

付 属 資 料

ミニッツ(中間評価報告書)

英文版

西文版(ATTACHED SHEET 1は英文版と同一につき省略)

Minutes of Discussions on the Mid-term Evaluation for
The Research Project on Soybean Production in Paraguay

Japan International Cooperation Agency (hereinafter referred to as “ JICA ”) organized the Advisory Team (hereinafter referred to as “ the Team ”) headed by Mr. Shinji Sakai, and assigned to the Ministry of Agriculture and Livestock (hereinafter referred to as “ MAG ”) of the Republic of Paraguay from the 6th June to 16th June, 2000.

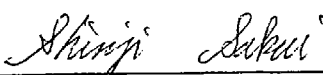
The Joint Evaluation Committee which consisted of 5 members from the Team and 6 members from the Republic of Paraguay was jointly organized for the purpose to conduct Mid-term Evaluation and make necessary recommendations for the Research Project on Soybean Production in Paraguay (hereinafter referred to as “ the Project ”).

The Joint Evaluation Committee conducted evaluation in the form of interviews, field surveys, and prepared the Mid-term Evaluation Report (hereinafter referred to as “ the Report ”). The Report was presented and discussed in the Joint Coordinating Committee Meeting of the Project.

The major items agreed in the Joint Coordinating Committee Meeting are attached, and are being recommended to the respective Governments.

This text was prepared in Spanish and English, respectively, with both the Spanish and English texts being equally authentic. In case of any divergence of interpretation, English text shall prevail.

Asunción, 15th June, 2000.


Mr. Shinji Sakai

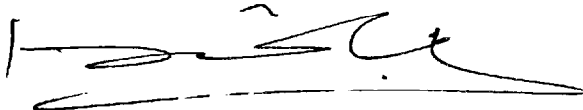
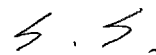
Leader,
Advisory Team,
Japan International Cooperation Agency


Mr. Enrique García de Zúñiga

Minister,
Ministry of Agriculture and Livestock,
Republic of Paraguay

ATTACHMENT

1. The Joint Evaluation Committee has presented the Report as per attached as ANNEX 1.
2. The Joint Coordinating Committee has agreed and accepted the Report presented by the Joint Evaluation Committee and taken note of the recommendations made for successful achievement of the Project purpose, therein.
3. The Joint Coordinating Committee has agreed and accepted the Project Design Matrix of the Project as per attached as ANNEX 2.

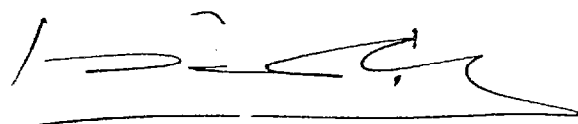
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**THE MID-TERM EVALUATION REPORT
ON
THE RESEARCH PROJECT
ON SOYBEAN PRODUCTION IN PARAGUAY**

Capitán Milanda , 14th June, 2000

Japan- Paraguay Joint Evaluation Committee

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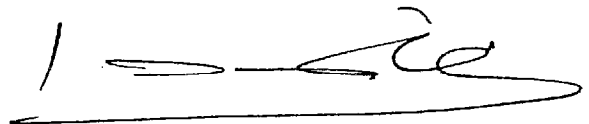
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1. BACKGROUND AND OUTLINE OF THE PROJECT

1-1 Background of the Project

Since the 1980s, the increase of soybean production has been rapid in the southeastern part of Paraguay. The soybean has become the most important crop to sustain Paraguay economy. However, on the other hand, countermeasures against soybean cyst nematode are urgently required, because of rapid expansion of its infected soybean production area in Brazil. Besides, there are several urgent tasks to tackle; - for stable and high productivity, the establishment of cultivation techniques for the diversification of crops after/before soybean, replacing wheat, - improvement of soil management techniques where soybean production is newly introduced.

In January 1996, the Republic of Paraguay made a request for Project-Type Technical Cooperation of the Government of Japan, with successive development of outcomes of previous project, for the purpose of resolving the above-mentioned tasks.

JICA sent a preliminary study team in January 1997 and an implementation study team in August 1997. The both government agreed to formulate the Research Project on Soybean Production in Paraguay for the purpose of enhancement of research capabilities of CRIA related to breeding, cultivation and soil management in soybean production on The Record of Discussions signed on 20th August, 1997. In October 1997, the team of Japanese long-term experts was dispatched and the Project commenced. In July 1998 consultation survey team was dispatched to formulate the detailed TSI (Tentative Schedule of Implementation). The activities of transference technology have been fully implemented. Now, the third year of the project is in progress.

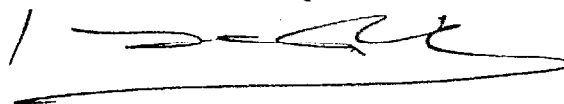
Under the above circumstances, the evaluation will be carried out for the confirmation of the progress of the project and examine of implementation and necessities of modification based on R/D and TSI, so as to make the activities of project more appropriate for the rest of the technical cooperation period.

1-2 Outline of the Project

The design of the Project is as follows:

Overall Goal: Stable productivity and an expansion of production area of soybean will be realized through the development of breeding techniques, sustainable cultivation techniques and the conveying of appropriate techniques to the farmers in Paraguay, thus contributing to the stability and development of Paraguay economy.

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Project Purpose: The research capabilities of CRIA related to breeding, cultivation and soil management in soybean production will be enhanced for the development of appropriate varieties and a sustainable cultivation system.

Project Outputs;

- 1) Techniques for breeding of soybeans will be improved.
- 2) Cultivation techniques contributing to the establishment of an appropriate cropping system will be improved.
- 3) Soil management techniques will be improved.

Project Activities

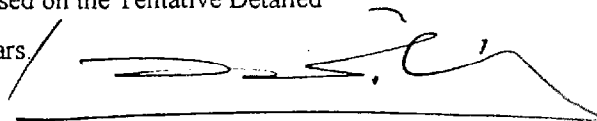
- 1 – 1 Collecting and selecting breeding materials, and ecological classification
 - (1) Collection and selection of breeding materials
 - (2) Ecological classification of breeding materials
- 1 - 2 Studying the breeding techniques of appropriate varieties
 - (1) Breeding of high yielding varieties for the area of Itapua/Alto Parana
 - (2) Breeding of varieties with appropriate growing periods for the area of Itapua/Alto Parana
 - (3) Breeding of germplasm resistance to soybean cyst nematode (SCN)
- 1 – 3 Improving the evaluation method of disease resistance
- 2 – 1 Studying cultivation techniques for the diversification of crops after/before soybeans.
 - (1) Ecological classification of sunflower
 - (2) Improvement of the appropriate cropping system
- 2 – 2 Studying cultivation techniques for stable and high productivity
 - (1) Effective utilization of soilphosphorus by mycorrhiza
 - (2) Improvement of deep application method of phosphorus fertilizer
- 3 – 1 Studying soil management techniques for new areas where soybean production is introduced and expanded
 - (1) Soil diagnosis for soybean production in Misiones
 - (2) Improvement of soil management techniques in Misiones

2. METHODS OF THE EVALUATION

2-1 Purpose of the evaluation

- 1) To evaluate the inputs and degree of achievement based on the Tentative Detailed Implementation Plan (TDIP) during the last three years.

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- 2) To assess the appropriateness of the project design, prospects for sustainability and impacts.
- 3) To identify problems on any aspects of project implementation and to propose necessary solution
- 4) To amend the TDIP for the remaining periods of the Project if necessary.

2-2 Composition of the Joint Evaluation Committee

(1) Japanese members

- 1) Mr. Shinji Sakai (Leader)
Director, Dept. of Crop Breeding,
Tohoku National Agricultural Experiment Station
Ministry of Agriculture, Forestry and Fisheries (MAFF)
- 2) Mr. Akinori Okabe (Soybean Breeding)
Senior Researcher, Dept. of Upland Farming,
Chugoku National Agricultural Experiment Station,
Ministry of Agriculture, Forestry and Fisheries (MAFF)
- 3) Mr. Hideyuki Mochida (Cultivation)
Laboratory Head, Crop Production Management, Dept. of Upland Farming
Kyushu National Agricultural Experiment Station,
Ministry of Agriculture, Forestry and Fisheries (MAFF)
- 4) Dr. Yukihiro Tamura (Soil Management)
Laboratory Head, Climatic Stress Control, Dept. of Biology and Environmental
Sciences,
Tohoku National Agricultural Experiment Station
Ministry of Agriculture, Forestry and Fisheries (MAFF)
- 5) Mr. Akio Kagawa (Project Management)
Staff, Livestock and horticulture Division
Agricultural Development Cooperation Department, JICA

(2) Paraguay members

- 1) Ing. Agr. Justo Leópez Portillo (Leader)
Department of Agricultural Investigation (DIA),
Ministry of Agriculture and Livestock (MAG)

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- 2) Ing. Agr. Jorge Ogasawara (Coordinator)
Direction of General Planning (DGP),
Ministry of Agriculture and Livestock (MAG)
- 3) Econ. Paola Vera Giardina
Direction of General Planning (DGP),
Ministry of Agriculture and Livestock (MAG)
- 4) Ing. Agr. Alfredo Ledesma (Soil Management)
National Institute of Agriculture (IAN),
Ministry of Agriculture and Livestock (MAG)
- 5) Ing. Agr. Pedro Juan Caballero (Soybean Breeding)
National Institute of Agriculture (IAN),
Ministry of Agriculture and Livestock (MAG)
- 6) Ing. Agr. Guido Chaparro (Cultivation)
National Institute of Agriculture (IAN),
Ministry of Agriculture and Livestock (MAG)

2-3 Items of the evaluation

The following items were evaluated,

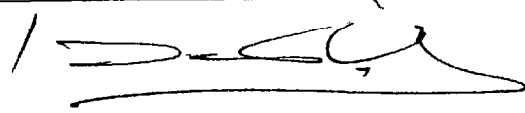
- 1) Inputs
- 2) Appropriateness of the Project Design
- 3) effectiveness
- 4) Prospects for Sustainability
- 5) Impact
- 6) Amendment of TDIP

2-4 Schedule of the evaluation

The Joint Evaluation Committee spent 7 days from 8th June to 14 June 2000, in the following itinerary.

Date	Place	Activities
June 8 Thursday	CRIA	The first Joint Evaluation Meeting. Formulation of the Joint evaluation Committee. Discussion on the purpose and schedule of the evaluation , Observation for the Project site.
June 9 Friday	CRIA	Meeting (Presentation about achievements of the Project activities from counterpart personnel, hearing from experts)
June 10 Saturday	-	Field Survey in Itapua and Alto Parana district Discussion with Agricultural Cooperative (La Paz , Colonias Unidas)
June 11 Sunday	CETAPAR	Meeting with CETAPAR Meeting (Presentation about achievements of the Project activities from counterpart personnel, hearing from experts)

S.S.



June 12 Monday		Draft making for the report
June 13 Tuesday	CRIA	Discussion on the final draft of the Report
June 14 Wednesday	CRIA	Joint Evaluation Meeting. Signature on the mid term Evaluation report
June 15 Thursday	MAG	Joint Coordinating Committee (Presentation on the result and future of plan of the Project)

3. RESULTS OF THE EVALUATION

3-1 Inputs

Inputs to the Project from both Japanese and Paraguay Sides are shown in attached sheet 1.

3-2 Appropriateness of the Project Design

Project design is thought to be appropriate because the enhancement of research capabilities of CRIA has contributed to the stability and development of Paraguay economy through the improvement of agricultural technology to the farmers from the following points.

- 1) Soybean plays a key role in Paraguay export trade, contributing to the development of national economy.
- 2) CRIA functions as principal research center in Paraguay for the investigation of soybean and other major crops.
- 3) Research capabilities of CRIA have been strengthened under the JICA technical cooperation program

3-3 Effectiveness

It is evaluated that the general activities are well progressing. However, some fields should be evaluated progressing.

The detailed evaluation is described in the Attached Sheet 2. The highlights in major fields of activities are as follows.

(1) Soybean breeding

As to breeding, research activities were almost advanced as scheduled by CRIA and CETAPAR. Now some elite lines derived from the previous project have been developed and the yield trial was carried out. In these breeding materials, two early maturing lines raised by CRIA will be registered soon as new varieties.

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Raising of breeding materials resistant to soybean cyst nematode were conducted by cooperation of CNPq-EMBRAPA and MT Foundation in Brazil. In addition, the counterparts have received the orientation about the RAPD experiment method from short-term expert, which is useful for the screening for soybean cyst nematode resistance.

Evaluation method of resistance to the stem canker was improved and will be used as one of the process of breeding system in the future.

Therefore, the most of activities in soybean breeding are evaluated to be progressing well, however, the preparation of a water well of greater capacity is required to avoid the lack of irrigation water.

(2) Cultivation

Cultivation techniques for the diversification of crop after/before soybean was studied at CRIA and CETAPAR. Effect of sowing time on the growth and yield of sunflower was studied in two years. Sowing time suitable for high yield was from July to August. However unstable climate condition and disease influenced the experiment result. In order to obtain accurate result, the trial period should be prolonged one more year.

Cultivation techniques for stable and high productivity for soybean were studied. The basic techniques for mycorrhiza was acquired under the guidance of short term expert. At present the manual for the method of technical study has been published in Spanish to diffuse the technique. On the other hand deep application method of phosphorus fertilizer was improved. A deep application machine has been developed with the collaboration of CEMA.

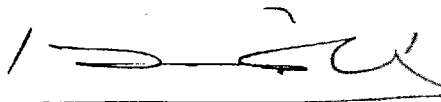
Therefore the most of activities in this subject are evaluated to be progressed on schedule. The activity in remaining period is the establishment of sustainable cropping system consisted of soybean and sunflower, including introduction of sunflower as manure crop. In addition the effect of mycorrhizal infection and deep application of phosphorus on the soybean growth and yield should be made clear.

(3) Soil management

The design of classification map of suitable soil moisture condition for soybean production was achieved by remote-sensing techniques. But the development of soil diagnosis standard is delayed due to lack of manpower at the past days. Therefore, the examination of the soil diagnosis should extend until the final year(2002) of cooperation period.

The possibility of soybean production on soil of weathering sandy rock in Misiones was certified. Therefore, the potential of soybean production at Misiones and/or another region that distributed of the same soil was shown. But it is necessary to make research of some abnormal growth partially appeared such as yellowish color of the leaves at the first time of cultivation of soybean after

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conversion, and experimental plan for weed control, and establishment of sustainable soil management for stable yield of soybean.

3-4 Prospects for Sustainability

Continuous efforts of MAG for securing local cost and allocation of counterparts are evaluated. Thus the Project has made a progress to some extent.

Realization of these two points affects for the sustainability of CRIA's activities after termination of the Project.

3-5 Impact

No-tillage cultivation system in Paraguay was originated in 1983 by a group of Japanese immigrants. This cultivation technique has expanded rapidly in the principal soybean production areas Alto Parana and Itapua owing to the support of research by CETAPAR and CRIA with technical cooperation from JICA. Now it accounts for the half of soybean production area in Paraguay, contributing to the stable production and soil conservation.

At the moment of this evaluation, following positive impacts are recognized.

3-5-1 Breeding of the early varieties for the area of Itapua and Alto Parana.

New variety could be released which has early maturity and resistant to the stem's canker. It will replace PARANA which has unstable yield because of damage d by stem's canker.

3-5-2 Development of new machine for a depth sowing/manuring

A depth sowing/manuring machine was developed with joined research between CRIA and CEMA. This machine has the capability to adjust the manuring depth up to 15 cm under soil surface.

3-5-3 Possibility of soybean production in Misiones

A remote sensing technique was introduced for describing the soil moisture condition by means of the LANDSAT data shown color image. Second crop of soybean production after conversion in Misiones was succeed.

3-6 Amendment of TDIP

As a result of the discussions and evaluation, it can be concluded that the amendment of TDIP for

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1-2-4

the rest of the project.

- 1) Ecological classification of sunflowers ;

This should extend the experimental period until 2000 due to delay caused by abnormal climate condition.

- 2) Soil diagnoses for soybean production in the area of Misiones ;

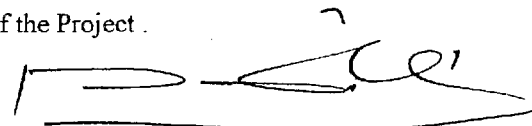
This should extend until the final year (2002) of cooperation period due to lack of man power.

4. RECOMMENDATIONS

The Joint Evaluation Committee recommends that the following measures should be taken to strengthen further technical transfers.

- (1) Close communication among Japanese experts and counterpart personnel is indispensable for the smooth implementation of the Project. Monthly meeting should be held as Team periodically to exchange information with each other. Active contact with CETAPAR is also necessary through exchanging information among counterparts.
- (2) Water supply for soybean experiment is insufficient, therefore water condition should be improved urgently to overcome serious water shortage. Rehabilitation or Construction of water well has to be considered on detail research of weather condition and water demand in each season.
- (3) It is highly evaluated that one counterpart had been assigned at the soybean breeding, and another one had been filled a vacancy at soil management.
- (4) It is necessary to secure independent research budget for continuing stable activities of CRIA. CRIA needs more efforts to establish or improving budget system under consultation with MAG. It is recommendable that MAG make more effort to keep a revolving fund available for CRIA itself, resulting from commission by using intellectual property right of registered varieties, income by selling seeds, and / or commission of soil analysis and diagnosis.
- (5) MAG should make more effort to secure local cost for the Project continuously, especially about the commission for custom clearance. Delay of collection for the equipment donated from Japan is serious influence to make smooth implementation of the Project.

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- (6) Strengthening research abilities are indispensable to encourage research activities of counterparts. At this point, it is very important to make opportunities of publishing research activities. Establishment of scientific society within CRIA, IAN, CETAPAR, Univ. of Asuncion seems as one example. It will be a big incentive to stabilize the assignment of counterparts.
- (7) Results of research activities have to be widely extended for soybean farmers and agricultural organizations. At this point seminar should be held than ever.
- (8) Technical exchange with other organizations in neighbor countries (EMBRAPA in Brazil etc.), and JIRCAS is very important. And it should be continued.

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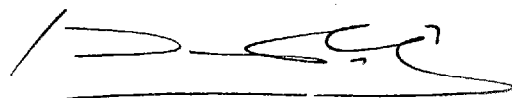
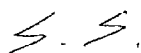
ATTACHED SHEET 1

Data on the Input by Japanese and Paraguayan Sides

From October 1997 to May 2000

- A 1 Dispatch of Japanese Experts
- A 2 Input by Japanese side (Local Cost, Equipment supply)
Dispatch of Mission
- A 3 Allocation of Counterpart
- A 4 Input by Paraguayan Side (Running Cost, C/P, Trainee)
Training of Paraguayan Personnel in Japan
- A 5 List of Major Machinery and Equipment Provided

The Research Project on Soybean Production in Paraguay



Dispatch of Japanese Experts

As of May, 2000

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(*) Nikkei Third Country Expert

Plan

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Input by Japanese Side (Local Cost, Equipment Supply)

Fiscal year (1*)	1997	1998	1999	2000
1) Local Cost				
(1) Local Running Cost	¥2,500,000 (US\$21,186)	¥7,200,000 (US\$51,799)	¥8,560,000 (US\$69,032)	¥7,190,000 **(US\$67,196)
(2) Cost for Enlightenment Activities		¥1,199,000 (US\$8,626)	¥1,017,000 (US\$8,202)	
(3) Model Infrastructure	¥7,930,000 (US\$67,203)	¥8,239,000 (US\$59,273)		
(4) Technical Exchange Programme		¥1,755,000 (US\$12,626)	¥1,436,000 (US\$11,581)	¥1,694,000 **(US\$15,832)
2) Equipment				
(1) Provision of Machinery and equipment	¥9,934,000 (US\$ 84,186)	¥12,281,000 (US\$88,353)	¥13,486,000 (US\$108,758)	
- Purchased and shipped in Japan	¥4,077,000 (US\$34,551)	¥7,869,000 (US\$ 56,612)	¥4,214,000 (US\$ 33,984)	
- Local Procurement	¥5,857,000 (US\$ 49,636)	¥4,412,000 (US\$31,741)	¥9,272,000 (US\$ 74,774)	
(2) Accompanied with Japanese Experts	¥2,400,000 (US\$20,339)	¥2,377,000 (US\$ 17,101)	¥3,209,000 (US\$25,879)	

Exchange Rate : (1997) 1US\$=2,159Gs=118Yen, (1998) 1US\$=2,700Gs=139Yen, (1999)1US\$=2,955Gs=124Yen, (2000) 1US\$=3,497Gs=107Yen,

(1*) Fiscal year in Japan begins in April and ends in March. ** Estimation (Plan)

Dispatch of Mission

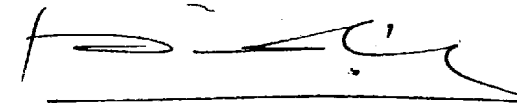
Name of Mission	Fiscal Year	1997							1998							1999							2000							2001						
	Month	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2					
Consulting Management Study Team								27/06	—	12/07																										

Preliminary Study Team Jan. 97

Implementation Study Team Aug. 97

Term of cooperation is five years from October 1, 1997.

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ALLOCATION OF COUNTERPART

As of May, 2000

Field		Fiscal Year		Allocation																								Training in Japan		Remarks
				1997		1998		1999		2000		2001		2002		Year	Main Training place													
		NAME	Month	4	7	10	1	4	7	10	1	4	7	10	1			4	7	10	1	4	7	10	1	4	7	10	1	
Project Management	Carlos Paniagua (CRIA Director)																									98	#1			
	Daniel Bordon Amarilla (CRIA Director)																											To be assigned to the post December, 1999		
Soybean Breeding	Eduardo Rodoriguez																									00	#3	April, 2000 to March, 2002 (Scholar ship/JICA allotment)		
	Carlos Chavez																													
	David Bigler																											To be assigned on March, 2000		
Cultivation	Victoriano Barboza																													
	Adrian Palacios																									98	#2			
Soil Management	Cantalicio Paredes																											Resigned from CRIA in August, 1999		
	Julio C. Britez																											6 months leave from Sept. 1998 and resigned from CRIA		
	Alodia Altamirano																													
	Javier Szostak																											To be assigned on April, 2000		

Allocation

Training in Japan

#1: Visit to various institutes

#2: Hokkaido National Agricultural Experiment Station

#3: Utsunomiya University

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Input by Paraguayan Side

Running Cost, C/P, Trainee

Fiscal year (*1)	1997	1998	1999	2000
Regional Agriculture Investigation Center (CRIA)	Running cost Gs. 529,061,956 (*2) (US\$ 245,050)	Running cost Gs. 518,804,270 (*2) (US\$ 192,150)	Running cost Gs. 518,804,270 (*2) (US\$ 175,568)	Running cost Gs. 347,325,000 (*3) (US\$99,321)
	Total C/P 6 Trainee	Total C/P 5 Trainee 3	Total C/P 5 Trainee	Total C/P 6 Trainee 1

Exchange Rate : (1997) 1US\$=2,159Gs=118Yen, (1998) 1US\$=2,700Gs=139Yen, (1999) 1US\$=2,955Gs=124Yen, (2000) 1US\$=3,497Gs=107Yen,

(*1) Fiscal year in Paraguay begins in January and ends in December.

(*2) Figures shown only budget requested, not actual expenditure.

It is estimated that 20 or 30 or 40 % of the amount was actual expenditure.

(*3) Budget requested only related to project.

List of Training of Paraguayan Personnel in Japan

Fiscal year	Name	Period	Training course	Principal Institute of Training
1998	Carlos Paniagua	28/09/98 - 13/10/98	Agricultural Research System Management	Visit to various institutes
	Adrian Palacios	22/03/99 - 27/10/99	Production of Upland crops under Rotation System	Hokkaido National Agricultural Experiment Station
	Casiano Altamirano(*)	22/03/99 - 27/10/99	Breeding Technique of Soybean	Tohoku National Agricultural Experiment Station
2000	Eduardo Rodriguez	April-00 - March-02	Scholar ship (Master course) provided by the Ministry of Education (JICA allotment)	Utsunomiya University
	Julio Morel (*)	May-00 - Dec-00(#)	Soil Diagnosis	National Agriculture Research Center

(*) Assistant

(#) Plan

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LIST OF MAJOR MACHINERY AND EQUIPMENT PROVIDED

*JFY	TOTAL	MAJOR ITEMS
1997	¥9,934,000 (US\$ 84,186)	Automatic water distillation apparatus Clean bench Power supply, Particle counter, Mini cycle Quadrat sampling winnower Ultralow freezer Ice maker, , air conditioner
1998	¥12,281,000 (US\$ 88,352)	CN Corder Pick-up Truck pH Meter Drying Sterillizer Soil misture meter Soil thermometer Sunflower Thresher Various lavoratory utensils
1999	¥13,486,000 (US\$ 108,758)	Microbus Vehicle 4WD Drying Oven, Copying Machine Freezer Power Tiller Mower Tractor, Personal Computer and Accessories Sprayer
2000	** ¥5,000,000 (US\$ 46,729)	Mini Cycler No Tillage Sowing Machine Digital Electronic Balance pH Meter Ultrasonic Cleaner for Pippet Wash Rack Shelf Working Table Plotter

Exchange Rate :

(1997) 1US\$=118Yen, (1998) 1US\$=139Yen, (1999)1US\$=124Yen, (2000) 1US\$=107Yen,

* JFY Japan fiscal year

Fiscal year in Japan begins in April and ends in March.

* * Estimation (Plan)

ATTACHED SHEET 2

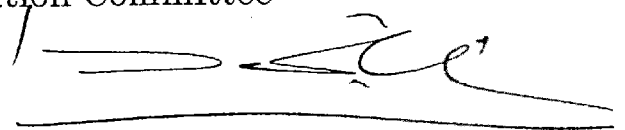
Attainment of Activities in TDIP

The Research Project on Soybean Production in Paraguay

June 14, 2000

Japan-Paraguay Joint Evaluation Committee

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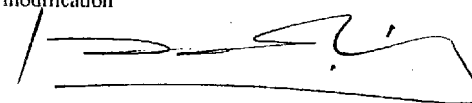
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Project outputs 1: The techniques for breeding of soybeans will be improved

Items/Activities	Targets	Present status/Problems	Activities in remaining period	Progress
1. Soybean breeding 1.1 Collection and selection breeding materials and classifying the ecological characteristics (1) Collection and selection of breeding materials *	Preservation of germplasm for soybean breeding	Soybean varieties resistant to nematodes were introduced from CNPso-EMBRAPA and FT-Sementes (Brazil). A total of 15 varieties. Besides, routes for introducing breeding materials were guaranteed.	Introduction of promising materials for soybean breeding. To visit to CNPso-EMBRAPA once a year for exchanging informations.	B
(2) Ecological classification of breeding materials *	Ecological determination of introduced germplasm and its utilization.	Evaluations of ecological characteristics of the introduced materials were also carried out.	To continue evaluations	B
1-2 Studying breeding techniques of appropriate Varieties (1) Breeding of high-yielding varieties for the area of Itapua/Alto Parana 1) For the area Itapua. # [Hybridization, and selection of individuals and lines. Investigation of productivity and other agronomic characters of promising lines]	Expansion of breeding scale through improvement of breeding efficiency Raising of high-yielding varieties for the area Itapua	The yield trial is carried out for the 8 early lines and the 5 semi-late lines. Within the early lines, there are promising lines which mature earlier or at the same time as PARANA. The preliminary yield trial is carried out for the 14 lines developed. Among them, there are some high yielding lines.	There are no varieties that could replace with PARANA, so new varieties will be registered soon to extend the harvesting period.	A
2) For the area Alto Parana *	To allow a stable yield	To continue with shortening of breeding cycle of the F1 and F2 generations. Individual selection of the F4 and F6 populations.	To continue with trials and improvement of varieties after the project is concluded.	B
(2) Breeding of the varieties with appropriate growing periods for the area of Itapua/ Alto Parana 1) For late planting # [Hybridization, and selection of individuals and lines. Yield trial of promising lines. Investigation of seeding time of suitable for selection of breeding materials for late planting]	Improvement of breeding method for late planting in various cropping systems Raising of lines for late planting	The study of agronomic characters is carried out in three seeding times, for the 5 late lines and 1 variety. The preliminary yield trial for the 9 late lines obtained on item(1) is carried out, the seeding time was at the beginning of January. For the individual selection in the hybrid population F5 and F4, there were 10 populations, but	The evaluation for the agronomic characters and preliminary yield trial will be continued, but the number of lines is reduced.	B

Progress : A : Fully progressed B: Progressed on schedule C: Slightly progressed (behind schedule) D: Requested for modification
In charge of : # : CRIA * : CETAPAR

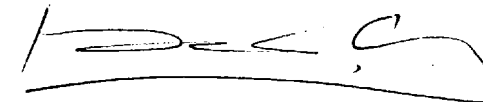
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		due to the lack of irrigation water, the germination was poor, so only 6 hybrid population could be selected. With regard to the objective, we decided to breed suitable varieties for late planting from middle of December till early January, after the harvest of sunflower for a little early planting. The sowing period of the hybrid population for the individual selection is established around middle of December, while the preliminary yield trial is beginning of January.	The pedigree line selection for late planting materials derived from in F5 and F4 will begin, but due to the poor germination in the previous year, the scale of the experiment could be reduced.	
2) For early planting *	Breeding of early planting allowing to diversity cropping systems.	Crossings were carried out in order to improve the early varieties with planting possibility for the beginning of October. Early varieties of the introduced lines were selected.	The introduced lines will be estimated the adaptability for early planting. The yield trial test will be carried out in the 2000/01 period.	B
(3) Breeding of germplasm resistant to soybean cyst nematode				
1) Evaluation of agronomic characters of introduced cultivars resistant to soybean cyst nematode # [Investigation of productivity and other agronomic characters of cultivars]	Selection for parents. Evaluation of adaptability of cultivars	The agronomic characters of the 14 introduced varieties were evaluated. The result can be used to select the varieties for farmers, parents for crossing and the indicator varieties for trials.	The preliminary yield trial will start using resistant lines developed at CRIA and varieties newly introduced from Brazil and U.S.A	B
2a) Raising of breeding materials # [Hybridization, and selection of individuals and lines]	Raising of lines superior to parents in agronomic characters	According to the result of screening for the resistance in Brazil, 9 resistant lines in F7 were selected. The screening for these lines will be carried out by MT. Foundation, and the preliminary yield trial will be started. The 123 lines from 498 in F6 and F5 generations, were selected. The 10 hybrid population in F5 had been planted for individual selection, but because of a lack of irrigation water, the germination was not good, so only 5 hybrid population could be selected. As a result, the number of new lines for next season will be reduced	For the research of nematode resistance, it is planned to send a counterpart to EMBRAPA and MT Foundation in Brazil.	B

Progress : A : Fully progressed B: Progressed on schedule C: Slightly progressed (behind schedule) D: Requested for modification
In charge of: #: CRIA *: CETAPAR

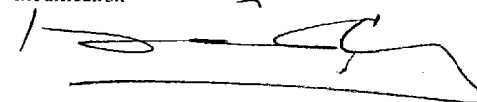
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2b) Raising of breeding materials *	Development of resistant materials.	to the half of this year. The construction of a well of greater capacity is dearly wished.		
3) Screening techniques for soybean cyst nematode resistance # [Studying of the RAPD method]	Transfer of technique on the RAPD method Applying to screening method	Crossings were carried between main varieties in the district and the introduced varieties. The counterparts were able to acquire the RAPD experiment method.	To continue crossings and shortening of breeding cycle of F1 and F2. The RAPID method will be applied for the screening of soybean cyst nematode resistance using materials developed at CRIA and confirm the effect by comparing with the method of EMBRAPA.	B A
1-3 Improving evaluation methods of resistance to some soybean diseases (1) Improving evaluation methods to some soybean diseases *				
1) Evaluation of resistance to the stem canker *	To improve the varieties that are resistant to the stem canker.	52 varieties have already evaluated the resistance to stem canker in the previous year in 1999/00, 33 varieties were evaluated by the toothpick method in a greenhouse and 75 lines by natural infection in the field.	To continue the evaluation as a process of breeding system.	A
2) Evaluation of resistance and development of new inoculation methods for <i>Macrophomina phaseolina</i> . *	Evaluation of varieties and inoculation method that are resistant to the charcoal rot.	50 varieties were evaluated the resistance to the charcoal rot through the toothpick method and the irrigation method of the pathogen suspension, besides 3 varieties were evaluated by the soil inoculation method. On the bases of the results of these evaluation, it was concluded that there is no resistant variety to this disease, therefore, the evaluation test may be terminated..	It is necessary to establish another effective control method.	B
3) Determination of inoculation methods in regard to other main disease. *	Evaluation of varieties that are resistant to other disease.		Regarding the evaluation methods for the resistance to <i>Cercospora</i> and <i>Xanthomonas</i> , it is possible to apply the methods established and developed in Brazil for the same purpose.	B

Progress : A: Fully progressed B: Progressed on schedule C: Slightly progressed (behind schedule) D: Requested for modification
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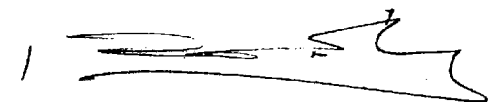


Project outputs 2: Cultivation techniques contributing to the establishment of an appropriate cropping system will be improved.

Items/Activities	Targets	Present status/Problems	Activities in remaining period	Progress
2. Cultivation				
2-1 Studying cultivation techniques for the diversification of crops after/before soybeans (1) Ecological classification of sunflowers # [Examining ecological response and productivity as a preceding crop of systems]	To clarify suitable ecological types of sunflower for seed as a preceding crop of soybean and applying to varietal selection	Status: 14 varieties of F1 sunflowers were tested in two years and the suitable varieties for the possible adaptation for the crop before/after the soybean are being studied. 1. The suitable sowing time to obtain good growth and yield is from July to August and the sowing before this period runs the risk of being affected by the "Sclerotinia sp" and by the freeze. 2. Almost all the sample materials present similar ecotypes, the M742 among them, is an early variety and its output is similar to other varieties. Problems: 1. It is difficult to get conclusion in two years, due to the great climatological changes.	1. Considering the great Climatological variation of each year, the trial period must be prolonged for one more year in order to obtain a correct evaluation of the agronomic features. 2. It is foreseen to gather and present the results.	B
(2) Improvement of an appropriate cropping system 1) For the area Itapua # [Investigation of an appropriate cropping system with sunflower for Itapua area. Testing sunflower for green manure, in addition, promising varieties for seed if found in ecological classification study]	To establish an appropriate cropping system with sunflower as a preceding crop of soybean, for reducing excessive concentration on soybean/ wheat system	Status: Under testing sunflower as a preceding crop of the soybean to introduce a new cropping system. 1. As green manure, 5 tons/ha. of dry material was obtained, but its effects are to be evaluated. 2. The sowing time seems to be promising after July, to obtain a good output (about 2 tons/ha of seed). 3. However, when sunflower was sown after September, the harvest delayed very much. And it is afraid of missing time to sow a subsequent crop of soybean, if a late variety were used. It seemed that the sunflower as a	1. To establish the combination system of sunflower as a preceding crop of soybean during the remaining period. 2. With the established system, to evaluate cost and benefit of the Sunflower-Soybean System, compared to the Wheat-Soybean system. 3. In regard to the introduction of sunflower as green manure, to evaluate the potentiality of the dry matter production in the winter and to study its effect as green	C

Progress : A : Fully progressed B: Progressed on schedule C: Slightly progressed (behind schedule) D: Requested for modification
In charge of: #: CRIA *: CETAPAR

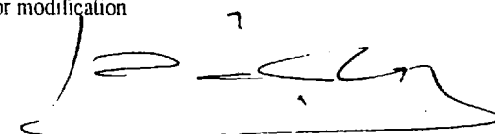
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2) For the area of Alto Paraná * 2-2 Studying cultivation techniques for stable and high productivity (1) Effective utilization of soil-phosphorus by mycorrhiza #	Selection of adequate items for crops prior to soybean and to explain their ecology To publish a manual on the investigation method	preceding crop of soybean should be sown and until August. Problem: 1. In the first year of experiment, a local variety of sunflower was used without any application of fertilizer and herbicide for the test of green manure, according to the normal way in Paraguay. However the productivity of the crop as a green manure did not evaluate because of insufficient growth caused by a great amount of damage with the <u>Sclerotinia</u> disease and the weed competition. 2. In this trial of sunflower as green manure, the main objective is the study of the winter crop, whether or not it is replaceable by wheat. Therefore, it is essential to evaluate, firstly, the potentiality of dry matter of the sunflower as a winter crop. 3. It is necessary to establish, in the future, a special study of the sunflower trials as low cost green manure (factors such as no fertilizers, no weed control and cheap seeds like the use of the F2 seed). The yield of the sunflower of the first year of the sunflower-soybean system no present favorable results due to the strong winds which caused the crop to tumble. Also, the second year presented a low yield level due to the damages caused by the diseases. Status: 1. In regard to the study method of the mycorrhizas, a general knowledge of the basic techniques was acquired, under the guidance of the short-term expert. At present, to diffuse of this	manure on the crop of soybean. 4. I think it would be difficult to carry out during this Project, but in case there is time for it, to prepare the sunflower as low cost green manure should study the assurance of the productivity of dry matter in the crop without neither fertilizers nor herbicides and with the F2 seeds produced from F1 varieties. We can not take a risk by stating that the sunflower/soybean rotation crop is better than the wheat/soybean system, thus, at the end of the soybean's evaluations for the 2000/01 year, it will be possible to establish the pursuit or the conclusion of said study. 1. Publishing of the Spanish manual about the Study Method for mycorrhizas.	B A
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Progress : A : Fully progressed B: Progressed on schedule C: Slightly progressed (behind schedule) D: Requested for modification
In charge of: #: CRIA *: CETAPAR

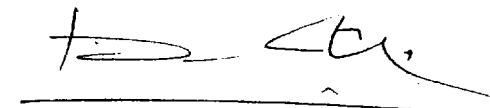
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1) Investigation method # [Establishing investigation method for mycorrhiza]		technique, the Spanish edition of the manual for the method of technical study is prepared and in press now. Problem: 1. It is necessary for a counterpart to comprehend well the concept of copyright.		
2) Techniques for establishment # [Studying techniques for establishment and increase of mycorrhiza population in the field and study]	To transfer the techniques for investigation and studying methods for increase availability of phosphorus in the soil with activities of mycorrhiza	Status: 1. By the proposal of the short-term expert, Dr. Saito, the trial plots were prepared again, after the cultivation of Brassica Sp. (turnip) which had planted in a season of '98 to make a correction of the great inequalities in the trial field. 2. The % of mycorrhizal infection were observed in the plots of wheat for seeds, and in green-manure's plots of corn, sunflower, oats and turnip, and in the fallow plots of with weeds one and weeded out one. At present, the first one cycle of observation is just over. 3. It can not be found out any tendency of mycorrhizal infection due to (supposedly) sampling variation. Problems: 1. It is necessary for counterparts to have intimate connection with Japanese professional and relation with any other filed to raise the research activities.	1. To study the infection percentage and the effect that spreads to the preceding crops regarding the soybean crop is explained through the difference of infection by mycorrhizas. 2. To analyze the absorption amount of phosphorus in crops, phosphorus level on soil, besides of explaining the classification of mycorrhizas inside the soil, amount of spores and others.	B
(2) Improvement of deep application method of phosphorus fertilizer # [Testing effective application methods of phosphorus under non-tillage]	To present an appropriate technique for application of phosphorus under non-tillage conditions	Status: 1. A depth sowing/manuring machine was prepared with the collaboration of the CEMA. 2. The sowing machine has the capability to adjust the manuring depth up to 15cm under soil surface. With the use of this sowing machine and through the programming of the fertilization of plots to 10 and 15cm deep of soil, the growth of soybean and the radicular	1. To explained by modifying another plot on one part (air flow or degree of deep fertilization). 2. To study about the influence of the deep fertilization improvement in regard to the growth and yield of soybean. 3. To study about at which depth it could be fertilized with the No-Tillage sowing machine.	B

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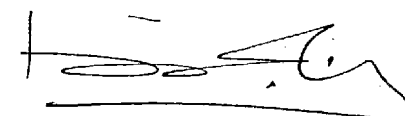
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		distribution were compared with a normal direct crop. 3. The deep fertilization consists in the tendency to extend at deep the radicular distribution, in particular, the distribution of the fine roots, however, this influence is not very clear in regard to the growth and the yield. Problems: 1. At present, the deep distribution of fine roots is not sure in deep fertilization plots, whether it is due to the influence of fertilizers or to the good air flow into the soil that penetrates when opening the deep ditches along the furrow at the time of fertilization.		
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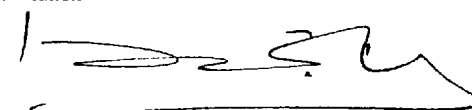


Project outputs 3: Soil management techniques will be improved.

Items/Activities	Targets	Present status/Problems	Activities in remaining period	Progress
3. Soil management 3-1 Studying soil management techniques for new areas where soybean production is being introduced (1) Soil diagnosis for soybean production in the area of Misiones # [Investigation of soil classification based on soil fertility, topography and land use capability] [Analyzing soil information using satellite photography] (2) Improvement of soil management techniques suitable for soybean fields in the area of Misiones # 1) Methods of conversion from native pasture to the field for upland crops [Studying method of conversion from native pasture to the upland field and management of fertilizer application for the purpose of introduction of no-tillage system] 2) Soil management on the weathered sandy	Design of classification map of suitable land for soybean production and preparation of soil diagnosis standard Planning Method of conversion from native pasture to the field for upland crops and technical guidance for introduction of no-tillage system.	1. The studies concerning the distribution of soil, mother rocks and topography of the 150,000 ha. of suitable soil for soybean crop was finished, and also the soil sampling. 2. Guided by the short-term expert, a map was elaborated describing the soil moisture condition by means of LANDSAT data and color images. 3. The work planned is delayed, due to the retirement of counterpart from the soil section and the designation of a new technician. It will be necessary to continue the subject until the last year 1. According to the result of field experiment of No-Tillage system, it was proved that introduction of No-Tillage system is possible. 2. On the first crop (wheat) and the second crop (soybean) after conversion, some abnormal growth partially appeared such as the yellowish color of the leaves. It is thought that the main reason was the deficiency of nutrients, but in case of soybean, it seems to be deficiency of nitrogen due to poor nodulation.	1. It is necessary to understand the nutrient situation and finish the soil analysis. 2. The soil analysis and ground trace will be completed to compare with the LANDSAT data and to prepare a map for soybean cultivation. 3. The soil diagnostic model will be reexamined. The minor subject 1) has been finished and its item will be continued with the subject 2)	C B

Progress : A: Fully progressed B: Progressed on schedule C: Slightly progressed (behind schedule) D: Requested for modification
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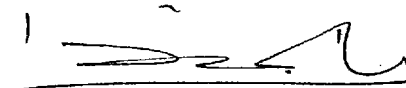
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soil # [Investigation the change of soil physical condition movement of soil nutrient and decomposition and accumulation of soil organic mater under no-tillage system using cover crop]	Establishment of sustainable soil management for soybean production on soil of weathering sandy rock in Misiones	1. It has been shown that the soybean yield on the second crop was higher in the no-tillage system plot than the conventional system plot. Also a better soybean yield was obtained after oat than after wheat. 2. According to the results obtained by studying the decomposition of green manure, the decomposition of oat was faster than the one of wheat, and because of a greater nutrient was released, the high yield was obtained after oat cropping. 3. The great influence of the cover crop was shown on the variations of soil moisture and temperature.	1. The experiment fields will be continued as planned and the growth and production will be checked. 2. The soil chemical and physical analysis and the nutrients uptake of crop will be studied. The fertilizer and soil management within No-Tillage system will be established. 3. At the moment of the conversion of native pastures to soybean fields, there were problems of weed control. And then, an expert from Brazil was invited and weed control methods were studied. The expert presented an experimental plan for weed control.	B
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Progress : A : Fully progressed B: Progressed on schedule C: Slightly progressed (behind schedule) D: Requested for modification
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ANNEX 2 PROJECT DESIGN MATRIX

NARRATIVE SUMMARY	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTION
OVERALL GOAL Stable productivity and an expansion of production area of soybean will be realized through the development of breeding techniques, sustainable cultivation techniques, and the conveying of appropriate techniques to the farmers in Paraguay, thus contributing to the stability and development of Paraguayan economy.			
PROJECT PURPOSE The research capability of CRIA related to breeding, cultivation and soil management in soybean production will be enhanced for the development of appropriate varieties and a sustainable cultivation system.	1.Improvement of research capability of relevant section in CRIA 2.Improvement of implementation system and relationship with relevant organization	1 Result of study about relevant research method and technology 2.Reports, research papers, guidelines and research manuals 3.Evaluation reports about research system and relationship with relevant organization	1.The results of study are disseminated. 2.Prices of agricultural products are stable. 3.C/P transferred the relevant technology does not leave. 4.Financial condition is enough and stable.
PROJECT OUTPUTS 1. The techniques for breeding of soybeans will be improved. 2. Cultivation techniques contributing to the establishment of an appropriate cropping system will be improved. 3. Soil management techniques will be improved.	Increase of presentation and publication of sufficient and significant results of study about each activities	By evaluation survey	Relationship among relevant section in CRIA, and with CETAPAR is assured.
PROJECT ACTIVITIES 1-a. Collecting and selecting breeding materials, and ecological classification (1)Collection and selection of breeding materials (2)Ecological classification of breeding materials 1-b. Studying the breeding techniques of appropriate varieties (1)Breeding of high yielding varieties for Itapua/Alto Parana (2)Breeding of varieties with appropriate growing periods for Itapua / Alto Parana (3)Breeding of germplasm resistant to SCN 1-c. Improving the evaluation method of disease resistance 2-a. Studying cultivation techniques for the diversification of crops after/before soybeans (1)Ecological classification of sunflower (2)Improvement of the appropriate cropping system 2-b. Studying cultivation techniques for stable and high productivity (1)Effective utilization of soil-phosphorus by mycorrhiza (2)Improvement of deep application method of phosphorus fertilizer 3-a. Studying soil management techniques for new areas where soybean production is being introduced and expanded (1)Soil diagnosis for soybean production in Misiones (2)Improvement of soil management techniques in Misiones	INPUTS <JAPANESE SIDE> 1.Experts (1) Long-term: Leader, Coordinator, Soybean breeding, Cultivation, Soil and fertility (2) Short-term 2. Provision of equipment 3.Acceptance of trainee 4.CETAPAR <PRAGUAYAN SIDE> 1.Executing organization 2.Counterpart personnel 3.Running expenses 4.Land,building, facilities necessary for the project		1.Suitable C/P is allocated 2.Suitable relationship among relevant section and organization is assured. 1.CRIA is the central institute for soybean. 2.Normal conditions of economical, social and natural environment regarding to soybean production are stable. 3.National strategy for soybean does not change.

MINUTA DE DISCUCION DE LA EVALUACION INTERMEDIA DEL PROYECTO DE INVESTIGACION SOBRE LA PRODUCCION DE SOJA EN EL PARAGUAY

La Agencia de Cooperación Internacional del Japón (en adelante referida como JICA), ha enviado al Equipo Asesor (en adelante referido como "El Equipo") dirigido por el Sr. Shinji Sakai, al Ministerio de Agricultura y Ganadería (en adelante referido como MAG) de la República del Paraguay, desde el 6 hasta el 16 de junio de 2000.

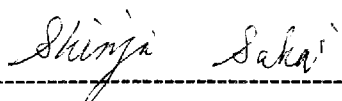
El Comité de Evaluación Conjunta, el cual consta de cinco miembros del equipo Japonés y seis miembros del Equipo del lado Paraguayo fue organizado conjuntamente con el propósito de conducir una evaluación intermedia y realizar las recomendaciones necesarias al Proyecto de Investigación sobre la Producción de Soja en el Paraguay (en adelante referido como "El Proyecto").

El Comité de Evaluación Conjunto realizó la evaluación a través de entrevistas, estudios de campo y se preparó el informe de Evaluación Intermedia (en adelante referido como "El Informe"). El informe fue presentado y discutido en la reunión del Comité Coordinador Conjunto del Proyecto.

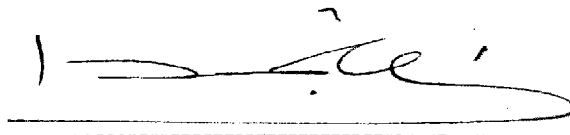
Los principales puntos acordados en el Reunión del Comité Coordinador Conjunto se hallan como adjunto, y han sido recomendados a sus respectivos Gobiernos.

El presente texto se halla redactado en español e inglés respectivamente, siendo cada texto igualmente auténticos. En caso de divergencia en la interpretación, prevalecerá la versión en inglés.

Asunción, 15 de junio de 2000.



Sr. Shinji Sakai
Líder
Equipo Asesor
Agencia de Cooperación Internacional
del Japón

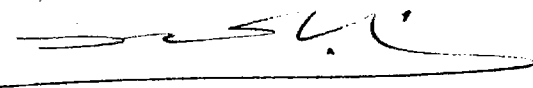


Sr. Enrique García de Zuñiga
Ministro
Ministerio de Agricultura y Ganadería,
República del Paraguay

ADJUNTO

1. El Comité de Evaluación Conjunta ha presentado el informe adjunto referido como Anexo 1
2. El Comité Coordinador Conjunto ha acordado y aceptado el informe presentado por El Comité de Evaluación Conjunta y tomado nota de las recomendaciones realizadas para el logro exitoso de las metas del Proyecto.
3. El Comité Coordinador Conjunto ha acordado y aceptado el Diseño matriz del Proyecto adjunto referido como Anexo 2.

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INFORME DE EVALUACION INTERMEDIA SOBRE EL PROYECTO DE INVESTIGACION SOBRE LA PRODUCCION DE LA SOJA EN EL PARAGUAY

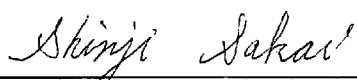
El Comité de Evaluación Conjunta (en adelante referido como "El Comité") fue organizado conjuntamente por la Agencia de Cooperación Internacional del Japón (en adelante referido como "JICA") y las autoridades de la República del Paraguay, con el propósito de realizar una Evaluación Intermedia y las recomendaciones necesarias para el Proyecto de Investigación sobre la Producción de Soja en el Paraguay (en adelante referido como "El Proyecto").

El Comité de Evaluación Conjunta realizó la evaluación a través de entrevistas, estudios de campo y reuniones.

Este informe fue preparado como resultado de la evaluación conjunta con la Cooperación del Centro Regional de Investigación Agrícola (en adelante referido como "CRIA") y el Ministerio de Agricultura y Ganadería (en adelante referido como "MAG").

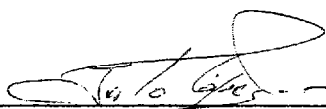
El presente texto se halla redactado en español e inglés respectivamente, siendo cada texto igualmente auténtico. En caso de divergencia en la interpretación, prevalecerá la versión en inglés

Capitán Miranda, 14 de junio de 2000



Sr. Shinji Sakai

Líder
Equipo Japonés
Comité Evaluación Conjunto



Ing. Agr. Justo López Portillo

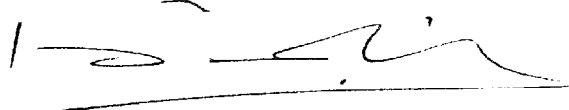
Líder
Equipo Paraguayo
Comité de Evaluación Conjunto

ANEXO 1

INFORME DE EVALUACION INTERMEDIA DEL PROYECTO DE INVESTIGACION SOBRE LA PRODUCCION DE SOJA EN EL PARAGUAY

Cap. Miranda, 14 de junio, 2000
Comité de Evaluación Conjunta Japón- Paraguay

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CONTENIDO

1. ANTECEDENTES Y RESUMEN DEL PROYECTO

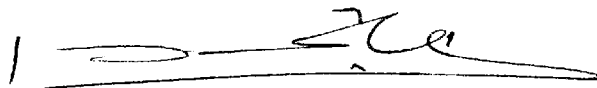
- 1-1 Antecedentes del Proyecto
- 1-2 Resumen del Proyecto

2. METODOS DE EVALUACION

- 2-1 Propósito de la Evaluación
- 2-2 Composición del Comité Evaluación Conjunta
- 2-3 Items evaluados
- 2-4 Cronograma de la Evaluación

3. RESULTADOS DE LA EVALUACION

- 3-1 Inversión
- 3-2 Pertinencia del Diseño del Proyecto
- 3-3 Efectividad
- 3-4 Perspectivas de sostenibilidad
- 3-5 Impacto
- 3-6 Enmienda del TDIP

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1 . ANTECEDENTES Y RESUMEN DEL PROYECTO

1-1 Antecedentes del proyecto

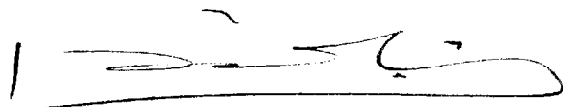
Desde 1980 el incremento de la producción de la soja ha sido acelerado en la zona sudeste del Paraguay. La soja se ha convertido en el cultivo más importante en la economía Paraguaya. Sin embargo se requiere de medidas urgentes para el control del Nemátodo del Quiste de la soja, debido a la rápida expansión de la infección en la producción de soja en el Brasil. Además, existen varios puntos urgentes a superar; Para una productividad alta y estable, el establecimiento de técnicas de cultivo para la diversificación de los rubros antes y posterior a la soja, reemplazando al trigo, - mejoramiento de las técnicas del suelo donde la producción de soja han sido recientemente introducidas.

En enero de 1996, la República del Paraguay solicito cooperación técnica tipo proyecto al Gobierno del Japón, teniendo en cuenta los resultados obtenidos en el desarrollo de proyectos anteriores, para el logro de los objetivos arriba mencionados.

La JICA envió un Equipo de Estudio Preliminar en enero de 1997 y un equipo de Estudio para la implementación, en agosto de 1997. Ambos gobiernos han acordado en formular el Proyecto de Investigación sobre la Producción de la Soja en Paraguay con el objetivo del mejoramiento de las capacidades del CRIA relacionados al mejoramiento, agronomía y el manejo de suelo para la producción de soja, firmado en el Registro de Discusiones en fecha 20 de agosto de 1997. En octubre de 1997 con la llegada del equipo de Expertos Japoneses de largo plazo fue iniciado el proyecto. En julio de 1998 fue enviado el Equipo de Estudio Consultivo para la formulación detallada del Cronograma Tentativo de Implementación TSI .

Las actividades de transferencia de tecnología han sido completadas. En la actualidad, el tercer año de proyecto está siendo desarrollado.

De acuerdo a lo referido anteriormente, la evaluación se realiza a fin de determinar; el progreso del proyecto, examinar la implementación y las necesidades de modificación



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tomando como base el RD y el TSI, a fin de llevar las actividades del Proyecto en la forma mas apropiadas para el resto del período de cooperación técnica.

1-2 Resumen del Proyecto

El diseño del proyecto es como sigue:

Meta Global: La estabilidad de la productividad y el aumento del área de cultivo de la soja, se realizará a través de técnicas de mejoramiento genético del cultivo, técnicas de producción sostenibles y la transferencia de las tecnologías apropiadas a los productores del Paraguay, contribuyendo así a la estabilidad y el desarrollo de la economía Paraguaya.

Objetivos del proyecto: La capacidad de investigación del CRIA relacionada al mejoramiento, cultivo y manejos del suelo en la producción de la Soja, serán mejorada a través del desarrollo de variedades apropiadas y sistema de producción sostenible.

Resultados del proyecto:

- 1) Serán mejoradas las técnicas de mejoramiento de la soja
- 2) Serán mejoradas las técnicas de cultivos que contribuyan al establecimiento de un sistema de cultivo apropiado
- 3) Serán mejoradas las técnicas de manejo del suelo

Actividades del proyecto:

1 – 1 Colección y selección de materiales de cultivos y clasificación ecológica

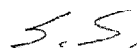
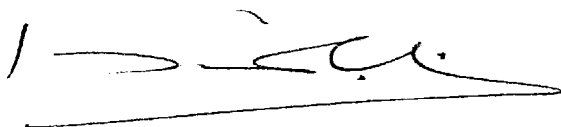
- (1) Colección y selección de materiales de cultivo
- (2) Clasificación ecológica de materiales de cultivo

1 - 2 Estudio de técnicas de cultivos de variedades apropiadas

- (1) Mejoramiento de variedades de alto rendimiento para las áreas de Itapúa/Alto Paraná
- (2) Mejoramiento de variedades con periodo de siembra apropiados para las áreas de Itapúa/Alto Paraná
- (3) Mejoramiento del Germoplasma para la resistencia al nemátodo del quiste de la soja (SCN)

1 – 3 Mejoramiento de métodos evaluación de resistencia a enfermedades

2 – 1 Estudio de técnicas de cultivo para la diversificación de rubros antes/posterior a



la soja.

- (1) Clasificación ecológica del Girasol
- (2) Mejoramiento del sistema apropiado de cosecha

2- 2 Estudio de técnicas del cultivo para una productividad alta y estable

- (1) Utilización efectiva del Fósforo del suelo por mycorriza
- (2) Mejoramiento del método de aplicación profunda de fertilizante fósforado

3 - 1 Estudio de técnicas de manejo de suelos para nuevas áreas donde la producción de soja ésta siendo introducida y expandida

- (1) Diagnóstico del suelo para la producción de soja en Misiones.
- (2) Mejoramiento de técnicas de manejo de suelo en Misiones

2. METODO DE EVALUACION

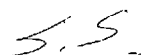
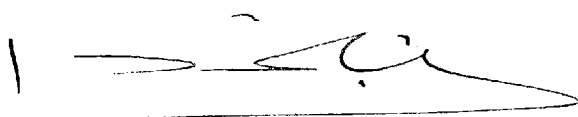
2-1 Objetivo de la evaluación

- 1) Evaluación de las inversiones y el grado de los logros basado Plan Tentativo Detallado de Implementación (TDIP) durante los últimos tres años.
- 2) Recomendaciones pertinentes para el diseño del proyecto, perspectiva de sostenibilidad e impactos.
- 3) Identificación de problemas en cualquier aspecto del Proyecto y proponer las soluciones necesaria.
- 4) Enmienda del TDIP en el periodo restante del Proyecto, en caso de ser necesario.

2-2 Composición del Comité de Evaluación Conjunta

(1) Miembros japoneses

- 1) Sr. Shinji Sakai (Líder)
Director, Dept. de mejoramiento
Estación Nacional de Investigación Agrícola de Tohoku
Misterio de Agricultura, Forestal y Pesca (MAFF)
- 2) Sr. Akinori Okabe (Mejoramiento)
Investigador Senior, Dept. de cultivo extensivo,
Estación Nacional de investigación Agrícola de Chugoku
Misterio de Agricultura, Forestal y Pesca (MAFF)
- 3) Sr. Hideyuki Mochida (Agronomía)



Jefe de laboratrios, Manejo de producción de cultivo, Dept. de Cultivo extensivo.

Estación Nacional de investigación Agrícola de Kyushu

Misterio de Agricultura, Forestal y Pesca (MAFF)

4) Dr. Yukihiro Tamura (Soil Management)

Jefe de laboratorio, Control de estres climático, Dept. de Ciencias biológicas y ecológicas.

Estación Nacional de Investigación Agrícola de Tohoku

Misterio de Agricultura, Forestal y Pesca (MAFF)

5) Sr. Akio Kagawa (Administración de proyecto)

Funcionario, División de Ganadería y horticultura

Departamento de Cooperación para el Desarrollo Agrícola, JICA

(2) Miembros paraguayos

1) Ing. Agr. Justo López Portillo (Líder)

Dirección de Investigación Agrícola (DIA),

Ministerio de Agricultura y Ganadería (MAG)

2) Ing. Agr. Jorge Ogasawara (Coordinador)

Dirección General de Planificación (DGP),

Ministerio de Agricultura y Ganadería (MAG)

3) Econ. Paola Vera Giardina

Dirección General de Planificación (DGP),

Ministerio de Agricultura y Ganadería (MAG)

4) Ing. Agr. Alfredo Ledesma (Manejo de Suelo)

Instituto Agronómico Nacional (IAN),

Ministerio de Agricultura y Ganadería (MAG)

5) Ing. Agr. Pedro Juan Caballero (Mejoramiento de soja)

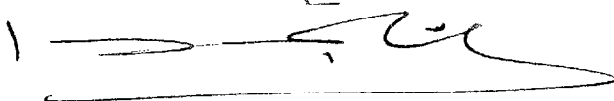
Instituto Agronómico Nacional (IAN),

Ministerio de Agricultura y Ganadería (MAG)

6) Ing. Agr. Guido Chaparro (Agronomía)

Instituto Agronómico Nacional (IAN),

Ministerio de Agricultura y Ganadería (MAG)



2-3 Items para la evaluación

Fueron evaluados los siguientes puntos;

- 1) Inversiones
- 2) Pertinencia del diseño del proyecto
- 3) Eficiencia
- 4) Perspectiva para la sustentabilidad
- 5) Impactos
- 6) Enmienda de TDIP

2-4 Cronograma de evaluación

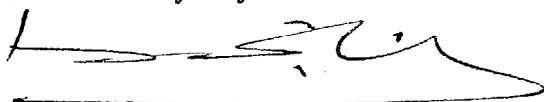
El Comité de Evaluación Conjunta se ha reunido durante 7 días, desde el 8 de junio al 14 de junio de 2000, con los siguientes itinerarios.

Día	Sitio	Actividades
Jueves 8 de junio	CRIA	Primera reunión de Comité de Evaluación Conjunta. Formación del Comité de Evaluación Conjunta. Deliberación sobre el objetivo e itinerario de observación para la evaluación el sitio del proyecto.
Viernes 9 de junio	CRIA	Reunión (Presentación de los avances del Proyecto por parte de los personales de contrapartes, y entrevistas con los expertos)
Sábado 10 de junio	-	Estudio de Campo en la zona de Itapúa y Alto Paraná Deliberación con las Cooperativas Agrícolas (La Paz Nikkei, Colonias Unidas)
Domingo 11 y Lunes 12 de junio	CETAPAR	Reunión con CETAPAR (Presentación de los avances de las actividades por los contrapartes y entrevista con los expertos) Elaboración de borrador del informe
Martes 13 de junio	CRIA	Deliberación del borrador final del informe
Miércoles 14 de junio	CRIA	Reunión de Evaluación Conjunta. Firma de Informe de evaluación intermedia
Jueves 15 de junio	MAG	Reunión del Comité Coordinador Conjunto (Presentación de los resultados y planes futuros del Proyecto)

3. RESULTADO DE LA EVALUACION

3-1 Inversiones

Las inversiones de la parte japonesa y la parte paraguaya para el proyecto es como se muestra en el hoja adjunta 1.



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3-2 Pertinencia del diseño del Proyecto

El diseño del Proyecto se considera apropiado porque el mejoramiento de la capacidad de investigación de CRIA ha contribuido en la estabilidad y el desarrollo de la economía paraguaya a través del mejoramiento de la tecnología agrícola de los proyectores en los siguientes puntos:

- 1) La soja es el principal rubro de exportación del Paraguay, contribuyendo para el desarrollo de la economía nacional.
- 2) La función del CRIA es el principal centro de investigación en Paraguay para la investigación de soja y otros cultivos importantes.
- 3) La capacidad de investigación de CRIA ha sido fortalecida mediante el programa de cooperación técnica de la JICA.

3-3 Eficiencia

En forma general se ha evaluado que tiene un buen estado de avance. Sin embargo, en algunas áreas el avance no es óptimo.

En forma general es como sigue:

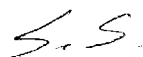
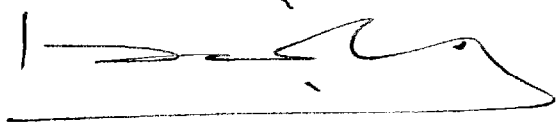
(1) Mejoramiento

En lo referente al mejoramiento, tanto el CRIA como CETAPAR ha tenido el avance programado. En este momento, se está desarrollando las líneas obtenidas en los proyectos anteriores y se está determinado el potencial de producción. Entre estos materiales para el mejoramiento, las líneas tempranas desarrolladas por CRIA serán registrada como nuevas variedades en un futuro cercano.

Con respecto a desarrollo de la variedad resistente al quiste del nemátodo en la soja, se está realizando una investigación mediante la cooperación del CNPso-EMBRAPA y Fundación MT. Además, los contrapartes han recibido orientaciones sobre el sistema de investigación RAPD por parte de los expertos a corto plazo, y dicha tecnología será utilizada para la selección de variedades resistentes al quiste del nemátodo.

La tecnología de evaluación de resistencia contra la enfermedad del cancro del tallo a sido mejorada, y la misma será utilizada en el futuro como uno de los métodos del sistema de mejoramiento de soja.

Con estos resultados, se concluye que las actividades pertinentes al mejoramiento del soja está avanzando sin ninguna inconveniencia. Sin embargo, como existe una carencia de agua para el riego, se concluye que es necesario equipar con un nuevo pozo.



(2) Agronomía

Las técnicas de diversificación del cultivo después y antes de la soja están siendo investigadas por el CRIA y CETAPAR. Se ha realizado durante 2 años el estudio de la influencia de la época de siembra sobre el crecimiento y volumen de cosecha. La época adecuada de siembra para obtener un buen rendimiento es de julio a agosto. Sin embargo, las condiciones climáticas inestables y enfermedades han afectado al resultado de la investigación. Para obtener un resultado exacto, es necesario ampliar un año más el periodo de investigación.

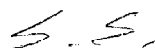
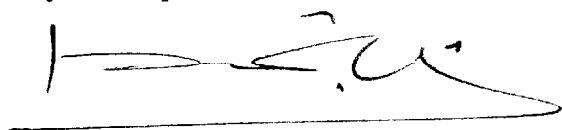
Se está llevando a cabo una investigación para conformar una técnica de alta producción y estable de soja. Se ha realizado una orientación sobre la investigación básica de Micorrriza, mediante el envío de experto a corto plazo. Actualmente, el manual en español sobre el sistema de investigación ha sido elaborado para difundir esta tecnología ha sido impresa. Por otro lado, se está desarrollando las tecnologías de fertilización profunda de fertilizantes fosforados. El equipo para la fertilización profunda ha sido desarrollado con la cooperación de CEMA.

Por ello, se concluye que las investigaciones pertinentes a este tema ha tendido un avance satisfactorio en su mayoría. Las actividades de investigación para el periodo restante, consiste en la conformación del sistema de cultivo rotativo entre soja y girasol que incluya la utilización del girasol como abono verde. Además, es necesario aclarar el efecto que produce al crecimiento y rendimiento del soja, la infección del Micorrriza, aplicación profunda de los fosforados.

(3) Manejo de Suelo

La elaboración del mapa de clasificación de suelos aptos para el cultivo de soja ha avanzado por las técnicas de sensores remotos. Pero el desarrollo de normas de diagnóstico de suelo ha tenido un retardo por la falta de asignación de recursos humanos en el pasado. Por ello, se estima que el estudio de normas de diagnostico de suelo requerirá hasta el ultimo año del proyecto (2002).

La posibilidad de producción de soja en suelos franco arenosos de origen sedimentario ha sido demostrada, por ello el potencial de producción en Misiones y / u otras regiones con similares características ha sido comprobado. Sin embargo, como se ha observado un defecto en el crecimiento, se espera la conformación de tecnologías para el manejo de suelo sostenible para la soja para el manejo del fenómeno de amarillamiento de las hojas en el primer año de conversión de tierra y control de malezas.



3-4 Perspectiva de sostenibilidad

Los esfuerzos continuos del MAG para asegurar los costos locales y la asignación de los contrapartes es evaluado de buena manera. Estos contribuyeron en gran manera al progreso del proyecto. La realización de estos dos puntos afecta a la sostenibilidad de las actividades del CRIA luego de la finalización del proyecto.

3-5 Impactos

El sistema de cultivo con siembra directa ha sido introducido al Paraguay en el año 1983 por el grupo de inmigrantes japoneses. Esta técnica de cultivo se ha expandido rápidamente en las zonas principales de producción de soja en el área de Alto Paraná e Itapúa con el soporte de la investigación de CETAPAR y JICA con la asistencia técnica de JICA. Actualmente se cuenta con la mitad de las áreas de siembras de soja en Paraguay, contribuyendo a la estabilidad de la producción y conservación de soja.

En el momento de la evaluación, fueron reconocidas los siguientes impactos positivos.

3-5-1 Mejoramiento de variedades tempraneras para el área de Itapúa y Alto Paraná
Será lanzada una nueva variedad con maduración tempranera y resistencia al cancro del tallo. Esto podría reemplazar al Paraná que ha tenido inestabilidades por daños causados por el cancro del tallo.

3-5-2 Desarrollo de nuevas maquinarias para la fertilización profunda

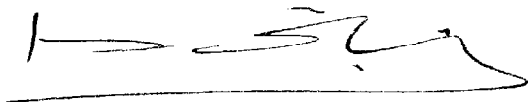
Se ha desarrollado un implemento de fertilización profunda con la investigación conjunta entre el CRIA y CEMA. Este implemento tiene la capacidad de ajustar la profundidad de fertilización a más de 15 cm de la superficie del suelo.

3-5-3 Posibilidad de producción de soja en Misiones

Ha sido introducida una técnica de sensores remotos para la descripción de las condiciones de humedad del suelo mediante los datos de imagen en colores mostrados por el LANDSAT. Se logró una segunda cosecha de soja en Misiones luego de la conversión.

3-6 Enmienda de TDIP

Como resultado de la deliberación y evaluación se puede concluir que las enmiendas al TDIP para el resto del proyecto son las siguientes.



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1) Clasificación ecológica de girasol

Debe ser extendido el periodo de investigación hasta el 2000, debido al retraso causado por las condiciones climáticas anormales.

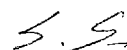
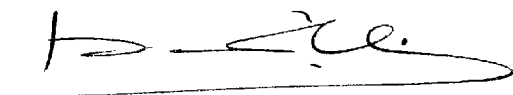
2) Diagnostico del suelo para la producción de soja en el área de Misiones

Se debe extender el periodo hasta el año final del periodo de cooperación (2002), debido a la carencia de Recursos humanos.

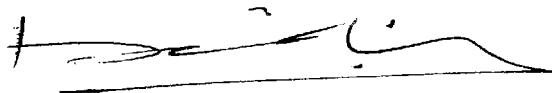
5. RECOMENDACIONES

El Comité de evaluación Conjunta recomienda las siguientes medidas a fin de fortalecer la transferencia de tecnología.

- (1) Se considera indispensable para la implementación fluida del Proyecto, una estrecha comunicación entre los expertos japoneses y el personal de contraparte. Deberán ser mantenidas reuniones mensuales para que el equipo intercambie informaciones en forma periódica. También, es necesario una activa comunicación con el CETAPAR, a fin de intercambiar información entre los contrapartes.
- (2) La provisión del agua deberá ser solucionada urgentemente a fin de paliar la falta de la misma, teniendo en cuenta la necesidad de agua para los experimentos realizados. La reparación o la construcción de un nuevo pozo debe ser realizada basándose en un estudio detallado de las condiciones climáticas y de requerimiento de agua en cada periodo.
- (3) Es altamente valorada la incorporación un contraparte en el área de mejoramiento de soja y otro en el área de suelo a fin de cubrir la vacancia. La asignación estable de estos es necesaria a fin de asegurar la sostenibilidad del Proyecto.
- (4) Es necesario asegurar la provisión del presupuesto adecuado para el desarrollo estable de las actividades de investigación del CRIA. El MAG deberá realizar mayores esfuerzos para una mayor asignación presupuestaria al CRIA. Se recomienda la adecuada implementación de los mecanismos de ingresos actuales como la comisión de regalías por el uso variedades protegidas, ingreso por venta de semillas, y / o comisiones por el análisis y diagnóstico de suelo.



- (5) El MAG deberá seguir realizando mayores esfuerzos a fin de asegurar los costos locales para el proyecto, especialmente aquellos relacionados a pago de comisiones de despacho aduaneros. El retraso en la recepción de los equipos donados por el gobierno del Japón, afecta seriamente a la fluida implementación del Proyecto.
- (6) El fortalecimiento de las capacidades de investigación es indispensable a fin de promover las actividades de investigación de los contrapartes. En este punto es muy importante, el crear oportunidades para publicar los resultados de las actividades de investigación. El establecimiento de una sociedad científica entre el CRIA, IAN; CETAPAR, y la Universidad Nacional de Asunción, puede ser tomado como un ejemplo, y sería un gran incentivo para la estabilizar la asignación de los contrapartes.
- (7) Los resultados de las actividades de investigación deben ser ampliamente difundidos entre los productores de soja y las organizaciones agrícolas. Desde este punto de vista, es deseable aumentar la cantidad de seminarios.
- (8) Se considera importante el intercambio técnico con organizaciones de países vecinos (EMBRAPA de Brasil) y JIRCAS y se debe continuar con este tipo de intercambios.



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