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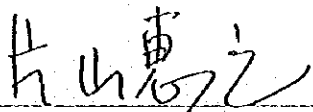
MINUTES OF UNDERSTANDING OF THE JOINT EVALUATION  
ON THE JAPANESE TECHNICAL COOPERATION  
FOR THE SEED POTATO MULTIPLICATION AND TRAINING PROJECT  
IN THE REPUBLIC OF INDONESIA

With about five months left until the termination of the cooperation period of "The Seed Potato Multiplication and Training Project" (hereinafter referred to as "the Project") on September 30, 1997, which started on October 1, 1992, as stated in the Record of Discussions (hereinafter referred to as "R/D"), the Japanese Evaluation Team organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Keishi KATAYAMA visited the Republic of Indonesia in order to conduct an overall review and evaluation of the performance of the Project. In order to achieve this, a Joint Evaluation Team was formed consisting of the aforementioned Japanese and a Indonesian Evaluation Team headed by Ir. SUBIYANTI SA'UD.

The teams conducted interviews with the Japanese experts and the Indonesian counterparts assigned to the project, had a series of discussions with the Indonesian authorities concerned, made field surveys and exchanged views among themselves.

Ir. Amrin Kahar, Director General of Food Crops and Horticulture, Ministry of Agriculture, received and agreed the joint evaluation report which is submitted by teams (attached hereto).

Jakarta, April 17, 1997



Mr. Keishi KATAYAMA  
Leader  
Japanese Evaluation Team



for Ir. Amrin Kahar  
Director General of  
Food Crops and Horticulture,  
Ministry of Agriculture

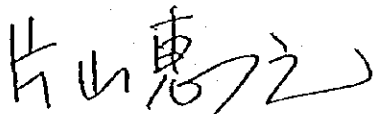
MINUTES OF EVALUATION RESULTS OF THE JOINT EVALUATION TEAM  
ON THE JAPANESE TECHNICAL COOPERATION  
FOR THE SEED POTATO MULTIPLICATION AND TRAINING PROJECT  
IN THE REPUBLIC OF INDONESIA

With about five months left until the termination of the cooperation period of "The Seed Potato Multiplication and Training Project" (hereinafter referred to as "the Project") on September 30, 1997, which started on October 1, 1992, as stated in the Record of Discussions (hereinafter referred to as "R/D"), the Japanese Evaluation Team organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Keishi KATAYAMA visited the Republic of Indonesia in order to conduct an overall review and evaluation of the performance of the Project. In order to achieve this, a Joint Evaluation Team was formed consisting of the aforementioned Japanese and a Indonesian Evaluation Team headed by Ir. SUBIYANTI SA'UD

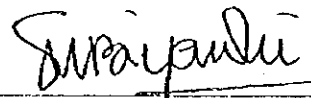
The teams conducted interviews with the Japanese experts and the Indonesian counterparts assigned to the project, had a series of discussions with the Indonesian authorities concerned, made field surveys and exchanged views among themselves.

As a result, both teams agreed to forward to their respective Governments a summary of the evaluation and recommendations which are referred to in the document attached hereto.

Jakarta, April 17, 1997



Mr. Keishi KATAYAMA  
Leader  
Japanese Evaluation Team



Ir. SUBIYANTI SA'UD  
Leader  
Indonesian Evaluation Team

**JOINT EVALUATION REPORT  
ON THE JAPANESE TECHNICAL COOPERATION  
FOR  
THE SEED POTATO MULTIPLICATION AND TRAINING PROJECT  
IN  
THE REPUBLIC OF INDONESIA**

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## 1. INTRODUCTION

Agriculture is the most important sector in the Republic of Indonesia (hereinafter referred to as "Indonesia") and nearly half of the working population is involved in agriculture. Since self-sufficiency in rice production was attained in 1984, the Government of Indonesia has been planning to increase production of other staple food crops such as potatoes and soybeans. However, using poor quality seed potato, low-level cultivation techniques and so on has caused a low yield of potatoes (10ton / ha). The cooperation program between Government of Indonesia and Government of Japan was conducted for increasing potato production in Indonesia.

### (1) Dispatch of experts

A total of four (4) Japanese experts have been dispatched to Lembang Horticulture Research Institute (LEHRI) since 1985. They transferred basic techniques related to virus-free seed potato and multiplication methods.

### (2) Development study

In 1986, the Government of Indonesia requested the formulation of the master plan entitled "Multiplication and Distribution of Improved Soybean and Seed Potato" to the Government of Japan and conducted a field survey.

### (3) Grant Aid Program

The Government of Indonesia requested grant aid program for "Multiplication and Distribution of High-quality Seed Potato Project" to Government of Japan. Government of Japan equipped for LEHRI, BBI, BBU and BPSB in 1991 to 1992.

### (4) Project-type technical cooperation

The Government of Indonesia requested technical cooperation to the Government of Japan which is aiming at improving technology and management for high quality seed potato (disease-free seeds) multiplication and distribution in West Java, and thus contributing to the increase of potato production in Indonesia.

Both Governments have implemented the Seed Potato Multiplication and Training Project (hereinafter referred to as "the Project") since October 1, 1992. The Project is scheduled to be implemented for five years.

Japanese technical assistance has been provided to support the following main activities.

#### 1 To establish technology for multiplication of good quality seed potato

##### (1) Inspection techniques for basic seed potato at LEHRI/RIV

1) Improvement of inspection techniques

2) Introduction of new inspection techniques

##### (2) Cultivation techniques and preparation of technical manual for multiplication of quality seed potato at BBI and BBU

1) Improvement of multiplication techniques for basic seed at BBI

2) Improvement of cultivation techniques for foundation seed at BBI

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- 3) Improvement of cultivation techniques for stock seed at BBU
  - 4) Manual preparation for the above mentioned techniques
  - (3) Techniques of post-harvest handling of seed potato at BBI and BBU
    - 1) Improvement techniques of preparation of seed potato before stored
    - 2) Improvement of storage techniques of seed potato
    - 3) Manual preparation for the above mentioned techniques
  - (4) Identification and control techniques of pest and diseases of seed potato at BBI and BBU
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    - 4) Improvement and development of control techniques for pest and other diseases
    - 5) Manual preparation for the above mentioned techniques
  - (5) Strengthening administrative function of BBI and BBU
- 2 To establish a training system at BBI
- (1) Preparation of training manual
    - 1) Planning a training curriculum
    - 2) Preparation of training manual
  - (2) Training of staff concerned and seed potato growers
- 3 To strengthen control and inspection system of quality seed potato in BPSB
- (1) Strengthening inspection and guidance system of BPSB
    - 1) Guiding BPSB staff to seed potato inspection and certification program and propagandizing it to seed potato growers
    - 2) Development of a guideline of BPSB's activities to lead seed potato growers to the inspection program, and implementation
  - (2) Establishment of technique for inspection and identification
    - 1) Improvement of field inspection technique
    - 2) Improvement of inspection and identification technique in laboratory
  - (3) Establishment of inspection standard and preparation of inspection manual
    - 1) Development and review of tentative standards
    - 2) Preparation and review of an inspection manual
  - (4) Strengthening administrative function of BPSB

With the cooperation period about to reach its termination, the Government of Japan and the Government of the Republic of Indonesia conducted a joint evaluation on the achievements of the Project.

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## 2. MEMBERS OF THE JOINT EVALUATION TEAM

### (1) The Japanese Evaluation Team

**Mr. Keishi KATAYAMA: Leader**

Associate Director, Upland Crop Division, Agricultural Production Bureau,  
Ministry of Agriculture, Forestry and Fisheries ( hereinafter referred to as M.A.F.F.)

**Mr. Atsuhiko MENO: Effect on Technical Cooperation**

Deputy Director, Technical Cooperation Division, International Affairs Department,  
Economic Affairs Bureau, M.A.F.F.

**Mr. Hatsuo MIYASAKA: Cultivation/Multiplication**

Planning Officer for Seeds and Seedlings, National Center for Seeds and Seedlings, M.A.F.F.

**Mr. Kinko KURIHARA: Seed Inspection**

Senior Plant Quarantine Inspector, Export and Domestic Quarantine Section,  
Yokohama Plant Protection Station, M.A.F.F.

**Mr. Akiro YAMANAMI: Plant Pathology**

Director, Seed Production and Evaluation Division, Unzen Experimental Farm,  
National Center for Seeds and Seedlings, M.A.F.F.

**Ms. Kanako MORIGUCHI: Technical Cooperation**

Staff, Agricultural Technical Cooperation Division,  
Agricultural Development Cooperation Department, JICA

### (2) The Indonesian Evaluation Team

**Ir. SUBIYANTI SA'UD: Leader**

Head of Bilateral Division, Foreign Cooperation Bureau, Ministry of Agriculture

**Ms. DJUJUK: Effect on Technical Cooperation**

Foreign Cooperation Bureau, Ministry of Agriculture

**Mr. ENDANG: Cultivation/Multiplication**

Staff of Economic Division, BAPPEDA

**Mr. SUTENDI: Seed Inspection**

Staff of Seed Inspection Quality Division, Directorate of Seed Development

**Mr. KASUM: Plant Pathology**

Staff of Food Crops Protection Division, Provincial Agriculture Services, West Java

**Ms. SRIWIJAYANTI YUSUF & Ms. YENNY NURCAHYA. S: Technical Cooperation**

Staff of Foreign Aid Administration Division, Directorate of Planning and Programming,  
Directorate General of Food Crops and Horticulture, Ministry of Agriculture

### 3. OBJECTIVES OF THE EVALUATION

- (1) To make a comprehensive and objective evaluation of the achievements of the Project with regard to the contents of the R/D and other concerned official agreements. The period of the Project subject to evaluation is 5 years from October 1, 1992 to September 31, 1997 (including scheduled activities and output).
- (2) To make recommendations and suggestions to the authorities of the two Governments concerned after the termination of the cooperation period of the Project.
- (3) To use the results and lessons obtained from the evaluation of the Project for cooperation planning and project implementation in similar cases in the future.

### 4. EVALUATION OF THE PROJECT

#### 4-1. ITEMS OF THE SURVEY

The joint evaluation team consisting of the Japanese Evaluation Team and the Indonesian Evaluation Team, conducted an evaluation survey with regard to the following items based on R/D and TSI.:

(1) Project input

1) Japanese Input

- Dispatch of experts
- Acceptance of Indonesian personnel in Japan
- Provision of machinery and equipment
- Supplement funds to cover local costs
- Dispatch of missions
- Other

2) Indonesian Input

- Assignment of counterpart personnel and administrative personnel
- Provision of land, buildings and facilities
- Allocation of recurrent expenses
- Supply and replacement of equipment
- Implementation of security measures
- Other

(2) Project activities and accomplishments

(3) Impact of the Project

(4) Management of the Project

(5) Future plans after the termination of the cooperation period

#### 4-2. EVALUATION METHOD

The evaluation was conducted in terms of an examination of the accomplishments of the Project

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with regard to the items listed in the R/D and the Tentative Schedule of Implementation (hereinafter referred to as "TSI").

## 5. RESULTS OF SURVEY

### 5-1. ACCOMPLISHMENTS IN TERMS OF INPUT

#### 5-1-1. JAPANESE INPUT

##### (1) Dispatch of experts

A total of 11 long-term experts have been dispatched. They include a team leader and coordinator, as well as personnel with expertise in multiplication, cultivation and training, seed inspection and plant pathology.

In line with the R/D and TSI, short-term experts were also dispatched as necessary. At present, 14 short-term experts have been dispatched to Indonesia.

Japanese experts have been dispatched in accordance with the R/D and TSI. Technical transfer has been favorably carried out (Annex 1).

##### (2) Acceptance of trainees

Training of counterparts in Japan started in fiscal year 1992 (the Japanese fiscal year starts on April 1 and ends on March 31, and is hereinafter referred to as "FY"). At present, 18 counterparts have visited Japan to participate in technical training, while two additional counterparts are scheduled to visit Japan as trainees before the end of the Project period. All training has been efficiently implemented according to schedule (Annex 2).

##### (3) Provision of machinery and equipment

Machinery and equipment were provided in order to carry out the Project activities effectively. All equipment and machinery provided or brought by the experts have contributed to the development and enhancement of the activities of the Project. It is also expected that they will contribute further in future development (Annex 3).

##### (4) Supplementary funds to cover local costs

The Japanese side paid part of the Project management cost and local cost for training middle-level technicians and seed growers in order to implement the Project effectively and on schedule.

The supplementary funds provided by the Japanese side are shown in Annex 4.

##### (5) Dispatch of study teams

###### 1) Consultation Study Team

A Consultation Study Team visited the Indonesia from May 26 to June 12, 1993 in order to formulate the detailed activities plan for the Project. The team and the authorities concerned of the Government of Indonesia reached an agreement on the contents of the TSI.

###### 2) Technical Guidance Team (Mid-term evaluation)

A Technical Guidance Team visited Indonesia from July 19 to August 2, 1995 in order to evaluate the activities of the Project over the previous 3 years. This evaluation concluded that the

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activities of the Project were, for the most part, being implemented almost on schedule, so there was no need to amend the R/D and TSI.

## 5-1-2. INDONESIAN INPUT

### (1) Provision of land, buildings and facilities

The Indonesian Government provided land, buildings and facilities required for the Project. The facilities and equipment were donated through a JICA grant aid program in 1991.

### (2) Allocation of budget

Indonesian side allocated 3,340 million Rp for the operational cost, training cost and seed potato production cost to LEHRI/RIV, BPSB, BBI and BBU from 1992 to 1996 (Annex 5).

### (3) Assignment of counterparts and other personnel

Indonesian counterparts and other personnel at LEHRI/RIV, BPSB, BBI and BBU were well assigned to the Project. ( Annex 6).

### (4) Supply and replacement of machinery and equipment

The machinery and equipment are in good condition at present.

## 5-2. PROJECT ACTIVITIES AND ACCOMPLISHMENT

### 5-2-1 To establish technology for multiplication of good quality seed potato

#### (1) Inspection techniques for basic seed potato at LEHRI/RIV

##### 1) Improvement of inspection techniques

The counterparts have understood that shoot apex culture and virus inspections go hand in hand as a technology. Inspections of the cuttings (G0) provided to BBI are being carried out based on production plans to check viruses by ELISA and inoculation tests and roguing abnormal plants in screen house. Transfer of the technology related thereto was finished within the period of activities designated in the TSI. This technology is expected to take firm root.

##### 2) Introduction of new inspection techniques

Basic technology related to the production of anti-serum for use in the detection of viruses was primarily transferred by short-term experts. Thus far, the counterparts have been able to produce antisera against the major viruses (PVX, PVY, and PLRV), extract IgG and conduct ELISA tests. Those antisera produced by LEHRI/RIV are also being used, so it can be concluded that the initial goal of self-sufficiency of antisera has been reached.

#### (2) Cultivation techniques and preparation of technical manual for multiplication of quality seed potato at BBI and BBU

##### 1) Improvement of multiplication techniques for basic seed at BBI

The necessary technology for producing G0 small tuber from G0 cutting in screen house A was transferred to the counterparts, e.g. sterilized compost was secured, cutting technology

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to raise rooting rates was improved, and fertilizer/irrigation technology to promote tuber enlargement, technology to prevent the reinfection of diseases by chemical spraying, and technology for the storage of harvested small tubers was enhanced. With this, the counterparts were able to independently implement cutting cultivation according to plan. In accordance with the G0 cutting self-sufficiency plan, cutting was obtained from G0 small tuber in screen house A, technology for the production of G0 tuber was learned, and the technology for loading it onto the production line was improved.

The counterparts were able to independently produce G1 in screen house B with the transferred technology related to soil disinfecting, planting, prevention of aphid and soil borne pests and diseases, water and chemical application suited to the production of potatoes, foliage cutting and harvesting, storage, and hastening of germination. Thus, it is confirmed that the initial objectives were achieved.

#### 2) Improvement of cultivation techniques for foundation seed at BBI

The counterparts were able to independently cultivate foundation seed with transferred technology related to the study of cultivation techniques at surrounding farms, preparation of planting fields (e.g. preparation of seed environment, soil analysis, introduction of crop rotation system), planting (e.g. fertilization, production technology for small-sized potato tubers), management (e.g. intertillage, weeding, earthing up). Thus, it is confirmed that the initial objectives were achieved.

#### 3) Improvement of cultivation techniques for stock seed at BBU

The counterparts were able to independently cultivate stock seed with transferred technology related to preparation of planting fields (e.g. preparation of seed environment, introduction of crop rotation system), planting (e.g. fertilization, cultivation intensity) and management (e.g. intertillage, weeding, earthing up). Thus, it is confirmed that the initial objectives were achieved.

#### 4) Manual preparation for the above mentioned techniques

A production manual, was prepared for screen house cultivation, foundation stock seed production and stock seed production. Thus, it is confirmed that the initial objectives were achieved.

### (3) Techniques of post-harvest handling of seed potato at BBI and BBU

#### 1) Improvement techniques of preparation of seed potato before stored

The counterparts were able to independently conduct tuber inspection ahead of BPSB with the transferred technology related to the establishment of a harvest period through yield survey, foliage cutting and selection (e.g. determination of standards, selection time and techniques). Thus, it is confirmed that the initial objectives were achieved.

#### 2) Improvement of storage techniques of seed potato

The counterparts were able to process seed potato at pre-storage, storage, and pre-planting stages in a manner that protected the seed potato from insect pests, with the transferred

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technology related to potato storage techniques (e.g. storage place, amounts) and pre-planting (e.g. selection, disinfection and hastening of germination). Thus, it is confirmed that the initial objectives were achieved.

### 3) Manual preparation for the above mentioned techniques

A production manual on yield studies, foliage cutting, selection, storage and potato disinfectant techniques was prepared. Thus, it is confirmed that the initial objectives were achieved.

### (4) Identification and control techniques of pests and diseases of seed potato at BBI and BBU

#### 1) Improvement of inspection techniques for basic seed at BBI

The counterparts were able to independently distinguish basic seeds cultivated at screen houses A and B with the naked eye and screen them for viruses through ELISA tests and inoculation tests with related transferred technology. Thus, it is confirmed that the initial objectives were achieved.

#### 2) Improvement and development of identification and inspection techniques for foundation and stock seed

At BBI and BBU, most of the potato pests that were forecasted appearance have been breaking out during the project period. The counterparts tried out their identification and inspection techniques on these pests. Thus, it is confirmed that the initial objectives were achieved.

#### 3) Improvement and development of control techniques for virus diseases at BBI and BBU field

In each production period, the counterparts accurately prepared a seed environment (through crop rotation, removal of solanaceae plant, and control of volunteer), rogued the infected plants, and controlled the virus vectors through the spraying of chemicals. At BBI, tests were conducted on the control of aphid using traps. As a result, very few virus diseases emerged and control techniques took firm root. Thus, it is confirmed that the initial objectives were achieved.

#### 4) Improvement and development of control techniques for pest and other diseases

The bacterial diseases are bacterial wilt, soft rot and common scab. Fungal diseases are late blight, early blight and dry rot. The nematode is root knot nematode. Insect pests include potato tuber moth and leaf miner. The greatest damage is caused by bacterial wilt, root knot nematode and potato tuber moth. Bacterial wilt occurs most frequently during rainy season at BBU, where the soil is contaminated. With the instruction of experts, the counterparts understood the deep roguing of infected plants and the lowering of bacteria concentrations through crop rotation and letting bare fallow during dry season.

Root knot nematode occurred at BBU and BBI, and guidance is being provided on control techniques through the introduction of nematode-antagonistic plants. Damage from potato tuber moth is being avoided through the establishment of storage facilities and promotion of

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proper storage management.

As for the control of soil-borne diseases and nematode, it is confirmed that the initial objectives were achieved because the transfer of basic technology has been completed. With regard to the diseases and pests that are currently infesting the fields, the continuation of control measures by the counterparts in the future is expected to resolve this problem. However, as for the root-knot nematode which have not been yet completed the identification and inspection, there is a need for watching the result of control techniques which are testing at present. It is anticipated that potato pests which have not yet broken out or unconfirmed are still in existence.

In the future, when the full-scale production of seed potato is conducted there is a need for practical control techniques.

Thus, from the perspective of a stable supply of virus-free seed potato, counterparts have need to acquire practical control techniques.

#### 5) Manual preparation for the above mentioned techniques

Though it is necessary to examine the damage caused by soil borne diseases and nematode, like a root knot nematode, which was not estimated at the time of formulation of TSI, a spray calendar has been prepared for most of the pests and diseases and is being utilized. Thus, it is confirmed that the initial objectives were achieved.

#### (5) Strengthening administrative function of BBI and BBU

BBI and BBU, established as technical institutions for the multiplication of seed potato, now produce and distribute high-quality G2 and G3 seeds, respectively. The sense of responsibility among the staff who carry out the work of these institutes has also been improved.

A working manual has already been prepared to implement each organization's activities smoothly. BBI and BBU are able to organize the meeting with the administrative organization, to promote their activities.

Thus, it is confirmed that the initial objectives were achieved.

#### 5-2-2 To establish a training system at BBI

##### (1) Preparation of training manual

###### 1) Planning a training curriculum

The counterparts prepared a training plan and curriculum based on the plans of the provincial agriculture service, and are conducting training. Thus, it is confirmed that the initial objectives were achieved.

###### 2) Preparation of training manual

A training text has already been prepared. A training manual is currently under preparation, and is expected to be finished by the end of the project. Thus, it is confirmed that the initial objectives would be achieved.

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## (2) Training of staff concerned and seed potato growers

Basic and technical training for concerned staff (e.g. BBI, BBU, BPSB, Dinas) and basic and practical training for seed growers was conducted 31 times (534 participants) since the beginning of the project. The implementation of training at BBI is thought to have taken firm root because counterparts gave these lectures. Thus, it is confirmed that the initial objectives were achieved.

### 5-2-3 To strengthen control and inspection system of high quality seed potato in BPSB

#### (1) Strengthening inspection and guidance system of BPSB

##### 1) Guiding BPSB staff to seed potato inspection and certification program and propagandizing it to seed potato growers

The counterparts sufficiently understand the inspection and certification programs, are able to manage and operate them, and have reached the level where they can independently hold meetings on potato inspections and training for BPSB staff, concerned organizations and seed growers. Non-counterpart staff and branch inspection officers do not yet sufficiently understand the systems and inspection techniques, so they are not yet considered capable of conducting independent inspections. However, the inspection and certification systems can be managed and operated adequately under the leadership of the counterparts. Thus, it is confirmed that the initial objectives were achieved.

While some seed growers do not have an adequate understanding of the inspection system, the counterparts and field inspection officers understand the necessity to promote understanding and are providing (and plan to continue providing) guidance at training sessions on seed production, and at the time of field inspections and tuber inspections. Thus, it is confirmed that the initial objectives were nearly achieved.

##### 2) Development of a guideline of BPSB's activities to lead seed potato growers to the inspection program, and implementation

Provisional guidelines were prepared for BPSB's activities to lead seed growers. The guidelines are being used in practice and revised to meet the actual circumstances. Thus, it is confirmed that the initial objectives related to the preparation of guidelines were achieved.

Counterparts and field inspection officers are providing guidance through the discussion of diseases and insect pests control at training sessions and the time of field inspections and tuber inspections to seed growers. Thus, they began to trust these inspection system and it is confirmed that the initial objectives were nearly achieved.

However, there are some seed growers who can not understand seed potato cultivation and inspection and certification systems sufficiently because the seed growers have limited experience on seed potato cultivation and BPSB has not enough time sufficiently extended related know how. As a result, re-inspection and inspection failures have occurred and some growers are concerned about a drop in the quality of products. BPSB is expected to continue to provide guidance in the future. Thus, from the perspective of a stable supply of high-quality seeds, it is expected that carrying out effective guidance with enhancement of linkages in concerned organizations.

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## (2) Establishment of technique for inspection and identification

### 1) Improvement of field inspection technique

The counterparts have undergone various training on how to distinguish diseases under different conditions, e.g. field inspections, tuber inspections, general field pest inspections, continued observation of diseases in next-generation monitoring fields, and survey of seed potato in the market. As a result, inspection techniques (ability to distinguish diseases and insect pests and to determine whether there is an accurate match or not) have improved.

While further training is necessary, it is confirmed that the initial objectives related to the overall level of inspection techniques were achieved.

### 2) Improvement of inspection and identification technique in laboratory

The identification of viruses (PLRV, PVS, PVX, PVY), bacteria (bacterial wilt, soft rot, common scab), fungi (late blight, early blight, dry rot), insect pests (aphid, potato tuber moth, thrips, leaf miner) and root-knot nematode, using ELISA, inoculation tests, culture and microscope techniques become possible. In terms of identifying viruses, it becomes possible for BPSB to extract IgG from antisera made by LEHRI/RIV, so these techniques are expected to take firm root.

## (3) Establishment of inspection standard and preparation of inspection manual

Provisional inspection standards were prepared in November 1993 and used for inspections thereafter. These were revised as part of the project, however, to adapt them to the actual circumstances. Trials were also conducted as part of the project. Thus, it is confirmed that the initial objectives were achieved.

### 1) Development and review of tentative standards

Provisional inspection standards were prepared in November 1993, then a part of the standards were revised in December 1996 and actually used in practice. In the future, BPSB will assume responsibility for preparing data for revision of these standards to actual circumstances and had already transferred these techniques. Thus, it is confirmed that the initial objectives were achieved.

### 2) Preparation and review of an inspection manual

An inspection manual was prepared in March 1995 after preparation the standards in 1993. Further it was looked at again along with the revised standards in December 1996. Thus, it is confirmed that the initial objectives were achieved.

## (4) Strengthening administrative function of BPSB

The policy has been outlined which calls for BPSB staff to work full time at the laboratory (not take on side work), in order to ensure the functions are carried on in the future. To make sure that the inspection and certification systems take firm root and function appropriately, BPSB took the initiative to invite concerned organizations and production groups to a meeting to discuss relevant issues. BPSB is now able to play a leadership role in this area. Furthermore, the Instruction for Seed Potato Inspection and Certification Program

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was drafted outlining the criteria for passing inspections, inspection application procedures (for farmers), and inspection methods (for inspection officers). The preparation of related draft is also underway among other activities to lead to the strengthening of administrative functions. Thus, it is confirmed that the initial objectives were achieved.

## 6. RESULT OF EVALUATION

### 6-1. EFFECTIVENESS

According to above result of activities, accomplishment of the Project is mentioned below.

The model of seed potato multiplication system was established in West Java. The counterparts are able to carry out production according to plan with the transferred technology related to the cultivation, multiplication and seed inspection of virus-free seed potato. In addition, BPSB and BBI are able to provide guidance to seed growers. In this way, the seed potato multiplication system is taking firm root in West Java. Thus, it is confirmed that the initial objectives were nearly achieved.

In the area of pests and diseases control and seed growers, cultivation techniques, it is remained to have to make a further effort by the Indonesian side. However, as for the pests and diseases control guidance on letting bare fallow and on the introduction of nematode-antagonistic plants is taking place. With the transferred technology, the Indonesian side is expected to make improvements through continued efforts in the future.

As for some seed growers, they only have a limited understanding of seed inspection systems at present. As the training activities of BPSB and BBI have taken firm root, however, improvements are expected over the long term through continued efforts on the Indonesian side.

Even though, outside the scope of this project's activities, there are recognized problems in correcting and facilitating the distribution of seeds once they have left from BBU. Through guidance of Ministry of Agriculture and the Governor of West Java province to the seed distribution and handling organizations, however, these problems are expected to be resolved in the future by the Indonesian side.

### 6-2. PROJECT IMPACT

#### 6-2-1. IMPACT

##### (1) Technical impact

Through the guidance of experts and training in Japan, the counterparts have gained an awareness of the importance of virus-free seeds in potato production and the maintenance of a good seed environment. In addition, they have understood the importance of linkages in related areas, such as multiplication, inspection and administration in seed production.

Besides it, as potato growers have recognized that they can expect high production using high quality seed potato, they have been introducing high quality seeds as an important factor in potato production system.

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## (2) Institutional impact

Through project activities and the planning and leadership of the Ministry of Agriculture and West Java provincial government, an excellent system for the multiplication of seed potato (LEHRI/RIV-->BBI-->BBU-->seed growers) has been established in West Java. The seed inspection system is linked with this multiplication system, and an inspection and certification system, under which seed potato that have passed inspection criteria are approved by the government, has been set up.

## (3) Economic impact

Indonesia has traditionally had to rely on expensive imported potatoes (4,000Rp/kg), but the establishment of a multiplication system under this project has made it possible to supply seed potato of equal quality to ordinary farmers at half the price and to gain high productivity. In the future, if Indonesia is able to expand its potato yield to meet demand, it is expected that economical implementation at national level by conserving foreign currency through a reduction in seed imports and increased potato production.

## (4) Social and cultural impact

Potato seed growers who obtained high quality seed potato production technology with seeing and touching real cultivation and demonstration can understand the importance of suitable cultivation techniques. They can also try to absorb new technology positively and extend their technology to surrounding ordinary farmers.

In addition, farmers in the region can recognize the importance of high quality seed potato through mass media such as newspaper and television on each opportunity such as seed potato distribution ceremony.

Concerning person in Indonesian side especially counterparts are now gaining their confidence by establishing high quality seed potato supply system by themselves.

## (5) Environmental impact

The staff engaged in potato cultivation have started to understand that minimizing the applications of agricultural chemicals is useful both in terms of management and for the prevention of environmental pollution. There is also an increasing awareness of the importance of observing proper use of chemicals to promote the health and safety of the field workers.

## 6-2-2. EXTENT OF IMPACT

### (1) Project level

The direct beneficiaries of this project are the counterparts. The counterparts received direct technical guidance from the Japanese experts, underwent further training in Japan on necessary technology, and are now able to put their skills into practical use. In addition, the technical level of staff at the project site has improved under the leadership of the experts and counterparts. In the end, seed growers learned seed potato production technology by participating in training and receiving guidance from officers at BPSB, testifying to the spread of project results.

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## (2) Sector level

The staff of the Directorate of Seed Development at the Ministry of Agriculture and the Food Crops Agriculture Service of West Java, who are in charge of planning and managing the multiplication and distribution of high quality seed potato, have improved their administrative skills through their work and the advice of experts, and the continuation of multiplication projects after completion of the Japanese cooperation is expected.

## (3) Regional level

Seeds produced under the multiplication system of the project are sold at a low price to ordinary farmers in the province, so as seed renewal is promoted, income will be increased and the livelihood of growers will be improved. At present, however, the supply is insufficient, and there is a need to expand production to meet demand in the future.

## (4) Macro level

The fact that the way to self-sufficiency in high quality seed potato has been opened in West Java gives hope to five other potato-producing provinces in the country. The Ministry of Agriculture has already hammered out a plan for the establishment of a system for the multiplication of seed potato nationwide.

### 6-3. EFFICIENCY

Japanese inputs (expert dispatch, training, equipment) have basically been carried out according to plan, leading to the smooth implementation of the project. There was a period of about 6 months for which no long-term expert in the area of seed inspection was present. Japanese government dispatched a short-term expert for about two months in response, so the initial objectives were achieved.

The fact that the Indonesian side made adequate arrangements in terms of facilities, buildings, staff and budgeting also contributed to the facilitation of project activities.

### 6-4. RATIONALE

The master plan of the Project was formulated under the upper development program; The fifth five-year development plan, and the later part of the project has been implemented under the sixth five-year development plan. However, the objective of the Project which is aiming at improving technology and management for high quality seed potato multiplication and distribution in West Java and thus contributing to the increase of potato production in Indonesia is sufficiently agreeable to the objective of the sixth five-year development plan; quality improvement of human resources on agriculture and life of farmer by diversification of agriculture, effective use of resources, sustainable agricultural technology and promoting value of agricultural products. Thus, it is confirmed the plan of the Project was rationale.

### 6-5. PROSPECTS FOR SUSTAINABILITY

#### 6-5-1. PROSPECTS FOR INSTITUTIONAL SUSTAINABILITY

##### (1) Implementing agency

LEHRI/RIV and BPSB belong to the Ministry of Agriculture and BBI and BBU belong

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to the provincial government in West Java. After the termination of this Project, these organization will continue present activities and retain organizational stability.

(2) Operation and management system of this Project

The management system of the high quality seed potato multiplication program was clarified at the start of the Project. The Ministry of Agriculture and Provincial government of food crops agriculture service are the implementing organizations, and they manage the personnel, budget and works of each concerned organization (The Ministry of Agriculture is LEHRI/RIV, BBI and BPSB, provincial government is also BBI). Furthermore, the Ministry of Agriculture provides policy guidance to the provincial government, as the central government.

BBU is strongly supervised by the provincial government while maintaining its self-supporting accounting system as a public corporation. These management systems will not be changed. They will continue after this Project.

(3) Reorganization

The Ministry of Agriculture reorganized from Directorate General of Food Crops Agriculture (DGFCA) to Directorate General of Food Crops and Horticulture (DGFCH) and established Directorate of Seed Development in DGFCH in September 1993. Directorate of Seed Development is in charge of the project in spite of Directorate of Horticulture Production Development to enhance the system of seed potato production.

Provincial government of food crops agriculture service was reorganized and responsibility of horticulture seed production section was established in 1995. There is no plan to reorganized at present.

## 6-5-2. PROSPECTS FOR FINANCIAL SUSTAINABILITY

(1) Necessary expenses

BBU has not yet gained any charge on foundation seeds because, up to now, the payment of foundation seed distributed from BBI to BBU is under discussion between BBI and BBU. However, BBI can supply the foundation seeds with official price determined by the Minister of Agriculture from now on. Therefore BBI will be able to expect to gain necessary collateral budget from the Central Government for selling the foundation seeds. Concluding from present yield, it will be possible to raise the necessary expenses.

BBU has a self-supporting accounting system and stock seed is charged. Delayed collection of the charge on stock seeds is now improved, and, thus, it is possible to cover the necessary expenses.

Training and seed inspection costs are covered under the public budget.

(2) Stable public assistance

There are no problems related to personnel and facility maintenance expenses. It is expected that the Ministry of Agriculture will secure necessary funds for the training because their recognition of its necessity for development of successors and improvement of seed growers's technologies.

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**(3) Expenses collection by self-funding system**

At present, only BBU have an income from seed selling. But it can not make a profit from small amounts of distribution because of diseases and pests in the soil. It is expected that they must continue to control diseases and pests to make a profit.

BBI can get a collateral budget for selling foundation seeds after the Project. It will be possible to make a profit with keeping present amount of distribution.

**(4) Necessity and validity of recurrent cost**

When the expensive precision instrument, like a ultra centrifugal separator, supplied by Japan, break down, it will be difficult to cover the repair costs. Training costs are the biggest concern with respect to management cost, but it is expected that the Ministry of Agriculture will secure necessary funds because of their recognition of the necessity of developing the successors.

**6-5-3. PROSPECTS FOR PHYSICAL AND TECHNOLOGICAL SUSTAINABILITY**

**(1) Contents of technical transfer and appropriateness of a technical level**

It is concluded that dispatched long-term and short-term experts were appropriate. Especially in the case of short-term experts, some of them met again with counterparts as supervisors for the counterpart training program in Japan. Under each arrangements, the technical transfer to counterparts from the experts went smoothly. Transferred technologies in the field of multiplication, cultivation and seed inspection are appropriate, because the Japanese experts tried to transfer the adoptable technologies to actual Indonesian circumstances.

**(2) Stability of transferred technique**

Most of the counterparts concentrated on their activities and rarely moved to other organizations. After the Project, there are no plans to change this stance. It is expected that transferred techniques will be sustained and developed further.

At BBI, counterparts give a lecture in training to farmers and other staff. Through their activities, transferred techniques will be accumulated.

**(3) Maintenance of equipment and materials**

Indonesian counterparts maintain the supplied equipment and materials in good condition, and it is expected that there will be no problems if maintenance and management of equipment is turned over to the Indonesian side. Each facility is now making an effort for preserving the equipment from stealing such as anti-thief alarm system. It is necessary to continue to maintenance of facility and equipment precisely.

**(4) Development of successors**

There is no program for staff development, but there are a Project-assisted training program and study meeting for staff at BBI.

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#### 6-5-4. RESTRICTION FACTOR FOR MANAGEMENT

Weakness of budgetary base of each institutions has not a little influence for establishing proper multiplication system by well planed seed potato production.

Delayed planting or insufficient pests control were obliged to occur, in BBI, by delayed budgetary proceeding from Ministry of Agriculture and West Java province, and, in BBU, by delayed collection of money for selling stock seeds.

Some seed growers could not afford to prepare necessary materials for proper production due to financial difficulties.

### 7. CONCLUSIONS AND RECOMMENDATIONS

#### 7-1. SUMMARY OF EVALUATION

The Project accomplished the major activities laid out in the R/D and TSI. It is expected that most of the activities will be completed at the end of this Project period in September 1997.

Furthermore, in the area of disease and insect pest control and improvement of cultivation technology of seed growers, it is remained some problems for further improvement of high quality and productivity of seed potato. Even though, it is promised that some unaccomplished activities will be accomplished with good results by the continuous activities and guidance of the Indonesian counterparts, because basic technical transfer was achieved. Thus, the Project will be finished at the termination of the cooperation period of the Project

The team hopes to extend the results of the Project not only to farmers in West Java but throughout Indonesia.

#### 7-2. RECOMMENDATIONS

The Evaluation Team requests that the Government of Indonesia maintain and extend the results of the Project as follows.

- 1) For establishing and confirming high quality seed potato multiplication system, it is most important to produce potatoes precisely from basic seed (G0) to seed potato (G4) under well organized plan. After the termination of the Project, it is necessary to establish production plan based on medium to long term vision, to inform the plan to the related institutions broadly and to strengthen the relationship of concerned institutions. Therefore it is expected to strengthen administrative function of related institutions, especially Ministry of Agriculture and Dinas, for establishing the plan and managing production program.
- 2) Technical level of concerned institutions has been improved remarkably through implementation of the Project. It is expected that the knowledge and experience acquired in the institutions should be utilized for further development of potato production not only in West Java but also whole Indonesia. Especially, since BBI and BPSB are expected to play great role for improvement of seed potato production technology in Indonesia, increasing financial and personnel support from Ministry of Agriculture and Dinas are strongly anticipated.
- 3) For reconsideration of tentative inspection standard planed to be conducted in the future, it

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should be very important to evaluate seed production situation and seed quality precisely.

- 4) To be thorough in the introduction of nematode-antagonistic plants to reduce the root knot nematode at BBI.
- 5) To execute crop rotation including fallow as a countermeasure of bacterial wilt at BBU.
- 6) Surrounding environment of seed potato fields in BBI and BBU should be renovated for ideal production. Besides it, sufficient investigation for sustaining proper reproduction such as irrigation facility in BBU should be well conducted.
- 7) To continue enlightenment activities for seed production farmers to obtain an understanding of the seed inspection system.
- 8) To promote proper and smooth management for seed circulation organizations in order to extend high quality seed potato technology to farmers of West Java .
- 9) To grasp financing perspectives for seed potato production and distribution including farmers level, and taking a necessary measures with transition from preparation stage to real production stage. Financial support such as low interest loan to seed growers and advice system on financial support should be strengthened.
- 10) To establish seed potato supply system to meet demand of ordinary potato farmers in the whole of Indonesia.
- 11) International seminar on potato production using high quality seed will be conducted in July, 1997 as an important activity of the Project under the collaboration with the United States of America. The seminar will be held as an activity of U.S.-Japan Common Agenda using experience and out-put of the project. It is expected the fully support from the Government of Indonesia for the seminar which can impact on whole potato production in Indonesia.

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Annex 1

Assignment of Japanese Expert

Fiscal Year	1992 (H.4)	1993 (H.5)	1994# (H.6)	1995 (H.7)	1996 (H.8)	1997 (H.9)
	4.7.10	4.7.10	4.7.10	4.7.10	4.7.10	4.7.10
	1 Oct. '92	1 Oct. '92	1 Oct. '92	1 Oct. '92	1 Oct. '92	1 Oct. '92
	Dr. Satoru TANAKA (Team leader)					
	25 Sep. '95 Dr. Hisahiro HORIO 30 Sep. '97					
	1 Oct. '92	Mr. Tadafumi AOKI (Multiplication) 30 Sep. '94				
	1 Oct. '92	11 Janu. '95 Mr. Shigeru YATSU 30 Sep. '97				
	1 Oct. '92	Mr. Keizo HIGASHIYAMA (Outs. & Training) 30 Sep. '94				
	1 Oct. '92	13 Sep. '94	Mr. Tadayoshi NAGAISHI 30 Sep. '97			
	1 Oct. '92	Mr. Yoshihisa MATSUBARA (Seed Inspection) 30 Sep. '95				
	1 Oct. '92	26 Mar. '96 Mr. Sumio SAITO 30 Sep. '97				
	1 Oct. '92	Dr. Kazumi KATAYAMA (Plant Pathology) 30 Sep. '97				
	1 Oct. '92	Mr. Tsuyoshi NABETA (Coordinator) 30 Sep. '95				
	1 Oct. '92	18 Sep. '95	Mr. Hiroo NAKANO 30 Sep. '97			
	29 Sep. '93	Mr. I. SAEKI (Seed Inspection)				
	16 Janu. '90	Mr. A. SUZUKI (Diseases Identification)				
	26 July '25	Oct. Mr. T. NISHIKAWA (Seed Cultivation)				
	26 July '25	Oct. Mr. K. TAJIMA (Diseases and Insect-pests Control)				
	20 Oct. '19	Janu. Mr. M. MAKINO (Inspection Method)				
	13 Feb. '20	Mar. Mr. S. SAITO (Seed Inspection)				
	18 Sep. '17	Dec. Mr. N. MIKI				
	17 Oct. '16	Janu. Mr. T. MATTA (Variety Selection)				
	1 Dec. '30	Feb. Mr. S. KOBAYASHI (Post Harvest)				
	10 Janu. '15	Mar. Mr. K. KUME (Field Inspection)				
	18 Sep. '19	Nov. Mr. H. SATO (Training Method)				
	20 Dec. '24	Dec. Mr. T. KAWAKAMI (New Inspection Technique)				
	21 Nov. '20	Feb. Mr. M. YAMASAKI (Small-sized Seed Pomo Production)				
	3 Dec. '28	Feb. Mr. T. TERAMOTO (Pest Control)				

## Annex 2

## List of C/P Training in Japan

Fiscal Year	Name	Place of work	Training subject	Training period	Place of training
1992 (H.4)	1. Ms. Lily Waliyah 2. Mr. Amir Pandji	Directorate of Seed Devel. "	Multiplication System "	24 Mar., '92 - 22 Apr. "	National Centre for S. & S. "
1993 (H.5)	1. Mr. Dadan Supardan 2. Mr. Dedi Ruswandi 3. Ms. Mia Resminti 4. Mr. Eddi Rusbandi	BPSBTPH - I BPSBTPH - I BBI BBI	Inspection General Inspection Technique Multiplication & Cultivation Multiplication & Cultivation	12 July, '93 - 10 Aug. 12 July, '93 - 21 Sep. 12 July, '93 - 5 Oct. 12 July, '93 - 5 Oct.	Yokohama Plant Pro. Sta. Yokohama Plant Pro. Sta. Tumagoi Farm (NCSS) Tumagoi Farm (NCSS)
1994 (H.6)	1. Ms. P. Mariani 2. Mr. Nana Sumarna 3. Mr. Luthfy Achmad 4. Mr. Hary Zuhary	BPSBTPH - I BBI Balisa BBU	Inspection General Multiplication & Cultivation Mul. & Ins. Technology Multiplication & Cultivation	26 June, '94 - 11 Aug. 24 July, '94 - 17 Sep. 24 July, '94 - 28 Oct. 20 Nov., '94 - 17 Dec.	Yokohama Plant Pro. Sta. Tumagoi Station (NCSS) Tumagoi Station (NCSS) National Center for S. & S.
1995 (H.7)	1. Mr. Undang Suwandi 2. Mr. Wawan Suwandi 3. Mr. Suharyono 4. Ms. Sri Lustari Utami	BBU BPSBTPH - I Directorate of Seed Devel. Directorate of Seed Devel.	Seed Potato Cultivation Inspection Technique Multiplication System Multiplication System	2 Aug., '95 - 4 Oct. 2 Aug., '95 - 1 Nov. 12 Nov., '95 - 3 Dec. 17 Mar., '96 - 30 Mar.	Tumagoi Station (NCSS) Yokohama Plant Pro. Sta. National Center for S. & S. National Center for S. & S.
1996 (H.8)	1. Mr. Wawan Wintarasa 2. Mr. Dasep Sudarman 3. Ms. Neni Gunzani 4. Mr. Dedea Rustandi	BBI BBI Balisa BPSBTPH - I	Pests & Diseases Control Multiplication & Cultivation Inspection Technology Field Inspection	14 May, '96 - 11 Aug. 14 May, '96 - 11 Aug. 28 May, '96 - 25 Aug. 11 June, '96 - 11 Aug.	Tumagoi Station (NCSS) Tumagoi Station (NCSS) Hokkaido Chuoh Sta. ( " ) Yokohama Plant Pro. Sta.
1997 (H.9)	1. Mr. Soeroto 2. Mr. Padio Leksono	Directorate of Seed Devel. BPSBTPH - I	Multiplication System Field Inspection		

\* NCSS : National Centre for Seeds and Seedlings

Annex 3

Provision of Machinery and Equipment

(x 1,000 Rupiah)

Fiscal Year	Purchased in Japan	Brought by experts	Purchased in Indonesia	Total
F.Y. 1992 (H.4)	-	53,510 (3,243)	222,421	275,931
F.Y. 1993 (H.5)	395,700 (19,785)	13,920 (696)	459,848	869,468
F.Y. 1994 (H.6)	561,286 (25,513)	40,920 (1,860)	275,233	877,439
F.Y. 1995 (H.7)	232,716 (10,578)	64,834 (2,947)	214,297	511,847
F.Y. 1996 (H.8)	520,000 (26,000)	25,580 (1,279)	78,207	623,787
F.Y. 1997 (H.9)	**240,000 (12,000)	-	-	240,000
Total	1,949,702 * (93,876)	198,764 * (10,025)	1,250,006	3,398,472

\*Figure in ( ) is shown with Japanese Yen.

\*\*This figure is under plan.

Exchange Rate in F.Y. 1992 : 16.5 Rp/Yen

1993 : 20.0 Rp/Yen

1994 : 22.0 Rp/Yen

1995 : 22.0 Rp/Yen

1996 : 20.0 Rp/Yen

1997 : 20.0 Rp/Yen

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TECNICAL COOPERATION EQUIPMENT FISCAL YEAR 1993  
PURCHASED IN JAPAN

¥100,000 <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE	QUANTITY	RECIPIENT					COMPANY NAME	RECEIVED ON
						R	B	U	P	D		
93	93EJ0005	HOMOGENIZER "KEMOTORIKA" Model: 10-80 with Transformer	JAPAN	¥150,000	1 pcs	1						
93	93EJ0018	MEDICAL COOLING CASE "SANYO" Model: MFR-311DR, 220V 50Hz	JAPAN	¥350,000	1 pce	1						
93	93EJ0019	FREEZING BOXES "SANYO" MDF-435	JAPAN	¥340,000	2 pcs	2						
93	93EJ0021	STEREOMICROSCOPE "KEMOTORIKA" Model: 25-2314 (MTr-W), w/Spare lamps (5pcs)	JAPAN	¥374,000	1 pce	1						
93	93EJ0022	SOIL NEMATODE DETECTION KIT "FKK" Model: DF401	JAPAN	¥295,000	1 pce	1						
93	93EJ0026	ELECTRONIC BALANCE "SANSYOU" Model: FA2000, 220V, 50Hz	JAPAN	¥120,000	2 pcs	1	1					
93	93EJ0027	AUTOMATIC METEOROLOGICAL-RECORDING STATION "OTA", Model: DS-801, 220V, 50Hz	JAPAN	¥6,900,000	1 set	1						
93	93EJ0030	SPECIFIC GRAVITY BALANCE "EVERWELL" No. 129, Reimann Type	JAPAN	¥422,000	1 set	1						
93	93EJ0049	MULTI SHAKER "SHIBATA" Model: CMS-10, 220V, 50Hz, with accessories	JAPAN	¥725,000	1 pce	1						
93	93EJ0069	MEDICAL FREEZER "SANSYOU" Model: RS-TS25 with transformer	JAPAN	¥230,000	1 set			1				
93	93EJ0083	MANFOLD DISPENSER SET "DORAMONDO" Cat. No.: 05-3005-90	JAPAN	¥100,000	3 pcs				3			

NOTE: R = RIV  
B = BBI

U = BBU  
P = BPSBTPH-1

D = Dinas Pertanian  
C = Central Office (JICA-SFP)

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TECHNICAL COOPERATION EQUIPMENT FISCAL YEAR 1994  
PURCHASED IN JAPAN

¥100,000 <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE	QUANTITY	RECIPIENT				COMPANY NAME	RECEIVED ON
						R	B	U	P		
94	94EJ0003	ELISA Kit Potato Virus S 649368	JAPAN	¥103,000	9 kits	2	5	2	.	.	Aug 7 95
94	94EJ0004	ELISA Kit Potato Virus X 661368	JAPAN	¥104,000	6 kits	2	2	2	.	.	"
94	94EH0006	SAKUR SHK-420, consist of: - Main unit + transformer - Rotary attachment - Reciprocating attachment OPTIONAL ACCESSORIES: - Universal shaking base; Shku-Tray 400 - Multi-shaking base; Shku-Base 400 - Stick sheet, Shku-Sheet 400 - Cramp; Shku-Cramp 100 - Cramp; Shku-Cramp 300 - Cramp; Shku-Cramp 1000	JAPAN	¥363,900	1 set	1	.	.	.	.	"
		GRAVITY BALANCE - Hand-held Type - Digital Potato Gouge DPG-2.5 - with transformer, AC adapter - Basket (2.5 kg)	JAPAN	¥229,800	2 sets	1	1	1	.	.	"
94	94EJ0008	CUTTING MILL HGB-SS 231320 OPTIONAL ACCESSORIES: - Container, small, SS710 - Automatic Voltage Regulator SCV-1216	JAPAN	¥123,500	1 set	1	.	.	.	.	"

NOTE: R = RIV  
B = BBI

U = BBU  
P = BPSBTPH-1

D = Dinas Pertanian  
C = Central Office (JICA-SPP)

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Technical Cooperation Equipment Purchased in Japan F.Y. 1994

¥100,000 <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE	QUANTITY	RECIPIENT					COMPANY NAME	RECEIVED ON
						R	B	U	P	D		
94	94EJ0009	ULTRASONIC CLEANER 8210-DTH STANDARD ACCESSORIES: - Stainless Bel Base OPTIONAL ACCESSORIES: - Tank Cover - Insert Tray - Insert Tray Hold - Beaker - Beaker Rack - Cleanser, 950 ml x 6 pcs	JAPAN	¥150,000	1 pce	.	.	.	.	.	.	Aug 7.95
				¥350,000	1 pce	.	.	.	.	.	.	"
				¥340,000	2 pcs	.	.	.	.	.	.	"
				¥374,000	1 pce	.	.	.	.	.	.	"
				¥295,000	1 pce	.	.	.	.	.	.	"
				¥120,000	1 set	.	.	.	.	.	.	"
94	94EJ0010	ELECTRONIC BALANCE EB-16KH	JAPAN	¥260,000	1 unit	.	.	.	.	.	.	"
94	94EJ0011	ANALYSIS BALANCE FX-400	JAPAN	¥179,000	2 sets	.	.	2	.	.	.	"
94	94EJ0012	BIOLOGICAL MICROSCOPE EX-50-32000/UTS-B01 (SP), main unit EX-50F - Mirror Tube Body, U-TR30 - Photographing Tube, U-SPT - Revolver, U-SVLDB - Stage, U-SVLDB - Condenser, U-AAC & U-SC - Objective Lens, UPLAPO 4X - Objective Lens, UPLAPO 2 X 2 - Objective Lens, UPLAPO 10x	JAPAN	¥1,409,400	1 set	.	.	.	1	.	.	"
					1 unit	.	.	.	1	.	.	"
					1 pce	.	.	.	1	.	.	"
					1 pce	.	.	.	1	.	.	"
					1 set	.	.	.	1	.	.	"
					1 pce	.	.	.	1	.	.	"
					1 pce	.	.	.	1	.	.	"
					1 pce	.	.	.	1	.	.	"

NOTE: R = RIV  
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8

Technical Cooperation Equipment Purchased in Japan F.Y. 1994

¥100,000 <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE	QUANTITY	RECIPIENT				COMPANY NAME	RECEIVED ON
						R	B	U	P		
94		- Objective Lens UPLAPO 20x	.	.	1 pce	.	.	1	.	.	Aug-7-95
		- Objective Lens UPLAPO 40x	.	.	1 pce	.	.	1	.	.	"
		- Objective Lens UPLAPO 100x	.	.	1 pce	.	.	1	.	.	"
		- Eyepiece, WH 15 x	.	.	2 pcs	.	.	2	.	.	"
		- Eyepiece, WH 35WH 10 x 2	.	.	1 pce	.	.	1	.	.	"
		- Halogen Lamp, 12V 100W	.	.	2 pcs	.	.	2	.	.	"
		- Photography Lens, PE 2.5X	.	.	1 pce	.	.	1	.	.	"
		- Photography Lens, PE 3.3X	.	.	1 pce	.	.	1	.	.	"
		- Photography Lens, PE 5X	.	.	1 pce	.	.	1	.	.	"
		- Spare Halogen Lamp, 12 V 100W	.	.	10 pcs	.	.	10	.	.	"
94	94EJ0013	NEMATODE DETECTION SET	JAPAN	¥260,000	1 set	.	.	1	.	.	"
		- Main Unit, No. 19	.	.	1 pce	.	.	1	.	.	"
		- Upper Sieve, No. 20	.	.	1 pce	.	.	1	.	.	"
		- Bottom Sieve, No. 21	.	.	1 pce	.	.	1	.	.	"
		- Watering Apparatus with Hose, No. 22	.	.	1 pce	.	.	1	.	.	"
		- Soil Sieve, No. 1	.	.	1 pce	.	.	1	.	.	"
		- Soil Sieve, No. 2	.	.	1 pce	.	.	1	.	.	"
		- Soil Sieve, No. 3	.	.	1 pce	.	.	1	.	.	"
94	94EJ0015	MICROSCOPE TABLE VSB-18	JAPAN	¥100,000	3 pcs	.	.	3	.	.	"
94	94EJ0016	MICROSCOPE PHOTOGRAPHING SYSTEM	JAPAN	¥418,000	1 set	.	.	1	.	.	"
		- Model: PM10-AK3-35AC + adapter PM-ADP (1 pce)	.	.		.	.		.	.	
		- Double-Guide Illuminator, LGW-1 + spare lamp (6 pcs)	.	¥140,000	1 set	.	.	1	.	.	"

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Technical Cooperation Equipment Purchased in Japan F.Y. 1994

¥100,000 <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE	QUANTITY	RECIPIENT				COMPANY NAME	RECEIVED ON
						R	B	U	P		
94	94EJ0017	STEREOSCOPIC MICROSCOPE Model: M-TR-W, with accessories: - Spare Lamp 20 WJM - Spare Lamp 6V 15W Hal - Double Light Guide Illuminator LGW-1 - Spare Lamp 15V 150W/WC	JAPAN	¥511,000	1 set	.	1	.	.	.	Aug. 7.95
94	94EJ0018	DESSICATOR 11-607-02 with standard accessories and transformer	JAPAN	¥328,000	1 set	.	.	.	1	.	.
94	94EJ0019	INCUBATOR Model: FIN-800MI with Temperature controller (with sensor)	JAPAN	¥570,000	2 sets	.	.	.	2	.	.
94	94EJ0020	BIOTRON Model: NC-350S with spare parts: - Temperature sensor - Humidity Sensor - Fluorescent Lamp for 40 W - Fluorescent Lamp for 20 W - Start Relay - Power Relay - Start Condenser - Motor Protector - Electronic Thermostat - Fan Motor - Drive Condenser	JAPAN	¥2,457,000	1 set	.	.	.	1	.	.
					1 pce	.	.	.	1	.	.
					1 pce	.	.	.	1	.	.
					32 pcs	.	.	.	32	.	.
					8 pcs	.	.	.	8	.	.
					3 pcs	.	.	.	3	.	.
					3 pcs	.	.	.	3	.	.
					3 pcs	.	.	.	3	.	.
					3 pcs	.	.	.	3	.	.
					1 pce	.	.	.	1	.	.
					1 pce	.	.	.	1	.	.
					3 pcs	.	.	.	3	.	.

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Technical Cooperation Equipment Purchased in Japan F.Y. 1994

¥100,000 <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE	QUANTITY	RECIPIENT							COMPANY NAME	RECEIVED ON
						R	B	U	P	D	C			
94	94EJ0021	WATER BATH TS-200 + Transformer	JAPAN	¥257,500	1 set	.	.	.	1	.	.	.		Aug.7.95
	94EJ0023	ULTRA HI-SPEED CENTRIFUGE	JAPAN	¥11,389,380	1 set	1	.	.	.	.	.	.		
		Model: Ultra-80, with accessories:	.	.	1 pce	1	.	.	.	.	.	.		"
		- Angel Rotor A-1256	.	.	1 pce	1	.	.	.	.	.	.		"
		- Angel Rotor T-1250	.	.	1 pce	1	.	.	.	.	.	.		"
		- Angel Rotor AH-629	.	.	1 pce	1	.	.	.	.	.	.		"
		- Tube 3987, 100 pcs/pack	.	.	1 pce	1	.	.	.	.	.	.		"
		- Tube 3141, 100 pcs/pack	.	.	1 pce	1	.	.	.	.	.	.		"
		- Tube 3989, 100 pcs/pac	.	.	1 pce	1	.	.	.	.	.	.		"
		- Spare parts Kit	.	.	1 pce	1	.	.	.	.	.	.		"
		- Automatic Voltage Regulator, MR-2234	.	.	1 pce	1	.	.	.	.	.	.		"

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4

TECNICAL COOPERATION EQUIPMENT FISCAL YEAR 1995  
PURCHASED IN JAPAN

¥100,000 <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE	QUANTITY	RECIPIENT				COMPANY NAME	RECEIVED ON	
						R	B	U	P			D
95	95E10021	INCUBATOR LIB 301, consumables:	JAPAN	¥747,600	1 set	.	.	.	.	.	10-10-96	
		- Fluorescent Tube		12 pcs	.	.	.	.	.	.	"	
		- Temperature Sensor:		1 pec	.	.	.	.	.	.	.	"
		- Fan Motor		1 pec	.	.	.	.	.	.	.	"
95	95E10025	- Compressor Cooling	JAPAN		1 pec	.	.	.	.	.	"	
		OPTIONAL ACCESSORY: LIB 301 AVR AC20-100V		1 set	.	.	.	.	.	.	"	
		REFRIGERATED CENTRIFUGE CR-21		1 set	¥3,882,360	.	.	.	.	.	.	"
		- Main Body (1)		1 pec	.	.	.	.	.	.	.	"
		- Power Supply Unit (1)	.	.	1 pec	.	.	.	.	"		
		ACCESSORIES:										
		- Rotor Cleaning Bar (1)			1 pec	.	.	.	.	.	"	
		- Silicone Grease (1)			1 pec	.	.	.	.	.	"	
		- Fuse (0.4A) Surge Type (1)			1 pec	.	.	.	.	.	"	
		- Fuse 2A (1), Fuse 25A (1)			1 pec	.	.	.	.	.	"	
		Special Accessories:										
		- Angel Rotor R20A2 (1)			1 pec	.	.	.	.	.	"	
		- Angel Rotor R21A (1)			1 pec	.	.	.	.	.	"	
		- Balancer 500G (1)			1 pec	.	.	.	.	.	"	
		- M PP Lid (20/set) (10) 328353A			10 pcs	.	.	.	.	.	"	
		- 11PA Tube (10/set) (10)			10 pcs	.	.	.	.	.	"	
		- C2-PP Lid (20/set) (5)			5 pcs	.	.	.	.	.	"	
		- Maintenance Spare Parts (1)			1 pec	.	.	.	.	.	"	

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Technical Cooperation Equipment Purchased in Japan F.Y. 1995

¥100,000 <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE	QUANTITY	RECIPIENT					COMPANY NAME	RECEIVED ON		
						R	B	U	P	D			C	
95	95E10027	REFRIGERATED CENTRIFUGE CF-702 - Main Body (1) - Power Supply Unit (1) ACCESSORIES: - Box Reach Set - Fuse - Caster Holder - Nut - Spring Washer Special Accessories: - Swing Rotor RT55A - 15 x 6 Assembly (15 ml x 24 pcs) - 50 x 1 Assembly (15 ml x 4 pcs) - Balancer for Assembly - 15 ml Glass Tube (50 pcs/set) - 15 ml Assembly (10 pcs/set) - 15A Fuse - Rack for 15 ml Glass Tube - Rack for 50 ml Glass Tube - Carbon Brush (2 pcs/set)	JAPAN	1,202,000	1 set 1 pce 1 pce 1 pce 1 pce 1 pce 1 pce 1 pce 1 pce 1 set 1 pce 1 pce 2 pcs 2 pcs 1 pce 1 pce 1 pce 1 set	.	.	.	.	.	.	10-10-96		
95	95E10029	SPECTROPHOTOMETER UV 1201 - Main Body	JAPAN	¥1,272,700	1 set 1 set	.	.	.	.	.	.	.	.	"

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Technical Cooperation Equipment Purchased in Japan F.Y. 1995

¥100,000 < .....

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE	QUANTITY	RECIPIENT					COMPANY NAME	RECEIVED ON			
						R	B	U	P	D			C		
95	95EJ0029	SPECIAL ACCESSORIES: - Copy Printer HCP-1 - Program Pack - Spectrum Program Pack - Protein Analysis Program - Pack and Data Pack - Slit Camera Unit 1601 - 10 mm Square cell - Sample Unit Consumables: - Halogen lamp - D2 Lamp - Fuse 2A - Chart Paper (50roll/set)			1 pce 1 pce 1 pce 1 pce 1 pce 1 pce 4 pcs 1 pce										10-10-96 " " " " " " " " " " " " " "
95	95EJ0041	MICROSCOPE SZ 6045 - Main Body - Stand SZ-ST - Objective Lens GSWH10X - Objective Lens GSWH15X OPTIONAL ACCESSORIES: - Halogen Illuminating Equipment LSGA-3 - AVR Output: 220 Input 160-240	JAPAN	¥176,700	1 set										" " " " " " " " " " " " " " " " "

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¥100,000 <

Technical Cooperation Equipment Purchased in Japan F.Y. 1995

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE	QUANTITY	RECIPIENT				COMPANY RECEIVED ON		
						R	B	U	P		D	C
95	95EJ0047	ROTARY TILLER - S No. 6587 Niplo (Matsuyama) - Model: MX-2402E-3L	JAPAN	\$24,600	1 set	.	1	.	.	.	10-10-96	
95	95EJ0048	SPARE PARTS FOR ROTARY TILLER - 1331-521000 Blade (E2L) - 1331-522000 Blade (E2R) - 1212-202000 Bolt, Nut, Washer for Blade - 1331-129000 Water Seal (AQ7242) - 1331-142000 Water Seal (AQ2688) - 5612-270004 Spider Assy.	JAPAN	¥123,600	39 pcs 39 pcs 150 pcs 1 pcs 1 pc 1 pc	.	39	.	150	.	.	.

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TECHNICAL COOPERATION EQUIPMENT FISCAL YEAR 1992  
PURCHASED IN INDONESIA

Rp. 2,000,000. <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE (RP)	QUANTITY	RECIPIENT					COMPANY NAME	RECEIVED ON	
						R	B	U	P	D			C
92	92EI0001	VEHICLES SUZUKI VITARA (JEEP)	INDONESIA	45.350.000	3 unit	.	.	.	.	3	.	CARAYA MOTOR INDOPERKASA	26-4-93
92	92EI0002	ELECTRONIC TYPEWRITER CANON AP 8100	INDONESIA	2.650.000	4 unit	1	.	.	1	.	1	SAMAETIRO	23-2-93
92	92EI0003	PHOTOCOPIY MACHINE CANON NP2020	INDONESIA	13.823.750	3 unit	.	.	.	1	.	1	.	"
92	92EI0004	COMPUTER - CPU Pringon AT 386 sv. 33 Mhz - 2 MB Super + Hard Disk 40 MB 3,5" conner	INDONESIA	4.587.000	4 unit	.	.	.	1	1	1	PRODATA	3-3-93
92	92EI0005	MONITOR FORTUNE VGA 1A - Card VGA 256 KB	INDONESIA	.	.	.	.	.	1	1	1	.	"
92	92EI0006	PRINTER EPSON LQ 1170 + Cable	INDONESIA	.	.	.	.	.	1	1	1	.	"
92	92EI0007	UPS ELSA 500 Watt + Accu Model: FA2000, 220V, 50Hz	INDONESIA	.	.	.	.	.	1	1	1	.	"
92	92EI0008	RADIO COMMUNICATION: - UHF Transceiver for base station (1 unit = 5 base station)	INDONESIA	\$4.830	5 unit	1	1	1	1	1	.	PT RADIO FREQUENCY COMMUNICA- TION	
92	92EI0009	UHF FM Transceiver for mobile unity	INDONESIA	\$1.925	3 unit	.	.	.	.	3	.	.	

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TECHNICAL COOPERATION EQUIPMENT FISCAL YEAR 1993  
PURCHASED IN INDONESIA

Rp. 2,000,000 <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE (RP)	QUANTITY	RECIPIENT						COMPANY NAME	RECEIVED ON
						R	B	U	P	D	C		
93	92EI0032	ISUZU PANTHER PICK UP. TBR 52 PR Supre L	INDONESIA	29.425.000	2 unit	1	1					TUNAS	
93	93EI0039	DRYING OVEN, ELECTRIC MEMMERT. - Type UM-600 - Chamber: 80 x 64 x 50 cm - 220Volt: 2.400 Watt	INDONESIA	6.100.000	1 set	1						MOBLINDO	
93	93EI0051	REAGENT FOR VIRUS	INDONESIA	8.007.635								PT. ALKIN	June 2, 94
93	93EI0086	WATER STILL GFL MODEL 2001/4 - Made in Germany - Capacity: 4L/hr, 3600 Watt, 220Volt	INDONESIA	2.525.000	1 pec	1						PT. C.M.S.I	June 8, 94
93	93EI0087	ULTRASONIC CLEANER BRANSON 8200-E4	INDONESIA	6.800.000	1 pec				1			PT. C.M.S.I	
93	93EI0105	MOTORCYCLE HONDA GL MAX	INDONESIA	3.850.000	10 unit	3	3	6				DAYADRA MUSTIKA	
93	93EI0129	TYPEWRITER CANON AP-8100	INDONESIA	2.615.000	3 unit	1	1	1				SAMAFTRO	
93	93EI0130	PHOTOCOPY MACHINE CANON NP-2020	INDONESIA	15.517.500	1 unit	1							
93	93EI0131	TOSHIBA NOTEBOOK T1:850C	INDONESIA	4.900.000	1 unit	1						PRODATA	
93	93EI0138	AIR CIRCULATION MIST SPRAY EQUIPMENT	INDONESIA	17.738.000	1 unit				1			PT. PRAPANCA	
93	93EI0139	SIMPLE SCREEN HOUSE	INDONESIA	39.077.000	2 sets							TUNGGAL	
93	93EI0145	SLIDE PROJECTOR KODAK EKTAPRO 3000	INDONESIA	2.750.000	1 unit	1						CV. WNDU	
93	93EI0147	FREEZE DRYER	INDONESIA	32.287.000	1 unit				1			PD. MARCO	May 24, 94
93	93EI0148	MANIFOLD	INDONESIA	13.052.200	1 set				1			PT. C.M.S.I	Aug. 16, 94

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Technical Cooperation Equipment Purchased in Indonesia F.Y. 1993

Rp. 2,000,000. <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE (RP)	QUANTITY	RECIPIENT				COMPANY NAME	RECEIVED ON	
						R	B	U	P			D
93	93EI0150	AMPOULE SEALER W/TREE FLAME	INDONESIA	6,225,000	1 pce	.	1	.	.	.	PT. CMSI	Aug. 16, 94
93	93EI0157	YODOKOH STEEL HOUSE - Type : AZEKURA - Model : YM-17 - H X W X D : 2.07 x 2.914 x 1.862 m	INDONESIA	4,480,000	3 unit	.	1	1	.	.	"	"
93	93EI0163	SHOW CASE/REFRIGERATOR - Capacity : 372 L - H X W X D : 1.850 x 595 x 600 mm	INDONESIA	3,150,000	1 unit	.	1	.	.	.	"	"
93	93EI0164	INCUBATOR LOW TEMPERATURE Type : ICB - 151 L	INDONESIA	7,500,000	3 unit	.	.	.	3	.	"	Aug. 25, 94

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4

TECHNICAL COOPERATION EQUIPMENT FISCAL YEAR 1994  
PURCHASED IN INDONESIA

Rp. 2,000,000. < .....

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE (RP)	QUANTITY	RECIPIENT					COMPANY NAME	RECEIVED ON	
						R	B	U	P	D			J
94	94EI0001	TRACTOR ROTARY R-850 "KUBOTA" Mesin Diesel Kubota RD 85 DI	INDONESIA	7,000,000	2 unit	.	2	.	.	.	KARYA EDUP	Apr. 24, 95	
94	94EI0002	TOYOTA KIJANG LSX-G	INDONESIA	37,400,000	2 unit	1	.	1	.	.	SENTOSA	May 17, 95	
94	94EI0003	MOTORCYCLE HONDA GL MAX 125 CC	INDONESIA	4,600,000	7 unit	.	3	.	4	.	DAYA ADIRA	Apr 4, 95	
94	94EI0008	PLATFORM SCALE CAP. 150KG/50gr	INDONESIA	3,245,000	3 pcs	.	1	2	.	.	PT. C.M.S.I	Apr. 22, 95	
94	94EI0009	REFRIGERATOR CAP. 300L, 1 Door	INDONESIA	3,320,000	1 unit	.	.	.	1	.	"	Aug. 20, 95	
94	94EI0010	STERILIZER, AUTOCLAVE MODEL HL-42 AP	INDONESIA	23,675,000	1 unit	.	.	.	1	.	"	Aug. 15, 95	
94	94EI0023	CHEMICAL	INDONESIA	2,710,350		.	.	.	.	.	"	Jan. 10, 95	
94	94EI0024	CHEMICAL	INDONESIA	4,802,575		V	.	.	V	.	"	"	
94	94EI0025	CHEMICAL	INDONESIA	2,151,650		.	V	.	.	.	"	"	
94	94EI0026	STORAGE	INDONESIA	8,000,000	1	.	.	.	1	.	PT. FRAPANCA		
94	94EI0027	SCREEN HOUSE	INDONESIA	24,315,900	1	.	.	.	1	.	TUNGGAL		
94	94EI0052	PHOTOCOPY MACHINE CANON 6016	INDONESIA	8,427,375	2 unit	.	.	.	.	1	1	1	Apr. 18, 95
94	94EI0055	TYPEWRITER CANON AP 8100 + IF 43	INDONESIA	2,875,500	1 unit	.	.	.	.	.	"	"	

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TECHNICAL COOPERATION EQUIPMENT FISCAL YEAR 1995  
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Rp. 2,000,000. <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE (RP)	QUANTITY	RECIPIENT				COMPANY NAME	RECEIVED ON
						R	B	U	P		
95	95EI0001	MAGNETIC STRIR - Six Motor Type, IWAKI BS-240 - 220V with 10 pcs pf 10 mm and 25 mm magnet	INDONESIA	5.151.000	1 unit	1				PT. CMSI	18-6-96
95	95EI0011	WATER FILTER - 1 Unit Caporit Valve Tube - 5 PCS Ball Valve Kit 0 1" - 1 Unit Water Filter 0 12" X 2 Kitz T 125 cm - 2 pcs Water Tank Wxcel 1000 l	INDONESIA	4.394.500	1 unit		1			PD. MUSTIKA	
95	93EI0017	KUBOTA ROTARY TILLER - Model: RM 17 G. - Tilling width 172 cm, Tilling Depth 18 cm	INDONESIA	12.870.000	1 unit		1			BINA PERTWI	14-3-96
95	95EI0019	TRUCK ISUZU Diesel 2771 cc, 2 ton	INDONESIA	38.535.000	1 unit		1			PT. JACAROO	23-4-96
95	95EI0023	BALANCE - Cat No. AND FG-150K - Max. 150kg to weighy containers, res 50 gr - Bench & Platform scale, digital	INDONESIA	2.200.000	2 unit		2			PT. CMSI	26-3-96
95	95EI0024	MOTORCYCLE HONDA GL Max II, 125 cc	INDONESIA	4.850.000	2 unit		2			DAYA ADRA	22-4-96
95	95EI0026	COMPUTER PARAGON I AT 486 DX4-100 Mbz	INDONESIA	5.170.000	3 unit		1	1		MUSTIKA	
	95EI0027	MONITOR TVM LR 4G			3 unit		1	1		"	
	95EI0028	PRINTER EPSON LQ-1170			3 unit		1	1		"	
95	95EI0029	VEHICLE KUJANG LSX-G, 5 SPEED	INDONESIA	41.050.000	1 unit				1	WJAYA MOTOR	11-4-96

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Technical Cooperation Equipment Purchased in Indonesia F.Y. 1995

Rp. 2,000,000. <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE (RP)	QUANTITY	RECIPIENT				COMPANY NAME	RECEIVED ON
						R	B	U	P		
95	95EI0035	SUBMERSIBLE PUMP - Grundfos type SP SA-17 CW - Motor 1.5 Kw (2 HP) - 1 x 220 vol + control box - 40 m depth with 2 inch tube. 40 m	INDONESIA	3.785.374	1 unit	.	.	1	.	PD SINAR ELECTRO	4-4-96
95	95EI0034	ELECTRIC TYPEWRITER CANON AP-8100	INDONESIA	2.915.000	2 unit	.	.	1	1	PT. SAMAFITR	20-3-96
95	95EI0037	COPY MACHINE CANON NP-6016 - Accessory: ADF, MS B1, Sorter, Cust Feeding	INDONESIA	14.713.575	1 unit	.	.	.	.	"	"
95	95EI0087	CAMERA NIKON FM-2N Black Body - Tube 3989, 100 pcs/pac	INDONESIA	3.005.000	1 pcc	1	.	.	.	NIAGA WAHA-NA SUPLENDO	March 96

NOTE: R = RIV  
B = BEI

U = BBU  
P = BFSBTPH-1

D = Dinas Pertanian  
J = Directorate/Jakarta

4

TECHNICAL COOPERATION EQUIPMENT FISCAL YEAR 1996  
PURCHASED IN INDONESIA

Rp. 2,000,000. <

F.Y.	NO.	ITEM & SPECIFICATION	PURCHASED IN	UNIT PRICE (RP)	QUANTITY	RECIPIENT					COMPANY NAME	RECEIVED ON	
						R	B	U	P	D			C
96	96EI0001	SLIDE PROJECTOR EXTRAPO 5000	INDONESIA	3.250.000	1 unit	.	.	.	.	1	.	NIAGA WAHA-NASUPLENDO	13-3-97
96	96EI0002	OVERHEAD PROJECTOR ELMO HP-A 380 Zoom	INDONESIA	3.500.000	1 unit	.	.	.	.	1	.	"	"
96	96EI0009	DISTILER GFL 41/hr. MODEL-2004	INDONESIA	4.150.000	1 set	1	.	.	.	.	.	PT. C.M.S.I	5-3-97
96	96EI0010	ULTRASONIC CLEANER - Branson Model: DC-85E	INDONESIA	6.697.000	1 set	1	.	.	.	.	.	"	"
96	96EI0011	SHOECASE TYPE REFRIGERATOR - Derby Dsc 45 STB MT - 327 L, 220V, 50Hz.	INDONESIA	3.495.000	1 set	1	.	.	.	.	.	"	"
96	96EI0014	AIR CONDITIONER - AC Split 1.5 PK NATIONAL - CS/CU - 1203	INDONESIA	2.430.000	1 unit	.	.	.	.	1	.	PT. MEGARJA MITRAJAYA	25-3-97
96	96EI0015	TEST DATA PROCESSOR - Compak LTE 5000, Model 510 CSTN - Printer Cannon BJC 70 color	INDONESIA	8.550.000	1 set	1	.	.	.	.	.	SIDOLA	20-3-97
96	96EI0016	HAND TRACTOR KUBOTA - Tractor Rotary R 850 RD DI	INDONESIA	770.000	1 unit	.	.	.	.	1	.	KARYA HDUP SENTOSA	

NOTE: R = RIV  
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D = Dinas Pertanian  
C = Central Office (JICA-SPP)

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TECHNICAL COOPERATION EQUIPMENT  
DISPATCHED ALONG WITH EXPERT

¥25,000 <

F.Y.	NO.	ITEM & SPECIFICATION	CLASSIFI- CATION	UNIT PRICE	QUANTITY	RECIPIENT					EXPERT NAME	RECEIVED ON	
						R	B	U	P	D			C
92	92CJ0035	PERSONAL COMPUTER NEC Model: PC-9801 NV	HANDCARRY	¥188,600	2 unit	.	1	.	.	.	1	KEIZO HIGASHIYAMA	12-1-93
92	92CJ0037	PRINTER EPSON	HANDCARRY	¥73,000	1 unit	.	1	.	.	.	.	.	.
92	92CJ0042	SOFTWARE WORD STAR V-6.0	HANDCARRY	¥46,000	1	.	1	.	.	.	.	.	.
92	92CJ0044	CAMERA NIKON NEW FM2 (with case)	HANDCARRY	¥65,800	1 pce	1	.	.	.	.	.	.	.
92	92CJ0045	CAMERA LENS, NIKON Microkkoel 55mm F2.8S	HANDCARRY	¥63,000	1 pce	1	.	.	.	.	.	.	.
92	92CJ0047	SOIL TESTER BF-225	HANDCARRY	¥39,500	1 set	.	1	.	.	.	.	.	.
92	92CJ0052	AUTOMATIC WATER DISTILLATION	HANDCARRY	¥357,500	1 set	1	.	.	.	.	.	.	.
92	92CJ0057	SHAKER WITH TRANSFORMER	HANDCARRY	¥140,000	1 set	1	.	.	.	.	.	.	.
92	92CJ0058	AIR COMPRESSOR 020P-5S	HANDCARRY	¥91,500	1 set	.	1	.	.	.	.	.	.
93	93CJ0061	POTATO LEAFROOL VIRUS	HANDCARRY	¥63,700	1 pce	.	.	.	.	.	.	I. SAEK	29-9-93
93	93CJ0062	POTATO VIRUS M	HANDCARRY	¥63,700	1 pce	.	.	.	.	.	.	.	.
93	93CJ0063	POTATO VIRUS S	HANDCARRY	¥63,700	1 pce	.	.	.	.	.	.	.	.
93	93CJ0064	POTATO VIRUS X	HANDCARRY	¥73,500	1 pce	.	.	.	.	.	.	.	.
93	93CJ0065	POTATO VIRUS Y	HANDCARRY	¥73,500	1 pce	.	.	.	.	.	.	.	.
93	93CJ0066	ANTI SERUM PVYT	HANDCARRY	¥63,700	1 pce	.	.	.	.	.	.	.	.
93	93CJ0067	POTATO RING LOT	HANDCARRY	¥43,700	2 pcs	.	.	.	.	.	.	.	.
93	93CJ0068	POTATO BACTERIA VLT	HANDCARRY	¥43,700	2 pcs	.	.	.	.	.	.	.	.
94	94CJ0078	MICROSCOPE SMZ-2T-1	HANDCARRY	¥235,000	1 pce	.	.	.	.	.	.	T. NISHIKAWA & K. TAJIMA	2-9-94
94	94CJ0095	TEMPERATURE/HUMIDITY METER 07-340-0710	HANDCARRY	¥50,000	1 pce	.	.	.	.	.	.	.	.
94	94CJ0101	ELECTRONIC BALANCE FB-2000 W/TRANSF	HANDCARRY	¥77,800	1 set	.	.	.	.	.	.	.	.

NOTE:

R - RV  
B - BH

U - BBU  
P - BPSBTPH:

D - Dinas Pertanian  
C - Central Office (JICA-SPP)

8

Technical Cooperation Equipment Dispatch along with Experts

¥25,000 <

F.Y.	NO.	ITEM & SPECIFICATION	CLASSIFI- CATION	UNIT PRICE	QUANTITY	RECIPIENT					EXPERT NAME	RECEIVED DATE
						R	B	U	P	D		
94	94CJ0102	HOMOGENIZER CM-100	HANDCARRY	¥184,850	1 pce	.	.	.	.	.	MASATO	11-11-94
94	94CJ0103	CUP CUTTER TANK 100-500ml	HANDCARRY	¥39,600	1 set	.	.	.	.	.	MAKINO	"
94	94CJ0104	DISSECTION TABLE OF RABBIT TO-18	HANDCARRY	¥54,850	1 pce	.	.	.	.	.	"	"
94	94CJ0105	TOOL OF RABBIT FIXING	HANDCARRY	¥40,900	1 pce	.	.	.	.	.	"	"
94	94CJ0113	COLUMN CF-18-3	HANDCARRY	¥34,200	1 pce	.	.	.	.	.	"	"
94	94CJ0114	COLUMN CF-30-3	HANDCARRY	¥45,600	1 pce	.	.	.	.	.	"	"
94	94CJ0126	POTATO LEAFROLL VIRUS (647411)	HANDCARRY	¥64,800	1 pce	.	.	.	.	.	SUZUO SATO	13-2-95
94	94CJ0127	POTATO VIRUS Y (647420)	HANDCARRY	¥64,800	1 pce	.	.	.	.	.	"	"
94	94CJ0129	SOIL NEMATODE DETECTION KIT 9DF-401) (Cyst separation apparatus)	HANDCARRY	¥227,500	1 set	.	.	.	.	.	"	"
95	95CJ0150	STIRRER FOR HOMOGENIZER (with trans.)	HANDCARRY	¥132,500	1 set	.	.	.	.	.	NOBUO MIKI	31-10-95
95	95CJ0162	CELL FOR SPECTROPHOTOMETER	HANDCARRY	¥30,500	1 pce	.	.	.	.	.	"	"
95	95CJ0165	ELECTRIC BALANCE EB330SA	HANDCARRY	¥72,300	1 set	.	.	.	.	.	"	"
95	95CJ0166	MAGNETIC STIRRER BS-56 with trans.	HANDCARRY	¥35,000	1 pce	.	.	.	.	.	"	"
95	95CJ0176	STIRRER FOR HOMOGENIZER (with trans.)	HANDCARRY	¥132,500	1 set	.	.	.	.	.	"	30-1-96
95	95CJ0179	DIGITAL BRX METER PR-101	HANDCARRY	¥74,500	3 pcs	.	.	.	.	.	TSUTOMU MAIDA	4-12-95
95	95CJ0181	DISPENSER L-4143037	HANDCARRY	¥88,200	1 pce	.	.	.	.	.	"	"
95	95CJ0185	PUMP PAD-15 with transformer	HANDCARRY	¥30,000	1 pce	.	.	.	.	.	"	"
95	95CJ0188	PERISTALTIC PUMP PST-100 W/TRANS.	HANDCARRY	¥60,000	1 pce	.	.	.	.	.	"	"
95	95CJ0193	ELECTRIC CONDUCTIVITY METER MODEL: CM-14P	HANDCARRY	¥78,400	1 pce	.	.	.	.	.	SETA	8-2-96
95	95CJ0194	CELL MODEL: CGP-110P	HANDCARRY	¥36,000	1 pce	.	.	.	.	.	KOBAYASHI	"

NOTE: R - RIV  
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8

Technical Cooperation Equipment Dispatch along with Experts

¥25,000 <

F.Y.	NO.	ITEM & SPECIFICATION	CLASSIFI- CATION	UNIT PRICE	QUANTITY	RECIPIENT					EXPERT NAME	RECEIVED ON
						R	B	U	P	D		
95	95CJ0195	PRINTER MODEL: PR-14P	HANDCARRY	¥60,000	1 pec						SETA	8-2-96
95	95CJ0199	AFFI-GEL PROTEIN A MAPS II KIT	HANDCARRY	¥58,950	1 pec			1			KOBAYASHI	8-2-96
95	95CJ0211	MACINTOSH POWERBOOK 5300cs/100 - 16MB/HDD750M/3824/J/A - Mac Light II (J) 1.5V2 - Software Excel V5.0J for Mac	HANDCARRY	¥298,900	1 set						DR. HIDEHRO HORIO	26-2-96
95	95CJ0212	PH.METER AC-10	HANDCARRY	¥130,000	1 set							
95	95CJ0219	PERSONAL COMPUTER POWERBOOK 5300 CS/10	HANDCARRY	¥288,000	1 unit						SUZUO SAITO	23-5-96
95	95CJ0220	FIBER OPTIC ILLUMINATORS LGW-1	HANDCARRY	¥123,250	1 unit							
95	95CJ0223	LATEX G24103 15ML	HANDCARRY	¥36,220	1 pec							
95	95CJ0224	LATEX G0301R 15 ml	HANDCARRY	¥43,680	1 pec						SUZUO SAITO	23-5-96
95	95CJ0225	LATEX G0304B 15 ml	HANDCARRY	43,680	1 pec							
96	96CJ0243	HI-8 VIDEO CAMERA CCD-TRV201 SONY	HANDCARRY	¥172,500	1 set			1			HIDEYASU SATO	18-9-96
96	96CJ0253	VIDEO TITLER XV-J1000 SONY	HANDCARRY	¥82,500	1 set			1				
96	96CJ0254	FRACTION CONNECTOR - Model: 2110 (BIO-RAD) with transformer	HANDCARRY	¥170,000	1 set	1					TSUKASA KAWAKAMI	20-10-96
96	96CJ0284	MICRO PIPETTE P-1000 (GILSON)	HANDCARRY	¥27,000	1 pec	1						
96	96CJ0300	POLYCEALER PC-200A (C) 56-725-05 TUCHI	HANDCARRY	¥34,500	1 pec	1						
96	96CJ0303	DIGITAL BALANCE 1000g	HANDCARRY	¥29,700	2 pcs						MASASHI YAMASAKI	21-11-96
96	96CJ0305	SPRAYER MS035D-1	HANDCARRY	¥50,000	3 pcs						T. TERAMOTO	3-12-96

NOTE: R - RIV  
B - BEI

U - BBU  
P - BPSE/PR-1

D - Dinas Pertanian  
C - Central Office (JICA-SPP)

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Annex 4

**Local Cost for Project Activity Supported by Japanese Government**

(x 1,000 Rupiah)

Fiscal Year	Expenditure for running the project	Training for middle level staff	Publicity activities for the project	Total
F. Y. 1992 (H.4)	60,041	-	-	60,041
F. Y. 1993 (H.5)	169,125	109,434	-	278,559
F. Y. 1994 (H.6)	187,609	85,460	-	273,069
F. Y. 1995 (H.7)	209,090	72,065	17,000	298,155
F. Y. 1996 (H.8)	147,500	43,400	-	190,900
F. Y. 1997 (H.9)	57,000 (For 6 month)	-	-	57,000
Total	830,365	310,359	17,000	1,157,724

\*The warehouse in BBU was built with JICA budget in F. Y. 1996, of which amount was 65,812,000 Rp.

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## Annex 5

## Project Execution Budget prepared by Indonesian Government

Project Office	Item of Budget	(x 1,000 Rp)						
		'92 F.Y. (H.4)	'93 F.Y. (H.5)	'94 F.Y. (H.6)	'95 F.Y. (H.7)	'96 F.Y. (H.8)	Total	
Sub Directorate of Horticulture Seeds	(1) Budget for seed production at BBI	87,500	103,280	102,290	132,750	152,330	578,150	
	(2) Expense for conducting training courses		6,900	9,600	9,100	15,000	40,600	
	(3) Personnel expenses for staff	3,000	3,000	3,750	6,700	21,000	37,450	
	(4) Others	16,000	16,000	15,800	17,250	136,150	201,200	
		(106,500)	(129,180)	(131,440)	(165,800)	(324,480)	(857,400)	
Research Institute of Vegetables	(1) Research activity	9,000	11,100	4,500	12,000	12,000	48,600	
	(2) Operational cost for cutting production	13,825	54,750	3,700	37,200	69,200	178,675	
	(Total)	(22,825)	(65,850)	(8,200)	(49,200)	(81,200)	(227,275)	
BPSBTPH-I	(1) Personnel expense	34,273	48,498	35,373	48,873	58,573	225,590	
	(2) Running cost for project	4,402	4,414	4,544	4,686	4,828	22,874	
	(Total)	(38,675)	(52,912)	(39,917)	(53,559)	(63,401)	(248,464)	
Dinas Pertanian, West Jawa Province	(1) Running cost for project from MOA	87,150	31,700	102,290	123,650	152,330	497,120	
	(2) Budget for training course from MOA		78,480	9,600	9,100	15,000	112,180	
	(3) Running cost for project from Dinas Per.	11,260	11,080	15,820	16,666	20,000	74,826	
	(4) Others	51,385	42,600	12,380	14,925	15,066	136,356	
	(Total)	(149,795)	(163,860)	(140,090)	(164,341)	(202,396)	(820,482)	
BBI*	Seed potato production expenses		75,861	161,483	198,481	220,336	(656,161)	
BBU	(1) Personnel expense (Staff only)		5,986	20,394	46,385	46,646	119,411	
	(2) Seed potato production cost			47,919	176,218	87,536	311,673	
	(3) Running cost to maintain BBU		5,414	3,291	27,170	29,479	65,354	
	(Total)		(11,401)	(71,604)	(249,776)	(163,661)	(496,438)	
	Income from selling the products				201,923	233,351	435,274	

\*The seed production expenses is only shown at BBI.

C/P's assignment and their fields (1)

Name of C/P	Assignment Period												C/P Training in Japan		Post
	1992 (H.4)		1993 (H.5)		1994 (H.6)		1995 (H.7)		1996 (H.8)		1997 (H.9)		Year	Place of Training	
	10	1	4	7	10	1	4	7	10	1	4	7			
Ms. Rini	Director of Seed Development, Directorate General of Food Crops, Ministry of Agriculture														Director, Direc. of Horti. Pro.
Mr. Abu Haerati	Project Manager (- 8 May '93)														Director, Direc. of Program Devel.
Mr. Mubamad Sidik	Acting Project Manager (Nov., '93 - Dec., '93)														Director, Direc. of Seed Devel.
Mr. Md. Munawir	Project Manager (5 April '94 - 17 Janu. '96)														Director, Direc. of Seed Devel.
Ms. Lily Waiyub	Coordinator for the whole project (- 4 April '94)														Head Sub Direc. of Horti. Seed
Mr. Alfaza	Coordinator for the whole project (5 April '94 - )														Head Sub Direc. of Horti. Seed
Mr. Soeroto	Assistant coordinator for whole project														Head Sub Direc. of Horti. Seed
Mr. Amar Pandji	Assistant														Section chief of vegetable plant
Ms. Sri Lustrani Utami	Assistant														Staff
Mr. Subaryono	Dinas Pertanian, West Java Province														Section chief of rice
Mr. Sagun	Head of Dinas Pertanian (- 2 Feb. '97)														Head of Dinas Pertanian
Ms. Ida	Coordinator in West Java Province (- 31 Dec. '95)														Sub-head of Horti. Division
Mr. Addi	Coordinator in West Java Province (2 Janu. '96 - 12 Nov. '96)														Sub-head of Horti. Division
Mr. A. Tarekat	Coordinator in West Java Province (8 Janu. '97 - )														Sub-head of Horti. Division
Mr. Sulaiman	Assistant coordinator in West Java Province (1 Nov. '95 - )														Subject Matter Specialist
Mr. Dadan Suparlan	BPSBTPH - 1														Head of BPSBTPH - 1
Ms. P. Mariani	Managing potato seed inspection system														Head of Seed Potato Division
Mr. Wawan Suwardi	Laboratory inspection														Chief of Laboratory
Mr. Dedi Ruswandi	Field inspection														Chief of Field Inspection
Mr. Deden Rusandi	Field inspection														Staff of Field Inspection
Mr. Pido Leksono	Field inspection (1 Oct. '93 - )														Staff of Field Inspection

\*NCSS: National Centre for Seedlings and Seeds

26 C/Ps assignment and their field (2)

Name of CP	Assignment Period										C/P Training in Japan		Post			
	1992 (H.4)		1993 (H.5)		1994 (H.6)		1995 (H.7)		1996 (H.8)		1997 (H.9)			Year	Place of Training	
	10	1	4	7	10	1	4	7	10	1	4	7				10
	<u>Research Institute of Vegetable</u>															
Dr. Ali	Improvement of inspection technique and introduction of new inspection technique (1 Oct. '94 - )															
Ms. Ash	Multiplication and inspection of mother plant															
Mr. Lutfy Achmad	Multiplication and inspection of mother plant															
Ms. Neni Gunawan	Improvement of inspection technique and introduction of new inspection technique (1 Oct. '94 - )															
	<u>BB1 (Foundation Seed Farm)</u>															
Mr. Iyep	Management of Foundation Seed Farm ( - May '92)															
Mr. Nana Sumarna	Management of Foundation Seed Farm ( 23 Sep. '93 - )															
Mr. Mia Resnandi	Multiplication of Foundation Seeds in Screen House															
Mr. Eddi Rusbandi	Cultivation of Foundation Seeds in Field															
Mr. Wawan Winarna	Cultivation of Foundation Seeds in Field and Their Storage and Training															
	<u>BB2 (Stock Seed Farm)</u>															
Mr. Hary Zubary	Management of Stock Seed Cultivation System															
Mr. Undang Surwandi	Management of Stock Seed Farm (Aug. '93 - 27 Aug. '96)															
Mr. Sutarjo	Management of Stock Seed Farm (1 Oct. '96 - )															
Mr. Dasop Sudirman	Cultivation of Stock Seeds															
	<u>BB3 (Stock Seed Farm)</u>															
	'94 NCSS													'94	NCSS	Manager of PT. Mamin
														'95	Tumagori Sta. (NCSS)	Head of Stock Seed Farm
														'96	Tumagori Sta. (NCSS)	Head of Stock Seed Farm
														'96	Tumagori Sta. (NCSS)	Chief of Production

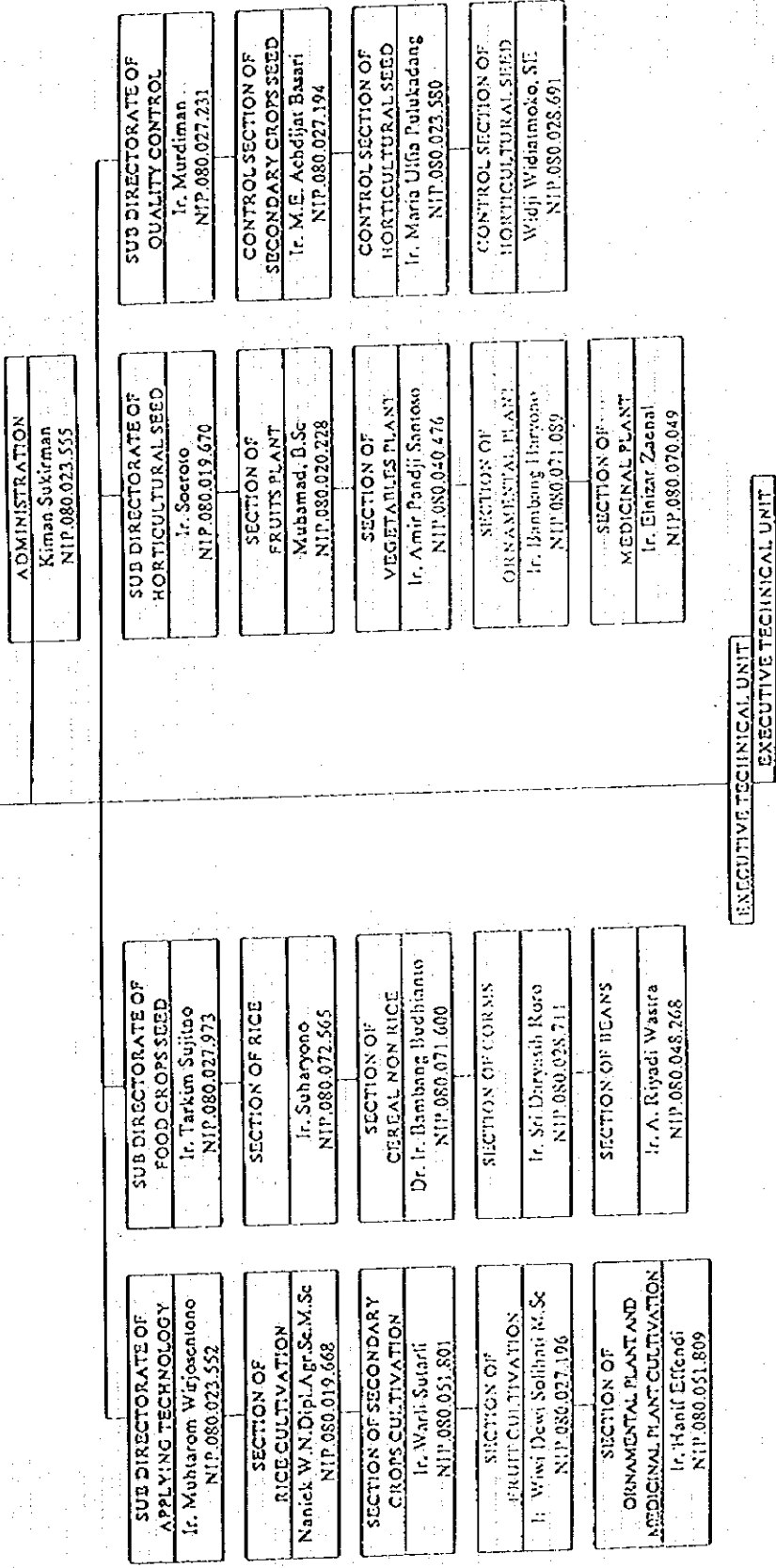
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Annex 7

ORGANIZATION CHART OF THE DIRECTORATE OF SEED DEVELOPMENT

as of January 1996

DIRECTORATE OF SEED DEVELOPMENT  
 Ir. Muhammad Munawir  
 NIP.080.017.541

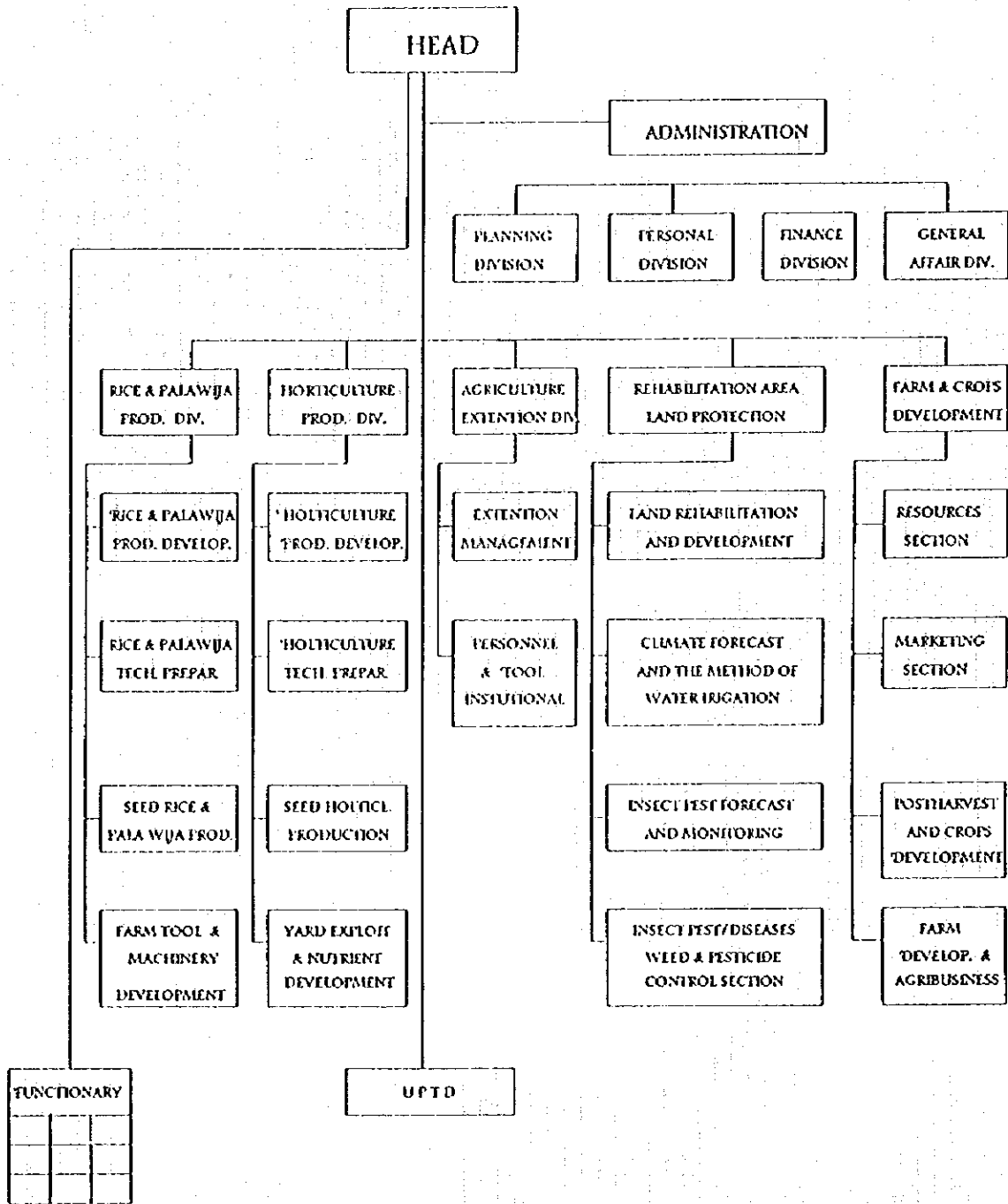


Note:

- The Projects under the Directorate of Seed Development:
1. Ir. RMH Manurung: Project Manager of EC
  2. Ir. Sri Harti Nastiti: Chief Board of Seed Development Project
  3. Nanick W.N., Dipl. Agr. Sc. M. Sc: Coordinator of Seed Laboratory
  4. Drs. Sarwono: Coordinator of National Seed Agency
  5. Ir. H. Amir Pandji Santoso: Project Coordinator of The Seed Potato Multiplication (ATA-524)
  6. Ir. Maria Ulfa Pulkadang: Project Coordinator of The Soybean Seed Multiplication (INS/93/020)

Annex 8

ORGANIZATION CHART  
FOOD CROPS AGRICULTURE SERVICE  
OF WEST JAVA PROVINCE



BANDUNG, JULY 12, 1995

LEGISLATIVE ASSEMBLY AT PROVINCIAL  
WEST JAVA PROVINCE

GOVERNOR  
WEST JAVA

H. AGUS MUBANDIEN

R. NURIANA

*ke*

*4*

## 1 合同評価報告書（和文）

日本の技術協力に関する討議議事録をもとに、1992年10月1日から開始されたインドネシア種子馬鈴薯増殖・研修計画（以下「プロジェクト」という）は、1997年9月30日をもって、討議議事録に定められた協力期間が終了する。協力期間終了の5ヶ月前にあたり、国際協力事業団によって組織された、片山 恵之（農林水産省農産園芸局畑作振興課需給調整官）を団長とする終了時評価調査団（以下「チーム」という）は、プロジェクトの総合評価を目的として、1997年4月6日より4月17日までインドネシアを訪問した。本目的を達成するために、日本側調査団と、スピヤンティー（農業省海外協力局2国間援助課長）を団長とするインドネシア側評価調査団は、日伊両国による合同評価調査団を結成した。

合同評価調査団は、日本人専門家およびカウンターパートに対する質疑応答、現地調査および伊側関係当局との一連の協議を行うと共に、団内での意見交換を行った。

その結果、合同評価調査団は、ここに添付する合同評価報告書に記載する諸事項について合意するとともに、評価結果を各々の政府に対して勧告することに同意した。

1997年4月17日 ジャカルタ

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片山 恵之  
団長  
日本側評価調査団

---

スピヤンティー  
団長  
インドネシア側評価調査団

# 合同評価レポート

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2. 合同評価チーム団員
3. 評価の目的
4. 評価方法
  - 4-1 調査項目
  - 4-2 評価方法
5. 調査結果
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  - 5-2 活動の目標達成度
6. 評価結果
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  - 6-2 プロジェクトの効果
  - 6-3 実施の効率性
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### 付属資料（英文レポートのみに添付）

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6. インドネシア側予算実績
7. 組織図（農業省種苗局、西ジャワ州農業部、野菜研究所、種子検査所、原原種農場、原種農場）



## 1. 背景

インドネシアにとって農業は最も重要な産業として位置づけられており(GDPの25.5%)、就業人口の約半数が農業に従事している。1984年、米の自給を達成したインドネシア国政府は、現在米以外の主要食用作物の代表として、馬鈴薯、大豆の生産の安定と増産を図っている。しかし、良質の種いもを使用していないこと等から、生産性は低い現状にある(約10t/ha)。そこで、インドネシアの馬鈴薯増産のために、日本政府により、下記の協力が行われた。

### (1) 個別派遣専門家

1985年10月から個別派遣専門家を延べ4名派遣し、レンバン園芸研究所(現レンバン野菜研究所)において種子馬鈴薯の無病化、増殖等の基礎技術を指導した。

### (2) 開発調査

1986年に「主要食用作物(馬鈴薯・大豆)生産振興計画(優良種子増殖配布)」に関するマスタープラン作成が日本政府に要請され、開発調査が行われた。

### (3) 無償資金協力

上記(2)のマスタープランの中からインドネシア政府は「優良種子馬鈴薯の増殖・配布計画」を優先的に取り上げ、その実施に必要な無償資金協力を要請した。

これを受けて1990年9月から1992年3月にかけて、レンバン園芸研究所、原原種農場、原種農場、種子検査所に対する協力(無病種子生産・検査および研修に必要な施設、機材や圃場の整備)を実現した(約9.4億円)。

### (4) プロジェクト方式技術協力

インドネシア政府は、無病良質の種いもの増産および供給体制を整える目的で、研究活動の強化、原原種農場の確立等を内容とし、レンバン園芸/野菜研究所、原原種農場、原種農場、種子検査所を対象としたプロジェクト方式技術協力を1991年7月に要請した。これを受けて両政府は1992年10月、5年間の協力でプロジェクトを開始した。

主な活動項目は以下の通りである。

## 1. 優良種子馬鈴薯の増殖に必要な技術の確立

### (1) 基本種子馬鈴薯の検査技術(レンバン園芸/野菜研究所)

1) 検査技術の改善

2) 新しい検査技術の導入

### (2) 優良種子馬鈴薯の増殖に必要な栽培技術及び技術マニュアルの作成

(原原種農場、原種農場)

1) 基本種子の増殖技術の改善(原原種農場)

2) 原原種生産技術の改善(原原種農場)

3) 原種生産技術の改善(原種農場)

4) 上記技術のマニュアル作成

- (3) 種子馬鈴薯の収穫後処理技術（原原種農場、原種農場）
  - 1) 貯蔵前準備技術の改善
  - 2) 貯蔵技術の改善
  - 3) 上記技術マニュアル作成
- (4) 種子馬鈴薯の病害虫の同定・管理技術（原原種農場、原種農場）
  - 1) 基本種子の検査技術の改善（原原種農場）
  - 2) 原原種・原種の同定・検査技術の改善と開発
  - 3) 圃場のウイルス病管理（防除）技術の改善と開発（原原種農場、原種農場）
  - 4) ウイルス病以外の病害虫管理（防除）技術の改善と開発
  - 5) 上記技術のマニュアル作成
- (5) 管理機能の強化（原原種農場、原種農場）

## 2. 原原種農場における研修システムの確立

- (1) 研修マニュアルの作成
  - 1) 研修カリキュラムの立案
  - 2) 研修マニュアルの作成
- (2) 関係者及び種子生産者への研修

## 3. 種子検査所における優良種子馬鈴薯の管理・検査システムの強化

- (1) 検査・指導体制の強化
  - 1) 種子検査所職員への検査・証明制度の指導と種子生産者への啓蒙
  - 2) 種子検査所の活動指針の作成と種子生産者への検査計画・実施の指導
- (2) 検査・同定技術の確立
  - 1) 圃場検査技術の改善
  - 2) 室内の同定・検査技術の改善
- (3) 検査基準の確立及び検査マニュアルの作成
  - 1) 暫定検査基準の作成と見直し
  - 2) 検査マニュアルの作成と見直し
- (4) 種子検査所の行政的機能の強化

## 2. 合同評価チーム団員

日本側、インドネシア側

## 3. 評価の目的

- (1) 技術協力開始から終了までの5年間の実績（予定も含む）をRD等の合意文書に基づき総合的に評価を行う。
- (2) 技術協力終了後の取るべき対応策について協議し、その結果を両国政府関係機関に

報告・提言すること。

- (3) 今後類似のプロジェクトが実施された場合、その技術協力をより適切かつ効果的に実施するため、評価結果を協力計画策定やプロジェクトの実施にフィードバックさせること。

#### 4. 評価方法

##### 4-1 調査項目

R/DおよびTSIに基づき、下記項目について調査する。

##### (1) プロジェクトの投入

###### 1) 日本側

専門家派遣、研修員受入、機材供与、ローカルコスト負担および調査団派遣等。

###### 2) インドネシア側

カウンターパートおよび行政官の配置、土地、建物、施設、運営経費の負担、機材の設置・更新、保全策の実施等。

##### (2) プロジェクト活動および実績

##### (3) プロジェクトの効果

##### (4) プロジェクト運営

##### (5) 協力期間終了後の将来計画

##### 4-2 評価方法

評価は、R/DおよびTSIに記載されている項目毎にプロジェクトの実績を調査して行う。

#### 5. 調査結果

##### 5-1 投入の実績（日本、イ側）

##### 5-1-1 日本側投入実績

###### (1) 専門家派遣

R/DおよびTSIに基づき、チームリーダー、業務調整、増殖、栽培・研修、種子検査、植物病理の長期専門家11名を派遣した。また、必要に応じて14名の短期専門家を派遣した。このため、技術移転は円滑に行われた。

###### (2) 研修員受入

プロジェクト開始後現在までに18名のカウンターパートを受け入れた。今後プロジェクト終了までに2名の受け入れを予定している。これらカウンターパートの研修は計画どおり行われ、カウンターパートの技術向上に効果が見られた。

### (3) 機材供与

プロジェクト活動に必要な資機材の供与が行われた。これら機材はプロジェクト活動の強化に役立ち、プロジェクト終了後も役立つことが期待される。

### (4) ローカルコスト負担

プロジェクト活動に必要な運営費と中堅技術者養成対策費の経費の負担がなされた。

### (5) 調査団派遣

#### 1) 計画打ち合わせ調査団

1993年5月に計画打ち合わせ調査団が派遣され、詳細な活動計画が作成された。この活動計画は調査団とインドネシア関係者の間で合意された。

#### 2) 巡回指導調査団

1995年7月に巡回指導調査団が派遣され、過去3年間のプロジェクト活動の評価を行った。評価の結果、活動はおおよそ予定どおり行われ、R/D、TSIの変更は必要ないとの結果であった。

## 5-1-2 インドネシア側投入実績

### (1) 建物および施設

インドネシア政府はプロジェクト活動に必要な施設および建物を供給した。これら施設は日本の無償資金協力により供与されたものである。

### (2) 予算措置

インドネシア政府はLEHR/RIV、BPSB、BBI、BBUにおける運営、研修、種子生産経費を通算3,340万ルピー（1992～1996）負担した。

### (3) 要員配置

インドネシア側はLEHR/RIV、BPSB、BBI、BBUに必要な要員の配置を行った。

### (4) 機材配置

資機材は現在のところ特に問題ない。

## 5-2 活動の目標達成度

### 5-2-1 優良種子馬鈴薯増殖に必要な技術の確立

#### (1) LEHR/RIVにおける基本種子馬鈴薯の検査技術

##### 1) 検査技術の改善

茎頂培養とウイルス病検定がセットとなって技術として成り立っていることをC/Pが理解し、BBIに供給するカッティング苗 (G0) のELISA、接種検定法によるウイルス病検定及び網室内での異常株抜取りが生産計画に基づいて着実に実施され

ていて、本項目に関する技術移転はTSIの活動期間内に終了しており、技術として定着するものと考えられる。

## 2) 新しい検査技術の導入

ウイルス検出用の抗血清作製に関する基本技術が主として短期専門家によって技術移転され、これまでに主要ウイルスであるPVX、PVY及びPLRVの抗血清を作製し、IgGを精製してELISAを行えるようになった。他のサイトでのRIV製抗血清の利用も進んでいるので、抗血清自給という当初目標は達成されたと判断される。

## (2) BBI、BBUにおける優良種子馬鈴薯の増殖に必要な技術とマニュアルの作成

### 1) BBIにおける基本種子の増殖技術の改善

網室AにてG0（カッティング苗）からG0（小塊茎）を生産するために必要な、無菌培養土の確保、活着率を高める挿し木技術の向上、塊茎肥大を促す施肥や灌水技術、薬剤散布による再感染予防技術、収穫した小塊茎の貯蔵技術等の向上が見られ、C/Pは、挿し木増殖を自力で計画どおり実施できるようになった。また、G0苗自給計画に備え、網室AでG0小粒塊茎からカッティング苗を採取し、G0塊茎を生産する技術も修得し、生産ラインに乗せられるまでに技術が向上した。

網室BでのG1生産では土壌消毒、植付、アブラムシや土壌病害虫の侵入防止、馬鈴薯の生育相に応じた水管理や薬剤散布、茎葉処理時期と収穫、貯蔵、催芽方法等の技術を修得し、C/Pは網室Bの栽培について自力で問題なく実施できるようになった。以上より、当初目標は達成されたと判断される。

### 2) BBIにおける原原種生産技術の改善

C/PはBBIにおける農場周辺農家の栽培方法の調査、植付圃場の準備（採種環境の整備、土壌分析、輪作の体系化等）、植付方法（施肥、小粒種いも生産技術等）、管理方法（中耕、除草、培土等）に関する技術を修得し、自力で原原種生産が行えるようになったので、当初目標は達成されたと判断される。

### 3) BBUにおける原種生産技術の改善

C/PはBBUにおける植付圃場の準備（採種環境の整備、輪作の体系化等）、植付方法（施肥、栽植密度等）、管理方法（中耕、除草、培土等）に関する技術を修得し、自力で原種栽培が行えるようになったので、当初目標は達成されたと判断される。

### 4) 上記技術のマニュアル作成

網室栽培、原原種栽培及び原種栽培について、栽培マニュアルが作成されているので、当初目標は達成されたと判断される。

### (3) BBI、BBUにおける種子馬鈴薯の収穫後処理技術

#### 1) 貯蔵前準備技術の改善

C/Pは、収量調査による収穫時期の確定、茎葉処理及び選別（規格の決定、選別の時期・方法等）に関する技術を修得し、BPSBが実施する生産物検査に先だてて自主検査も行えるようになったため、当初目標は達成されたと判断される。

#### 2) 貯蔵技術の改善

C/Pは、種いもの貯蔵方法（貯蔵場所、貯蔵量等）、植付前処理（選別、消毒、催芽方法等）に関する技術を修得した結果、害虫の発生に注意した貯蔵および貯蔵前、貯蔵中、植え付け前それぞれの段階にあった処理ができるようになり、害虫侵入防止措置も含めて問題なく実施されているので、当初目標は達成されたと判断される。

#### 3) 上記技術のマニュアル作成

収量調査、茎葉処理、選別、貯蔵、種いもの消毒方法に関するマニュアルが作成され、当初目標は達成されたと判断される。

### (4) BBI、BBUにおける種子馬鈴薯の病害虫の同定・防除技術

#### 1) BBIにおける基本種子の検査技術の改善

C/Pは、網室A及び網室Bで栽培される基本種の肉眼鑑別、ELISA及び接種検定法によるウイルス病検定等について技術を修得し、自力で実施できるようになったため、当初目標は達成されたと判断される。

#### 2) 原原種、原種の同定・検査技術の改善と開発

BBI、BBUにおいては、当国で当初発生が予想された病害虫のほとんどがプロジェクト期間中に発生し、C/Pはそれら病害虫の病徴・同定法を身をもって体験した。従って、既発生の病害虫の同定と検定については当初目標は達成されたと判断される。

#### 3) BBI、BBUにおける圃場のウイルス病管理（防除）技術の改善と開発

輪作の実施、ナス科作物の排除や野生えいもの除去などによって採種環境を整備し、感染病株の抜取り、農薬散布によるウイルス媒介昆虫の防除が作期毎に的確に実施された。BBIではアブラムシのトラップによる発生消長の調査がおこなわれている。このため、圃場におけるウイルス病の発生はごく少なく、防除技術は定着したと言えるので、当初目標は達成されたと判断される。

#### 4) ウイルス病以外の病害虫管理（防除）技術の改善と開発

細菌病では青枯病、軟腐病及びそうか病、菌類病では疫病、夏疫病及び乾腐病、線虫ではネコブセンチュウ、害虫ではジャガイモガ及びハモグリバエが発生しているが、被害が大きいのは青枯病、ネコブセンチュウ及びジャガイモガである。青枯病は土壌が汚染されているBBUで雨期作に発生が多く、C/Pは専門家の指導により、

輪作のほか乾期の裸地休耕による菌密度の低下策や発病株の徹底抜取りを理解した。ネコブセンチュウはBBU、BBIに発生し、線虫対抗植物の導入による防除方法の指導を試みている。ジャガイモガは、貯蔵庫の整備及び貯蔵管理の徹底によって被害を回避できている。

土壌病害虫の防除については、基本的な防除技術の移転は終了したことで当初目標は達成されたと判断される。このことから、現在発生中のほとんどの病害虫については、今後C/Pによる防除対策を継続することで解決に向かうと期待される。しかし、ネコブセンチュウについては、分類・同定の作業が完了していないこともあり、現在の防除対策の試験成果を見守ることが必要である。また、種馬鈴薯生産においては、未発生もしくは未確認病害虫の発生が予想され、今後種馬鈴薯の生産が本格化すれば、その場合の対策については応用的な防除技術が求められるため、無病種馬鈴薯の安定供給という観点からすれば、今後C/Pの更なる技術習得が必要である。

#### 5) 上記技術のマニュアル作成

TSI策定時には十分想定できなかった、ネコブセンチュウ等土壌病害虫の被害については更なる検討が必要であるものの、多くの病害虫については防除暦を作成し活用しているので、当初目標は達成されたと判断される。

#### (5) BBI、BBUの管理機能の強化

種子馬鈴薯増殖専門機関として設立されたBBIおよびBBUがそれぞれ高品質のG2及びG3種子を生産・配布しており、業務を担う職員の意識も向上してきている。

また、それぞれの機関の業務を円滑に進めるための業務マニュアル等を作成するとともに、BBIおよびBBUが行政機関と十分連携をとって業務を推進するために、必要に応じて関係者による打ち合わせを行うようになってきている。

このため、当初目標は達成されたと判断される。

### 5-2-2 BBIにおける研修技術の確立

#### (1) 研修マニュアルの作成

##### 1) 研修カリキュラムの立案

C/Pは、州農業部の計画に基づいて研修計画を作成し、カリキュラムを作成して研修を実施しているので、当初目標は達成されたと判断される。

##### 2) 研修マニュアルの作成

研修用テキストが作成され、研修マニュアルは作成中であるがプロジェクト終了までにはでき上がる見込みなので、当初目標は達成されると判断される。

## (2) 関係者及び種子生産者のへ研修

関係職員（BBI、BBU、BPSB、Dinas他）に対する基礎研修及び専門研修、種子生産農家に対する基礎研修及び応用研修がプロジェクト開始以来延べ31回（534名）実施され、現在ではC/Pが研修の講師を努めていることから、BBIにおいてこれら研修の実施は定着したと見られるため、当初目標は達成されたと判断される。

### 5-2-3 BPSBにおける種子馬鈴薯検査・取締体制の強化

#### (1) 検査・指導体制の強化

##### 1) BPSB職員への検査・証明制度指導と種子生産者への啓蒙

C/Pは検査・証明制度を十分理解し、管理・運営できるとともに、BPSB職員、関係機関及び種子生産農家等への研修並びに種馬鈴薯検査に関する会議を自ら開催できるレベルにまでなった。C/P以外のスタッフ及び支所の検査官は、未だ制度や検査方法の理解が十分でなく、独力での検査は無理と考えられるが、C/Pを中心にした検査・証明制度の管理・運営は十分可能であり、当初目標は達成されたと判断される。

種子生産農家への啓蒙については、種子生産農家の検査制度に対する理解はまだ浅いが、C/P及び圃場検査官が啓蒙の必要性を認識し、種子生産予定者研修会や圃場及び生産物検査時に指導していること、および今後も継続して指導が続けられる体制があることから、当初目標はほぼ達成されたと判断される。

##### 2) BPSBの活動指針の作成と種子生産者への検査計画・実施の指導

種子生産農家への指導指針である活動指針（暫定ガイドライン）が作成され、これを用いて実際に指導を行いながら、更に実態に合ったものに見直しが行われている。従って、活動指針の作成については当初目標は達成されたと判断される。

種子生産農家への指導は、C/Pや検査官が研修会や生産物検査時における病害虫防除の話し合い等を通じて指導を行った結果、種子生産農家からこれら検査制度に対する信頼を得られ始めており、当初計画は概ね達成されたと判断される。

しかしながら、農家の種馬鈴薯栽培経験が浅いことや、BPSBが指導を行う十分な時間がないことから、BPSBの種馬鈴薯栽培及び検査・証明制度に対する指導を十分理解していない農家が存在するのが実態である。このため、再検査や検査不合格がでたり、生産物の品質低下が懸念される農家もある。BPSBの指導は今後も継続的に実施されるが、高品質普及種子の安定供給という観点からすれば、関連機関との連携強化により農家への効果的指導を行うことが期待される。



## (2) 検査・同定技術の確立

### 1) 圃場検査技術の改善

C/Pは、圃場検査及び生産物検査、一般馬鈴薯圃場における病害虫調査、次代検定圃場における病徴の継続的な観察及び市場の種馬鈴薯調査等、種々条件の異なる場面での病徴識別の訓練を積んでいるため、検定技術（病害虫の識別及び合否判定能力）は、改善されたと認められる。

なお一層の修練が必要であるが、全体の検査技術レベルから判断すると、当初目標は達成されたと判断される。

### 2) 室内の同定・検査技術の改善

ウイルス病（PLRV、PVS、PVX、PVY）、細菌（青枯病菌、軟腐病菌、そうか病菌）、糸状菌（疫病菌、夏疫病菌、乾腐病菌）、害虫（アブラムシ類、ジャガイモガ、スリップス類、ハモグリバエ類、ネコブセンチュウ類）をELISA、接種検定、培養、検鏡等の手法によって同定可能になったので、当初目標は達成されたと判断される。特にウイルス病の同定については、BPSBでRIV製の抗血清を利用したIgG精製が可能となっており、技術として定着していると判断される。

## (3) 検査基準の確立および検査マニュアルの作成

暫定検査基準及び検査マニュアルは1993年11月に作成され、その後の検査に適用されてきたが、実態に即したものとするためにプロジェクト内で見直しを行い、試行されることになった。法律第12号大統領令44号法令の改正は今後イ国側の手に委ねられることになるが、当初目標は達成されたと判断される。

### 1) 暫定検査基準の作成とその見直し

1993年11月暫定検査基準が作成され、更に1996年12月に一部修正を行いつつ実際の検査にも適用されてきた。今後、BPSBは実態に合わせて同基準を見直すために必要なデータを準備する役割を担っており、その能力も技術移転されている。このため、当初目標は達成されたと判断される。

### 2) 検査マニュアルの作成と見直し

1993年11月に暫定実施基準とともに検査マニュアルが作成された。更に、1996年12月の基準見直しに伴いマニュアルの見直しも行われたため、当初目標は達成されたと判断される。

## (4) BPSBの行政的機能の強化

馬鈴薯実験室スタッフの兼務を解いて全員を専任にし、将来に亘ってその機能を存続させる方針が明確にされた。また、検査・証明制度を定着・機能させていくため、自ら関係機関、生産団体等を召集し、種馬鈴薯に関する協議会等を開催するなど、検査・証明上の問題を協議する上で指導的役割を果たせるようになってきた。そのほか、検査合格基準、生産農家の検査申請方法および検査官の検査方法を明記

した局長通達案「種子馬鈴薯検査・証明要領」を作成し、また、関係通達の整備に着手する等、行政機能強化に繋がる活動をしている。従って、当初目標は達成されたと判断される。

## 6. 評価結果

### 6-1 目標達成度

プロジェクト活動の成果から判断し、プロジェクトの目標達成度は以下の通りである。

西ジャワ州においては、RIVから種子生産農家までの種子馬鈴薯増殖システムのモデルができあがり、C/Pは優良（無病）種子増殖に必要な栽培・増殖・検査技術を修得し、計画通りの生産を行えるようになった。また、BPSBおよびBBIでは、種子生産農家に対する指導も行えるようになった。このように、西ジャワ州内における種子馬鈴薯増殖システムは定着しつつあることから、当初のプロジェクト目標は概ね達成されたと判断できる。

一方、病害虫対策および種子生産農家の栽培技術については今後インドネシア側の更なる努力が必要な部分が残されているが、病害虫防除については、現在裸地休耕や線虫対抗植物の導入などの指導を行っており、これら技術を修得することによって、今後インドネシア側の継続的努力による改善が期待される。

また種子生産農家では、現段階においては種子検査制度に関する理解が浅いが、BPSBやBBIでの研修活動が定着していることから、継続的な研修、啓蒙活動を行うことにより、長期的視点で見れば改善が期待される。

また、本プロジェクト活動の範囲外のことで、BBU以降の種子流通の適正化・円滑化が問題として認められたが、農業省および西ジャワ州の種子流通取扱団体に対する指導により、インドネシア側にて解決されることが期待される。

### 6-2 プロジェクトの効果

#### 6-2-1 効果の内容

##### (1) 技術的インパクト

専門家の指導および日本での研修を通じて、カウンターパートの間に馬鈴薯生産における優良（無病）種子の重要性及び採種環境の良好な維持について認識が広がり、また、種子生産に携わる増殖、検査、行政等関係各分野の連携が重要であることが理解されてきた。また、一般栽培農家にも優良（無病）種子の使用により高い収量が得られることが理解され、高生産性馬鈴薯生産技術体系の重要な要素として定着しつつある。

## (2) 制度的インパクト

プロジェクト活動を通じ、農業省及び州政府の企画・指導のもとに、LEHR/RIV→BBI→BBU→採種農家の順に増殖していく優良種子馬鈴薯増殖システムが西ジャワ州で確立された。また、この増殖システムに種子検査システムが連携し、検査基準に合格した種子馬鈴薯に国家が証明を行う検査・証明制度が確立した。

## (3) 経済的インパクト

従来インドネシアでは、高価な輸入種馬鈴薯 (4,000Rp/kg) に頼らざるを得なかったが、本プロジェクトの増殖システムが西ジャワ州で確立されたことによって、州内では輸入種子と同等品質の種馬鈴薯がこれの半額で一般農家に供給可能となるとともに高い収量を上げることが可能となった。今後、イ国側が種馬鈴薯需要に応じた量的拡大を図れば、種子輸入量の減少による外貨節約及び増産による国家経済の向上に貢献し、また、馬鈴薯生産農家の収入増による農家経済の向上が見込まれる。

## (4) 社会・文化的インパクト

実習や実証を通じ優良種子馬鈴薯栽培技術を修得した種子生産農家は、適正栽培技術の重要性を理解するとともに新しい技術に対して積極的に取り組むようになった。また、適正栽培技術は種子生産農家を通じ一般栽培農家にまで広がりつつある。

本プロジェクト活動は種子馬鈴薯の引き渡し式等の機会毎に新聞、テレビ等マスメディアを通じ紹介され周辺農家の適正種子馬鈴薯生産の重要性の理解が広まった。

また、C/Pを始めプロジェクト関係者の間で優良種子生産体系を自らの手で樹立したことに対する自信が広まった。

## (5) 環境的インパクト

種子馬鈴薯栽培現場の職員は、農薬の選択と適期防除によって農薬散布回数を必要最小限度に減らすことが、経営面のみでなく環境汚染防止に役立つことを理解し始めた。また、作業従事者の健康と安全のために、農薬の正しい使用方法を守ることの大切さが認識されつつある。

## 6-2-2 効果の広がりや受益者の範囲

### (1) プロジェクトレベルのインパクト

直接の受益対象者はC/Pである。C/PはJICA専門家から直接に技術指導を受け、更に日本での研修によって必要な技術を蓄積し、実際の業務に活用できるようになった。また、プロジェクトサイトの職員は専門家やC/Pから指導を受けて技術の向上が見られた。種子生産農家は、研修参加や種子検査所検査官からの指導を通じて種子

馬鈴薯生産技術を学び、最終的には種子生産農家までプロジェクトの効果が広がった。

#### (2) セクター（農業省・西ジャワ州農業部）レベルのインパクト

優良種子馬鈴薯増殖・配布の企画管理を担当する農業省種苗局及び西ジャワ州農業部の職員は、実務及び専門家のアドバイスを通して種苗行政遂行能力が向上し、プロジェクト終了後の増殖事業継続に期待が持てるようになった。

#### (3) 地域（西ジャワ州）へのインパクト

本プロジェクトの増殖システムによって生産される普及種子は州内の一般農家へ安価（輸入種子の半額程度）に販売されるので、種子更新が促進され、収量増加による農家経済の向上が期待される。なお、現状では供給量が不足しているので、今後、需要に応じた量的拡大が必要である。

#### (4) マクロ（インドネシア）レベルのインパクト

西ジャワ州で良質の種子馬鈴薯自給の道が開かれたことは、国内で馬鈴薯の主産地を持つ他の州（5州）に将来の自給に向けて大きな夢を抱かせることとなった。農業省は既に全国的な種子馬鈴薯増殖システム確立のための構想を打ち出している。

### 6-3 実施の効率性

日本側投入の専門家派遣、研修員受入および機材供与はほぼ計画通り行われ、プロジェクトの円滑な実施に貢献した。一部種子検査の長期専門家の交替時に半年ほど空きが生じたが、2ヶ月ほど短期専門家派遣で対応したため、当初の目的は達成することができた。

一方、インドネシア側が適切な施設、建物、人員の配置、経費の支出を行ったこともプロジェクト活動を円滑に実施する要因となった。

### 6-4 計画の妥当性

本プロジェクトの実施計画は上位計画である第5次5カ年計画のもとで策定され実行されてきたが、プロジェクト実施中に第6次5カ年計画が策定されプロジェクト後半は第6次5カ年計画のもとで実施されることとなった。西ジャワ州における優良種子馬鈴薯の増殖に必要な技術及び管理方法の改善を図り、もってイ国の馬鈴薯増産に寄与することを目的とする本プロジェクトは、農業の多角化、資源の最適な活用、持続的農業技術、農業生産物の付加価値の増進等を通じ、農業の人的資源の質的向上と農民の生活の向上を図るといった第6次5カ年計画の農業開発目標と十分整合性がとれており、本プロジェクトの計画は妥当であったといえる。

## 6-5 自立発展の見通し

### 6-5-1 組織的自立発展の見通し

#### (1) 実施機関

プロジェクトサイトとなっているLEHR/RIV、BPSBは農業省所管の機関で、BBIおよびBBUは西ジャワ州政府所管である。プロジェクト終了後のこれらの機関は引き続き現在の業務を継続することになっており、組織的には安定している。

#### (2) 管理運営体制

優良種子馬鈴薯増殖事業は、プロジェクト発足当初から管理運営体制が明確にされていて、農業省（食用作物園芸総局種苗局、研究開発庁園芸研究開発センター）及び西ジャワ州農業部が実施機関となり、関係下部機関（農業省はRIV、BBI、BPSB、州政府はBBI）の人事、予算、事業内容を管理しており、また、農業省は中央政府として政策・方針を州に指導する立場にある。

BBUは公社の性格上独立採算制であるが、出資者である州政府の指導・監督下にある。この管理運営体制はプロジェクト実施期間中も変更なく、終了後も継続されることになっている。

#### (3) 組織の改廃

農業省は、1993年9月に園芸部門や種苗行政を強化するため、食用作物総局を食用作物園芸総局に改め、総局内に種苗局を新設した。本プロジェクトは従来の園芸局から種苗局担当に替わり、種子馬鈴薯生産に対する取り組みが強化された。また、西ジャワ州農業部では、1995年12月に内部組織の改編があり、園芸種子生産のセクションが明確化された。現在のところ、今後の組織改正等の予定はない。

### 6-5-2 財務的自立発展の見通し

#### (1) 必要経費調達の見通し

現在までに供給された原原種に対する販売代金に関してはBBIとBBUとの間で検討が続けられているため、BBIでは、現在のところ販売代金の回収は行われていないが、今後供給される原原種については農業大臣令で定められた価格で販売され、この販売代金が生産経費に充当されることになる。現在の生産量から判断すれば、栽培管理等他の経費を加えても必要経費の調達は可能と思われる。

BBUでは現在でも、独立採算制で運営されており遅れていた資金回収についても改善されていることから、今後も必要経費の調達は可能と思われる。

研修及び種子検査経費は、これまでと同様に公的予算が使われることになる。

## (2) 公的補助及びその安定性の見通し

人件費及び施設維持管理費等の予算的措置は問題ないものと思われる。研修関係予算について農業省は、関係機関の人材育成及び種子生産農家の技術向上の必要性を認識しているため、引き続き予算措置がとられることが見込まれる。

## (3) 自主財源による費用回収状況

現在のところ、プロジェクトで種子販売収入を回収しているのはBBUのみである。土壤病害虫の発生でこれまで配布数量が少なかったために、収益を上げるまでに至っていないが、防除対策を続行中であり遠からず黒字に転向するものと期待される。

BBUは、今後は公定価格で種子販売代金が回収できる計画になっており、現在の配布量を維持すれば、費用の回収が可能である。

## (4) リカレントコスト負担の必要性及び妥当性

供与機材のうち超遠心分離機など比較的高額の精密機械が故障した場合には、修理経費の負担が重いと予想される。運営経費負担のうち最も心配されるのは研修経費であるが、農業省は人材育成の必要性を認識しているため、必要経費の確保の見込みはある。

## 6-5-3 物的・技術的自立発展の見通し

### (1) 技術移転の内容及び技術レベルの適正度

長期専門家、短期専門家ともに特に問題はなく、適切な派遣がなされたと判断される。特に短期専門家の場合、日本でのC/P研修受け入れで既に面識のある者が多かったことは、技術移転を円滑なものにした。専門家は、増殖、栽培、検査、研修の各分野ともインドネシアの実状にあった技術の移転に励んだため、その技術は適切であった。

### (2) 技術の定着状況

プロジェクト開始以来、技術分野でのC/Pの配置転換はごく少なく、ほとんどが終始一貫して各技術分野の活動に専念した。プロジェクト終了後も大きな変化は予想されないため、移転された技術は定着すると見込まれる。

BBUにおいては、技術移転を受けたC/Pが研修の講師を務めており、技術の蓄積が進んでいると考えられる。

また分野によって差はあるものの、業務に対する積極性や視野の広がりも見られるようになっており、技術の一定の維持・発展はなされているものと判断される。

### (3) 施設機材の維持管理状況

各種施設・機材は良好に管理されており側の管理運営面については問題はない。各施設とも機材盗難の危険性に備えて、盗難防止のためアラーム施設の設置等努力を行っているが、今後とも施設管理を厳重に行うよう留意する必要がある。

### (4) 後継者の育成計画

育成計画といったものは特にないが、BBIで実施する職員研修参加のほか、職場内で大勢の職員を対象にした勉強会・検討会を補助的に行ってきた。

## 6-5-4 その他管理運営上の制約要因

各機関の財政基盤が脆弱なことが、計画的な種馬鈴薯生産による適正な増殖体系の確立に少なからず影響を与えることとなった。

BBIにおいては農業省、西ジャワ州からの予算執行が遅れることにより、またBBUにおいても販売代金の回収が遅れることにより、作付け時期が遅れたり適期の病害虫防除が困難になる等の影響が見られた。

種子生産農家においても、経営基盤が脆弱なため、適切な種子生産に必要な資材の調達が十分に行えないといった影響が見られた。

## 7. 結論

### 7-1 要約

本プロジェクトの活動はRD、TSIに沿って概ね計画通り実施され、プロジェクト目標は、1997年9月のプロジェクト終了時までに概ね達成されると評価できる。

なお、病害虫防除と採種農家の栽培技術の向上については、更なる品質と生産性向上のための課題は残るものの、基本的な技術移転は見られるため、今後インドネシア側の継続的な活動によって成果が出るが見込まれる。そのため、本プロジェクトは当初の協力予定期間をもって終了する。

プロジェクト終了後は、インドネシア側の努力により本プロジェクトの成果が西ジャワ州内の農民、またインドネシア全土に広がることを期待する。

### 7-2 提言

プロジェクトの成果を終了後も維持し拡大していくため、インドネシア側には下記について要望する。

- 1) 優良種子馬鈴薯供給体制の確立のためには、基本種 (G0) から種子馬鈴薯 (G4) にいたる生産を計画的に行うことが最も重要である。プロジェクト終了後は中長

期的な視野に立った生産計画の樹立と関係機関への周知徹底及び連携の強化が重要である。このような計画樹立と計画的な生産の実行のための関連機関、特に農業省及び西ジャワ州政府の行政体制の強化が期待される。

- 2) 本プロジェクトの実施により関係機関の技術力は著しく向上した。これらの機関に蓄積された知識と経験は、西ジャワ州のみならずインドネシア全体の馬鈴薯生産の発展に大きな役割を果たすことが期待される。特にBBI及びBPSBは今後のインドネシアにおける種子馬鈴薯生産技術の向上のために大きな役割を果たすことが期待されており、農業省及び西ジャワ州の十分な支援を期待する。
- 3) 暫定種子検査基準の将来の改正に当たっては、種子の生産状況と種子の品質について、正確に評価することが重要である。
- 4) BBIにおけるネコブセンチュウ密度を下げるため、線虫対抗植物の導入を徹底すること。
- 5) BBUでの青枯病対策として、休耕を含む輪作の措置を引き続き実施すること。
- 6) BBI、BBUにおける種子馬鈴薯生産環境を整備すること。また、BBUの灌漑施設の整備等、再生産を行うための適切な投資を十分に行うこと。
- 7) 種子生産農家の種子検査制度への理解を得るために、啓蒙活動を継続的に行うこと。
- 8) 優良な種子馬鈴薯が計画的に一般栽培農家にまで行き渡るように、種子流通を取り扱う団体への適正かつ円滑な運営の指導を徹底すること。
- 9) 今後本格的な種子生産段階への移行に伴い、一般栽培農家までを含めた種子馬鈴薯の生産・流通に関する資金環流の見通しを把握するとともに所要の対策を講じること。特に種子馬鈴薯生産農家に対する融資制度やそれに伴う指導体制の充実を図ること。
- 10) 全国レベルで一般栽培農家の需要に見合った種子馬鈴薯の供給体制を構築すること。
- 11) 本年7月に本プロジェクトの成果を踏まえ、優良種子を利用したインドネシアの馬鈴薯生産に関する国際セミナーを日米コモンアジェンダの一環としてアメリカ合衆国と共催で実施することとしている。本セミナーはインドネシアの馬鈴薯生産全体に大きなインパクトを与えるものであり、インドネシア政府の十分な支援が期待されている。