付　属　資　料

1．ミニッツ（英文、西文）

2．合同評価報告書の要約（和文、西文）

3．実績表（Table of achievements）

4．各技術分野における５年間の成果、プロジェクト目標に対する貢献度及び今後の問題点（専門家及びカウンターパートの作成資料）

5．各種実績資料（和文）

6．プロジェクト要約の変遷

7．農牧省「野菜及び果樹生産国家計画」（仮和訳）

8．PLAN ESTRATÉGICO ECONÓMICO Y SOCIAL

MINUTES OF DISCUSSIONS
BETWEEN
THE JAPANESE EVALUATION TEAM
AND
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF REPUBLIC OF PARAGUAY
ON
THE JAPANESE TECHNICAL COOPERATION
FOR
THE IMPROVEMENT OF VEGETABLE PRODUCTION TECHNIQUES FOR SMALL SCALE FARMERS
IN
REPUBLIC OF PARAGUAY

With about five months left to the termination of cooperation term of the Project for the Improvement of Vegetable Production Techniques for Small Scale Farmers in Republic of Paraguay (hereinafter referred to as "the Project") on March 31st 2002, which started on April 1st 1997, as stated in the Record of Discussions (hereinafter referred to as "the R/D"), the Japanese Evaluation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), headed by Mr. Kozo INADA, visited Republic of Paraguay from October 22nd to November 1st 2001.

The Team had a series of discussions with the relevant authorities of the Government of Paraguay, made field surveys and exchanged views from technical and administrative points of view.

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

Done in both English and Spanish, each text being equally authentic. In case of any divergence of interpretation, the English text shall prevail.

Asuncion, October 31st, 2001

Mr. Kozo INADA
Leader, Japanese Evaluation Team,
Japan International Cooperation Agency,
Japan

Mr. Pedro Luno MOREL
Minister,
Ministry of Agriculture and Livestock,
Republic of Paraguay

Major Points of Understandings

The Japanese side and the Paraguayan side agreed on the following matters discussed in the Joint Coordinating Committee.

1. The Joint Evaluation Report was accepted that is shown in the ATTACHMENT, which the Japanese Evaluation Team and the Paraguayan Evaluation Team elaborated. It was understood that the Project Purpose would be achieved until the R/D period as scheduled.

2. The Government of Paraguay should allocate necessary staffs as well as enough budgets and execute it appropriately during and after the Project cooperation period, in order to make the Project self-sustainable. Also, Paraguayan side should make up a plan of operation and development in order to materialize "*Vegetables and Fruits Production National Plan*", that should be a must for self-sustainability besides the realistic budgetary plan.

3. Japanese side may consider dispatching short-term Japanese expert(s) on necessity and on condition that the Paraguayan side submits the Operational Plan mentioned above (2.).

4. In order to make the Project self-sustainable, continuous collaboration between IAN and DEAG should be maintained. IAN and DEAG can consult with CETAPAR (The Technology Center of Agriculture and Livestock in Paraguay) in aspects of technical information and extension, when necessary.

5. The handling of the vegetable varieties brought in from Japan for the purposes of experiment and research in this Project, is to be considered through mutual consultation between Japanese and Paraguayan sides until the end of the cooperation period.

THE ATTACHMENT

MINUTES OF DISCUSSIONS
OF
THE JOINT EVALUATION
ON
THE JAPANESE TECHNICAL COOPERATION
FOR
THE IMPROVEMENT OF VEGETABLE PRODUCTION TECHNIQUES
FOR SMALL SCALE FARMERS
IN
REPUBLIC OF PARAGUAY

With about five months left to the termination of cooperation term of the Project for the Improvement of Vegetable Production Techniques for Small Scale Farmers in Republic of Paraguay (hereinafter referred to as "the Project") on March 31st 2002, which started on April 1st 1997, as stated in the Record of Discussions (hereinafter referred to as "the R/D"), the Japanese Evaluation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), headed by Mr. Kozo INADA, visited Republic of Paraguay from October 22nd to November 1st 2001.

The Joint Evaluation Committee (hereinafter referred to as "The JEC") was organized consisting of the aforementioned Japanese Evaluation Team and the Paraguayan Evaluation Team headed by Ing. Francisco IBARRA in order to review the overall performance and to conduct the final evaluation for the Project.

The Teams had a series of discussions with the relevant authorities of the Government of Paraguay, made field surveys and exchanged views among themselves from technical and administrative points of view.

As a result of discussions, the JEC agreed to recommend to their respective Governments the matters referred to in the documents attached hereto.

Done in both English and Spanish, each text being equally authentic. In case of any divergence of interpretation, the English text shall prevail.

Asuncion, October 31st, 2001

Mr. Kozo INADA
Leader, Japanese Evaluation Team,
Japan International Cooperation Agency,
Japan

Ing. Francisco IBARRA
Leader, Paraguayan Evaluation Team,
Ministry of Agriculture and Livestock,
Republic of Paraguay

1. Introduction

Agriculture is a key industry in Paraguay where 40% of the working force are engaged. But the recent deterioration in cotton production, which nearly 200 thousand small-scale farmers (which is about 83% of the total agricultural producers) are said involved, decreased their earnings and put them in necessitous situation. Also, establishment of MERCOSUR is an anxiety for the domestic small-scale farmers, since vegetables that are cheaper and higher in quality are easily imported from nearby countries. It is an urgent task to diversify their crops to better worthy produce and to nourish and strengthen their competitiveness both in domestic and export markets.

The Government of Japan received official request from the Government of Paraguay for technical cooperation in the aim to: introduce high profitable vegetables; develop superior cultivation methods to improve and stabilize its production; prevent environmental pollution through using suitable amount and kinds of agricultural chemicals; strengthen and extend the implementation system of activities concerned that would improve small-scale farmers' management and their living standards.

After JICA dispatched the Preliminary Study Team and the Project Design Team, both Governments signed the Record of Discussions in December 1996, and the Project began at the period of five (5) years starting from April 1997 at an aim to develop and extend superior vegetable cultivation methods for small-scale farmers. The Project main sight was placed at IAN and sub-sight at DEAG. CETAPAR was nominated to support the Project activities.

Up until now, the Project activities have been well implemented. The vegetable production techniques and superior varieties selected at IAN are extended to and demonstrated at leading small-scale farmers and local agricultural cooperatives. Seminars and training programs were held for DEAG extension staffs. Pamphlets introducing vegetable cultivation techniques were published and distributed to affiliated staffs and workers as well as farmers.

This time, with about five (5) months remaining in the cooperation period, JICA dispatched the Final Evaluation Study Team for the purpose of evaluating together with Paraguayan Evaluation Team the degree of achievement, identifying problems and proposing necessary solution, and recommending any necessary matters to their respective governments.

2. Outline of the Project

2-1. Objective of the Project

(1) Overall Goal

For small-scale farmers, the improvement in the fabric of management of farming will be achieved, thus contributing to the improvement on the standard of living.

(2) Project Purpose

The cultivation techniques of vegetable crops suitable for the production systems of small-scale farmers will be developed at IAN. These techniques will be disseminated to regional leading small-scale farmers.

2-2. Outputs of the Project

1) Techniques for the breeding and selection of appropriate vegetable varieties will

be improved.

2) Cultivation techniques contributing to the establishment of appropriate cultivation systems in Paraguay will be developed.
3) Studies on the occurrence and control of primary diseases and insect pests will be enhanced.
4) Techniques and knowledge developed in the Project will be disseminated to DEAG extension staffs and leading small-scale farmers in Paraguay, particularly in the Departments of Cordillera, Central, Caaguazu, Paraguari and Alto Parana (as the primary areas of vegetable production promoted by the Government of Paraguay) by IAN, DEAG and CETAPAR.

3. Members and Schedule of the Joint Evaluation Team

3-1. Japanese Evaluation Team

The Member list is attached in ANNEX 1.

3-2. Paraguayan Evaluation Team

The Member list is attached in ANNEX 2.

3-3. The Schedule of the Evaluation

The Schedule is attached in ANNEX 3.

4. Objectives of the Evaluation

The evaluation activities were performed at the objectives of:

(1) Evaluating the degree of achievement based on TDIP and PDM;
(2) Identifying problems on any aspects of the Project implementation and proposing necessary solution, so as to help its self-sustainability after the cooperation period; and
(3) Recommending any matters to their respective governments that are necessary for the smooth and successive implementation of the Project.

5. Evaluation of the Project

5-1. Evaluation Methods

This evaluation was conducted by the Joint Evaluation Team which was composed of the Japanese Evaluation Team and the Paraguayan Evaluation Team in accordance with R/D, TDIP and PDM through report analysis, field visits and surveys, interviews and discussions with the personnel in the Project based on five Evaluation Components as follows:

(1) Efficiency
(2) Effectiveness
(3) Project Impact
(4) Relevance
(5) Sustainability

5-2. Analysis based on the Evaluation Criteria

The Team analyzed the performance of the Project using the following five (5) criteria.

(1) Efficiency

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

(2) Effectiveness

Effectiveness was assessed by analyzing the Project achievements.

(3) Project Impact

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

(4) Relevance

The validity of the Project purpose was judged according to the relevance of the policy of the Paraguayan government.

(5) Sustainability

Sustainability of the Project was prospected by examining such factors as utilization of the Project inputs and allocation of Paraguayan counterparts, management capacity and resources available for successive Project activities.

6. Results of the Evaluation

6-1. Efficiency

6-1-1. Input from Japanese side

(1) Dispatch of Japanese Experts

A total of eight (8) long-term experts (Chief Advisor, Coordinator, Breeding, Cultivation of Vegetables / Extension, Plant Protection (Disease Control and Insect Pest Control) and fifteen (15) short-term experts have been dispatched to the Project (ANNEX 4).

A long-term expert for Breeding was not dispatched at the beginning of the Project for six (6) months due to personal reasons. Therefore a short-term expert substituted its place for three (3) months. This caused a little delay in formulating its precise plan of operations. Except for this case, necessary short-term experts were dispatched timely and no other crucial matters occurred.

(2) Training of Paraguayan Personnel in Japan

A total of seventeen (17) C/P have participated training in Japan (ANNEX 5).

(3) Local Cost Expenditure

The detail of Local cost is listed in ANNEX 6. Besides General Local Cost, Japanese side have born costs for Public Relations and Extension, Security Measures, Technical Exchange Program, and Urgent Measures. Especially, for Basic Infrastructure Construction Expense, twenty-six (26) million yen was spent to build the one and only Vegetables Research Center in Paraguay.

(4) List of Provided Equipment

The list of equipment provided by the Project is listed in ANNEX 7. All provided equipment are maintained in fair condition.

6-1-2. Input from Paraguayan side

(1) Allocation of C/P

A total of eighteen (18) C/P have been placed (ANNEX 8). Three (3) of them resigned for personal reasons but three (3) were reallocated soon after.

(2) Allocation of Budget

Paraguayan side has allocated the budget as listed in ANNEX 9.

6-1-3. Evaluation

(1) Validity of input

The Japanese side has implemented its plan pertinently along with the R/D such as dispatching experts, accepting C/P trainees and providing necessary equipment, as well as disbursing necessary costs for building facilities and operations at project sites.

With these inputs, Japanese experts were able to transfer their knowledge and techniques to Paraguayan C/P, achieving excellent outputs together. Although some people were inexperienced, Paraguayan C/P were allocated properly to each technical field and they improved their ability and skills through training in Japan. They are well trained enough to serve as instructors in technical seminars for farmers. The provided equipment helped advance activities on breeding, cultivation and research on plant protections. Most of equipment are maintained in the Vegetable Research Center, the only facility that has the most complete functions on vegetable research in Paraguay. It is necessary that Paraguayan side maintains and makes the best use of the Center.

As a whole, it is concluded that most of the outputs are achieved through efficient input.

(2) Problems arising from input and output

During the Project cooperation period, three (3) C/P resigned for personal reasons. It is a problem not just because they resigned but because they resigned even after training in Japan. This means that knowledge and techniques transferred by experts and expenses spent for them, including their stays as trainees in Japan, left nothing to help the sustainability of the Project. It is necessary for the Paraguayan side to consider giving incentives or improve treatments of the assigned personnel as C/P of the Project so that they will work long, even after the Project cooperation period.

As for the custom clearance of some equipment, it even took as long as one (1) year to clear Paraguayan customs when the Project was bringing in the provided equipment to Paraguay. Due to this delay, major necessary equipment were unable to use until the latter half of the Project period, causing delay in its activities.

The allocation and disbursement of Paraguay's local costs were often late and less than the amount proposed, and it often prevented smooth operation of the Project. The Japanese side had to bear local expenses for even small equipment, expendables, maintenance fee for provided equipment, communication fee, etc., that should all be paid originally by the Paraguayan side. Also, as for C/P, the Paraguayan government should keep paying them overtime duties continuously to maintain its activities. Paraguayan government should take necessary measures to

cope with this situation in order to sustain the Project.

Up to this year, there was no exclusive allocation of counterpart budget for this Project. Paraguayan Parliament approved the revised budget for 2001 and necessary costs for foreign assisted projects were separately allocated for the first time to MAG. Such measures are necessary for successive and sustainable Project activities. Moreover, it is obvious that budget allocation and accounting management would be needed after the Project period. Therefore, it is recommended that IAN make up a plan of operation and development under a realistic budgetary plan.

(3) Outputs of each technical field

a. Breeding

1) The variety that was suitable for Paraguay was searched. As for melon, the new variety 'Autumn Waltz' was newly introduced and started to extend, which made up for existing main variety, and had good storage and tolerance to diseases. 'Dover', the strawberry variety, was selected for the reason of resistance in anthracnose that had increased at the main production area. As a result, this area remained as main strawberry producing area. For tomato, 'Horizon' was selected as a useful mother plant.

2) New varieties, a tomato with resistance to bacterial spot disease named 'SUPER CETAPAR' and a melon that has green pulp and good storage, with resistant to primary diseases named 'LUNA YGUAZU', were bred in CETAPAR.

3) In melon, a new line, which had reddish fruit and good storage, and its harvesting time could be judged by its looks, was bred by inbreeding of 'Autumn Waltz'. F1 lines were bred, which had crossed between this new line and intermediate mother plant that had tolerance to Fusarium wilt. From now on, it will be able to register as a new variety after adaptability tests are done through local examination,

4) For strawberry, promising line was selected from hybridized line, in order to obtain variety that has early-ripening, hard fruit and good yield. Variety of this line will be able to register after examination of tolerance to disease, productivity and characteristic, and a local adaptation test scheduled later on.

5) For tomato, one line of reddish-large fruit was fixed as useful mother plant. From now on, this line will be tested on combination with the main disease resistance, and it is assumed to get an excellent F1 variety. On the other hand, the number line, which has hard fruit, is fixed, and combination examination with the mother plant 'Horizon' is undergoing.

6) Method of making use of breeding material, and technology selection and mating was transferred, but technology transfer of examining tolerance to disease, characteristic, local adopting and harvesting seed have not finished yet. Also, buildings of harvesting seed organization and variety registration work are left.

b. Vegetable Cultivation

1) As for tomato, summer cultivation system using cheesecloth coverings was developed. This resulted in production of tomato from January to May, when selling price was higher than other harvesting seasons.

2) As for melon, cultivation system using tunnel covering of white cheesecloth was developed. This resulted in shipping of melons during October when selling price was 60% higher and harvesting season was one month earlier than before, and yield increased.

3) As for strawberries, long-term stability harvesting system that harvests from May to December was developed with adoption of combinations of early-ripening and late-ripening variety and with improvement of nursery culture. Harvesting season of strawberries was made possible two months earlier and its yield increased about 20% more than before.

4) Year-round culture of tomato and cultivation system of melon from July to next April was developed, using rain shelter house. Planting time increased drastically and producing high quality crops became possible.

5) Vegetable cultivation management technology and research techniques were transferred through project implementation.

c. Plant Protection (Disease Control)

1) The Project identified and clarified the occurrence of primary diseases for tomato, melon, strawberry and green pepper. It established methods to control these diseases. Therefore, farmers were able to spray less agricultural chemicals (frequency decreased about 30%).
2) For strawberries, there was an outbreak of anthracnose and pestalochia (a disease newly found) in the major producing region, which damaged 30% to 40% of the total plants. The Project established and extended an appropriate disease control.
3) It was identified that primary diseases damaging much of tomatoes were two (2) kinds of virus – TSWV and TYLCV – carried by insects.
4) Disease control methods was established that uses less agricultural chemicals such as using varieties that have tolerance to diseases, using solar heat for disinfecting, etc..
5) C/P acquired techniques for diagnosis research and experimental methods.

d. Plant protection (Insect Pest Control)

1) The Project identified and clarified the occurrence of major insect pests for tomato, melon, strawberry and green pepper. It established methods to control these insects. Therefore, farmers were able to spray less agricultural chemicals (frequency decreased about 50%).
2) For tomatoes, two (2) insect vectors of virus disease were identified – *Bemisia argentifolii* and *Frankliniella schultzei*. Also, the Project established covering

cultivation and an appropriate insect control method in seedling period. Therefore, 75% of the damage due to these insects decreased.

3) The Project clarified the effectiveness of natural insects such as aphides and mites. The additional uses of agricultural chemicals to these insects are now under investigation.
4) C/P acquired techniques for insect pest research and experimental methods.

e. Extension

The Project extended its outputs as follows:

①The techniques developed and varieties selected by the Project were introduced to the leading farmers (such as leaders of the committees) by Japanese experts, C/P and DEAG extension staffs.

②Seminars and workshops were held in demonstration farms.

③Pamphlets introducing technical methods were published.

The leading farmers play an important role in demonstrating its farms to other farmers. A total of thirteen (13) demonstration and verification farms were placed in places like Ita, Nueva Italia, Aregua, Caraguatay, etc. More than fifty (50) seminars and workshops were held in such places where more than 3,000 people (researchers, extension staffs, farmers, etc.) participated.

The leading farmers are cultivating the selected varieties ('Autumn Waltz' (melon), 'Dover' (strawberry), 'Super CETAPAR' (tomato)) more than the traditional ones (Sun Rise (melon), Tufts (strawberry), Santa Clara (tomato)). They are satisfied with the Project because damage from diseases and insect pests are fairly controlled, therefore improving the quality and quantity of those crops. Although it varies according to seasons, most of them had larger amount of profit through selling new varieties. Necessary materials and seeds were subsidized by the Project at first, but many leading farmers say that net profit is even larger than before, enough to cover the production costs.

The techniques are under extension to other farmers in the group committee. The leaders will explain and show them how new techniques are being implemented through committee meetings and other occasions. The leaders also understand that they are the leading farmers and they are the ones that should extend newly developed methods. The materials like shade net (cheese cloth), plastic films, watering hose are a little expensive to most of farmers, but methods such as simple rain shelter house for seedlings, transplantation to ridges, watering, appropriate disease and insect pest controls, etc., that are technically available are said to being imitated. Once they understand that new techniques and varieties will steadily produce higher quality and quantity, it is expected that farmers may borrow some money to purchase necessary materials.

Characters and methods on agricultural chemicals that circulate in Paraguay were compiled in the following materials.

①Insecticide and germicide list

②Series of technical pamphlets

The making of manual, which explains the way of cultivation and diagnostics of disease and insect pest, etc, obtained from researches in each field, is now undergoing.

6-2. Effectiveness

It was recognized that the Project activities had almost achieved Outputs as a result of efforts made by both Japanese and Paraguayan sides except for a few activities in the field of breeding. IAN C/P acquired and improved their basic knowledge on how-to cultivate vegetables; methods to expand planting period; techniques for producing high quality crops; techniques on diagnosis of plant diseases and insect pests; and methods of experimental planning, research and analyzing. Also, at IAN and CETAPAR, relevant techniques were developed for melon, strawberry and tomato to establish production systems that would be made useful to small-scale farmers.

The Project set up demonstration farms, held workshops and seminars, published series of pamphlets introducing cultivation techniques. DEAG extension staffs diffused those techniques to leading small-scale farmers who have started using them.

Therefore, it is evaluated that the Project purpose "*The cultivation techniques of vegetable crops suitable for the production systems of small-scale farmers will be developed at IAN. These techniques will be disseminated to regional leading small-scale farmers.*" has been achieved to a certain level.

But, it needs to be noted that there are 250 thousand small-scale farmers in Paraguay and 120 thousand of them are said to live in the target areas of the Project (the 5 provinces). There are hardly any statistics involving the relationship between vegetable cultivation and its technical dissemination or amount of crops produced within these provinces. This keeps from evaluating the achievements on a statistical base.

To reach the Overall Goal which is "*For small-scale farmers, the improvement in the fabric of management of farming will be achieved, thus contributing to the improvement on the standard of living.*", the Government of Paraguay should endeavor to cope with existing problems.

The vegetables produced in Paraguay are under a tense competition in the export market. This Project alone could not tackle the issue. Outputs and effects deriving from the Project have limitations to solving these problems.

As it was suggested by the Project, MAG is now making "*Vegetables and Fruits Production National Plan*". Once it is adopted, it shall make clear concrete aims and targeted areas and farmers where and what to extend through utilizing the outputs of the Project.

6-3. Project Impact

(1) Technical impact

The importance and necessity of breeding were understood and those techniques have been mostly established. For strawberry, 'Dover', which had tolerance to Anthracnose, was selected. The truebreed tomato 'Horizon', which had tolerance to many diseases with self-topping type was selected. Long-storable melon with red sarcocarp named 'Autumn Waltz' was selected and introduced to regional small-scale farmers. The production of crops increased due to the developed techniques, for example, melon from 2.3kg (in farms using traditional cultivation methods) to 8.2kg (in verifying farms using methods developed by the Project) per plant, the same with strawberry, from 490g to 568g.

Mechanism of outbreak of plant diseases and insect pests were investigated and

clarified through studies. As a result, effective prevention methods were established. Ratio of outbreak of tomato-virus disease decreased drastically to 5-25% in the farm with systematic disease and insect control, while it was 75-95% in the farm without it.

DEAG extension staffs were placed long-term in IAN and CETAPAR as counterparts to acquire broad relative techniques. They gave instructions on cultivation techniques and had influence to regional extension staffs and small-scale farmers.

The series of pamphlets that the Project (including CETAPAR) published are somewhat a first full-scale technical guidebook in Paraguay, describing vegetable cultivation skills. They could be used from time to time by researchers, extension staffs, farmers, students, etc. They were utilized in various seminars and also appeared in several newspapers; thus making the Project well known to the public.

(2) Institutional impact

Researchers increased in numbers because the Vegetables Research Center was newly established at IAN.

The Seed Directorate of MAG established seed seedling law on vegetables, because CETAPAR registered the first new vegetable specie, 'Super CETAPAR' (tomato) in Paraguay.

Also, MAG is now working to draw up "*Vegetables and Fruits Production National Plan*", which would help examine middle and long term targets of applying the Project's outputs on Paraguay's own development plan.

(3) Economical impact

There is little influence on the bases of macro-economical impact because inputs of the Project are very limited and necessary statistics or figures do not exist. There is one factor that consumption and production of vegetables in Paraguay is likely to depend upon amount of vegetables imported from nearby countries. The establishment and expansion of the acquired skills that would be made through the effort of Paraguayan side, will be one element of making this impact even greater. In order to do so, the Paraguayan government should also allocate necessary budget for sustainability of the Project as well as implementing necessary measures, such as establishing infrastructure for small-scale farmers.

(4) Social impact

The Project has occasionally announced its activities through newspapers, television, radios, etc. One newspaper continuously ran articles on the Project activities. These arouse people's interest in vegetable cultivation and research. Many farmers, students and consumers visited the demonstration farms and the research center in IAN.

Further increase of people's interest in vegetable consumption and its quality will contribute to developing more efficient skills of vegetable cultivation

(5) Environmental impact

Toxic and water-polluting agricultural chemicals were often used to protect plants from diseases and insect pests. Sometimes these had no instructions nor even farmers did not know their effectiveness or how to use them. Unsuitable and excess

use of these chemicals are causing environmental pollution or even the contrary effect – an increase in other insect pests.

The Project warned the risk of those chemicals and recommended using less-toxic chemicals. The Project had advised C/P the adequate use of chemicals such as utilization of selective chemicals that may preserve natural enemies and reduction of chemical dosage. These results are expected to save the environment and help realize sustainable growth and development of agriculture in Paraguay.

- Range of Effects and Beneficiaries -

(6) Project level

The IAN C/P improved their research ability through the Project activities. Also, technical and extension staffs of DEAG, technical staffs of prefectures, leading small-scale farmers, members of cooperative, staffs of NGO and others concerned had easy access to vegetable cultivation skills through Project's seminars, workshops and pamphlets.

(7) Sector level

In the "*Social Economics Strategy Plan (PEES, 1999-2003)*", two programs are adopted under Agriculture sector:

① To increase production of exported agricultural products, and

② To strengthen farm management and improve productivity.

The outputs of the Project may be applied to these programs from the aspect of technical bases.

On the other hand, in JICA's development study "*The Study on the Economic Development of the Republic of Paraguay (2000)*", there are two proposed priority programs:

① To increase productions of new export products (horticulture), and

② To integrate, systematize, and utilize the research findings of research institutions and MAG agricultural experiment.

These programs are expected to realize by utilizing and applying the Project's outputs. Needless to say that the Project must be sustainable.

Also, MAG prepared "*Vegetables and Fruits Production National Plan*", which would help examine middle and long term targets of applying the Project's outputs on Paraguay's own development plan.

(8) Regional level

The Project experts instructed seminars (including DEAG workshops) that were held in demonstration farms like Ita, Aregua, Caraguatay, etc. As a result, an expansion of new producers for each vegetable can be observed in such places.

(9) Macro level

Not available at this point

6-4. Relevance

From the beginning to the mid-term evaluation (December 1999) of the Project, no changes were made in pre-conditions of the Project. Vegetable production by

small-scale farmers; improvements in their profit; and strengthening competitiveness in export market were important policies under agricultural sector. Thus, relevance of the plan was maintained.

As mentioned earlier in 6-3. (7), in the "*Social Economics Strategy Plan (PEES, 1999-2003)*", and in JICA's development study "*The Study on the Economic Development of the Republic of Paraguay (2000)*", vegetable cultivation by small-scale farmers are prioritized and emphasized important.

On the other hand, one of JICA's aid policies toward Paraguay is "*Strengthening Competitiveness in the MERCOSUR System and Promoting Economic Growth*". Within this program includes "*Diversification of Agricultural Products (Experimental researches and techniques extension to promote diversified agricultural products)*". Therefore, the Project still has relevance to the Overall Goal and Project Purpose with relation to the development program of the Republic of Paraguay.

6-5. Prospects for Sustainability

Some leading small-scale farmers have acquired the developed techniques to a certain level and they are able to instruct other small-scale farmers. Therefore, expansions of these techniques to local farmers are expected in the future.

(1) Organizational aspects

Allocation of necessary staffs as well as budget, expansion of research and extension system, and other official support to improve production of small-scale farmers are all needed in order to apply and utilize the Project's outputs. These are important assumptions of the Project that would be needed to make it self sustainable. It should be recognized that disbursement of local costs by Paraguayan side were not enough throughout the whole cooperation period. Therefore, enough budget and appropriate staffs should be allocated in order to sustain the Project activities.

a. IAN

The counterparts have acquired skills through instruction from the experts and training in Japan. But, some of them had little experience in preparing new research programs, designing experimental methods, and implementing experiments on their own. These skills would be needed to solve new problems and to develop new skills on their own. It is expected that the Project work on improving those skills for the rest of the cooperation period.

As a national center of research institute, IAN should maintain and develop its research ability. To do this, C/P should remain in their positions even after the cooperation period of the Project, and they should be given incentives to work. Supervising system shall be established to secure research budget so that researchers can concentrate on their activities. Also, a research adviser who can instruct vegetable research activities from general and institutional management point of view shall be appointed.

b. DEAG

Future condition of the organization and management is uncertain because DEAG has a plan to utilize private sector for improvement of its service. These actions are considered to aim at effective management. But the management and

organizational policy should be clarified soon because the Project sustainability also depends on its extension activities.

c. Management

Managerial leadership is necessary to stipulate the Project activities. Some examples may be as follows: extending day time working hours, securing operating costs, organizing work plans, maintaining equipment and machinery, publishing periodical reports and issuing transcripts, establishing an academic society, promoting research exchanges with other countries, etc.

(2) Financial aspects

a. Local costs

Considering the present and prospective financial conditions of the Paraguayan government, it is likely that the Project may not secure enough budgets to maintain its activities at full scale after the cooperation period. Therefore, there is a concern that provided equipment and machinery as well as facilities may not be well maintained. All in all, it is expected that the Paraguayan government strive to allocate enough budgets.

b. Other financial resources

They are not likely to be found.

c. Earning own profit

IAN earns its own profit by selling produces and seeds although it is not enough to cover its own operational fees. But, all profits are paid to national treasury first. The reallocation of this profit is often too late to implement smooth operation of the Project. The measures to self-support its own finance system should be established.

(3) Personnel aspects

Project C/P should remain in their present positions even after the Project is over in order to make it self-sustainable.

IAN C/P and DEAG technical staffs are basically in charge of one crop per staff. This system is making hard to train successors by themselves because when a technician has to leave or transfer its position for any reasons, there will be no one who will take his duties over and it is likely that all skills he (she) acquired would drain out at that moment. To improve ability of IAN and DEAG as a whole, successors should be trained by IAN C/P and DEAG technical staffs.

7. Summary of the Evaluation

In conclusion, based on discussions and surveys with concerned personnel, JEC concluded that the Project has mostly achieved its objectives set in the R/D and remaining activities that were not completed by the time of evaluation due to the delayed schedule of research on breeding, are within capability of the trained C/P. Accordingly, it is appropriate that the technical cooperation should terminate at the end of March 2002, as scheduled in the R/D.

Japanese experts and Paraguayan C/P should endeavor continuously to finish the rest of the activities and achieve the Project purpose within the cooperation term of the Project.

8. Recommendation

The following issues and necessary measures are recommended by JEC to the Government of Paraguay and Japan in order to sustain and further develop the achievement of the Project.

(1) In order to make the Project self-sustainable after the termination of technical cooperation, the Government of Paraguay should allocate the necessary budget, consider the organizational structure and the assignment of adequate number of personnel for sustaining the technology and facilities to be fully effective. Also, a researcher should be assigned to take leadership in vegetable research sector so that responsibility of directing research system would be established and clarified.

(2) Paraguayan side should prepare a plan of operation and development in order to materialize "Vegetable and Fruits Production National Plan" that is essential for self-sustainability under a realistic budgetary plan. The Plan should be submitted to JICA office in Paraguay until the end of this Project cooperation period.

(3) For the purpose of accomplishing the objectives of the Project, Japanese government may consider dispatching short-term Japanese expert(s) on necessity and on condition that the Paraguayan side submits the Plan mentioned above (8. (2)). In that sense, Paraguayan side should inform quarterly the progress concerning self-sustainability to JICA Office in Paraguay even after the cooperation period.

(4) In order to make the Project self-sustainable, continuous collaboration between IAN and DEAG should be maintained. IAN and DEAG may consult with CETAPAR in aspects of technical information and extension, when necessary

(5) Equipment, machinery and vehicles provided by JICA in the Project should be maintained and utilized properly for the Project by IAN and DEAG in each place. Each should have responsibility to make regulations and assign adequate personnel for them.

(6) The vegetable breeds brought in from Japan for experimental purposes in this Project should be used exclusively for the Project purposes even after the termination of the technical cooperation.

9. Lessons learned from the Project

Through the evaluation of the Project, the Team had recognized some lessons that are useful for the Paraguayan and Japanese governments to plan and implement similar projects in the future.

(1) For smoother and appropriate management of the technical cooperation project, the participatory approach should be taken at the project planning stage, using PDM, PO, and Plan of Monitoring and Evaluation, should be prepared at the project formulation stage. PDM and PO should be revised in a timely manner according to the progress of the project activities.

(2) The Government of Paraguay should allocate enough budget to implement the Project activities smoothly and effectively.

(3) Equipment and machinery provided by JICA should clear the Paraguayan custom smoothly and timely so that necessary equipment can be installed in the Project as planned. The delay causes unnecessary adjustments in the Project activities.

LIST OF ACRONYMS AND ABBREVIATIONS

CETAPAR	The Technology Center of Agriculture and Livestock in Paraguay
C/P	Counterpart personnel
DEAG	Directorate of Agrarian Extension
DGP	Bureau of General Planning
DIA	Bureau of Agricultural Research
IAN	National Agronomical Institute
JEC	Joint Evaluation Committee
JICA	Japan International Cooperation Agency
MAG	Ministry of Agriculture and Livestock
PDM	Project Design Matrix
PO	Plan of Operations
R/D	Record of Discussions
STP	Secretary of Technical Planning
TDIP	Tentative Detailed Implementation Plan

LIST OF ANNEXES

ANNEX 1.

Japanese Evaluation Team

1. Mr. Kozo INADA (Leader)
   Deputy Managing Director, Agricultural Development Cooperation Department, JICA

2. Mr. Akihiko KITA (Agricultural Policy Cooperation)
   Section Chief, International Affairs Office, Administration Division, Agricultural Production Bureau, Ministry of Agriculture, Forestry and Fisheries

3. Mr. Tomotoshi KASHIO (Vegetable Breeding and Cultivation/Plant Protection)
   Associate Director for Research, Department of Vegetable and Flower Research, National Agricultural Research Organization, National Agricultural Research Center for Kyushu and Okinawa Region

4. Mr. Noriharu MASUGI (Planning Evaluation/Extension)
   Staffs, Livestock and Horticulture Division, Agricultural Development Cooperation Department, JICA

5. Mr. Hiroei ISHIHARA (Project Cycle Management Evaluation)
   Deputy Director, Technical Division, Overseas Project Department, NIPPON GIKEN Inc.

ANNEX 2.

Paraguayan Evaluation Team

1. Ing. Francisco IBARRA
   Technical Coordinator, DGP

2. Dra. Gladys TORRES
   Technical Assistant, DGP

3. Ing. Maria Cristina COLINA
   Technical Assistant, DEAG

4. Ing. Justo LOPEZ
   Chief, Department of Planning, Monitoring and Evaluation, DIA

5. Ing. Edgar ALVAREZ
   Chief, Laboratory of Biotechnology, IAN, DIA

ANNEX 3.

Schedule of Evaluation

Date & Time	Activities	Accommodation
Oct. 21 (Sun)	Leave Tokyo (JL048)	In the plane
Oct. 22 (Mon)	Via Sao Paulo (RG8902) Arrive at Asuncion JICA Office (Courtesy call) Embassy of Japan (ditto) STP (Courtesy call) Meeting with JICA experts	Asuncion
Oct. 23 (Tue)	MAG (Vice Minister, DGP, IAN) (Courtesy call) DIA (Courtesy call) DEAG (Courtesy call) Meeting with Paraguayan Evaluation Team (Field survey at IAN)	Asuncion
Oct. 24 (Wed)	Demonstration farms at ITA, Nueva Italia, Aregua (Field survey)	Asuncion
Oct. 25 (Thu)	IAN (Discussions and meetings)	Asuncion
Oct. 26 (Fri)	Demonstration farms at Caraguatay and Blas Garay (Field survey) Move to Iguazu by car CETAPAR (Discussions)	Iguazu
Oct. 27 (Sat)	Move to Asuncion by car	Asuncion
Oct. 28 (Sun)	Arrange reports and documents	Asuncion
Oct. 29 (Mon)	Discussions with the Project at IAN Meeting with Paraguayan Evaluation Team	Asuncion
Oct. 30 (Tue)	Meeting with Paraguayan Evaluation Team Finalize the Joint Evaluation Report Arrange and submit the Report and Draft Minutes of Meeting	Asuncion
Oct. 31 (Wed)	Joint Evaluation Committee (Sign the Joint Evaluation Report) Joint Coordinating Committee (Sign the Minutes of Meeting)	Asuncion
Nov. 1 (Thu)	Embassy of Japan (Survey report) JICA Office (ditto) Leave Asuncion (RG8903)	In the plane
Nov. 2 (Fri)	Via San Paulo (JL063)	In the plane
Nov. 3 (Sat)	Arrive at Tokyo	

ANNEX 4. Dispatch of Japanese experts

(1) Long term expert

	Responsible area	Name	Period
1	Team leadere	Dr. Takashi Ishijima	1997. 4. 2 ～ 2002. 4. 1
2	Coordinator	Mr. Akira Matsuda	1997. 4. 2 ～ 2002. 3.31
3	Vegetable cultivation/Agricultural extension	Mr. Tatsuyoshi Taga	1997. 5.28 ～ 2002. 3.31
4	Plant Protection (disease control)	Mr. Shunji Sato	1997. 5.28 ～ 2002. 3.31
5	Plant Protection (Insect pests control)	Mr. Yutaka Kimura	1997. 5.28 ～ 2002. 3.31
6	Breeding	Dr. Tokio Hisatomi	1997. 9.27 ～ 2002. 3.31
7	Vegetable cultivation/Agricultural extension	Mr. Shinichiro Fujii	1999. 5.12 ～ 2002. 3.31
8	Coordinator	Mr. Yoichi Okawara	1999. 9.13 ～ 2002. 3.31

(2) Short term expert

	Subject	Name	Contents	Period
1	Breeding	Mr. Yozo Sakurai	Vegetable breeding.	1997. 7.16 ～ 1997.10.17
2	Breeding	Mr. Yozo Sakurai	Genetic material evaluation.	1998. 3. 6 ～ 1998. 6. 3
3	Vegetable cultivation	Mr. Shigeki Furuya	Cultivation techniques in the hot climate.	1998. 3. 6 ～ 1998. 4.10
4	Breeding	Mr. Tadayuki Wako	Artificial inoculation test of disease resistance on seedling stage plant.	1998. 9.17 ～ 1998.10.29
5	Plant Protection (Insect pests control)	Mr. Tetsuzo Hamamura	Efficient control method on leaf tick.	1998.10. 1 ～ 1998.10.27
6	Vegetable cultivation	Mr. Sunao Kikuchi	Soil management and fertilization on vegetable cultivation.	1999. 2.18 ～ 1999. 3.29
7	Plant Protection (disease control)	Mr. Chiyoichi Noda	Diagnosis on virus diseases of tomato.	1999. 2.26 ～ 1999. 4.14
8	Breeding	Mr. Makoto Okimura	Plant selection from crossed population.	1999. 8. 2 ～ 1999. 9.10
9	Vegetable cultivation	Dr. Mio Yoshida	Soil improvement on low productivity farm	1999. 9.13 ～ 1999.10.28
10	Plant Protection (disease control)	Dr. Ikuo Kadota	Diagnosis and identification of bacteriological disease	1999.10. 1 ～ 1999.11.29
11	Plant Protection (Insect pests control)	Dr. Tamito Sakurai	Confirmation of tomato virus disease vector.	2000.01.26 ～ 2000.03.01
12	Agricultural extension	Mr.N aomitsu Uehara	Extension techniques.	2000.07.15 ～ 2000.08.30
13	Plant Protection (disease control)	Dr. Zenichi Sano	Damage of nematode on strawberry and their control.	2000.09.25 ～ 2000.11.03
14	Plant Protection (Insect pests control)	Dr. Takashi Noda	Evaluation on depredater of sucking insects and effect test on chemical product aplication.	2000.10.10 ～ 2000.11.18
15	Breeding	Dr. Kimio Ito	Efficient techniques for hibrid F1 seed production.	2000.10.18 ～ 2000.11.27

ANNEX 5.

Counterpart Training in Japan

Fiscal Year	Name	Period	Topics	Principal Institute of Training
1997	Mr.Marcos Villalba	10/27/97- 11/18/97	Administration of agricultural investigation	NIVOT *
	Mr.Luis Raidán	01/09/98- 03/25/98	Breeding of strawberry	NIVOT
	Mr.Viligilio Delgado	03/30/98- 07/02/98	Vegetable Cultivation	Aichi Prefecture Research Institute of Agriculture
	Mr.Edgar Amarila	03/30/98- 09/21/98	Breeding of melon	NIVOT
	MS.Rossamary Santacruz	03/30/98- 09/21/98	Breeding of tomato	NIVOT
1998	Mr.Blas Benicio Valiente	08/17/98- 11/11/98	Vegetable Cultivation	NIVOT
	Mr.José Félix Bareiro	03/14/99- 04/11/99	Administration of agricultural investigation	NIVOT
	Mr.Gustavo Cuenca	02/11/99- 09/24/99	Vegetable Cultivation and extension	Tsukuba Trainning Centre of JICA
	Mr.Oscar Guillen	03/29/99- 07/29/99		NIVOT, Hokkaido Agricutural Research Centre
	Mr.Carlos Palacios	03/29/99- 07/29/99	Insect Pest Control	NIVOT
1999	Ms.Maria T. Ayala	05/05/99- 08/11/99	disease Controk	NIVOT
	Mr.Carlos Alberto Huespe	06/02/99-09/01/99	Breeding of vegetables	NIVOT
	Dr.Ramon Cipriano Enciso	03/15/00-04/07/00	Administration of agricultural investigation	NIVOT
2000	Ms.Elena Ayala	05/02/01-11/16/01	Vegetable Cultivation Tecnology	Tsukuba Trainning Centre of JICA
2001	Ms.Juana Caballero	05/07/01-07/21/01	Aguricultural Extension Planning and Management	
	Mr.Gregorio Bozzano	05/28/01-08/15/01	Desease Control of Vegetable Crops	NIVOT
	Ms.Delia Martinez	05/28/01-08/29/01	Breeding and Cultivation Methods of Melons	NIVOT

* NIVOT: National Reserach Institute of Vegetables, Ornamental Plants and Tea (Mnistry of Agriculture Forestry and Fishery)

ANNEX 6.

Expenditures on Provided Equipment and Local Cost by JICA

	Fiscal Year / Month		1996	1997 4 6 8 10 12 2	1998 4 6 8 10 12 2	1999 4 6 8 10 12 2	2000 4 6 8 10 12 2	2001 4 6 8 10 12 2
EQUIPMENT	For Supply	Purchased and shipped in Japan	10, 957, 000¥	17, 342, 000¥	18, 569, 000¥	6, 394, 000¥		
		Local Procurement		24, 841, 000¥	19, 377, 000¥	17, 704, 000¥	12, 113, 000¥	
		Total			37, 946, 000¥	24, 098, 000¥	12, 113, 000¥	
	Accompanied with Japanese Experts			6, 217, 000¥	2, 024, 000¥	1, 505, 000¥	1, 084, 000¥	
burden of Local-cost	Model Infrastructure			26, 457, 000¥				
	Technical Exchange Program				1, 618, 000¥		1, 715, 000¥	
	Security Expense Budget				3, 103, 000¥			
	Publicity activities			4, 105, 000¥	6, 000, 000¥	5, 800, 000¥	3, 573, 000¥	
	Emergency Expense Budget				5, 324, 000¥			
	Local technical application						2, 849, 000¥	4, 100, 000¥
	Local running Cost			3, 000, 000¥	5, 699, 000¥	5, 700, 000¥	5, 000, 000¥	5, 100, 000¥

*1 Transportation and other charges included

* Exchange rate: (1997) 1US$=2, 159Gs=118¥、(1998) 1US$=2, 700Gs=139¥、(1999) 1US$=2, 955Gs=124¥, (2000) 1US$=3, 542Gs=112¥

ANNEX 7.
PROVIDED EQUIPMENT AND MACHINERY
1. OVER 1,600,000 ¥

FTSCAL YEAR	No.	EQUIPMENT	PRTCE(US $)	QUANTITY	LOCATION	USE	CONDTION	REMARKS
1996	1	4WD STATION WAGON(TOYOTA PLADO)	41,103	1	IAN	A	A	
	2	MINIBUS (MITSUBISHI L-300)	26,307	1	IAN	A	A	
1997	1	IRRIGATION SYSTEM	32,500	1	IAN	A	A	
	2	GLASS HOUSE	49,000	1	IAN	A	A	
	3	PICKUP TRUCK (MITSUBISHI L-200)	14,900	1	IAN	A	A	
	4	BUS (MITSUBISHI ROSA)	47,600	1	DEAG	A	A	
	5	INSECT LIGHT TRAP(IKEDA RIKA, MT-7)	14,669	1	IAN	A	A	
1998	1	ELECTRIC GENERATOR	14,500	1	LABORATORY	A	A	
	2	TRACTOR AND ATTACHMENTS (YANMAR 1050 DH)	24,000	1	IAN	A	A	
	3	REGULAR VAN (FORD XLT E 350)	44,800	1	IAN	A	A	
	4	SPLAYER (IKEDA RIKA, HT-4)	17,595	1	ENTOMOLOGY	A	A	
1999	1	PLASTIC GREEN HOUSE WITH METAL STRUCTURE(IRIE)	20,100	1	IAN	A	A	
	2	DIGITAL PRINTER(LANIER 5706)	19,408		ADMINISTRARION	A	A	
	3	STEREO MICROSCOPE WITH CAMERA SYSTEM(OLYMPUS-SZX12)	21,023	1	FITOPATHOLOGY	A	A	
2000	1	4WD DOUBLE CABIN PICK-UP TRUCK(TOYOTA, HILUX)	23,927	1	IAN	A	A	
	2	AUTOCLAVE(ALP, MCY-40DP)	14,500	1	CULTIVATION	A	A	

PROVIDED EQUIPMENT AND MACHINERY

2. OVER 100,000¥ AND UNDER 1,600,000¥

FISCAL YEAR	No.	EQUIPMENT	QUANTITY	USE	CONDITION	LOCATION	REMARKS
1996	1	MINI TRACTOR (Yammer14HP, 3ATTACHMENTS)	1	A	A	CULTIVATION	
	2	PHOTOCOPY MACHINE(Sharp SF2114)	1	A	A	ADMINISTRATION	
	3	PLASTIC GREEN HOUSE WITH METAL STRUCTURE(IRIE)	1	A	A	IAN	
1997	1	PHOTOCOPY MACHINE (XEROX5328)	1	A	A	ADMINISTRATION	
	2	PERSONAL COMPUTER (VTC-Samurai,PRINTER-HP720)	4	A	A	ADMINISTRATION	
	3	PERSONAL COMPUTER (PowerMac6320,PRINTER-HP870)	1	A	A	ADMINISTRATION	
	4	UPS (APC, BACK UP PRO 1400)	1	A	A	ADMINISTRATION	
	5	AIR CONDITIONER (LIBERTY 36,000BTU)	4	A	A	LABORATORY	
	6	PLASTIC GREEN HOUSE(YANO,50m*2)	2	A	A	IAN	
	7	ULTRA PURE WATER MAKER (ADVANTEC, GS-200)	1	A	A	FITOPATHOLOGY	
	8	ELECTRONIC BALANCE (METTLER TOLEDO, SB16001DR)	1	A	A	CULTIVATION	
	9	ELECTRONIC BALANCE (SHIMADZU, EB-430-HVW)	1	A	A	CULTIVATION	
	10	ELECTRONIC BALANCE (SHIMADZU, BX6200S)	1	A	A	FITOPATHOLOGY	
	11	LOW TEMPERATURE INCUBATOR (IWAKI, ICB-301L)	1	A	A	FITOPATHOLOGY	
	12	LOW TEMPERATURE INCUBATOR (IWAKI, ICB-151L) WITH STAND	2	A	A	CUL./ENTM.	
	13	DRYING OVEN (ADVANTEC, FC-610)	2	A	A	CUL./ENTM.	
	14	HOMOGENIZER (IUCHI, CM-100)	1	A	A	GENETIC IMPROVEMENT	
	15	RECORDING THERMOMETER(ISUZU #3-3148-13)	1	A	A	GENETIC IMPROVEMENT	
	16	MICROSCOPE (NIKON, E400)	1	A	A	FITOPATHOLOGY	
	17	DRY CABINET (IUCHI, AD-S)	2	A	A	FITOPATHOLOGY	
	18	ULTRASONIC PIPETTE WASHER (IUCHI,UCL-1730N)	1	A	A	FITOPATHOLOGY	
	19	AUTOCLAVE (TOMII SEIKO)	1	A	A	FITOPATHOLOGY	
	20	STERILIZER OVEN (ISUZU,SKM-117S)	1	A	A	CULTIVATION	
	21	WATER BATH STIRRER (IUCHI, PI-301)	1	A	A	FITOPATHOLOGY	
	22	WATER BATH (IUCHI, ED-1)	1	A	A	FITOPATHOLOGY	
	23	LAMINAR FLOW CABINET (IWAKI,CLB-VR1604L)	1	A	A	FITOPATHOLOGY	
	24	AIR PURIFIER AND HUMIDIFIER(BS KOGYO, PH14)	1	A	A	ENTOMOLOGY	
	25	STEREO MICROSCOPE(CARTON,Z2001)	1	A	A	ENTOMOLOGY	
	26	HOT PLATE(IUCHI 501C-1)	1	A	A	FITOPATHOLOGY	

LIST OF EQUIPMENT

2. OVER 100,000¥ AND UNDER 1,600,000¥

FISCAL YEAR	No.	EQUIPMENT	QUANTITY	USE	CONDITION	LOCATION	REMARKS
1996	1	MINI TRACTOR (Yammer14HP, 3ATTACHMENTS)	1	A	A	CULTIVATION	
	2	PHOTOCOPY MACHINE(Sharp SF2114)	1	A	A	ADMINISTRATION	
	3	PLASTIC GREEN HOUSE WITH METAL STRUCTURE(IRIE)	1	A	A	IAN	
1997	1	PHOTOCOPY MACHINE (XEROX5328)	1	A	A	ADMINISTRATION	
	2	PERSONAL COMPUTER (VTC-Samurai,PRINTER-HP720)	4	A	A	ADMINISTRATION	
	3	PERSONAL COMPUTER (PowerMac6320,PRINTER-HP870)	1	A	A	ADMINISTRATION	
	4	UPS (APC, BACK UP PRO 1400)	1	A	A	ADMINISTRATION	
	5	AIR CONDITIONER (LIBERTY 36,000BTU)	4	A	A	LABORATORY	
	6	PLASTIC GREEN HOUSE(YANO,50m*2)	2	A	A	IAN	
	7	ULTRA PURE WATER MAKER (ADVANTEC, GS-200)	1	A	A	FITOPATHOLOGY	
	8	ELECTRONIC BALANCE (METTLER TOLEDO, SB16001DR)	1	A	A	CULTIVATION	
	9	ELECTRONIC BALANCE (SHIMADZU, EB-430-HVW)	1	A	A	CULTIVATION	
	10	ELECTRONIC BALANCE (SHIMADZU, BX6200S)	1	A	A	FITOPATHOLOGY	
	11	LOW TEMPERATURE INCUBATOR (IWAKI, ICB-301L)	1	A	A	FITOPATHOLOGY	
	12	LOW TEMPERATURE INCUBATOR (IWAKI, ICB-151L) WITH STAND	2	A	A	CUL./ENTM.	
	13	DRYING OVEN (ADVANTEC, FC-610)	2	A	A	CUL./ENTM.	
	14	HOMOGENIZER (IUCHI, CM-100)	1	A	A	GENETIC IMPROVEMENT	
	15	RECORDING THERMOMETER(ISUZU #3-3148-13)	1	A	A	GENETIC IMPROVEMENT	
	16	MICROSCOPE (NIKON, E400)	1	A	A	FITOPATHOLOGY	
	17	DRY CABINET (IUCHI, AD-S)	2	A	A	FITOPATHOLOGY	
	18	ULTRASONIC PIPETTE WASHER (IUCHI,UCL-1730N)	1	A	A	FITOPATHOLOGY	
	19	AUTOCLAVE (TOMII SEIKO)	1	A	A	FITOPATHOLOGY	
	20	STERILIZER OVEN (ISUZU,SKM-117S)	1	A	A	CULTIVATION	
	21	WATER BATH STIRRER (IUCHI, PI-301)	1	A	A	FITOPATHOLOGY	
	22	WATER BATH (IUCHI, ED-1)	1	A	A	FITOPATHOLOGY	
	23	LAMINAR FLOW CABINET (IWAKI,CLB-VR1604L)	1	A	A	FITOPATHOLOGY	
	24	AIR PURIFIER AND HUMIDIFIER(BS KOGYO, PH14)	1	A	A	ENTOMOLOGY	
	25	STEREO MICROSCOPE(CARTON,Z2001)	1	A	A	ENTOMOLOGY	
	26	HOT PLATE(IUCHI 501C-1)	1	A	A	FITOPATHOLOGY	

2. OVER 100,000¥ AND UNDER 1,600,000¥

FISCAL YEAR	No.	EQUIPMENT	QUANTITY	USE	CONDITION	LOCATION	REMARKS
1998	1	AIR CONDITIONER (YORK, 36000BTU)	4	A	A	LABORATORY	
	2	AIR CONDITIONER (YORK, 18000BTU)	3	A	A	LABORATORY	
	3	NET HOUSE(WITH STAND AND FLOOR)	1	A	A	IAN	
	4	NET HOUSE	1	A	A	IAN	
	5	MINITRACTOR (YAMMER, 14HP)	1	A	A	IAN	
	6	TRACTOR ATTACHMENT(CULTIVATOR)	1	A	A	IAN MACHINARY STORAGE	
	7	PLASTIC GREEN HOUSE(YANO)	1	A	A	IAN	
	8	AUTOCLAVE(ALP, MC-400PW)	1	A	A	FITOPATHOLOGY	
	9	MULTI CHAMBER INCUBATOR(ALP, ITM 540)	1	A	A	FITOPATHOLOGY	
	10	UV SPECTROPHOTOMETER(TOKYO RHOTO ELEC. ANA-720W)	1	A	A	FITOPATHOLOGY	
	11	STEREO MICROSCOPE (CARTON, SCZ-TB)	1	A	A	FITOPATHOLOGY	
	12	REFRIGERATED MICRO CENTRIFUGE(KOKUSAN, H-1500DR)	1	A	A	FITOPATHOLOGY	
	13	SPECIFIC GRAVITY METER(19SCALES)	1	A	A	FITOPATHOLOGY	
	14	ILLUMINATED INCUBATOR (NIHON IKA, LH 200-RD, 230L)	1	A	A	ENTOMOLOGY	
	15	MICROSCOPE(LEICA, DMLS-ETD)	1	A	A	FITOPATHOLOGY	
	16	LOW TEMPERATURE INCUBATOR(YAMATO, IN600)	3	A	A	FITOP./ENTOM.	
	17	PHOTOGRAPHIC EQUIPMENT FOR MICROSCOPE(H-III-35)	1	A	A	FITOPATHOLOGY	
	18	SPLAYER(KYORITSU, HPFS403)	1	A	A	EVALUATION ROOM	
	19	RECORDING THERMOMETER(CHINO, AL3765-N00)	1	A	A	CULTIVATION	
	20	GLASS MATERIAL DRYER(IKEDA, SK-IILN)	1	A	A	FITOPATHOLOGY	
	21	AUTOCLAVE(PASOLINA, IST-150)	1	A	A	FITOPATHOLOGY	
	22	MICRO CENTRIFUGE(PASOLINA, MD-16N)	1	A	A	FITOPATHOLOGY	
	23	ICE MAKER(TOSHIBA, RTI-25E)	1	A	A	FITOPATHOLOGY	
	24	REGENT STORAGE CABINET(IUCHI, SU-5N)	5	A	A	FITOPATHOLOGY	
	25	VACUUM PUMP(IUCHI, DAH-20VC)	1	A	A	FITOPATHOLOGY	
	26	STERILIZER OVEN(YAMATO, SG600)	1	A	A	FITOPATHOLOGY	

2. OVER 100,000¥ AND UNDER 1,600,000¥

FISCAL YEAR	No.	EQUIPMENT	QUANTITY	USE	CONDITION	LOCATION	REMARKS
1999	1	DRYING OVEN(SHIMADZU,STAC-PC50K,150L)	4	A	A	FITOPATHOLOGY	
	2	LOW TEMPERTURE INCUBATOR(SHIAMADZU, BITEC-300, 140L)	4	A	A	LABORATORIES	
	3	LOW TEMPERTURE INCUBATOR(SHIAMADZU, BITEC-400, 280L)	1	A	A	FITOPATHOLOGY	
	4	STEREO MICROSCOPE (SHIMADZU, VCK-TB)	1	A	A	FITOPATHOLOGY	
	5	ILLUMINATED INCUBATOR (NIHON IKA, SHIMADZU, LH 200-RD, 230L)	1	A	A	ENTOMOLOGY	
	6	LOW TEMPERTURE CABINET(TECNIMET, 2mX2mX2m)	2	A	A	BULDING FOR INVES.& EVALU.	
	7	FRONT LOADING ATTACHMENT(TATU, PAH, 300L)	1	A	A	IAN	
	8	ESCAVATOR ATTACHMENT(TATU, RTA-6, 102L)	1	A	A	IAN	
	9	SLIDE MAKER(POLALOID, HR6000)	2	A	A	IAN,DEAG	
	10	HOT PLATE MAGNETIC STIRRER(JENWAY,1103ZX11861E)	2	A	A	FITOPATHOLOGY	
	11	DESK TOP PC(AMD K6 450Mhz,HD 8.4GB, INK JET PRINTER)	2	A	A	ADMI.1, GEN.IMP.1	
	12	CLEARING SAW(HUSQVARNA, 235R, 1.5hp)	2	A	A	IAN	
2000	1	ELECTRIC PRECISION BALANCE(SARTORIUS-BP 221S)	1	A	A	FITOPATHOLOGY	
	2	DESK TOP PC(PentiumⅢ 650MHz, HD 20GB, 128MB.PRINTER APOLLO P220(	3	A	A	CUL.1, FIT.1, ENT.1	
	3	AIR CONDITIONOR(SPRINGER, 48000BTU)	2	A	A	BULDING FOR INVES.& EVALU.	
	4	CAMERA(CANON,EOS50E,28-105mm)	1	A	A	ENTOMOLOGY	
	5	BIOLOGICAL MICROSCOPE(OLYMPUS,CX-40)	1	A	A	ENTOMOLOGY	
	6	BIOLOGICAL MICROSCOPE(OLYMPUS, BX-40, VIDEO CAMERA)	1	A	A	FITOPATHOLOGY	
	7	FIBER OPTIC ILUMINATOR(DOLAN JENNER 180)	1	A	A	ENTOMOLOGY	
	8	CHLOROPHYL METER(MINOLTA, SPAD 502)	1	A	A	ENTOMOLOGY	
	9	ORBITAL SHAKER(BIG BILL, P 51801-05)	1	A	A	FITOPATHOLOGY	
	10	VIDEO CAMERA(SONY, DCR-TRV520P)	1	A	A	DEAG	
	11	MULCHI MEDIA PROJECTOR(PROXIMA,LS2)	1	A	A	DEAG	

3. OVER 20,000¥ AND UNDER 100,000¥

FISCAL YEAR	No.	EQUIPMENT	QUANTITY	USE	CONDITION	LOCATION	REMARKS
1996	1	REFRIGERATOR(BRASTEMP, 2DOOR)	1	A	A	ADMINISTRATION	
1997	1	UPS(APC650)	4	A	A	LABORATORY	
	2	REFRIGERATOR(CONSUL, CRD32ABDEX)	4	A	A	LABORATORY	
	3	FREEZERCONSUL(FRREZER 280)	1	A	A	ENTOMOLOGY	
	4	DRY CABINET(TOLIHAN, HD-190)	3	A	A	FITOPATHOLOGY	
	5	DRY CABINET(TOYO LIVING, F-100)	1	A	A	FITOPATHOLOGY	
	6	MAGNETIC STIRRER(IUCHI, NSD-4)	1	A	A	FITOPATHOLOGY	
	7	TEST TUBE SHAKER(IKA WORKS, MS-1)	1	A	A	FITOPATHOLOGY	
	8	PIPETTE CASE	1	A	A	FITOPATHOLOGY	
	9	WATER BATH STIRRER(IUCHI, WBS-80)	1	A	A	FITOPATHOLOGY	
1998	1	REFRIGERATOR(WHIRLPOOL, 350L, 2DOOR)	2	A	A	GEN. IMPROV. 1, ENTM. 1	
	2	INSECT KEEPING BOX	10	A	A	ENTOMOLOGY	
	3	SPLAYER(KARTSPRAY PICO MS-20)	1	A	A	EVALUATION ROOM	
	4	TURN TABLE(TM-701)	1	A	A	FITOPATHOLOGY	
	5	DISPENSOR(ULTRA ASEPT)	5	A	A	FITOPATHOLOGY	
1999	1	DISH WASHER(FRIGIDAIRE, DW1265)	1	A	A	FITOPATHOLOGY	
	2	DESCICATOR(SCHOT, 170mmΦ, Height 120mm)	10	A	A	FITOPATHOLOGY	
	3	REFRIGERATOR(WHIRLPOOL, 350L, 2DOOR)	2	A	A	FITOPATHOLOGY	
2000	1	HOT PLATE STIRRER(MARIENFELD-M6.1)	2	A	A	FITOPATHOLOGY	
	2	HIGH PRESSURE WASHER(JACTO, 5500)	1	A	A	IAN	

4. EQUIPMENT ACCOMPANIED WITH EXPERTS, OVER 100,000¥

FISCAL YEAR	No.	EQUIPMENT	QUANTITY	USE	CONDITION	LOCATION	REMARKS
1997	1	PERSONAL COMPUTER(Macintosh PM8500)	1	A	A	ADMINISTRATION	
	2	PERSONAL COMPUTER(IBM, NOTEBOOK)	1	A	A	ADMINISTRATION	
	3	LASER PRINTER(Canon LBP-720)	1	A	A	ADMINISTRATION	
	4	CAMERA(Canon Eos Kiss)	1	A	A	ENTOMOLOGY	
	5	ELECTRONIC BALANCE(Mettler PG-80000)	1	A	A	CULTIVATION	
	6	PH METER(FHK HM-5S)	1	A	A	CULTIVATION	
	7	DIGITAL PH METER(IUCHI CP-1PT)	1	A	A	ENTOMOLOGY	
	8	STEREO MICROSCOPE(CARTON, Z-100)	1	A	A	GENETIC IMPROVEMENT	
	9	BIOLOGIACL MICROSCOPE(CARTON, M-936)	1	A	A	GENETIC IMPROVEMENT	
	10	CAMERA (Canon New Eos Kiss)	1	A	A	CULTIVATION	
1998	1	VIRUS SCREEN (GEMINI 100T)	1	A	A	FITOPATHOLOGY	
1999	1	SPLAYER (MYS-100)	1	A	A	CULTIVATION	
	2	TENSION METER(DIK-3150)	1	A	A	CULTIVATION	
	3	CHLOROPHYL METER(MINOLTA, SPAD 502)	1	A	A	FITOPATHOLOGY	
	4	ELECTRIC GENERATOR(HONDA, G1500A, 1.Tkw)	1	A	A	ADMINISTRATION	
	5	NOTE BOOK PC(TOSHIBA, SATELLITE 2550)	1	A	A	ADMINISTRATION	
	6	DIGITAL CAMERA(OLYMPUS, C-2000 ZOOM)	1	A	A	ADMINISTRATION	
	7	ELCTRICAL BALANCE(METTLER, SG16001DR)	1	A	A	CULTIVATION	
	8	DIGITAL ACIDITY METER(COS, CA-30)	1	A	A	CULTIVATION	
	9	FRUIT WEIGHT CLASIFICATOR(TAKATA, TB-15)	1	A	A	CULTIVATION	

4. EQUIPMENT ACCOMPANIED WITH EXPERTS, OVER20,000¥ AND UNDER 100,000¥

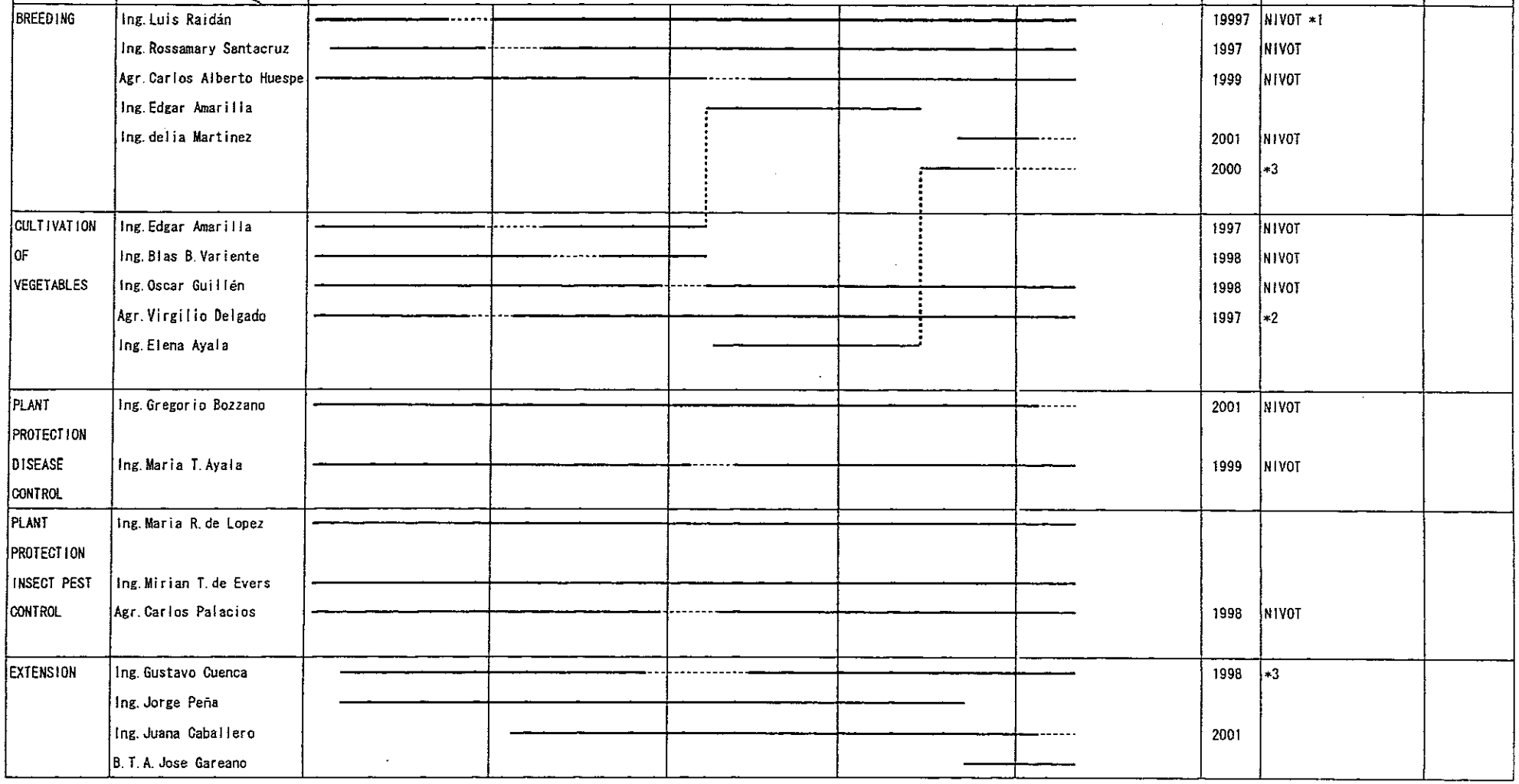
FISCAL YEAR	No.	EQUIPMENT	QUANTITY	USE	CONDITION	LOCATION	REMARKS
1997	1	PRINTER(Epson MP-930C)	1	A	A	ADMINISTRATION	
	2	CAMERA(Nikon FE10)	1	A	A	ADMINISTRATION	
	3	BOOKBINDER(NICHIBAN SB-100)	1	A	A	ADMINISTRATION	
	4	TRANSFORMER (1500AE)	1	A	A	ADMINISTRATION	
	5	ELECTRICAL BALANCE (TOP C-400)	1	A	A	ENTOMOLOGY	
	6	SAMPLE CASE (MARUYAMA MH9D)	1	A	A	ENTOMOLOGY	
	7	ＥＣ METER (FHK DM-37)	1	A	A	CULTIVATION	
	8	SPLAYER (KYORITSU C-12)	1	A	A	CULTIVATION	
	9	TOOL SET (HT-2100)	1	A	A	ADMINISTRATION	
	10	PH METER (R-212)	1	A	A	GENETIC IMPROVEMENT	
	11	(NO3)METER	1	A	A	GENETIC IMPROVEMENT	
	12	(Na)METER	1	A	A	GENETIC IMPROVEMENT	
	13	(K)METER	1	A	A	GENETIC IMPROVEMENT	
	14	TEMPERATURE REGISTER (ONDOTORI IR-/1)	4	A	A	GENETIC IMPROVEMENT	
	15	CELLULAR PHONE (MOTOROLA TX400)	1	A	A	ADMINISTRATION	
	16	FAX (SHARP FO-435)	6	A	A	ADMINISTRATION	
	17	LUX METER (DIK-8331)	1	A	A	CULTIVATION	
	18	MICRO PIPETTE(ACBM-2)	1	A	A	FITOPATHOLOGY	
	19	MICRO PIPETTE(ACBM-100)	1	A	A	FITOPATHOLOGY	
	20	MICRO PIPETTE(ACBM-1000)	1	A	A	FITOPATHOLOGY	
	21	MICRO PIPETTE(ACBM-5000)	1	A	A	FITOPATHOLOGY	
	22	CONNECT TYPE INJECTOR(ULTRA ACEPT)	1	A	A	FITOPATHOLOGY	
	23	ELECTRICAL BALANCE(HF-200)	1	A	A	CULTIVATION	
	24	LUX METER(ANA-F11)	1	A	A	CULTIVATION	
1998	1	MICRO PIPETTE(PIPETTEMAN P-1000)	1	A	A	FITOPATHOLOGY	
	2	MICRO PIPETTE(PIPETTEMAN P-5000)	1	A	A	FITOPATHOLOGY	
	3	INJECTOR(20ml)	1	A	A	FITOPATHOLOGY	

FISCAL YEAR	No.	EQUIPMENT	QUANTITY	USE	CONDITION	LOCATION	REMARKS
1999	1	DIGITAL HANDY LOAD GAUGE (9501B)	1	A	A	GENETIC IMPROVEMENT	
	2	PUSH CORN(DIK5552)	1	A	A	CULTIVATION	
	3	COMMUNICATION PORT FOR THRMO RECORDER(TR-50C)	1	A	A	GENETIC IMPROVEMENT	
	4	WATRE PUMP(SPP152)	1	A	A	CULTIVATION	
	5	ELECTRIC DISK SAW(MAKITA・SS2001A)	1	A	A	CULTIVATION	
	6	ELECTRIC PLANE(MAKITA・A-17681)	1	A	A	CULTIVATION	
	7	ELECTRIC HAND SAW(MAKITA・4320)	1	A	A	CULTIVATION	
	8	HAND EHLD DISK GRAINDER(MAKITA,9526TP)	1	A	A	CULTIVATION	
	9	ELECTRIC DIVER(MAKITA・6315DRA)	1	A	A	CULTIVATION	
	10	THERMO-HYGRO RECORDER WITH CHART PAPER(NKK・Wing-99)	2	A	A	CULTIVATION	
	11	PRINTER(CANON・BJ-F600)	1	A	A	ADMINISTRATION	
	12	Zip DRIVE(iomega・Zip100)	1	A	A	ADMINISTRATION	
	13	SACANNER(CANON・FB6205)	1	A	A	ADMINISTRATION	
	14	MINI PUMP(SHIBATA,MP-2N)	1	A	A	ENTMOLOGY	
	15	DIGITAL PLANIMETER(ATAGO,PR-101)	1	A	A	CULTIVATION	
	16	THERMO-HYGRO RECORDER(T&D・Ondotori PII)	2	A	A	CULTIVATION	
	17	COLONY COUNTER(SHIBATA・CL-500)	1	A	A	FITOPATHOLOGY	
2000	1	MINI PUMP(SHIBATA, MP-2N)	1	A	A	ENTMOLOGY	
	2	PORTABLE STEREO MAICROSCOPE(NIKON-FARBLE)	1	A	A	ENTMOLOGY	
	3	FLUID METER(KIMMON・30mm)	7	A	A	GENETIC IMPROVEMENT	
	4	SHEEVE(TUKASA・直径100mm、篩目20μm)	1	A	A	FITOPATHOLOGY	
	5	SERIAL MANUAL COUNTER(TOGOSHI・10)	1	A	A	FITOPATHOLOGY	
	6	DIGITAL REFLACTRO METER(ATAGO, PR101)	1	A	A	GENETIC IMPROVEMENT	
	7	FERTI IRRIGATON EQIPMENT(DOSATRON, D116)	1	A	A	GENETIC IMPROVEMENT	
	8	DISK FILTER(MITSUSEKI-AGRI, EVER FLOW-150)	1	A	A	GENETIC IMPROVEMENT	
	9	FLUID METER(KZX-30)	1	A	A	GENETIC IMPROVEMENT	

ANNEX 8.

ALLOCATION OF PARAGUAYAN COUNTERPART PERSONNEL

FIELD	NAME	TRAINNING	PRINCIPAL INSTITUTO OF TRAINNING	REMARKS
BREEDING	Ing. Luis Raidán	19997	NIVOT *1	
	Ing. Rossamary Santacruz	1997	NIVOT	
	Agr. Carlos Alberto Huespe	1999	NIVOT	
	Ing. Edgar Amarilla			
	Ing. delia Martinez	2001	NIVOT	
		2000	*3	
CULTIVATION OF VEGETABLES	Ing. Edgar Amarilla	1997	NIVOT	
	Ing. Blas B. Variente	1998	NIVOT	
	Ing. Oscar Guillén	1998	NIVOT	
	Agr. Virgilio Delgado	1997	*2	
	Ing. Elena Ayala			
PLANT PROTECTION DISEASE CONTROL	Ing. Gregorio Bozzano	2001	NIVOT	
	Ing. Maria T. Ayala	1999	NIVOT	
PLANT PROTECTION INSECT PEST CONTROL	Ing. Maria R. de Lopez			
	Ing. Mirian T. de Evers			
	Agr. Carlos Palacios	1998	NIVOT	
EXTENSION	Ing. Gustavo Cuenca	1998	*3	
	Ing. Jorge Peña			
	Ing. Juana Caballero	2001		
	B. T. A. Jose Gareano			



——— ALLOCATION --------TRAINING IN JAPAN

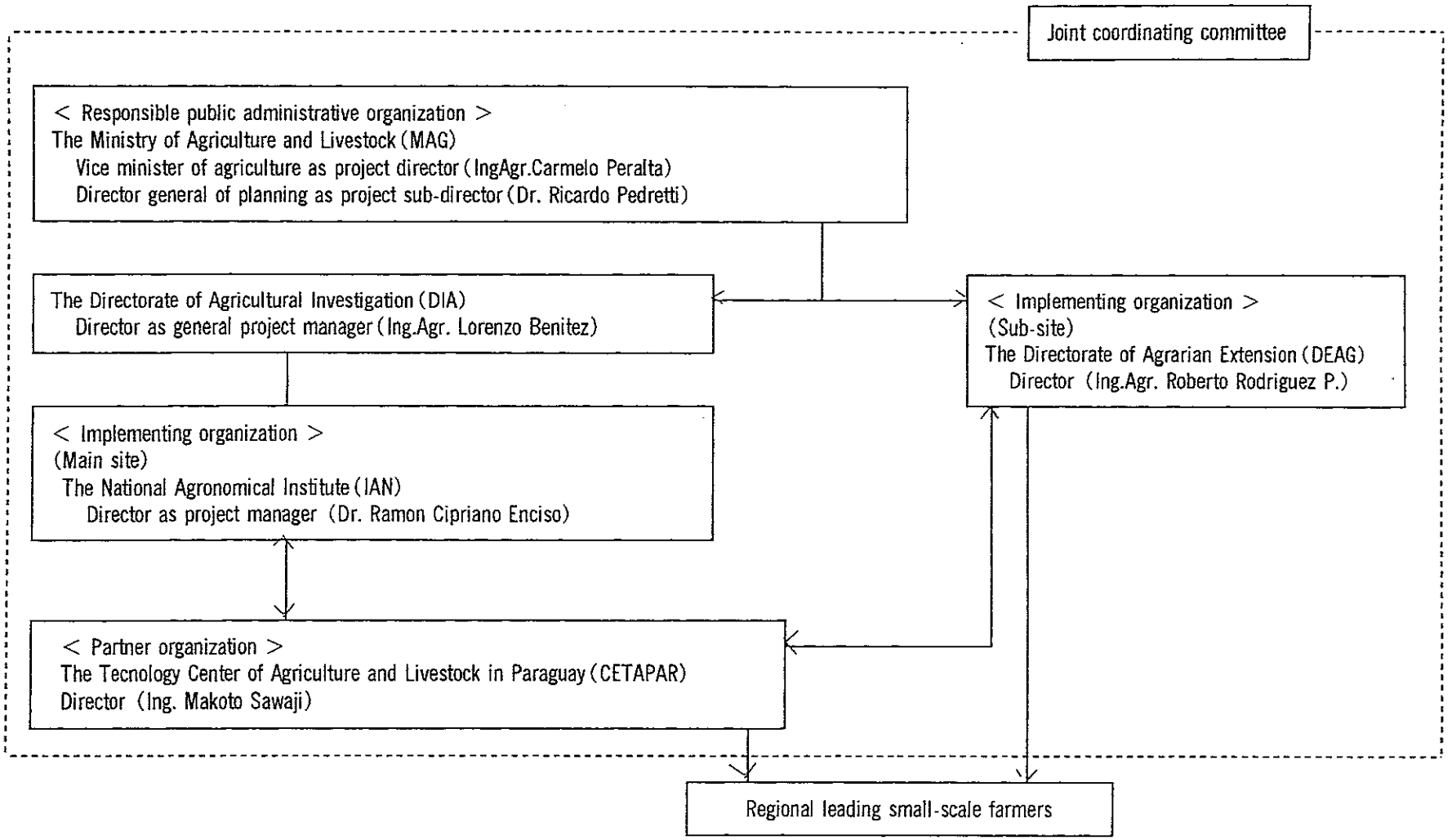
*1:NATIONAL RESERACH INSTITUTE OF VEGETABLES. ORNAMENTAL PLANTS AND TEA (MINISTRY OF AGRICULTURE. FORESTRY AND FISHERIES). *2 AICHI PREFECTURE RESEARCH INSTITUTE OF AGRICULTURE

*3 TSUKUBA TRAINING CENTER OF JICA

ANNEX 9.
Input by Paraguayan side

Name of Mission \ Fiscal Year / Month	1997 6 8 10 12 2	1998 4 6 8 10 12 2	1999 4 6 8 10 12 2	2000 4 6 8 10 12 2	2001 4 6 8 10 12 2 4
Allocation of C/P	———	———	———	———	———
Administration	———	———	———	———	———
Office Chamber	———				
Budget for Operation	———	———	———	———	———
(Expense without base salary of counterparts, japanese yen)	(4, 148, 000¥)	(3, 992, 000¥)	(4, 020, 000¥)	(3, 891, 000¥)	

Annex 10. Organization chart of the Project



ANNEX 11. Project Design Matrix for Evaluation (PDMe)

Project Name : Project for the Improvement of Vegetable Production for Small-Scale Farmers in Paraguay — Implementation period : April 1, 1997 to March 31, 2002

Date of preparation : Oct 30, 2001

Target area : Cordiria、Central、Caaguaz、Paraguari、Alto Paraná — Target group : Direct beneficiaries; Staffs from IAN and DEAG; Final beneficiaries; Small-Scale farmers

Narrative Summary	Verifiable Indicator	Means of Verification	Important Assumption
Overall Goal 1. The yearly income of the small-scale farmers at the target area improves through production of vegetables. 2. The amount of production and quality of vegetable that small-scale farmers harvest at the target area improve.	1.The number of reconstruction houses of small-scale farmers increases. 2-1. The amount of arrival of vegetables (strawberry, melon, tomato) produced in the country, increases yearly and monthly at the Central Market. 2-2. Vegetable products in the Central Market are sold in grades and the products from small-scale farmers of the target area are given higher grades.	1-1. Statistics data of the Central Market 1-2. Hearing from the wholesaler in the Central Market 2. On-the-spot investigation	1. Supporting policy for small-scale farmer of the federal and the prefecture doesn't withdraw. 2. Unexpected event such as the long-term abnormal weather, occurrence of disease and insect pest are not happen. 3. Road condition is maintained to reach the market.
Project Purpose IAN improves vegetable production techniques for small-scale vegetable producers and leading small-scale farmers at the target area use them.	1. All counterparts acquire knowledge and improve research abilities according to each specialized field. 2. New techniques are developed at IAN. 3. The number of farmers adopting new techniques developed by the Project.	1-1. Interviews to counterpart personnel and dispatched experts. 1-2. Report on experiment and research results, series of technological books and treatise 2 Project output report 3-1. Interviews to extension staffs 3-2. Interviews to farmers	1. The cooperation among IAN and DEAG and CETAPAR is done closely, and it goes on. 2. The technological level and activities of IAN and DEAG are maintained. 3. Cooperation between organizations related to the project and producer association is kept. 4. International trading situation will not change dramatically. 5. Management budget is ensured suitably.
Result/Output 1. Appropriate varieties are selected, and they are raised. 2. Appropriate cultivation technique is improved. 3. The occurrence of primary diseases and insect pest are made clear, and those control techniques are developed. 4. Technique and knowledge developed by the Project are transferred to extension workers from DEAG and leading small-scale farmers in the target area.	1. The report showing the appropriate varieties of 3 crops (strawberry, melon and tomato), had been selected and bred. 2. The technical document showing: the stable production techniques using simple facilities, materials and new cropping type; techniques to improve fertilizing methods and water management; and techniques to improve quality by appropriate harvesting and preparation method for shipping. 3-1. The number of elucidation of the occurrence mechanism of the primary disease and insect pest. 3-2. The damage from the disease and insect pest decrease more than 50% by using control measures for the primary disease and insect pest. Sprinkling of Agricultural chemicals decrease.	1. Project report. 2. Project report. 3-1. Experiment and research records 3-2-1. Interviews to experts and counter part personnel 3-2-2. Report on experiment and research results, series of technological books and treatise 3-3. Project output report 4-1. Activities records on mobile training courses 4-2. Records of training courses held	1. The financial condition of IAN and DEAG doesn't become worse. 2. Cooperation among IAN, DEAG and CETAPAR is done efficiently. 3. Counter part personnel stay. 4. Extension officers who were transferred techniques stay in DEAG. 5. Leading small-scale farmers adopt techniques developed with the project at target area.

PDM$_E$

	3-3. Technical document about the control method of disease and insect pest. 4-1. Extension staffs from DEAG attend the training courses on developed techniques. 4-2. Leading small-scale farmers using methods developed by the Project appear in the target area.		
Activity 1 . Appropriate varieties. 1-1. Collect and introduce genetic resources, and select useful varieties and breeding material. 1-2. Establish testing methods of hereditary characters which have disease resistance and high quality. 1-3. Evaluate a superior seed seedling, and develop that increasing technology. 1-4. Develop appropriate varieties and that breeding line. 1-5. Evaluate the adaptability of the newly developed and/or selected breeding lines varieties to soil, climate and social conditions in Paraguay. 2. Proper cultivation techniques 2-1. Develop the stable production techniques using simple facilities and materials and new cropping types. 2-2. Develop techniques to improve quality and yield with improving fertilizing methods water management. 2-3. Develop techniques to improve quality by appropriate harvesting and preparation method for shipping. 3. Study of occurrence mechanism of the primary diseases and insect pest, and stituation of that control technique. 3-1. Investigate the actual condition of the occurrence of diseases and the damage by disease, diagnose primary disease, identify pathogens and clarify their ecology. 3-2. Develop control measures for the primary disease. 3-3. Investigate the actual condition of occurrence and	**Input** **Japanese side** 1 . Long-term expert ① Team Leader(1person) 60.0MM ② Coordinator (2 persons) 60.5MM ③ Cultivation of vegetable and agricultural extension (Two persons) 57.5MM ④ Plant protection (Disease control) (1 person) 60.0MM ⑤ Plant protection (Insect pest control) (1 person) 60.0MM ⑥ Breeding (1 person) 54.2MM 2. Short-term expert ① Breeding (5 persons) 10.0MM ② Cultivation of vegetable (Tree persons) 4.3MM ③ Plant protection (Disease control) (Tree persons) 4.9MM ④ Plant protection (Insect pest control) (Tree person) 3.4MM ⑤ Extension (One person) 1.6MM 1. Training ① Training held in Japan : 17 persons (Incumbent : 12 persons) 4. Machine and equipment ① Procurement(Vehicle、Tractor、materials, etc) J¥ 134,371,000 ② Hand carry materials J¥ 11,822,000 Cumulative total J¥ 146,194,000 5. Local cost : Cumulative total J¥ 62,686,000 6. Others : The construction of the vegetable research	**Paraguay side** 1 . Assignment of the counter part ① Project Director ② Deputy project Director ③ General project manager ④ Project manager ⑤ Breeding (5 persons) 178MM ⑥ Cultivation of vegetables (5 persons) 182MM ⑦ Plant protection (Disease control) (2 persons) 104MM ⑧ Plant protection (Insect pest control) (3 persons) 156MM ⑨ Extension (4 persons) 142MM ⑩ Secretary and driver 2 名 Note; Period of MM is until end of August 2001. This contains training period in Japan. 2. Local cost (Project management control fee and C/P basic salary are not included.) Cumulative total J¥ 16,051,000 Note; Until end of March, 01 3. Offer of the land and the facilities : • Project Office • The laboratory of each field • Land (1.75 ha)	1. Research facilities and test field are prepared, and managed carefully. 2. There is no delay in the procedure of the customs clearance and transport of the material for the research and training. 3. Preparing budget for executing the project, which is including arrangement of the counter part personnel, is not delayed. 4. Machines, equipment and materials are used efficiently. **Pre-conditions** 1. MAG, agricultural office of prefecture, research organization related to the project, producer association, and so on support the project. 2. Vegetable producer agrees on the execution of the project.

damage caused by insect pest, and clarify the ecology of primary insect pests. 3-4. Develop control measures for primary insect pests. 4. The transfer of the technology. 4-1. Verify and demonstrate suitable varieties newly selected of vegetables in the Project through trial and demonstration activities. 4-2. Hold technical training courses and technical seminars for extension officers and leading small-scale farmers. 4-3. Hold mobile training courses to develop the capability of leading small-scale farmers who will guide other small-scale farmers. 4-4. Make teaching materials and technical publication for further extension.	ridge (780m²) J¥ 26,457,000		

ANNEX 12.

The Final Progress of Activities on the Detailed Implementation Program for 5 years for the Project for the Improvement of Vegetable Production Technology for Small-Scale Farmers in Paraguay (1. Main Site: IAN)

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Reasons for activity delays	Future Plans
Subjects	Activities					
1. Selection and breeding of appropriate varieties of vegetables. (1) Collection and introduction of genetic resources, and selection of useful varieties and breeding materials. 1) Collection and introduction of genetic resources.						
① Investigation on the characteristics of wild and native species in Paraguay.	Collecting tomato, strawberry and melon plants as well as their related species, and investigating their characteristics.	Collect the useful breeding materials of fruit vegetables such as tomatoes, melons and strawberries and others that have diseases and insects resistance, and environmental stress resistance caused by temperature and/or water content , and that shipping property and high quality, and thus accumulate those genetic resources.	The domestic varieties of tomatoes, melons and strawberries were not found in Paraguay. Three wild species of Solanaceae family were collected , investigated and preserved.	4		
② Introduction of breeding materials from foreign countries. 2) Selection of useful varieties and breeding materials.	Introducing useful breeding materials from foreign countries.		Eighty seven varieties of tomatoes and one hundred and seventeen varieties of melons and sixty varieties of strawberries were introduced from mainly Japan, the United States, Brazil and China .	4		

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Reasons for activity delays	Future Plans
Subjects	Activities					
① Test for the adaptability of introduced varieties.	Testing the adaptability of introduced varieties and lines in the fields of IAN.	Select the adaptable varieties or lines from introduced ones for their utilization in Paraguay.	The adaptability of 45 varieties of tomatoes was examined through of three-terms cultivation test. Santa Clara, T-70, Acclaim, Carmen, Raisan, Merry Road, etc., were selected as excellent varieties adapted to Paraguay. In the case of strawberries, after two-term tests on 38 varieties, Rindamore and Dover were selected as early-ripeing and highly productive varieties, while Dover, Princes Isabel and Campinas were selected as varieties resistant to anthracnose . As for melons, a four-term research study was performed on 70 varieties, confirming that Autumn Waltz was suitable to Paraguay. As a result, since Tufts, which had been the main variety of strawberry, was susceptible to anthracnose, it was replaced by Dover, and among melons. Autumn Waltz started to be grown instead of Sun Rise, which had been the main varieties so for.	4		
② Selection of breeding materials.	Selecting the varieties or lines with useful genetic characters.	Select useful genetic materials.	Nine varieties of tomatoes, apart from Santa Clara, were selected as breeding materials. Among strawberries, 13 foreign varieties were selected in addition to Sweet Charie, and 14 Japanese varieties were selected apart from Rindamore. As for melons, Autumn Waltz was selected as superior breeding material, and its self-pollinated strains were genetically fixed.	4		
③ Maintenance of genetically fixed varieties.	Maintaining the parent stocks of strawberries and genetically fixed varieties of tomatoes and melons.	Maintain varieties and lines with the genetically fixed characteristics as materials for breeding.	The varieties that are being propagated and preserved are: among tomatoes, Anou No.1 to 6 (which are intermediate mother plants resistant to diseases) and lines with the rin gene that governs ripeness: among melons, 5 intermediate mother plants resistant to powdery mildew, Fusarium wilt and gummy stem blight. Twenty varieties of strawberries are preserved in screen houses.	4		
(2) Tests for disease						

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Reasons for activity delays	Future Plans
Subjects	Activities					
			method that was conceived in order to remove testers' individual differences during tests and evaluation.			
(3) Development of techniques for evaluation of high-quality seeds and seedlings as well as their appropriate propagation. 1) Multiplication and preservation techniques.						
① Efficient seed production methods.	Testing efficient seed production methods through utilization of flower visiting insects, of pollens preserved and others, and harvesting F1 seed production by the efficient method.	Establish the high-quality and low-cost F1 seed production methods, and prepare for or build up a distribution system of the seeds and seedlings.	Since the implementation of tests up to the stage of seed production on economic bases, such as mating through the use of pollinating insects and preserved pollens, could not be afforded, such tests have not been implemented so far. A method implemented in Japan was adopted for the harvesting of F1 seeds. The preparation of a distribution system for seeds and seedlings is currently under examination.	1	No distribution system for seeds and seedlings has been prepared, but its construction will have to be examined before the project completion.	Consultation with the Paraguayan side and the construction need to be accerated up.
② Maintenance, multiplication and preservation of excellent mother plants.	Conducting maintenance, multiplication and preservation of the tomato and melon seeds harvested from excellent mother plants, Conducting multiplication of excellent stokes of strawberries, and of preservation of their mother ones.	Realize maintenance, multiplication and preservation of the newly bred mother plants for production of F1 seeds. Multiply virus-free seedlings and supply them, and preserve the original seedling stocks of strawberries.	Intermediate mother plants of melons and tomatoes are being preserved and propagated through seed production by means of self pollination. Strawberry selected seedlings and collected useful varieties are preserved in screen houses of IAN. The rearing and propagation of virus-free strawberries were not carried out since it is being implemented by the Biotecnology Lab. of IAN.	4		Virus free strawberries are propagated at the IAN screen house that was rebuilt by the project.
③ Methods of seed preservation.	Investigating and testing seed preservation methods.	Transfer techniques for seed preservation.	As for seeds preservation, the technique that was transferred consisted in putting seeds and silica gel together in plastic containers or glass bottles with caps and maintaining them under low temperature and moisture conditions in a refrigerator.	4		

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Reasons for activity delays	Future Plans
Subjects	Activities					
resistance and high quality characters. 1) Test for disease resistance.						
① Artificial inoculation tests.	Testing resistance by artificial inoculation against primary diseases such as viruses and Fusarium wilt of tomatoes, anthracnose and powdery mildew of strawberries, and Fusarium wilt of melons and other vegetable diseases.	Select the breeding materials and varieties with disease resistance through efficient screening methods of resistant characters.	Resistant varieties or lines of melons were cranifyed by testing their resistance to Fusarium wilt and gummy stem blight through artificial inoculation of pathogen to young seedlings, and strawberries resistance to anthracnose though inoculation to petioles. Melons resistance was confirmed by artificial inoculation tests at seedling stage on F1 hybrids of breeding lines and intermediate mother plants resistant to Fusarium wilt.	3	In the case of tomatoes and strawberries, the breeding of varieties has not been completed yet, and the stage of inoculation tests on breeding varieties and lines has not been reached	If new varieties are bred during the Project period, they are tested at that time. In case of delays, tests has to be carried out by IAN staff
② Field tests.	Testing resistance of tomatoes and melons against primary diseases in fields.	Select the vegetables with disease resistance in fields.	Since one of the main objectives of breeding varieties of tomatoes, melons and strawberries was the production of varieties resistant to the main diseases, they were tested and selected on the grades of resistance to diseases and insect pests at the stage of open field cultivation. In the case of tomatoes and strawberries, at present the selection and rearing are under way.	3	Delays are due to the short time for breeding varieties.	It is estimated that the breeding of tomato varieties will not finish during the Project period, accordingly the left off part must be implemented by the IAN staff
2) Test for high-quality characters.						
① Tests for fruit quality characters and their evaluation methods.	Testing the measurement and evaluation methods for fruit quality characters relating to taste, flavor, maturing and others.	Select high quality characters through the developed quality evaluation methods.	The taste, aroma and degree of maturity of tomato, strawberry and melon fruits were evaluated by establishing a five step evaluation method at the times of comparative tests of varieties and lines selection. The sugar content and the fruit hardness were measured by handy refractometer and pressure tester respectively, while shape and color were evaluated by establishing standards for each item.	4		
② Evaluation of fruit quality.	Developing a standard for evaluation of fruit quality.	Evaluate fruit quality through the standard	At the time of evaluation, fruits were evaluated in an objective way by means of a five step evaluation	4		

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Reasons for activity delays	Future Plans
Subjects	Activities					
2) Evaluation techniques for excellent seeds or seedlings.						
① Inspection methods of seeds and seedlings.	Testing characters and quality of seeds or seedlings to fulfill as the excellent ones, and introducing the techniques for germination test of seeds or for inspection to confirm the seedlings to be virus-free.	Establish the inspection methods to supply the seeds or seedlings with reliable quality.	For the purpose of evaluating the characters and quality of melon and tomato seeds or strawberry seedlings obtained through the line selections, the evaluation, investigation and inspection techniques that were implemented in Japan were introduced.	4		
(4) Breeding of appropriate varieties and lines.						
1) Breeding of excellent mother plants.						
① Crossing, selection and genetic fixation.	Breeding the mother plants on which are fixed useful characteristics through both efficient selection and shortening term of breeding, giving the priorities to the traits of big size, fruits quality, and resistance to diseases and environmental stress in tomatoes, and also to the traits of high sugar content and storage ability of fruits as well as the disease resistance in melons.	Breed excellent mother plants, and realize shortening of breeding term by efficient screening.	Tomatoes are being selected and genetically fixed in ten lines of three types : the big size round red fruit, the medium size round red one (Santa Clara type) and the self topping type with big size round red fruits. Among them, a line of the fifth hybrid generation has almost been fixed. Among melons, the three lines were fixed the characters of breeding object; high sugar content, storing ability and the salmon orange pulp similar to the variety Sun Rise through self pollination of Autumn Waltz.	3	Since genetic fixauon of hybrid lines proceeds slowly because tomatoes cultivation permits only two harvest per year, genetically selected pure bred lines have not been grown yet.	Since it may be predicted that the final sellection test for tomatoes will not be finish during the Project period, the remaining parts will have to be carried out by the IAN staff
② Tests for cross combination.	Testing the combination ability for F1 hybrid plants by the crossing of intermediate mother plants, of pure bred lines, of breeding mother plants and	Breed F1 hybrid varieties with the high ability of cross combination through selecting mother plants.	Among melons, a parent of one pure bred lines having salmon orange pulp had high effeciency in the crossing with Georgia 47 and PBL No.2, which are intermediate mother plants resistant to Fsarium wilt. Through this crossing combination the F1 varieties, which had an superior rind, good shape and pulpy as	3	As for tomatoes, selected pure bred lines have not been produced yet	Selected pure bred lines of tomatoes are expected to be produced within this year.

Plans of Activities		Goals	Progresses and Achievements	Evalua-tion	Reasons for activity delays	Future Plans
Subjects	Activities					
	others.		well as a high sugar content, were bred. As for tomatoes, combination between Horizon (a self topping variety with big size round red fruits) and the lines with the gene rin, which controls maturity, are being carried out in order to increase the hardness of fruits in the former.			therefore, combination tests must be carried out next spring.
③ Selection of the excellent individual plants from crossed population.	Selecting the excellent individual stocks of strawberries that have such prior traits as abilities of early maturing and long harvesting term, high sugar content and hardness of fruits, resistance to diseases and insects and environmental stresses, in addition of high responsiveness to day length and air temperature.	Select the excellent individual stocks from the hybrid seeds among breeding materials through efficient screening.	As for strawberries, 3,500 hybrid individual seedlings obtained from the cross combination of 158 pares of interchangeable varieties were grown in 1998. Among them, a hybrid individuals of 91 lines out of 48 combinations was underwent a primary selection. The following year. from those lines one line with early maturity and higher yield had been chosen after a secondary selection, but its weakness to anthracnose was found out from the results of the cultivation in the year 2001 and the line was excluded from breeding object. In 1999, thirteen lines were selected though a primary screening out of 1,680 hybrid seedlings. They were reared from crossing among parents which were selected as the ones with the highest probability that excellent hybrid lines would appear as the result of previous cross breeding. A secondary screening is under way in 2001, aiming at early ripening, high yielding and anthracnose resistant varieties.	3	Due to the fact that in Paraguay annual differences in the occurrence of strawberry anthracnose are conspicuous, and to the lack of anthracnose resistant materials, it is very difficult to breed varieties with resistance to the disease.	In 2001 the secondary selection will be made, and subsequent tests on anthracnose resistance will be carried out.
2) Test for excellent F1 combination lines or selected hybrid stocks.						
① Test for characteristics.	Testing the characteristics of the F1 combination lines and the selected hybrid stocks.	Confirm the characteristics of bred lines.	The breeding objects of melons are varieties whose harvesting time can be easily judged from the external appearance with a good storing ability and a salmon orange pulp similar to the Sun Rise, which has been the staple varieties in Paraguay so for. The pure bred line that were produced meets such conditions, but when it comes to F1 through crossing	3	Since it is possible to produce only two crops of tomatoes and one of strawberries	The production of varieties will continue in line with the schedule

Plans of Activities		Goals	Progresses and Achievements	Evalua-tion	Reasons for activity delays	Future Plans
Subjects	Activities					
			with the intemediate mother plants resistant to Fusarium wilt, the harvest time of the line did not become so clear as in the case of pure bred line. The breeding objects of strawberries, which present resistance to anthracnose, red pulp, and the early maturity, abundant yield and same hardness of fruits as those of foreign varities, the secondary selection is undergoing nowadays. As for tomatoes, at present excellent mother plants are under production.		per year, the period to breed varieties is not sufficient and the activities are delayed.	
② Test for disease resistance.	Testing the disease resistance of bred lines.	Confirm the resistance to primary diseases.	In case of melons, since the pure bred lines that were produced are resistant to powder mildew but not to Fsarium wilt. Accordingly such trait is added in F1 varieties which were crossed with intermediate mother plants resistant to Fusarium wilt. With regard to strawberry anthracnose, it seems pretty arduous to add the same resistance of the Dover.	3	ditto	ditto
③ Test for yielding ability.	Testing yielding ability of bred lines.	Evaluate yielding ability of the newly bred varieties.	The yielding in the pure bred line of melons that was cultivated by a trained over soil method showed that its productivity, compared with Sun Rise and Autumn Waltz, was the same. One strawberry line under breeding has been excluded from the breeding object because of the frequent occurrences of anthracnose, though it presented early ripeness, a long harvesting duration, and a harvest amount of 1 kg per plant, which is twice the quantity of the usual varieties.	3	ditto	ditto
④ Test for quality.	Testing the quality of bred lines.	Evaluate quality of the newly bred varieties.	A pure bread line of melons that were produced had spherical fruits with a minute net, cream coloured rind, sugar content around thirteen degrees, little aroma and good pulp. The fruit net of the F1 hybrid was of the cultivar Earls type.	3		ditto
3) Breeding of excellent varieties (pure bred varieties).	Selecting the resistant breeding lines of tomatoes to bacterial spot disease.	Breed resistant varieties to bacterial spot disease of tomatoes.	(Shared and implemented by CETAPAR)			

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Reasons for activity delays	Future Plans
Subjects	Activities					
(5) Evaluation of regional adaptability of the newly developed or selected breeding lines and varieties.						
1) Environmental adaptability.	Testing the adaptability to temperatures, water content, soil conditions and others in the fields of IAN and CETAPAR.	Confirm the adaptability of the newly bred varieties to such environmental conditions as meteorology, soil and others, for promoting the spread of those varieties to vegetable producing areas in Paraguay.	With regard to the variety newly bred at CETAPAR, the "SUPER CETAPAR" which is resistant to the bacterial spot disease of tomatoes, tests on its productivity and disease resistance were carried out in IAN open fields in the year 2000. Santa Clara and T 70, the main Paraguayan varieties, were chosen as check varieties. As a results, no difference could be found between the compared varieties with respect to the resistance to tomato bacterial spot disease, whereas productivity, compared with the check varieties, was slightly inferior. As for IAN breeding varieties, breeding operations were conducted throughout one year, during the those process of breeding selection in IAN fields, examining at the same time the adaptability to environmental conditions.	2	Breeding of varieties are not completed yet.	Tests are expected to be carried out immediately after the production of new varieties
2) Cropping-type adaptability.	Confirming the traits of earliness, of cold or hot resistance and so on.	Confirm the adaptability to cropping types in order to realize the extension of harvesting periods through making each of present cultivation seasons more forward or backward.	Tests for characteristics of the new variety "LUNA YGUAZU", a F1 green pulp melon bred at CETAPAR, were carried out in IAN plastic houses. Fruits were of a bit long spherical shape, with a weight of 1.2 ~ 1.3 kg ; the nets were excellent and the sugar content was around 13 degrees. There was few occurrence of diseases and insect pests . The activities to produce new varieties at IAN are carried out all the year round, and being also confirmed their adaptability to cropping types and crooping seasons through a process of breeding and selection. With regard to strawberries, by introducing genes of Japanese varieties, the newly bred lines could have the trait of early maturing in comparison with the original foreign varieties. As the result of it, the	2	ditto	ditto

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Reasons for activity delays	Future Plans
Subjects	Activities					
			harvest season is able to start almost one month earlier, and both the extension of the harvesting period and the increase in the amount of crops are expected.			
2) Social adaptability.	Researching consumer's favorite and component of market prices.	Confirm advantages of the newly bred varieties in agricultural management. In addition, provide an indicator and a guide line to put the new varieties to practical use, and evaluate their marketability through their cultivation on a practical scale.	In the case of tomatoes, melons and strawberries, the breeding objects are varieties which suit the Paraguayans current taste, and may be profitable from the business point of view. Among melons, the breeding objects are: salmon orange pulp, the possibility to judge easily the harvesting time from the external appearance, resistance to Fusarium wilt and high quality. In the case of tomatoes, they are big size red round fruits, or middle size red round fruits of Santa Clara type, both with red round fruits and hard pulp. As for strawberries, breeding mother plants were bred by crossing and selecting on the basis of the breeding objects, which are early maturity, fruits hardness, abundant yield, resistance to anthracnose, etc., and new candidate varieties were grown in conformity to such objectives.	2	The stage of evaluation based on cultivation on practical scale has not been reached.	

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Resons for activity delays	Future Plans
Subjects	Activities					
2. Development of appropriate cultivation techniques of vegetables. (1) Development of stable production techniques by using simple installation and materials, and development of new cropping types.						
1) Clarification of growing characteristics of vegetables in different cropping types. ① Relationship between growing characteristics of vegetables and weather conditions in summer. ② Relationship between growing characteristics of vegetables and weather conditions in winter.	Analyzing the relationship between growing characteristics in each cropping type and characteristics of weather in each corresponding season, consequently preparing the basic data to establish a cultivation technique system for each of cropping season.	Understand the weather characteristics affecting to the cultivation of tomatoes, melons and strawberries in each season, and in addition provide an appropriate standards for using various agricultural materials. Based on the standard, provide an appropriate cropping system in each season to realize a year-round cultivation.	Understanding weather characteristics: After having analyzed IAN's meteorological observation values, it became evident that, since in 5~10 years there is more than one probability of a frost in the forty days from the beginning of July to the beginning of August, protective measures for strawberry fruits as well as for melon and tomato foliage were needed. Besides, measures to rise soil temperature were considered necessary to grow melons in that period. Appropriate standards for the use of materials: The following points were confirmed. Tomatoes; in case of summer cultivations, white cheesecloth coverings with 20% of sunshade rate at a height of 2 m were appropriate, while black plastic films were fit for mulching. As for winter cultivations, rain shelter houses were needed to protect against frost. Melons; a tunnel covering of white cheesecloth with 20% of sunshade rate was necessary for the planting at the beginning of August. Cultivation with braces in rain shelter houses was effective for the stabilization of the harvest in April. Strawberries; for seedling raising, it was necessary to use plastic pottos and installations consisting of rain shelters, coverings of black cheesecloth with 50% of sunshade rate, and high shelves (called a rain-shelter, sunshade, high-shelf, raising-seedling structures). A black plastic mulch was appropriate on the field.	4 4		Tests on planting times of tomatoes, melons and strawberries are subcequently under way ,thus realizie the accumulation of the data

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Resons for activity delays	Future Plans
Subjects	Activities					
			Appropriate cropping types for different cropping periods; the efficiency of the following cropping types was confirmed. Tomatoes; ① Cropping type for harvest in winter; The variety Sofia was planted in May and grown in rain shelter houses, and it was possible to harvest from July to October. ② Cropping type for harvest in summer; the variety Acclain, was planted at the beginning of every month from October to March and grown under white cheesecloth, and it was possible to harvest continuously every month from November to May. Melons; ① early ripening cropping type grown in tunnels; the variety Autumn waltz was planted at the beginning of August and grown in white cheesecloth tunnels, and it was possible to harvest in November. ② propped cultivations in rain shelters; the varieties Autumn Waltz and Florence were planted in November and they were possible to harvest in January; ③ the same varieties as in ② were planted in February and they were possible to harvest in April, using the same installations. Strawberries; ① long-term stability harvesting system; seedling-raizing started from October using a rain shelter-black cheesecloth, sunshade-high shelf-raising seedling structure; Dover and other early-ripening varieties were planted in mid-March and harvested from June to October, while late-maturing varieties like Princess Isabel were planted in mid-April and was possible to harvest from July to November.			Conduct accumulation of data by continuing tests to confirm the practical utility of a rain shelter-sunshade-high shelf-raising seedling structure for strawberries.
2) Development of appropriate utilization methods for simple structures or materials for cultivation. ① Materials for soil mulch. ② Materials for crop protection.	Testing the practical utility of materials for covering crops or soils (materials for mulch or tunnel cultivation), crop protection and simple structures (simple vinyl house and so on) in the different cropping type cultivations of	Provide the appropriate standards for using various structures and materials in each cropping type of vegetable cultivation.	Standards for using materials according to the cropping period: as above.	4		

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Resons for activity delays	Future Plans
Subjects	Activities					
③ Simple structures (rain shelter etc.)	tomatoes, melons, strawberries and others.					
3) Selection of appropriate varieties for each of different growing types.	Selecting appropriate varieties for each of different cropping types by making a comparison with growing characteristics, yields, disease resistance and quality in tomatoes, melons, strawberries and so on.	Select excellent varieties for each of different cropping types of tomatoes, melons and strawberries.	The appropriate varieties were selected as follows: Tomatoes; For the summer cropping type grown under a structure covering by white cheesecloth at a height of 2 m, the varieties T-126 and Acclain, and for winter cropping type grown in rain shelter structure, the Sofia, had all good quality and abundant yields. Melons; for cultivation in open field, Autumn waltz was excellent thanks to its easy cultivation, high-quality, abundant yielding and storing ability, while for propped cultivation in rain shelter houses, the quality of Autumn waltz and Florence was good. Strawberries: Dover among early ripening varieties, and Princess Isabel among late ripening varieties were easy to grow, and had high-quality and abundant yields.	4		
(2) Development of techniques for upgrading the quality and yields through improved manuring practices and water management.						
1) Clarification of characteristics of materials for nursery soil and determination of their practical utilization methods.	Investigating the characteristics of the locally obtainable materials for nurseries such as fowl droppings and cow manure, and clarifying their well matched mixture rates and utilization methods for each of main fruit vegetables.	Clarify the effect of materials for nursery soil on the growth or quality of each seedlings of tomatoes, melons and strawberries, consequently determine the appropriate standards of nursery soils.	The standard for the appropriate nursery soil in the case of tomatoes, melons and strawberries consisted in mixing mountain soil with ripe cow manure in a 1 to 1 proportion.	4		Tests to confirm the efficacy of watering to melons and strawberries are under way, and the results are supposed to be verified by mid-November
2) Analysis of characteristics of organic materials (decomposition speed etc.) and determination of their	Testing the application methods and amounts of the locally available organic materials such as poultry	Develop the appropriate utilization methods and the standards of application rates of organic matters for each of	The appropriate standards for the use of organic materials were as follows. Tomatoes; for summer cropping types grown in open fields, 30-50 ton/ha of cow manure or poultry manure	4		

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Resons for activity delays	Future Plans
Subjects	Activities					
appropriate methods of utilization.	manure and cow manure.	different crops.	were applied on the whole surface and all the plow layer. Melons; for the method of cultivation in open field, 50 tons of cow manure or 10 tons of poultry manure per ha were applied on the whole surface and all the plow layer.			
3) Improvement of the techniques for fertilizer application and watering.		Determine the standards of fertilizer application and watering for each of different crops or of different cultivation systems.	As standards concerning the fertilization and watering of each crop, the following points were clarified. Tomatoes; the amount and proportion for each of basal and additional applications of chemical fertilizers were clarified according to their rate of three major constituents. It was verified that the watering method based on a system of trip-tubes was efficient. Melons; the appropriate amount of nitrogenous basal fertilizer in open filed cultivations was 10-20 kg/10a. Strawberries: the appropriate amount of basal fertilizer was 1,000 kg/10a of fowl droppings.	4		
① Cultivation in open fields.	Testing the rates and methods of fertilizer application and labor-saved watering for each of tomatoes, melons and so on.					
② Mulching cultivation	Testing the methods for fertilizer application and water-saving watering in mulching cultivation.					
4) Improvement of techniques for cultivation of vegetables.						
① Methods of training and trimming shoots.	Testing the methods of training and trimming shoots for different ages or growing types (e.g. self-topping or normal types) of tomato and melon plants. Testing the cultivation methods putting braces on melon plants.	Establish the appropriate cultivation management methods for each of main fruit vegetables. Establish a training method putting braces on melon plants to improve their fruits in quality.	Tomatoes; among training methods, the two-stalk method was opportune to raise the yield amount of low flower clusters, under the fifth cluster. Strawberries; the planting of two rows per ridge had abundant yields, excellent quality and few diseases. Melons: As for propped cultivation of Autumn waltz, the best method was the training that had been left 2~3 veins out of secondary ones, and the ideal number of fruits on each vine was 3~4.	4		
5) Improvement of soil fertility and control of weeds through introducing green	Testing the improvement of physical and chemical properties of soils by	Realize the betterment in quality and yields of vegetables through the	As for green-manure crops, Crotalaria has been largely considered more appropriate than maize or 'mukuna' for the weight of its ripe fresh weeds.	4		

Plans of Activities		Goals	Progress and Achievements	Evalua-tion	Resons for activity delays	Future Plans
Subjects	Activities					
3) Test on the methods of preparation for harvested vegetables and the techniques of simple storage for their shipping.	Testing the retention of freshness of vegetables harvested at the times of different air temperatures, and testing the preparation and simple storage methods for shipping vegetrables.	Provide appropriate methods of harvest, preparation and of handling products.	Tomatoes: After having examined the simplest methods of storage after harvesting for the tomato variety Acclain, a low temperature up to 10 ℃ under a light ventilation was effectual to improve the quality retention. In case of indoor strage at 28.2 ℃ ± 1.7 ℃ the storing ability was of eight days, while under a light ventilation or a room temperature of 10 ℃ it was possible to prolong it to twenty days. Melons: the quality retention period was of seven days in the case of Autumn waltz and three days in Sun Rise. The primary factors affecting the storing ability were copious rainfalls during the harvesting time and a ripening-degree of the fruits. In particular, the influence of precipitations was considerable, since due to rainfalls on the harvesting appointed day or three days before, the quality retention period was reduced to 2 or 3 days.	4		

Plans of Activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
manure crops.	introducing green manure crops, and testing the effective utilization methods of green manure crops that are subsequently cultivated as the succeeding crops of vegetables.	improvement of soil fertility, and in addition develope the integrated cultivation systems that were organically combined green manure crops with succeedingly cultivating vegetables.	As for the influence of introduction of green-manure crops on vegetables, the effectiveness of having introduced any of them was recognized in the case of melons and strawberries, but Crotalaria was particularly excellent.			
(3) Development of techniques for shipping of high qualities vegetables through the improvement of harvesting and preparation methods.						
1) Investigation on actual conditions of maturation stages at harvesting times.	As for tomatoes and melons, investigating actual conditions of harvesting in each of varieties and in each of maturation stages of fruits, and accumulating the basic data to improve harvesting methods.	Determine appropriate harvesting and shipping times of vegetables.	In the case of tomatoes and melons, it is as follows. Tomatoes: the appropriate harvesting time for the varieties Santa Clara and Acclain was time when approximately 80% of the skin's surface had become red. Melons: the best harvesting time for Autumn waltz was time when about 30% of the rind's surface had turned yellow, or, no matter the yellow colour, when cracks started to appear at the base of the fruits peduncle.	4		
2) Framing of methods for judging the appropriate harvesting times.	Judging the appropriate harvesting times through the tests under differences of maturation stages of fruits, of changes in markers of plant bodies and of integrating air temperature, of tomatoes and melons.	Frame the methods for judging the appropriate harvesting times of by means of simple diagnosis.	Tomatoes; the right standard to judge the appropriate harvesting time was the proportion of fruit surface which had become red, and apporopriat time was considered to be when the red surface showed around 80%. Melons; the right standards to judge the appropriate harvesting time of Autumn waltz were the proportion of the fruit surface that had turned externally yellow and the presence of cracks at the base of the peduncle. The appropriate harvesting time was when 30% of the fruit surface had become yellow and the cracks had started to appear.	4		

Plans of activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
3. Clarification of the occurrence and ecology of primary diseases and insect pests and development of control techniques for them. (1) Investigation on actual conditions of the disease occurrence and of its damage, and diagnosis of primary diseases, identification of their pathogens and clarification of their ecology.						
1) Clarification of the actual occurrences of vegetable diseases.	Investigating the periodical occurrences and damages of diseases in tomatoes, melons, strawberries and sweet peppers.	Confirm vegetable diseases necessary for practical control.	Tomatoes: Septoria blight, bacterial spot and viral diseases were confirmed to be the main diseases. The former two start to occur under conditions of high humidity in March-May and September-November, immediately after seedlings transplantation, and by the time the fifth and sixth fruit clusters bloom, they reach the upper leaves, severely affecting productivity. Their occurrence decreases with controls during the nursery and immediately after seedlings transplantation. The most numerous occurrences of viral diseases are recorded from April to June, when many fields become harvestless due to an occurrence rate of 100%. The occurrence in October-November was also considerable. The insect-borne infection was clarified during the period from the nursery to the time immediately after transplantation, which was ascertained from the fact that the occurrence increased rapidly from two to four weeks after seedlings had been transplanted. Viral pathogens are mainly composed of tomato spotted wilt virus (TSWV), that transmitted by thrips, and one of Gemini virus (taken for tomato yellow leaf curl virus or TYLCV) transmitted by white fly.	4		

Plans of activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
			Strawberries: It was verified that the main diseases were anthracnose, powdery mildew and the new Pestalotia. In the case of anthracnose, leaves, petioles, runners and fruits develope disease symtpms in the period from nursery to the harvest. When the crown part was attacked, the entire plant withered and died. Damages reached an extent as high as in old producing areas, and assumed serious proportions owing to incomplete prevention during the nursery and to the transplantation of infected seedlings. As for powdery mildew, since susceptible varieties as Dover and others have been adopted since the year 2000, its occurrence started from the nursery period, and it was very frequent in fruits during the harvest season, so that the fruits lost their commercial value. Pestalotia is described in the paragraph on "new diseases". Melons: Fusarium wilt, gummy stem blight and downy mildew were confirmed to be the main diseases. It was ascertained that Paraguayan Fusarium wilt pathogen belongs to the race 0, and it occurred very frequently on the " Sun Rise", which is the main variety in the country. The plants attacked by the disease withered and died immediately before harvest, and in many cases there was no productivity at all. The newly introduced variety "Autumn Waitz" was tolerant to the disease. As for gummy stem blight, its occurrence at the plant foots has increased after the time of fruitage, with many cases of withering and a decreasing productivity with their death. In the case of both diseases, they caused a severe defoliation after the diseases appearance and the amount of fruit was diminished. Sweet peppers: Bacterial spot and the viral disease due to CMV have been cralified as the main diseases. Both diseases occurred a severe defoliation after their appearance. The infected fruits lose their commercial			

Plans of activities		Goals	Progress and Achievements	Evalua-tion	Resons for activity delays	Future Plans
Subjects	Activities					
			value.			
	Conducting isolation, culturing, pathogenecity confirmation, identification and preservation of pathogens from diseased vegetables.	Conduct transference of the techniques for isolation, culturing, identification and preservation of causal microorganisms. Confirm pathogens causing vegetable diseases, and clarify their characteristics and actual occurrence conditions.	The undermentioned pathogens that were isolated from diseased plants, were identified and confirmed thier pathogenicity, were preserved and used for physiologocal and ecological studies. Tomatoes; bacterial spot, bacterial wiltt, Septoria, Fusarium wilt , sclerotium, damping-off. Strawberries; anthracnose, Pestaloiia, Dendrophoma, grey mould. Melons: Fusarium wilt, gummy stem blight Sweet peppers: bacterial wilt, bacterial spot			
	Conducting detection and differentiation of virulent viruses by indicator plants and/or sera.	Identify primary virulent viruses, and clarify their characteristics and occurrence conditions, in addition transfer the discrimination techniques for the related viruses.	Through indicator plants and the ELISA and DIBA methods using antisera, a TYLCV-like virus and Tomato spotted wilt virus (TSWV) were confirmed to have a role as tomato pathogenic viruses.	3	Since the antiserum virus used in the ELISA method needs to be frozen during transportation, but the clearance through Paraguayan customs requires a long time, it my lose its vital power.	Identifying the pathogenic TYLCV-like virus.
2) Determination of the insect vectors and clarification of their transmitting times of virus diseases of tomatoes.	Confirming the transmission of virulent viruses by insect vectors. Investigating periodically the possible relationship between the occurrence of insect vectors and that of virus diseases.	Confirm virulent viruses and their insect vectors, and clarify the relationship between the times of vector's transmission and the times of disease appearance in the infected crops, and clarify infection source plants and so on.	Non-infected tomato seedlings were exposed in local fields to investigate the conditions of insect vectors feeding, and then were taken back after 1 or 2 weeks, to observe the occurrence of viral diseases. As a result, it was confirmed that there is a close relationship between the inhabitation of thrips species and the occurrence of tomato spotted wilt virus (TSWV).	4		
		Clarify occurrence and ecology of virus diseases, consequently confirming times for effective control. Conduct transference of techniques for the virulent virus inoculation by minute insect vectors.	TSWV and TYLCV-like viruses occurring in tomatoes infect to seedlings during the nursery period and after the transplantation of seedlings in regular fields, then damages have been confirmed to grow serious. For that reason, it is possible to reduce their occurrence and damages to the minimum by means of a pest control during the nursery period and 2 or 3 weeks after transplantation.	3	The causal agent which induced similar symptoms as those due to a virus of Gemini group, assumed to be TYLCV ,but has not been identified yet	Identifying TYLCV virus.

Plans of Activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
	Investigating virus infection source plants and their epidemiological role.	Clarify virus infection source plants in the lands adjacent to tomato fields .	Viral symptoms were observed in weeds belonging to families such as *Solanaceae*, *Compositae*, *Leguminosae*, and *Malvaceae*, growing in the vicinity of tomato fields; among them, a TYLCV-like virus was detected in Malvaceae plants with yellow veins; TSWV and a TYLCV-like virus were detected in Leguminosae plants with yellow leaves as well as in Solanaceae plants with vein clearing; TSWV was detected in weeds of the *Compositae* family presenting colour -removing spots or micro spots. As a result, it was suggested that infected weeds might become infection sources for tomatoes.	4		
3) Clarification of the occurrence and ecology of the newly recognized diseases.	Investigating newly occurred diseases in tomatoes, melons, strawberries and sweet peppers.	Identify pathogens of the newly occurred diseases of vegetables. Clarify occurrence conditions and ecology of the newly occurred diseases.	It was confirmed that the leaf blights due to *Pestalotiopsis* sp., which has not yet been observed in Japan, occur very frequently on strawberries. This pathogenic fungus was often isolated from infected spots in leaves, petioles, runners and fruits, and it also attacks the inner part of the crown, killing it down. Up to now, seventy-five isolates have been obtained from each infected spot, cultured and preserved. The disease symptoms occurred at all the parts inoculated with the fungus isolates, which could be re-isolated from the parts. This fungus has been identified as *Pestalotiopsis longisetura*, and the disease has been named Pestalotia (Mancha marron), as it was announced at the meeting of Japanese Phytopathological Society in September, 2000. Since conidiaspores of the disease are scattered with water drops during rainfalls and watering, it is evident that the outbreak of the disease is inhibited by cultivation under rain shelter tructures. Score (Difenoconazole) and Baycoral (Bitertanol) were effective insecticides.	3	The current year's work is under execution.	Ascertainning pathogenicity to many plant species
4) Preparation of the data base on the occurrences of the vegetable diseases and	Inputting investigating data into personal computers and preparing their accumulation.	Aim at the establishment of efficient control measures by compiling the data on the	In relation to the main diseases affecting tomatoes, strawberries and melons, data on the conditions for seasonal occurrence of the diseases have been	4		Add data of the year 2001

Plans of Activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
their control.	arrangement and processing.	occurrence conditions of vegetable diseases. Prepare the basic research data for establishment of the control measures for vegetable diseases.	imputed into the computers. The preparation for the data base of fungicidesis has been conducted.			
(2) Development of control measures for primary diseases. 1) Cultural control.						
① Comparative tests for disease resistance among the newly bred varieties and lines.	Testing the resistance of existing varieties or the newly bred varieties and lines to primary diseases.	Determine resistant varieties and lines, and realize their utilization.	Strawberry powdery mildew; Tufts, Camarosa and Selva were resistant, while Dover, P. Isabel and the varieties of Japanese origin were susceptible. Strawberry anthracnose; Dover was relatively resistant. Tufts, Sweet Charlie, OSO Grande, IAC Guarani were susceptible varieties. Strawberry Pestalotia; Dover, P. Isabel and Rindamore were resistant varieties, while Tufts, Camarosa and OSO Grande were susceptible. As for melons' Fusarium wilt race 0, Sun Rise is a susceptible variety, but Autumn waltz and the breeding lines of the project, A-1 and other 13 lines, were resistant.	3	Tthe resistance of the breeding lines produced by the project to each kind of diseases needs to be verified.	The work is continuously under execution.
② Control by utilizing materials or facilities.	Testing the control measures for bacterial leaf spot of tomatoes and sweet peppers, and for anthracnose and Pestarochia diseases of strawberries by means of the rain shlter house cultivation and others .	Confirm the effect of control measure by preventing rain-borne infection, and utilize it as one of the practical measures for control.	A Rain shelter, sunshade and high shelf raising seedling facility permit to obtain healthy seedlings of strawberry, in comparison with a ground nursery in farming fields, however, varieties susceptible to anthracnose and Pestalotia, such as Tufts, need to be periodically spread with chemicals in order to reduce the low-rate disease occurrence even in the rain shelter-sunshade-high shelf facility. After fix planting of strawberries in the cultivation under rain shelter houses, non-infected healthy fruits were obtained, without observing a development of strawberry anthracnose and Pestalotia, while in the cultivation in farming fields the diseases grew more	4		

Plans of Activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
			serious with every rainfall and frequently occurred also on fruits.			
			In the period from November to March, when the weather keeps fine, with a daytime maximum temperature over 30 C, the field were copiously irrigated after ploughing and the soil surface was covered with vinyl to obtain a subterranean temperature over 40 C; with a 30-day covering, it was possible to control tomato Septoria blight, damping -off, bacterial spot and sclerotium, melon Fusarium wilt, strawberry anthracnose, Pestalotia, grey mould and soil nematoda.	4		
	Testing the control measures of virus diseases by using the mulching or barriers to prevent invading of insect vectors.	Confirm the preventive effect of control measures against virus diseases by utilizing materials or facilities such as rain shelter cultivation methods, consequently put them practical use as one of the control measures.	It was confirmed that covering with non-woven fabrics on tomato seedings during their growing in nursery bed has high preventive effect on invading of insect vectors and on the consequent occurrence of virus diseases.	4	The control effect of rain shelter houses against tomato bacterial spot disease has not been investigated yet.	It will be implemented this year in October, the period in which the occurrence of the disease is most frequent
2) Chemical control.	Testing the effect of control by agricultural chemicals against primary diseases of tomatoes, melons, strawberries and sweet peppers: searching for effective chemicals in vitro, and testing their effectiveness in fields.	Transfer techniques for the efficacy tests of agricultural chemicals in vitro and in fields. Verify effective chemicals against primary diseases, and utilizing them as one of the control measures.	Score and Baycoral were promising to contorol strawberry anthracnose. The efficacy of Antracol (Propineb) is of middle level, while in the case of Benlate (Benomil) it differs according to the fungus isolates.	4		
			Score and Baycoral were promising for strawberry Pestalotia. Some isolates were resistant to Benlate. The following chemicals were efficient against each disease in field tests: Tomato Septoria blight: its occurrence decreased by means of a control with Daconil (Clorotalonil) and Score during the nursery and immediately after seedlings transplantation. Tomato zonate spot: Dithane (Mancozeb) Strawberry anthracnose, Pestalotia and powdery mildew: Score.	4		

Plans of Activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
			Strawberry powdery mildew: Afugan (Pirazofos), Kumulus (Azufre).			
3) Systematization of control.	Investigating systematic methods for control by combining rationally various measures.	Establish a rational control system by combining various effective measures.	It was observed that the combined use of nursery bed coverings and insecticide spraying after transplantation was highly effective for the control of tomato virus diseases by decreasing insects vectors' transmission. As for the systematic control of tomato diseases and insect pests, at present it is being proven and demonstrated in two local farming fields.	3	The demonstration and exhibision of techniques are underway in two local fields with the entomology section.	Continuing the investigation
4) Preparation of a manual for controlling diseases and insect pests of vegetables.	Compiling a manual in which are summarized the achievements during five years of research activities for controlling primary diseases and insect pests of vegetables.	Generalize the newly obtained information and the newly developed techniques throughout the Project activities, compile them as a manual for vegetable diseases control to be used daily by farmers and others with relation to the vegetable production in Paraguay.	The paragraph on diseases control in the technical manual for fruit vegetables cultivation is being prepared.	3	A draft is being written out.	Completing the draft by November.

Plans of Activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
(3) Investigation on the actual condition of occurrence and of damage caused by insect pests, and clarification of occurrence and ecology of primary insect pests.						
1) Investigation on the actual conditions of damage caused by insect pests.						
① Investigation on damage caused by insect pests.	Investigating the actual conditions of damage caused by insect pests to tomatoes, melons, strawberries and sweet peppers in local fields.	Clarify the actual conditions of damage caused by insect pests in each of crops, and determine the pests with necessity for practical control.	The actual conditions of insect pests has been clarified for each crop both in fields of IAN and in local fields of small-scale farmers. As a result, the following have been confirmed to be the primary insect pests to be controlled, and their occurrence and ecology as well as the methods to exterminate them have been elucidated. Tomato; mites, thrips, *Tuta absolute*, white fly Melon: *Diaphania spp.*, mites, aphids Strawberry; aphids, mites Sweet peppers; broad mites	4		
② Identification of harmful insect species.	Identifying species of vegetable insect pests.	Identify primary insect pests and transfer the techniques for identification of the pests.	As for the insect pests attacking each vegetable, 15 species have been identified in tomatoes, 7 in strawberries, 8 in melons and sweet peppers, respectively. Among such pests, with respect to the groups of aphids and white flies, all were identical to the Japanese species. Besides, the occurrence of two species belonging to the mites has been confirmed, one was identical to the Japanese species.	4		
2) Investigation on the occurrence and ecology of primary insect pests.						
① Investigation on the	Investigating the	Clarify the immigration	The each immigration period of aphids, white flies	4		

Plans of Activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
seasonal prevalence of virus transmitting insect vectors.	immigration of aphids by means of yellow trap, and investigating that of thrips and white flies by means of sticky trap.	prevalence of adult aphids throughout a year and their relations with virus transmission, and in addition determine the times for effective control. Transfer the techniques for identification of species caught by yellow traps and others.	and thrips has been confirmed by means of traps, and accurate data have been obtained in relation to the periods in which to control each insect. The number of immigrating species and individuals of aphids was small in comparison with Japan. Cotton aphid (*Aphis gossypii*), which is typical of Paraguay, immigrated all the year round, but it was pretty numerous from January to April. White flies immigrated numerous from December to April. Thrips started immigrating from October, but their number reached a peak from January to February, and it suddenly decreased in April.			
② Investigation on the seasonal prevalence of occurrence in the chewing type insect pests.	Clarifying the seasonal prevalence of occurrence through the research on the population density by means of light-trapping and ovservation on vegetable bodies.	Clarify the prevalence of occurrence throughout a year of adults and larvae of the chewing type of insect pests.	The period in which each insect pest of the families of Lepidoptera (*Tuta absoluta*, *Spodoptera* spp., *Diaphania* spp., and other genera) and Coleoptera (*Diabrotica* spp.) occurs more frequently has been clarified by means of traps and field surveys, so that accurate data were obtained in relation to the periods in which to control each insect pest. The number of *Tuta absolute* increased from September, reaching a peak in November and decreasing in February. The occurrence of *Spodoptera* spp. all year round was confirmed, but in strawberries it became a problem especially in May and June. The genus of *Diaphania* spp. occurred from September to February, and the damages during the period in which melon fruits get to thickening growth became a problem. *Diabrotica* spp. occurred all year round, but it raised in density from January to April.	4		Continuing accumulating data
③ Investigation on the seasonal prevalence of occurrence in sucking type insect pests.	Investigating the changes in population density of the pests feeding on new leaves or buds of vegetables.	Clarify the prevalence of occurrence throughout a year of adults and nymphs of the sucking type of insect pests.	The occurrence periods of mites, aphids, thrips and white flies were clarified for each crop, and accurate data were obtained regarding the periods in which to control each insect pest. The occurrence of white flies and thrips in fields	4		Continuing accumulating data

Plans of Activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
			showed the same trend of the circumstances in which they fly to traps. Mites increased from August, reached a peack from October to January, and suddenly decreased in April. Cotton aphids occurred all year round, with a high prevalence in melons from January to February.			
3) Clarification of the ecology of primary insect pests.						
① Clarification of the ecology of chewing type insect pests.	Investigating primary insect pests in fields and investigating the pests reared indoors.	Clarify the ecology of primary insect pests of chewing type, and in addition transfer the techniques for their rearing methods.	As for *Diabrotica* spp. and *Spodoptera spp.*, the ecology of their occurrence has been clarified through rearing and investigating them in fields, so that accurate data were obtained on the necessity as well as the proper times for control. In the case of *Diabrotica sp.*, the damages due to their feeding and the span of each larval stage and were ascertained by rearing them. As for *Spodoptera spp.*, predation at the early larval stage by their natural enemies exceeded any expectation, and the living population density decreased.	4		
② Clarification of the ecology of sucking type insect pests.	Investigating primary insect pests in fields and the pests rearing indoors.	Clarify the ecology of primary insect pests of sucking type, and in addition transfer the techniques for their rearing methods.	As for *Tetranychus marianaea*, a species closely related to the *Tetranychus urticae*. and *Ranklinella shultzei* , the ecology of their occurrence was clarified in detail by rearing them, and the data that back up the conditions of their occurrence in fields were obtained. It was demonstrated that the most abundant proliferation of *Tetranychus marianae* occurs under temperature conditions of 25 -30 C, and it is most frequent in November-December. In the case of *Franklinella spp.*, it was verified that 25 -28 C are suitable for proliferation, while at a temperature below 18 C or over 30 C the larvae stop growing, which is the reason why the occurrence in fields in January- February as well as June-September	4		

Plans of Activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays	Future Plans
Subjects	Activities					
			is rare.			
4) Confirmation of the insect vectors transmitting virus diseases of tomatoes, and clarifying their times of virus transmission.	Collecting and identifying the insect vectors of virus diseases.	Identify the insect vectors of virus diseases and clarify their epidemiological role.	As for seriously damaging virus diseases of tomatoes, it has been confirmed through inoculation tests by insects that the insect vectors of Tomato spotted wilt virus (TSWV) and TYLCV-like virus are the species of *Frankliniella schultzei* and *Bemisia argentifolii* respectively, and the conditions for transmission were partly elucidated.	4		Taking supplementary tests during the occurrence season of vectors (December)
5) Preparation of data base.						
① Preparation of the data base for occurrence and ecology of insect pests.	Preparing a data base through inputting the investigating or experimental data on the occurrence and ecology of insect pests into personal computers.	Prepare a data base system will be possible it to output necessary data concerning each of different kinds of insects or vegetables, or each different season.	The results of the investigations on the conditions for the occurrence of insect pests, which were carried out in fields within IAN and in local farming fields from the year 1997 to 2000, have been inputed into a database using the database software Access.	3	The results of the year 2001 have not been completely organized nor added.	Adding the results of the year 2001. Creating a database
② Preparation of the data base for damage caused by and morphology of insect pests.	Preparing the data base through recording in color slides.	Transfer techniques for taking close-up photography, and in addition prepare the data base inputted color slides of insect pests.	The techniques of close-up photography have been completely transferred. The morphology of insect pests and damages due to them have been recorded by means of pictures through the application of the techniques for close-up photography, and pictures showing the morphology of insect pests as well as the symptoms of damages have been almost completely collected in relation to the primary insect pests of vegetables. They are being used as materials in seminars and training meetings for extensionists, leading small-scale farmers and others. The collected slides are currently being inputed into a database.	3	The accumulated slides are being inputed into a database.	
(4) Development of control methods for primary insect pests.						

Plans of Activities		Goals	Progress and Achievements	Evaluation	Resons for activity delays.	Future Plans
Subjects	Activities					
1) Biological control.						
① Search for natural enemies and their evaluation.	Searching for natural enemies to the primary insect pests of tomatoes, melons, strawberries and sweet peppers and evaluating their effect.	Clarify effective natural enemies to primary insect pests.	The natural enemies of the main insect pests were clarified. Aphids natural eneenemies; 5 species of the ladybird, 1 species of *Syrphidae*, 1 species of *Chrisopidae*. Mites natural enemies; 2 species of *Phytoseiidae*, 1 species of ladybird White flies natural enemies; 2 species of ladybird, 1 species of *Aphelinidae* bee As for 4 of the species of the ladybird, which are aphids natural enemies, it was ascertained that they develop in the nearly 20 days from the oviposition to the adult stage, and through the results basic data were obtained on their reproduction speed. As for *Phytoseiidae*, which are mites natural enemies, it was ascertained that the quantity of mites eggs predated per day amounts to nearly 30, and basic data were obtained on the effect of predation. The utility value of ladybirds and *Phytoseiidae* as natural enemies is high, because of their predatory and reproductive capacity.	4		Carrying out supplementary tests on the predation amount of ladybirds and *Tuta absoluta*.
2) Cultural control.						
① Control effect of agricultural materials.	Testing the preventive effects of mulching or barriers on invading of insect vectors and occurrence of virus diseases.	Utilize agricultural materials as one of the control measures for virus diseases.	It was ascertained that the plastic films silver-grey in color have a repellent effect on aphids. However, since the films are hard to obtain in the country, and the actual damages due to viral diseases transmittrd by aphids are small, it has not been considered necessary to put tests for practical use. Since cultivation with covered nurseries kept off invasions and infestation of insect vectors of tomato virus diseases (white-flies and thrips), it was elucidated that it was very effective to prevent infections of viruses, so that it was adopted as part of a systematic control.	4		Carrying out supplementary tests on *Palomilla*.

ANNEX 13. Seminars and Workshops

Year	Month	Day	Name of seminar	Titles (Lecturer)	Participants	Number	Remarks
98	2	18	Technical training course	Main insect pests of vegetables and their control(Mrs. Mirian Trabuco, Agr. Carlos Palacio)	Leading small scale Farmer	20	CETAPAR 5Days
98	3	18	Field training course	Strawberry cultivation(Mr.Edgar amarilla, Mr.Gregorio Bozzano, Mr.Alfredo Valiente)	Famers	16	Estanzuela
98	3	25	Seminar on vegetble production techniques	Nematodes in the Strawberry farm(Mr.Alfredo Valiente)	Researcher,Extension officer ,Local government, Farmer ,Cooperative etc.		
98	3	26	Field training course	Control for strawberry disease(Mr.Gregorio Bozzano, Mr.Alfredo Valiente)	Farmer	11	Toledo Canada
98	4	3	Field training course	Control for strawberry disease(Mr.Gregorio Bozzano, Mr.Alfredo Valiente, Mr. Luis Raidan. Mr.Edgar Alvarez)	Farmer	11	Toledo Canada
98	6	26	Seminar on vegetble production techniques	Presentation of buletin(5 counterparts)	Researcher,Extension officer ,Local government, Farmer ,Cooperative etc.	60	
98	8	3	Technical training course	Control of main insect pests of Tomato and Melon (Mrs.Maria de Lopez),Control of main diseases of Tomato and Melon (Mr.Gregorio Bozzano, Mrs.Maria T Ayala)	Leading small scale Farmer	16	CETAPAR 5Days
98	9	10	Exhibition day	Seedling production of strawberry(6 counterparts)	Researcher,Extension officer ,Local government, Farmer ,Cooperative etc.	150	
98	10	16	Seminar on vegetble production techniques	Control of primary insect pests in Japan and major problems(Mr. Tetsuzo Hamamura, Sho.Exp.),Melon breeding for disease resistance in Japan(Mr. Tadayuki Wako, Exp.Cor.)	Researcher,Extension officer	50	
98	10	19	Technical training course	Control on primary insect pests of tometo and melon(Mrs.Maria de Lopez), Control on primary diseases of tomato and melon(Mr.Gregorio Bozzano, Mrs. Maria T Ayala)	Extension officer	20	CETAPAR 5Days
98	10	26	Seminar on activity results of experts	Resistance of leaf tick on chemical products in Paraguay.(Mr.Tetsuzo Hamamura, Exp.Cor.),Artificial inoculation test of disease resistance on melon and strawberry(Mr.Tadayuki Wako, Sho.Exp.)	Researcher,Extension officer	34	
98	11	2	Technical training course	Seedling production of tomato and melon (1 counterpart)	Leading small scale Farmer	20	CETAPAR 5Days

*Sho.Exp. means short term expert, Lon.Exp. means long term expert.

Year	Month	Day	Name of seminar	Titles (Lecturer)	Participants	Number	Remarks
99	3	4	Exhibition day	Strawberry cultivation	Researcher,Leading small scale Farmer	160	
99	3	17	Seminar on vegetble production techniques	Simple analysis method of soil and plant nutrition(Mr.Sunao Kikuchi, Sho. Exp.),Diagnosis and control of virus disease(Mr.Chiyoichi Noda, Sho.Exp.), Autumn Waltz, introduced excellent variety of melon(Mr.Tatstsuyoshi Taga. Lon.Exp.)	Researcher,Extension officer ,Local government, Farmer ,Cooperative etc.		
99	3	25	Seminar on activity results of experts	Results of chemical analysis and improvement techniques on soils of small acale farmers (Mr.Sunao Kikuchi, Sho.Exp.)	Researcher,Extension officer	20	
99	4	8	Seminar on activity results of experts	Virus disease of tomato(Mr.Chiyoichi Noda, Sho.Exp.)	Researcher,Extension officer	31	
99	4	22	Field training course	Diagnosis and conrol of melon and sweet pepper diseases(Mr.Gregorio Bozzano, Mrs.Maria T Ayala)	Farmer	18	Arroyos y Esteros
99	5	21	Seminar on activity results of experts	Situation of vegetable cultivation anf result of summer cultifation system tomato (Mr.Tatstsuyoshi Taga. Lon.Exp.)	Researcher,Extension officer ,Local government, Farmer ,Cooperative etc.		
99	7	3	Field training course	Melon cultivation(Mr.Edgar Amarilla), Control on insect pests of tomato.(Mrs. Maria de Lopez)	Farmer	120	Arroyos y Esteros
99	8	11	Field training course	Control on insect pests of tomato and melon(Mrs.Mirian Trabuco)	Farmer	200	Ita
99	8	12	Field exhibition day	Strawberry(6 conterparts)	Extension officer, Farmer, Cooperative.	120	
99	8	23	Technical training course	Cultivation tecniques of Tamato and Melon(4 Counterparts)	Leading small scale Farmer	20	CETAPAR 5Days
99	8	31	Seminar on vegetble production techniques	Strawberry cultivation in the tropical and semi-tropical region, ecological and fisiological response(Mr.Makoto Okimura, Sho.Exp.),Presentation of technical bulletin (4 Counterparts)	Extension officer, Farmers ,Cooperative, Plant protection bureau	110	
			Seminar on activity results of experts	Selection of plants from crossed population of Strawberry(Mr.Makoto Okimura, Exp.Cor.)			
99	9	9	Exhibition day	Melon cultivation(6 Counterparts)	Extension officer, Cooperative.	40	

Year	Month	Day	Name of seminar	Titles (Lecturer)	Participants	Number	Remarks
99	9	23	Seminar on vegetable production and extension	Commercialize and quality of vegetables, production of vegetables required from market(Expert and technicians of CETAPAR, Counterparts, Comercial sector)	Extension officer,, Cooperative., Researcher Local government, Comercial sector	150	DEAG
99	10	4	Technical training course	Cultivation of melon, tomato, and strawberry(4 Counterparts)	Extension officer	20	CETAPAR 5Days
99	10	5	Seminar on vegetble production techniques	Efects of organic materials on farm soil, cultivation and enevironmental contamination(Dr.Mio Yoshida,Sho.Exp.),Bacterial diseases on tomato and diagnostic method of pathogen(Dr.Ikuo Kadota,Sho.Exp.)	Researcher,Extension officer ,Local government,Farmer , Cooperative		
99	10	18	Technical training course	Cultivation of melon, tomato, and strawberry(4 Counterparts)	Extension officer	20	CETAPAR 5Days
99	10	25	Seminar on activity results of experts	Comaprison on phisical caracteristics of soils in the farm of IAN and vegetable farms of farmers around the IAN(Dr.Mio Yoshida,Sho.Exp.),Bacterial diseases of solanacea family crops(Dr.Ikuo Kadota,Sho.Exp.)	Researcher,Extension officer ,Local government, Farmer ,Cooperative, etc.	60	
00	1	12	Field training course trip	Tomato cultivation system with simple covering structure(Expert and technicians of CETAPAR,DEAG-Mr.Jorge Pena)	Local government,Farmers, Cooperative, etc.	80	Alto Parana
00	2	25	Seminar on vegetble production techniques	Tenciques on rearing of trips, vector of tomato disease virus and diagnostic method of pathogen(Dr.Tamito Sakurai, Sho.Exp.),Control of tomato virus disease throu extermination of vector snsects(Mrs.Maria de Lopez)	Researcher,Extension officer ,Local government, Farmer , Cooperative	71	
			Seminar on activity results of experts	Ecology if trips in Paraguay and control on yellow necrosis (Dr.Tamito Sakurai, Sho.Exp.)			
00	3	10	Field exhibition day	Strawberry cultivation(4 Counterparts)	Extension officer,Leading small scale Farmer	100	
00	3	10	Local field exhibition day	Strawberry cultivation(4 Counterparts)	Extension officer,Leading small scale Farmer	68	Ita
00	4	25	Speciao training course	Strawberry cultivation(4 Counterparts)	Extension officer	32	
00	8	8	Speciao training course	Melon cultivation(4 Counterparts)	Extension officer	13	

Year	Month	Day	Name of seminar	Titles (Lecturer)	Participants	Number	Remarks
00	8	25	Seminar on vegetable production techniques	Vegetable production in Okinawa, Recommendation for technical transfer from investigation to extension, from extension to farmer in the Paraguay(Mr. Naomitsu Uehara,Sho.Exp.),Present situation of extension in the Paraguay(Mrs. Juana Caballero)	Extension officer, Leading small scale Farmer, Cooperative.	34	
00	9	14	Seminar on vegetble production techniques	Cultivation of strawberry(5Counterparts)	Extension officer,Farmer	67	
00	9	22	Seminar on vegetble production techniques	Cultivation of melon(Expert of CETAPAR,Counterparts)	Extension officer,Farmer	55	
00	10	2	Technical training course	Cultivation technhiques of tomato and melon(3Counterparts)	Extension officer	20	CETAPAR 5
00	10	5	Speciao training course	Strawberry seedling production.(4 counterparts)	Extension officer	27	
00	10	16	Technical training course	Cultivation tecniques of Tamato and Melon.(3 Counterparts)	Leading small scale Farmer	20	CETAPAR 5Days
00	10	30	Seminar on vegetble production techniques	Nematodes in the vegetable farm of Paraguay(Dr. Zchiro Sano, Shr.Exp.), Control techniques for nematode using manure green crops in the structure cultivation system .(CETEPRO ,Mrs Daria Yogi, Mr.Pereen)	Researcher,Extension officer ,Local government, Cooperative., Farmer	35	
00	10	30	Technical training course	Cultivation tecniques of Tamato and Melon.(3 Counterparts)	Leading small scale Farmer	20	CETAPAR 5Days
00	11	2	Exhibition day	Seedling production of strawberry.(6 counterparts)	Extension officer,Leading small scale Farmer, Cooperative.	37	
00	11	10	Seminar on vegetble production techniques	Present condition of natural enemy use and roblems,Rearing and evaluatoin of insect eating insect in the Paraguay.(Ing.Chiyoichi Noda, Sho.Exp.),Situation of breeding on industrial use tomato, problems on tomato and breeding coutermeasure in the Paraguay.(Dr.Kimio Ito,Sho.Exp.)	Researcher,Extension officer ,Local government, Cooperative., Farmer	38	
00	11	23	Seminar on activity results of experts	Results of breeding activity on tomato, recomendation for future breeding work. (Dr.Kimio Ito,Sho.Exp.)	Researche,Extension officer ,Local government, Cooperative., Farmer	140	
00	11	28	Field exhibition day	Autumn Waltz, newly intrduced variety of melon.(3 counterparts,comercial buareu officer)	Extension officer,Local government, Cooperative. Farmer	140	Caraguatay

Year	Month	Day	Name of seminar	Titles (Lecturer)	Participants	Number	Remarks
01	1	24	Field training course trip	Tomato cultivation system with simple covering structure.(Expert and technicians of CETAPAR,DEAG- Mr.Jorge Pena)	Farmers, Cooperative, Local government, etc.	80	Alto Parana
01	3	14	Field training course	Seedling production of strawberry(Mr.Luis Raidan, Mrs.Maria T Ayala)	Extension officer,Leading small scale farmers, Cooperative.	53	Aregua
01	3	28	Field training course	Strawberry cultivation(2Counterparts)	Farmer,Cooperative.	64	Ita
01	4	6	Field exhibition day	modernization of strawberry production(4 Counterparts,omercial buareu officer)	Extension officer,Leading small scale farmers, Cooperative.	55	
01	4	20	Field exhibition day	Strawberry cultivation(DEAG,3 Counterparts)	Farmer,Local government, Cooperative	350	Ita
01	5	11	Seminar on vegetble production techniques	Breeding of melon and tomato.(Mr.Junosuke Harada, Lon.Exp. in CETAPAR)	Researcher,Extension officer	30	
01	9	3	Technical training course	Cultivation techniques of Tomato and Melon(3 Counterparts)	Extension officer	22	CETAPAR 5Days
01	9	28	Field exhibition day	Autumn Waltz, newly intrduced variety of melon(Counterparts)	Extension officer,Leading small scale farmer, Cooperative.	45	
01	10	1	Technical training course	Cultivation techniques of Tamato and Melon(3 Counterparts)	Leading small scale farmer	20	CETAPAR 5Days
01	10	12	Field exhibition day	Autumn Waltz, newly intrduced variety of melon(Counterparts)	Extension officer,Leading small scale farmer, Cooperative.	62	

MINUTAS DE DELIBERACION
ENTRE
EL EQUIPO JAPONES DE EVALUACION
Y
LAS AUTORIDADES CORRESPONDIENTES DEL GOBIERNO DE LA REPUBLICA DEL PARAGUAY
SOBRE
LA COOPERACION TECNICA JAPONESA
PARA
MEJORAMIENTO DE LA TECNOLOGIA DE PRODUCCION DE HORTALIZAS PARA LOS PEQUEÑOS PRODUCTORES
EN
EL PARAGUAY

El Equipo Japonés de Evaluación (de aquí en adelante denominado como "el Equipo") organizado por la Agencia de Cooperación Internacional del Japón (de aquí en adelante mencionada como "JICA"), encabezada por el Sr. Kozo INADA, visitó la República del Paraguay desde el 22 de Octubre al 1 de Noviembre de 2001, faltando aproximadamente cinco meses para la culminación del período de cooperación para el Proyecto de Mejoramiento de la Tecnología de Producción de Hortalizas para los Pequeños Productores en el Paraguay (de aquí en adelante mencionado como "el Proyecto") prevista el día 31 de Marzo de 2002, y cuyo inicio se dio el día 17 de Abril de 1997, de acuerdo a lo estipulado en el Registro de Deliberación (de aquí en adelante mencionado como "R/D").

El Equipo mantuvo varias deliberaciones con las autoridades pertinentes del Gobierno del Paraguay, realizando estudios de campo e intercambió pareceres desde los puntos de vista técnicos y administrativos.

Como resultado de las deliberaciones, ambas partes acordaron recomendar a sus respectivos gobiernos los temas mencionados en los documentos adjuntados al presente.

El presente documento se halla elaborado tanto en inglés como en español con un mismo tenor y para un solo efecto, siendo ambas igualmente auténticas. Sin embargo en caso de divergencia prevalecerá la versión redactada en inglés.

Asunción, 31 de Octubre de 2001.

Sr. Kozo INADA
Líder del Equipo Japonés de Evaluación
Agencia de Cooperación Internacional del Japón
JAPÓN

Sr. Pedro Lino MOREL
Ministro
Ministerio de Agricultura y Ganadería
PARAGUAY

Principales Acuerdos de entendimiento mutuo

La parte japonesa y la parte paraguaya acordaron acerca de los siguientes temas conversados en el Comité Coordinador Conjunto.

1. El Informe de Evaluación Conjunta, elaborado por el Equipo Japonés de Evaluación y por el Equipo Paraguayo de Evaluación, fue aprobado, la cual se adjunta al presente documento. Acordando que las metas del Proyecto será alcanzada dentro del periodo estipulado en el R/D.

2. El Gobierno de Paraguay deberá disponer del presupuesto necesario y asignar el personal para ejecutar adecuadamente el Proyecto durante y después del período de cooperación, con el fin de que de el mismo sea autosustentable. Y la parte paraguaya elaborará el plan de operación y desarrollo, además de tomar las medidas presupuestarias reales para concretar la sostenibilidad del "Programa Nacional de la Producción de Hortalizas y Frutas".

3. La presentación del plan operativo del mencionado programa será un requisito para que el gobierno del Japón considere el envío de expertos a corto plazo de acuerdo a la necesidad.

4. Para que el Proyecto sea autosustentable, se deberá mantener una estrecha coordinación entre el IAN y la DEAG. El IAN y la DEAG, podrá consultar a CETAPAR (Centro Tecnológico Agropecuario del Paraguay) sobre las informaciones técnicas y para la extensión.

5. Con respecto a las variedades de hortalizas introducidas por el proyecto para la investigación y experimentación, su uso se determinará antes de la culminación del periodo de cooperación técnica mediante la deliberación entre ambas partes.

DOCUMENTOS ADJUNTOS

MINUTAS DE DELIBERACIÓN
DE
LA EVALUACION CONJUNTA
SOBRE
LA COOPERACION TECNICA JAPONESA
PARA
MEJORAMIENTO DE LA TECNOLOGIA DE PRODUCCION DE HORTALIZAS PARA PEQUEÑOS PRODUCTORES
EN
EL PARAGUAY

El Equipo Japonés de Evaluación (de aquí en adelante denominado como "el Equipo") organizado por la Agencia de Cooperación Internacional del Japón (de aquí en adelante mencionada como "JICA"), encabezada por el Sr. Kozo INADA, visitó la República del Paraguay desde el 22 de Octubre al 1 de Noviembre de 2001, faltando aproximadamente cinco meses para la culminación del período de cooperación para el Proyecto de Mejoramiento de la Tecnología de Producción de Hortalizas para los Pequeños Productores en el Paraguay (de aquí en adelante mencionado como "el Proyecto") prevista el día 31 de Marzo de 2002, y cuyo inicio se dio el día 17 de Abril de 1997, de acuerdo a lo estipulado en el Registro de Deliberación (de aquí en adelante mencionado como "R/D"),.

El Comité de Evaluación Conjunta (de aquí en adelante mencionado como "el CEC") estuvo organizado y compuesto por el arriba citado Equipo Japonés de Evaluación y por el Equipo Paraguayo de Evaluación, encabezado por el Sr. Francisco Ibarra con el fin de revisar el desempeño general y para dirigir la evaluación final del Proyecto.

Los equipos mantuvieron varias conversaciones con las autoridades pertinentes del Gobierno del Paraguay, realizaron estudio de campo e intercambiaron pareces entre los miembros desde los puntos de vista técnicos y administrativos.

Como resultado de las deliberaciones, el CEC acordó recomendar a sus respectivos gobiernos los temas mencionados en los documentos aquí adjuntados.

El presente documento se halla elaborado tanto en inglés como en español con un mismo tenor y para un solo efecto, siendo ambas igualmente auténticas. Sin embargo en caso de divergencia prevalecerá la versión redactada en inglés.

Asunción, 31 de Octubre de 2001.

Sr. Kozo INADA
Líder del Equipo Japonés de Evaluación
Agencia de Cooperación Internacional del Japón
JAPON

Sr. Francisco IBARRA
Líder del Equipo Paraguayo de Evaluación
Ministerio de Agricultura y Ganadería
PARAGUAY

1. Introducción

La agricultura es un sector productivo clave en el Paraguay, ocupándole 40% de la mano de obra. Pero debido al reciente merma en la producción del algodón, aproximadamente 250.000 pequeños productores (lo cual representa a cerca del 83% del total de productores agrícolas) involucrados, se vieron disminuidas en sus ingresos, dejando ante una situación carenciada. También, la creación del MERCOSUR es motivo de desafío para los agricultores locales a pequeña escala, debido a que las hortalizas con precios más bajos y de mayor calidad son fácilmente importados desde los países vecinos. Por ello, es una tarea urgente la diversificación de los cultivos para mejorar el valor agregado y aumentar su competitividad, tanto en los mercados locales como en los mercados de exportación.

El Gobierno del Japón recibió la solicitud oficial del Gobierno del Paraguay para la cooperación técnica con el objetivo de; introducir hortalizas de alta rentabilidad; desarrollar métodos superiores de cultivo para mejorar y estabilizar su producción; evitar la contaminación ambiental por medio del uso de cantidades apropiadas y adecuados agroquímicos; fortalecer y ampliar el sistema de implementación de actividades concernientes que mejoren la administración agraria de los pequeños productores y la calidad de vida..

Luego del envío del Equipo para Estudios Preliminares y el Equipo para Diseño del Proyecto, por parte de la JICA, ambos gobiernos firmaron el Registro de Deliberaciones en Diciembre de 1996, y el Proyecto empezó por un período de cinco (5) años a partir de Abril de 1997 apuntando al desarrollo y extensión de mejores métodos para el cultivo de hortalizas para pequeños productores. La sede principal del Proyecto se fijó en el IAN y la sub sede en la DEAG. Se nominó al CETAPAR para apoyar las actividades del Proyecto.

Hasta ahora, las actividades del Proyecto han sido bien implementadas. Las técnicas de producción de hortalizas y las variedades promisorias seleccionadas en el IAN, fueron difundidas y presentadas a los agricultores lideres y a las cooperativas agrícolas locales. Se llevaron a cabo seminarios y programas de entrenamiento para los extensionistas de la DEAG. Se publicaron boletines presentando las técnicas de cultivo y se distribuyeron a los extensionistas y personas relacionadas así como a los agricultores.

En esta oportunidad, restando aún alrededor de cinco (5) meses del período de cooperación, la JICA envió el Equipo de Evaluación Final, con el fin de evaluar en forma conjunta con el Equipo Paraguayo de Evaluación, el grado de logros, identificando los problemas y proponiendo las soluciones necesarias, y recomendando temas necesarios a sus respectivos gobiernos.

2. Descripción del Proyecto

2-1. Objetivo del Proyecto

(1) Meta superior

Lograr el mejoramiento de la estructura de gerenciamiento de los pequeños productores de manera a contribuir al mejoramiento de la calidad de vida de los mismos.

(2) Meta del Proyecto

Las técnicas de cultivo de hortalizas adaptados a los sistemas de producción de los pequeños productores serán desarrolladas en el IAN. Estas técnicas serán difundidas a los líderes de los pequeños productores de cada región.

2-2. Resultados del Proyecto

(1) Se mejorarán las técnicas para Mejoramiento genético y selección de las variedades apropiadas de hortalizas.

(2) Se desarrollarán técnicas de cultivo que contribuirán al establecimiento de sistemas adecuados de cultivo en el Paraguay.

(3) Se ampliarán los estudios sobre la ocurrencia y control de principales enfermedades y plagas.

(4) Se difundirán técnicas y conocimientos desarrollados en el Proyecto a los extencionistas de la DEAG y a los pequeños productores líderes, especialmente en los departamentos de Cordillera,

Central, Caaguazú, Paraguarí y Alto Paraná (como áreas principales de producción hortícola promocionadas por el Gobierno del Paraguay) por parte del IAN, la DEAG y del CETAPAR.

3. Miembros y Programa del Equipo de Evaluación Conjunta

3-1. Equipo Japonés de Evaluación

La lista de miembros está adjuntada como Anexo 1.

3-2. Equipo Paraguayo de Evaluación

La lista de miembros está adjuntada como Anexo 2.

3-3. El Cronograma de Evaluación

El Cronograma está adjuntado como Anexo 3.

4. Objetivos de la Evaluación

Las actividades de evaluación fueron desarrolladas con el fin de:

(1) Evaluar el grado de logros basados en TDIP y en PDM;

(2) Identificar los problemas sobre cualquier aspecto de la implementación del Proyecto y proponer las soluciones necesarias, de modo a ayudar a su autosustentabilidad posterior al período de cooperación; y

(3) Recomendar cualquier tema a sus respectivos gobiernos que sean necesarios para una implementación fluida y continua del Proyecto.

5. Evaluación del Proyecto

5-1. Métodos de Evaluación

Esta evaluación fue llevada a cabo por el Equipo de Evaluación Conjunta, compuesto por el Equipo Japonés de Evaluación y por el Equipo Paraguayo de Evaluación de acuerdo con el **R/D**, TDIP y PDM a través del análisis de informes, visitas y estudio de campo, entrevistas y conversaciones con el personal del Proyecto basadas en cinco criterios de Evaluación, tales como:

(1) Eficiencia
(2) Eficacia
(3) Impacto
(4) Pertinencia
(5) Sustentabilidad

5-2. Análisis basado en los Criterios de Evaluación

El Equipo analizó el desempeño del proyecto usando los siguientes cinco (5) criterios:

(1) Eficiencia

La eficiencia de la implementación del Proyecto fue analizada centrándose en calidad, cantidad, oportuno, uso de las inversiones, administración general de la actividades del Proyecto y otros factores externos.

(2) Eficacia

La eficacia fue evaluada analizando los logros del Proyecto.

(3) Impacto del Proyecto

El impacto del Proyecto fue identificado centrándose principalmente en el impacto positivo y negativo, directo e indirecto relacionado con el Objetivo General del Proyecto realizando como una evaluación final del Proyecto.

(4) Pertinencia

La pertinencia del propósito del Proyecto fue juzgada de acuerdo con las principales políticas de desarrollo del Gobierno Paraguayo.

(5) Perspectivas de Sustentabilidad

La sustentabilidad del Proyecto fue estimada examinando los factores tales como la utilización de las inversiones del Proyecto y la designación de contrapartes paraguayas adecuados, capacidad de administración y recursos disponibles para continuar las actividades del Proyecto.

6. Resultados de la Evaluación

6-1. Eficiencia

6-1-1. Aportes de la parte japonesa

(1) Envío de Expertos Japoneses

Un total de ocho (8) expertos a largo plazo (Jefe Asesor, Coordinador, Mejoramiento genético, Cultivo de Hortalizas/Extensión, Protección de Plantas [Control de Enfermedades y de Plagas]), y quince (15) expertos a corto plazo fueron enviados para el Proyecto de como se muestra en el ANEXO 4.

El experto a largo plazo para Mejoramiento genético no fue enviado al comienzo del Proyecto por seis (6) meses debido a problemas personales. Por dicho motivo fue reemplazado por un experto a corto plazo durante tres (3) meses. Esto causó un ligero retraso en la formulación del plan detallado de implementación. A excepción de este caso, se enviaron en forma oportuna a los expertos a corto plazo necesarios y no aconteció ningún otro asunto crucial.

(2) Entrenamiento del Personal Paraguayo en el Japón

Un total de diez y siete (17) personales de los C/P (contraparte paraguaya) participaron de los entrenamientos en el Japón, como figura en el ANEXO 5. Pero tres (3) de ellos renunciaron a sus cargos luego del entrenamiento por razones personales.

(3) Costo Local

El detalle del Costo Local está anexado como ANEXO 6. Además del Costo Local General, la parte japonesa ha asignado y pagado los costos de divulgación, Medidas de Protección de las instalaciones, Programa de Intercambio Técnico, y Medidas Urgentes. Especialmente, para Gastos de Construcción de Infraestructura Básica, se gastaron veintiséis (26) millones de Yenes para construir el único Laboratorio de Investigación de Hortalizas en el Paraguay.

(4) Lista de Equipos Donados

La lista de los equipos donados por el Proyecto se muestra como ANEXO 7. Todos los equipos donados están bien mantenidos y en buen estado.

6-1-2. Aporte de la parte paraguaya

(1) Asignación de C/P (contraparte paraguaya)

Un total de diez y ocho (18) personas de la C/P han sido nombradas de acuerdo a la lista que figura en el ANEXO 8. Pero tres (3) de los mismos han renunciado por razones personales, sin embargo los mismas fueron inmediatamente reemplazados.

(2) Asignación de Presupuesto

La parte paraguaya ha asignado el presupuesto que figura en el ANEXO 9.

6-1-3. Evaluación

(1) Validez de Aporte

La parte japonesa ha implementado su plan oportunamente conforme al R/D, tal como el envío de expertos, becando a los C/P (contraparte paraguaya) y proveyendo los equipos necesarios, así como el desembolso necesario de los costos para construir las instalaciones y las operaciones en los sitios del Proyecto.

Con estos aportes, los expertos japoneses fueron capaces de transferir sus técnicas y conocimientos a los C/P, logrando excelentes resultados en forma conjunta. Aunque algunos de ellos carecían de experiencia, los C/P fue asignada adecuadamente en cada

campo técnico y los mismos mejoraron sus técnica, a través del entrenamiento recibido en el Japón. Ellos están suficientemente entrenados como para actuar de instructores en seminarios técnicos para los agricultores. Los equipos suministrados ayudaron a adelantar las actividades de Mejoramiento genético, agronomía e investigación sobre protección para plantas. La mayoría de los equipos se mantiene en el Laboratorio de Investigación de hortalizas, la única instalación que posee las más completas facilidades para la investigación de hortalizas en el Paraguay. Es necesario que la parte paraguaya conserve y haga buen uso de dicho Laboratorio.

En general, se concluye que la mayoría de los resultados fueron logrados por medio de aportes adecuados.

(2) Problemas que surgieron de los aportes y para el logro de los resultados

Durante el período de cooperación del Proyecto, tres (3) personales de los C/P renunciaron por razones personales. Es un problema no solamente porque los mismos hayan renunciado, sino porque renunciaron inclusive después de haber sido entrenados en el Japón. Esto significa que los conocimientos y técnicas transferidos por los expertos y todos los gastos que se pagaron por los mismos, incluyendo sus estadías en el Japón para entrenamiento, no dejan ningún aporte para ayudar a la sustentabilidad del Proyecto. Es necesario que la parte paraguaya considere dar incentivos o mejorar el trato dado al personal asignado como C/P del Proyecto de modo a que los mismos trabajen por mucho tiempo, durante y después de la culminación del período de cooperación.

Otro problema, es con respecto las horas de trabajo de los C/P. El Gobierno del Paraguay debería considerar pagarles sus obligaciones de horas extras en forma continua, debido a que el horario de trabajo de los empleados gubernamentales en el Paraguay es hasta la una de la tarde.

El despacho de algunos de los equipos donados por el Proyecto al Paraguay demoró hasta un año. Debido a este retraso de los equipos fundamentales y necesarios, no pudieron ser usados hasta finales de la última mitad del período del Proyecto, causando esto retraso en las actividades.

La asignación y desembolso de los costos locales del Paraguay a menudo estaban atrasados y eran inferiores a los montos propuestos, y esto impedía el buen funcionamiento Proyecto. La parte japonesa tuvo que hacerse cargo de los gastos locales, incluso para equipos pequeños, insumos, mantenimiento de los equipos suministrados, teléfonos, etc., que debieron haber sido pagados originalmente por la parte paraguaya. Por otra parte, el gobierno del Paraguay deberá mantener el pago de horas extras para continuar las actividades. El Gobierno del Paraguay deberá tomar las medidas necesarias para manejar esta situación, a fin de dar sustentabilidad al Proyecto.

Durante los primeros tiempos de implementación del Proyecto no se contó con una asignación presupuestaria disgregada para el proyecto. El Congreso del Paraguay aprobó el presupuesto para el 2001 y los costos necesarios para los proyectos de asistencia extranjera fueron asignados por separado, y por primera vez al MAG. Dichas medidas son necesarias para las actividades sucesivas y sustentables del Proyecto. Además, es obvio que la asignación del presupuesto y la administración contable iban a ser necesarias para después del período del Proyecto. Por ello, se recomienda que el IAN prepare un plan de operación y desarrollo según un plan de presupuesto realista.

(3) Resultados de cada área técnica

a. Mejoramiento genético

1) Fueron seleccionadas las variedades adecuadas para el Paraguay. En cuanto a melón, la variedad 'Autumn Waltz' que tiene la tolerancia a enfermedades y conservación post cosecha en comparación con la variedad existente, se ha introducido y

comenzó difundirse. La variedad de frutilla 'Dover' fue seleccionada por su resistencia a antracnosis y aumentando su cultivo en la principal zona de producción. Por esta razón la zona permanece como la principal zona de producción de frutilla. Con respecto al tomate la variedad 'Horizon' fue seleccionado como progenitor promisorio.

2) Una nueva variedad de tomate con resistencia a la mancha bacteriana denominado "SUPER CETAPAR" y melón con pulpa verde, buena capacidad de conservación post cosecha y tolerancia contra las principales enfermedades denominado "LUNA YGUAZU" fueron desarrolladas en el CETAPAR.
3) En cuanto a melón nueva línea de pulpa roja y capacidad de conservación post cosecha y determinación de época de cosecha por la coloración, fue desarrollado por autopolinización de 'Autumn Waltz'. Fue desarrollada híbrido F1 a partir del cruzamiento de nueva línea y líneas intermediarias con tolerancia a fusariosis. Después de la realización de prueba de adaptabilidad es posible registrar como nueva variedad.
4) En frutilla, líneas promisorias fueron seleccionadas a partir de líneas híbridas para obtener una variedad precoz, fruta dura y alto rendimiento. La variedad desarrollada de esta línea se puede registrarse después de la prueba de tolerancia a enfermedad, productividad y adaptabilidad local programados más tarde.
5) En cuanto a tomate, una línea con fruta roja y grande fue fijado como una excelente planta madre. En adelante esta línea será examinada a través del cruzamiento para obtener la resistencia a principales enfermedades, se estima que podrá obtener un excelente híbrido F1. Por otra parte una línea de fruta dura fue fijada y se realiza la prueba de cruzamiento con variedad 'Horizon'.
6) Métodos de uso de material de mejoramiento genético, técnica de selección y cruzamiento fueron transferidos. Sin embargo técnica de prueba de tolerancia a enfermedad, característica, adaptabilidad local y producción de semilla no han terminado. Además creación de sistema de producción de semilla y registro de variedad están pendientes.

b. Agronomía
1) En cuanto a tomate, fue desarrollada la tecnología de producción de cultivo de verano, mediante utilización de malla de media. Con este resultado, se espera la producción desde Enero hasta Mayo, cuando el precio de venta es más alto que otras temporadas de cultivo.
2) En cuanto al melón, fue desarrollada un sistema de cultivo con utilización de túnel de malla blanca. Este sistema permite la cosecha melón durante el mes de octubre y el precio es 60% más caro, adelantándose un mes el período de cosecha y mejorando el rendimiento.
3) En cuanto a frutilla, fue desarrollado un sistema producción estable y prolongada fue desarrollada, posibilitando la cosecha desde mayo y hasta diciembre mediante la combinación de variedad precoz y tardía, además del mejoramiento del sistema de producción de mudas. Se hizo posible el adelantamiento de dos meses de período de cosecha y casi 20% de aumento de rendimiento.
4) Sistemas de cultivos de producción de tomate para todo el año y sistemas de cultivo de melón para la plantación en el período de julio a abril fueron desarrolladas mediante la utilización de protección contra lluvia y en altura. El período de plantación se amplió y se hizo posible la producción de alta calidad.
5) Las técnicas de cultivo y planeamiento de investigación fueron transferidos.

c. Protección de Plantas (Control de Enfermedades)

1) El proyecto determinó la ocurrencia de principales enfermedades de tomate, melón, frutilla y pimiento. Fueron establecidos los métodos de control de estas enfermedades, lo cual posibilitó la reducción de la pulverización alrededor de 30%.
2) En cuanto a la frutilla, había fuerte aparición de antracnosis y pestalochia (una enfermedad recién descubierta) en la zona principal de producción . Estas enfermedades eran responsables por un 30 a 40% de perdidas de plantas en las parcelas. El proyecto desarrolló y difundió métodos adecuados de control.
3) Se determinó las principales enfermedades que causan muchos daños a tomate. Son dos tipos de Virus- TSWV y TYLCV- transmitidos por insectos.
4) Fueron desarrollados métodos de control de enfermedades que usan menos productos químicos, tales como utilización de variedades tolerantes a enfermedades, desinfección de tierra por el calor del sol, etc.
5) Los contrapartes adquirieron las técnicas de diagnóstico y métodos de ensayo.

d. Protección de Plantas (Control de Plagas)
1) El proyecto determinó la ocurrencia de principales plagas de tomate, melón, frutilla y pimiento. Fueron establecidos los métodos de control de estas plagas, lográndose reducir la pulverización en alrededor de 50%.
2) En tomate, dos insectos transmisores de enfermedades virósicas fueron identificados – *Bemisia argentifolii* y *Frankliniella schultzei*. También el proyecto desarrolló la técnica de cultivo con cobertura y método de control en la etapa de muda, lográndose reducir en un 75% los daños causados por estas plagas.
3) El proyecto determina la efectividad de los enemigos naturales para pulgones, ácaros y mosca blanca. El uso de los productos químicos con bajo efecto sobre los enemigos naturales están en investigación.
4) Los contrapartes adquirieron las técnicas de control de plagas y métodos de experimento.

e. Extensión
El Proyecto difundió los resultados como sigue.
① Las técnicas desarrolladas y variedades seleccionadas en el proyecto fueron introducidos y adoptados por los productores líderes(como líderes de comunidad) a través de expertos japoneses, contrapartes y extensionistas del DEAG.
② Cursos y días de campo fueron realizados en las parcelas demostrativas.
③ Boletines técnicos fueron publicados.

Los productores líderes tienen un función muy importante por la demostración en su parcela a otros productores. En total siete(7) parcelas de demostración y validación fueron instalados en Itá, Nueva Italia, Caraguatay, etc. Más de cincuenta(50) seminarios y día de campo fueron realizados y participaron más de tres mil(3000) personas(investigadores, extencionistas, productores, etc.)

Los productores líderes cultivan las variedades seleccionadas(Autumn Waltz, (melón), Dover(frutilla), Super CETAPAR(tomate)) reemplazando a las variedades tradicionales(Sun Rise(melón), Tufts(frutilla), Santa Clara(tomate)). Existen satisfacción por el uso de nuevas tecnologías debido a que los daños causados por enfermedades y plagas están bien controlados, observándose un sustancial mejoramiento de los productores líderes en cuanto calidad y rendimiento. Aun que dependiendo de la temporada, mayoría de ellos tienen mayores ganancias por la producción y venta de nuevas variedades. Inicialmente los materiales y semillas fueron subsidiados por el proyecto, sin embargo los productores líderes dicen que la ganancia neta es mayor que antes, y suficiente de cubrir los gastos de materiales.

Las técnicas están difundiendo a los otros productores en la comunidad. Los líderes les van a explicar y mostrar en las reuniones de la comunidad y otras oportunidades. Los líderes también entienden que ellos son productores líderes y tienen conciencia de que ellos deben difundir nuevas técnicas desarrolladas. Los materiales como malla de media sombra, películas de plástico, mangueras para riego son un poco caros para mayoría de los productores. Sin embargo las técnicas sencilla tales como protección contra lluvia en almacigo, utilización de tablones, irrigación, adecuado control de enfermedades y plagas, etc. técnicamente están disponibles y fácilmente adoptables. Una vez que entiendan los productores que las nuevas variedades y técnicas dan mayor calidad y cantidad, se espera que los productores accedan a créditos para adquirir materiales necesarios.

Sobre las informaciones de agroquímicos comercializados en Paraguay, fueron elaborados los siguientes materiales.

①Lista de insecticidas y fungicidas.

②Boletines técnicos.

Está en proceso la elaboración de manuales sobre técnicas de cultivo, diagnóstico de enfermedades y plagas, etc. obtenidas por las investigaciones de cada área.

6-2. Efectividad

Se reconoció que las actividades del Proyecto casi han logrado los resultados como consecuencia de los esfuerzos realizados tanto por la parte japonesa como por la parte paraguaya, excepto por algunas actividades en el área de mejoramiento genético. Los C/P de IAN adquirieron y mejoraron sus conocimientos básicos sobre el cultivo de hortalizas; métodos para ampliar el período de cultivo; técnicas para la producción de cultivos de alta calidad; técnicas sobre diagnóstico de enfermedades y plagas de plantas; y métodos de planificación, investigación y análisis experimentales. Igualmente, en el IAN y en el CETAPAR, se desarrollaron importantes técnicas para melón, frutilla y tomate para establecer sistemas de producción que serán de utilidad para los pequeños productores.

El Proyecto instaló parcelas demostrativas, llevó a cabo talleres y seminarios, publicó una serie de boletines presentando técnicas de cultivo. Los extensionistas de la DEAG difundió dichas técnicas a los pequeños productores líderes que habían empezado a usarlas.

Por ello, se concluye que propósito del Proyecto "*Las técnicas adecuadas de cultivo de hortalizas a los sistemas de producción de los pequeños productores serán desarrolladas en el IAN. Estas técnicas serán difundidas a los pequeños productores líderes.*" se ha logrado en cierto grado.

Pero, se debe observar que existen alrededor de 250.000 pequeños productores en el Paraguay y 120.000 de ellos estarían residiendo en las áreas objetivo del Proyecto (5 Departamentos). Casi no existen estadísticas relacionada al cultivos de hortalizas y la difusión técnica o cantidad de cultivos producidos dentro de estos departamentos. Esto hace que no sea posible evaluar los logros en base a datos estadísticos.

Para alcanzar el Objetivo General que es "*Para los pequeños productores, se logrará el mejoramiento en los elementos de producción, contribuyendo así al mejoramiento de sus niveles de vida.*", el Gobierno del Paraguay debería realizar sus mejores esfuerzos para lidiar con los problemas existentes.

Las hortalizas producidos en el Paraguay se encuentran bajo una fuerte competencia en el mercado de exportación. Este Proyecto no es el único método. Los resultados y los efectos que deriven del Proyecto tienen limitaciones para solucionar estos problemas.

De acuerdo a lo sugerido por el Proyecto, el MAG actualmente está elaborando un "*Programa nacional de hortalizas*". Una vez que esto se adopte, deberá trazar objetivos claros y concretos, áreas y agricultores objetivos, dónde y qué difundir, utilizando los resultados del Proyecto.

6-3. Impacto del Proyecto

(1) Impacto Técnico

La importancia y necesidad de mejoramiento genético fueron comprendidas y dichas técnicas fueron prácticamente establecidas. Para la frutilla, se eligió "Dover", que presentaba tolerancia a la Antracnosis. Se eligió la variedad "Horizon" del tomate que presentaba tolerancia a muchas enfermedades con el tipo crecimiento determinado. Se seleccionó la variedad de melón "Autumn Waltz" con capacidad de conservación post cosecha por largos períodos, con pulpa roja y fue presentado a los pequeños productores regionales. El rendimiento del cultivo aumentó gracias a las técnicas desarrolladas, por ejemplo, el melón de 2,3 Kg. (con una técnica tradicional) aumentó a 8,2 Kg por planta. (en la parcela demostrativa con técnicas desarrolladas en el proyecto); lo mismo aconteció con la frutilla, que aumentó de 490 Gr. a 569 Gr por planta.

La ocurrencia de las enfermedades y plagas de las plantas fue investigado y aclarado a través de los estudios. Como resultado, se establecieron métodos de control efectivo. El grado de ocurrencia de enfermedades virósicas del tomate disminuyó drásticamente entre 5 a 25% en la parcela con control de enfermedades y plagas, mientras que en las parcelas que no contaban con dicha control fue de 75 a 95%.

Los extensionistas de la DEAG fueron designados a largo plazo en el IAN y en CETAPAR como contraparte para adquirir las técnicas desarrolladas. Ellos brindaron instrucciones sobre técnicas de cultivo y tuvieron influencia sobre el personal regional de extensión y sobre los pequeños productores.

La serie de boletines que el Proyecto (incluyendo a CETAPAR) publicó, es en cierta forma una guía técnica a escala completa dentro del país, describiendo las técnicas para el cultivo de hortalizas. Los mismos podrían ser utilizados eventualmente por investigadores, los extensionistas, agricultores, estudiantes, etc. Los mismos fueron utilizados en varios seminarios y también fueron publicados en diversos periódicos; haciendo de esta forma que el Proyecto sea bien conocido por el público.

Se espera que las autoridades del Paraguay, realicen sus mejores esfuerzos para difundir las técnicas adquiridas para aquellos que necesitan con el fin de causar un mayor impacto técnico. Igualmente, se espera que los C/P difunda los conocimientos adquiridos a los demás tecnicos dentro del IAN o de la DEAG.

(2) Impacto Institucional

Aumentó la cantidad de investigadores especializados debido a que se creó un laboratorio de Investigaciones para Hortalizas recientemente en el IAN.

La Dirección de Semillas del MAG estableció las normas de inscripción para el registro nacional de cultivares de tomate y melón debido a que CETAPAR solicitó la inscripción de las primera variedades de hortaliza en el Paraguay (Tomate, "Super CETAPAR").

Igualmente, el MAG está trabajando actualmente en el diseño del "*Programa nacional de hortalizas*", el cual ayudaría a revisar objetivos a mediano y largo plazo de la aplicación de los resultados del Proyecto en el propio plan de desarrollo del Paraguay.

(3) Impacto Económico

Existe muy poco impacto macroeconómico debido a que los aportes del Proyecto son muy limitados y no existen las cifras o estadísticas necesarias. Existen factores que hacen que el consumo y la producción de hortalizas en el Paraguay tengan una alta probabilidad de depender de las cantidades de hortalizas importados de los países vecinos. El impacto sería mayor, si el establecimiento y la difusión de las tecnologías desarrolladas se realizase por medio del esfuerzo de la parte paraguaya. Para tal efecto, el Gobierno del Paraguay debería también asignar el presupuesto necesario para la sustentabilidad del Proyecto así como tomar las medidas necesarias; tales como el establecimiento de una infraestructura básica para pequeños productores, etc.

(4) Impacto Social

El Proyecto ha anunciado en varias ocasiones sus actividades a través de los periódicos, la televisión, la radio, etc. Uno de los periódicos publicó en forma continua artículos sobre las actividades del Proyecto. Esto produjo el interés del público en el cultivo e investigación de hortalizas. Muchos agricultores, estudiantes y consumidores visitaron las parcelas de demostración y el laboratorio de Investigaciones ubicado en el IAN.

Un mayor incremento del interés de las personas en el consumo de hortalizas y su calidad va a contribuir a desarrollar técnicas más eficientes de cultivo de hortalizas.

(5) Impacto Ambiental

Los productos agroquímicos que contaminan las aguas fueron utilizados a menudo para proteger a las plantas de enfermedades y plagas. Algunas veces, estos productos químicos no cuentan con instrucciones de uso y los agricultores tampoco sabían su efectividad ni cómo usarlos. El uso excesivo e inadecuado de estos productos químicos causan la contaminación ambiental o incluso el efecto contrario – un aumento de otras plagas.

El Proyecto advirtió acerca de dichos productos químicos y recomendó usar productos químicos de menor toxicidad. El Proyecto había aconsejado a los C/P sobre el uso adecuado de productos químicos tales como el uso de agroquímicos selectivos que preservan los enemigos naturales y la reducción de la dosis. Se espera que estos resultados contribuyan a mejorar la calidad del ambiente y ayuden a realizar un crecimiento y desarrollo sustentables de la agricultura en el Paraguay.

Nivel de alcance de Efectos y Beneficiarios

(6) A nivel del Proyecto

Los C/P del IAN mejoraron su capacidad de investigación por medio de las actividades del Proyecto. También, el personal técnico y extensionistas de la DEAG, el personal técnico de las municipalidades, los líderes de los pequeños productores, miembros de cooperativas, el personal de las ONGs, y otras personas tuvieron fácil acceso a las técnicas de cultivo de hortalizas a través de los seminarios, talleres y boletines del Proyecto.

(7) A nivel del Sector

Se incorporaron dos programas en el "*Plan Estratégico Económico y Social (1999-2003)*" en el sector agrícola:

① Aumentar la producción de los productos agrícolas de exportación, y

② Fortalecer la administración agraria y mejorar la productividad.

Los resultados del Proyecto podrían ser aplicados a estos programas para servir como las bases técnicas.

Por otro lado, en el estudio de desarrollo de la JICA denominado "*El Estudio sobre el Desarrollo Económico de la República del Paraguay (2000)*", existen dos programas de prioridad propuestos:

① Aumentar la producción de nuevos productos de exportación (horticultura),

② Integrar, sistematizar, y utilizar los hallazgos de investigación de los institutos de investigación y de los experimentos agrícolas del MAG.

Se espera que estos programas se lleven a cabo utilizando y aplicando los resultados del Proyecto. Demás está decir que el Proyecto debe ser sustentable.

También, el MAG preparó el "*Programa nacional de hortalizas*", que ayudaría a revisar los objetivos a mediano y largo plazo de la aplicación de los resultados en el plan de desarrollo propio de Paraguay.

(8) Nivel Regional

Los expertos del Proyecto impartieron seminarios (incluyendo talleres en la DEAG) que fueron llevados a cabo en parcelas demostrativas tales como las de Itá, Areguá, Caraguatay, entre otros. Como resultado, se puede observar un aumento de nuevos productores para cada rubro de hortalizas en los lugares mencionados.

(9) Nivel Macro

No disponible en este momento.

6-4. Pertinencia

Desde el inicio de la evaluación correspondiente a la mitad del período (Diciembre de 1999) del Proyecto, no se realizaron cambios en las condiciones externas del Proyecto. La producción de hortalizas de los pequeños productores; las mejoras en sus ingresos; y el fortalecimiento de la competitividad en el mercado de exportación fueron políticas importantes en el sector agrícola. De esta manera, se mantuvo la importancia del plan.

De acuerdo a lo mencionado anteriormente en 6-3. (7) en el "*Programa de Desarrollo Nacional (1999-2003)*" y en "*El Estudio sobre el Desarrollo Económico de la República del Paraguay (2000)*", el cultivo de hortalizas por parte de los pequeños productores tiene prioridad e importancia acentuadas.

Por otro lado, una de las políticas de la JICA hacia el Paraguay es "*Fortalecer la Competitividad en el sistema del MERCOSUR y Promover el Crecimiento Económico*". Dentro de este programa se incluye "*Diversificación de los productos agrícolas (Investigaciones experimentales y extensión de técnicas para promover productos agrícolas diversificados)*". Por ello, el Proyecto aún tiene importancia para el Objetivo General y el Propósito del Proyecto con relación al programa de desarrollo de la República del Paraguay.

6-5. Perspectivas de Sustentabilidad

(1) Aspectos Organizacionales

Con el fin de aplicar y utilizar los resultados del Proyecto se necesita de la asignación de personal y presupuesto necesario, de la expansión del sistema de extensión e investigación y de otros apoyos oficiales para mejorar la producción de los pequeños productores. Estos aspectos son factores importantes del Proyecto que se necesitarían para hacerlo sustentable. Se debería reconocer que el desembolso de los costos locales realizado por la parte de Paraguay no fue suficiente a lo largo de todo el período de cooperación. Por esto deben ser asignados el presupuesto y personales para mantener las actividades del proyecto.

a. IAN

Las contrapartes han adquirido las técnicas por medio de las instrucciones impartidas por los expertos y a través del entrenamiento recibido en el Japón. Sin embargo, algunos tenían muy poca experiencia para la preparación de nuevos programas de investigación, métodos de diseño experimental, y en la implementación de experimentos por cuenta propia. Estas técnicas se necesitarían para solucionar nuevos problemas y para desarrollar nuevas técnicas por cuenta propia. Se espera que el Proyecto opere en el Mejoramiento genético de dichas técnicas durante el resto del período de cooperación.

Como centro nacional de un instituto de investigación, el IAN debería conservar y desarrollar su capacidad investigativa. Para hacer esto, los C/P debería permanecer en sus puestos incluso después de la culminación del período de cooperación del Proyecto, y deberían recibir incentivos para trabajar. Deberá establecerse un mecanismo para asegurar el presupuesto para investigaciones, de modo que los investigadores puedan concentrarse en sus actividades. También, se deberá nombrar a un consejero de investigaciones que pueda impartir orientaciones sobre investigaciones de hortalizas desde un punto de vista de administración general e institucional.

b. DEAG

La condiciones futuras del DEAG no es muy clara ya que existen planes de tercerización de los servicios. Estas acciones apuntan hacia una administración efectiva. Pero la política administrativa y organizacional deberían ser clarificadas pronto porque la sustentabilidad del Proyecto también depende de las actividades de extensión.

c. Administración

Es necesario un liderazgo administrativo para incentivar las actividades del proyecto. Por ejemplo, extender horarios de trabajo, asegurar costos de operación, planificación organizacional de trabajo, mantenimiento de equipos y maquinarias, informes periódicos y publicaciones, creación de sociedad académica, promoción de intercambio de investigadores con los otros países, etc.

(2) Aspectos Financieros

a. Costos Locales

Considerando las actuales y futuras condiciones financieras del Gobierno Paraguayo, es probable que el Proyecto no asegure suficiente presupuesto para mantener sus actividades operando a escala completa luego de la finalización del período de cooperación. Por ello, existe la preocupación de que los equipos y maquinarias así como las instalaciones que fueron suministrados, no sean mantenidos en buenas condiciones. De todos modos, se espera que el gobierno paraguayo se esfuerce para asignar recursos suficientes.

b. Otros Recursos Financieros

Existe poca probabiliad de encontrarlos.

c. Generación de Ingresos Propios

El IAN genera sus propios ingresos mediante la venta de productos y semillas a pesar de no ser suficiente para ganar sus propios costos operacionales. Pero, todos los ingresos son depositados en primer lugar en el Ministerio de Hacienda, la cual entorpece el fluido desembolso de los mismos. Se debe hacer algo para la autonomía de sus presupuestos.

(3) Aspectos de Personal

Los C/P del Proyecto debería permanecer en sus cargos actuales incluso después que el Proyecto haya finalizado para convertirse en autosustentable.

Los C/P del IAN y el personal técnico de la DEAG están básicamente a cargo de un cultivo por personal. Este sistema hace que sea difícil entrenar a sucesores por cuenta propia, debido a que cuando un técnico tenga que dejar o transferir su cargo, no habrá quien asuma sus obligaciones y es probable que todas las técnicas que él/ella haya adquirido se irán por la borda en ese momento. Para mejorar la capacidad del IAN y de la DEAG como un todo, los sucesores deberían ser entrenados por la C/P del IAN y por el personal técnico de la DEAG.

7. Resumen de la Evaluación

En conclusión, basado en las conversaciones y verificaciones con el personal concerniente, el EEC (Equipo de Evaluación Conjunta) llegó a la conclusión de que el Proyecto ha logrado mayormente sus objetivos propuestos en el R/D y que las actividades restantes no completadas hasta el momento de la evaluación debido al programa no concluido de investigación sobre mejoramiento genético, están dentro de las posibilidades de los C/P entrenados finalizarlos. En consecuencia, es apropiado que la cooperación técnica culmine a finales de Marzo de 2002, de acuerdo con lo programado en el R/D.

Los expertos japoneses y la contraparte paraguaya (C/P) deberían realizar sus mejores esfuerzos en forma continua para terminar el resto de las actividades y lograr el propósito del Proyecto dentro del período de cooperación del Proyecto.

8. Recomendaciones

Los siguientes temas y medidas necesarias son recomendadas por el EEC al Gobierno del Paraguay y del Japón con el fin de sustentar y más adelante, desarrollar el logro del Proyecto.

(1) Para que el proyecto sea auto-sustentable después de la culminación de cooperación técnica, el gobierno de Paraguay debe considerar una asignación completa del presupuesto, estructura organizacional, asignación de personales adecuados para que las tecnologías y facilidades sean efectivas. Además debe existir una persona que tome el liderazgo en investigación hortícola a fin establecer y clarificar la responsabilidad de dirigir el sistema de investigación.

(2) La parte paraguaya debe hacer un plan operativo y desarrollo del Programa Nacional de Hortalizas que tenga un presupuesto real para que sea auto-sustentable. El plan tiene que ser entregado a la oficina de JICA antes de la finalización de cooperación técnica..

(3) Desde el punto de vista del cumplimiento continuo de los objetivos del Proyecto, el Gobierno del Japón podría considerar el envío de expertos japoneses a corto plazo con la condición que la parte paraguaya envíe el Plan mencionado arriba en el ítem (8.(2)). En ese sentido, la parte paraguaya debería informar trimestralmente sobre el progreso concerniente a la sustentabilidad para la oficina de la JICA en Paraguay, incluso después de haber terminado el período de cooperación.

(4) Para el proyecto sea auto-sustentable, deben mantenerse una colaboración continua entre IAN y DEAG. IAN y DEAG pueden hacer la consulta sobre investigación y extensión a CETAPAR para que pueda tener cooperación.

(5) Los equipos, maquinarias y vehículos suministrados por la JICA al Proyecto deberían ser mantenidos y utilizados apropiadamente por el Proyecto en el IAN y DEAG, en sus respectivos sitios, las cuales deberán tener la responsabilidad de efectuar las disposiciones y nombrar al personal idóneo para ello.

(6) Las variedades traídas desde Japón para fines de experimentos deberían ser usadas exclusivamente para los objetivos del Proyecto, incluso luego de la culminación de la cooperación técnica.

9. Lecciones Aprendidas del Proyecto

A lo largo de la evaluación del Proyecto, el Equipo ha aprendido algunas lecciones que son útiles para los gobiernos de Paraguay y Japón para planificar e implementar proyectos similares en el futuro.

(1) Para lograr una administración más fluida y apropiada del proyecto de cooperación técnica, la planificación participativa en la etapa de planificación del proyecto, el monitoreo y la evaluación utilizando el PDM, PO, y el Plan de Monitoreo y Evaluación, deberían ser preparados en la etapa de formulación del proyecto. PDM y PO deberían ser revisados oportunamente de acuerdo con el progreso de las actividades del proyecto.

(2) El Gobierno de Paraguay debería asignar suficientes recursos para ejecutar las actividades del Proyecto de manera fluida y efectiva.

(3) Los equipos y maquinarias suministrados deberían ser despachados en forma rápida y oportuna por las aduanas paraguayas de modo a que se puedan instalar los equipos necesarios en el Proyecto de acuerdo a lo planificado. El retraso causa desajustes en actividades del Proyecto.

LISTA DE ABREVIACIONES

CETAPAR	CENTRO TECNOLOGICO AGROPECUARIO EN PARAGUAY
P/C	PERSONAL DE CONTRAPARTE
DEAG	DIRECCION DE EXTENSION AGRARIA
IAN	INSTITUTO AGRONOMICO NACIONAL
EEC	EQUIPO DE EVALUACION CONJUNTA
MAG	MINISTERIO DE AGRICULTURA Y GANADERIA
PDM	MATRIZ PARA DISEÑO DEL PROYECTO
PO	PLAN DE OPERACIONES
R/D	REGISTRO DE DELIBERACIONES
PTID	PLAN TENTATIVO DE IMPLEMENTACION DETALLADA

LISTA DE ANEXOS

ANEXO 1.

EQUIPO JAPONES DE EVALUACION

1. Sr. Kozo INADA (Líder)
   Director Administrativo Asistente, Departamento de Cooperación para el Desarrollo Agrícola, JICA.

2. Sr. Akihito KITA (Cooperación para Política Agrícola)
   Jefe de Sección, Oficina de Asuntos Internacionales, División Administrativa, Oficina de Producción Agrícola, Ministerio de Agricultura, Silvicultura y Pesca.

3. Sr. Tomotoshi KASHIO (Cultivo y Mejoramiento genético / Protección de Plantas)
   Director Adjunto para Investigaciones, Depto. de Investigaciones de Hortalizas y Flores, Organización Nacional de Investigaciones Agrícolas, Centro Nacional de Investigaciones Agrícolas para las Regiones de Kyushu y Okinawa.

4. Sr. Noriharu MASUGI (Evaluación de Planificación / extensión)
   Personal, División Ganadería y Horticultura, Depto. de Cooperación para el Desarrollo Agrícola, JICA.

5. Sr. Hiroei ISHIHARA (Evaluación de Administración de Ciclos del Proyecto)
   Director Asistente, División Técnica, Dpto. de Proyectos de Ultramar, NIPPON GIKEN, Inc.

ANEXO 2.

EQUIPO PARAGUAYO DE EVALUACION

1. **Ing.. Francisco IBARRA** (Líder)
   Coordinador técnico DGP-MAG

2. **Dra. Gladys TORRES**
   Asesora técnica, DGP-MAG

3. **Ing. María Cristina COLINA**
   Asesora técnica, DEAG-MAG

4. **Ing. Justo LOPEZ**
   Jefe de departamento de planificación, DIA-MAG

5. **Ing. Edgar ALVAREZ**
   Jefe de laboratorio de Biotecnología, IAN-MAG

ANEXO 3.

PROGRAMA DE EVALUACION

Fecha y Hora	Actividades	Alojamiento
21/OCT. (DOMINGO) AVION	SALIDA DESDE TOKYO (JL408)	EN EL
22/OCT. (LUNES) ASUNCION	VIA SAN PABLO (RG8902) LLEGADA A ASUNCION OFICINA DE JICA (VISITA PROTOCOLAR) EMBAJADA DEL JAPON (IDEM) REUNION CON EXPERTOS DE LA JICA	
23/OCT. (MARTES)	M.A.G. (VISITA PROTOCOLAR) DEAG, DIA, IAN (IDEM) REUNIONES CON EQUIPO PARAGUAYO DE EVALUACION (VERIFICACION DE CAMPO EN EL IAN)	ASUNCION
24/OCT. (MIERCOLES) ASUNCION	PARCELAS DE DEMOSTRATIVAS EN ITA, CARAGUATAY, AREGUA (VERIFICACION DE CAMPO)	
25/OCT. (JUEVES) ASUNCION	IAN (CONVERSACIONES Y REUNIONES)	
26/OCT. (VIERNES)	TRASLADO A YGUAZU EN AUTOMOVIL CETAPAR (VERIFICAR SITUACION DEL PROYECTO; CONVERSACION)	YGUAZU
27/OCT. (SABADO) ASUNCION	PARCELAS DEMOSTARATIVAS DEL PROYECTO (VERIFICACION DE CAMPO). TRASLADO HASTA ASUNCION EN AUTOMOVIL	
28/OCT. (DOMINGO) ASUNCION	PREPARAR INFORMES Y DOCUMENTOS	

29/OCT. (LUNES) ASUNCION	REUNIONES C/EL EQUIPO PARAGUAYO DE EVALUACION	
30/OCT. (MARTES) ASUNCION	REUNIONES C/EQUIPO PARAGUAYO DE EVALUACION TERMINAR EL INFORME DEL EQUIPO CONJUNTO DE EVALUACION PREPARAR Y ENVIAR BORRADOR DE LAS MINUTAS DE LAS REUNIONES	
31/OCT. (MIERCOLES) ASUNCION	COMITÉ DE EVALUACION CONJUNTA (FIRMAR EL INFORME DE EVALUACION CONJUNTA) COMITÉ COORDINADOR CONJUNTO (FIRMAR LAS MINUTAS DE LA REUNION)	
01/NOV. (JUEVES) AVION	EMBAJADA DEL JAPON (INFORME DE VERIFICACION) OFICINA DE JICA (IDEM) SALIDA DESDE ASUNCION (RG8903)	EN EL
02/NOV. (VIERNES) AVION	VIA SAN PABLO (JL063)	EN EL
03/NOV. (SABADO)	LLEGADA A TOKYO	

Anexo 4 Lista de expertos enviados

(1) Experto de largo plazo

	Area responsable	Nombre	Plazo de envio
1	Líder	Dr. Takashi Ishijima	1997. 4. 2 ~ 2002. 4. 1
2	Coordinador	Ing.Agr. Akira Matsuda	1997. 4. 2 ~ 2002. 3.31
3	Cultivo de hortalizas/Extensión agraria	Ing.Agr. Tatsuyoshi Taga	1997. 5.28 ~ 2002. 3.31
4	Fitoprotección(Control de enfermedades)	Ing.Agr. Shunji Sato	1997. 5.28 ~ 2002. 3.31
5	Fitoprotección(Control de plagas)	Ing.Agr. Yutaka Kimura	1997. 5.28 ~ 2002. 3.31
6	Fitomejoramiento	Dr. Tokio Hisatomi	1997. 9.27 ~ 2002. 3.31
7	Cultivo de hortalizas/Extensión agraria	Ing.Agr. Shinichiro Fujii	1999. 5.12 ~ 2002. 3.31
8	Coordinador	Ing.Agr. Yoichi Okawara	1999. 9.13 ~ 2002. 3.31

(2) Experto de corto plazo

	Area	Nombre	Temas	Plazo de envio
1	Fitomejoramiento	Ing.Agr. Yozo Sakurai	Mejoramiento de hortalizas.	1997. 7.16 ~ 1997.10.17
2	Fitomejoramiento	Ing.Agr. Yozo Sakurai	Evaluación de material genético.	1998. 3. 6 ~ 1998. 6. 3
3	Cultivo de hortalizas	Ing.Agr. Shigeki Furuya	Técnicas de cultivo en el clima carloso.	1998. 3. 6 ~ 1998. 4.10
4	Fitomejoramiento	Ing.Agr. Tadayuki Wako	Prueba de resistencia a enfermedades sobre mudas.	1998. 9.17 ~ 1998.10.29
5	Fitoprotección(Control de plagas)	Ing.Agr. Tetsuzo Hamamura	Método eficiente de control sobre ácaro de hojas.	1998.10. 1 ~ 1998.10.27
6	Cultivo de hortalizas	Ing.Agr. Sunao Kikuchi	Manejo de suelo y fertilización en el cultivo de hortalizas.	1999. 2.18 ~ 1999. 3.29
7	Fitoprotección(Control de enfermedades)	Ing.Agr. Chiyoichi Noda	Diagnóstico de enfermedades virósicas de tomate.	1999. 2.26 ~ 1999. 4.14
8	Fitomejoramiento	Ing.Agr. Makoto Okimura	Selección de planatas obtenidas de cruzamiento.	1999. 8. 2 ~ 1999. 9.10
9	Cultivo de hortalizas	Dra. Mio Yoshida	Mejoramiento de suelos de parceras de bajo rendimiento.	1999. 9.13 ~ 1999.10.28
10	Fitoprotección(Control de enfermedades)	Dr. Ikuo Kadota	Diagnóstico y identificación de enfermedades bacteriosis.	1999.10. 1 ~ 1999.11.29
11	Fitoprotección(Control de plagas)	Dr. Tamito Sakurai	Confirmación de vectores de enfemedades virósicas de tomate.	2000. 1.26 ~ 2000. 3.01
12	Extensión agraria	Ing.Agr. Naomitsu Uehara	Técnicas de extensión.	2000. 7.15 ~ 2000. 8.30
13	Fitoprotección(Control de enfermedades)	Dr. Zenichi Sano	Daños causados por nemátodos de frutilla y su control.	2000. 9.25 ~ 2000.11.03
14	Fitoprotección(Control de plagas)	Dr. Takashi Noda	Evaluación sobre capacidad de depredadores de insectos chupadores y ensayo sobre efectos de apricación de productos químicos.	2000.10.10 ~ 2000.11.18
15	Fitomejoramiento	Dr. Kimio Ito	Técnicas eficientes de producción de semilla de híbrido F1.	2000.10.18 ~ 2000.11.27

Anexo 5 Programa de Entrenamiento del Personal Paraguayo en Japón

Año Fiscal	Nombre	Periodo	Materia	Principal Lugar de Entrenamiento
1997	Ing.Agr. Marcos Villalba	27/10/97- 18/11/97	Administración de investigación agricola	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP
	Ing.Agr. Luis Raidán	09/01/98- 25/03/98	Mejoramiento de frutilla	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP
	Agr. Viligilio Delgado	30/03/98- 02/07/98	Cultivo de hortalizas	Estación experimental Agricola de la prefectura de Aichi
	Ing.Agr. Edgar Amarila	30/03/98- 21/09/98	Mejoramiento de melón	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP
	Ing.Agr. Rossamary Santacruz	30/03/98- 21/09/98	Mejoramiento de tomate	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP
1998	Ing.Agr. Blas Benicio Valiente	17/08/98- 11/11/98	Cultivo de hortalizas	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP
	Ing.Agr.José Félix Barciro	14/03/99- 11/04/99	Administración de investigación agricola	Instituto de Investigacion de hortalizas, plantas ornamentales y te del MAFP
	Ing.Agr Gustavo Cuenca	11/02/99- 24/09/99	Cultivo de hortalizas y extención	Centro de entrenamiento de Tsukuba de la JICA
	Agr. Carlos Palacios	29/03/99- 29/07/99	Control de plagas	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP
1999	Ing.Agr.Maria T. Ayala	05/05/99- 11/08/99	Control de enfermedades	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP
	Ing.Carlos Alberto Huespe	02/06/99-01/09/99	Mejoramiento de hortalizas	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP
	Dr.Ramon Cipriano Enciso	15/03/00-07/04/00	Administration of agricultural investigation	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP
2000	Ing.Agr.Elena Ayala	02/05/01-16/11/01	Vegetable Cultivation Tecnology	Tsukuba Trainning Centre of JICA
2001	Ing.Agr.Juana Caballero	07/05/01-21/07/01	Aguricultural Extension Planning and Management	
	Ing.Agr.Gregorio Bozzano	28/05/01-15/08/01	Desease Control of Vegetable Crops	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP
	Ing.Agr.Delia Martinez	28/05/01-29/08/01	Breeding and Cultivation Methods of Melons	Instituto de Investigación de hortalizas, plantas ornamentales y te del MAFP

ANEXO 6

Equipo y Presupuesto

	Año fiscal / Mes		1996	1997						1998						1999						2000						2001						
				4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2	4
EQUIPO	Equipo de donación	Adquirido y despachado en Japón *1	10, 957, 000¥	17, 342, 000¥						18, 569, 000¥						6, 394, 000¥																		
		Adquirido en Paraguay		24, 841, 000¥						19, 377, 000¥						17, 704, 000¥						12, 113, 000¥												
		Total								37, 946, 000¥						24, 098, 000						12, 113, 000¥												
	Acompañado con los Expertos *1			6, 317, 000¥						2, 024, 000¥						1, 505, 000¥						1, 081, 000¥												
Presupuesto	Infraestructura			26, 457, 000¥																														
	Intercambio de técnicas									1, 618, 000¥												1, 715, 000¥												
	Gastos para la seguridad									3, 103, 000¥																								
	Gastos para la extención		4, 105, 000¥							6, 000, 000¥						5, 800, 000¥						3, 573, 000¥												
	Gastos para la emergencia									5, 324, 000¥																								
	Gastos de aplicación técnica																					2, 819, 000¥												
	Gastos de operación			3, 000, 000¥						5, 699, 000¥						5, 700, 000¥						5, 000, 000¥						5, 100, 000¥						

*1 Incluye los gastos de despacho　＊ Tipo de cambio: (1997) 1US$=2, 159Gs=118¥、(1998) 1US$=2, 700Gs=139¥、(1999) 1US$=2, 955Gs=124¥、(2000) 1US$=3, 512Gs=112¥