資　料

1　合同評価報告書（英文）
2　評価用PDM（和文）
3　詳細暫定実施計画書（和・英文）
4　カウンターパート配置状況
5　各分野活動計画のフローチャート
6　評価調査結果要約表
7　プロジェクト方式技術協力終了時評価調査表
8　プロジェクト概要資料
9　プログレスレポート（英文）
10　農業省土壌・水管理局組織図
11　農業省組織図（英文）
12　協力分野別評価表
13　プロジェクト課題別評価表
14　供与機材の利用・管理状況表

資料１　合同評価報告書（英文）

MINUTES OF UNDERSTANDING OF THE JOINT EVALUATION ON THE JAPANESE TECHNICAL COOPERATION FOR THE SOILS RESEARCH AND DEVELOPMENT CENTER PROJECT PHASE II IN THE REPUBLIC OF THE PHILIPPINES

With about six months left until the termination of the cooperation period of the Soils Research and Development Center Project Phase II in the Republic of the Philippines (hereinafter referred to as "the Project") on January 31st 2000, which started on February 1st, 1995, as stated in the Record of Discussions (hereinafter referred to as "R/D"), the Japanese Evaluation Team organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), headed by Dr. Naoto OWA, visited the Republic of the Philippines in order to conduct an overall review and evaluation of the performance of the Project. In order to achieve this, a Joint Evaluation Team (hereinafter referred to as "the Team") was formed consisting of the aforementioned Japanese Team and the Philippines Evaluation Team headed by Dr. Rodolfo C. Undan.

The Team conducted interviews with the Japanese experts and the Philippine counterparts assigned to the Project, had a series of discussions with the authorities concerned of the Government of the Republic of the Philippines, made field surveys and exchanged views among themselves.

As a result of discussions, the Team agreed upon forwarding to their respective governments the Joint Evaluation Report which is referred to in the document attached hereto.

Manila, August 18, 1999

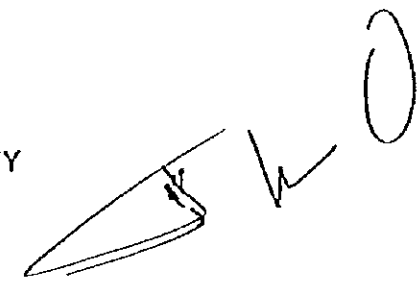
Naoto Owa

Dr. Naoto OWA
Leader,
Japanese Evaluation Team,
Japan International Cooperation Agency,
Japan

Dr. Rodolfo C. Undan
Leader,
Philippine Evaluation Team,
Republic of the Philippines

Mr. Domingo F. Panganiban
Undersecretary,
Department of Agriculture,
Republic of the Philippines

JOINT EVALUATION REPORT
ON THE JAPANESE TECHNICAL COOPERATION FOR
THE SOILS RESEARCH AND DEVELOPMENT CENTER PROJECT PHASE II
IN THE REPUBLIC OF THE PHILIPPINES



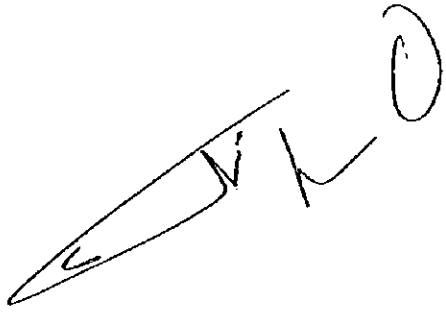
6-5-1. PROSPECTS FOR INSTITUTIONAL SUSTAINABILITY
6-5-2. PROSPECTS FOR FINANCIAL SUSTAINABILITY
6-5-3. PROSPECTS FOR PHYSICAL AND TECHNICAL SUSTAINABILITY

7. CONCLUSIONS
8-1. SUMMARY OF FINDINGS AND OBSERVATIONS
(1) Degree of goal achievement
(2) Impact
(3) Efficiency
(4) Relevance
(5) Prospect of sustainability

9. RECOMMENDATIONS
9-1. RECOMMENDATIONS FOR SHORT TERM IMPROVEMENT
9-2. RECOMMENDATIONS FOR LONG TERM IMPROVEMENT

10.LESSONS LEARNED FROM THE PROJECT

ANNEXES
ANNEX 1. List of Japanese experts dispatched
ANNEX 2. List of Counterparts accepted for the technical training in Japan
ANNEX 3. List of major machinery and equipment provided
ANNEX 3-1. Provision of machinery and equipment
ANNEX 3-2. List of machinery and equipment
ANNEX 4. List of supplementary funds to cover local costs
ANNEX 5. List of expenditure by the Philippine side
ANNEX 6. List of Philippine Counterparts Assigned
ANNEX 7. Project Design Matrix of the Project
ANNEX 8. Performance Matrix of the Project



1. INTRODUCTION

The agriculture, forestry and fisheries industry, which accounts for 22.5% of the GDP, is the main industry in the Philippines, employing 45.9% of the working population and accounting for more than 109.6 million jobs. The share of agriculture, forestry and fisheries products accounts for 20.8% of the country's exports. In order to improve agricultural productivities and profits, the development of the rational land use system technology and support for small-scale farmers are crucial; thus, it is necessary to promote the survey and research of soils and relevant technologies.

Although the Government of the Republic of the Philippines has been conducting activities related to the production of the soil map, which is essential to the planning and implementation of agricultural development policy, these activities have not been functioning effectively due to lack of survey and research methods, as well as relevant facilities.

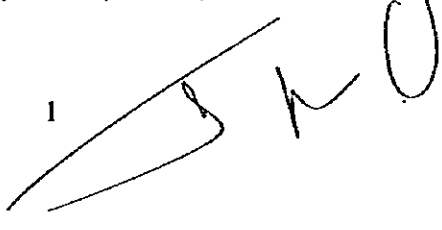
The above-mentioned circumstances led the Government of the Republic of the Philippines to make two requests: a project-type technical cooperation program aimed at strengthening the human resources capability in the research and development; and a grant aid program to set up research facilities and equipment through the establishment of the Soils Research and Development Center (hereinafter referred to as "SRDC") from the Government of Japan in 1988.

In response to this request, the Government of Japan through JICA carried out a project aimed at improving the agricultural productivity and profits through the appropriate soil research, and development and dissemination of agricultural technology from July 1st, 1989 to June 30th, 1994. After the completion of the project, three experts, including the team leader, remained at SRDC as individual experts to give technical guidance to their Philippine counterparts.

When the Japanese evaluation team of the project arrived in the Philippines on November 1993, the team leader of the Japanese evaluation team was given an advanced copy of the phase II project by the Director of the Bureau of Soils and Water Management of the Department of Agriculture (hereinafter referred to as "BSWM"). The official request for the phase II project (which covered various environmental issues) arrived at the Ministry of Foreign Affairs of Japan on May 16th, 1994. In response to the request, the Preliminary Study Team for the phase II project was dispatched on August 1994. This team formulated the cooperation policy which focused on the development of technologies for acid upland soils (the Ultisols) which accounts for 46% of the territory of the Philippines, in contrast to the phase I project, which was aimed only at basic research on soils. Based on the results of the preliminary study, the resident representative of the JICA Philippine office and the Director of the BSWM signed the R/D and the Tentative Schedule of Implementation (hereinafter referred to as "TSI") on December 21st, 1994.

In accordance with this agreement, the phase II project activities began dispatching five long-term experts with a five-year cooperation term starting February 1st 1995.

During the course of the Project, JICA dispatched the Consultation Study Team for the purpose of formulating the detailed TSI, and Advisory Team for the purpose of conducting an overall review and an interim evaluation in the performance of the Project and providing advice for the smooth implementation of the Project.



2. ACTIVITIES OF THE PROJECT

In accordance with the R/D and the TSI signed on December 21st, 1994, the following activities are being implemented.

(1) Soil and Fertilizer

1) Analysis of constraints for crop productivity in Problem Soils including Ultisols (hereinafter referred to as "PSIU") and their improvement

2) Development of methods for integrated soil improvement technology for PSIU

(2) Soil Conservation

1) Improvement of technologies for soil erosion control for PSIU

2) Development of methods for soil conservation for PSIU

(3) Soil Productivity Capability Classification

1) Development of methods for basic land classification

2) Development of methods for soil productivity capability classification

3) Development of methods for soil management in classified units

3. MEMBERS OF THE JOINT EVALUATION TEAM

3-1. The Japanese Evaluation Team

(1) Dr.Naoto OWA : Team Leader / Soil Conservation
Director, Department of Agro-Environment Sciences,
Hokkaido National Agricultural Experiment Station,
Ministry of Agriculture, Forestry and Fisheries (M.A.F.F.)

(2) Mr. Toshiro MATSUNAGA : Soil and Fertilizer
Chief, Laboratory of Soil Resources and Plant Nutrition,
Department of Agro-Environmental Management,
Kyushu National Agricultural Experiment Station, M.A.F.F.

(3) Dr. Takashi KUSABA : Soil Productivity Capability Classification
Chief, Soil Fertility Evaluation Laboratory,
Department of Soils and Fertilizers,
National Agriculture Research Center, M.A.F.F.

(4) Mr. Kenji KANEKO : Plan Evaluation
Deputy Director, Agricultural Technical Cooperation Division,
Agricultural Development Cooperation Department, JICA

(5) Mr. Tsuyoshi ITO : Evaluation Analysis
Consulting Department,
IC Net Ltd.

(6) Ms. Yukiyo MAEDA : Technical Cooperation
Staff, Agricultural Technical Cooperation Division,
Agricultural Development Cooperation Department, JICA

3-2. The Philippine Evaluation Team
(1) Dr. Rodolfo C. UNDAN : Team Leader / Overall evaluation
President, Central Luzon State University

(2) Dr. Severino S. MAGAT : Soil and Fertilizer
Research Manager (Scientist IV)
Philippine Coconut Authority

(3) Mr. Rolando V. LABIOS : Soil Conservation
Chief Agriculturist
Bureau of Agricultural Research

(4) Dr. Jose I. CLAR DE JESUS : Soil Productivity Capability Classification
Professor, Department of Soil Science
University of the Philippines

(5) Mr. Junibert E. de Sagun : Technical Cooperation
Project Development Officer III, Project Development Service
Department of Agriculture

4. OBJECTIVES OF THE EVALUATION
(1) To make a comprehensive and objective evaluation of the Project achievements with regard to the contents of the R/D, TSI and other official agreements concerned. The cooperation period which is the subject of the evaluation is five (5) years from February 1st, 1995 to January 31st, 2000 (including the scheduled activities and output)

(2) To make recommendations and suggestions to the authorities of both Governments concerned with the activities after the termination of the cooperation term of the Project.

5. EVALUATION OF THE PROJECT
5-1. ITEMS OF THE EVALUATION
The Team conducted the evaluation of the Project applying the Project Cycle Management (PCM) method. Items of the evaluation were set according to the PCM evaluation method, which include following five aspects:

a) "Achievement" of the Project. There are two dimensions of the "Achievement." One is achievement of "Output." "Output" refers to the direct products or concrete outcomes of the Project. The other dimension of the "Achievement" is achievement of "Project Purpose." "Project Purpose" refers to the overall accomplishment of the Project.

b) "Impact" of the Project. "Impact" refers to the direct contribution of the Project accomplishment to the "Overall Goal" or higher development goals.

c) "Efficiency" of the Project. "Efficiency" refers to the efficiency of inputs with regard to the realization of the "Output." Evaluation on the extent of the direct contribution of the "Output" to realization of the "Project Purpose" is another dimension of the "Efficiency."

d) "Relevance" of the Project. Relevancy refers to the compliance of the project framework with needs of the country, needs of the implementing agency, and the needs of the beneficiaries of the Project.

e) "Sustainability" of the Project. "Sustainability" refers capability of the implementing agency for continuation of the project activities in terms of institutional capability, financial capability, and technical capability.

In addition to these five evaluation aspects, inputs and detail activities of the Project were also investigated. Results of this investigation were utilized for analyzing causes of problems.

5-2. EVALUATION METHODS

PCM evaluation method requires formulation of a Project Design Matrix (PDM) which describes the framework of the Project. However, since the PCM method was not applied throughout the period of the planning and the implementation of the Project, the Team formulated a PDM based on the existing project documents and information given from the staff members of the Project. This PDM is attached hereinafter (Annex 7).

The PDM contains "Verifiable Indicators" for "Project Purpose" and "Output," that shows the expected destinations of them. Members of the Team specialized in the subject matters of the Project (e.g. Soil and Fertilizer, Soil Conservation, and SPCC) were guided to evaluate the "Achievement" of "Output" of each subject matter according to the responding "Verifiable Indicator." Evaluation of "Activities" was mainly conducted based on the information acquired from interviews, reports and other relevant project documents. Based on the results of the evaluation of "Achievement," the Team gave an evaluation score to the respective "Activities" and "Output" in accordance with the following criteria.

Score	Definition
4	Completed
3	Incomplete, but expected to be completed by the end of the Project
2	Incomplete, and completion by the end of the Project is uncertain
1	Incomplete, and possibility of completion by the end of the Project is low

During the evaluation of "Output," when any problems or inefficiency affected realization of "Output," the Team also analyzed causes of the problems, and identified recommendations to solve them.

"Achievement" of "Project Purpose" was evaluated by all the members of the Team according to the results of the evaluation of "Output." The other four aspects of the evaluation were conducted by the members of the Team in charge of overall evaluation through the discussions with the managerial members of the Project.

Proceeding of the evaluation is as follows:
a) General Discussion 1: Formulation of PDM;
b) Group Discussion: Group interviews for evaluation of each evaluation aspects;
c) General Discussion 2: Presentation of the results of the Group Discussion, and discussion on the achievement of "Project Purpose."

5-3. ANALYSIS BASED ON THE EVALUATION CRITERIA

The Team analyzed the performance of the Project using the following five criteria.

(1) Effectiveness

Effectiveness of the Project implementation was assessed by analyzing the Project achievements.

(2) Efficiency

Efficiency of the Project implementation was analyzed focusing on quality, quantity, timing, utilization of inputs, overall management of Project activities and other external factors which affected the implementation.

(3) Impact

Project Impact was identified focusing mainly on positive and negative indirect impact related to the Overall Goal of the Project realized as of the final evaluation of the Project.

(4) Relevance

The validity of the Project purpose was judged according to the development policy of the Republic of the Philippines, the agricultural research policy of the BSWM, the research program of the SRDC and the needs of the beneficiaries.

(5) Sustainability

Sustainability of the Project was forecasted by examining such factors as utilization of the Project inputs and qualified Philippine counterparts, management capacity and resources available for SRDC, etc.

6-1. EFFECTIVENESS

6-1-1. ACCOMPLISHMENT IN TERMS OF INPUTS

6-1-1-1. JAPANESE INPUTS

(1) Dispatch of Japanese Experts

A total of seven (7) long-term experts have been dispatched in accordance with the R/D and the TSI. They include team leaders, coordinators and experts in the fields of Soil and Fertilizer, Soil Conservation, Soil Productivity Capability Classification which are as stated in the R/D.

Twenty-three (23) short-term experts have been dispatched.

Details are shown in ANNEX 1.

(2) Acceptance of Philippine counterpart personnel for Technical Training in Japan

The technical training of Philippine counterparts in Japan started in the Japanese fiscal year 1995. Since then, a total of twenty two (22) counterparts were accepted by JICA to provide the technical training in Japan in order to upgrade their technical skills. One counterpart is planned to get technical training in Japan in September 1999. All the training programs have been efficiently conducted in cooperation with the Tsukuba International Center of JICA and related research institutions of MAFF.

More detailed information is given in ANNEX 2.

(3) Provision of Machinery and Equipment

Machinery and equipment shown in ANNEX 3 were provided by the Japanese side in order to carry out the Project activities. All machinery and equipment provided have no doubt contributed to the Project activities.

(4) Supplementary Funds to cover local costs

The Japanese side provided a part of the project management cost in order to implement the Project activities in a timely manner.

Supplementary expenditure made by the Japanese side is shown in ANNEX 4.

(5) Dispatch of Study Teams

1) Preliminary Study Team

The Preliminary Study Team was dispatched from August 16th to August 25th, 1994 in order to confirm the contents of the proposal submitted by the Government of the Republic of the Philippines to the Government of Japan concerning the Soils Research and Development Center Project Phase II, studying the possibility of its implementation from view of technical aspect, examining its justification according to the Project-Type Technical Cooperation Scheme of JICA, and jointly formulate with the Philippine side a tentative master plan of the proposed project in the case of confirming the possibility of the project implementation.

2) Consultation Study Team

The Consultation Study Team was dispatched from October 9th to October 20th, 1995 in order to formulate the detailed TSI as well as discussing the major issues related to the implementation of the

Project.

3) Advisory Team

The Advisory Team was dispatched from October 27th to November 6th, 1997 in order to conduct an overall review and an interim evaluation on the performance of the Project and provide advice for smooth implementation of the Project.

6-1-1-2. Philippine INPUTS

(1) Provision of Land, Buildings and other necessary facilities

The Philippine side provided land, building and facilities necessary for the implementation of the Project. All the facilities of the project sites have been very effectively utilized for the Project.

(2) Allocation of Recurrent Expenses

The Philippine side allocated approximately 87 million pesos of local running costs as wages for secretary, technical personnel, drivers, field management laborers, traveling fees, telephone, fax, fuel, mailing, electricity, transportation and installation of equipment, etc. from the commencement of the Project, up to the present. The recurrent expenses by the Philippine side were allocated as shown in ANNEX 5.

(3) Assignment of counterparts and other personnel

A total of one hundred sixteen (116) Philippine counterpart personnel and a principal counterpart of the group of counterparts for each activity have been assigned to the Project as shown in ANNEX 6.

(4) Supply and Replacement of Machinery and Equipment

All the machinery and equipment provided by JICA during the technical cooperation period have been used effectively and efficiently for the Project activities stated in the master plan of the R/D. The Philippine side has been maintaining those machinery and equipment properly, thus those equipment are in good conditions up to the present. The current conditions of those machinery and equipment are shown in ANNEX 3.

6-1-2. MAJOR ACHIEVEMENT OF THE PROJECT

In this section, the results of the evaluation conducted by the Team regarding achievements of "Output" are discussed. Results of the evaluation on achievement of the "Activities" are listed in Annex 8.

6-1-2-1. Soil and Fertilizer

Output 1.1

Constraints for crop production and method for improvement for PSIU are clarified.

Verifiable Indicator and the results of the evaluation

1.1-1) Soil constraints of PSIU against productivity of crops are clarified

Score: 3

Most of the activities for this output have been completed except three studies on macronutrients and one study on organic matter accumulation by legume-grass mixture. The former activity is expected to be completed by the end of the Project. The later activity requires longer period to obtain reliable conclusions.

1.1-2) The Philippine counterparts can manage to conduct a study on constraints of crop productivity, analysis for microelements and isotope analysis.

Score: 4

During the implementation of the Project, the Japanese experts have been involved in the activities mainly as advisors. Necessary analyses are currently conducted by the Philippine counterparts.

1.1-3) Effectiveness of technology for soil improvements that are adaptable by poor farmers is verified.

Score: 4

As the results of the studies, chicken manure application has found to be the most effective method for soil improvement.

Conclusion on the evaluation of Achievement of Output 1.1

Score: 3.67

Although a typhoon, droughts, and damage by rats hindered crop performance and data collection, most of the activities necessary to realize "Output" has been completed or expected to be completed by the end of the Project. Completion of the analysis on organic matter accumulation by legume-grass mixture by the project termination was identified as difficult, however, major constraints of PSIU for crops and one improvement method for low-income farmers have been identified.

Output 1.2

Manual for integrated soil improvement technology for PSIU is developed.

Verifiable Indicator and the results of the evaluation

1.2-1) A manual for integrated soil improvement is completed.

Score: 3

An interim manual is drafted, and will be finalized by the end of the Project.

1.2-2) Research results on "Soil and Fertilizer" are presented and evaluated annually at a department workshop.

Score 4:

Annual presentations were conducted at In-house reviews and workshops, and the results of the studies were compiled in two technical reports of the Project in 1997 and 1998.

Conclusion on the evaluation of Achievement of Output 1.2

8

Score 3.5:
All the outputs are expected to be realized by the end of the Project.

6-1-2-2. Soil Conservation

Output 2.1

Technologies of soil erosion control for PSIU are improved.

Verifiable Indicator and the results of the evaluation

2.1-1) Erosion control technologies for each area (Districts) that is adaptable by poor farmers were established.

Score: 3

Erosion control technologies in Tanay Research Center were established

Effect of hedgerows and contour deep plowing, live/plant-residue mulch and use a run off interception technologies were quantitatively clarified.

In addition to that, efforts were done by the Soil Conservation group to apply these technologies gives in other areas. The team concluded that these achievements are sufficient to considering the limited time of the Project.

2.1-2) The Philippine counterparts can conduct a study on soil erosion.

Score : 4

Counterpart training in Japan, fellow research in Japan, and other technical transfer activities have successfully completed. Maintenance and operation of equipment are currently done by the Philippine counterparts.

Conclusion on the evaluation of Achievement of Output 2.1

Score : 3.5

Although output of 2.1-1 is limited to carry, considering applicability of its achievement was regarded to be satisfactory.

Output 2.2

Methods for soil conservation for PSIU are developed.

Verifiable Indicator and the results of the evaluation

2.2-1) A technical manual for soil conservation is completed.

Score 3:

Technical reports that are the materials of the manual are completed, and concrete contents of the manual have been under discussion. The manual is expected to be completed by the end of the Project.

2.2-2) Soil erosion maps which shows the distribution of erosion risk is completed for model sites.

Score 3:

Land use map of Tanay is completed, and an erosion map of Tanay is expected to be completed by the end of the Project.

2.2-3) Research results on "Soil Conservation" are presented and evaluated annually at a department workshop.
Score 4:
Results of the assessment of soil erodibility, evaluation of contour hedgerows and vegetative barriers using high value crops and tree crops, and other results were presented at and awarded by The Philippine Society of Soil Science and Technology (hereinafter referred to as " PSSST ") Annual Meeting, and the BSWM In-house Reviews.

Conclusion on the evaluation of Achievement of Output 2.2
Score 3.33
Production of the technical manual and the erosion map at Tanay are still underway, however, these outputs are expected to be completed by the end of the Project.

6-1-2-3. Soil Productivity Capability Classification
Output 3.1
Method for basic land classification is developed.

Verifiable Indicator and the results of the evaluation (Conclusion on the evaluation of Achievement of Output 3.1
3.1) Basic land classification maps are completed.
Score 4:
Land classification maps for land use cover of Romero River watershed, and land suitability maps for rice and corn for Isabela Province have been completed.

Output 3.2
Method for SPCC is developed.

Verifiable Indicator and the results of the evaluation
3.2-1) SPCC is established and SPCC maps are completed at a model site.
Score 4:
SPCC method has been developed by the Project. A detailed SPCC map for Tanay Research Center and a regional SPCC map for Region 2 are completed.

3.2-2) Institutional system for feedback of field data to the revise of the identification of soil productivity class.
Score 4:

Linkage with Tanay and Bulacan Research Center, and collaboration with Xavier University have been established for SPCC validation.

3.2-3) The Philippine counterparts can conduct preparation of SPCC maps.
Score 4:
Core members of SPCC and Subject Matter Specialist (SMS) staffs have been trained for SPCC rating and mapping.

Conclusion on the evaluation of Achievement of Output 3.2
Score 4:
All the indicators have been satisfied.

Output 3.3
Methods for soil management in SPCC units are developed.

Verifiable Indicator and the results of the evaluation (Conclusion on the evaluation of Achievement of Output 3.3)
3.3) A guideline of soil management for each unit of soil fertility class is completed.
Score 3:
A prototype guideline is to be completed by the end of the Project. Production of a "prototype" was recognized as a sufficient achievement considering the project period and other conditions.

Additional Output of SPCC Group
3.4) Local Area Networking is established.
A networking system was installed in 1997 and inaugurated in 1998. Staff members have been trained for the operation and management of the network. Data sharing procedures were prepared for the BSWM. The BSWM web page has been produced. Currently the system is waiting for the last connection to the server of Department of Agriculture.

6-1-3. ACHIEVEMENT OF THE PROJECT PURPOSE

"Project Purpose" of the Project is "Technologies of soil management for PSIU is improved." Since the technologies of soil management mainly imply soil improvement technology, erosion control technology, and soil classification technology, it is rational to evaluate degree of achievement of "Project Purpose" by overall achievement of "Output." As a result of the evaluation of "Output," four out of seven "Output" has been already achieved, and the other three "Output" are expected to be achieved by the end of Project. Total score point of output achievement at the evaluation time is 25.83 which is 92.3 % of full score point (7 outputs times 4 points is 28). Based on this result, the Team recognized "Project Purpose" of the Project is expected to be achieved by the end of the Project.

6-2. IMPACT

(1) Impact to the "Overall Goal"

Overall Goal of the Project is "Farmers technology of soil management for PSIU is improved." Several steps exist between the Overall Goal and the Project Purpose of technology improvement on soil management for PSIU at the BSWM. These steps include such as verification of the newly developed technologies at the local farmer's settings, introduction of the technologies to the farmers, and continuous technical support to the farmers in the broad base. This means that the Project is still in the earlier phase of this farmer's technology development. Despite this situation, contributions of the Project to the Overall Goal have been confirmed. Major evidences of the contributions are the following.

- 450 farmers have been intentionally visited the BSWM research Center at Tanay during the period of the Project, and Bulacan Center was also visited by farmers.
- Technologies developed by the Project have been utilized in the farmers training at Tanay Research Center.
- Collaboration with Xavier University organized farmers training program for utilization of organic matter. Eight hundred (800) farmers joined this program.
- Districts in Ilocos, Nueva Ecija, Western Samar, and Compostela Valley provinces have adapted the soil conservation technology developed by the Project for its watershed management activities for the region, and several districts have followed the fertilization technology from the Project, which will eventually reach to the local farmers in the regions through their extension works.

These evidence are not exactly showing the direct impact of the Project to the Overall Goal, however, these contributions have been confirmed that the Project has been on the right direction towards the realization of the Overall Goal.

(2) Other Impacts

In addition to the direct contribution to the Overall Goal of the Project, the Team identified following impacts of the Project.

1) National level

Technologies developed by the Project have been widely appreciated in the nation. Information exchange between the BSWM and universities and research institutes such as Xavier University and University of Eastern Philippines have been actively done and the technologies developed by the Project has been widely transferred. PSSST has been also inspired by the achievement of the Project, and grown rapidly in recent years.

The Project has improved technical capacity of the BSWM, and this institutional competence contributed to the improvement of overall research quality of the nation. The BSWM has conducted high quality studies and investigations including study on effect of lahar after the Pinatubo eruption which was utilized for a formulation of land management plan, investigations on cause and impact of soil erosions, impact of El Nino. Technical capability of the BSWM combined with its modernized facilities which also

improved by the Phase 1 and Phase 2 of the Project attracted increasing number of request for laboratory testing. The number of determinations has increased from 18,626 in 1994 to 124,313 in 1998. The BSWM has contributed to the National Treasury about 1.6 million Pesos annually by sales of soil maps and contracted analysis for private companies such as fertilizer producers.

2) International level

The Project has been involved in international activities such as follows.

- One Philippine counterpart was sent by JICA as a Third Country Expert of JICA to Bangladesh in 1999.
- A Subject Matter Specialist was invited to Okinawa, Japan due to the new invention of equipment during the Project.
- Three-day International Symposium on Management of Problem Soils invited three neighboring countries.
- SPCC group conducted Technical Exchange Program with Thailand in 1997.

6-3. EFFICIENCY

(1). Input / Output Efficiency

Although delay of equipment delivery, re-assignment a key person, and replacement of a head of section affected proceeding of some activities, in general, input of personnel, equipment, were adequate in terms of quantity, quality and schedule. There was an observation that duration of Short-term Japanese experts were too short to accomplish the TORs of the experts.

(2). Activities / Output Efficiency

Most of the project activities were closely linked with the realization of the Outputs. Combinations of the activities were well organized to achieve the Outputs.

There was one observation made by the Team regarding the efficiency of the project implementation. Project activity 3.3.1, "Field experiments for fertilizer response to main crops at model farms" was not fully implemented due to limited manpower of the SPCC group. The Team discussed that independent field experiments by SPCC group may have caused a duplication with the activities of the Soil and Fertilizer, and Soil Conservation groups, and the Team expressed an opinion that the original planning may have not been done fully considering the practical situations of the BSWM. Despite this condition, the Project responded properly and this shortcoming was supplemented by data collection from Soil and Fertilizer, and Soil Conservation groups of the Project, Balanced Fertilizer Strategy group of the BSWM and collaborating institutions such as Xavier University.

6-4. RELEVANCE

(1) Relevance to the Sectoral Development Policy

Although the purpose of the Project is improvement of technology for management of "Problem Soils including Ultisol," most of the activities of the Project have focussed on Ultisol. This emphasis of the Project can be justified the fact that distribution of Ultisol is 46% of the total land of the country.

The Project is also found to fully comply with the sectoral national development strategy of the Philippines. For example, the current government has been strongly emphasized the necessity of poverty alleviation. Agriculture and Fisheries Modernization Act of 1997 is emphasizing farmers involvement, extension, research activities, and information network; and pronounces areas of small-scale farmers is one of the strategic agricultural development zone, that is totally complied with the contents of the Project. Sectoral development program of the Department of Agriculture, Agrikulturang MakaMASA has also been extended its target area from prime agricultural land of GintongAni of last administration to poor soil areas.

(2) Relevance to the Needs of Implementation Agency

One of the mandates of the BSWM is technical support to the Department of Agriculture for formulation of agricultural development policy, and the Project enhanced the capacity of the research function that is the basis for the policy formulation. The BSWM has been designated by the DA-Bureau of Agricultural Research as a lead agency of National Network on Soil and Water Resource Research and Development/Extension.

As a conclusion, the Project has been significantly relevant to the needs of implementation agency

6-5. PROSPECTS FOR SUSTAINABILITY

6-5-1. PROSPECTS FOR INSTITUTIONAL SUSTAINABILITY

The BSWM has not formulated a formalized institution exclusive for the Project. Staff members assigned to the Project still belong to their original divisions of the BSWM, and project activities are additional mandate for them on top of the regular mandate in their original divisions. In this situation, a critical question is how to incorporate the project activities into regular activities of the BSWM. Among the activities of the Project, following activities should be continued, and others will be ended.

- Follow up studies on soil improvement through soil organic matter accumulation by legume-grass mixture.
- Assessment of soil erodibility and rainfall erosivity for other soils.
- Application of SPCC to other regions.
- Application of Soil erosion technologies in other districts.

14

These activities still require coordinated effort throughout the BSWM. Probability of effective coordination was confirmed as reasonably high from the following facts.

- Team activities are commonly practiced among the BSWM such as BFS.
- Some parts of the actives of Phase 1 of the Project have been incorporated within the regular mandate of the BSWM.
- Personnel appointment has been done by the Head of the Project, who is the Director of the Bureau.
- Coordination with local wings is essential for the further continuation of the activities especially for SPCC mapping and soil classification. Strategic Technical and Administrative Regional Staff (STARS) can be a coordinating partner for the activities, once these activities are regularized.
- There is a high possibility that these activities will be covered by the next project, which is currently appraised by the Japanese government.

Another issue relevant to the institutional sustainability is monitoring mechanisms of activities. The Project has carried out monthly manager conferences in which staff members higher than the head of sections participate. The Project also conducted In-house seminars and workshops to review the on-going activities. These mechanisms have functioned as monitoring mechanisms.

As a conclusion, institutional sustainability in terms of the continuation of the Project activities found to be satisfactory.

6-5-2. PROSPECTS FOR FINANCIAL SUSTAINABILITY

As mentioned in the previous section, only a part of the Project activities ought to be continued after the termination of the Project. Currently, the Project has spent about 40% of the annual budget of the BSWM, and amount required for the continuation of these activities including maintenance of facilities and equipment is estimated to be decreased to about 25 % of the annual budget of the BSWM. During the project implementation period, the annual budget of the BSWM was firmly increasing, and drastic cut of budget is not expected to happen in the near future. On top of these facts, expenses for maintenance and repair of facilities and equipment during the Project have been completely covered by the BSWM. These evidences reasonably confirm the financial sustainability of the BSWM for continuation of the necessary activities.

6-5-3. PROSPECTS FOR PHYSICAL AND TECHNICAL SUSTAINABILITY

In order to maintain the technical sustainability, three conditions have to be met. One is mechanisms for improvement of technology and skill for senior researchers, the second is mechanisms for training of junior researchers, and the last is environment which keep the trained persons within the institution. The Team has found that following situations of the BSWM would maintain these three requirements for sustainability.

- In-house technical transfer has been done through variety of systems such as:

- Staff members who trained abroad will work as a team when he/she comes back to the BSWM for dissemination of the acquired skills and knowledge.
- A person who trained in abroad is also obliged to have a seminar or a workshop for the purpose of knowledge sharing.
- Regular in-house training.

- Global information access including web page construction, preparation of web data collection guidelines has been established. This will be an important source of latest information on new technologies and opportunities for expansion of linkage with similar institutions abroad.
- All the staff members of the Project are permanent staff of the BSWM, and out-going of permanent staff from the BSWM has not happened often in the past.

7. CONCLUSIONS

Based on the findings of the evaluation, the Team concluded that the Project activities have been successfully conducted under a close collaboration between the Japanese experts and Philippine counterparts, and most of the project outputs have been completed. By the end of the Project, January 31st, 2000, the Project is expected to obtain still more accomplishment through the remaining activities. The Project has substantially contributed to the improvement of research capability and of national and international reputation of the BSWM. The Team also concluded that current institutional, financial and technical capability is sufficient enough to maintain the activities initiated by the Project and additional activities for further development of current technologies.

8. SUMMARY OF THE EVALUATION

(1) ACHIEVEMENT OF THE PROJECT

Four out of seven planed outputs have been already achieved. The remaining three outputs are expected to be accomplished by the end of the Project. Necessary technical transfer from the Japanese experts to the Philippine counterparts have been successfully completed. As the result, the Project is expected to accomplish the purpose of the Project.

(2) IMPACT

The Project has not only developed new technologies for soil improvement, soil conservation and soil classification, but also contributed to dissemination of the developed technologies to farmers, LGUs, and universities. Due to this remarkable effort, the Project contributed considerably to the overall goal of the improvement of farmers' technology. Improved research capability of the BSWM by the Project has also contributed to the nation through execution of variable studies relevant to soil and land management and reliable laboratory testing. The Project has been also well known in the Asian region, and the Project was actively involved in dissemination of its knowledge and technologies in the region.

(3) EFFICIENCY

Although there were some negative situations such as typhoon, delay of equipment procurement, re-assignment of staff members, insufficient time for short-term Japanese experts, and an unsuitable activity plan, the Project responded to these problems appropriately, and the efficiency of the project implementation was maintained. In addition to this, SPCC group accomplished additional outputs such as establishment of a local information network.

(4) RELEVANCE

Both national and sectoral development policy of present government have strong emphasis on support to disadvantaged groups including low-income farmers in marginal soil areas. The framework of the Project is completely complied with these higher policies.

(5) SUSTAINABILITY

After the end of the Project, only a part of the project activities will be continued. These activities will be either incorporated in regular activities of the BSWM or covered by a following cooperation project, which is currently under consideration. In either case, present condition of institutional settings and financial background of the BSWM are strong enough to support the continuation of the activities. The BSWM has also facilitated several mechanisms for in-house information sharing and staff member training to maintain and develop its institutional technical capability.

9. RECOMMENDATIONS

As the results of the review and evaluation of the Project, the Team has made following recommendations to both the Japanese and Philippine government.

9-1. RECOMMENDATIONS FOR SHORT-TERM IMPROVEMENT

(1) Extension of the project period or a follow up cooperation is not necessary.
(2) Power supply for the rain simulator at research Centers should be facilitated to promote the utilization.
(3) Irrigation systems at research Centers should be maintained, and experimental field should be fenced.
(4) Activities of SPCC group should focus on analyzing of data and preparing maps, and operation of field experiments could be done by internal and external specialized groups such as Soil Conservation, and Soil and Fertilizer groups of the Project, BFS group, universities, and other research institutions. Close coordination between SPCC and Soil Survey Division is necessary for evaluation of collected data.
(5) Mandate of the BSWM should be prioritized, and closer coordination among the divisions and sections should be made based on the priority.
(6) Continuous communication between the predecessor and the successor at personnel replacement is recommended. If a chief of a section is replaced, it is recommended that he/she be instructed to avoid sudden changes in research approach or research policy.

9-2. RECOMMENDATIONS FOR THE LONG-TERM IMPROVEMENT

(1) Continuous upgrading of the staff members of the BSWM

After the completion of the Project, the BSWM needs to develop the technical capability of the staff members by own means. More over, the next step is to adapt the developed technologies by the Project to local conditions for the purpose of extension. Therefore, continuous effort to enhance the research capability in terms of human resources and facilities should be done. Current activities for human resource development such as in-house seminars, and dissemination of knowledge from trained staff among the other staff members should be enhanced.

(2) Strengthening of financial basis

Due to the achievement of the Project, large part of the current research activities will be ended by the termination of the Project. However, the BSWM still needs to maintain about 25% of its budget (approximately 27.5 million Pesos) for the continuation of necessary activities initiated by the Project. As mentioned in the previous, new activities for adaptation of the developed technology will require further budget allocation. The BSWM has enjoyed steady increases in budget allocation, however; further financial support from the government may be necessary.

(3) Strengthening of further linkages with relevant institutions for development of integrated technologies.

Appropriate agricultural technologies are integrated technologies includes soil management as well as water management, crop production, pest control, economic feasibility, and more. Consideration of the socio-economic conditions of farmers are also critical for development of appropriate technologies. For the purpose of effective utilization of the developed technologies by the Project for establishment of the integrated appropriate technologies, close coordination with other relevant research institutions is indispensable.

(4) Strengthening of further linkages with relevant institutions for dissemination of technologies to farmers

Close coordination with LGUs is critical for the purpose of dissemination of the technologies to farmers. Another critical linkage is with regional agricultural research institutions and universities. Since soil conditions of farmers' land and socio-economic conditions of the farmers vary widely in the nation, it is rather inefficient for the BSWM to bear all the responsibility to develop appropriate technologies for the farmers. Further effort and deep commitment for establishment of nation wide linkage is anticipated.

(5) Further technical cooperation with Japan after the completion of the Project

The Philippine government requested a project-type technical cooperation entitled "Environmental and Productivity Management of Marginal Soils in the Philippines" aimed at developing appropriate soil and water management technologies for marginal and degraded soils, and dissemination of the technologies to farmers. This project is on the same line toward the ultimate goal of the Project, and it would have further impact to the Overall goal of the Project. Realization of the proposed project is strongly recommended, and implementation should be in a timely manner. The BSWM should take an initiative for the realization of the project, and be fully committed to the implementation of the project once the

Japanese government approves it.

(6) To improve transparency and to produce more objective results, it is recommended that project -related reviews and workshops should be further undertaken together with outside institutions such as DA-Central, Bureau of Agricultural Research, Philippine Coconut Authority, and other institutions engaged in similar activities.

10. LESSONS LEARNED FROM THE PROJECT

From the evaluation of the Project, the Team has identified several lessons that are useful for the Philippine and Japanese governments to plan and/or implement similar project in the future.

(1) Flexibility of the project management and amendment on TOR of the Project

SPCC group of the Project completed most of its planned outputs earlier than the schedule. Due to this unexpected early achievement, SPCC group started additional activities such as establishment of local information network. However, this activity was not reflected in the TSI. On top of this, during the evaluation, staff members of SPCC group expressed the opinion that additional technical transfer from Japanese side could have helped the group to realize further achievement. Flexibility in implementation of cooperation by the Japanese government such as additional inputs and modification of TSI should be seriously considered.

(2) Trade-off between human resource development and smooth implementation of project activities

On the way of human resource development, sometimes a high potential person is sent for training or research abroad. Since this person is most likely a key person in his/her group, absence of the person can cause a serious shortage of manpower in the group. This problem gives a trade-off decision to the managerial group. Careful consideration has to be made to alleviate the expected problems.

ANNEX 1. List of Japanese Experts dispached

1.Long-term Experts

	Field	Name	Dispached Duration
1	Leader	Dr.Tamaki YASUDA	1995.02.01～1997.01.31
2		Dr.Michio ARARAGI	1997.01.15～2000.01.31
3	Coordinator	Mr.Toru HARADA	1995.03.27～1997.09.26
4		Mr.Masaru IMAMURA	1997.09.04～2000.01.31
5	Soil and Fertilizer	Dr.Shigemitsu ARAI	1995.03.02～2000.01.31
6	Soil Conservation	Dr.Yoshimi UENO	1995.02.01～2000.01.31
7	Soil Productivity Capability Classification Standard	Dr.Toshiaki OKURA	1995.02.01～2000.01.31

2.Short-term Experts

	Field	Name	Dispached Duration
F.Y.1995			
1	Soil and Fertilizer	Dr.Shoichiro AKAO	1995.07.08～1995.08.03
2	Soil Productivity Capability Classification Standard	Dr.Yoshitake KATO	1995.07.10～1995.07.30
3	Soil Conservation	Dr.Ichiro TANIYAMA	1996.01.17～1996.03.14
4	Plant Ecological Chemistry	Dr.Yoshiharu FUJII	1996.03.11～1996.03.30
F.Y.1996			
5	Agro-Meteorology	Dr.Seishi ISOBE	1996.05.30～1996.10.29
6	Plant Physiology	Dr.Satoshi YAMADA	1996.10.01～1997.03.15
7	Plant Ecology	Dr.Masayuki NEMOTO	1996.10.21～1996.11.16
8	Plant Ecogical Chemistry	Dr.Yoshiharu FUJII	1996.10.29～1996.11.23
9	Soil Survey & Classification	Dr.Tadao HAMAZAKI	1996.11.04～1996.12.14
10	Installation(ICP)	Mr.Tsuyoshi TOZAWA	1997.02.14～1997.02.22
F.Y.1997			
11	Plant Nutrition	Dr.Masanori SAITO	1997.07.01～1997.07.21
12	Soil Microbiology	Dr.Shuichi ASANUMA	1997.08.05～1997.09.04
13	Soil Erosion Monitoring	Mr.Kenji BANZAI	1997.10.06～1997.10.25
14	Installation(15N Analyzer)	Mr.Wataru MARUYAMA	1997.11.11～1997.11.23
15	Soil Formation Processing	Mr.Kunihiko KATO	1998.01.20～1998.03.07
F.Y.1998			
16	Map Overlay Technology	Mr.Kenji MATSUMORI	1998.06.22～1998.08.01
17	Soil Erosion	Dr.Ichiro TANIYAMA	1998.10.06～1998.11.03
18	Biochemistry	Dr.Noriharu AE	1998.10.19～1998.11.20
19	Soil Chemistry	Mr.Tsunehisa INOUE	1998.11.17～1998.12.15
F.Y.1999			
20	Soil Management	Mr.Norio YASUDA	1999.08.26～1999.10.30
21	Nitrogen Balance Analysis		
22	Soil Conservation		
23	Soil Microbiology		

ANNEX 2. List of Counterparts accepted for Technical Training in Japan

	Field	Name/Position	Training Period	Destination/Affiliation
F.Y.1995				
1	Plant Analysis	Ms.Esperanza V.DACANAY (Supervising Agriculturist)	1995.06.19～1995.09.27	National Agriculture Research Center (NARC)
2	Soil Chemistry	Ms.Beatriz C.MAGNO (Agriculturist II)	1995.07.17～1995.10.15	National Institute for Agro-Environmental Sciences(NIAES)
3	Soil Physics	Mr.Calros F.SERRANO (Senior Agriculturist)	1995.07.17～1995.10.15	National Institute for Agro-Environmental Sciences(NIAES)
4	Soil Microbe	Dr.Reynald G.PALIS (Agricultural Center Chief IV)	1995.09.11～1995.09.30	Ministry of Agriculture,Forestry and Fisheries(MAFF),NIAES,etc.
5	Soil Survey and Classification	Mr.Virgilio A.CASTANEDA (Senior Agriculturist)	1996.03.04～1997.06.02	National Institute for Agro-Environmental Sciences(NIAES)
F.Y.1996				
1	Soil Microbiology	Ms.Elvira M.BAUTISTA (Agriculturist II)	1996.06.03～1996.09.01	Hokkaido National Agricultural Experiment Station(HNAES)
2	Soil Conservation	Mr.Pablo M.MONTALLA (Agriculturist II)	1996.06.10～1996.09.08	National Institute for Agro-Environmental Sciences(NIAES)
3	Plant Ecology	Ms.Elmer B.BORRE (Agriculturist II)	1996.06.10～1996.09.08	National Institute for Agro-Environmental Sciences(NIAES)
4	Observation of Agricultural Research Facilities In Japan	Mr.Alejandrio R.BALOLOY (Assistant Director)	1996.08.21～1996.09.08	Ministry of Agriculture,Forestry and Fisheries(MAFF),NIAES,etc.
5	Crop Analysis	Ms.Vilma M.QUIMSON (Senior Agriculturist)	1997.03.24～1997.06.28	National Institute for Agro-Environmental Sciences(NIAES)

	Field	Name/Position	Training Period	Destination/Affiliation
F.Y.1997				
1	Computer Management	Ms.Cleotilda M.NICOLAS (Agriculturist II)	1997.05.12～1997.08.13	National Institute for Agro-Environmental Sciences(NIAES)
2	Soil Ecology	Ms.Cristy C.PERLADO (Agriculturist II)	1997.06.10～1997.08.13	National Institute for Agro-Environmental Sciences(NIAES)
3	Soil Mineralogy	Ms.Purisima G.PAJARO (Agriculturist II)	1997.07.28～1997.11.03	Tohoku University
4	Soil Amelioration Technology	Mr.Dominciano D.RAMOS Jr. (Agriculturist II)	1997.09.15～1997.12.17	National Agriculture Research Center (NARC)
F.Y.1998				
1	Soil Conservation	Mr.Edgardo R.REYES (Senior Agriculturist)	1998.05.28～1998.06.21	Shikoku National Agricultural Experiment Station(SNAES),NARC
2	Soil and Fertilizer	Ms.Mary Jane R.dela CRUZ (Agriculturist II)	1998.07.07～1998.09.06	Kyushu National Agricultural Experiment Station(KNAES)
3	Soil Information Analysis	Mr.Mario E.VINLUAN (Agriculturist II)	1998.08.24～1998.12.03	National Institute for Agro-Environmental Sciences(NIAES)
4	Observation	Dr.Lauro G.HERNANDEZ (Project Manager)	1998.09.15～1998.10.03	MAFF,NIAES,NARC,JIRCAS,OIC,TBIC

	Field	Name/Position	Training Period	Destination/Affiliation
F.Y.1999				
1	Audio Visual Technology	Ms.Georina C.Z.SIENA (Chief TIDS)	1999.05.06～1999.08.28	Okinawa International Center(OIC)
2	Lysimeter Experimental Methods	Mr.Venerando F.NABOA (Agriculturist II)	1999.05.31～1999.09.01	National Agriculture Research Center (NARC)
3	Soil Microbiology	Ms.Jacqueline S.ROJALES (Agriculturist II)	1999.05.31～1999.09.01	National Institute for Agro-Environmental Sciences(NIAES)
4	Soil Conservation	Ms.Jessica A.TORRION (Agriculturist II)	1999.06.28～1999.10.03	National Agriculture Research Center (NARC)
5	Survey and Collection of Technology for Soil Research	Dr.Redentor S.GATUS (Supervising Agriculturist)	1999.09.08～1999.09.23	MAFF,NIAES,NARC,JIRCAS,Tsukuba Univ. Kobe Univ.

ANNEX 3--1. Provision of Machinery and Equipment

(Pesos)

Year	Procurement in Japan	Brought by Experts	Procurement in the Philippines	Total
FY 1994		409,800.00		409,800.00
FY 1995	6,741,000.00	777,500.00		7,518,500.00
FY 1996	8,750,000.00	767,270.00	8,814,340.00	18,331,610.00
FY 1997	10,970,000.00	891,830.00		11,861,830.00
FY 1998	*13,185,000.00	1,136,560.00		*14,321,560.00
FY 1999		**486,030.00	**297,700.00	**783,730.00
Total	39,646,000.00	4,468,990.00	9,112,040.00	53,227,030.00

* : Estimated
** : Proposed

ANNEX 3－2. List of major Machinery and Equipment provided
(Over 1,600,000 J. Yen)

J F Y	No.	Description/Manufacturer/Model	Unit Price(¥)	Qty.	Location	Usage	Cond.	Date of Arrival	Remarks
1995(H.7)	1	Vehicle(MITSUBISHI Space Wagon) & parts	1,813,900	1set	Administration	A	W	06.27,1996	
1995(H.7)	2	Vehicle(MITSUBISHI Space Wagon) & parts	1,813,900	1set	Administration	A	W	06.27,1996	
1995(H.7)	3	Vehicle(MITSUBISHI Pickup L 200) & parts	1,556,500	1set	Administration	A	W	09.19,1996	
1995(H.7)	4	Ion Chromatograph(HITACHI L-7100,L-7200,L-7300)	4,400,000	1set	SWRRD(Chemistry)	B	W	01.08,1997	
1995(H.7)	5	Nitrogen Determination System(SHIBATA B-316,435)	1,650,000	1set	LSD(Chem.Analysis)	A	W	01.08,1997	
1995(H.7)	6	Sprinkling Intensity System(DAIKI DIK-4260-S)	2,400,000	1set	SCMD	B	W	01.08,1997	
1995(H.7)	7	Spectro/Flame Photometer(FUJIHIRA SPAD SFP-2)	2,185,000	1set	NCSWRRS(Bulacan)	B	W	01.08,1997	
1995(H.7)	8	Spectro/Flame Photometer(FUJIHIRA SPAD SFP-2)	2,185,000	1set	NCSWRRS(Tanay)	D	W	01.08,1997	Unstable voltage
1996(H.8)	1	Vehicle(MITSUBISHI L 300) & parts	2,024,000	1set	Andministration	A	W	10.16,1996	Local procurement
1996(H.8)	2	Vehicle(MITSUBISHI Pajero) & parts	3,124,000	1set	Andministration	A	W	10.16,1996	Local procurement
1996(H.8)	3	ICP Atomic Emission Spectrometer(HITACHI P-4000)	16,201,000	1set	LSD(Chem.Analysis)	B	W	12.18,1996	Local procurement
1996(H.8)	4	Tractor(KUBOTA GL-301ES8P) & parts	4,502,200	1set	NCSWRRS(Bulacan)	A	W	08.27,1997	
1996(H.8)	5	Tractor(KUBOTA GL-301ES8P) & parts	5,193,000	1set	NCSWRRS(Tanay)	A	W	08.27,1997	
1996(H.8)	6	Heavy Nitrogen Analyzer(SHOKOTSUSHO N-151)	9,191,600	1set	SWRRD(Water)	B	W	08.27,1997	
1996(H.8)	7	Rain Drop Size Measuring Device(DISTROMET RD-69,ADA-90)	5,342,600	1set	SCMD	B	W	08.27,1997	
1996(H.8)	8	Pressure Menbrane Apparatus(DAIKI DIK-3500,9212)	1,662,000	1set	LSD(Physical)	B	W	08.27,1997	
1996(H.8)	9	Gas Chromatograph(YANACO G3810-TCD-FID)	2,616,700	1set	SWRRD(Biology)	B	W	08.27,1997	
1996(H.8)	10	Rain Fall Apparatus(MARUTOSANYU)	3,290,000	1set	NCSWRRS(Tanay)	D	W	08.27,1997	Under construction
1997(H.9)	1	High Speed Refrigerated Centrifuge(TOMY GRX-220)	3,642,870	1set	SWRRD(Chemistry)	B	W	09,29,1998	
1997(H.9)	2	Desk-top type X-Ray Diffraction Device(RIGAKU MINIFLEX)	8,900,000	1set	SWRRD(Physics)	B	W	09.30,1998	
1998(H.10)	1	Atomic Absorption Spectrophotometer(HITACHI Z-5700)	6,122,000	1set	SWRRD(Chemistry)	D	W	05.20.1999	Under adjustment
1998(H.10)	2	Double Beam UV-VIS Spectrophotometer(HITACHI U-2001)	1,858,000	1set	LSD(Chem.Analysis)	D	W	05.20,1999	Under adjustment
1998(H.10)	3	Trencher(KAWABE F-45LH)	2,101,050	1set	NCSWRRS(Tanay)	D	W	07.09,1999	Under adjustment
1998(H.10)	4	Total Organic Carbon Nitrogen Analyzer(SUMIKA NC-80)	4,970,000	1set	SWRRD(Chemistry)	D	W	07.09.1999	Under adjustment
1998(H.10)	5	Excavator(KOMATSU PC12R-8)	3,146,000	1set	NCSWRRS(Tanay)				Requested

SWRRD:Soil and Water Resources Research Division, LSD:Laboratory Service Division, SCMD:Soil Conservation and Management Division, SSD:Soil Survey Division, ALMED:Agricultural Land Management and Evaluation Division, WRMD:Water Resources and Management Division, COD:Cartographic Operation Division, NCSWRRS(Bulacan,Tanay):National Center for Soil and Water Resources Research Station(Bulacan,Tanay)

(Over 100,000 and less than 1,600,000 J. Yen)

J F Y	No.	Description/Manufacturer/Model	Unit Price(¥)	Qty.	Location	Usage	Cond.	Date of Arrival	Remarks
1995(H.7)	1	Cone Penetrometer(DAIKI DIK-5520)	240,000	1set	NCSWRRS(Tanay)	C	W	01.08,1997	
1995(H.7)	2	Cylindrical Intakerate Meter(DAIKI DIK-4200)	280,000	1set	NCSWRRS(Tanay)	C	W	01.08,1997	
1995(H.7)	3	Soil Crushing-sieving Machine(EVERWELL RC-100A)	170,000	1set	NCSWRRS(Tanay)	C	W	01.08,1997	
1995(H.7)	4	Sieves Shaker(EVERWELL SS-93)	260,000	1set	NCSWRRS(Tanay)	C	W	01.08,1997	
1995(H.7)	5	Cultivator(MAMETORA MRU2D)	330,000	1set	NCSWRRS(Bulacan)	B	W	01.08,1997	
1995(H.7)	6	Cultivator(MAMETORA MRU2D)	330,000	1set	NCSWRRS(Tanay)	B	W	01.08,1997	
1995(H.7)	7	Sprayer(MARUYAMA MS153EMM-1R)	220,000	1set	NCSWRRS(Bulacan)	B	W	01.08,1997	
1995(H.7)	8	Sprayer(MARUYAMA MS153EMM-1R)	220,000	1set	NCSWRRS(Tanay)	B	W	01.08,1997	
1995(H.7)	9	Water Purifier(SHIBATA ROD-11)	1,100,000	1set	LSD(Phys.,Fertlty)	A	W	01.08,1997	
1995(H.7)	10	Stocker(IUCHI SCR-551G)	240,000	1set	SWRRD(Chemistry)	A	W	01.08,1997	
1995(H.7)	11	Desiccator(IUCHI ADDLA-D)	230,000	1set	SWRRD(Chemistry)	B	W	01.08,1997	
1995(H.7)	12	Automatic Pressure Controller(DAIKI DIK-9212)	660,000	1set	LSD(Physical)	B	W	01.08,1997	
1995(H.7)	13	Compact Shaker(SHIBATA LCS-100)	120,000	1set	SWRRD(Biology)	B	W	01.08,1997	
1995(H.7)	14	COD Meter(TOA COD-50S)	370,000	1set	LSD(Biology)	B	W	01.08,1997	
1995(H.7)	15	DO Meter(TOA DO-25A)	315,000	1set	LSD(Biology)	B	W	01.08,1997	
1996(H.8)	1	Systems for SPCC Map(COMPAQ Prosignia 300 etc.)	858,600	1set	ALMED(ISRIS)	A	W	08.15,1996	Local Procurement
1996(H.8)	2	Systems for SPCC Map(COMPAQ Prosignia 300 etc.)	889,500	1set	ALMED(ISRIS)	A	W	08.15,1996	Local Procurement
1996(H.8)	3	Digestion Unit(BUCHI B-435)	692,000	1set	LSD(Phys.,Fertlty)	B	W	12.16,1996	Local Procurement
1996(H.8)	4	Digestion Unit(BUCHI B-435)	692,000	1set	LSD(Phys.,Fertlty)	B	W	12.16,1996	Local Procurement
1996(H.8)	5	Scrubber(BUCHI B-412)	621,300	1set	LSD(Phys.,Fertlty)	B	W	12.16,1996	Local Procurement
1996(H.8)	6	Distillation Unit(BUCHI B-316)	854,100	1set	LSD(Phys.,Fertlty)	B	W	12.16,1996	Local Procurement
1996(H.8)	7	Distillation Unit(BUCHI B-316)	854,100	1set	LSD(Phys.,Fertlty)	B	W	12.16,1996	Local Procurement
1996(H.8)	8	Titration Unit(METROHM 719)	905,100	1set	SWRRD(Chemistry)	B	W	12.10,1996	Local Procurement
1996(H.8)	9	Titration Unit(METROHM 719)	905,100	1set	LSD(Chem.Anlysis)	B	W	12.10,1996	Local Procurement
1996(H.8)	10	Jew Crusher(YOSHIDA 1020A)	1,010,000	1set	LSD(Dry Room)	A	W	08.27,1997	
1996(H.8)	11	Shaker(YAMATO MK200D)	243,500	1set	LSD(Chem.Anlysis)	B	W	08.27,1997	
1996(H.8)	12	Automatic Motar(IUCHI ANM-200)	223,560	1set	LSD(Chem.Anlysis)	B	W	08.27,1997	
1996(H.8)	13	Electric Furnace(YAMATO FP32)	492,600	1set	NCSWRRS(Tanay)	D	W	08.27,1997	Unstable Voltage
1996(H.8)	14	Crusher(IUCHI SM-1)	113,890	1set	LSD(Chem.Anlysis)	B	W	08.27,1997	
1996(H.8)	15	Low Temperature Incubator(TABAY LU-112T)	583,280	1set	SWRRD(Chemistry)	B	W	08.27,1997	
1996(H.8)	16	Cool Water Circulation Aspirator(TOKYORIKA CA-1100)	266,500	1set	SWRRD(Chemistry)	B	W	08.27,1997	
1996(H.8)	17	Ultrasonic Cleaner(HONDA DENSHI W-222) 8.6L	175,000	1set	SWRRD(Chemistry)	A	W	08.27,1997	
1996(H.8)	18	Ultrasonic Cleaner(HONDA DENSHI W-232) 26L	291,000	1set	LSD(Chem.Anlysis)	A	W	08.27,1997	

J F Y	No.	Description/Manufacturer/Model	Unit Price(¥)	Qty.	Location	Usage	Cond.	Date of Arrival	Remarks
1996(H.8)	19	Electronic Balance(METTLER PG-802)	132,500	1set	SWRRD(Biology)	B	W	08.27,1997	
1996(H.8)	20	Electronic Balance(METTLER PG-802)	132,500	1set	LSD(Chem.Anlysis)	B	W	08.27,1997	
1996(H.8)	21	Electronic Balance(METTLER PG-3001)	112,500	1set	SWRRD(Biology)	B	W	08.27,1997	
1996(H.8)	22	Electronic Balance(METTLER PG-3001)	112,500	1set	LSD(Chem.Anlysis)	B	W	08.27,1997	
1996(H.8)	23	pH Meter(HORIBA HM-26S)	247,200	1set	LSD(Chem.Anlysis)	B	W	08.27,1997	
1996(H.8)	24	pH Meter(HORIBA HM-14P)	119,700	1set	SWRRD(Chemistry)	B	W	08.27,1997	
1996(H.8)	25	Three Phase Meter(DAIKI DIK-1121)	382,000	1set	SWRRD(Physics)	C	W	08.27,1997	
1996(H.8)	26	Falling Head Permeameter(DAIKI DIK-4050)	146,800	1set	SWRRD(Physics)	C	W	08.27,1997	
1996(H.8)	27	Color Plotter(ENCAD Novajet Inkjet Plotter)	1,321,200	1set	ALMED(Remo-Sen)	A	W	07.07,1997	Local Procurement
1996(H.8)	28	Server System(COMPAQ Proriant 800 etc.)	1,357,300	1set	ALMED(Remo-Sen)	A	W	07.08,1997	Local Procurement
1996(H.8)	29	Server System(COMPAQ Proriant 800 etc.)	1,306,200	1set	ALMED(ISRIS)	A	W	07.25,1997	Local Procurement
1996(H.8)	30	Long Term Pluviograph(ISUZU 3-6070-02)	916,000	1set	NCSWRRS(Tanay)	A	W	08.01,1997	Local Procurement
1996(H.8)	31	Portable Weather Instruments(ISUZU 3-7120-01)	232,600	1set	SCMD	C	W	08.01,1997	Local Procurement
1996(H.8)	32	Software(ERDAS Imagine Windows NT)	1,469,000	1set	ALMED(Remo-Sen)	A	W	08.29,1997	Local Procurement
1997(H.9)	1	Total Station Surveying Instrument(SOKIA SET5FS)	1,450,000	1set	SCMD	C	W	09.29,1998	
1997(H.9)	2	Self-moving Cutter(YAMAMOTO CX150JM)	484,000	1set	NCSWRRS(Tanay)	B	W	09.29,1998	
1997(H.9)	3	Disk Mower(STAR MDM1000)	561,000	1set	NCSWRRS(Bulacan)	B	W	09.29,1998	
1997(H.9)	4	Software(ABACUS Stat View)	105,000	1pce	ALMED(ISRIS)	A	W	09.29,1998	
1997(H.9)	5	Software(ADOBESYSTEM Adobe Photoshop)	119,000	1pce	ALMED(ISRIS)	A	W	09.29,1998	
1997(H.9)	6	Quarts Cell for U-2000(HITACHI)	220,000	1pce	SWRRD(Chemistry)	A	W	09.29,1998	
1997(H.9)	7	Soil Moisture Meter(FUJIWARA SPAD-PF-33)	208,000	1set	SWRRD(Water)	B	W	09.29,1998	
1997(H.9)	8	Electronic Conductivity Meter(FUJIWARA SPAD-PK-33)	195,000	1set	SWRRD(Water)	B	W	09.29,1998	
1997(H.9)	9	Electronic Conductivity Meter(TOA CM-14P)	164,000	1set	SWRRD(Chemistry)	B	W	09.29,1998	
1997(H.9)	10	Electronic Conductivity Meter(TOA CM-20S)	164,000	1set	LSD(Biology)	B	W	09.29,1998	
1997(H.9)	11	Water Quality Checker(TOA WQC-20A)	273,650	1set	SWRRD(Physics)	B	W	09.29,1998	
1997(H.9)	12	Water Quality Checker(TOA WQC-20A)	273,650	1set	ALMED	B	W	09.29,1998	
1997(H.9)	13	Water Quality Checker(TOA WQC-20A)	273,650	1set	NCSWRRS(Bulacan)	B	W	09.29,1998	
1997(H.9)	14	pH Meter(HORIBA M-11)	308,000	1set	NCSWRRS(Bulacan)	B	W	09.29,1998	
1997(H.9)	15	pH Meter(HORIBA M-13)	458,000	1set	SWRRD(Chemistry)	B	W	09.29,1998	
1997(H.9)	16	pH Meter(HORIBA M-13)	458,000	1set	LSD(Chem.Anlysis)	B	W	09.29,1998	
1997(H.9)	17	pH Meter(HORIBA M-13)	458,000	1set	LSD(Chem.Anlysis)	B	W	09.29,1998	
1997(H.9)	18	Global Positioning System Camera(KONIKA Land Master)	235,000	1set	SCMD	C	W	09.29,1998	
1997(H.9)	19	Global Positioning System Camera(KONIKA Land Master)	235,000	1set	ALMED	C	W	09.29,1998	

J F Y	No.	Description/Manufacturer/Model	Unit Price(¥)	Qty.	Location	Usage	Cond.	Date of Arrival	Remarks
1997(H.9)	20	Global Positioning System Camera(KONIKA Land Master)	235,000	1set	SSD	C	W	09.29,1998	
1997(H.9)	21	Ultrasonic Homogenizer(TOKYORIKA VC501)	609,000	1set	LSD(Physical)	B	W	09.29,1998	
1997(H.9)	22	Mill,Ball(YAMATO UB-32)	382,100	1set	LSD(Dry Room)	A	W	09.29,1998	
1997(H.9)	23	Mixer(YAMATO MH-300)	97,490	1set	SWRRD(Chemistry)	A	W	09.29,1998	
1997(H.9)	24	Mixer(YAMATO MH-300)	97,490	1set	LSD(Chem.Anlysis)	A	W	09.29,1998	
1997(H.9)	25	Table-top Centrifuge(KOKUSAN H-103N)	340,800	1set	SWRRD(Chemistry)	A	W	09.29,1998	
1997(H.9)	26	Autoclave(SHIBATA DS-400)	1,104,000	1set	LSD(Biology)	B	W	09.29,1998	
1997(H.9)	27	Water Bath(YAMATO BF-400,BZ-100)	179,000	1set	SWRRD(Chemistry)	B	W	09.29,1998	
1997(H.9)	28	Water Bath(YAMATO BF-400,BZ-100)	179,000	1set	LSD(Chem.Anlysis)	B	W	09.29,1998	
1997(H.9)	29	Sieve Shaker(FUJIWARA MVS-220)	762,900	1set	LSD(Physical)	B	W	09.29,1998	
1997(H.9)	30	Growth Chamber(TOKYORIKA FLI-160)	941,000	1set	LSD(Biology)	B	W	09.29,1998	
1997(H.9)	31	Electronic Balance(METTLER AG-204)	220,000	1set	LSD(Chem.Anlysis)	A	W	09.29,1998	
1997(H.9)	32	Electronic Balance(METTLER PG-503)	230,000	1set	SWRRD(Chemistry)	A	W	09.29,1998	
1997(H.9)	33	Electronic Balance(METTLER PG-3001)	152,000	1set	SWRRD(Biology)	A	W	09.29,1998	
1997(H.9)	34	Chlorophyll Meter(MINOLTA SPAD-502)	135,000	1set	SWRRD(Biology)	A	W	09.29,1998	
1997(H.9)	35	Grain Moisture Meter(KETT PM-700)	150,000	1set	SWRRD(Biology)	B	W	09.29,1998	
1997(H.9)	36	Hot Plates(SHIBATA NP-7)	122,000	1set	SWRRD(Chemistry)	B	W	09.29,1998	
1997(H.9)	37	Hot Plates(ASAHIRIKA AHP-650)	298,000	1set	LSD(Chem.Anlysis)	B	W	09.29,1998	
1997(H.9)	38	Sample Mill(AKUTAK Cycrotec-1093)	793,750	1set	LSD(Chem.Anlysis)	B	W	09.29,1998	
1997(H.9)	39	Sample Mill(AKUTAK Cycrotec-1093)	793,750	1set	LSD(Chem.Anlysis)	B	W	09.29,1998	
1997(H.9)	40	Drying Oven(SANYO MOV-212)	202,500	1set	SWRRD(Chemistry)	B	W	09.29,1998	
1997(H.9)	41	Refrigerator(SHIBATA RC-490)	502,000	1set	LSD(Chem.Anlysis)	B	W	09.29,1998	
1997(H.9)	42	Mirror Stereoscope(SOKIA MS27)	315,500	1set	ALMED	C	W	09.29,1998	
1997(H.9)	43	Mirror Stereoscope(SOKIA MS27)	315,500	1set	SSD	C	W	09.29,1998	
1998(H.10)	1	X-Ray Pipe Ball for XD-1A(SHIMADZU Cu 2.0 KW)	680,000	1pce	SWRRD(Physics)	A	W	12.13,1998	
1998(H.10)	2	X-Ray Pipe Ball for XD-1A(SHIMADZU Cu 2.0 KW)	680,000	1pce	SWRRD(Physics)	A	W	12.13,1998	
1998(H.10)	3	Base Board for XD-1A(SHIMADZU XRG-1)	500,000	1set	SWRRD(Physics)	A	W	12.13,1998	
1998(H.10)	4	Color Printer(QMS Magicolor 2EX220V)	974,200	1set	ALMED(ISRIS)	A	W	07.12,1999	
1998(H.10)	5	Copy Server Component(EPSON ES-8000,PM5000C,CS5000N)	606,800	1set	ALMED(ISRIS)	A	W	07.12,1999	
1998(H.10)	6	Mirror Stereoscope(SOKIA MS27)	110,500	1set	SCMD	C	W	07.12,1999	
1998(H.10)	7	Current Meter(SANEI SOKURYOKI HIROI Type)	116,590	1set	SCMD	C	W	07.12,1999	
1998(H.10)	8	Software(PACK Inocu Lan for Windows NT)	100,400	1set	ALMED(ISRIS)	A	W	07.12,1999	
1998(H.10)	9	Aggregate Analyzer(DAIKI DIK-2000)	574,600	1set	SWRRD(Physics)	C	W	07.12,1999	

J F Y	No.	Description/Manufacturer/Model	Unit Price(¥)	Qty.	Location	Usage	Cond.	Date of Arrival	Remarks
1998(H.10)	10	High Pressure Compressor(DAIKI DIK-9260)	598,000	1set	SWRRD(Physics)	C	W	07.12,1999	
1998(H.10)	11	Software(MS Windows NT Server)	77,800	1set	ALMED(ISRIS)	A	W	07.12,1999	
1998(H.10)	12	Wiley Crusher(YOSHIDA 1029-B-S)	682,500	1set	LSD(Dry Room)	B	W	07.12,1999	
1998(H.10)	13	Wiley Crusher(YOSHIDA 1029-B-S)	682,500	1set	LSD(Dry Room)	B	W	07.12,1999	
1998(H.10)	14	Sample Mill(KYORITSU RIKO SK-M10)	164,100	1set	SWRRD(Water)	C	W	07.12,1999	
1998(H.10)	15	Sample Mill(KYORITSU RIKO SK-M10)	164,100	1set	LSD(Chem.Anlysis)	C	W	07.12,1999	
1998(H.10)	16	Soil Moisture Meter(IUCHI YZ-132)	214,700	1set	SWRRD(Fertility)	A	W	07.12,1999	
1998(H.10)	17	pH Meter(FUJIWARA PHS-120)	131,500	1set	SWRRD(Fertility)	A	W	07.12,1999	
1998(H.10)	18	Colony Counter(SHIBATA CL-560)	83,740	1set	SWRRD(Biology)	A	W	07.12,1999	
1998(H.10)	19	Electronic Balance(METTLER AG-104)	218,400	1set	SWRRD(Biology)	A	W	07.12,1999	
1998(H.10)	20	Electronic Balance(METTLER AG-104)	218,400	1set	SWRRD(Water)	A	W	07.12,1999	
1998(H.10)	21	Electronic Balance(METTLER AG-104)	218,400	1set	LSD(Chem.Anlysis)	A	W	07.12,1999	
1998(H.10)	22	Electronic Balance(METTLER AG-104)	218,400	1set	LSD(Biology)	A	W	07.12,1999	
1998(H.10)	23	Heating Block for Nitrogen Digention(YAMATO HF-61)	422,000	1set	SWRRD(Chemistry)				Requested
1998(H.10)	24	Cart(MAMETORA SC-10V)	327,800	1set	NCSWRRS(Bulacan)				Requested
1998(H.10)	25	Cart(MAMETORA SC-10V)	327,800	1set	NCSWRRS(Tanay)				Requested
1998(H.10)	26	Cone Penetrometer(DAIKI DIK-5520)	299,200	1set	SWRRD(Physics)				Requested
1998(H.10)	27	Hand Tractor(KUBOTA TR-60)	235,400	1set	NCSWRRS(Bulacan)				Requested
1998(H.10)	28	Hand Tractor(KUBOTA TR-60)	235,400	1set	NCSWRRS(Tanay)				Requested
1998(H.10)	29	Mower(MAMETORA MH-400)	228,800	1set	NCSWRRS(Bulacan)				Requested
1998(H.10)	30	Mower(MAMETORA MH-400)	228,800	1set	NCSWRRS(Tanay)				Requested
1998(H.10)	31	Workstation(COMPAQ AP200 6450/20+)	1,299,800	1set	ALMED(ISRIS)				Requested
1998(H.10)	32	Workstation(COMPAQ AP200 6450/20+)	1,299,800	1set	ALMED(ISRIS)				Requested
1998(H.10)	33	RAID System for Server(NEWTECH NRAID-S27G/64N1)	899,000	1set	ALMED(ISRIS)				Requested
1998(H.10)	34	RAID System for Server(NEWTECH NRAID-S27G/64N1)	899,000	1set	ALMED(ISRIS)				Requested
1998(H.10)	35	Scrubber(SHIBATA B-414)	596,000	1set	SWRRD(Chemistry)				Requested
1998(H.10)	36	Nitrogen Determination System(SHIBATA K-314)	912,000	1set	SWRRD(Water)				Requested
1998(H.10)	37	Desk-top Centrifuge(KOKUSAN 103N)	591,000	1set	LSD(Biology)				Requested
1998(H.10)	38	Eh Meter(FUJIWARA EHS-120)	214,000	1set	SCMD				Requested
1998(H.10)	39	LCD Projector(EPSON ELP-7300)	1,290,000	1set	ALMED(ISRIS)				Requested
1998(H.10)	40	Three Phase Meter(DAIKI DIK-1121)	570,000	1set	SWRRD(Fertility)				Requested
1998(H.10)	41	Sterilizer(ISUZU PT-12S)	643,000	1set	LSD(Biology)				Requested
1998(H.10)	42	Auto Burette(SHIBATA 725/8)	575,000	1set	SWRRD(Water)				Requested

Over 100,000 and less than 1,600,000 J. Yen(Carried by Experts)

J F Y	No.	Description/Manufacturer/Model	Unit Price(¥)	Qty.	Location	Usage	Cond.	Date of Arrival	Remarks
1994(H.6)	1	pH Meter(MERCK Rqflex)	92,300	1set	Dr.ARAI's Room	C	G	04.21,1995	
1994(H.6)	2	Personal Computer(IBM Think Pad 340CSE 2JD)	278,000	1set	Dr.OKURA's Room			05.22,1995	Stolen(Sep.22,'96)
1995(H.7)	1	Personal Computer(IBM Think Pad 340CSE KFJ)	315,000	1set	Dr.OKURA's Room	A	W	08.08,1995	
1995(H.7)	2	Manure Making Machine(KANSAI SANGYO SMG-500)	238,000	1set	NCSWRRS(Tanay)	C	G	09.25,1995	
1995(H.7)	3	Heating Block(YAMATO HF-21)	114,000	1set	SWRRD(Biology)	A	W	09.25,1995	
1995(H.7)	4	Angle Rotor for Centrifuge(KOKUSAN RM-180)	180,000	1set	SWRRD(Biology)	B	W	09.25,1995	
1995(H.7)	5	Sample Shipper(HITACHI 118-00501)	280,000	1set	LSD(Chem.Analysis)	A	W	09.25,1995	
1995(H.7)	6	Digitizer(CALCOMP C800238)	168,000	1set	Dr.OKURA's Room	C	G	09.25,1995	
1995(H.7)	7	Cone Penetrometer(DAIKI DIK-5520)	201,000	1set	NCSWRRS(Tanay)	C	G	01.18,1996	
1996(H.8)	1	Personal Computer(IBM Aptiva 770)	351,600	1set	Dr.UENO's Room	A	W	06.20,1996	
1996(H.8)	2	Personal Computer(DIGITAL Highnote VP-80)	280,000	1set	Dr.OKURA's Room	C	G	10.30,1996	
1996(H.8)	3	Personal Computer(IBM Aptiva J33)	281,000	1set	Team Leader's Room	A	W	11.05,1996	
1996(H.8)	4	Pipette Analyzer(Yamanaka Type)(DAIKI DIK-2020)	197,000	1set	SWRRD(Physics)	B	W	04.11,1997	
1996(H.8)	5	Grain Moisture Meter(KETT PM-700)	138,000	1set	Project Manager	C	G	04.11,1997	
1996(H.8)	6	Water Quality Checker(TOA WQC-20A)	89,100	1set	LSD(Chem.Analysis)	B	W	04.11,1997	
1996(H.8)	7	Digital Camera(KODAC DC-50)	96,200	1set	Dr.OKURA's Room	B	W	05.22,1997	
1997(H.9)	1	Double Fiber Illumination(NIKON)	135,800	1set	SWRRD(Biology)	B	W	07.02,1997	
1997(H.9)	2	Personal Computer(TOSHIBA DynaBook Satellite 220CS)	230,400	1set	Coordinator's Room	A	W	10.28,1997	
1997(H.9)	3	Personal Computer(Macintosh Power Macintosh 7200/120)	270,800	1set	LSD(Chem.Analysis)	C	G	11.18,1997	Local Procurement
1997(H.9)	4	Drawing Instrument(UCHIDA BP-3500/800-1050)	123,000	1set	SCMD	B	G	02.27,1998	
1998(H.10)	1	Water Purifier(TOKYO RIKA Milli-Q Jr.)	183,800	1set	LSD(Chem.Analysis)	A	W	07.20,1998	
1998(H.10)	2	Software(MS Proxy Server)	129,000	1set	Dr.OKURA's Room	A	W	09.09,1998	
1998(H.10)	3	Soil Piston Sampler(DAIKI DIK-170A)	137,800	1set	Dr.UENO's Room	B	G	09.28,1998	
1998(H.10)	4	Column for HITACHI HPLC(HITACHI 655-2618)	162,750	1set	SWRRD(Biology)	C	G	11.17,1998	
1998(H.10)	5	Integrated GIS Software (ESRI PC ArcInfo v.3.5.2)	651,000	1set	ALMED(ISRIS)	A	W	03.30,1999	Local Procurement
1998(H.10)	6	GIS Viewer(ESRI ArcView GIS v.3.1 for Windows)	260,500	1set	ALMED(ISRIS)	A	W	03.30,1999	Local Procurement
1998(H.10)	7	GIS Viewer(ESRI ArcView GIS v.3.1 for Windows)	260,500	1set	ALMED(ISRIS)	A	W	03.30,1999	Local Procurement
1998(H.10)	8	Detector of SHIMADZU XD-3(SHIMADZU)	332,000	1set	SWRRD(Physics)	A	W	06.03,1999	
1998(H.10)	9	Gonio Control Reley Unit for XD-3(SHIMADZU)	420,000	1set	SWRRD(Physics)	A	W	06.03,1999	

ANNEX 4. List of supplementary funds to cover local costs

(Yen)

JFY	Local Running Cost	Construction of Lysimeter	Repairment	Technical Exchange Cost	Third Country Expert Program	International Symposium	Total
1995	6,000,000	15,741,000					21,741,000
1996	5,200,000	583,000	12,843,000		1,260,000		19,886,000
1997	4,500,000			1,055,000			5,555,000
1998	3,825,000						3,825,000
1999	3,825,000					2,112,000	5,937,000
Total	23,350,000	16,324,000	12,843,000	1,055,000	1,260,000	2,112,000	56,944,000

ANNEX 5. List of expenditure by the Philippine side

(Pesos)

Year	Disbursement	Amount
FY 1995	Salaries	3,691,817.00
	Maintenance and other operating expenses	13,000,000.00
		16,691,817.00
FY 1996	Maintenance and other operating expenses	17,090,199.00
FY 1997	Maintenance and other operating expenses	18,787,331.00
FY 1998	Maintenance and other operating expenses	20,495,020.00
FY 1999	Maintenance and other operating expenses	14,021,417.00 (as of July)
Total		87,085,784.00

Maintenance and other operating expenses:
Traveling expenses,Communication services,Repair and maintenance of facilities and vehicles,Transportation services,Supplies and materials,Gasolin and oil,Other services

ANNEX 6. List of Philippine Counterparts Assigned

Management and Administration

Name	Position	Duration	Training In Japan
Mr.Godfred N.ALCASID Jr.	Director	February ,1995 ~ June ,1996	JICA,MAFF,NIAES/1989(Phase I)
Dr.Rogelio N.CONCEPCION	Assistant Director/Director	February ,1995 ~ present	JICA,MAFF,NIAES/1989(Phase I)
Mr.Alejandrino R.BALOLOY	Chief,SCMD/Assistant Director	July ,1996 ~ present	JICA,MAFF,NIAES/1996
Mr.Alejandro G.MICOSA	Chief,SSD(Project Manager)	August ,1996 ~ January ,1998	NIAES/1990(Phase I)
Dr.Lauro G.HERNANDEZ	Project Manager	January ,1998 ~ present	JICA,MAFF,NIAES,OIC/1998

Soil and Fertilizer

Name		Position	Duration	Training In Japan
Dr.Perfecto P.EVANGELISTA	(SWRRD)	Chief,SWRRD	February ,1995 ~ present	
Dr.Lauro G.HERNANDEZ	(ALMED)	Infor.Technology Officer II	February ,1995 ~ January ,1998	JICA,MAFF,NIAES/1998
Dr.Nora B.INCIONG	(LSD)	Chief,LSD	February ,1995 ~ Agust ,1996	
Mr.Crisostomo B.ALCALDE	(Blacn)	Agricultural Center Chief IV	February ,1995 ~ present	
Mr.Tranquilino C.ATIENZA	(SWRRD)	Supervising Agriculturist	February ,1995 ~ June ,1996	
Mr.Wilfredo E.CABEZON	(ALMED)	Chief,ALMED	February ,1995 ~ present	
Ms.Esperanza V.DACANAY	(SWRRD)	Supervising Agriculturist	February ,1995 ~ present	NARC/1995
Ms.Imelda E.SANTOS	(SWRRD)	Supervising Agriculturist	February ,1995 ~ present	
Ms.Redemcion B.GRIFAL	(SWRRD)	Supervising Agriculturist	February ,1995 ~ present	JICA,MAFF/1992(Phase I)
Ms.Marcelina J.PALIS	(SWRRD)	Supervising Agriculturist	February ,1995 ~ present	NIAR/1993(Phase I)
Mr.Victorcito V.BABIERA	(SWRRD)	Supervising Agriculturist	February ,1995 ~ present	Kyoto Univ./1991,1992(Phase I)
Mr.Salvador F.VILLAREY	(SWRRD)	Senior Agriculturist	February ,1995 ~ present	
Ms.Elisa D.AYO	(SWRRD)	Senior Agriculturist	February ,1995 ~ present	
Ms.Beatriz C.MAGNO	(SWRRD)	Agriculturist II	February ,1995 ~ present	
Ms.Elvira M.BAUTISTA	(SWRRD)	Agriculturist II	February ,1995 ~ present	
Ms.Ma Teresa T.MANUEL	(LSD)	Chemist III	February ,1995 ~ present	
Ms.Digna R.ALLAG	(SWRRD)	Agriculturist II	February ,1995 ~ present	

Soil and Fertilizer

Name		Position	Duration	Training In Japan
Mr.Venerando F.NABOA	(Blacn)	Agriculturist II	February ,1995 ~ present	NARC/1999
Ms.Amelia A.BANGALAN	(SWRRD)	Senior Agriculturist	February ,1995 ~ present	
Ms.Josie P MERCADO	(SWRRD)	Senior Agriculturist	February ,1995 ~ present	
Engr.Rafael A MONTE	(LSD)	Supervising Agriculturist	February ,1995 ~ present	
Mr.Virgincito G.ESTOCONING	(SWRRD)	Laboratory Aid I	February ,1995 ~ present	
Ms.Purisima G.PAJARO	(SWRRD)	Agriculturist II	February ,1995 ~ present	Tohoku University/1997
Ms.Celia C.GROSPE	(SWRRD)	Senior Agriculturist	February ,1995 ~ present	
Mr.Ramon P.ULIBAS	(SWRRD)	Agriculturist II	February ,1995 ~ present	
Ms.Jacqueline S.ROJALES	(SWRRD)	Agriculturist II	February ,1995 ~ present	NGRI/1999
Ms.Mary Jane R.dela CRUZ	(ALMED)	Agriculturist II	February ,1995 ~ present	KNAES/1998
Mr.Leandro M.DE LEON	(Blacn)	Senior Agriculturist	February ,1995 ~ present	
Mr.Wilfredo C.PERALTA	(Blacn)	Agriculturist II	February ,1995 ~ present	
Mr.Francis A.TORRES	(SWRRD)	Science Res.Specialist I	February ,1995 ~ present	
Ms.Leogarda T.RUBITE	(SWRRD)	Agriculturist II	February ,1995 ~ present	
Ms.Amy O.YAMBOT	(SWRRD)	Senior Agriculturist	February ,1995 ~ present	
Mr.Apolinario P.CARANDANG	(SWRRD)	Agriculturist II	February ,1995 ~ present	
Mr.Carlos F.SERRANO	(SWRRD)	Senior Agriculturist	February ,1995 ~ present	
Ms.Bernardina I.DAGUIO	(SWRRD)	Laboratory Aid I	December ,1996 ~ present	
Ms.Perla V.PANGANIBAN	(SWRRD)	Agriculturist II	December ,1996 ~ present	
Ms.Violeta E.CASTANEDA	(SWRRD)	Senior Agriculturist	December ,1996 ~ present	
Ms.Leonora P.DE LEON	(SWRRD)	Agriculturist II	December ,1996 ~ present	
Mr.Alan H.ANIDA	(SWRRD)	Agriculturist II	February ,1997 ~ present	
Ms.Alma J.GONZALES	(SWRRD)	Agriculturist II	February ,1997 ~ present	
Ms.Erlinda G.LOBERIZA	(SWRRD)	Agricultural Technician I	February ,1997 ~ present	

Soil Conservation

Name		Position	Duration	Training In Japan
Mr.Alejandrino R.BALOLOY	(SCMD)	Chief,SCMD/Assistant Director	February ,1995 ~ July ,1996	JICA,MAFF,NIAES/1996
Dr.Jose D.RONDAL	(SCMD)	Chief,SCMD	February ,1995 ~ present	
Mr.Florencio G.MANANGHAYA	(SCMD)	Supervising Agriculturist	February ,1995 ~ present	
Dr.Reynaldo G.PALIS	(Tanay)	Agricultural Center Chief	February ,1995 ~ present	JICA,MAFF,NIAES/1995
Engr.Rodolfo M.LUCAS	(WRMD)	Chief,WRMD	February ,1995 ~ present	
Dr.Modesto L.BOJA	(WRMD)	Supervising Agriculturist	February ,1995 ~ July ,1996	
Mr.Wilfredo E.CABEZON	(ALMED)	Chief,ALMED	November ,1997 ~ present	
Mr.Manuel S.STA.ANA	(Tanay)	Supervising Agriculturist	February ,1995 ~ present	
Engr.Arnulfo B.GESITE	(SCMD)	Supervising Agriculturist	February ,1995 ~ present	NIAES/1991(Phase I)
Dr.Redentor S.GATUS	(SCMD)	Supervising Agriculturist	February ,1995 ~ present	JICA,MAFF,NIAES/1999
Engr.Henry M.CACAYAN	(SCMD)	Agriculturist II	February ,1995 ~ present	
Engr.Mario B.COLLADO	(SCMD)	Agriculturist II	February ,1995 ~ present	
Engr.Pablo M.MONTALLA	(SCMD)	Agriculturist II	February ,1995 ~ present	NIAES/1996
Ms.Eliosa B.GO	(SCMD)	Agriculturist II	February ,1995 ~ present	
Mr.Florentino C.AGUSTIN	(SCMD)	Agriculturist II	February ,1995 ~ present	
Mr.Jose D.MANGUERRA	(SCMD)	Agriculturist II	February ,1995 ~ present	
Mr.Antonio A.SAN ANDRES	(SCMD)	Agriculturist II	February ,1995 ~ present	
Mr.Edgardo R.REYES	(Tanay)	Senior Agriculturist	February ,1995 ~ present	NARC,SNAES/1998
Mr.Joseph B.ROJALES	(Tanay)	Agriculturist II	February ,1995 ~ present	NIAES,SNAES/1994(Phase I)
Mr.Roosevelt P.CREENCIA	(Tanay)	Contractual	February ,1995 ~ present	
Engr.Wilfredo B.DELA CRUZ	(SCMD)	Senior Agriculturist	February ,1995 ~ present	
Mr.Leonardo A.SEMANA	(Tanay)	Heavy Equip.Operator II	February ,1995 ~ present	
Mr.Rogelio P.CREENCIA	(SCMD)	Cartographer I	February ,1995 ~ present	
Mr.Carlos F.SERRANO	(SWRRD)	Senior Agriculturist	February ,1995 ~ present	NIAES/1995
Ms.Filipina Z.VENTIGAN	(SCMD)	Agriculturist II	November ,1997 ~ present	

Soil Conservation

Name		Position	Duration	Training In Japan
Engr.Danilo E.ADRIATICO	(WRMD)	Agriculturist II	November ,1997 ~ present	
Ms.Aida T.LATOZA	(SCMD)	Agriculturist II	November ,1997 ~ present	
Ms.Sonia M.SALGUERRO	(WRMD)	Agriculturist II	November ,1997 ~ present	
Ms.Marina P.MARGES	(SCMD)	Agriculturist II	November ,1997 ~ present	
Mr.Salvador T.BALADING	(SCMD)	Cartographer II	November ,1997 ~ present	
Mr.Jose B.BURA	(SCMD)	Agriculturist II	November ,1997 ~ present	
Ms.Purisima G.PAJARO	(SWRRD)	Agriculturist II	February ,1998 ~ present	Tohoku University/1997
Mr.Leonardo M.DE LEON	(Blacn)	Senior Agriculturist	February ,1998 ~ present	
Mr.Deogracias R.MAGTALAS	(SCMD)	Agriculturist II	February ,1998 ~ present	
Mr.Henry A.APOLINARES	(Admin)	Agriculturist II	February ,1998 ~ present	
Mr.Willy C.PERALTA	(Blacn)	Agriculturist II	February ,1998 ~ present	
Ms.Josephine L.NANA	(LSD)	Agriculturist II	February ,1998 ~ present	
Ms.Fe P.VADIL	(LSD)	Senior Agriculturist	February ,1998 ~ present	
Ms.Luz C.CABAMONGAN	(LSD)	Senior Agriculturist	February ,1998 ~ present	
Engr.Rafael A.MONTE	(LSD)	Supervising Agriculturist	February ,1998 ~ present	
Ms.Jessica A.TORRION	(ALMED)	Agriculturist II	February ,1999 ~ present	NIAES/1999

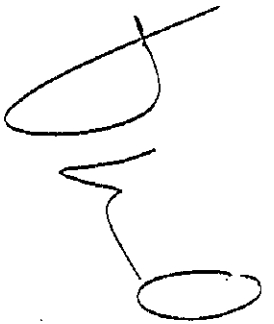
Soil Productivity Capability Classification Standard

Name		Position	Duration	Training In Japan
Mr.Alejandro G.MICOSA	(SSD)	Chief,SSD	February ,1995 ~ present	NIAES/1990(Phase I)
Dr.Nora B.INCIONG	(LSD)	Chief,LSD	August ,1996 ~ present	
Dr.Jose D.RONDAL	(SCMD)	Super.Agri./Chief,SCMD	February ,1995 ~ February,1999	
Mr.Wilfredo E.CABEZON	(ALMED)	Chief,ALMED	February ,1995 ~ present	
Mr.Andres BAES	(ALMED)	Supervising Agriculturist	February ,1995 ~ March ,1996	
Mr.Rodelio B.CARATING	(ALMED)	Agriculturist II	February ,1995 ~ present	KNAES/1994(Phase I)

Name		Position	Duration	Training In Japan
Ms.Edna de Leon SAMAR	(SWRRD)	Super.Sci.Res.Specialist	February ,1995 ~ present	
Mr.Igmidio B.LAPIS	(SWRRD)	Senior Agriculturist	February ,1995 ~ January ,1999	
Mr.Nestor M.TICZON	(SSD)	Supervising Agriculturist	February ,1995 ~ present	JICA,MAFF,NIAES/1991(Phase I)
Engr.Reynaldo P.BAJAR	(COD)	Chief,COD	February ,1995 ~ present	
Ms.Cristy C.PERLADO	(ALMED)	Agriculturist II	February ,1995 ~ present	NIAES/1997
Mr.Virgilio A.CATANEDA	(SSD)	Supervising Agriculturist	February ,1995 ~ present	
Mr.Nestor T.MERJILLA	(SSD)	Agriculturist II	February ,1995 ~ March ,1998	
Ms.Magdalena Q.FAVIS	(SSD)	Supervising Agriculturist	February ,1995 ~ March ,1998	
Mr.Querubin A.NAVERRO	(SSD)	Supervising Agriculturist	February ,1995 ~ March ,1998	
Mr.Oscar F.COSTELO	(SSD)	Agriculturist II	February ,1995 ~ present	
Ms.Josefina G.DILOY	(ALMED)	Agriculturist I	February ,1995 ~ present	
Ms.Cleotilde M.NICOLAS	(ALMED)	Information System Analyst	February ,1995 ~ present	NIAES/1997
Ms.Julieta G.ESPINELI	(ALMED)	Agriculturist I	February ,1995 ~ present	
Mr.Emiliano M.SIBOLBORO	(ALMED)	Supervising Agriculturist	February ,1995 ~ present	
Mr.Bertolio P.ARELLANO	(ALMED)	Agriculturist II	February ,1995 ~ present	
Ms.Natividad M.SALONGA	(ALMED)	Agriculturist II	February ,1995 ~ present	
Ms.Juliet R.MANGUERRA	(ALMED)	Computer Programer III	February ,1995 ~ present	
Ms.Constancia G.MANGAO	(LSD)	Supervising Agriculturist	February ,1995 ~ present	
Ms.Cecilia B.ORLANES	(LSD)	Senior Agriculturist	February ,1995 ~ present	
Mr.Mario E.VINLUAN	(SSD)	Agriculturist II	February ,1995 ~ present	NIAES/1998
Mr.Leo R.RETAMAR	(SSD)	Agriculturist II	February ,1995 ~ present	
Mr.Andrew B.FLORES	(SWRRD)	Computer Programer III	February ,1997 ~ present	
Ms.Jovette L.TENORIO	(SSD)	Cartographer I	February ,1997 ~ present	
Ms.Angelita C.MARCIA	(SSD)	Agriculturist II	February ,1997 ~ present	
Ms.Ma.Perpetua P.OCAMPO	(SWRRD)	Science Res.Specialist I	February ,1997 ~ present	

Soil Productivity Capability Classification Standard

Name		Position	Duration	Training In Japan
Ms.Aurora V.MARIANO	(LSD)	Agriculturist II	February ,1997 ~ present	
Mr.Silvino M.FELLO	(ALMED)	Agriculturist II	February ,1997 ~ present	
Mr.Raul R.VILLACORTE	(ALMED)	Agriculturist II	February ,1997 ~ present	
Mr.Godofredo M.RAMOS Jr.	(ALMED)	Agriculturist II	February ,1997 ~ present	
Mr.Joven A.ESPINELI	(ALMED)	Agriculturist II	February ,1997 ~ present	
Ms.Clarita D.BACATIO	(SSD)	Supervising Agriculturist	February ,1997 ~ present	
Ms.Luzdivina R.SISON	(LSD)	Supervising Agriculturist	February ,1997 ~ present	
Mr.Ricardo C.ALEGRID	(LSD)	Supervising Agriculturist	February ,1997 ~ present	



Annex 7. Evaluation PDM

Beneficiary	Direct beneficiary of the project is BSWM, however, ultimate beneficiary is farmers in marginal soil areas in the country.	
Target area	S.R.D.C. and its research stations; SPCC covers all types of the soils, however, the target of the other subject matters is Ultisol.	
	Narrative Summary of the Project	Verifiable Indicator
Super Goal	Agricultural productivity in problem soil area is improved.	
Overall Goal	Farmers' technology of soil management for Problem Soil including Ultisol (PSU) is i	Number of farmers adopted the technology developed by SRDC.
Project Purpose	Technology of SRDC on soil improvement for the PSU, on erosion control at the selected sites, and on Soil Productivity Capability Classification Standard are	All the outputs are completed.
Output	1. Soil and fertilizer 1.1 Constraints for crop production and methods for improvement for PSU are clarified. 1.2 Manual for integrated soil improvement technology for PSU is developed. 2. Soil conservation 2.1 Technologies for soil erosion control for PSU are improved. 2.2 Methods for soil conservation for PSU are developed. 3. Soil productivity capability classification standard 3.1 Method for basic land classification is developed. 3.2 Method for Soil Productivity Capability Classification (SPCC) is developed. 3.3 Methods for soil management in SPCC units are developed.	1.1-1 Constraints of PSU against productivity of crops are clarified. 1.1-2 The Philippine CP can manage to conduct a study on constraints of crop productivity, analysis for microelements and isotope analysis. 1.1-3 Effectiveness of technology for soil improvement which are adaptable by poor farmers is verified. 1.2-1 A manual for integrated soil improvement is completed. 2.1-1 Erosoin control technology for each area (District) which is adaptable by poor farmers is established 2.1-2 The Philippine CP can conduct study on soil erosion. 2.2-1 A technical manual for soil conservation is completed. 2.2-2 Soil erosion maps which shows the distribution of erosion risk is completed for model sites. 3.1 Basic land classification maps are completed. 3.2-1 SPCC is established and SPCC maps are competed at model site. 3.2-2 Institutional system for feedback of field data to the revise of the identification of soil productivity class. 3.2-3 The Philippine CP can conduct preparation of SPCC maps. 3.3 A guideline for soil management for each unit of soil fertility class is completed.
Activities	1. Soil and fertilizer 1.1 Clarification of constraints for crop production and method for improvement for PSU. 1.1.1 Analysis on response of main crops to fertilizers including effect of macro and micro elements. 1.1.2 Study on soil improvement through soil organic matter accumulation by legume-grass mixture. 1.1.3 Study on improvement of soil physical and chemical properties by application of organic matters. 1.1.4 Study on improvement of soil physical property by application of inorganic soil amendments. 1.2 Manual for integrated soil improvement technology for PSU is developed. 1.2.1 Selection of crops adaptable to PSU. 1.2.2 Standardization of methods of fertilizer application for the adaptable crops. 1.2.3Standardization of application of available organic matter for the adaptable crops. 2. Soil conservation 2.1 Technology for soil erosion control for PSU is improved. 2.1.1 Assessment of soil readibility and rainfall erosivity. 2.1.2 Assessment of soil properties and erosion occurrence on sloping lands. 2.1.3 Study on mechanism on soil productivity decline by soil erosion, and assessment of soil productivity decline associated with soil erosion including economic evaluation. 2.1.4 Assessment of ability of various tropical plants and for erosion control and fertility. 2.1.5 Study on improvement of erosion control practice. 2.2 Method for soil conservation for PSU are developed. 2.2.1 Preparation of technical manual for soil conservation practices 3. Soil productivity capability classification standard 3.0 Establishment of SPCC Subject Matter Specialist. 3.1 Method for basic land classification is developed. 3.1.1 Setting up of topographical zoning and data arrangement. 3.1.2 Setting up of parent material zoning and data arrangement. 3.1.3 Setting up of climate zoning and data arrangement. 3.1.4 Setting up of detailed soil zoning and data arrangement (1/50,000 map). 3.1.5 Preparation of basic land classification maps (done by the Philippine side). 3.2 Method for Soil Productivity Capability Classification (SPCC) is developed. 3.2.1 Setting up of criteria for SPCC by refering criteria of Japan, USDA, and FAO). 3.2.2 Setting up of SPCC. 3.2.3 Identification of soil productivity class for basic land classification. 3.2.4 Preparation of SPCC maps (done by the Philippine side). 3.3 Methods for soil management in SPCC units are developed. 3.3.1 Field experiments for fertilizer response to main crops at model farms. 3.3.2 Preparation of a guideline for soil management for each unit of soil fertility class.	

ANNEX 8. Performance Matrix of the Project

1. Soil and Fertilizer: Activities (1.1 Clarification of constraints for crop production and method for improvement of PSIU)

Planned Activities	Evidence of Achievement	Evaluation
1.1.1 Analysis on response of main crops to fertilizers including effect of macro and micro elements.	No. of sutudies conducted = 17 15 macronutrients (12 - completed; 3 – ongoing) 2 micronutrients (completed) 1. response to N but slight to K 2. response to application of chicken manure and boron 3. P response of corn at 166 P_2O_5 kg/ha and peanut at 60 P_2O_5 kg/ha	3
1.1.2 Study on soil improvement through soil organic matter accumulation by legume-grass mixture.	No. of studies = 2 (1 - completed 1 - ongoing) Legumes (Siratro, Indigofera, Kudzu and Stylosanthes) and grasses (Setario, Napier and Paspalum) are suitable for a legume-grass mixture on Ultisols	3
1.1.3 Study on improvement of soil physical and chemical properties by application of organic matters.	No. of studies = 4 (completed) Incorporation of leguminous residues generally increased organic matter, CEC (peanut and cowpea) and soil porosity.	4
1.1.4 Study on improvement of soil physical property by application of inorganic soil amendments	No. of studies = 2 (three more croppings are recommended) Application of inorganic soil amendments (zeolite, scoria and carbonized rice hull) generally increased yield which contributed likely to increase in yield with favorable available moisture	4

1. **Soil and Fertilizer: Activities (1.2 Manual for integrated soil improvement for PSIU is developed).**

Planned Activities	Evidence of Achievement	Evaluation
1.2.1 Selection of crops adaptable to PSIU	➡ Selection of annuals (cereals, legumes, root crops, vegetables) – completed ➡ Screening of fruit trees – ongoing (non-bearing stage)	4 2
1.2.2 Standardization of methods of fertilizer application for adaptable crops.	➡ Interim guide for annuals drafted (c/o SWRRD)	3
1.2.3 Standardization of application of available organic matter for the adaptable crops.	➡ Interim guide for annuals drafted (c/o SWRRD)	3
1.2.4 Formulation of a guideline for integrated soil amendment based on the results of activity 1.2.2 and 1.2.3.	➡ Interim guide for annuals drafted (c/o SWRRD)	3

1. Soil and Fertilizer: Output

Expected Output	Verifiable Indicators	Achievement	Evaluation	
1.1 Constraints for crop production and method for improvement for PSIU are clarified	1.1-1 Soil constraints of PSIU against productivity of crops are clarified	➡ Liming, N, and P application needed ➡ Application of plant residues increased porosity ➡ Application of chicken manure, and/or boron to increase yield ➡ Potentials of establishing pasture, mixture of bracharia and stylosanthes	3	4
	1.1-2 The Philippines CP can manage to conduct a study on constraints of crop productivity, analysis for microelements and isotope analysis	➡ Philippine CP are capable	4	
	1.1-3 Effectiveness of technology for soil improvement which are adaptable by poor farmers is verified.	➡ Chicken manure application to increase soil productivity	4	
1.2 Manual for integrated soil improvement technology for PSIU is developed	1.2-1 A manual for integrated soil improvement is completed	⇨ An interim manual is drafted.	3	4
	1.2-2 Research results on "soil and fertilizer" are publicized and evaluated annually at a department workshop.	⇨ Technical reports were integrated as a compilation of technical reports in 1997 and 1998. Annual presentation during in-house review and workshop was undertaken	4	

Results of the discussion on causes of the problems

Activities / Output	Problems	Causes	Recommendations
1.1.1 to 1.1.4	Yield data not fully obtained in the studies in 1997 and 1998. Sample size may became smaller than planned.	Crops were severely damaged by a typhoon; droughts, rats, etc.	- Site selection should be considered including these issues. - Appropriate cropping pattern should be considered.

Results of the discussion on the Efficiency

Inefficient Input / Activities	Situation of the inefficiency	Recommendations
1.1.1 to 1.1.4	Duration of short-term Japanese experts is limited.	Business trip abroad of a head of laboratories in Japanese agricultural institutes are limited to one month by a regulation. Close communication between the Philippine side and Japanese side on recruitment and TOR of the expert are recommended.
	Longer time to repair laboratory equipment and machinery procured from Japan.	Improve procurement and maintenance management.

ANNEX 8. Performance Matrix of the Project

2. Soil Conservation: Activities (2.1 Technology for soil erosion control for PSIU is improved.)

Planned Activities	Evidence of Achievement	Evaluation
2.1.1 Assessment of soil erodibility and rainfall erosivity - Assessment of soil erodibility indices using rainfall simulator (Sub-study 1)	1. 100 percent completed,all objectives attained as scheduled 2. Completed technical report to be published in the ASOCON Contour Journal Publication, edited for submission. 2. Significant findings: - confirmed that soil loss is a function of inherent soil properties and rainfall intensity - erodibility of bare land can be predicted using prediction soil equation derived from the combined influences of soil properties e.g. hydraulic conductivity, clay ratio, dispersion ratio, macropore and organic matter - by knowing erodibility indices we can advocate modification and improvement of soil properties as an alternative approach to soil conservation - Soil properties used as indices of erodibility can be used in prescribing soil protection requirements and other water management practices - computed rainfall erosivity index	4.0
2.1.2 Assessment of soil properties and erosion occurrence on sloping lands	1. 100 percent completed all objectives attained as scheduled 2. Identified soil factors causing erosion such as hydraulic conductivity, clay ratio, O.M., dispersion ratio and macropore.	4.0
2.1.3 Assessment of soil productivity decline associated with soil erosion.	1. 100 percent completed all objectives attained as scheduled 2. Result showed that the soil can be more productive when the right amount of fertilizer is applied (90-60-60 kg/ha)	4.0
2.1.4 Assessment of the ability of various tropical Plants for erosion control and fertility. - Evaluation of some high value crops/tree crops as contour hedgerows and /or vegetative barrier in controlling erosion.	1. 100 percent completed all objectives attained as scheduled evaluated six perennial crops (pigeon pea, pineapple, citrus, asparagus, gliricidia with black pepper and guava) as hedgerows. 2. Results showed that asparagus followed by gliricidia with black pepper and pineapples are effective hedgerows in minimizing soil erosion. 3. Hedgerows and alley cropping system can provide both short and long term economic benefits.	3.0

Planned Activities	Evidence of Achievement	Evaluation
2.1.5 Study on the improvement of erosion control practices.		
1. Effect of tillage and plant residue management on soil properties, crop yield and erosion	1. 100 percent completed all objectives attained as scheduled 2. Results showed that plant residue used as mulch irrespective of tillage management can reduce soil loss to almost nil and improve soil fertility as shown by the 50 % yield increase (additional income of P 7,000.00) of upland rice compared to farmers practice without plant residue.	4.0
2. Improvement of soil erosion control practices under various land uses in hilly land.	1. 100 percent of technology transfer is completed, however, 50 percent of the data were generated to have a conclusive result. 2. Combination of hedgerows and mulching plus deep plowing were initially found to be the best erosion control	3.0 3.0
3. High density planting of Mango	1. 100 percent of technology transfer is completed, however, 40 percent of the data were generated to have conclusive result 2. Agronomic data is available.	3.0
4. Run-off Interceptor Techniques for Agro-forestry	1. 100 percent of technology transfer is completed, however, 50 percent of the data were generated, started last quarter of 1998. 2. Have developed a modified run-off interceptor making the soil permeable and enhances deep percolation. 3. Installed tensiometers for monitoring the available soil moisture . 4. Preliminary data on soil loss, run-off, soil moisture content, plant height, canopy and girth, yield, soil properties and biological changes is available.	3.0

2. Soil Conservation: Activities (2.2 Method for soil conservation for PSIU are developed)

Planned Activities	Evidence of Achievement	Evaluation
2.2.1 Preparation of technical manual for soil conservation practices.	1. Technical reports are ready for compilation to be finalized and completed at the end of the project. 2. Discussions regarding the contents of manual were done by the management and the expert. 3. Information on the data is available	3.0
2.2.2 Development of methods for soil loss prediction on sloping lands areas.	1. Developed a mode for soil loss equation with the following factors: rainfall, soil, slope, cropping system and management, using of rainfall simulator and application of USLE 2. A Filipino counterpart is undergoing training on erosion mapping in Japan. 3. A short-term JICA expert is coming to assist in this aspect 4. To be completed at the end of the project 5. Land use map of the Tanay Station is available	3.0
Other Activities:		
1. Modified design, fabrication and testing of low-cost mechanical recorder	1. Modified design was made in 1997 using local materials of 5-liter model. A 3-liter model was made in 1998. 2. Best paper award during the 1998 ESWM R&D In-House Review 3. Introduced at JIRCAS Ishigaki through a research grant on soil erosion and monitoring of runoff.	4.0
2. Establishment of a collaborative study on Agro-forestry for soil and water conservation in University of Eastern Philippines, Northern Samar.	1. started in June 1999 and expected to be completed by year 2002 . 2. provision of measuring device, run-off recorder, sediment trap, runoff intereceptor using coffee as test crop. 3. 50 percent completed	4.0
3.Establishment of linkages with other agencies/ institutions regarding soil conservation.	1. Increasing number of visitors ((Students, farmers, extensionists and researchers from other government and non-government agencies) visited the project in Tanay e.g. in 1998, 28 groups visited the area. 2. Some staff were tapped as resource persons/trainors in the farmers associations seminars/meetings.	-

2. Soil Conservation: Output

Expected Output	Verifiable Indicator	Achievement	Evaluation	
2.1 Technology for soil erosion control for PSIU is improved	2.1-1 Erosion control technologies for each area (District) which is adaptable by poor farmers are established.	1. Erosion control technologies in Tanay area were established. These were selection of tropical trees and cash crops as hedgerows, use of plant residues, contour deep plowing and the use of runoff interceptor technique, etc.	3.0	
	2.1-2 The Philippine CP can conduct study on soil erosion	1. Sending five Filipino counterpart to Japan for short term training to upgrade their capability 2. Dispatch five (5) Japanese short-term and one (1) long-term experts to the Philippines. 3. Sending one Filipino to Japan as visiting research fellow at JIRCAS. 4. The operation and maintenance of the donated equipment can be done by the Filipino counterpart. 5. The Filipino counterpart gained knowledge from JICA experts in the conduct of soil conservation researches.	4.0	3.5
2.2 Method for soil conservation for PSUI are developed	2.2-1 A technical manual for soil conservation is completed	1. Technical reports are ready for compilation and the contents of the manual were already discussed with the management and JICA expert.	3.0	
	2.2-2 Soil erosion maps which shows the distribution of erosion risk is completed for model sites.	1. Land use map in Tanay is available Erosion map of Tanay will be available by the end of the Project	3.0	
	2.2-3 Research results on "Soil Conservation" are publicized and evaluated manually at a Department workshops.	1. Assessment of Soil Erodibility Using Rainfall Simulator - Won the Best Paper Award during the 1999 PSSST Annual Meeting and Symposium held at BSU Benguet. 2. Evaluation of some high value crop/tree crops as contour hedgerows and or vegetative barrier in controlling erosion - Won the Best Poster Award during the 1999 PSSST Annual Meeting and Symposium held at BSU Benguet. 3. Effect of Tillage and Plant residue Management on Soil Properties, crop yield and erosion. - Won the 2nd Best Poster Award during the 1999 PSSST Annual Meeting and Symposium held at BSU Benguet. - Won 2nd Best Paper Award on the 1999 BSWM R&D In-House Review. 4. Design and fabrication of modified runoff mechanical recorder - Won the Best Paper Award in the 1998 BSWM R&D In-House Review.	4.0	3.33

Results of the discussion on causes of the problems

Activities /Output	Problems	Causes	Recommendations
2.1.1	Re-assignment of researchers to other activity	- lack of manpower	- have a permanent staff for the conduct of the study
2.1.2	None	-	
2.1.3	1. Yield reduction of upland rice 2. Delayed planting in the 1st cropping	1. Birds and rats infestation 2. Drought in 1997	1. Sustained baiting (rat control) 2. Operationalization and maintenance of irrigation systems
2.1.4	Delayed planting of hedgerows and test crops	- Drought in 1997	- Operationalization and maintenance of irrigation systems
2.1.5.1	Delayed planting of hedgerows and test crops	- Drought in 1997	- Operationalization and maintenance of irrigation systems
2.1.5.2	Delayed planting of hedgerows and test crops Astray animals	1. Drought in 1997 2. No fencing/open land grazing of animals	1. Operationalization and maintenance of irrigation systems 2. Fencing and dialogue with the farmers around the station
2.1.5.3	Delayed planting of hedgerows and test crops Astray animals	1. Drought in 1997 2. No fencing/open land grazing of animals	-do-
2.1.5.4	Delayed planting of hedgerows and test crops Astray animals	1. Drought in 1997 2. No fencing/open land grazing of animals	-do-
2.2.1	Incomplete information for the technical manual	Collection of all relevant data can be completed by the end or beyond the project	- facilitate the consolidation of available data - more time is needed to generate the relevant data e.g. mango, citrus
2.2.2	None	-	
Others	- Flow of communication with the JICA expert and Filipino counterpart	- No permanent head of the Soil Conservation and Management Division from 1997 to 1998	- continuous communization/dialogue

Results of the discussion on the Efficiency

Inefficient Input / Activities	Situation of the Inefficiency	Recommendations
- Re-assignment of research staff to other activities	- calendar of activities are affected	- strict recruitment and assignment of staff
- Under utilization of rainfall simulator equipment	- power supply is not yet connected with the main grid	- facilitate the connection of the Station to NAPOCOR

ANNEX 8. Performance Matrix of the Project

3. Soil productivity capability classification : Activities (3.0 Organization of SPCC Core Group and Subject Matter Specialists./ 3.1 Method for basic land classification is developed.)

Planned Activities	Evidence of Achievement	Evaluation
3.0 Organization of SPCC Core Group and Subject Matter Specialists	> Organized SPCC Core Group (9) and SMS (20) > Trained 4 Core / SMS staff for a total period of 12 months	4
3.1.1 Setting up of topographical zoning and data arrangement.	>Developed methodologies for topographic zoning and mapping of Romero River Watershed. >Extended prototype to apply to provincial (Isabela), regional (Region 2) and detailed level (Tanay Research Station). 100% completed, published and presented	4
3.1.2 Setting up of parent material zoning & data arrangement.	>Developed methodologies for parent zoning and mapping of Kapatalan Microwatershed.(a part of Romero River Watershed) >Extended the prototype to apply to provincial (Isabela) and detailed level (Tanay Research Station) 100% completed, published and presented	4
3.1.3 Setting up of climate zoning and data arrangement.	>Developed methodologies for climatic zoning and mapping (pedo-ecological zone) of Romero River Watershed. 100% completed, published and presented	4
3.1.4 Setting up of detailed soil zoning and data arrangement (1:50,000 map).	>Developed methodologies for soil zoning and mapping of Romero River Watershed. >Extended prototype to apply to provincial (Isabela) regional (Region 2) and detailed level (Tanay Research Station) 100% completed, published and presented	4
3.1.5 Preparation of basic land classification maps (done by the Philippine side).	>Mapped the land cover of Romero River Watershed. >Interpreted and mapped the suitability of soils of Isabela province for rice and corn; degradation of soil resources. 100% completed; published	4

3. Soil productivity capability classification

3.2 Method for Soil Productivity Capability Classification (SPCC) is developed.

Planned Activities	Evidence of Achievement	Evaluation
3.2.1 Setting of criteria for SPCC (by referring criteria of Japan, USDA, and FAO.)	>Reviewed and published (SPCC Notes - 1995) approaches to soil data interpretations on : Soil Capability (USDA, Japan) Soil Suitability (USDA, FAO) Soil Productivity (Japan); Soil Fertility (Japan); Soil potentials (USDA) and Soil Limitation (USBR) >Developed framework and defined criteria for evaluation under the SPCC. 100% completed, published and presented	4
3.2.2 Setting up of SPCC.	>Defined classes (4 Classes: 3 suitable 1 not suitable) >Developed qualitative and quantitative approaches to SPCC >Determined soil, land and crop requirements >Set up criteria for SPCC 100% completed, published and presented	4
3.2.3 Identification of soil productivity class for basic land classification.	>Defined and modified soil quality ratings 12 soil qualities and 23 soil characteristics >Developed soil ratings for upland crops, lowland rice, orchard and pasture >Tested the prototype model of SPCC under Isabela condition >Tested the improved SPCC model to Batanes and Bukidnon 100% completed, published and presented	4
3.2..4 Preparation of SPCC maps (done by the Philippine side.)	>Prepared digitized maps and SPCC reports of: - Region 02 (1:250,000) - Tanay Research Station (1: 2,000) - Romero River Watershed (1:75,000) published and presented	4

3. Soil productivity capability classification

3.3 Method for Soil Management in SPCC units are developed.

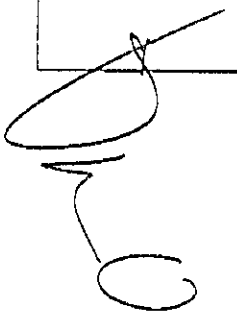
Planned Activities	Evidence of Achievement	Evaluation
3.3.1 Field experiments for fertilizer response to main crops at model farms.	>Completed dry season cropping (April-June 1999) on a Topic Epiaquent of Valencia, Bukidnon in collaboration with Xavier University under an Integrated Pest Management/ Integrated Nutrient Management scheme-testing inorganic (100% completed) , organic (100% completed) and combined system (70% completed; presented) >Request for collaboration received from Palawan Polytechnic University >Planned collaboration with Xavier University to continue until year 2000 wet cropping season >Other validation trials programmed	4
3.3.2 Preparation of a guideline for soil management for each unit of soil fertility class.	>Continuing activity dependent on the completion of collaborative studies on fertilizer responses >Compiled data and information on fertilizer response	3

3. Soil Productivity Capability Classification
3.4. Local Area Networking

Additional Activities	Evidence of Achievement
3.4.0 Development of Local Area Network for Soil Data and Information Sharing 3.4.1 Installation of LAN Network 3.4.2 Standardization of Data Sharing Proceedings 3.4.3 Production of BSWM a Webpage	System installed late 1997. Inaugurated by JICA President 1998. Operational in 16 Work Stations, within the BSWM and expected to have 2 more additional work station by September. Two servers, with operating systems and network printers (laser colored, laser monochrome) / scanners complement the network. • Training of personnel and end-users • Preparation of BSWM LAN Manual • Design • Development of a webpage components ➢ Database ➢ Events, profile

3. Soil Productivity Capability Classification
3.5. Technical Exchange Program

Additional Activities	Evidence of Achievement
3.5.0 SPCC technology dissemination	• Technology exchange with Thai counterparts on SPCC, Soil Survey Strategies, and Problem Soils (acid, salt affected, sloping soils) as implemented in the Philippines and Thailand.

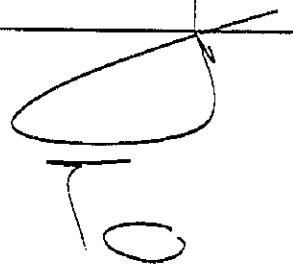


3. Soil Productivity Capability Classification: Output

Expected Output	Verifiable Indicator	Achievement	Evaluation	
3.1 Method for basic land classification is developed.	3.1 Basic land classification maps are completed.	Completed basic land classification maps on different scales of interpretation Watershed - Land Use Cover Provincial - Land Suitability for Rice and Corn	4	4
3.2 Method for Soil Productivity Capability Classification (SPCC) is developed.	3.2-1 SPCC is established and SPCC maps are completed at model site.	Completed SPCC and maps under different scales of interpretation Detailed – Tanay Research Station Regional – Region 2	4	4
	3.2-2 Institutional system for feedback of field data to the revise of the identification of soil productivity class.	• Collaborated with State University (Xavier Univ.) for testing and validation of SPCC rating • Established linkage with the Tanay and Bulacan Research Stations for testing and validation of SPCC rating	4	
	3.2-3 The Philippine CP can conduct preparation of SPCC maps.	• Core and SMS staff trained to handle the software and hardware components of SPCC rating and mapping	4	
3.3. Methods for soil management in SPCC units are developed.	3.3 A guideline for soil management for each unit of soil fertility class is completed.	• Under the process of preparation and validation; a prototype guideline to be completed at the end of the project.	3	3

Results of the discussion on causes and problems (3. SPCC)

Activities/ Output	Problems	Causes	Recommendations
3.3.1	• Activity started 6 months behind schedule. • Validation trials were limited to one cropping season only.	• Site selection and subsequent soil survey was delayed. • SPCC rating was dependent on soil survey data and information generated by the survey team. • Collaboration of Xavier University started after the completion of SPCC rating of the project site.	• Planning for this activity should have been done a year earlier. • Activities outside of the control of SPCC Core Group should have been prioritized.
3.2	• Delay of activities	• This activity is dependent on the outputs of the field experimentation/ validation of the SPCC ratings.	



Results of the discussion on the Efficiency (3. SPCC)

Inefficient Input / Activities	Situation of the inefficiency	Recommendations
None		

資料２　評価用PDM（和文）

別添表1－2　評価PDM(和訳版案)

受益者	直接的受益者はBSWM。ただし、究極の受益者はフィリピンの貧困土壌地域で農業を行う農民	
対象地域	SRDCとその研究センター。SPCCはすべての土壌タイプを対象としているが、その他の成果はアルティソルを対象とする。.	
	プロジェクトの概要	指標
超上位目標	貧困土壌における農業生産性が向上する。	
上位目標	アルティソルを含む貧困土壌(PSIU)のための農民の土壌管理技術が向上する。.	SRDCによって開発された技術を適用している農家の数
プロジェクト目標	SRDCの、選定された地域でのPSIUを対象にした土壌改善、土壌浸食防止技術が改善し、また土壌生産可能性分級の技術が改善される。.	すべての成果の達成
成果	1. 土壌肥料 1.1 PSIUの生産制限因子と改良方法が解明される。 1.2 PSIUの総合的土壌改良技術に関するマニュアルが開発される。 2. 土壌保全 2.1 PSIUの浸食防止技術が改善される。 2.2 PSIUの土壌保全技術が開発される。 3. 土壌生産力可能性分級(SPCC) 3.1 立地類型基本区分の手法が開発される。 3.2 土壌生産力可能性分級手法(SPCC)が開発される。 3.3 各SPCC単位の土壌管理指針が策定される。	1.1-1 PSIUの生産制限因子が解明される。 1.1-2 フィリピン側カウンターパートが土壌の生産制限因子に関する研究、微量元素および同位元素を用いた分析を独自に行える。 1.1-3 低所得農家が適応可能な土壌改良技術の有効性が証明される。 1.2-1 総合的土壌改良技術マニュアルが完成する。 1.2-2「土壌肥料」分野の研究成果が毎年BSWMのワークショップなどで発表・評価される。 2.1-1 各ディストリクトにおいて、低所得農家が適応できる土壌浸食技術が開発される。 2.1-2 フィリピン側カウンターパートが土壌浸食に関する研究を独自に実施できる。 2.2-1 土壌保全技術マニュアルが完成する。 2.2-2 土壌浸食危険度の分布を示す土壌地図が各モデルサイトにおいて完成する。 2.2-3「土壌保全」分野の研究生4が毎年BSWMのワークショップなどで発表・評価される。 3.1 立地類型基本区分地図が完成する。 3.2-1 SPCCが開発され、SPCC地図がモデルサイトにおいて完成する。 3.2-2 SPCCで等級分けされた各土地の等級見直しのための現場データのフィードバック体制が整う。 3.2-3 フィリピン側カウンターパートが、SPCC地図作成を独自に行える。 3.3 土壌肥沃度分級単位ごとの土壌管理指針が完成する。
活動	1. 土壌肥料 1.0 土壌肥料分野の課題研究専門家チームの結成。 1.1 PSIUの生産制限因子と改良方法の解明。 1.1.1 主要経作物の、マクロ要因、ミクロ要因を含む施肥感応の解明。 1.1.2 イネ科およびマメ科牧草混播作付けによる土壌有機物蓄積と土壌改良に関する研究。 1.1.3 有機物投入による土壌理化学性の改良に関する研究。 1.1.4 無機土壌改良材の投入による土壌物理性の改良に関する研究。 1.2 PSIUの総合的土壌改良技術に関するマニュアルの開発。 1.2.1 PSIUに適した作物の選定。 1.2.2 作物別の標準施肥基準の設定。 1.2.3 利用可能な有機物施肥基準の策定。 1.2.4 1.2.2、1.2.3の結果に基づく、総合的土壌改良指針の策定。 2. 土壌保全 2.0 土壌保全分野の課題研究専門家チームの結成。 2.1 PSIUの浸食防止技術の改善。 2.1.1 土壌の受食性および耕西の浸食特性の評価。 2.1.2 傾斜地における土壌の性質と侵食発生機構の解明。 2.1.3 土壌浸食に伴う土壌生産力低下の機構に関する研究および、経済評価を含む土壌生産力低下の評価。 2.1.4 緑業植物の土壌保全・肥沃度向上への有用性の解明。 2.1.5 土壌浸食防止農法改善に関する研究。 2.2 PSIUの土壌保全技術の開発。 2.2.1 土壌保全マニュアルの作成。 2.2.2 傾斜地における土壌流出予測法の開発。 3. 土壌生産力可能性分級(SPCC) 3.0 SPCC分野の課題研究専門家チームの結成。 3.1 立地類型基本区分の手法の開発。 3.1.1 地形区分の設定とデータ整理。 3.1.2 母材区分の設定とデータ整理。 3.1.3 気候区分の設定とデータ整理。 3.1.4 精密土壌区分の設定とデータ整理(1/50,000地図)。 3.1.5 土壌立地類型基本区分図の作成(フィリピン側による活動)。 3.2 土壌生産力可能性分級手法(SPCC)の開発。 3.2.1 SPCCの基準項目の設定(日本、アメリカ、FAOのものを参考に)。 3.2.2 SPCCの設定。 3.2.3 土壌分級基準に基づく等級の決定。 3.2.4 SPCC地図の作成(フィリピン側による活動)。 3.3 各SPCC単位の土壌管理指針の策定。 3.3.1 モデルファームでの主要作物の施肥感応試験。 3.3.2 土壌肥沃度分級単位ごとの土壌管理指針の作成。	

資料３　詳細暫定実施計画書（和・英文）

DETAILED TENTATIVE SCHEDULE OF IMPLEMENTATION （詳細暫定実施計画）
OF
THE TECHNICAL COOPERATION
ON
THE SOILS RESEARCH AND DEVELOPMENT CENTER PROJECT PHASE II

Field/Item　Year	1	2	3	4	5	Remarks
(1) SOIL and FERTILIZER 土壌肥料 1) Analysis of constraints for crop productivity in problem soils including Ultisols and their improvement アルティソル等不良土壌の作物生産制限因子の解明とその改良						
(a) Response of crops to fertilizers 主要畑作物の施肥感応						To recognize response of main crops to N, P, K and micro nutrients and bases. 主要作物の３要素、塩基、微量要素感応を確認する。
(b) Soil improvement on soil organic matter accumulation by legume-grass mixture イネ科及びマメ科牧草混播作付体系による土壌有機物蓄積による土壌改良						To increase fertility with accumulation of soil organic matter croping gramineous and leguminous plants in Ultisols which is poor in organic matter. イネ科及びマメ科飼料作物を栽培することにより、有機物含量の乏しいアルティソルの有機物蓄積を図り、地力の増強を行う。
(c) Improvement of soil physical and chemical properties with application of organic matter 有機物投入による土壌理化学性の改良						To improve soil physico-chemical properties using organic matter like animal manure. 家畜糞尿等の有機物を利用して土壌の理化学性の改良を行う。
(d) Improvement of soil physical property with different inorganic soil amendment 各種土壌改良資材による土壌物理性の改良						To improve soil physical property with soil conditioners as coaral, sands, volcanic ejecta and so on which can be easily obtained near at hand. サンゴ石灰岩、砂、火山灰等、現地で手に入りやすい改良資材を投入して土壌物理性の改善を図る。
2) Development of methods for integrated soil improvement technology for problem soils including Ultisols アルティソル等不良土壌の総合改良技術の開発						
(a) Selection of adaptable crops 適作物の選択						To select adaptable crops to problem soils including Ultisols. アルティソル等不良土壌に適した作物を選定する。
(b) Standardization of method of fertilizer application for crops 作物の標準施肥基準設定						To set up standard application rate of fertilizer for problem soils including Ultisols. アルティソル等不良土壌に適した標準施肥基準を設定する。
(c) Setting up of standard application of available organic matter for crops 利用可能な有機物施用基準の策定						To set up standard application rate of organic matter for main crops in problem soils including Ultisols. アルティソル等不良土壌における主要作物の有機物施用基準を設定する。
(d) Setting up of guideline for integrated soil amendment 総合土壌改良指針の策定						To prepare guideline for optimum soil improvement by analyzing and evaluating the whole situation of 1) and 2). 1）及び2）を総合的に解析・評価し、最適な土壌改良指針を策定する。

Field/Item	Year	1	2	3	4	5	Remarks
(2) SOIL CONSERVATION 土壌保全 1) Improvement of technology for soil erosion control for problem soils including Ultisols アルティソルを含む不良土壌の侵食防止技術の改善							
(a) Assessment of soil erodibility and rainfall erosivity 土壌受食性及び降雨侵食性の評価							To assess soil erodibility under natural and artificial rainfall experiments and to relate to routinely measured soil properties. To study also the rainfall characteristics in the Philippines. 土壌の受食性を自然・人工降雨試験により評価するとともに、土壌理化学性との関連を明らかにする。又、フィリピンの降雨の特性も明らかにする。
(b) Assessment of soil properties and erosion occurrence on sloping lands 傾斜地における土壌理化学性及び侵食発生形態の解明							To study soil physical/chemical properties and their distribution on sloping lands and to relate to the erosion occurrence and the topographical features. 傾斜地における土壌理化学性の特徴と分布を調査し、侵食発生形態と地形との関連を明らかにする。
(c) Assessment of soil productivity decline associated with soil erosion 土壌侵食による土壌生産力低下要因解明と評価							To assess the productivity decline of soil caused by soil erosion in relation to chemical and physical degradation of soil. 侵食に起因する土壌生産力低下を化学的・物理的劣化との関連で解明・評価する。
(d) Assessment of ability of various tropical plants on erosion control and fertility 熱帯有用植物の土壌保全機能と肥沃性改善機能の評価							To evaluate the ability of various tropical plants including trees and wild plants for the improvement of soil erosion control and fertility. 土壌保全と肥沃性改善のために木本や野性植物を含んだ熱帯有用作物の可能性を評価する。
(e) Improvement of erosion control practices 土壌侵食防止対策法の改善							To examine effective practices and farming systems to improve soil erosion control and rehabilitation of eroded lands. Those include residue mulch, alley or inter cropping, hedgerow, subsoiling and no tillage, etc. 作物残渣マルチ、間作、生垣、心土耕、不起耕等を含めた土壌侵食防止及び侵食地の回復のための対策方法を検討する。
2) Development of methods for soil conservation on problem soils including Ultisols アルティソルを含む不良土壌の侵食防止技術指針の作成							
(a) Preparation of technical manual for soil conservation practices 土壌保全技術マニュアルの作成							To prepare technical manual for soil conservation practices on the basis of the results obtained by the studies in 1). 1）の結果に基づき、具体的な侵食防止技術マニュアルを作成する。
(b) Development of methods for soil loss prediction on sloping lands areas/field 土壌侵食予測手法の開発							To develop soil loss prediction method for conservation planning on a pilot area considering rainfall erosivity, soil erodibility, slope gradient, land use and etc. 農地整備開発地域等における具体的な土壌保全計画（図）を作成するために、降雨侵食性、土壌受食性、地形、土地利用等を要素とする土壌侵食予測法を開発する。

Field/Item Year	1	2	3	4	5	Remarks
(3) SOIL PRODUCTIVITY CAPABILITY CLASSIFICATION STANDARD 土壌生産力可能性分級						
1) Development of methods for basic land classification 立地類型基本区分の手法開発						
(a) Setting up of topographic zoning and data arrangement 地形区分地帯の設定及びデータ整理						To read data using topography map of 1 : 50,000 and airphotoes. 5万分の1地形図及び航空写真のデータを読み取る。
(b) Setting up of parent material zoning and data arrangement 母材区分地帯の設定及びデータ整理						To read lithology from time geologic map. 年代地質図から岩質の読み取りを行う。
(c) Settingup of climate zoning and data arrangement 気候区分地帯の設定及びデータ整理						To read climatic conditions from soil classification and other materials. 土壌分類及び他の資料から気候区分を読み取る。
(d) Settingup of detailed soil zoning and data arrangement 精密土壌区分地帯の設定及びデータ整理						To have more detailed soil survey and classification map. 更に精密な土壌調査及び分類図を作成する。
(e) Preparation of basic land classification map 土壌立地類型基本区分図の作成						To prepare basic land classification with overlaying soil, topography, geology and climate data. Implemented by BSWM itself. 土壌、地形、地質、気候区分それぞれを重ね合わせて作成する。フィリピン側で行う。
2) Development of methods for soil productivity capability classification 土壌生産力可能性分級手法の開発						
(a) Setting up of criteria for soil productivity capability classification 土壌生産力可能性分級基準項目の設定						To set up of classification criteria(e.g. slope, erodibility, drought and etc.) including soil constraints and countermeasures of soil improvement with reference to FAO, USDA and Japan system. FAO、USDA及び日本のシステムを参照にしながら、土壌制限因子・土壌改良対策を含めた分級基準項目（傾斜侵食、干ばつ等）を設定する。
(b) Setting up of soil productivity capability class 等級の設定						To set up of criteria for soil productivity capability class for main crops with overlaying and analyzing criteria items of 2)-(a). 主要作物に対する上記分級項目の等級を設定する。
(c) Identification of soil productivity class in basic land classification 土壌分級基準に基づき等級決定						To decide soil productivity capability class of zoning area in 1)-(e) in accordance with 2)-(a) and (b). 2)－(a)及び(b)に従って、1)－(e)の立地類型基本区分の分級等級を決定する。
(d) Preparation of soil productivity capability classification map 土壌分級図作成						To materialize soil productivity capability classification map. 土壌生産力可能性分級図の図化を行う。フィリピン側で行う。

Field/Item　Year	1	2	3	4	5	Remarks
3) Development of methods for soil management in classified units 分類された単位毎の土壌管理指針策定						
(a) Field experiments for fertilizer response to main crop 主要作物の現地実証連絡試験の実施						To perform field crop experiments in model farmer's field to ascertain productivity of capability classification and to have better management. モデル（農家）圃場を選定し、栽培試験を行う。
(b) Preparation of guideline for soil management on units of soil fertility class 土壌肥沃度分級単位ごとの土壌管理指針の策定						To set up of guidline for soil management with bases on field crop experiments. 栽培試験に基づき土壌管理指針を策定する。