

ミニッツ（合同評価報告書、分野別活動項目達成状況表、PDM等）

**Minutes of Discussions
on the Joint Coordinating Committee Meeting
of the Final Evaluation
for the Seed Bank Project in the Union of Myanmar**


From October 21, 2001 to November 2, 2001 the Japan International Cooperation Agency (hereinafter referred to as "JICA") organized and dispatched the Project Evaluation Team (hereinafter referred to as "the Team"), headed by Mr. Noriaki NIWA, to the Union of Myanmar.

The Joint Evaluation Committee consists of five (5) members from the Team and five (5) members from the Union of Myanmar. It was jointly organized for the purpose of conducting the final evaluation and preparing necessary recommendations for the Seed Bank Project in the Union of Myanmar (hereinafter referred to as "the Project").


After intensive analytical study on activities and achievements of the Project, the Joint Evaluation Committee prepared the Joint Evaluation Report (hereinafter referred to as "the Report") and presented it to the Joint Coordinating Committee.

The Joint Coordinating Committee discussed the major issues pointed out in the Report, and agreed to recommend to the respective governments the matters attached.

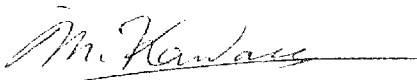
Yangon, October 31, 2001



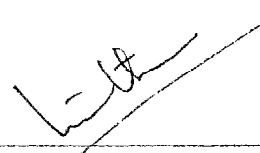
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ATTACHMENT

1. The Joint Evaluation Committee has presented the Report to the Joint Coordinating Committee.
2. The Joint Coordinating Committee has accepted the Report and taken notes of the recommendations aimed for successfully sustaining and extending the achievement of the Project.
3. The Myanmar side has requested further Japanese assistance on the Project, in order to promote utilization of plant genetic resources for increasing food and agricultural productivity. The Japanese side has agreed to convey this request to the Japanese Government.

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Joint Evaluation Report
on the Seed Bank Project
in the Union of Myanmar

Yangon, October 31, 2001

Japan – Myanmar Joint Evaluation Committee

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The Joint Evaluation Committee (hereinafter referred to as “the Committee”) was jointly organized by the Japan International Cooperation Agency (hereinafter referred to as “JICA”) and authorities concerned of the Union of Myanmar for the purposes of conducting final evaluation and for the preparation of necessary recommendations for the Seed Bank Project (hereinafter referred to as “the Project”).

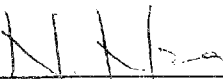
This Joint Evaluation Report (hereinafter referred to as “the Report”) has been prepared by the following members with the cooperation of the Project, Myanma Agriculture Service (hereinafter referred to as “MAS”), Department of Agricultural Planning (hereinafter referred to as “DAP”), Ministry of Agriculture and Irrigation (hereinafter referred to as “MOAI”), Japanese Embassy in the Union of Myanmar and JICA Myanmar office.

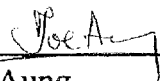
The Committee conducted joint evaluation in the form of interviews, field surveys and discussions. As a result of these discussions, the Committee agreed to present to the respective governments the Report contents.

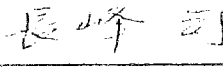
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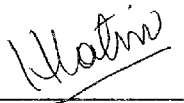
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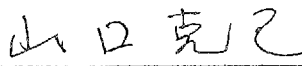
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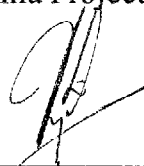

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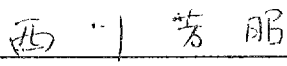

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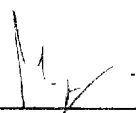

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Contents

1. BACKGROUND AND OUTLINE OF THE PROJECT

1-1 Background of the Project

1-2 Outline of the Project

2. METHODS OF THE EVALUATION

2-1 Purpose of the evaluation

2-2 Methods of the evaluation

2-3 Composition of the joint evaluation committee

2-4 Schedule of the evaluation

3. RESULTS OF THE EVALUATION

3-1 Efficiency

3-1-1 Input by both governments

3-1-2 Appropriateness of input

(1) Dispatch of experts

(2) Provision of equipment

(3) Counterpart training

(4) Local cost by Japanese side

(5) Input by Myanmar side

3-2 EFFECTIVENESS

3-2-1 Effectiveness in terms of project purpose

3-2-2 Major achievement of project activities

(1) Exploration and collection

(2) Classification and evaluation

(3) Conservation and multiplication

(4) Data management

(5) Exchange of genetic resources and information

3-3 IMPACT

3-3-1 Institutional aspects

3-3-2 Social cultural aspects

3-3-3 Economic aspects

3-4 RELEVANCE

3-4-1 Relevance of the overall goal

(1) Relevance of the overall goal

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- 3-4-2 Relevance of the project purpose
 - (1) Relevance of the project purpose
 - (2) Change of international environment in genetic resources
- 3-4-3 Factors lacking validity
 - (1) Difficult circumstance prevailing at the starting stage

3-5 SUSTAINABILITY

- 3-5-1 Organizational aspects
- 3-5-2 Institutional aspects
- 3-5-3 Financial aspects
- 3-5-4 Technical aspects

4. CONCLUSIONS AND RECOMMENDATIONS

- 4-1 Conclusions
- 4-2 Recommendations
- 4-3 Lessons drawn from the Project

LIST OF APPENDIXES

- APPENDIX- 1 Dispatch of Japanese experts
- APPENDIX- 2 Acceptance of counterpart personnel in Japan
- APPENDIX- 3 Input of local cost by Japanese side
- APPENDIX- 4 Provision of machineries and equipment by the Japanese side
- APPENDIX- 5 Allocation of counterpart personnel
- APPENDIX- 6 Budget allocated for the Project by the Myanmar side
- APPENDIX- 7 Activities in Detailed Implementation Plan (DIP)
- APPENDIX- 8 Research papers, book leaflets, abstracts and other materials produced by the Project
- APPENDIX- 9 Seminars and workshops held in the Project
- APPENDIX- 10 Project Design Matrix
- APPENDIX- 11 Organization chart

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1 BACKGROUND AND OUTLINE OF THE PROJECT

1 – 1 Background of the Project

Many precious plant genetic resources are thought to exist in Myanmar due to its geographic position and diverse climate conditions. In particular, many different types of wild rice are expected to exist. However, it is still not definite, because exploration and collection has been made to some extent so far. Moreover, as a result of the spread of high yielding varieties in recent years, cultivation of traditional varieties has decreased. It will result in an unfortunate loss of genetic resources necessary for the improvement of crops.

In 1986 the Myanmar Government requested grant aid and technical cooperation from the Japanese Government to implement the Seed Bank Project aimed at effective use of the plant genetic resources, through activities such as collection, characterization, evaluation and preservation of genetic resources.

Although the construction of building through the grant aid and the delivery of related equipment was carried out in February 1990, due to political situations, a further implementation of technical cooperation had been suspended for the time being.

However, taking necessity of the further cooperation in to account, JICA dispatched an Implementation study team in December 1996, and started project type of technical cooperation in a plan for the five years after June 1 1997. A mutual consultation team was dispatched in August 1998 to work out the Detailed Implementation Plan (DIP). The mid-term evaluation team was dispatched in November 1999.

1 – 2 Outline of the Project

The design of the Project is stipulated as follows.

(1) Overall Goal

Agricultural productivity and production in Myanmar are improved through plant breeding utilizing genetic resources introduced in the Project.

(2) Project Purpose

The system for genetic resources management, exploration and collection, classification and evaluation, preservation and multiplication, data management of plant genetic resources, and exchange of genetic resources and information is established in the seed bank.

(3) Outputs of the Activities

- 1) Acquiring knowledge and technologies for exploration and collection
- 2) Acquiring knowledge and technologies for classification and evaluation
- 3) Acquiring knowledge and technologies for preservation and multiplication
- 4) Improving management and utilization of data
- 5) Improving systems for exchange of genetic resources and information

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2 METHODS OF THE EVALUATION

2 – 1 Purpose of the evaluation

Evaluation activities were performed with the purpose of:

- 1) Evaluating the overall achievement of the Project based on the Record of Discussion (R/D), Detailed Implementation Plan (DIP), and Project Design Matrix (PDM),
- 2) Identifying remaining problems and recommending necessary measures to be taken after the termination of the Project to the respective governments, and
- 3) Considering the lessons drawn from the Project activities in order to reflect them in future projects in the interest of making them more effective and efficient.

2 – 2 Methods of the evaluation

Evaluation activities were conducted by the Joint Evaluation Committee, which was composed of the Japanese Evaluation Team and the Myanma Evaluation Team in accordance with the R/D, DIP, and PDM. These activities included report analysis, field survey, and discussions with concerned officials/staff members based on the five Evaluation Components listed below :

(1) Efficiency :

An economic term which means that aid uses the least costly resources to achieve the result. Efficiency measures the output -qualitative and quantitative- in relation to the inputs. This generally requires comparing alternative approaches to achieving the same outputs in order to see whether the most efficient process has been used.

(2) Effectiveness :

A measure of the extent to which the Project attains its objectives. Effectiveness measures the extent to which the activity achieves its purpose, or whether this can be expected to happen on the basis of the outputs.

(3) Project impact :

A term indicating whether the Project has had an effect on its surroundings in terms of technical, economic and socio-cultural, institutional, and environmental factors.

(4) Relevance :

The extent to which the Project is consistent with the priorities and policies of the target group, recipient, and donor.

(5) Sustainability :

The extent to which the objectives of the Project will continue after the Project is completed; also, the extent to which the groups affected by the Project want to and can take charge themselves to continue accomplishing its objectives. Sustainability is concerned with measuring whether an activity or an impact is likely to continue after donor funding has been withdrawn. The Project needs to be environmentally, financially, and socially sustainable.

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2 – 3 Composition of the joint evaluation committee

(1) Japanese members

1) Mr. Noriaki NIWA (Team Leader)

Director, Livestock and Horticulture Division, Agricultural Development Cooperation Department, Japan International Cooperation Agency (JICA)

2) Dr. Tsukasa NAGAMINE

(Preservation and Multiplication/Classification and Evaluation)

Head, Plant Genetic Resources Lab., Genebank, National Institute of Agrobiological Sciences

3) Mr. Katsumi YAMAGUCHI (Cooperation Evaluation)

Cooperation Coordinator, Technical Cooperation Div., General Food Policy Bureau, Ministry of Agriculture, Forestry and Fisheries

4) Mr. Yoshiaki NISHIKAWA (PCM evaluation)

Associate Professor, Faculty of Economics, Kurume University

5) Mr. Makoto SHINKAWA (Planning Evaluation)

Staff, Livestock and Horticulture Div., Agricultural Development Cooperation Dept., JICA

(2) Myanmar members

1) Dr. Toe Aung (Team Leader)

Deputy Director General, Department of Agricultural Planning, Ministry of Agriculture and Irrigation

2) U Hla Tin (Preservation and Multiplication/Classification and Evaluation)

Deputy General Manager, Agricultural Chemistry Division, Central Agriculture Research Institute, Myanma Agriculture Service

3) Dr. Mya Thwin (Cooperation Evaluation)

General Manager, Project Planning, Management and Evaluation Division, Myanma Agriculture Service

4) U Tin Maung Shwe (PCM Evaluation)

Deputy General Manager, ASEAN Division, Department of Agricultural Planning, Ministry of Agriculture and Irrigation

5) U Maung Maung Yi (Planning Evaluation)

Manager, Project Planning, Management and Evaluation Division, Myanma Agriculture Service

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2 – 4 Schedule of the evaluation

The Joint Evaluation Committee spent eight (8) days from October 24 to October 31, 2001 in Yangon and Yezin, and carried out the following activities:

- (1) Brief review of Project activities through technical presentations by counterpart personnel of the Project;
- (2) Discussion in individual sections with JICA experts and the counterpart personnel;
- (3) Consultation meetings with MAS executive officials; and
- (4) Analysis of the observations and findings identified during the meetings of the Committee.

| | | |
|--------|-----|--|
| 24/Oct | Wed | Formulation of the Committee Confirmation of the evaluation methods Presentation of the Seed Bank activities Observation of the Seed Bank activities |
| 25/Oct | Thu | Evaluation of the Project achievement (Discussion with Seed Bank Manager and Counterparts in each sections) |
| 26/Oct | Fri | Evaluation of the Project achievement (Discussion with staff of the Central Agriculture Research Institute (hereinafter referred to as "CARI"), and Yezin Agricultural University (hereinafter referred to as "YAU"), Fields survey) Wrap up meeting |
| 27/Oct | Sat | Preparation of the draft Evaluation Report |
| 28/Oct | Sun | Move to Yangon from Yezin |
| 29/Oct | Mon | Discussion on the results of the evaluation in Joint Evaluation Team Settlement of the Report |
| 30/Oct | Tue | Final discussion on the results of the evaluation in MAS and DAP |
| 31/Oct | Wed | Joint Coordinating Committee Presentation of the Report Signing of the Report |

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3 RESULTS OF THE EVALUATION

3-1 Efficiency

3-1-1 Input by both governments

The inputs from the Japanese and Myanmar sides are summarized in APPENDIX from 1 to 6.

3-1-2 Appropriateness of input

(1) Dispatch of experts

So far, thirteen short-term experts and seven long-term experts have been dispatched, making it possible for the Seed Bank to operate efficiently through the provision of advice and technical instructions to establish the genetic resources management system appropriate the current situation there.

(2) Provision of equipment

Maintaining the basic function for the preservation of seeds effectively, through introduction of a seed chamber to dry seeds, introduction of a large-scale electric generator to prepare for a power outage, the replacement of a cooling unit in the seed storage for working collection, seemed to positively affect the result.

The creation of a working group for maintaining equipment and training of the engineers have been conducted and their function well. The engineers were able to recognize what kind of trouble may have happened in machinery. However, the old equipment was not repaired in a timely fashion and the countermeasures planned in the event of a breakdown and replacement of old equipment is not yet sufficient.

(3) Counterpart training

Fourteen out of 32 counterparts(C/Ps) had been trained in Japan. This training seemed not only to contribute directly to the technical improvement of each counterpart, but also to the improvement of their abilities in the operation and maintenance of the Seed Bank, as they could grasp a concrete image of the system they will try to build through the visits to the Seed Bank in Japan. As the trainees from Myanmar who do not have many opportunities to expose themselves to foreign countries, the training in Japan encourage them to study genetic resources and related fields.

(4) Local cost by Japanese side

The Japanese side has provided the opportunities for the C/Ps to visit the third country for exchanging views and collecting new information, for engineers to train the maintenance of equipment and for staff of CARI and YAU to implement the joint research. These opportunities contribute to strengthening the establishment of the genetic resources management system.

(5) Input by Myanmar side

It's expected that the technology transferred by JICA experts will take root in the Seed Bank. Though some of the counterparts have been transferred to the different posts in CARI, many of the counterparts continue to work on a full-time basis without transfer in the near future.

Recurrent cost, including costs for maintenance of facilities, procurement of fixture and consumption articulated and labor, have being borne in a timely fashion. The Myanmar Government released the budget for fuel to meet sudden increasing demands for electricity caused by the frequent power outages in 1998.

However, Myanmar side depends on Japanese side for the most part to fix the granted and

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provided equipment because Myanmar side has difficulty in bringing the engineers timely from Yangon and obtaining necessary imported parts.

Due to the poor state of telecommunication in Yezin, it is difficult to keep an effective communication among the people concerned. However, unstable power supply makes, the equipment apt to break down. Under the influence of such a unfavorable infrastructure at present, it was difficult to use some inputs in full scale.

3-2 Effectiveness

3-2-1 Effectiveness in terms of project purpose

The overall goal of the Project is to increase agricultural production and productivity in Myanmar by collecting plant genetic resources conserved, evaluating several agricultural characters, conserving the precious resources and distributing the accessions to breeders as breeding materials.

The Project purpose is to develop the system for genetic resources management including exploration and collection, classification and evaluation, conservation and multiplication, data management and exchange of genetic resources and information. After the completion of the storage and research facilities in the Seed Bank, the implementation of project type technical cooperation was delayed. However, staff in the Seed Bank had been managing the Seed Bank well with their own effort before the start of the Project in 1997.

Through the implementation of the Project, the significance of plant genetic resources for food and agriculture and the present situation of domestic genetic resources in Myanmar were well recognized among researchers in the Seed Bank and CARI staff as well. The fundamental concept on botanical classification, basic information about characterization and evaluation of agricultural characters, and the principle of seed conservation were transferred to the Seed Bank staff. Practical implementation of exploration and collection for several crop species, characterization and evaluation of several characters of crops, mainly cultivated rice varieties, conservation and multiplication of the crop varieties collected were conducted systematically and deliberately by the Seed Bank staff with the good cooperation of CARI staff members. The germination test prior to storage and periodical monitoring of germinability were established in the Seed Bank. Collected and multiplied seeds of crop species were stored in medium-long-term and short-term storage separately. Distribution map of wild rice and descriptors of 23 crops were published and used by researchers of the Seed Bank and CARI. A seed catalogue was published and is expected to be utilized among breeders of CARI for the purpose of seed acquisition. 16 seminars and 3 workshops were organized to give the recent techniques and information gathered by training in Japan and at International Workshops not only to the researcher and staff of CARI, but also to satellite farms and extension officers.

Staff members of the Seed Bank have come to the awareness that seed banks have to function as a research institution rather than as a simple storage facility for genetic resources.

As a whole, it could be concluded that the purpose of the Project has been mostly achieved.

3-2-2 Major achievement of project activities

(1) Exploration and collection

Each Division under CARI has been organizing own exploration and collection, sometimes with

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the international research institutes. During of the Project 17 explorations were conducted and more than 1300 accessions were collected. Through the international collaborative collections the qualification of the researchers was improved in terms of technology on exploration and collection and they have large confidence in this field.

According to the present yearly-plan, Seed Bank researchers entered un-explored regions such as Kachin State, and collected various kinds of crops; rice, food legumes, oil crops, vegetables and root crops. However, Mon, Tanintharyi and Rakhine States are remained un-explored.

An annual and short term plan for exploration and collection after the Project was established in the Seed Bank considering the condition of genetic erosion of each crop species and target area after the consultation with CARI.

Distribution maps of crop species are very useful for on farm and in situ conservation of genetic resources and planning of exploration/collection activity. The distribution map of wild rice species was drawn based on information from extension officers and collection activities before and during the Project, and the results were presented at an international conference. Researchers of the Seed Bank recognized the significance of the distribution map. It should be mentioned that Seed Bank has to update distribution maps for other crop species.

As a whole, fundamental knowledge and techniques on exploration and collection were transferred to the Seed Bank researchers. However, it should be pointed out that further activities of exploration and collection, particularly for upland crops, are needed to cover diverse genetic resources in Myanmar.

Measures for introduction and isolation of genetic resources from abroad were planned to establish in the Seed Bank, however, governmental regulations/laws concerning introduction of genetic resources is not legislated yet, thus it is decided that the measures are not needed to be taken. Considering the future demand of germplasm exchange the Seed Bank should provide necessary measures of introduction and isolation.

(2) Classification and evaluation

Basic knowledge on classification is necessary to the Seed Bank researchers, however classification is not fully conducted because of the shortage of training. Further training and invitation of botanists and taxonomists to the Seed Bank are needed.

Based on the descriptors supplied by International Rice Research Institute (IRRI) and International Plant Genetic Resources Institute (IPGRI), the Seed Bank established own descriptors of 23 crops with the cooperation of CARI. Researchers of the Seed Bank and CARI fully recognized the significance of the standard descriptors for characterization and evaluation.

According to the descriptors, characterization and evaluation for the genetic resources collected before and during the Project were conducted with the cooperation of CARI and YAU. A total of 8,700 accessions were characterized and evaluated during the Project as a whole. As for rice genetic resources, the Seed Bank researchers evaluated their morphological and biochemical characters. Recently evaluation of the resistance to bacterial leaf blight (BLB) was started using rice accessions collected in Myanmar with the collaboration of Plant Pathology Division and YAU. Evaluation data is being compiled in the evaluation database.

Though most of evaluation activities in the Seed Bank was concentrated on rice, and other crops are waiting for their evaluation, it can be said that the purpose of the characterization and evaluation was achieved considering the size of rice genetic resources stored in the Seed Bank.

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(3) Conservation and multiplication

Although it is discovered that the damages and decrepitude occurred in some facilities and equipment before the beginning of the Project, the Seed Bank staff have been maintaining those facilities well by their own efforts. Seed multiplication for the collected accessions during the Project was conducted based on reproductive systems of crop species. The Seed Bank multiplied seeds of 8,700 accessions during the Project.

A seed drying room with low-temperature and low-humidity was installed and a low-temperature drying chamber was introduced in the Seed Bank. By introducing an appropriate seed-drying technology, they established a conservation method to keep high seed germinability in the Seed Bank. A duplicated conservation system for seeds of a short-term and a medium-long-term storage was perfectly accepted and operated in the Seed Bank.

The Seed Bank established a system of germination test prior to storing seeds into the storage and also a periodical monitoring of seed germinability during the storage. Staff of the Seed Bank recognized the importance of low-temperature and low-humidity conditions for the seed drying. But manuals for conservation and multiplication including seed processing after harvest and germination test was not made yet.

Seed multiplication for deteriorated accessions in the Seed Bank was conducted and new seeds with high germinability were exchanged. Seed multiplication was mainly performed in rice, but seed multiplication methods for cross-pollinated crops such as pigeon pea, pearl millet and wild rice collected should be established soon.

Summarizing the achievement in this field mentioned above, it could be said that the purpose of the field has been almost attained.

(4) Data management

A genetic resources database was newly constructed in the Seed Bank using the software "Access 97" for passport data, evaluation data and seed stock data. Sequential numbers were newly adopted for the accessions collected before and during the Project and the numbers were commonly used in the passport database, evaluation database and seed stock database for efficient and smooth data retrieval. These database are used by the researchers in the Seed Bank and CARI. It is necessary to further train researchers of the Seed Bank in advanced data management.

Seed catalogue of the collected accessions before and during the Project in the Seed Bank has been published.

Therefore, it can be said that the basic principle of data management was transferred well to the Seed Bank staff and the purpose of the field has been achieved.

(5) Exchange of genetic resources and information

A total of 680 accessions and 4,555 accessions were distributed to domestic research stations and foreign institutions respectively.

16 seminars and 3 workshops on exploration/collection, characterization/evaluation, conservation/multiplication, data management were provided to the staff in the Seed Bank and officials in the Extension Divisions during the Project. Information of the above-mentioned fields obtained in the training abroad was delivered to other staff members in the Seed Bank and CARI. The staff received new technology and information about plant genetic resources through seminars given by long-term and short-term Japanese experts.

Several kinds of documents relating to plant genetic resources were gathered in the library of the Seed Bank by the collaboration of IPGRI and JICA.

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Some researchers attended international conferences and presented research topics of the Seed Bank. These international activities stimulated the motivation of Myanmar researchers in terms of several researches of plant genetic resources and it is expected these academic activity to be continued.

As a whole, it can be said that the purpose of the exchange of genetic resources and information has been achieved.

3-3 IMPACT

The Project impact is difficult to be seen when the Project is running. However, the following observation can be made from the evaluation.

(1) Institutional aspects

The established management system of plant genetic resources has lead to understanding the importance of conservation and utilization of plant genetic resources by officials concerned in MOAI, particularly in MAS. The Project effectively disseminates the idea of the Seed Bank management system, not only to the researchers and officials in CARI, but also to staff of satellite farms and extension officers, through ordinary activities, seminars and workshops.

As a result of these activities, the necessity of the national committee on managing genetic resources, which is composed of the Ministries concerned, is widely recognized for taking appropriate measures on international trends in genetic resource management. Besides, the feed back system of evaluation data from users of genetic resources is being established.

(2) Technical aspects

The Seed Bank collects and preserves breeding materials which are utilized by other crop divisions in CARI for breeding and research. Therefore, these divisions can concentrate on their own works by reducing collection and preservation works.

(3) Social and cultural aspects

The Seed Bank is open to the public. YAU students come to the Seed Bank to implement their research works, while Seed Bank researchers give lectures at the YAU. The exploration has been carried out with extension officers and farmers. The Seed Bank activities were broadcasted on TV program.

These activities will enhance the public support of the Seed Bank activities.

(3) Economic aspects

The Seed Bank has provided 680 and 4555 accessions to domestic and foreign institutes respectively. It is steadily becoming clear that there are some accessions with BLB resistance among the preserved genetic resources. Therefore, it is possible that in the future resistant varieties will be created. However, it should be understood significant amount of time will be needed to breed such varieties for farmers and thereby enhance agricultural productivity.

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3-4 RELEVANCE

3-4-1 Relevance of the overall goal

Improvement of agricultural productivity through active utilization of genetic resources collected, characterized, evaluated and conserved is in line with national development policy in Myanmar, where agriculture is the key industry and large biodiversity remains, although in threat because of genetic erosion.

The basic framework of a seed bank that functions as a national gene bank to utilize genetic resources collected for plant breeding programs was established. It will take a long time to contribute to the development of agriculture productivity. Therefore, the basic concept of the overall goal is valid, but it should be set as the super goal. Considering better correspondence of the overall goal with beneficiaries' needs and the fact that a long time is needed for utilization of plant genetic resources, the overall goal should be explicitly confined to active utilization of plant genetic resources in breeding programs.

3-4-2 Relevance of the Project purpose

(1) Relevance of the Project purpose

In line with the policy for improving agricultural productivity and sustainability, Myanmar Agenda 21 mentions the responsibility of the Ministry of Agriculture and Irrigation on the introduction of new crop varieties and cultural practices compatible with local agro-ecological conditions. Establishment of the Seed Bank management system is an absolutely necessary step to utilize effectively the genetic resources collected, characterized, evaluated and conserved. The Seed Bank is the only institution of this kind in the country, and works as one of the core institutions within CARI. Therefore the project purpose is valid. The achievement of the purpose contributes to the prevention of the genetic erosion and offering the materials for breeding.

(2) Change of international environment in genetic resources

Since the introduction of the Convention of Biological Diversity, the international environment in genetic resources is rapidly changing, but the Seed Bank is still core in the conservation system for cultivated and wild species and establishment of the system is necessary for future breeding work in the country.

Necessity of diversifying conservation methods, such as in situ conservation, field genebank and in vitro technology is recognized. It is also recognized the necessity of molecular biology technology for further evaluation of germplasm.

3-4-3 Factors lacking validity

(1) Difficult circumstance prevailing at the starting stage

The technical cooperation project started over seven years after the construction of the Seed Bank and related facilities by grant aid. Shortly after starting the Project, it is discovered that the damages and decrepitude occurred in some facilities and equipment during the seven years. Unstable power supply and difficult telecommunication also have been amounting not to perform well on the Project activities.

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3-5 SUSTAINABILITY

3-5-1 Organizational aspects

The framework of the Seed Bank System has been established and it is expected that the Seed Bank will continue to provide essential services within the agricultural research system of Myanmar.

3-5-2 Institutional aspects

The national committee on plant genetic resources management, that discusses periodically and determines national policy, is going to be established. Once the Committee has been established, Seed Bank activities will be promoted along with the policy decided from a broader point of view. It will continually enhance provision of plant genetic resources to breeders and research institutions including universities.

Seed law, which is being drafted, designates the Seed Bank as the responsible institute for preservation of plant genetic resources.

3-5-2 Financial aspects

Substantial inputs in salary and maintenance of facilities and some of the equipment have been secured by the Myanmar Government throughout the Project period. However, most of the replacement and improvement of equipment has been conducted by Japanese side, due to the necessity of foreign currency. Therefore, it is necessary for the Seed Bank to make further efforts to obtain necessary funds for future operation of the Seed Bank. It is also necessary to increase the number of the Seed Bank staff for future activities.

3-5-3 Technical aspects

The technical level of the staff members of the Seed Bank has been improved to the standard which was originally planned at the time of project implementation. The established system will continue to work as the conservation and research institution for genetic resources. Necessary technologies such as tissue culture and the screening of resistance to pest can be obtained within CARI and/or from YAU. However, it will be necessary to obtain further technology to keep up to date with advanced technology which has been developed in the world.

4. CONCLUSIONS AND RECOMMENDATIONS

4-1. Conclusions

The Seed Bank staff have acquired the necessary technology for seed bank management including exploration and collection, classification and evaluation, preservation and multiplication, data management, and exchange of genetic resources and information. The basic system for plant genetic resources management has been established in the Seed Bank. The preservation of plant genetic resources is vital for developing new varieties. It is deemed to impart a great influence on improving agricultural productivity.

In conclusion, based on the series of discussions with concerned officials and counterparts as well as a field survey, it is fair to say that the Project has achieved its objectives set by the R/D and that the remaining problems are within the competence of the trained counterparts. Therefore, it is justified that the Project is to be terminated as planned in the R/D.

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4-2 Recommendations

The following issues and necessary measures are recommended by the Committee to sustain and further develop the achievements of the Project.

- (1) Allocation of necessary budget, assignment of personnel, and provision of equipment to strengthen the current activities of the Seed Bank are required.
- (2) Equipment provided through the Project should be maintained and utilized effectively.
- (3) The national committee on genetic resources management, as a body that can ensure cross-sectional management of relevant research institutions, should be established at the earliest opportunity for the preservation, utilization and domestic and foreign transfer of genetic resources.
- (4) In order for the Seed Bank to effectively work as the national focal point of plant genetic resources, it is necessary for the Seed Bank staff members to exchange updated information and research activities through communications and international meetings.
- (5) Distribution maps of crop species are useful for planning exploration/collection activities. The Seed Bank needs to make distribution maps not only for rice, but also other crop species.
- (6) Considering the future demand of germplasm exchange, the Seed Bank should provide necessary measures of introduction and isolation.
- (7) Evaluation of the resistance to BLB was started recently using rice accessions collected in Myanmar with the collaboration of CARI and YAU. These activities should be continued for further development of the Project achievements.
- (8) Most of evaluation activities were concentrated on rice. The Seed Bank should start to evaluate other crops.
- (9) The manuals for conservation and multiplication including seed processing after harvest and germination test need to be published soon.

Besides, considering the next stage in which the major outputs of the Project are utilized, the following measures are recommended to the Government of Myanmar.

- (10) The research plans for breeding objectives for new disease resistant varieties should be drawn up.
- (11) Further cooperation with related institutions is needed.
- (12) In order for the Seed Bank to positively contribute to improving agricultural productivity, it is needed to promote the utilization of the preserved genetic resources for developing new varieties.
- (13) The situation of the instability in power supply and telecommunication should be improved. This is great importance in order to ensure appropriate operations in the Seed Bank.

5-3 Lessons drawn from the Project

It must be fully understood that it takes time for the extended effect to reach the ultimate beneficiaries of any project, especially in the case of research project. The specific role of the Project must be elucidated in that context.

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APPENDIX-1 Dispatch of Japanese experts

| Name | Subject | Dispatched period | Affiliation before dispatch |
|----------------------|-----------------------------------|------------------------|---|
| <Long-term experts> | | | |
| Shinji Watanabe | Team leader | 1997.10.08 ~1999.04.25 | |
| Mitsunori Oka | " | 1999.06.02 ~2000.03.31 | Japan International Research Center for Agricultural Studies |
| Makoto Kawase | " | 2000.07.24 ~2002.05.31 | Shikoku National Agricultural Experiment Station |
| Hidemoto Tanaka | Project coordinator | 1997.06.01 ~2002.05.31 | Ion Co. Ltd. |
| Masamitsu Ito | Conservation & multiplication | 1997.10.08 ~2000.04.07 | |
| Katsuo Egara | " | 2000.03.14 ~2002.05.31 | Hokuriku National Agricultural Experiment Station |
| Kenji Irie | Classification & evaluation | 1998.03.12 ~2002.03.11 | Agricultural University of Tokyo |
| <Short-term experts> | | | |
| Tsukasa Nagamine | Exploration & collection | 1997.07.15 ~1997.07.30 | National Institute of Agrobiological Resources |
| Shinji Watanabe | Classification & evaluation | " | |
| Masamitsu Ito | Conservation & multiplication | " | |
| Chukichi Kaneda | Evaluation | 1998.07.06 ~ 08.03 | Association for International Cooperation of Agriculture and Forestry |
| Mitsunori Oka | Exchange of PGR & PGR Information | 1999.01.10 ~ 01.23 | Japan International Research Center for Agricultural Studies |
| Naoto Takeda | Data Management | 1999.02.04 ~ 02.12 | National Institute of Agrobiological Resources |
| Mitsuo Horita | Evaluation | 1999.08.03 ~ 08.31 | National Institute of Agrobiological Resources |
| Katsuo Egara | Exploration & collection | 1999.11.08 ~ 11.20 | Hokuriku National Agricultural Experiment Station |
| Hisatoshi Kaku | Evaluation | 2000.10.04 ~ 10.20 | National Institute of Agrobiological Resources |
| Mitsuharu Ozaki | Conservation | 2000.11.28 ~ 12.10 | Reiki Co. Ltd. |
| Masahiro Nakagahra | Utilization of PGR | 2000.12.21 ~ 12.30 | STAFF Institute |
| Yukino Ochiai | Exploration & collection | 2001.01.19 ~ 03.18 | National Ethnology Museum |
| Hisatoshi Kaku | Evaluation | | National Institute of Agrobiological Resources |
| () | Evaluation | | |
| () | Exploration & collection | | |
| () | Exploration & collection | | |

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APPENDIX-2 Acceptance of counterpart personnel in Japan

| Name | Period | Technical field | Subject & Recipient | Assignment at/when received | Present assignment |
|-------------------|-------------------------|---------------------------|--|---|---|
| Mr. Soe Pe | 1997.07.30 - 08.30 | PGR management | Seed Bank Manager NIAR | Assistant Manager Admi & Account, Seed Bank | - |
| Mr. Win Twat | 1997.10.20 ~ 12.21 | Conservation & Evaluation | Conservation & Evaluation NIAR | Dy Supervisor, Eval. & Mult., Seed Bank | - |
| Mrs. Yi Yi Myint | 1997.11.10 ~ 1998.02.08 | Data Management | Data Management NIAR | Dy Supervisor, Data Manage., Seed Bank | - |
| Ms. Tin Tin | 1998.05.25 - 10.30 | PGR management | Plant Genetic Resources NIAR | Dy Supervisor, Conserv., Seed Bank | Dy Supervisor, Data Manage., Seed Bank |
| Mrs. Khin Aye | 1998.07.07 ~ 12.02 | Multiplication | Multiplication NIAR | Dy Supervisor, Conserv., Seed Bank | Assistant Manager, Conserv., Seed Bank |
| Mrs. Than May | 1998.08.31 ~ 12.18 | Exploration & Collection | Exploration & Collection NIAR | Assistant Manager, Expl. Col. & Intr., Seed Bank | Assistant Manager Admi & Account, Seed Bank |
| Mr. Than Htay Oo | 1999.05.03 - 10.29 | PGR management | Plant Genetic Resources NIAR | Dy Supervisor, Expl. Col. & Intr., Seed Bank | Dy Supervisor, Char. Eval. & Mult., Seed Bank |
| Mrs. San San Yee | 2000.01.24 - 03.29 | Data Management | Data Management NIAR | Dy Supervisor, Expl. Col. & Intr., Seed Bank | - |
| Mr. Thein Zaw | 1999.12.09 ~ 2000.02.16 | Conservation | Conservation NIAR | Dy Supervisor, Conserv., Seed Bank | Dy Supervisor, Char. Eval. & Mult., Seed Bank |
| Mr. Min San Thein | 2000.10.04 - 10.27 | PGR management | Plant Genetic Resources NIAR | Dy Supervisor, Expl. Col. & Intr., Seed Bank | Dy Supervisor, Char. Eval. & Mult., Seed Bank |
| Mrs. San Win Kyi | 2000.07.03 ~ 10.04 | Evaluation | Evaluation NIAR | Dy Supervisor, Conserv., Seed Bank | - |
| Mrs. L. Nang Kha | 2000.08.14 - 10.25 | Data Management | Data Management NIAR | Dy Supervisor, Conserv., Seed Bank | - |
| Mr. Myo Nyunt | 2001.01.08 - 01.20 | PGR management | Genetic Resources Management (Study Tour) NIAR | General Manager, Administration Div., Myanmar Agriculture Service | - |
| Mr. Tin Maw Oo | 2001.05.07 ~ 11.02 | PGR management | Plant Genetic Resources NIAR | Dy Supervisor, Expl. Col. & Intr., Seed Bank | - |
| () | | Evaluation | Evaluation NIAR | | |
| () | | Conservation | Conservation NIAR | | |
| () | | Evaluation | Evaluation NIAR | | |

APPENDIX-3 Input of local cost by Japanese side

(Unit: 1,000 yen)

| Item | 1997 (6.01~) | 1998 | 1999 | 2000 | 2001 | 2002 (~5.31) |
|---|--------------|--|--|--|---|--------------|
| Primary local expenses for experts' activities | 2,400 | 5,844 | 6,500 | 6,500 | 6,000 | |
| Assistance on Project security countermeasures | 265 | | | | | |
| | Fax machine | Radio Telephone | | | | |
| Special allotment to LLDC | | 1,647 | 3,546 | 4,079 | 2,405 | |
| | | Survey on electric power distribution, Facilities/equipment repair & maintenance | Establishment of multiplication field, Facilities/equipment repair & maintenance | Maintenance training to C/P, Improvement of ventilation system, Facilities/equipment repair & maintenance, Improvement of multiplication field | Maintenance training to C/P, Replacement of cooling unit, Facilities/equipment repair & maintenance | |
| Assistance on promotion & dissemination of Project activities | | 3,446 | 3,959 | | | |
| | | Technical guidance for exploration & collection, Workshop, Teaching material | Technical guidance for exploration & collection, Workshop, Teaching material | | | |
| Assistance for technology adoption | | | | 2,405 | 1,385 | |
| | | | | Technical guidance for exploration & collection, Workshop, Teaching material | Technical guidance for exploration & collection, Workshop, Teaching material | |
| Technical exchange program | | | 1,322 | | 736 | |
| | | | International Congress by IPGR | | SABRAO Asian Agriculture Congress, IRRI, PhilRice | |

APPENDIX-4 Provison of machineries and equipment by the Japanese side

| Ser.No | Arrival | Item | Specification | Manufacturer | Nos. | Price | Section | Location | Present Status |
|--------|------------|---|----------------|--------------|------|-------|---------|----------|----------------|
| 1 | 05.01.1998 | Copier | OMEGA2310 | OLYMPIA | 1 | 759 | Adm | PM | ○ |
| 2 | 05.01.1998 | Copier | OMEGA2330 | PLYMPIA | 1 | 759 | Adm | TL | ○ |
| 3 | 23.08.1997 | Personal Computer | PM7300 | MACINTOSH | 1 | 572 | Adm | GYN | ○ |
| 4 | 09.10.1997 | Camera Set | EOS55 | CANON | 1 | 171 | Adm | TL | ○ |
| 5 | 05.01.1998 | Personal Computer Set | Desk Pro2000 | COMPAQ | 1 | 347 | Dat | DAT | ○ |
| 6 | 05.01.1998 | Air-Con/Split Type | CS/CUM903 | NATIONAL | 5 | 770 | Adm | B9 | ○ |
| 7 | 05.01.1998 | Air-Con/Window Type | CWC240 | NATIONAL | 4 | 318 | Adm | B4.B5 | ○ |
| 8 | 25.02.1998 | Vehicle 4WD Station Wagon | Landcluiser VX | TOYOTA | 1 | 5,675 | Adm | GRG | ○ |
| 9 | 25.02.1998 | Vehicle 4WD Pick-up | Hilux | TOYOTA | 1 | 2,837 | Adm | GRG | ○ |
| 10 | 05.01.1998 | Slide Projector | 253E | ELMO | 1 | 132 | Adm | ADM | ○ |
| 11 | 18.03.1998 | Personal Computer Set | Vecta VL5 | HP | 1 | 347 | Dat | DAT | ○ |
| 12 | 19.08.1998 | Ice Maker | S27 | RI | 1 | 200 | Eva | LAB | ○ |
| 13 | 19.08.1998 | Grain Moisture Tester | PM-700 | KETT | 2 | 252 | Cns | B4 | ○ |
| 14 | 19.08.1998 | Electric Balance | HM-202 | A&D | 2 | 366 | Cns | B4 | ○ |
| 15 | 21.03.1999 | Generator | 6CTAA83G | SDMO | 1 | 5,726 | Adm | DST | ○ |
| 16 | 25.02.1999 | Motor Bike | C100MT | HONDA | 5 | 952 | Adm | GRG | ○ |
| 17 | 25.02.1999 | Video Camera | NV-M3500EN | NATIONAL | 1 | 609 | Adm | ADM | ○ |
| 18 | 25.02.1999 | Monitor | TC-29S95R | NATIONAL | 4 | | Adm | ADM | ○ |
| 19 | 25.02.1999 | Personal Computer Set | Vecta VE | HP | 2 | 1,083 | Dat | DAT | ○ |
| 20 | 14.05.1999 | Seed Dryer | T-10F | MTSUBISHI | 1 | 5,736 | Cns | B5 | ○ |
| 21 | 14.05.1999 | Incubator | IS900 | YAMATO | 1 | 1,048 | Cns | B4 | ○ |
| 22 | 14.05.1999 | Camera Set | EOS55QD | CANON | 2 | 517 | Adm | ADM | ○ |
| 23 | 14.05.1999 | Thermo-Hygrometer | HRT3000 | ISUZU | 1 | 108 | Cns | B4 | ○ |
| 24 | 14.05.1999 | Hygrometer | 54-EC | ISUZU | 1 | 111 | Cns | B4 | ○ |
| 25 | 11.10.1999 | Micro-Bus | Urban Long Bod | NISSAN | 1 | 1,958 | Adm | GRG | ○ |
| 26 | 11.10.1999 | Vehicle 4WD Station Wagon | Patrol 4WD GL | NISSAN | 1 | 3,190 | Adm | GRG | ○ |
| 27 | 08.07.1999 | Personal Computer | PCG-887 | SONY | 1 | 372 | Adm | TL | ○ |
| 28 | 28.02.2000 | Air-Con Split Type | MS24NV | MTSUBISHI | 4 | 1,434 | Cns | B4 | ○ |
| 29 | 28.02.2000 | Air-Con Window Type | CW18 | NATIONAL | 5 | | Adm | B5 | ○ |
| 30 | 28.02.2000 | Personal Computer Set (Net Server) | LC3PIII+4050N | HP | 1 | 1,241 | Dat | DAT | ○ |
| 31 | 28.02.2000 | Submersible Pump | SP27-9 | Grundfos | 1 | 1,150 | Eva | FLD | ○ |
| 32 | 28.06.2000 | Vacuum Packer | TV-300 | HASHIMOTO | 1 | 1,158 | Cns | B4 | ○ |
| 33 | 28.06.2000 | Grain Moisture Meter | PM-600 | KETT | 4 | 522 | Cns | B4 | ○ |
| 34 | 28.06.2000 | Dehumidifier | KFH-301 | MTSUBISHI | 1 | 816 | Cns | B4 | ○ |
| 35 | 28.06.2000 | Spectro-Photometer | UV-1240 | SHIMAZU | 1 | 653 | Eva | LAB | ○ |
| 36 | 28.06.2000 | Inverted Micro Centrifuge Angle Roter | 1120 | KUBOTA | 1 | 261 | Eva | LAB | ○ |
| 37 | 28.06.2000 | Electrophoresis Slab Chamber (dual type) | AE-6220 | ATTO | 1 | 228 | Eva | FLD | ○ |
| 38 | 03.10.2000 | Vehicle /4WD Station Wagon | 4WD GL | NISSAN | 1 | 3,935 | Adm | GRG | ○ |
| 39 | 28.11.2000 | Cooling Unit for Seed Strage Cabinet wz Tools | 484R | REIKI | 1 | 680 | Cns | B5 | ○ |

| | | | | | | | | | |
|----|------------|-----------------------------|------------------------|-------------|---|-------|-----|-----|---|
| 40 | 22.02.2001 | Dehumidifier | KFH-5C1 | mitsubishi | 2 | 1,237 | Cns | B4 | ○ |
| 41 | 22.02.2001 | Dehumidifier | KFH-3C1 | MITSUBISHI | 1 | 454 | Cns | B4 | ○ |
| 42 | 22.02.2001 | Desicator | SP-W | IUCHI | 2 | 394 | Cns | B4 | ○ |
| 43 | 22.02.2001 | Infrared Moisture Tester | FD-600 | KETT | 1 | 139 | Cns | B4 | ○ |
| 44 | 22.02.2001 | Winnower (Motor Drive) | 08402101 (PS) | FUJIWARA | 1 | 516 | Eva | B6 | ○ |
| 45 | 22.02.2001 | Winnower | 08402001 (B-2) | FUJIWARA | 1 | 260 | Eva | B6 | ○ |
| 46 | 22.02.2001 | Ultra Pure Water Maker | SIMS7000J | MILIPORE | 1 | 333 | Eva | LAB | ○ |
| 47 | 22.02.2001 | Hotplate Stirrer | F-202H | TGK | 2 | 209 | Eva | LAB | ○ |
| 48 | 22.02.2001 | Electronic Balance | JL-180 | YMC | 2 | 278 | Eva | LAB | ○ |
| 49 | 22.02.2001 | Electrophoresis Apparatus | EH-200 | ADVANTEC | 1 | 124 | Eva | LAB | ○ |
| 50 | 22.02.2001 | Multimedia Projector | ELP-5550 | EPSON | 1 | 375 | Adm | ADM | ○ |
| 51 | 22.02.2001 | Near Infrared Spectrometer | InfraAlyzer2000 | Bran Luebbe | 1 | 9,213 | Eva | LAB | ○ |
| 52 | 22.02.2001 | Automatic Voltage Regulator | 100kVA/144.34A | STAVOL | 1 | 6,048 | Adm | DST | ○ |
| 53 | 22.02.2001 | Two Wheel Tractor | JP-102 (JohnDeereEng) | JACKPETCH | 1 | 373 | Eva | GRG | ○ |
| 54 | 22.02.2001 | Personal Computer Set | VL400PIII733 S | HP | 2 | 670 | Dat | DAT | ○ |
| 55 | 22.02.2001 | Personal Computer (Laptop) | OMNIBOOK XE3 | HP | 1 | 264 | Dat | DAT | ○ |

APPENDIX-5 Allocation of counterpart personnel

| Subject | Name | Assigned period | | | | | | CP training | | Remarks | | |
|--|--------------------|-------------------------------------|---------|---------|---------|---------|---------|-------------|-----------|--|------|---|
| | | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | FY | Recipient | | | |
| | | 6 7 0 1 4 | 7 0 1 4 | 7 0 1 4 | 7 0 1 4 | 7 0 1 4 | 7 0 1 4 | | | | | |
| Project Management | (Dr. Tin Soe) | _____ | | | | | | 1997 | NIAR | Former Project Manager Transferred to Myanmar Farm Enterprise General Manager of CARI 1 MAR 2001 | | |
| | U Kyaw Soe | (2000.2 -) _____ | | | | | | | | Present Project Manager Also in charge Food Legume Div, CARI | | |
| | U John Ba Maw | _____ | | | | | | | | Seed Bank Manager Also in charge of Other Cereals Division, CARI | | |
| | U Soe Pe | _____ | | | | | | | | In charge of Admin & Account of Seed Bank including storage and maintenance of facilities. Reported to FAO/IBPGR symposium & national symposium JICA CP training "Seed Bank Manager" | | |
| | Daw Than Mey | (00.10 From Expl.Col.Intr.) _____ | | | | | | | | 1998 | NIAR | Supervising, planning & coordination of mainly exploration & collection JICA CP training "Exploration" |
| | U Maw Kyi | (00.10 From Expl.Col.Intr.) _____ | | | | | | | | Supervision, planning & coordination of multiplication, classification & evaluation Reinstated Oct. 1998 from medical care | | |
| Exploration, Collection & Introduction | (U Maw Kyi) | (00.10 To Project management) _____ | | | | | | 2001 | NIAR | (See 'Project Management) | | |
| | U Than Sein | (00.10 From Consv.) _____ | | | | | | | | Section head, Exploration, Collection & Introduction Competant cp in cooperative exploration with IRRI and other countries. Well trained in IRRI. Reported in national symposium. Reported in IPGRI Internat. symposium. | | |
| | (Daw Than Mey) | (00.10 To Project Management) _____ | | | | | | | | (See 'Project Management) | | |
| | Daw San Myint | _____ | | | | | | | | Cultivation of vegetables Training at IRRI. | | |
| | U Tin Maw Oo | _____ | | | | | | | | Pest resistance evaluation in rice in cooperation with CARI. Ongoing CP training in Japan. | | |
| | Daw San San Yee | _____ | | | | | | | | 1999 | NIAR | Fiber crops. Now in master course in YAU. CP training "Data management" |
| | (U Than Htay Oo) | (00.10 To Eval.Mult.) _____ | | | | | | | | (See Eval.Mult) | | |

| Subject | Name | Assigned period | | | | | | CP training | | Remarks |
|-----------------------------|---------------------|------------------------------------|---------|---------|--------------------------|---------|------|-------------|-----------|--|
| | | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | FY | Recipient | |
| | | 6 7 0 1 | 4 7 0 1 | 4 7 0 1 | 4 7 0 1 | 4 7 0 1 | 4 | | | |
| | (U Min San Thein) | <u>(00.10 To Eval.Mult.)</u> | | | | | | | | (See Eval.Mult.) |
| | (Daw Yee Yee Myint) | <u>To OISCA</u> | | | <u>To Rice Div.,CARI</u> | | | | | OISCA rice cultivation training |
| Evaluation & Multiplication | Daw Khin Myint Kyi | <u>_____</u> | | | | | | | | Section Head, Characterization, Evaluation & Multiplication. Collaborative BLB evaluation. Cereal cultivation training in ICRISAT. Now in master courses in YAU. Reported IPGRI Internat. symposium. |
| | Daw Myint Than Htay | <u>_____</u> | | | | | | | | PGR classification, evaluation, collection training in IPGRI. Rice and pulses |
| | (Daw Khin Aye) | <u>(00.10 To Consv.)</u> | | | | | | | | (See Consv.) |
| | U Hla Myo | <u>_____</u> | | | | | | | | IRRI training on agricultural research institution management Millet. |
| | U Min San Thein | <u>(00.10 From Expl.Col.Intr.)</u> | | | <u>_____</u> | | | 2000 | NIAR | Collaborative rice BLB evaluation. CP training "PGR" |
| | U Thein Zaw | <u>(00.10 From Consv.)</u> | | | <u>_____</u> | | | 1999 | NIAR | Industrial crops. CP training "Conservation". |
| | Daw Tin Tin | <u>(00.10 From Consv.)</u> | | | <u>_____</u> | | | 1998 | NIAR | Pulses. Secondary characters including chemical analysis. CP training "PGR" |
| | U Than Htay Oo | <u>(00.10 From Expl.Col.Intr.)</u> | | | <u>_____</u> | | | 1999 | NIAR | Cereals. CP training "PGR" |
| | U Win Twat | <u>_____</u> | | | | | | 1997 | NIAR | Secondary characters including chemical analysis. CP training "Evaluation & Conservation" |
| | Daw Win Win Nwe | <u>_____</u> | | | | | | | | Cereals. Now in master course in YAU. |
| | Daw Ni Ni Hla | <u>_____</u> | | | | | | | | 2nd year after graduation. Oil crops & rice. |
| | U Yee Htun Htun | <u>_____</u> | | | <u>00.11~</u> | | | | | Transferred from Seed Division. Rice seed production. |

| Subject | Name | Assigned period | | | | | | CP training | | Remarks |
|-------------------------------------|---------------------|-----------------|-----------------------------|---------|---------|---------|------|-------------|--|---------|
| | | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | FY | Recipient | |
| | | 6 7 0 1 | 4 7 0 1 | 4 7 0 1 | 4 7 0 1 | 4 7 0 1 | 4 | | | |
| | Daw Thu Zar Sein | _____ | _____ | _____ | _____ | _____ | | | Rice. | |
| | Daw Ohn Mar Aung | | | | _____ | | | | New face. Pulses. | |
| | (U Kyaw Nyein) | _____ | (To Cotton Enterprise) | | | | | | | |
| Conservation | (U Than Sein) | _____ | (00.10 To Expl.Col.Intr.) | | | | | | (See Expl.Col.Intr.) | |
| | Daw Khin Aye | | (00.10 From Evsl.Mult.) | _____ | | | 1998 | NIAR | 00.10 Became section head, Conservation. CP training "Multiplication". | |
| | Daw San Win Kyi | _____ | | | | | 2000 | NIAR | Temporary conservation. Attended to VARI-CIMMYT Farming System Internat. Congress. CP training "Evaluation" | |
| | (Daw Tin Tin) | _____ | (00.10 To Eval.Mult.) | | | | | | (See Eval.Mult.) | |
| | Daw Nu Nu Yee | _____ | | | | | | | Germination test. Training of PGR evaluation & utilization | |
| | (U Thein Zaw) | _____ | (00.10 To Eval.Mult.) | | | | | | (See Eval.Mult.) | |
| | Daw Ohn Mar Saw | _____ | | | | | | | Monbusho Scholarship in Kyushu Univ. from April 2001. | |
| Data Management | Daw L. Nang Kha | _____ | | | | | 2000 | NIAR | Cereal cultivation. Training of PGR conservation and utilization (DSE, Germany). CP training "Data management". | |
| | Daw Yi Yi Myint | _____ | | | | | 1997 | NIAR | CP training "Data management", Rice Breeding. Master degree. | |
| | Daw Moe Yu Thwe | _____ | | | | | | | 2nd year after graduation. | |
| Maintenance of Facility & Equipment | Daw Naw Kyi Mar Aye | | | | 00.07~ | _____ | | | Just graduated from Technology Training School. Newly assigned for maintenance of facilities & equipment | |
| | U San Shwe | _____ | | | | | | | Repairs of equipment | |
| | U Kyaw Myint | _____ | | | | | | | Security | |

APPENDIX-6 Budget allocated for the project by the Myanmar side

(Unit: Kyat)

| Item | 1997 - 1998 | 1998 - 1999 | 1999 - 2000 | 2000 - 2001 |
|---|-------------|-------------|-------------|-------------|
| Salary, wages & travelling allowance for research | 700,000 | 1,309,000 | 1,708,000 | 4,595,000 |
| Procurement of fixtures & consumables for laboratory and field research | 3,083,000 | 2,129,000 | 1,739,000 | 2,093,000 |
| Maintenance cost for facilities and equipment | 152,000 | 234,000 | 1,448,000 | 1,378,000 |
| Total | 3,935,000 | 3,672,000 | 4,895,000 | 8,066,000 |

APPENDIX-7 Activities in Detailed Implementation Plan (DIP)

| Activity plan | | Objectives | Present achievement | Level | Reasons for delay | Future plan |
|---|---|--|---|-------|---|--|
| Item | Activities | | | | | |
| 1. Exploration and collection | | | | | | |
| (1) Exploration planning | To make overall exploration plan and detailed exploration plan based on overall plan | The overall exploration plan will be made regarding to priority regions and crops. | Overall plan was withdrawn in 1998, based on which yearly plans have been made. | 4 | | |
| (2) Field survey and collection | To make field survey at appropriate period for each crop | Native plant genetic resources of Myanmar will be collected. | Several missions are dispatched based on the plans to make field survey and collection. | 4 | | (It became clear that there is a huge biodiversity in Myanmar. It is seriously needed to organize systematic exploration and collection continuously.) |
| (3) Distribution map making | To collect information of distribution for each crop and put it into distribution map | Distribution maps of local varieties and wild species of main crops are described. | Distribution maps are reported in academic symposia in Myanmar and overseas. | 3 | Enough information on rice landraces has not been collected in some regions. | Information has been accumulated in most regions. Distribution maps will be prepared by obtaining data from them. |
| (4) Pest control of collected materials | To treat collected materials with pesticides while paying attention to germination impediment | Collected materials will be treated by pesticides. | Research made it clear that rapid drying of collected seeds can control pest adequately. | 4 | | |
| (5) Isolation and purification | To transfer method of isolation | Isolation will be done based on Myanmar's plant protection standards. | Information has been collected from Plant Protection Division. | 2 | The isolation of the genetic resources introduced in Seed Bank has not been needed according to the current law. There are facilities that can be used for isolation. | It is necessary to keep contact with the Plant Protection Division to obtain latest information. |
| 2. Classification and Evaluation | | | | | | |
| (1) Classification and identification of collected materials | To identify, classify and put plant code on collected materials | Collected materials will be classified based on international plant classification standard. | Collected samples are classified and identified, to which scientific names are given. | 3 | There is no good illustrated flora or dictionary. | Research Botany and Taxonomy should be strengthened introducing techniques of molecular biology in the near future. |
| (2) Establishment of methodologies and standards for evaluation | To decide essential and optional items of evaluation for each crop | Items and standards for evaluation (descriptor) of main crops will be decided. | Descriptors were edited for 16 crops in cooperation with CARI. | 4 | | |
| (3) Evaluation of conserved accessions | To evaluate conserved accessions through close cooperation with CARI's concerned divisions | Conserved accessions will be evaluated based on the descriptors. | Over 2,500 accessions are cultivated every year in the fields and evaluated according to the descriptors. | 4 | | (Evaluation for disease and pest resistance is quite important for utilizing genetic resources. Cooperation with CARI Divisions and Yezin Agricultural University that has already started is desirable to develop.) |
| (4) Evaluation of collected accessions | To evaluate collected accessions through close cooperation with CARI's concerned divisions | Collected accessions will be evaluated based on the descriptors. | Ditto. | 4 | | |

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|---|---|---|---|----------|--|--|
| <p>3. Conservation and Multiplication</p> <p>(1) Multiplication of collected accessions</p> | <p>To multiply collected accessions with method suitable for each crop</p> | <p>Collected accessions will be multiplied.</p> | <p>Over 2,500 accessions are cultivated every year for multiplication in the fields. Over 7,000 accessions are stored as base and active collections.</p> | <p>4</p> | | <p>(It is necessary to develop a method to multiply cross-pollinating crops efficiently but with keeping their genetic constitutions.)</p> |
| <p>(2) Establishment of methodologies for desiccation and conservation</p> | <p>To study appropriate methods of desiccation and conservation for each crop</p> | <p>Methods of desiccation and conservation for each crop will be established.</p> | <p>The introduction of a dry-room and a low-temperature seed dryer improved desiccation.</p> | <p>3</p> | <p>At the beginning, the seed storage chambers for working collection could not used in prevailing wrong and unstable electric power situations, because its default temperature was set below the freezing point.</p> | <p>Cooling units for the seed storage chambers for working collection will be changed to ones with a new design in 2001.</p> |
| <p>(3) Germination test of seeds</p> | <p>To test germination rate periodically</p> | <p>Germination rate will be kept above 80% by periodical germination test.</p> | <p>Germination test is done before storage and periodically during storage.</p> | <p>4</p> | | |
| <p>(4) Rejuvenation</p> | <p>To rejuvenate collected accessions with a germination rate below 80%.</p> | <p>Conserved seeds with declining germination rate will be multiplied.</p> | <p>Rejuvenation is done on demand.</p> | <p>4</p> | | <p>(It is necessary to develop a method to multiply cross-pollinating crops efficiently but with keeping their genetic constitutions.)</p> |
| <p>4. Data management</p> | | | | | | |
| <p>(1) Standardization of data</p> | <p>To unify the management form of data (passport data, evaluation data and seed management data)</p> | <p>The management form of every data (passport data, evaluation data and seed management data) will be unified.</p> | <p>The data formats were unified using popular business software.</p> | <p>4</p> | | |
| <p>(2) Design of information system</p> | <p>To configure the system to access each kind of data within the seed bank</p> | <p>Every kind of data will be shared within the Seed Bank.</p> | <p>A system that enables to share every data has been constructed.</p> | <p>3</p> | <p>It took longer time to acquire database and computer technologies in the limited conditions.</p> | <p>User-friendly interface should be needed for actively used by breeders and other researchers.</p> |
| <p>(3) Construction of database</p> | <p>To construct card type and digital database for each kind of data</p> | <p>Every kind of data will be put into database based on the management form.</p> | <p>The data that had been obtained were already input to the databases.</p> | <p>4</p> | | |
| <p>(4) Cataloging</p> | <p>To publish the catalog of conserved accessions based on the database</p> | <p>Catalog of conserved accessions will be published.</p> | <p>Manuscript of the catalog has been completed and is ready to press.</p> | <p>3</p> | <p>It needed a longer time to correct data for catalog.</p> | <p>The catalog of conserved accessions is to be published in 2001.</p> |

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|---|--|--|--|----------|---|--|
| <p>5. Exchange of genetic resources and information</p> <p>(1) Training</p> | <p>To hold training, seminars and workshops for persons concerned</p> | <p>Awareness and skill on genetic resources will be raised up through the periodical training.</p> | <p>Understanding of the people in CARI and affiliate farms on genetic resources was promoted through seminars and workshops hold to enhance public relations for genetic resources as well as ordinary activities. Techniques for genetic resources management have been updated by CP training and others.</p> | <p>4</p> | | <p>(It is a rule with MAS that people who studied or trained abroad have to be engaged in service inside the country at least for 3 years before the next foreign study. The most suitable person might not be nominated for CP training under this rule.)</p> |
| <p>(2) Preparation of exchange system for genetic resources and information</p> | <p>To assist in formulating exchange rules for plant genetic resources</p> | <p>Plant genetic resources and relevant information will be exchanged smoothly with institutions concerned inside or outside of Myanmar.</p> | <p>The collaboration with and CARI and other related organization has been enhanced through ordinary activities, seminars, workshops, joint exploration, etc. Seed Bank dispatched researchers to attend international symposia and to visit IRRRI and PhilRice for information exchanges. Over 2,000 accessions were distributed to domestic and overseas institutions.</p> | <p>3</p> | <p>The National Committee for Plant Genetic Resources is not established in Myanmar. If it is established, Seed Bank activities will be promoted domestically and internationally. Prevailing telecommunication situations on which project site is not accessible by phone/FAX from abroad obstructed smooth exchanges of information.</p> | <p>Publication of the catalog of conserved accessions and other data on will enable smoother exchanges of genetic resources and their effective utilization. The access to Internet is not allowed in this country, but it will be very effective to install LAN in Seed Bank and CARI that make it possible to enhance rapid information exchanges with users such as breeders.</p> |

APPENDIX-8 Research papers, book leaflets, abstracts and other materials produced by

| Name of documents | | |
|--|---------|-------------------|
| The present situation of plant genetic resources and the role of Seed Bank | 1997.11 | S. Watanabe |
| Introduction to PGR center of Sri-Lanka | 1998.02 | S. Watanabe |
| Evaluation & utilization of germplasm: An example case of rice with special emphasis on insect resistance | 1998.07 | C. Kaneda |
| Significance of PGR and prospects for more sustainable food supply | 1998.07 | C. Kaneda |
| Present international situation on activities of plant genetic resources | 1998.08 | F. Kikuchi |
| Seed Bank Project (leaflet : English Virsion) | 1998.12 | |
| Seed Bank Project (leaflet: Myanmar Virsion) | 1998.12 | |
| End-of-year Assessment Report | 1998.12 | |
| Useful Plants in Myanmar | 1999.03 | S.Watanabe |
| Sugarcane breeding in Japan | 1999.07 | M. Oka |
| Progress in Seed Bank Project in 1999-2000 | 1999.12 | |
| Current situation of PGR Management in Myanmar | 2000.07 | M. Oka |
| Sugar cane production and breeding in Japan | 2000.07 | M. Oka |
| Bacterial Blight of Rice: Current study of Research and Future Prospects for Control | 2000.10 | H. Kaku |
| Annual Report 1998 | 2000.12 | |
| Annual Report 1999 | 2001.07 | |
| Training Course on Bio-chemical Analysis of Plant Genetic Resources | 1999.08 | |
| Plant genetic resources documentation and regional network | 1999.09 | Paul Quak (IPGRI) |
| Genetic Resources and Plant Resources in Myanmar: Aspects from Ethnobotany | 2001.03 | |
| Genetic Resources and "Me" | 2001.06 | M. Kawase |
| Progress Report FY2000 | 2001.04 | |
| The highlight of multiplication and conservation activities on plant genetic resources in 1997-1999 | 2000.03 | M. Ito |
| Computer systems for statistical analysis | 2001.05 | K. Egara |
| Genetic Resources and "Me" | 2001.06 | M. Kawase |
| Genetic Resources & Crop Evolution | 2001.07 | M. Kawase |
| DESCRIPTORS for; Rice, Finger millet, Maize, Pearl millet, Sorghum, Wheat, Black gram, Chick-pea, Cow-pea, Green gram, Lima bean, Pigeon pea, Soy bean, Groundnut, Cotton, Jute | | |

| Research paper & reports | | | |
|--|---------|---|--|
| Exploration and collection of crop genetic resources in Magway in Magway Division I | 1999.01 | Soe Pe, Than Htay Do, Min San Thein, M. Ito | |
| Exploration and collection of crop genetic resources in Magway in Magway Division II | 1999.01 | Toe Aung, Tin Yee, San Win Kyi, S. Watanabe | |

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| Multiplication and Characterization of; Wheat, Sorghum, Pigeon pea, Chick-pea | 1999.07 | Win Twat, Khin Myint Kyi, | |
| Screening of BLB on 100 Myanmar local rice varieties | 1999.07 | Khin Myint Kyi | |
| Multiplication and Characterization of; Green gram and Black gram | 1999.07 | Myint Than Htay | |
| Screening of Protein Analysis on Myanmar Rice | 1999.07 | Win Twat | |
| Multiplication and characterization of Rice | 1999.07 | Thu Zar Sein | |
| Screening of Phrotonia on 92 Maize Accessions | 1999.07 | Win Win New | |
| Multiplication and Characterization of; Groundnut, Maize | 1999.07 | Ni Ni Hla, Win Win New | |
| Multiplication, Characterization, and Evaluation Station | 1999.07 | Win Twat | |
| Wild and local rice exploration in Kachin State I | 1999.10 | Than Sein, Soe Pe, Tin Maw Oo, K. Irie | |
| Exploration and collection in Southern Shan State | 1999.11 | Seed Bank & MAFF | |
| Exploration in Sagaing, Mandalay, and Magway Divisions | 1999.12 | Seed Bank & MAFF | |
| Exploration in Kachin State | 1999.12 | Than Sein, Tin Maw Oo, | |
| Exploration of local rice and multi-crop landraces in Northern Chin State and Sagaing Division | 2000.01 | Khin Than New, Than May, Tin Maw Oo, Min San Thein, K. Irie | |
| Current investigation of wild relatives of rice in Myanmar | 2000.06 | Tin Maw Oo, Than Sein, Than Htay Oo, Min San Thein, M Ito | -'International Conference on Science and Technology for Managing Plant Genetic Diversity in the 21st Century'; IPGRI, June 12-16 2000, Kuala Lumpur, -Annual Conference by Accademy on Agriculture, Fishery, and Forestry, Apr06,2000 |
| Conservation of Plant Genetic Resources in Myanmar at present and for future | 2000.06 | Khin Myint Kyi, Tin Mar Than, M Ito, K Irie | -'International Conference on Science and Technology for Managing Plant Genetic Diversity in the 21st Century'; IPGRI, June 12-16 2000, Kuala Lumpur, -Annual Conference by Accademy on Agriculture, Fishery, and Forestry, Apr06,2000 |
| The Status of wild relatives of rice in Myanmar | 2000.12 | Tin Maw Oo, Than Sein, Than Htay Oo, Min San Thein, M Ito | -Research Buletein, Annual Report '1998', Seed Bank Project -Annual Conference by Accademy on Agriculture, Fishery, and Forestry, Apr06,2000 |
| Charcterization of Rice | 2000.12 | Win Twat, Myint Than Htay, Khin Myint Kyi, Hla Myo, Ni Ni Hla, Win Win Nwe, John Ba Maw, M Ito & K Irie | Research Buletein, Annual Report '1998', Seed Bank Project |
| Characterization of groundnut | 2000.12 | Win Twat, Ni Ni Hla, John Ba Maw, Tin Soe, K Irie, M Ito | Research Buletein, Annual Report '1998', Seed Bank Project |
| Characterization of black gram | 2000.12 | Myint Than Htay, Tin Tin, Win Twat, Win Win New, John Ba maw, K Irie | Research Buletein, Annual Report '1998', Seed Bank Project |
| Characterization of green gram | 2000.12 | Myint Than Htay, Tin Tin, Thein Zaw, Hla Myo, Than Htay Oo, Win Win New | Research Buletein, Annual Report '1998', Seed Bank Project |

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|---|---------|--|--|
| Characterization and preliminary evaluation of pigeon pea germplasm | 2000.12 | Khin Myint Kyi, Tin Mar Than, M Ito, K Irie | Research Buletein, Annual Report '1998', Seed Bank Project |
| Studies on seed strage proteins of 120 Myanmar rice accessions by electrophoresis | 2000.12 | Win Twat | Research Buletein, Annual Report '1998', Seed Bank Project |
| Isozymes and classification of rice varieties | 2000.12 | Tin Tin | Research Buletein, Annual Report '1998', Seed Bank Project |
| Survey and exploration in Northern Kachin State | 2000.12 | Kyaw Soe, Min San Thein, K. Egara | |
| Multiplication and Characterization of; Rice, Groundnut, Wheat, Pigeon pea, Sorghum, Sweet sorghum, Chick pea, Green gram, Black gram | 2000.12 | WinTwat, Khin Myint Kyi, Ni Ni Hla, John Ba Maw, Win Aung, Kyaw Win, Myin Than Htay, Tin Tin | |
| Exploration and collection for local varieties of Rice in Mon and Kayin State | 2001.02 | Than Sein, Y. Ochiai, K. Irie | |
| Study for Useful Plants in Sin-thot village | 2001.03 | Myint San Thein | Workshop on 'Study for Useful Plants in Central and Southern Parts of Myanmar'; 2001.03.01 |
| Study for Useful Plants in Tatkon Township | 2001.03 | Than Htay Oo, Myint Than Htay, K Irie, Y Ochiai | Workshop on 'Study for Useful Plants in Central and Southern Parts of Myanmar'; 2001.03.01 |
| Study for Useful Plants in Yezin and Pyinmana market | 2001.03 | Ni Ni Hla, San Myint, K. Irie, Y. Ochiai | Workshop on 'Study for Useful Plants in Central and Southern Parts of Myanmar'; 2001.03.01 |
| Study for Useful Plants in Mon State | 2001.03 | L. Nang Kha | Workshop on 'Study for Useful Plants in Central and Southern Parts of Myanmar'; 2001.03.01 |
| Genetic Resources collected by Exploration in Mon State | 2001.03 | Than Sein | Workshop on 'Study for Useful Plants in Central and Southern Parts of Myanmar'; 2001.03.01 |
| Survey and exploration in Northern Shan State | 2001.03 | Min San Thein, Ni Ni Hla, Y. Ochiai | |
| Recent Progress of Collecting and Conservaing Diverse Plant Genetic Resources in Myanmar | 2001.04 | Kyaw Soe, Tin maw Oo, Soe Pe, M. Kawase | "Asian Agriculture Congree"; 2001.4.24-27, Manila, RP |
| Rice Varietal Improvement and Its Implication for Food Security in Myanmar | 2001.04 | Khin Than New, Tin Tin Myint, Aye Aye Myint, M. Kawase | "Asian Agriculture Congree"; 2001.4.24-27, Manila, RP |
| Current Achievements on Hybrid Corn Breeding in Myanmar | 2001.04 | John Ba Maw, Thant Lwin Oo, Toe Aung, M. Kawase | "Asian Agriculture Congree"; 2001.4.24-27, Manila, RP |

APPENDIX- 9 Seminars and workshops held in the Project

| | Subject | Presentatr | Date |
|----|---|---|---------------|
| 1 | The present situation of plant genetic resources and the role of Seed Bank | S. Watanabe | 1997.11.27 |
| 2 | Introduction to PGR center of Sri-Lanka | S. Watanabe | 1998.2.19 |
| 3 | Evaluation & utilization of germplasm: An example case of rice with special emphasis on insect resistance | C. Kaneda | 1998.7.17 |
| 4 | Significance of PGR and prospects for more sustainable food supply | C. Kaneda | 1998.7.29 |
| 5 | Present international situation on activities of plant genetic resources | F. Kikuchi | 1998.8.21 |
| 6 | The highlight of the sections in the management of plant genetic resources | S. Watanabe | 1998.11.27 |
| 7 | Workshop on "End-of-year Assessment Report" | Every member | 1998.12.30 |
| 8 | Introduction to data mangement systems | N. Takeda | 1999.2.10 |
| 9 | Workshop on Management of Plant Genetic Resources | John Ba Maw, Than Sein, San Myint, Than May, TinMaw Oo, Than Htay Oo, Win Twat, San Myint, Hla Myo, TinSoe, S. Watanabe, H. Tanaka, | 1999.2.16 -18 |
| 10 | Significance of PGR management and future prospects for Seed Bank | Every Section Head | 1999.3.8 |
| 11 | Seminar on PGR management: Final lecture by Dr. S. Watanabe | S. Watanabe | 1999.4.9 |
| 12 | Workshop on work plan | Every Section Head | 1999.7.2 |
| 13 | Sugarcane breeding in Japan | M. Oka | 1999.7.15 |
| 14 | Bio-chemical Analysis of Plant Genetic Resources | M. Horita | 1999.8.9 -25 |
| 15 | Plant genetic resources documentation and regional network | Paul Quaki (IPGRI) | 1999.8.24 |
| 16 | Rice breeding in Japan | K. Miura, M. sakai | 1999.11.19 |
| 17 | The highlight of multiplication and conservation activities on plant genetic resources in 1997-1999 | M.Ito | 2000.3.28 |
| 18 | Current situation of PGR Management in Myanmar | M. Oka | 2000.7.5 |
| 19 | Sugar cane production and breeding in Japan | M. Oka | 2000.7.6 |
| 20 | Workshop on Seed Bank Progress Report (2000) & CP Training in Japan | Sue Pe, WinTwat, Yi Yi Hyint, Than May, Khin Aye, Tin Tin, San San Yee, Than Htay Oo, Thein Zaw, San Win Kyi, L.Nang Kha, Min San Thein | 2000.9.24 |
| 21 | Bacterial Blight of Rice: Current study of Research and Future Prospects for Control | H. Kaku | 2000.10.16 |
| 22 | Utilization of plant Genetic Resources | M. Nakagahra | 2000.12.26 |
| 23 | Utilization of plant Genetic Resources | M. Nakagahra | 2000.12.28 |
| 24 | CABI Abstract | K. Egara | 2001.1.19 |
| 25 | Genetic Resources and Plant Resources in Myanmar: Aspects from Ethnobotany | Y. Ochiai | 2001.3.1 |
| 26 | Study for Useful Plants in Central and Southern Parts of Myanmar | Min San Thein, Than Htay Oo, Than May, Ni Ni Hla, L.Nang Kha, Than Sein | 2001.3.1 |
| 27 | Computer systems for statistical analysis | K. Egara | 2001.5.18 |
| 28 | Genetic Resources and "Me" | M. Kawase | 2001.6.14 |
| 29 | Genetic Resources & Crop Evolution | M. Kawase | 2001.7.3 |

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|----------------|--|
| Collected Data | Passport Data in Myanmar Seed Bank |
| | Stock Data in Myanmar Seed Bank |
| | Evaluation Data in Myanmar Seed Bank |
| | Distribution Data; Wild Relatives of Rice, Local Varieties of Rice |

APPENDIX-10 Project Design Matrix (PDM)

Project: Seed Bank Project

Period: June 1, 1997 - May 31, 2001

Country: Myanmar

Target: Seed Bank, CARI, MAS, MAOI

Date: June 14, 2001

| Narrative summary | Objectively verifiable indicators | Means of verification | Important assumptions |
|--|---|--|---|
| <p>Overall goal Agricultural productivity and production in Myanmar are improved through plant breeding utilizing genetic resources introduced in the project</p> | <p>Plant genetic resources in Seed Bank are utilized in plant breeding programs in order to develop new cultivars to be released by 2016, which will lead to the increase of yields.</p> | <p>Registration of new cultivars</p> | <p>No major change in the management of MAS and in policy in DAP, MOAI on plant genetic resources and agriculture.</p> |
| <p>Project purpose The system for genetic resources management, exploration and collection, classification and evaluation, preservation and multiplication, data management of plant genetic resources, and exchange of genetic resources and information is established in the Seed Bank</p> | <p>1. Systematic exploration and collection are planned and implemented in various parts of Myanmar, if necessary, in cooperation with domestic and foreign organizations. 2. Collected materials are adequately classified and evaluated. 3. Collected materials are properly multiplied and preserved. 4. Genetic resources and information are ready to exchange.</p> | <p>Annual Report (Seed Bank CARI, MAS)</p> | <p>Plant breeders are interested in and use genetic resources conserved in Seed Bank as breeding materials. No major change in the management of MAS and in policy in DAP, MOAI on plant genetic resources and agriculture.</p> |
| <p>Outputs</p> <p>1) Acquiring knowledge and technologies for exploration and collection</p> <p>2) Acquiring knowledge and technologies for classification and evaluation</p> <p>3) Acquiring knowledge and technologies for preservation and multiplication</p> <p>4) Improving management and utilization of data</p> <p>5) Improving systems for exchange of genetic resources and information</p> | <p>Overall plan and detailed yearly plans Manuals for exploration and collection are made. Distribution maps of wild rice, rice cultivars and other crops are made and reported. Effective use of equipment for exploration No. of samples collected</p> <p>Plant specimens are made if necessary, classified and preserved. Manuals for classification and evaluation are made and used. (including those for analytical equipment) Crop descriptors of major crops are made and used. No. of accessions characterized and evaluated Workshops for evaluation</p> <p>Manuals for preservation and multiplication (including those for seed processing after harvest and germination test) are made and used. No. of accessions multiplied No. of accessions preserved in long-term and short-term storage Utilization (freq.) of Seed Storage facilities Adequate maintenance system of seed storage facilities Maintenance manuals for seed storage facilities</p> <p>Databases on passport data and evaluation data Manuals for data processing Publishing Catalogs of plant genetic resources and Annual Reports</p> <p>Seminars and workshops for public relations</p> | <p>Plan Manuals Scientific report.</p> <p>Use record of equipment Annual report</p> <p>Plant specimen</p> <p>Manuals Crop descriptors Annual report Record of workshop (Annual report) Manuals</p> <p>Annual report Annual report</p> <p>Maintenance record Manuals</p> <p>Databases Manuals Catalogs published Annual reports published</p> <p>Record of workshop (Annual report)</p> | <p>Seed Bank staffs cooperate well with CARI divisions, other research institutions, organizations and farmers.</p> |

| Activities | Inputs | | Facilities and equipment are maintained properly |
|--|---|---|--|
| <p>1) Exploration and collection</p> <p>(a) Exploration planning</p> <p>(b) Field survey and collection</p> <p>(c) Distribution map making</p> <p>(d) Pest control of seeds introduced</p> <p>(e) Isolation and purification</p> <p>2) Classification and evaluation</p> <p>(a) Classification and identification of samples</p> <p>(b) Establishment of methodologies and standards for evaluation</p> <p>(c) Evaluation of samples conserved ex-situ</p> <p>(d) Evaluation of samples collected</p> <p>3) Preservation and multiplication</p> <p>(a) Multiplication of samples collected</p> <p>(b) Establishment of samples collected</p> <p>(c) Germination test of seeds</p> <p>(d) Rejuvenation</p> <p>4) Data management</p> <p>(a) Standardization of data</p> <p>(b) Design of information system</p> <p>(c) Construction of data base</p> <p>(d) Cataloging</p> <p>5) Exchange of genetic resources and information</p> <p>(a) Training</p> <p>(b) Preservation of exchange system for genetic resources and information</p> | Japan | Myanmar | Trained personnel continuously works in Seed Bank. |
| | <p>Personnel</p> <p>Long-term experts</p> <p>Leader</p> <p>Coordinator</p> <p>Expert for classification and evaluation</p> <p>Expert for preservation and multiplication</p> <p>Short-term experts on demand</p> <p>Provision of technical equipment</p> <p>CP training in Japan</p> <p>Local cost assistance</p> | <p>Personnel</p> <p>Project manager</p> <p>CP for coordination</p> <p>CP for classification and evaluation</p> <p>CP for preservation and multiplication</p> <p>Staffs for general affairs and project operations</p> <p>Provision of Facilities</p> <p>Budget allocation</p> <p>Allocation of counterpart personnel</p> <p>Procurement of fixtures and necessary consumables</p> | |

APPENDIX-11 Organization chart

< Ministry of Agriculture & Irrigation >

