m from the site. The guest room of the training center located 8 km from the site is proposed for experts' overnight stay.
- 5) Land Ownership: All fields in the site are farmers' private land.
- 6) Existing land use: The whole area of 19 ha is used for rice cultivation in both dry and wet seasons. However, the irrigators' association in charge of this area has decided to introduce corn and peanuts in the dry season because of the high cost of water.

Note: The independence from outside water level can ease inside water control. The location along the national road is very suitable for demonstration.

However, the landowners' agreement for leasing, except Mr. Villangca's agreement, has not yet been confirmed.

4.3. Muñoz

The site, having about 3 ha is located beside the compound of the Soil and Water Laboratory and Water Management Training Center, facing Central Luzon State University (CLSU).

- 1) Soil texture: Clay Loam for the surface layer, and Clay or Heavy

Clay for the lower layer.

- 2) Water resource availability: Water is supplied from the canal by gravity.
- 3) Accessibility to head office: A distance of 151 km and about a 3 hr trip is required. The road condition is partly rough.
- 4) Convenience availability: A vacant room of the ADD Building where the Soils and Qater Laboratory (SWL) is located or of the training center is proposed for the office, and a bed room of the training center dormitory is proposed for experts' overnight stay.
- 5) Land Ownership: The land is owned by CLSU for the research farm, and formerly NIA used it for studying seed production and water management.
- 6) Existing Land Use: Rice is grown on the site.

Note: The clay soil will cause drainage difficulty for non-rice crop growing.

4.4. Tarlac

The suitable farm size can be selected from the existing 100 ha area. The location is 10 km from the TASMORIS office.

- 1) Soil texture: Silty Clay Loam to Silty Clay
- 2) Water resource availability: Gravity water and three pumping facilities are available. Because of the gravity water deficit in the dry season, supplemental ground water supply is necessary. However, the expense of pump operation costs has stopped operating pumps.
- 3) Accessibility to head office: When surveyed, we went along the national road and spent 3-4 hrs for about 150 km. However, it has been reported that using the highway road (direct Quezon City to Tarlac via North Expressway, exit Dau, Pampanga) it will take about 1 1/2 hrs. The distance to Muñoz is 61 km. (via Guimba-Baloc road).
- 4) Convenience availability: One vacant room of the former TISIP project office is proposed for the site office, spacing 11.5 m x 6. m = 69. sq.m. An official residence beside the project office is proposed

for experts' overnight stay. Both are 10 km from the site.

5) Land Ownership: A total of 37 farmers own the 100 ha. It has been reported that 36 farmers are amenable to the lease agreement proposal.

6) Existing land use: Rice is planted in the wet season, and non-rice crops (yellow corn and vegetables) are partly planted in the dry season.

Note: According to the report, about 94% of the total respondents are in favor of the lump sum payment for a five year leasing arrangement. Further, the too large capability of the existing pump to be efficiently applied for test farm with 2 to 3 ha of the farm size should be considered; one existing pump having a diameter pipe of 200 mm can cover 50 ha irrigation in the dry season. This discussion about the pump capability was not mentioned in the conference held on Sept. 16-17, 1986.

4.5. Recommendation

All the proposed sites have potential for recommendation. However, some difficulties bring a very limited number of site recommendations for the initial stage of project implementation. For the results of site investigation and of analysis with the suggested research and experimental items and contents described in "3.1 Diversified Crop Irrigation Study," San Rafael's two sites are recommended as suitable sites. Site 1 is recommendable for the research farm. And Site 2 for the experimental farm. The reasons are described below.

1) For Site 1, the soil texture and drainage condition are very suitable for conducting various basic research activities. Further stable water resource and easiness of water control can be obtained with the large and deep main canal.

2) For Site 2, the independence from outside water level influence with the surrounding road and railway banks line can ease control of inside water control. Further, demonstration effectiveness is expected

being located along the national road.

- 3) The accessibility to head office is good; the distance to the NIA central office is minimum among the proposed sites and road condition is good.
- 4) These sites are relatively near to the Soils and Water Laboratory in Munoz.
- 5) An independent office, the research office building can be used.
- 6) The two sites can be applied for the research farm and experimental farm respectively, and these are managed by one site office.

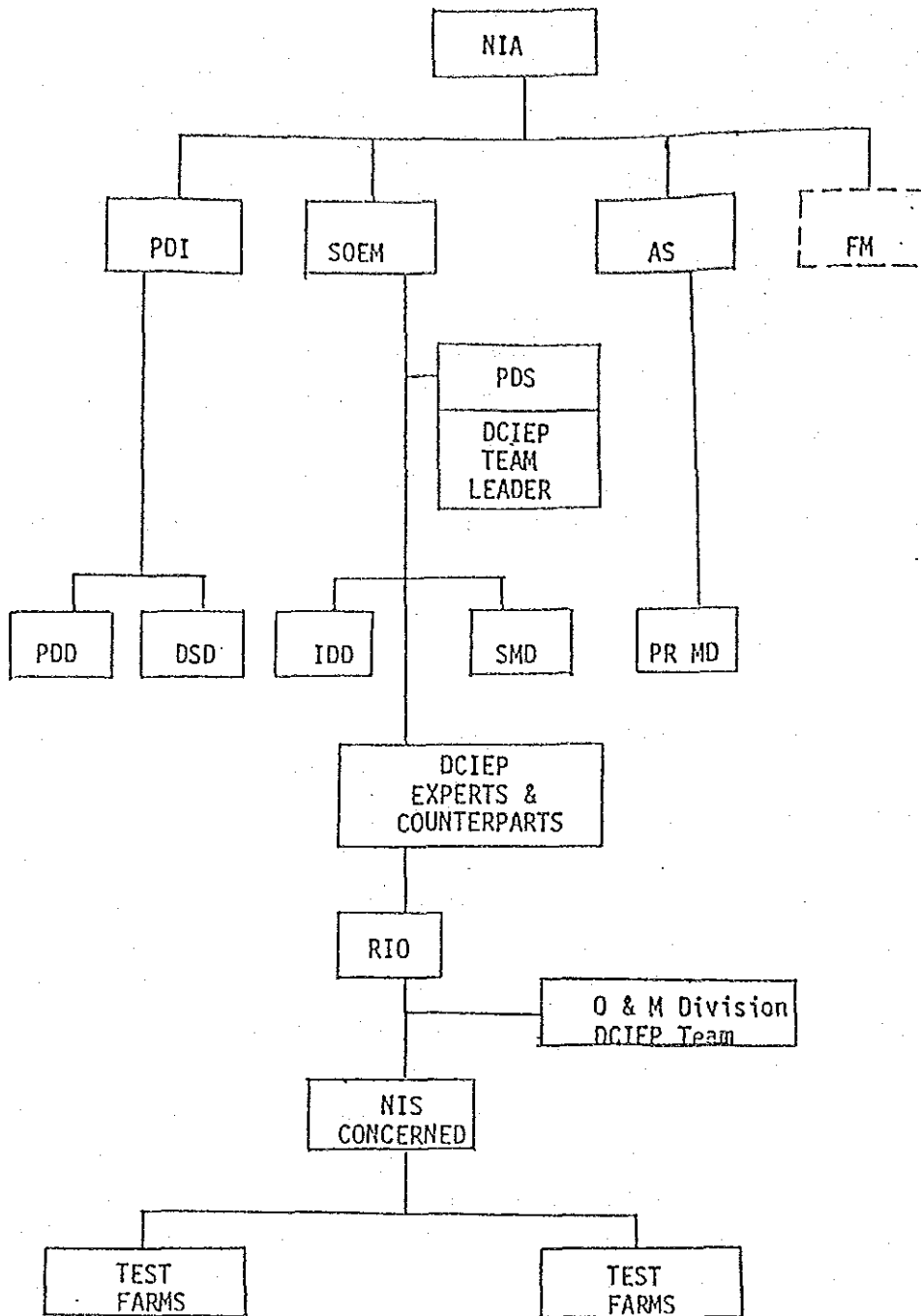
However, when supplemental study activities are required according to the progress of DCIEP study, Cavite, Muñoz and Tarlac will be recommended for the high potential sites.

5. PROPOSAL OF IMPLEMENTATION STRUCTURE

The proposed organization chart of DCIEP is shown in Figure 3, which is the revised chart through discussion in the conference held on Sept. 16-17, 1986. The proposal of head office space in the NIA head office building is confirmed to be submitted before end of Sept. through the JICA Philippine office. For the final draft of the implementation structure, more discussions will be required with the following mission.

VI. DISCUSSION SUMMARY WITH NIA RESPONSIBLE OFFICIALS

The preliminary summary of the one-month survey RESULTS for DCIEP was presented at the conference held on Sept. 16-17, 1986 with all the responsible officials of NIA. The contents of the preliminary summary are almost same as the description in the Chapter V, although description of "V-1 PROJECT BACKGROUND" and "V-2. BASIC CONCEPT OF DCIEP ACTIVITIES" is more detailed than the description in the preliminary one. The list of conference attendance is shown in Appendix D.



Note: Abbreviation is described on the next paper.

Figure 3. ORGANIZATION CHART FOR DIVERSIFIED CROPS IRRIGATION ENGINEERING PROJECT

ACRONYMS

NIA	- National Irrigation Administration (Office of the Administrator)
PDI	- Project Development and Implementation (Office of the Assistant Administrator)
SOEM	- Systems Operation and Equipment Management (Office of the Assistant Administrator)
AS	- Administrative Services (Office of the Assistant Administrator)
FM	- Finance and Management (Office of the Assistant Administrator)
PDS	- Program Development Staff
DCIEP	- Diversified Crops Irrigation Engineering Project
PDD	- Project Development Department
DSD	- Designs and Specifications Department
IDD	- Institutional Development Department
SMD	- Systems Management Department
PRMD	- Personnel and Records Management Department
RIO	- Regional Irrigation Office
O & M	- Operation and Maintenance
NIS	- National Irrigation System Office

At the conference, NIA officials well understood and agreed contents of the summary. However, regarding the results of test farm site investigation and the preliminary draft of the organization chart, the following comments/suggestions were made. These comments/suggestions have been reported to the responsible officials of the Government of Japan and JICA at the meeting held on October 13, 1986.

- 1) On the establishment of test farms, the following criteria should also be considered:
 - a) The sites should represent the different soil types/texture, hence the need to establish as many sites as the number of major soil types/texture.
 - b) The need of the system like UPRIIS where crops other than rice should be introduced during the dry season to increase the area irrigated. In the case of TASMORIS, it has very limited water supply and could serve only about 9,000 ha during the wet season and 2,000 ha during the dry season out of the potential service area of 14,000 ha.
 - c) The on-going programs in the projects/systems like SLBIP CFLIS where the vegetable component needs to be complemented by the DCIEP project.
- 2) It was recommended that a test farm be established in SLBIP/CFLIS (Cavite) and TASMORIS (Tarlac).
- 3) If AMRIS (San Rafael) test farms are definitely chosen for the initial phase, the second or succeeding phases of the study should consider other sites in establishing similar test farms.
- 4) TASMORIS (Tarlac) was strongly recommended for the establishment of the test farms. The following justifications were brought up:
 - a) That the problem of lump sum payment for lease on farmers' field could be solved and necessary arrangements with the farmers regarding the use of their farms as test sites could be negotiated.

- b) TASMORIS has a very low irrigated cropping intensity of only 90 percent.
 - c) Potentials for crops other than rice is great, especially with the implementation of Balog-Balog Multipurpose Project which would irrigate 39,200 ha.
 - d) A building with 200 sq. m. floor area which was intended to be used as a Quality Control Laboratory (constructed during the implementation of TISIP) could be used as an office for the DCIEP.
 - e) TASMORIS would be interconnected with the Magat Flood Forecasting, telecommunication System "Hot Line", hence no problem in communicating with NIA-Q.C. Head Office.
- 5) Some changes in the Project organization chart:
- a) Involve the Designs and Specification Department (DSD),
(The revised organization chart is shown in Figure 3.)

APPENDIX A. LIST OF MEETING MEMBERS

1. NIA

NIA-CENTRAL OFFICE

- Dr. Manuel M. Vergel : Acting Assistant Administrator
for Systems Operation & Equipment
Management (SOEM)
- Dr. Agustin N. Ramos, Jr. : Acting Assistant Administrator
for Project Development & Implementation
- Mr. Avelino S. Rivera : Manager, Project Development Department
- Mr. Sebastian I. Julian : Manager, Systems Management Department
- Mr. Avelino M. Mejia : Manager, Institutional Development
Department
- Ms. Ma. Ines Pinat-Bagadion : Assistant Program Manager,
Program Development Staff
Systems Operation and Equipment Management
(SOEM)
- Mr. Serafin A. Palteng : Program Manager, Programs Development Staff
(PDS) and Project Manager, National
Irrigation Systems Improvement Project
- Mr. Abelardo Dajano : Division Manager, Administrative Division
- Mr. Dominador D. Pascua : Principal Engineer and Head, Land Use
Section, Project Development Department (PDD)
- Mr. Abelardo Y. Armentia : Head, Feasibility Studies and
Environmental Section, PDD
- Mr. Liberato L. Piczon : Principal Engineer C, Research Division,
SMD
- Mr. Resty A. Macalalad : Manager, Training & Development Division
- Mr. Edgar C. Maglipon : Audio Visual Production Technician,
Training & Development Division
- Mr. Bonifacio M. Mangalindan : Manager, Public Affairs and Information
Staff.
- Mr. Salvador Salandanán : Division Manager, Research & Development
Division, Systems Management Department

Mr. Remeo G. Sidjo : Legal Staff in the Central Office
 Mr. Yasuhiko Mishima : JICA Expert
 Mr. Osamu Umekawa : JICA Expert
 Mr. Nariaki Tamura : JICA Expert

NIA-FIELD OFFICES

Mr. Nicasio San Miguel : Acting Regional Irrigation Director,
 Region IV
 Mr. Alexander A. Reuyan : O & M Division Manager, Region IV.
 Mr. Teofilo P. de Jesus : Project Manager, Second Laguna de Bay
 Irrigation Project (SLBIP).
 Mr. Vicente M. Olea : Chief, Agriculture Division, SLBIP
 Mr. Juanito R. Barlis : Supervising Engineer B., SLBIP
 Mr. Franklin G. Maunes : Engineer B., SLBIP
 Mr. Rolando T. Bonrostro : Regional Irrigation Director,
 NIA Region III
 Mr. Leonardo S. Gonzales : Angat-Maasim Rivers Irrigation System
 (AMRIS), Irrigation Superintendent V.
 Mr. Marcelino S. Santos : Irrigation Superintendent III, AMRIS
 Mrs. Lourdes C. Julian : Officer Incharge of NIA National Training
 Center, (San Rafael)
 Dr. Leonardo C. Lucero : Division Manager, Institutional Development
 Division (Cabanatuan)
 Upper Pampanga River Integrated Irrigation
 Systems (UPRIIS)
 Mr. Wilfredo S. Tiangco : Operations Manager, UPRIIS
 Mr. Mario M. Sagum : Head, Soils & Water Laboratory (SWL),
 (Muñoz)
 Mr. Noli Vinluan : Head of Agricultural Development Unit,
 TASMORIS

Mr. Juan Raña, Jr. : Chief of O & M Section, TASMORIS
 Mr. Leonardo T. Maniaul : Head of Institutional Organization, TASMORIS
 Mrs. Rosita M. Gregorio : Supervising Chemist, SWL
 Mr. Alfredo T. Aguilar : Water Master, TASMORIS

2 MINISTRY OF AGRICULTURE AND FOOD (MAF)

Ms. Jindra L. Demeterio : Chief Agricultural Project Officer, Agricultural Research Office
 Ms. Frida R. Ferrer : Sr. Project Officer, Special Projects Office
 Mr. Edgar Sandalo : Agricultural Research Officer, MAF
 Mr. Benedicto S. Ramos : Project Manager, SLBIP, Vegetable Component
 Mr. Alfonso M. Bergonio : SLBIP, Vegetable Component, Staff

3. ADB

Dr. Kunio Takase : Director, Irrigation and Rural Development Department
 Dr. Richard M. Bradley : Manager, Irrigation and Rural Development Department, Division II
 Mr. Graham Walter : Senior Project Economist, Irrigation and Rural Development Department
 Mr. Tetsuro Miyazato : Project Engineer, Irrigation and Rural Development Department

4. IIMI

Dr. Alfredo Valera : Project Coordinator, ADB-IIMI Research Project on Crop Diversification, IIMI Liaison Office, NIA

5. Irrigators Association

Mr. Pascual Maningas : Chairman of Kapatiran Irrigators Association, Group II, AMRIS (San Rafael)

6. Bohol

Mr. M. Yasuo : Team Leader of Japanese Experts, Agricultural Promotion Center Project (APCP)

Mr. Y. Syouzaki : Coordinator of Japanese Experts, APCP

Mr. T. Hidaka : Expert of APCP

Mr. N. Iguchi : Expert of APCP

Mr. T. Tsuboi : Expert of APCP

Mr. Calixto M. Seroje : Provincial Irrigation Engineer

Mr. Bonifacio Betco : Assistant Provincial Irrigation Engineer

7. International Rice Research Institute (IRRI)

Dr. Sadigul I. Bhuiyan : Agricultural Engineer & Head Water Management Department, Water Management Department

Mr. Ignacio C. Manalili : Assistant Design Engineer, Agricultural Machinery Department

Mr. Y. Shimizu : Visiting Research Fellow, Multiple Cropping Department

8. UP Los Baños

Dr. Wilfredo P. David : College of Engineering and Agro-Industrial Technology, Department of Land & Water Resources Engineering and Technology.

9. EMBASSY OF JAPAN

Mr. Y. Nakajo : First Secretary

10. JICA PHILIPPINE OFFICE

Mr. M. Miyamoto : Director

Mr. T. Iwata : Staff

Mr. Y. Okazaki : Staff

APPENDIX B WORK SCHEDULE

DATE	WORK DESCRIPTION
August 20 W	Make presentation to JICA.
21 Th	Make presentation to NIA.
22 F	Make presentation to ADB, Study Questionnaire.
23 Sat	Study the collected information.
24 Sun	do.
25 M	Make presentation to MAF. Discuss at NIA.
26 Tu	Visit CAVITE and make field investigation (overnight Manila).
27 W	Leave Manila for San Rafael and Angat, and make field investigation (overnight San Rafael)
28 Th	Leave San Rafael for Munoz and make field investigation (overnight Cabanatuan City).
29 F	Leave Cabanatuan City for Tarlac and make field investigation (overnight Tarlac).
30 Sat	Study the collected data/information.
31 Sun	Study the collected data/information.
September 1 M	Leave Manila for BOHOL (5:30a.m.) and visit APC.
2 Tu	Study the APC site.
3 W	Leave BOHOL for Manila.
4 Th	Visit IRRI and UP Los Banos.
5 F	Make interim report to EMB, and Discuss at JICA
6 Sat	Study the collected data.
7 Sun	do.
8 M	Collect questionnaire answers.
9 Tu	Study questionnaire answers.
10 W	Discuss with NIA, and Visit ADB.
11 Th	Study questionnaire answers, and Visit MAF.
12 F	Conduct summary work.
13 Sat	do.
14 Sun	do.
15 M	Make summary memorandum
16 Tu	Make presentation of summary memorandum.
17 W	do.
18 Th	Make presentation to MAF/EMB/JICA.

APPENDIX C. STUDY ACTIVITIES RELATED TO CROP DIVERSIFICATION

1. MAF has studied crop diversification under the title of "Technology verification Program on Farm" since 1982. In this program, "Crop Intensification" has been studied. The difference between crop diversification and crop intensification is that the former aims at introduction of only non-rice crops as the second and/or third crop while the latter aims at introduction of not only non-rice crops but also rice for intensification.
2. IRRI has conducted the study of crop diversification under the Multiple Cropping Department since 1972. The department has studied introduction of non-rice crops in development of a farming system based on low land rice for increase of land utilization rate and promotion of employing idle farm laborers in the dry season. The main study items are crop adaptation, variety approach, and component technology, especially tillage methods. Although irrigation method, quantity and period are partly studied as items of component technology, the main items are focused on agronomical aspects.
3. IRRI Water Management Department has studied Upper Pampanga River Integrated Irrigation Systems during the drought of 1983-84 with the items of farmers' and agencies' activities for overcoming the drought. However, such a study has been so seldom conducted that only one applicable research paper can be found within the last five years.
4. The World Bank dispatched a mission for sugarlands diversification study in June/July 1985, consisting of one Economist, one Agricultural Economist, one Agronomist, one Irrigation Engineer and three Consultants. The purpose of this study was to review the present problems of the country's sugar sector and recommend to the Government policies and programs to facilitate and manage the sectoral adjustment process under way. Based on the findings of the

mission, a report was issued on March 6, 1986 called "PHILIPPINES SUGARLANDS DIVERSIFICATION STUDY."

5. The UP Los Banos has studied water requirement of corn, tobacco, beans, vegetables and other crops since 1975 at the university research farm. Further, all hydrological data before 1984 in the Philippines have been collected and compiled by computer.

6. The APC is a Japanese technical assistance project located at Bohol with five years cooperation program starting from February 1983. There are three activities defined for APC including research, training and extension to study and develop the suitable varieties of rice and non-rice crops to Bohol island having various soil types. At present, APC has a main center at Tagbilaran, three experimental fields at Tubigon, Bilar and Ubay and one pilot farm at Carmen. APC has focused on rice although non-rice crops have been studied in the experimental fields, because the productivity of rice in Bohol is still low and no other profitable crops have been found. It was stated that crop diversification should be introduced after establishment of rice cultivation technology, and thus APC has focused on raising the level of rice cultivation technology. Some non-rice crops have been studied to define the growing period in the experimental fields. Although sprinkler irrigation is provided in one field, water requirements have not been studied.

APPENDIX D. CONFERENCE ATTENDANCE

- September 16-17, 1986, at Cavite -

Members of the JICA Survey Team:

- | | |
|-------------------|---|
| Hideyuki Kanamori | - Development Specialist
Institute for International Cooperation, JICA |
| Noriaki Shiojiri | - Deputy Head, Resources Division
Kinki Regional Bureau, MAFF |

NIA-JICA/MAFF (Government of Japan) Staff:

- | | |
|------------------|--|
| Yasuhiko Mishima | - Sr. Irrigation & Drainage Engineer, JICA |
| Osamu Umekawa | - Irrigation Engineer/JICA |
| Nariaki Tamura | - Irrigation Engineer, JICA |

NIA Officials:

- | | |
|-------------------------|---|
| Manuel M. Vergel, Jr. | - Acting Assistant Administrator
for Systems Operations & Equipment
Management (SOEM) |
| Avelino S. Rivera | - Department Manager
Project Development Department (PDD) |
| Sebastian I. Julian | - Department Manager
Systems Management Department (SMD) |
| Rolando T. Bonrostro | - Regional Irrigation Director
Region 3, (San Rafael, Bulacan) |
| Nicasio San Miguel | - Regional Irrigation Director
Region 4, (Pila, Laguna) |
| Avelino M. Mejia | - Department Manager
Institutional Development Department |
| Serafin A. Palteng | - Project Manager, NISIP
and Acting Program Manager, PDS, SOEM |
| Ma. Ines Pinat-Bagadion | - Assistant Program Manager, PDS, SOEM |
| Teofilo P. de Jesus | - Project Manager,
Second Laguna de Bay Irrigation Project
(SLBIP) |

- Wilfredo S. Tiangco - Operations Manager
Upper Pampanga River Integrated
Irrigation Systems (UPRIIS)
- Leonardo C. Lucero - Division Manager
Institutional Development Division (IDD),
UPRIIS
- Alexander A. Reuyan - Division Manager
Operations Division, Region 3
- Marcelino Santos - Assistant Irrigation Superintendent
AMRIS (San Rafael)
- Sixto N. Santiago - Division Manager
IDD, Region 3
- Honorio Encarnacion - Irrigation Superintendent
TASMORIS, (Tarlac)
- Juan Raña, Jr. - Assistant Irrigation Superintendent
TASMORIS, (Tarlac)
- Alberto dela Cruz - Irrigation Superintendent
Cavite Friar Lands Irrigation System
- Juanito Barlis - Staff, IDD, SLBIP
- Frank Maunes - Staff, IDD, SLBIP

NIA COUNTERPARTS TO JICA Survey Team

- Dominador D. Pascua - Principal Engineer; Head, Land Use Section,
PDD
- Salvador Salandanan - Division Manager
Research & Development Division (RDD), SMD
- Leo Piczon - Staff, RDD, SMD

EXPLANATORY NOTE
ON
THE IMPLEMENTATION SURVEY TEAM
May 21, 1987

Description and Discussion of Basic Concepts for Implementation

1. The comprehensively basic concept for implementation is that technical transfer should be carried out by mutual efforts. The NIA staffs are the implementators, and Japanese experts are to assist them. Upon the comprehensive base, there are four concepts supporting contents of the R/D. The four consist of definition and target area of crop diversification in the Project, definition of target criteria formulated in the Project, Process to formulate the criteria, and training by mutual efforts. The details of these basic concepts are described below.

Definition and Target Area of Crop Diversification

2. Crop diversification in the Project is defined as diversification of the paddy rice production area by introducing non-rice crops during dry season. Therefore, the target area of the Project is mainly the existing irrigated paddy rice fields.

Definition of Target Criteria

3. The criteria formulated in the Project is defined as manuals which can guide engineers and other related staffs to plan and design irrigation and drainage technology/facilities for crop diversification in the specific area. Therefore, the criteria will be formulated by considering the specific local conditions including climatical conditions and others.

Process for Criteria Formulation

4. Criteria formulation has two main stages. On the first stage, classification of the target area is made by collecting and analyzing available basic data in climatology, hydrology and other related fields, by collecting, compiling and analyzing existing study reports and papers concerning crop diversification, and by site surveying. Simultaneously, Field research is carried out to confirm and/or complement the existing data/study. On the second stage, the criteria is formulated for technology transfer. Simultaneously, experimental activities are carried out to confirm the applicability of the criteria.

Training by Mutual Efforts

5. Training in the Project is to be carried out by mutual efforts under the implementators of NIA with assistance of Japanese experts.

DIVERSIFIED CROPS IRRIGATION ENGINEERING PROJECT

LIST OF EQUIPMENT

I. Main Project Office at NIA Headquarters in Quezon City

1. Office space will be provided at the groundfloor of the Annex Building (BLdg. C); area of approximately 85 square meters; with centralize air-conditioning.
2. Facilities now available or would be made available by August, 1987:
 - 14 - EXECutive Tables and chairs for EXPerts and Counterparts
 - 2 - Drafting Tables and chairs
 - 4 - CLerical Tables and chairs, for SEcretary and Administrative Support Staff
 - 4 - Filing CABinets
 - 2 - Storage cabinets for supplies
 - 4 - TElephone sets, local and direct lines
3. Facilities requested to be provided by the Project:
 - 1 - Super Mini-Computer, for Data Management
 - 8 - Personal Computer, 4 for Experts and 4 for Counterparts
 - 2 - W rd Processor, for Expert and SEcretary
 - 2 - Electric Typewriter for Expert and COunterparts
 - 2 - Drafting Equipment
 - 1 - Photocopying Machine
 - Books and Teaching Materials including audio-visual aides
 - Audio-visual equipment
 - Video Camera
 - Video CAsette Recorder
 - TV set
 - Overhead Projector
 - Transparency
 - Opaque
 - Camera
 - Sound System
 - Slide Projector

II. Field Office/Laboratory

1. One building at the Training Center will be renovated for use by the Project; with office and laboratory room (overnight stay of Experts will be provided for in the Training Center's Guest Rooms.)
2. Facilities to be made available by August, 1987:
 - Office Tables and Chairs
 - Storage Cabinets

III. Test Farm

1. One Trial Farm will be provided
2. Locally available equipment and materials like plows, harrows, shovels, would be procured when needed by the Project.
3. Equipment requested to be provided by the Project
 - Irrigation and Drainage equipment and instruments
 - Soil Moisture Tester
 - Soil Tensiometer
 - Hydromet Apparatus
 - Std. RG
 - Recording RG
 - Evaporation Pan
 - Psychometer
 - Wind Vane
 - Solarimeter
 - Flow Measuring Devices
 - Agricultural machinery and equipment, including spare parts.
 - 4-wheel farm tractor
 - 2-wheel farm tractor
 - 20-liter Sprayer (Knapsack-manual)
 - 20-liter Sprayer (knapsack-power)
 - 50-liter tractor drawn power sprayer
 - Grain Moisture Tester
 - Multi-Grain Thresher
 - Paddy Reaper
 - Platform Weighing Scale
 - Corn Sheller
 - Manure Spreader
 - Disc plows & harrows
 - Baling Machine
 - Grain Dryer
4. 1-Pre-fabricated shelter (similar to those in APC-Bohol) for farm equipment/machinery shed and storage to be set-up on a suitable area within the Training Center compound, near the Test Farm.

IV. Soil and Water Laboratory at CLSU Muñoz, Nueva Ecija

1. Available Equipment

NUMBER	DESCRIPTION:	KIND/MAKE)
1	a/ Atomic Absorption Spectrophotometer with Recorder, Beckman Model 1253, 110V, 60 Hz	
1	Flame Photometer, Dr. Lance #60	
1	Colorimeter, Klett Summersion MEG, No. 8003	
1	Spectrophotometer, Perkin Elmer 35	
1	b/ Centrifuge, High Speed Beckman Model 21 B	
1	Centrifuge, Beckman Model TV-6	
1	Centrifuge, VWR-GF6	
2	Conductivity Bridge, YSI-Model 31	
1	Percolation Apparatus, Assembled	
1	Matric Tension Test Assembly	
1	Vacuum Pump, Welch duo Seal Model 1399	
1	Vacuum Pump, Lament Industry Cat. No. 0413, 3 hp motor, 1 1/4 IN FPT	
1	Torbal-Torsion Balance	
1	Mettler, PN 163	
1	Mettler, Analytical	
2	Oven, GCA Precision SC. No. 27	
1	Oven, Fisher ISO Temp.	
1	Fumehood, Philippine Lab.	
1	Distilling Column, Barstead A 1015 Model	
1	Grinder, NASCO Asplin	
1	Crusher, 4 x 6 MASCO Crusher	
1	PH Meter, FISher Portable	
1	PH meter, Photovolt Portable	
1	PH Meter, Beckman Expandomatic	
2	Compressor PM Compressor	
1	Compressor	

NUMBER	:	DESCRIPTION:	KIND/MAKE
	:	Assorted Glasswares, Burets/pipettes, Flash, tubes, etc.	
	:	Furnitures; Cabinets, tables, racks, etc.	

- a/ Not operational due to lack of spare parts
- b/ Also out of order. No spare parts available

V. Vehicles

1. At the start of the Project, two service jeeps would be made available for use by the Team of Experts and Counterparts.
2. Vehicles requested to be provided by the Project
 - 2 - Service Car
 - 2 - Station Wagon
 - 1 - 4 x 4 Pick-Up
 - 1 - Mini-Bus - 22 persons capacity

JICA