Dr. Marchetti also explained that many items of the second delivery are parts and accessories of the equipment which has already arrived. It was kept for the next meeting the evaluation of the situation. It was approved that the duplicates of the equipment can be sent to other Cerrado experimental stations.

The JICA's representative informed the Committee about the arrival, in September, of a team of evaluation from Japan, to evaluate the program and it will be necessary for all the equipment to be already set up or to have a specific place to put it in. If it is not possible, it will be discussed with this team about the needs of installation, such as experts to do it.

Regarding to the 4th item - Relationships with CPPA and other-, it was decided to leave it to the next meeting.

It was approved by the Committee the research activities of the Japanese team. The Chairman suggested that Dr. Isumyiama visit the Soybean Center in the end of August. Dr. Wenceslau informed that Dr. Zuñiga, from Chile, an expert on biological control, will spend 2 years in Brazil and will try to introduce 12 species of wheat.

Drs. Iwata, Kawasaki and Dedecek's experiment - Effect of Soil Preparation System in Alternative Planting of Soybean/Wheat - will be conducted in Araxã, together with NOHURABRÃS.

The Committee agreed to leave the Terms of Reference to the next meeting, once it is missing items and the functions, obligations and power of the Committee are not clear. Dr. Sunaga and Dr. Wagner will prepare them, together, after consulting the Japanese authorities.

About the Short-Term-Consultancy, it was established the fields of interest: root development, weed control and mechanization/ machinery. As the Japanese do not have specialists on drip irrigation, this will be replaced by equipment installation and maintenance. It was suggested that the consultants could arrive in October/November, 1978, to evaluate and

observe the situation and availabilities and, after studying the problems in Japan, they could return to start working next year. Regarding their names it was kept for discussion between Dr. Sakurai and Wenceslau, after the meeting.

The next meeting will be held in Belo Horizonte, Minas Gerais, on September 10, 1976, with the attendance of an special guest from CPPA.

EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA
CENTRO DE PESQUISA AGROPECUÁRIA DOS CERRADOS

JAPAN/BRAZIL AGRICULTURAL CO-OPERATION PROGRAM

THIRD MEETING

Belo Horizonte (EPAMIG), November 27, 1978.

A G E N D A

I. Report by Dr. E. Wagner and Dr. D. Marchetti on their visit to Japan.

II. Items to be discussed

(1) Deliberation of the Terms of Reference of the Committee

(2) Research collaboration between CPAC and other agricultural research institutions listed on 4, Annex I of the Arrangement.

(3) Collaboration with activities of the Companhia de Promoçao Agricola (CPA).

(4) Review and deliberation of the Co-operation Projet for 1978 and 1979.

(i) Japanese researchers on short-term assignment

(ii) Equipments and materials delivered from Japan

(iii) Technical trainees to be sent to Japan

(5) Others.

Draft

for 1978 & 1979 Annual Operational Work Plan of the Project

November, 1978

Japan Guidance Team of the Japan - Brazil Agricultural Research Cooperation Project

Japan International Cooperation Agency (J I C A)

1. Japanese Experts Dispatch Plan

(1) Experts on short Term

a) Dispatch Plan In 1978 Fiscal year in Japan

(a) Background of the theme and the theme

(b) Field of Experts

(c) Dispach Term

(d) Name of Experts

(e) Present Position

b) Dispatch Plan In 1979 Fiscal year in Japan

(a) Background of the theme and the theme

(b) Field of Experts

(c) Dispatch Term

(d) Name of Experts

(e) Present Position

2. Plan of Training and Study Tour in Japan

(1) Training of counterpert researcher

a) Independent training course

(a) '78 Fiscal year in Japan

- Background of the theme and the theme, Field, Name, Present Position, Term

(b) '79 Fiscal year

- above do

b) Group training course

(a) '79 Fiscal year in Japan

- Background of the theme and the theme, Field, Name, Present Position, Term

(2) Study tour of Research Administrators on '79 year

- Name, Present Position, Term, Time, Spesial Oder Place to visit

3. Plan for Providing Equipment, Machinery and Materials

(1) Basic Plan for Providing

(2) Plan of '79 Fiscal year lists for Providing machinery, etc.

- Budget of '79 Fiscal year may be ¥100 million

(3) Plan of Budget for Demand on '80 Fiscal year

EMBRAPA
EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA
CENTRO DE PESQUISA AGROPECUÁRIA DOS CERRADOS

JAPAN/BRAZIL RESEARCH COOPERATIVE PROGRAM
JOINT COMMITTEE - FOURTH MEETING
Goiânia, GO, May 22, 1979

S U M M A R Y

The President of EMBRAPA, Dr. Eliseu Alves, oppened the fourth meeting of the Joint Commitee, talking about the buildings construction. Dr. Ramalho is in-charge-of that, and the engineering people are giving emphasis to this subject. Dr. Sunaga said that JICA is very pleased with the comment of the President.

Oppened the agenda, it was made the formal introduction of the new Chairman, Dr. José Ramalho de Castro.

All the members were also introduced: Dr. Sakurai, Dr. Izumiama, Dr. Sunaga, Dr. Farnesi, Dr. Helvécio Saturnino, Mr. Kobaiashi, Dr. Memória, Dr. E.Wagner, Dr. Wenceslau Goedert and Dr. Marchetti.

As Dr. Ramalho is replacing Dr. Blumenschein, it is proposed that he will go to Japan with Dr. Wenceslau, next September. All the members agreed with the suggestion.

About the fourt item of the Agenda, Dr. Helvécio Saturnino explained that EPAMIG would like to have strong colaboration with the Japanese researchers. They could visit Minas Gerais and suggest some cooperative work. The second point is that the short term consultant could go to Minas Gerais and give seminars to the EPAMIG researchers, instead of some staff members of EPAMIG travelling to Brasília. The third point is training facilities for EPAMIG staff. The last point mentioned was that EPAMIG needs some equipment not available in Brazil.

Dr. Sunaga explained that the fiscal year starts in April and so, the training program would have to start after that for every fiscal year. He also explained the Japanese system.

The Chairman suggested that EPAMIG, CPAC and JICA representatives could plan together and design a framework on a first approuch.

Finally, four positions of the trainees to be sent to Japan in 1979 were proposed: three from CPAC and one from EPAMIG. Dr. Sunaga said that, unfortunately, Goiás and Mato Grosso are excluded from this Agreement. The idea is to extend the cooperation program to other States within the Cerrado; possibilities which should be studied further.

The possibility of a long term cooperation from 1981 to 1983 was offered to the President of EPAMIG and the same suggestion was made to CPAC.

The Chairman put forward that a "proposal" should be presented next Ocotber, at the Fifth Meeting, together with EPAMIG, JICA, CPAC and EMBRAPA. He also suggested that the Japanese staff members should pay a visit to EMGOPA, to assist in the realization of said proposal.

Dr. Wagner suggested that the same concentrated effort should be considered in Minas Gerais as in the CPAC.

Dr. Marchetti explained that the second delivery is allready in Rio de Janeiro and that all of it will be installed.

The third list also includes some equipment for EPAMIG.

According to information from Tokyo, about six millions cruzeiros were alocated for 1979 for the delivery of equipments. The limited financial resources of JICA and the delayed construction of new buildings of CPAC resulted in smaller alocation of the budget.

Dr. Ramalho explained that the cotation are already in operation. Constructions will begin in July and, if priority is given to the laboratory buildings, it is possible that they will be ready by July 1980.

Dr. Sunaga asked EMBRAPA to store the delicate equipment in case the buildings will not be ready in July 1980. It was agreed that if the buildings were not ready to receive the equipments by July, EMBRAPA would be obligated to store it, in good conditions. EMBRAPA would make every effort

to finish the construction of the buildings by the end of October at. latest. If EMBRAPA would not accept this condition, the JICA would reserve the right to detain the shipment. This subject was finalized and approved.

Dr. Wenceslau made some comments on short term consultancy: Yoshida's work was excellent. The program is so good that CPAC is thinking of sending Jose Eurıpedes da Silva as a counterpart to Japan. The second consultant was Yamamoto. Three months were not enough to complete the work, but he made a very good start.

In conclusion: both consultants were very efficient and helpfull to CPAC. The next three consultants will be in the following areas: 1) Mechanization - minimum tillage (September/October); 2) Micronutrients (December to March - any time) and 3) Agricultural Meteorology: energy balance, which is very difficult to get in Japan.

The CPAC suggestion is to come for 1 month and, later , we could send CPAC specialist to Japan, for 3 months.

The Chairman made a suggestion that, when a short term consultant comes to CPAC, EPAMIG should be advised, in order to send some researchers to CPAC, to follow the work plan and also to coordinate seminars in their State Enterprises.

Everybody agreed with this suggestion.

It was agreed that CPAC will pay hotel and breakfast, and JICA will pay luch and dinner for the short term consultants.

The participation of Dr. José Maria Memória as Advisory Officer for International Cooperation was presented by Dr. Ramalho. It was suggested that the formal proposal be left for the next Joint Committee meeting.

After discussing all the items of the Agenda, it was talked about the following:

1) Dr. Sunaga gave some additional informations about the development of CPA. To date, CPA still has to buy 50.000 ha in Minas Gerais. The decision was to buy it in Paracatu and Coramandeu and Iraí de Minas. This is for individual farms. So, CPA has to wait and see the result, then CPA will ask CPAC to help in this survey.

2) Copies of this Summary should be send to Presidents of EPAMIG and EMGOPA.

3) The next meeting should be held in October, in Brasília.

4) Dr. Memória said that he was very pleased to participate and ask Dr. Sunaga a list of Japanese research institutions.

The Chairman thanked Dr. Farnesi for the kindness for holding the meeting and said that for EMBRAPA and CPAC this Agreement is very important. The people which is working in the program said that the world is looking at what we are doing!

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JAPAN/BRAZIL RESEARCH COOPERATIVE PROGRAM

JOINT COMMITTEE - V MEETING

S U M M A R Y

The V Meeting of the Joint Committee of the Japan/Brazil Research Cooperative Program was held on the 1st. of November, 1979, at the Japanese Embassy, Brasília-DF.

The Agenda of this meeting was:

I. Trip Report

II. Material and equipment that will be dispatched by Japan, and installation facilities

III. Collaboration in the Cerrados between CPAC/EPAMIG/CPA

IV. Others

Besides of the effective members of the Committee, the following persons were invited to participate: Paulo Afonso Romano (President of CPA), Tokiso Araki (Vice-President of CPA), Helvécio Mattana Saturnino (President of EPAMIG), Toshiyuki Tanaka (EPAMIG), Aluizio Fantini Valerio (CPA) and Torn Shimizu (Japanese Embassy).

At 09:15, Dr. José Ramalho, the Chairman of the Joint Committee, opened the V Meeting, and asked Dr. Goedert to present a report of the trip to Japan (Annex I). At the end, Dr. Ramalho recommended that, besides visiting National Research Institutes if should be scheduled visits to Prefectural Research Stations.

Dr. Wagner was in charge of discussing the second item of the Agenda: "Materials and Equipments". A list of equipments, including 55 items

requested by EPAMIG, was send to Japan and, as informed by Mr.Sunaga, it should arrive to Brazil by the end of next June. Dr. Helvecio Saturnino explained that a complete list of equipments was delivered to CPAC, in order to be included in the 4th delivery. He made clear that the effort will be concentrated at Uberaba Station. Mr. Sunaga proposed that EPAMIG's list should be discussed in the next meeting of the Joint Committee, which was accepted Finally, Mr. Sunaga expressed concernment with the installation facilities for the new equipments. Dr. Ramalho informed that the CPAC new building should be ready by July, 1980.

The third item of the Agenda dealed with the next meeting. As proposed by Mr. Sunaga, this event was set for next February, when the Review Team of JICA will visit Brazil. Dr. Sakurai reminded that a future plan (1980/1981) should be ready by the end of November, 1979. This plan must be prepared by JICA/CPAC/EPAMIG.

To introduce the 4th item of the Agenda, the Chairman asked Dr. Paulo Romano to present a summary of the actual situation of CPA. After explaining that the farmer settlement plan is already approved, Dr. Romano expressed the necessity to evaluate the CPA Project, in technical, social and economical terms.

After some discussions among the participants it was decided that EPAMIG together with CPA will prepare a plan establishing the estrategy to perform this evaluation. This plan will be submitted to the Joint Committee later.

The last item discussed was the training program for the future. A list was presented by Dr. Goedert (see Annex II). This list will be sent to JICA for future decision.

At 11:00, Dr. Ramalho thanked the active participation of everybody and ended the meeting.

As schedulled, after a short interval, and with the presence of the Japanese Embassador, it was presented a General Report of the Cooperative Program (Annex III). As suggested by Dr. Ramalho, the report was presented as following:

I. Introduction (Dr. Wagner)

II. Research Activities (Dr. Sakurai)

III.Training activities (Dr. Goedert)

IV. Equipment (Dr. Marchetti)

After the presentation, the Embassador thanked all the participants and closed the section.

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RELATÓRIO DE MISSÃO NO EXTERIOR

I - Especificação da Missão

Visita às instituições de pesquisa agropecuária ligadas ao Ministério da Agricultura, Peixes e Floresta do JAPÃO.

II - Organização Patrocinadora

Essa atividade foi patrocinada pelo JICA (Japan International Cooperation Agency), dentro do Convênio de Cooperação existente entre o Brasil e o Japão.

III - Local e Período

O programa incluiu reuniões e visitas a várias instituições e locais, conforme segue:

27/09/79 - Reunião com o Presidente do JICA/Tóquio

28/09/79 - Reunião com a assessoria do Ministro da Agricultura/ Tóquio.

29/09/79 - Visita ao NIAS (National Institute of Agricultural Sciences)/ Tóquio.

01/10/79 - Visita ao "Hokkaido National Agricultural Experiment Station"/Saporo.

03/10/79 - Visita ao "Tohoku National/Agricultural Experiment Station"/Morioka.

05/10/79 - Visita ao "Tropical Agricultural Research Center"/ Tsukuba.

09/10/79 - Visita ao escritório regional do JICA/Hakata.

11/10/79 - Visita ao "Kyushu National Agricultural Experiment Station"/Miyakonojo.

EMBRAPA - CPAC

13/10/79 - Reunião no JICA e Ministério da Agricultura/Tóquio

IV - Composição da Delegação Brasileira

José Prazeres Ramalho de Castro
Wenceslau J. Goedert
Edson Lobato

V - Descrição detalhada dos assuntos tratados

A missão teve por objetivo discutir alguns ítens do acordo de cooperação e tomar conhecimento dos trabalhos de pesquisa em andamento naquele país.
No que concerne ao acordo foram discutidos os programas de treinamento e a remessa de equipamentos ao Brasil.
Durante as visitas aos Centros de Pesquisa foi observado os trabalhos com as culturas de arroz, soja, hortaliças, gado e suínos.

VI - Análise Crítica e Sugestões

As reuniões mantidas no JICA, Ministério da Agricultura e a visita aos Centros de Pesquisa serviram para auxiliar no direcionamento das atividades futuras do acordo de cooperação. Foi possível observar algumas áreas em que o intercâmbio deve ser enfatizado tais como: fitopatologia, entomologia, irrigação e drenagem, etc.
As visitas propiciaram observar a organização de pesquisa no Japão, por sinal, bastante semelhante à organização brasileira. Desse modo, foram de grande utilidade no fortalecimento da pesquisa em nosso País. Contudo, visando atividades futuras sugere-se incluir no programa algumas visitas a instituições estaduais de pesquisa, bem como a cooperativas e produtores.

Wenceslau J. Goedert

TRAINING IN JAPAN

Short Individual Training

1980 (4 or 5 places)

	Period	Area	Objectives
EPAMIG Antonio João Cancian	March/August	Plant Physiology	Improvement in pachinghouse operations and studies of ripeness regulation of horticulture products
EMBRAPA/CPAC Helio Ferreira da Cunha	August/September	Plant Pathology	To know research works in the area of Plant Health in Japan
CPAC Arlovaldo Luchiari Junior	April/May	Micrometeorology	To carry on works which are being conducted in this area, observing the methodologies, research priorities, equipments (installation and maintenance)
José Eustáquio da Silva	June/July	Plant Physiology	Training in methodology of root evaluation and knowledge of researchs related to his work area
Dimas Vital Siqueira Resck	May/June	Soil Conservation	Knowledge of new techniques of soil physico-hydric analysis, new technologies, and to be familiar with new equipments

1981 (4 or 5 places)

EPAMIG ?			
EMBRAPA/CPAC Mario Eichler	August/September	Soil Fertility	To know research works in the area of Soil Fertility
CPAC Juscelino Antonio de Azevedo	April/June	Irrigation/Drainage	To know new technologies and research techniques in irrigation. To visit irrigated areas in order to identify technologies used in Japan
Carlos Roberto Spehar	June/August	Plant Breeding	Knowledge of soybean research. Learning of new research methodologies

Milton Teixeira Varges	September/November	Soil Microbiology	To know research works which are being conducted in the area of Nitrogen fixation, mainly studies of rhizobium ecology
1 (3 or 4 places) CPAC (candidates) Antonio Eduardo Guimarães Reis	April/June	Drainage/Irrigation	Up to date knowledges of irrigation and drainage technology. To contact institutions and people involved in this area, in order to get more informations to future researchs in CPAC
Gilson Martin Cosenza	August/September	Pest Management and Plant Resistance	To get more knowledges to the development of researchs on plant resistance against insects and integrated control
Sergio Mauro Folle	May/July	Agricultural Mechanization	To know researchs on agricultural mechanization, in order to give allowances to future works in CPAC.
Manoel Vicente de Mesquisa Filho	April/June	Soil Chemistry	To observe new laboratory techniques and methods of soil analysis determination and field measures.
Maria José D'Avila Charchar	March/April	Plant Patnology	To compare methodologies and techniques used in isolation, multiplication and control of parasitic fungi. To observe the setting up of Plant Pathology Laboratory

MASTER PLAN AND ANNUAL OPERATIONAL WORK PLAN FOR THE JAPAN/BRAZIL AGRICULTURAL RESEARCH COOPERATION PROJECT

Brasilia, Brazil - April, 1980

This plan outlines in detail the practical considerations in relation to the master plan and the annual operational work plan for the realization of the Japan-Brazil Agricultural Research Cooperation Project. The latter is to be carried out in accordance with the arrangement between the Government of Japan and the Federal Government of Brazil, concerning Agricultural Research Cooperation in Brazil, and conforms to the Basic Agreement on Technical Cooperation between the two Governments.

This plan is the result of a series of consultations held between the Japanese Team (headed by Yoshiro Sakurai) as well as the Japanese Guidance Team (headed by Shigeru Tsuchiya) and the Brazilian specialists in charge of agricultural technology.

April, 1980.

In Brasilia, Brazil.

ELMAR WAGNER
General Director of the Agricultural Research Center for the Cerrado Region

YOSHIRO SAKURAI
Leader of the Japanese Expert Team

JOSÉ RAMALHO DE CASTRO
Director of the Brazilian Agricultural Research Cooperation

SHIGERU TSUCHIYA
Leader of the Japanese Guidance Team

I. DETAILS OF THE MASTER PLAN

1. Purpose of cooperation

The purpose of the proposed cooperation in research is outlined in Art. 1.(1) of the Arrangement, signed on 30th September, 1977, by Japan and Brazil. The research cooperation covers the research fields stated in the Annex II of the Arrangement. In this plan, major research subjects in the future will be emphasized.

(1) Soil-plant-water relationships: In the cerrados, in addition to the socio-economic conditions inherent to the region, the main limiting factors for agricultural development from the technical point of view are the low fertility of the soil, the accumulation of toxic substances and the inadequate distribution of moisture, including rainfall.

In this respect, in order to achieve some of the objectives mentioned above, the problem to tackle is to devise an economical method of fertilization including the preservation and improvement of the soil along with the removal of toxic substances, by developing soil management techniques for the tropical soil of the cerrados.

(2) Crop cultivation including crop physiology: The main crops in the cerrado areas are upland rice, wheat, soybean, maize, sorghum, cassava and perennial crops including coffee, fruit trees, combined with cattle raising and forestry.

Crop cultivation: The Japanese team will carry out cooperative research in two fields, namely it will work in close cooperation with experts in soil science and fertilizer application to:

1 set up techniques of fertilization and tillage for upland cropping in the cerrado areas.

2 establish a system of crop cultivation suited to the environment and social conditions prevailing in the cerrado areas.

Tillage methods for tropical crops: Tillage methods which minimize the exhaustion of soil organic matter are most important if soil fertility is to be maintained. Therefore, it is necessary to adopt tillage systems which enable to preserve over a long period of time the organic matter and fertilizer whithin such soils, in investigating on a short or long-term basis the beneficial effect of tillage methods consisting of minimum or

no tillage. Limited tillage could also contribute to the prevention of soil erosion caused by heavy rains, in the rainy season.

The test crops in this study will be soybean and wheat, primarily. Among the many problems confronting farmers in the cerrado, the establishment of control methods of weeds is an important one, and various methods of weed control will be compared in soybean fields.

(3) Control of disease and pest damage: The occurrence of disease and pest affecting important crops in the cerrados will be investigated so as to establish methods of control.

For the diseases of crops, the selection of resistant varieties is fundamental, and cooperative research aimed at the development of methods for detection of resistance and pathogen races and for inoculation will be carried out.

As for the pests, the lesser corn-stalk borer (elasmo) in upland rice and the stink bugs in soybean will be studied so as to devise methods for forecasting occurrence and for prevention.

(4) In addition to the fields listed above, cooperation on agricultural meteorology, farm mechanization, plant breeding, farm management and economic analysis will be carried out according to the decisions made by the Joint Committee, and when necessity arises, experts will be dispatched for a short period of time which should not exceed 12 months.

To achieve these objectives, the Japanese team will work in close cooperation with the Brazilian researchers.

OUTLINE OF COOPERATION

1. Cooperative research on methods of fertilization for cerrado cropping

1.1. Studies on the root development of upland crops.

The root systems of plants are only found in the upper layers of soil in the Cerrados. The roots of crops are also shallow, due to the severe damage caused by the short dry spell during the rainy season, creating serious problems in cerrado cropping.

For these reasons, root development will be studied. Physiological properties of roots of upland crops cultivated in the cerrados will be investigated so as to elucidate the relations between soil and roots.

Topics to be taken up are as follows:

a) Investigation on root development of crops in cerrado
b) Investigation on soil of cerrado
c) Identification of toxic factors affecting root development by method of pot experiment
d) Physiology of crop roots
e) Field experiments

1.2. Studies on the deficiency in minor elements in crops.

The soil of cerrado is mainly made up of oxisol and is deficient in crop nutrients. Therefore, for modern farming, nutrients should be applied through fertilization.

Although experiments on fertilization for major nutrients have been conducted at CPAC, little is known about minor nutrients. The deficiency in minor elements needs to be studied so as to set up methods of prevention. To achieve such objectives, experts could be working on a short or long-term basis.

The themes of study are as follows:

a) Study on the deficiency of minor elements in crops
b) Study on the manifestations of disorders due to deficiency in minor elements in crops
c) Study on the effect of minor element application

1.3. Study on the preservation of organic matter in soil.

There is little organic matter in the soils of cerrado, and it seems that the organic matter decreases rapidly by application of chemical fertilizers. For the improvement of soil fertility in cerrado, it is necessary to apply organic matter. How to preserve the organic matter content should be studied. Such investigations will take time and require the assistance of experts in soil microbiology and crop cultivation.

The study will be conducted in connection with the following subject, 2.1.

2. Cooperation in research for the improvement of cropping systems

2.1. Research on the improvement of cropping methods, in cerrado

a) Studies on the tillage system for upland cropping.

For the maintenance of soil fertility, it is essential to prevent the decrease of organic matter in soils.

Frequent tillage decreases organic matter in soils resulting in poor crop production under the tropical conditions. To prevent this phenomenon, it is desirable to decrease the frequency of tillage or to omit tillage. On the other hand, deep tillage and application of fertilizers to the subsoil are important for the development of deep roots and for prevention of damage caused by the short dry spell during the rainy season.

For the solution of this problem, it is necessary to devise a special tillage method in cerrados and to cooperate closely with the experts of soil fertilization. Crops to be tested will be soybean as well as soybean and wheat rotation.

b) Studies on the establishment of farming systems suited to the cerrados.

The problems to solve are as follows: cultivation methods suited to soil fertility and climate; planting systems from the point of view of management or soil improvement; mechanization of agriculture in relation to large scale farming; methods of weed control, etc. It is difficult to solve these problems all at once. It is necessary to carry out the research step by step.

The studies will be performed with soybean crop as a test crop, as soybean is the principal crop in the cerrado region. The study will aim at devising cultivation methods adapted to the level of soil fertility, in placing emphasis of soybean. Also, studies will be carried out for the establishment of techniques for weed control which is an urgent problem in soybean cultivation.

2.2. Tests on new crops introduced from foreign countries

The introduction of new crops or new cultivars may be of great value, if they prove to be suited to the cerrado areas. The Japanese team will extend technical assistance for such studies.

3. Cooperation in research on the control of diseases and pests

3.1. Investigations on the incidence of major diseases and pests in the main crops.

The conditions of occurrence of important diseases and pests affecting cerrado crops, i.e. upland rice, wheat, soybean, corn and cassava will be investigated.

3.2. Studies on the ecology and control of lesser corn-stalk borer

Lesser corn-stalk borer (elasmo), which is a serious pest in the USA and Central America., affects upland rice, wheat, soybean, sugar cane, etc., in Brazil. In the case of upland rice, the larvae bore the stem of the young shoots of the plant,causing "dead heart" symptom. Many stems may wither, and serious damage occurs in the stage of rice cultivation. Severe damage is known particularly to occur in the first years consecutive to land clearing.
The research aims at defining the incidence of this rice pest as well as at developing methods of its control. The same studies will also involve soybean.

3.3. Studies on the ecology and control of the stink bug of soybean.

Among the pests of soybean, stink bugs are the species which exert a marked influence on the yield and quality of soybean. In the cerrados, the quality of soybean deteriorates, following damage caused by stink bugs which have a high population density. Therefore, research should be conducted to identify the insects, to study the conditions of infestation, to forecast outbreaks and to develop methods of their control.

3.4. Studies on crop varieties resistant to diseases

Control of diseases in the cerrados should be achieved through cultural practices and the cultivation of resistant varieties. In tne field of disease control, technical assistance should involve the development of methods enabling to select resistant varieties.

For the resistant varieties, the following experiments should be conducted:

a) Differentiation method for testing field resistant varieties.
b) Inoculation method of pathogen.
c) Methods for testing the resistance of a variety by using seedlings.
d) Differentiation method for pathogenic race.
e) Methods for selection of field resistant varieties.

The studies aiming at important diseases of major crops should involve anthracnosis of Stylosanthes which is a forage crop.
Technical assistance will also be extended for studies on diseases of other important crops.

3.5. Studies on virus disease of cassava

A few researchers have carried out physico-chemical studies on virus diseases of crops in Brazil by electron microscopy or by using anti-serum.
However, basic studies involving transmission or biological tests are very few.
The present control of virus diseases consists of:

a) the interception of the route of transmission;
b) the elimination of the virus;
c) the breeding of resistant varieties, and
d) the utilization of attenuated virus.

It can not be achieved without basic studies on virus ecology.
As cassava is an important crop in the cerrados, studies on vein mosaic virus of cassava, which have not been performed so far, should be undertaken. These could contribute to the development of methods of control by carrying out a series of studies on the ecology of the virus through transmission experiments.

III. LOCATION OF RESEARCH FIELD ACTIVITIES

The major effort for the implementation of this operational work plan will be alocated at Planaltina-DF (CPAC), and at branches as experimental fields in Paracatu, Coromandel and Iraí de Minas, in accordance to the Annex I, item 4, of the Arrangement, for the promotion purpose of the cerrado development scheme in Minas Gerais.

IV. ANNUAL OPERATIONAL WORK PLAN

(1) Annual operational work plan according to the fields of cooperation

	Items	Year of implementation				
		1st year	2nd year	3rd year	4th year	5th year
1. Methods of fertilization for upland crops in the cerrados	1.1. Root development of crops					
	1.2. Deficiency of minor elements in crops					
	1.3. Preservation of organic matter in soil					
2. Improvement of cropping system	2.1. Improvement of crop methods in cerrados.					
	2.2. New crop introduction					
3. Control of diseases and pests	3.1. Incidence of important diseases and pests					
	3.2. Ecology and control of LCB					
	3.3. Ecology and control of stink bug					
	3.4. Crop varieties resistant to diseases					
	3.5. Cassava vein mosaic virus					

(2) Plan for dispatch of experts

(Duration of cooperation: September 30, 1977 - September 29, 1982)

	1978	1979	1980	1981	1982
Dispatch of experts					
.Leader	2.20		8.19		9.29
.Soil science					
.Soil science or Agronomy					
.Agronomy					
.Plant pathology					
.Entomology					
.Liaison officer					
Short-term experts		Root development Weed control	Nutrient deficiency Farm management Agr.meteorology Agr. Machinary Economic analysis	Remote sensing	RI Soil chemistry

Due to the single year budget system of Japan this is an estimate subject to necessary budget appropriation throughout the period of cooperation as well as on the assumption that the Brazilian side takes every necessary measures for the execution of the Project.

Training programme

Specification	1978	1979	1980	1981	1982
(training)					
1.Soil physics and chemistry		Fertilizer Leo	Soil conservation	Fertilizer Microbiology	Fertilizer
2.Agronomy			Physiology(Fruit)	Physiology	
3.Diseases and pests		Disease Takatsu Insect Marcio Nemat. Sharma		Disease	Disease Insect
4.Agrometeorology			Agrometeorology		
5.Agric.machinery				Irrigation(?)	Irrigation(?) Agric.Machinery
6.Breeding				Breeding	
7.Agr.economics				and other one from EPAMIG	
(study tours)	Wagner Marchetti	Wenceslau Ramalho Lobato	2 mem.	2 mem.	2 mem.
(Japanese survey team)	5 members		5 members	5 members	5 members

Due to the single year budget system of Japan this is an estimate subject to necessary budget appropriation throughout the period of cooperation as well as on the assumption that the Brazilian side takes every necessary measures for the executions of the Project

EMBRAPA
EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA
CENTRO DE PESQUISA AGROPECUÁRIA DOS CERRADOS

JAPAN/BRAZIL RESEARCH COOPERATIVE PROGRAMME
JOINT COMMITTEE - VII MEETING
August 12, 1980

The Chairman oppened the 7th Meeting giving wellcome to the new staff members who have just arrived at CPAC. Dr. Sakurai made the introduction of Dr. Ogata, Dr. Abe, Dr. Sonku and Dr. Fukuhara. Also informed that the regular members of the Joint Committee will be Drs. Ogata and Abe. Dr. Helio Alves, Technical Director of EPAMIG, attended this meeting.

Dr. Sunaga expressed his thanks to EMBRAPA to the hospitality that was given to all the present members and expecting that the same will happen with the new members.

Dr. Ramalho talked about how important is the Research Cooperative Program to Brazil, EMBRAPA and CPAC.

Dr. Wenceslau made a brief explanation about the technical program which is going to be held by the new members and the counterparts of CPAC. Dr. Fukuhara said that there is a little difference from what was prepared in advance with same activities in soil science plus remote sensing. So, his duties are going to be detailed in the new future.

With reference to the training program, Dr. Ramalho explained that Dr. Eliseu Alves has problems to leave Brazil. A change was proposed also for Dr. Flamarion, formal President of EPAMIG, who can not go this year. The same occurs with the administratives who could only go next March. The documentation must be prepared as soon as possible. Dr. Helio promised to send the documents. The Japanese Embassy did not receive Dr. Marco Aurelio's documents yet.

As Brazilians have limitation on foreign travelling it is important to find out a way to guarantee the continuity of the training program, considering that JICA has already allocated money on the budget that has to be used.

The item IV of the Agenda was explained by Dr. Elmar Wagner, who said that the CPAC could begin working in Paracatu in next October, with experiments on soybean, fertility and, in February, with wheat. There is an agriculture technician from EPAMIG there, besides two japanese researchers. CPAC will give complete experiments to set up, besides the work on green manure and farming system that is being done by two japanese researchers working there.

Dr. Sunaga said that CPA-CAMPO is supposed to have some budget for research purpose.

The survey to collect information about the impact of socio-economic is missing on somebody. Also, may be CPA-CAMPO should allocate some money.

Dr. Wenceslau suggested that when the two agronomists come, they could put their experiments in Paracatu, preferentially then São Gotardo and Araxã. This suggestion was approved and details will be discussed later on.

A consultancy should be done to CPA-CAMPO, asking for the allocation of some budget.

About the V item of the Agenda - extension of Japan/Brazil Cooperation Program - the idea is to prepare a proposal for the extension of this cooperation. Dr. Sunaga suggested that a minute should be prepared and includedin this summary, justifying the extension of the Cerrado Project.

The Japanese Embassy is contacting CINGRA and SUBIN with respect forestation and horticulture as new projects.

Dr. Ramalho thanked the japanese team who is leaving Brazil and has colaborated very much with CPAC and all the region of Cerrados, as São Gotardo, Araxã, etc. He talked about the Japanese aid to the development of technologies and know-how to Brazil, thanking the material support with respect equipments and exchange in general.

Dr. Sakurai expressed his thanks to CPAC and EMBRAPA, talking about the good relationships among the staff.

Dr. Sunaga mentioned that is important to consider the grant of 5 cars to be preferentially used by the Japanese experts. This grant has received the approval from Government of Japan and needs also the approval from the Government of Brazil.

JICA's Head Quarter is awaiting for the approval of the grant. From EMBRAPA side, there is no limitation. At the Federal Government, according to the agreement, there are some facilities, for example, with respect taxes.

Dr. Sunaga said that if taxes will be difficult to be cut down, JICA does not mind; however, they need the formal approval through the Ministry of Agriculture and Itamaraty.

After the meeting, the members of the Joint Committee visited the central computer and the unity 3705, granted by JICA to the CPAC's terminal computer. After then, EMBRAPA offered a lunch to all the members of the Joint Committee.

For the next meeting, should be discussed the Japanese Research Bulletins.

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JAPAN/BRAZIL RESEARCH COOPERATIVE PROGRAM

JOINT COMMITTEE - VIII MEETING

The VIII meeting was held on the December 18th, 1980, at the Head Quarters of EMBRAPA.

At this meeting, we had the presence of the Japanese Guidance Team, with the assignments as follow:

- Mutsuo Ojima
- Manjiro Yamamoto
- Shigeyoshi Nishiwaki

Besides of the effective members of the Committee, the following persons have also participated:

- Hélio Andrade Alves
- Yoshihiko Sugai
- Morishige Ike
- Michikazu Fukuhara
- Kazunori Igita
- Toru Shimizu
- Ogibe Teixeira Carvalho Filho
- J.M. Pompeu Memória

Before following the agenda, Dr. Matsuo Ojima made some comments about the Project and the trip they made to Minas Gerais State.

I. Research activities for 1981/1982

It was decided to leave this item to the end of the meeting, as it is connected to the item IV as well as item V.

II. Short term consultants for 1980

Included in the Master Plan already approved is an Economic Analist (80) and Agricultural Machinery (80) and recently we are suggesting another one, in Agrometeorology. They should begin in next March.

Today other position is been asked by Dr. Ogata in Plant Disease in Stylosanthes. This fourth position is now under discussion for formal approval. Concerning CPAC Program, there is no problem. Dr. Sonku is requesting short term consultancy for disease classification in Stylosanthes, depending on JICA budget, it was approved for 1980 fiscal year.

III. Equipment and vehicles

Yesterday it was approved by the Foreign Affair authorities the donation of five vehicles from JICA to CPAC/EMBRAPA. In advance, the Chairman of the Joint Committee is going to prepare a letter announcing the result. Apparently it will include taxes because it was not requested.

Concerning equipments, Dr. Marchetti made some comments, saing that three deliveries were received. The fourth delivery, as far as we know, was also approved.

In all the deliveries, we have received equipments asked by the Japanese experts and Brazilian experts. The Japanese request was attended in total and only part of what was asked by the Brazilian experts.

Today, Dr. Marchetti is asking the Guidance Team to advise CPAC about the next delivery and he would like to have the strong participation of the Japanese experts in the selection and priorities for the last list, in order to be completed in February or March.

Dr. Ogata said that he understand the CPAC point of view, but also thinks that the need of equipments must follow the necessity of the Project. Dr. Ramalho said that the lists were prepared together with CPAC and JICA. In Japan, there are two barriers for final approval of the list

A suggestion was made by Dr. Wenceslau that this last list should have all the equipment which was not attended by the other three.

IV. Training program

The Chairman explained that Dr. Eliseu is planning to go next March, from Sunday to Sunday. Dr. Memória will go with him and stay beyond this time, to complete the special program as Senior Administration.

Dr. Flamarion is supposed to go in the begining of April

All the three applications are with CPAC and will be submitted as soon as possible.

The 1980 candidate from EPAMIG is Levi Ferreira, Entomologist from Uberaba. So, the three candidates for 1980 where Mello, in Soil Fertility, Ariovaldo Luchiari in Agrometeorology, and Levi Ferreira, in Entomology.

For 1981, there are five positions, four from CPAC and one from EPAMIG. The CPAC candidates are Milton Vargas, Gilson Cosenza, Juscelino Azevedo and Carlos Spehar. The Guidance Team suggested that the fifth candidate, from Minas Gerais, should be from PADAP (Cotia).

For 1982, computing the total number of 31 candidates, the areas Fertilizers, Plant Disease, Soil Fertility, Organic Matter, Remote Sensing, Agricultural Machinery, Drainage and one vacancy to EPAMIG, considering that all the Brazilian counterparts are included.

V. Research activities for 1981/1982

Dr. Ogata explained the out look of the research activities. The details are presented as follow, considering that the activities are divided in two parts, in CPAC and out reach:

a) at CPAC

1) Tamotsu Ogata and João Pereira - Management and conservation of soils - organic matter ; efficiency of nitrogen of gree manure for wheat at the Latosoil.

2) Yasuo Sonku and Maria José Charchar - Plant protection; Studies on Anthracnosis of Stylosanthes sp. in Cerrados; Forecasting on occurence of important disease for main crops introduced in Cerrados.
3) Noboru Abe and Gilson Cosenza - Plant protection; Study on the ecology of Elasmopalpus lignoselli of wheat and its control; Study on the ecology of soy bean sucking bugs and their control
4) Kazunori Igita and Carlos Roberto Spehar - Improvement of crop production; Effect of different spacing and fertility levels soybean varities; Resistance of soybean varities to insects in the Cerrados
5) Morishige Ike and Dimas Vital S.Resck - Management and conservation of soils; Effects of land utilization and tillage upon the soil physical properties and plant growth
6) Michikazu Fukuhara and Luiz Azevedo - Evaluation of natural and socio-economic resources of Cerrados; Application of remote sensing for survey of Cerrados

(2) RESEARCH WORK AT THE OTHER INSTITUTIONS

	NAME	UBERABA	PADAP	PATOS DE MINAS	EPAMIG	OTHERS
Leader Soil-Plant-Water relationship	Dr. Tomotsu Ogata	o	o	-	-	o
Plant pathology	Dr. Yasuo Sonku	o(M)	△	-	-	oo
Entomology	Dr. Noboru Abe	o(M)	o(M)	-	-	o(M)
Agronomy	Dr. Kazunori Igita	o(M)	o	o(M)	-	-
Agronomy	Dr. Morishige Ike	o	o(M)	-	-	(M)
Soil-Plant-Water relationship	Dr. Michikazu Fukuhara	-	(M)	-		o(M)

NOTE 1.

- ● Research work
- o Advice and guidance
- △ survey
- (M) Providing machinery and equipment

2. Themes will be decided after consulting with researchers of each institution
3. As to EPAMIG, experts on farm management and economic analysis and agricultural meteorology will advice and guide in each field
4. Advice and guidance will conducted at least twice a year

All the activities presented were approved by the Joint Committee.

VI. Research work at Paracatu Experimental Field

The Guidance Team, who visited Paracatu recently, gave to the Joint Committee their own impressions saying that, considering that is a new instalation, they already have two researchers living there. The research experiments seem to be OK in soil conservation, green manure and varieties trials, with the attendance of Dr. Medeiros with sorghum, soybean and wheat.

Paracatu Experimental Field is very good to test CPAC results. The difficulty is that they do not have good road facilities.

The Chairman explainde that he was very pleased to hear those impressions and said that, in the future, EPAMIG will be more involved in the Program in Paracatu.

VII. Building as new laboratory facilities

The present contract is to complete research offices, laboratories, seed preparation, fertilizer preparation and machinery in general, with 11.000 m^2, will be made by June/July.

The second fase is going to be completed by the end of 1982, including library, auditorium, administration, restaurant, remote sensing, computer, pesticides, etc.

As we have the architecture projects and budget for 1981 and 1982, we believe that now is a question of physical conditions to build everything and to finish the constructions.

The Guidance Team made some comments on the progress of the building program of EMBRAPA.

With respect to the transfer of the equipment to the new installations, Dr. Marchetti explained that there are some representatives of Japanese manufacturers in Brazil, but even so some help is going to be needed. At these moment, the problem is with the scanning microscope. Somebody from Japan should come soon. The others should come by July.

VIII. Others

Coming back to short term consultancy, as the four positions are supposed to be 1980 fiscal year, the Guidance Team suggested two short term consultants for 1981 (Biological control and Soil physics). For 1982 one is Radioisotope in soil chemistry is been proposed, considering that the laboratory rooms are going to be ready in July, and the equipment is been asked by now.

Through the Agreement some exchange of informations and seeds are considered. The Guidance Team asked to implement more and more the exchange.

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JAPAN/BRAZIL TECHNICAL COOPERATION PROGRAM

JOINT COMMITTEE - IX MEETING

EMBRAPA, March 25, 1981

The IX meeting was held on the March 25th, 1981, at the Head Quarter of EMBRAPA.

Besides of the effective members of the Committee, the following persons have also participated:

.Carlos Alberto de Azevedo Pimentel - Counsellor, DCOPT/Itamaraty

.Garry Soares de Lima - Coordinator, CTRE/Itamaraty

.Eliana Maria Martins Ferreira - Director, DRI/CINGRA

.Toru Shimizu - Secretary, Japanese Embassy

.Yasuo Sonku - Japanese expert

The Chairman oppened the meeting, introducing all the participants.

1. General Program Presentation

Dr. Elmar Wagner made a general presentation about long term consultancies, short term consultancies, the training program and the equipment situation.

Mr. Garry made some comments about the importation and or donation of equipment which can be produced locally and explained that the Brazilian Government wants to avoid the importation of such equipment or material.

Dr. Flamarion Ferreira, speaking for EPAMIG, gave a brief report on the Technical Cooperation, saying that they are very pleased with the assistance and hope it will continue.

2. Next list of equipment

Dr. Ogata explained the items of the next equipment list, speaking as follows:

As this is the last equipment list of the present agreement, it was reviewed very carefully, in order to cover the needs of the research program. The list was made by the researchers of CPAC and EPAMIG together with the Japanese experts, considering the following aspects:

a) They selected the equipment which had already been asked for but not delivered.

b) Preference was given to repair parts and articles of consumption for equipment already received in the previous deliveries

c) The end of the constructions of CPAC, especially the laboratories, will permit the installation of the equipment which has been excluded in the previous lists, and included in the present one.

d) This proposal also contemplates the inclusion of some equipment in the order to cover EPAMIG's needs.

In the end, he said that although the situation of the present budget seems to be stiff to satisfaction for this requirement, he will make an effort to fill the list as much as possible.

As for articles of the list, Mr. Garry questioned about color film and plastic plate, saying that as they are produced in Brazil, they should not be donated from Japan, according to the arrangement.

Dr. Ogata and Dr. Abe answered to this question, explaining that there is a problem with the quality of these films for specific equipment, such as the electron scanning microscope and that about the plastic materials, they are the special cylinders for breeding some insects, not for common use.

Furthermore, both Mr. Garry and Mr. Cavalcanti stressed the importance of obaying the arrangement at the listing the equipment and material and required the check on the list by CINGRA and SUBIN.

Mr. Shimizu explained the procedure for processing the request for equipment in cooperative agreement and said that before being presented on this Committee the complete of checking the list by CINGRA and SUBIN, in case of need, is desired, because the sending of the list directly to JICA from this Joint Committee is approved.

3. Technical Report in Portuguese

Although the Technical Report of former Japanese expert's team in Portuguese had not been ready, because of delayed work at the printers, Dr. Wenceslau explained its content breafly, giving an high evaluation to its contribution for the development of agriculture in Cerrados. Furthermore, he introduced the research works of present team both in CPAC and out of CPAC, being continued and developed from these former achievements.

The copies of the report will be distributed to the Joint Committee members and guests as soon as it is ready.

Mr. Cavalcanti asked Dr. Ogata to comment about absorption of research method and techniques by the Brazilian counterparts. Dr. Ogata answered this question saying that 'The Technical Transplantation' at the research work seems likely not to be so simple as the teaching only the method of using some equipment. At the research work, many aspects should be contained, such as the getting the problems to be solved from some field, building up the theme of studies, making experimental methods and schedules and evaluating the results obtained.

So the research work needs many scientific and practical experiences and information. The Japanese experts and their counterparts are conducting their work by the way of so called 'give and take', sahirring their technology and information each other and make effort together to aim their common objection, overcoming the barrier of the language.

Dr. Abe in his relationship with his counterpart, Dr. Gilson Cosenza, had experience in transfer technology to local technicians in these aspects.

4. Extension of Cooperative Project

With respect to the possible extension of the program, Dr. Ramalho said that even though good results have been gotten to date, using the example of antracnosis, which has started, but was not finished.

Dr. Elmar said it is the opinion of CPAC that (1) we will have equipment to put in operation, (2) many jobs are still in process, (3) there has been a concentration within CPAC and it would be desirable also to extend more in the region which would suggest an extension.

Dr. Ogata said that any further obligation now would be premature since the general evaluation has not been completed.

But he personally recommended an extension of the arrangement since the Cerrados represent a very large area, while the participation of the Japanese team had began to understand the Cerrados environment, and general development of the Cerrados had been just now starting, so would be very crucial to have the right assistance.

Dr. Ramalho said that Brazil is the only part of the world which is using savannas.

The idea or intention for extending the Project is on the table to be discussed. As an intention it is approved.

5. Invited Entities Recommendations

Some invited instructions represented some comments. Namely, Dr. Ramalho talked about the agricultural ocupation of the Cerrados and the technology that is being developed by EMBRAPA/CPAC. Brazil is a pioneer in the development of technology for savanna like Cerrados. It is noted with satisfaction that through this cooperation, the problem is being treated. The need of review the equipment lists keeping in mind similarity of locally made equipment was reemphasized.

Finally, on the subject of extension, CINGRA will wait for the finished report and proposal clarifying the necessity for the project.

Mr. Garry, from SUBIN, is going to analyse the subject, considering the priorities of the Ministry of Agriculture.

6. Others

In the item 'Others', Dr. Flamarion, from EPAMIG, mentioned some aspects that he considers basic:

1) We know that Japan can not transfer technology of Cerrados agriculture for Brazil, since it does not have Cerrados.
2) He said that the most important thing is the methodology.
3) The possibility of training young Brazilian researchers is great.
4) We are taking advantage of the experience of the Japanese team.

5) In terms of crops, livestock and the agroindustry, this is the position of the Brazilian Government.
6) It is feld that rural engineering and research and development of agricultural machinery and equipment are important for EPAMIG.
7) A serious evaluation of the extension would be very useful and he would like that EPAMIG could express its opinion not just in the length of the extension, but also in the areas and lines of work, consulting its necessities.

The participants were invited to lunch at the Japanese Embassy.

JAPAN/BRAZIL TECHNICAL COOPERATION PROGRAM

JOINT COMMITTEE - X MEETING

EMBRAPA, March 22nd, 1982

SUMMARY

The 10th Meeting was held on March 22nd., 1982, at EMBRAPA.

In addition to the members of the Committee, the following people also participated:

- Morishige Ike
- Mikio Habu
- Kazunori Igita
- Michikazu Fukuhara
- Yasuo Sonku
- Yoshihiko Sugai
- Tsunehiko Kisaka
- Silvio de M. Carvalho

I. Opening the sessions, the Chairman presented the two new members, Dr. Edson Lobato and Dr. Luiz Cēsar Guedes.

Dr. Ramalho talked about the potential of the Cerrados and gave a brief idea about the Irrigation Program for one million hectares - PROFIR.

II. Dr. Lobato talked about the activities of the Japanese long term consultants staff (six experts) and their specialities and area of research.

Dr. Ogata explained that in 1981, four specialists arrived to work in the areas of Plant Pathology, Remote Sensing, Biological Control and Soil Physics.

For 1982, 5 specialists are programmed to work at CPAC in Soil/plant relationship, water metabolism of plant, drainage, agrometeorology and

technician in equipment maintenance.

Dr. Ramalho expressed his opinion saying that those experts are coming at a good time considering the emphasis placed on water management.

III. Training program:

Four positions have been proposed to receive specialization training in Japan. The following names, duration and specialities are given:

- Milton Vargas - 3 months - soil biology
- Eduardo Reis - 3 months - drainage
- Y. Sugai - 4 weeks - agron. economics
- Tanaka - 6 months - soil fertility

IV. Equipment

The final delivery is mainly concentrated in spare parts and articles of consumption. Since it has taken a long time to be delivered, it is expected that those parts will arrive in the beginning of the next year (1981 budget).

In terms of the 1982 budget (US$ 87,000) the Japanese counterpart explained that in case the agreement is not extended beyond the present terminal date, most of the budget will be utilized for accessory parts and other materials. In case an extension is approved, the additional budget would be US$ 130,000 and would include equipment for the second phase and more accessories.

V. Extension of the Project

Concerning the extension of the Project, Dr. Wagner explained the following:

a) We reduced by half the request for equipment, because in the 2nd phase we must complete settling up the laboratories which has not been completed.

b) We made an adjustment in the disciplines in accord with the General Agreement.

c) We proposed 5 years, however the idea is to reduce it to 4 years. The present staff would stay for 1 more year and the new staff would stay for 3 years.

Dr. Ogata said that during past one year, two evaluation teams visited the Project, Dr. Ozaki (Mission Leader) came with the 1st. group to collect data which would serve as a basis to study the extension of the project, Dr. Matsuyama (Director of JICA) was with the second group and stayed here 1 day. The objective was to review 6 projects in South America and to verify the administrative problems of the projects. The general impression of both missions was very good and the technical level of the activities was considered high.

They visited the Cerrados and found rapid progress being made in the region with important research of accompaning the development.

It is fundamental, however, to emphasize research, which is the main interest to continue with the technical collaboration project, which has been satisfactory to date. Because of this, the Japanese Government is receptive to the proposal.

Particularly, Dr. Ogata wanted to give his impression after participating in the Leaders Meeting in Paraguay, in February.

With respect to the general budget, based on 1982, no sector received any increase, except International Cooperation which was increased by 8 percent with important alocations, such that the number of projects are increasing (South America, China, Asia and Africa). The Ministry of Finance, a strong power of decision, is not accepting new projects, insisting that these projects which have fixed dates to be terminated. This is a problem.

In spite of this pressure from the Ministry of Finance, the two mission insisted in the maintenance and extension of the agreement with the Cerrados. In this case, the content of the extension would be very rigid especially in relation to maintaining specialists here..

Dr. Ramalho made some conclusions:

a) We have a good proposal, with good arguments.

b) There is a reduction in the general budget.

c) The proposal is already in the Itamaraty for official consideration.

Dr. Abe asked if the approval of the proposal is with or without restrictions. The chairman answered that there had not been any restrictions.

Dr. Umetani asked who is in charge in Itamaraty and Dr. Silvio

Carvalho answered that the person in charge is Dr. Paulo Roberto. Dr. Umetani also said that the amounts of the budget were not exact, but general estimates.

Mr. Kisaka, substituting for Mr. Shimizu as observer, asked if a meeting between the two Governments would be included in the agenda. He answered afirmative. The Joint Meeting Japan/Brazil will coincide with the arrival of the Third Mission for the Cerrados.

Mr. Kisaka observed that the extension, not yet signed, receive, from both Governments, a demonstration of interest. He suggested that the content should be made more clear and in more detail.

Dr. Ogata agreed with his suggestion and added that the disciplines should be listed, in order of priority with definite time frame.

There was a general concern about the channels of diplomatic approval. The necessary adjustments and doubts could be discussed in the next meeting.

Dr. Ramalho said that the details should be discussed later, during the next Mission visit, considering that everything has been done closely between Japanese and Brazilians.

Dr. Abe explained that, for example, his own field, Entomology, is closely associated with that of Dr. Gilson Cosenza. The research that they are doing at CPAC is very important. Dr. Abe is now conducting research work at CPAC and at Paracatu, which is rather difficult. The idea is to concentrate the work more at CPAC.

According to the Chairman, the idea is to give more experience in this kind of collaborative work.

Dr. Edson made a comment saying that in plant protection we must use the Commodity Centers of EMBRAPA, otherwise we could not support all the needs at CPAC. This interaction is extremely necessary through program meetings.

Dr. Ramalho ended the meeting by expressing his hope that the cooperation with JICA would be reniewed.

/akn.

事務連絡

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国際協力事業団
農業開発協力部長 殿

プロジェクト「ブラジル農業研究協力事業」
リーダー名 尾形 保

件名 第11回合同会議（Joint Committee, J/C）の報告書

日時：1982年7月16日（金）9:40～11:45
場所：CPAC 会議室
出席者：議長 José Ramalho（EMBRAPA 理事）
委員：伯国側 Elmar Wagner（CPAC所長）
Edson Lobato（CPAC副所長）
Luiz Cézar Guedes（CPAC副所長）
日本側 尾形 保（団長）
阿部 登（研究員代表）
梅谷重夫（JICA代表）
評価ミッション：山下鏡一（団長），高沢 寛
岩田岩保，守中 正，石塚幸寿
オブザーバー：門脇書記官（日本大使館），猪工弥寿雄，
果儀田和典，池昭重，土生鋭夫，古畑哲，桜谷哲夫
安藤忠男（以上専門家），Amadeu Sérgio Bandieri（SUBIN）
Luiz Gonzaga Soares Dutra Neto（CINGRA），Carlos Moyses Andreotti（EMBRAPA），山口（日本大使館通訳）

議題：評価ミッションによる「ブラジル農業研究協力事業」評価報告

今回は本事業の終結を目前にして，事業の成果を調査・評価するために来伯した調査団の報告会をJ/C主催で行ったものである。

報告内容は別紙英文報告書にまとめられているので省略するが短時間のうちに本報告書を作成したミッションメンバーの努力は日・伯双方より高く評価されていた。特に伯側には日本人の真しな態度が本事業推進に対する熱意の現われとして好印象を与えたように思える。

議事は山下団長の約1時間にわたる内容説明のあと、議長、SUBIN、CINGRA、Wagner、Edson5から二三の感想や質問希望などが出されたが全体として報告書の内容についてもほぼ満足した感じが窺われた。以下発言の主な事項を記す

- SUBIN：本事業で日本側が支出した費用を供与機材費だけでなく全費目についてリストアップして欲しい（伯側は供与機材費を全費用の30%を越えないことを目標にしている）。成果の報告をポ語印刷物で出すことを高く評価。
- CINGRA：延長になった場合の内容等の正式決定について。
- Wagner：3ケ年の延長の場合の長期専門家の在伯期限は小間切れでなく同一人が3ケ年は欲しい。テクニコの技術研修も積極的に考慮して貰いたい。
- 議長：このプロジェクトは日伯農業開発協力事業の推進と不可分のもの。である。長期的視点の下に見て欲しい。本プロジェクトの推進には日本大使館、SUBIN、CINGRA伯国外務省など多くの関係機関の協力、援助もまた大きく貢献してきたことに感謝する。

—以上—

EMBRAPA
EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA
CENTRO DE PESQUISA AGROPECUÁRIA DOS CERRADOS

C.CIRC. CPAC. 739/82 Brasília 11 de agosto de 1982.

Ilmo. Sr.
Dr. KEIICHI YAMASHITA
Líder e pesquisador Governo e Líder da Missão

Servimo-nos da presente para encaminhar a V.Sa o resumo da Reunião do Joint-Committee, realizada em 16 de julho do corrente, no CPAC.

Colhemos o ensejo para enviar-lhe nossas

Cordiais Saudações,

Elmar Wagner

Anexo: (01)

casl/

EMBRAPA
EMPRESA BRASILEIRA DE PESQUISA AGROPECUARIA
CENTRO DE PESQUISA AGROPECUÁRIA DOS CERRADOS

PROGRAMA DE COOPERAÇÃO TÉCNICA BRASIL/JAPÃO

JOINT COMMITTEE - XI REUNIÃO

CPAC, 16 de julho de 1982

R E S U M O

O Presidente do Joint-Committee, Dr. José Ramalho, abriu a reunião falando sobre a importância do Acordo e do assunto a ser discutido: "Ávaliação do Programa de Cooperação", na opinião desta última Missão Japonesa.

O Dr. Yamashita, Líder da Missão, expressou sua satisfação em poder contribuir para a cooperação em execução, aumentando o bom relacionamento entre nossos países, contribuindo com o desenvolvimento agrícola dos Cerrados.

O sumário distribuído foi elaborado por esta última Missão, não estando completo devido à exiguidade de tempo.

O Dr. Yamashita passou então a relatar diretamente, a partir da pg. 4 do relatório, expressando os objetivos, os métodos de avaliação, manifestando a opinião de que os resultados até agora foram altamente satisfatórios. A conclusão, constante do Relatório, qualifica todo o desempenho como altamente satisfatório, dizendo que há necessidade de continuarmos com a cooperação

para que se assegure o pleno sucesso do Projeto. Conseqüentemente, a Missão irá recomendar a prorrogação do Acordo, pelo menos por mais três anos.

O Dr. Ramalho perguntou onde se situa o problema de comunicação e como se poderia melhorar. Foi respondido que é um processo evolutivo que, com a continuação do entrosamento, não se constituirá no maior problema.

Com relação ao equipamento destinado ao PADAP, foi esclarecido que a EPAMIG consta do "General Agreement" e que já foram enviados os equipamentos para lá destinados. O restante do equipamento deverá chegar brevemente e será imediatamente enviado.

Dr. Amadeu Bandieri, representante da SUBIN, fez um agradecimento e reconheceu a importância da avaliação, dada a prioridade do Projeto Cerrados. Pediu que os recursos fossem divididos em três sub-ítens: a) Peritos; b) Treinamento e c) Equipamentos. Aproveitou também para se congratular pelo fato de terem surgido publicações em português.

Dr. Luiz Gonzaga Soares Neto, representante da CINGRA, mencionou a recomendação de que, para que se possa ter um controle, necessitariam ter em mãos a documentação de origem: i) o Acordo; ii) Ajuste Complementar e iii) agora a renovação.

Foram levantados três pontos carentes, além da comunicação.

a) a dificuldade inicial do primeiro Staff Japonês;

b) demora da construção dos edifícios, dificultando o uso dos equipamentos;

c) dificuldades de locomoção (veículos)

Dr. Elmar lembrou que, em reunião recentemente promovida, o Dr. Ogata levantou a necessidade de se proceder a um programa de treinamento de nível médio, que é o pessoal que utiliza e manipula os equipamentos nos Laboratórios.

Finalmente, quanto ao prazo recomendado de no mínimo 3 anos, disse que já foi feita uma observação quanto à composição do staff permanente ou de longo-prazo, de acordo com a duração do Convênio

a) se de 5 anos - 2 equipes de 2 1/2 anos cada;

b) se de 4 anos - 2 equipes de 2 anos cada;

c) se de 3 anos - 1 só equipe pelo período do Acordo renovado.

Quanto ao prazo de prorrogação, não é praxe do Japão prorrogar por 5 anos. Dois, no máximo três anos seria o normal.

Aos peritos de curto prazo que entram pelo Rio de Janeiro têm sido cobrado impostos. A próxima reunião conjunta deveria tratar do assunto.

EMBRAPA - CPAC

O Dr. Edson perguntou se os ítens 1, 2 e3 da pag. 8 (final) são prioritários. Foi esclarecido que são complementares.

O Dr. Ramalho, antes de encerrar a reunião, manifestou estar muito satisfeito com o resultado da presente Missão. Disse que todo o processo de cooperação tem agido com muita franqueza para a obtenção de resultados e pleno êxito.

A EMBRAPA está muito satisfeita com essa cooperação, ressaltando o trabalho do CPAC em base também a esse tipo de colaboração. Outro ponto é que esse Programa constitui uma parte importante do Acordo Brasil/Japão, no desenvolvimento dos Cerrados, estando integrado aos demais segmentos, como p. ex. CPA-Campo.

Lembrou que uma variedade de soja leva o nome DOKO.

Todo o Programa tem sido possível graças a várias instituições,Embaixada Japão, CINGRA, SUBIN e Itamarati que tem participado ativamente para a consecução do Projeto.

Finalmente agradeceu todo o empenho da Missão e desejou feliz regresso ao Japão.

EMBRAPA - CPAC

RELAÇÃO DOS PARTICIPANTES

1. Dr. Keiichi Yamashita - Líder e pesquisador do governo
   Dr. Iwaho Iwata - Chefe de Laboratório - MAFF
   Dr. Tadashi Morinaka - Chefe do laboratório de Doenças de Fungo
   Mr. Hiroshi Takazawa - Diretor Adjunto - Administração
   Mr. Yukihisa Ishizuka - Coordenador - Cooperação Técnica - JICA
   Dr. Amadeu Sérgio Bandieri - Coordenador Assessor Cooperação Técnica do Exterior - SUBIN
   Dr. Luiz Gonzaga Soares Dutra Neto - Assessor Técnico - CINGRA
   Dr. Carlos Moyses Andreotti - Assessor ACI/EMBRAPA
   Dr. Tamotsu Ogata - Líder dos(Consultores)Japoneses CPAC - 'Team Leader'
   Dr. Noboru Abe - CPAC
   Dr. Elmar Wagner - Chefe CPAC
   Dr. José Ramalho - Diretor EMBRAPA
   Dr. Edson Lobato - Chefe Adjunto Técnico - CPAC
   Dr. Luiz Cézar Guedes -Chefe Adjunto Apoio - CPAC

（参考資料　8 ）

CPACの予算

1976-1983

項目 / 年	インフレ率	人件費	増加率 (%)	事業費	増加率 (%)	工事	増加率 (%)	その他の経費	増加率 (%)	合計	増加率 (%)
1976	46.3	14,850	-	13,135	-	2,118	-	3,333	-	33,436	-
1977	38.6	22,312	50.25	15,054	14.61	650	(-)	7,653	129 61	45,669	36.59
1978	40.8	43,881	96.67	28,747	90 96	5,845	-	14,490	89.34	92,963	103.56
1979	77.2	82,368	87.71	40,292	40.16	37,775	-	7,629	(52 65)	168,064	80.79
1980	110.2	174,800	112.22	70,103	73.99	924	-	4,982	(34.70)	250,809	49.23
1981	95.2	363,700	108 07	128,071	82 69	155,395	-	33,353	569.47	680,519	171.33
1982	98.7	835,682	129.77	243,226	89.91	227,295	-	83,700	150.95	1,389,903	104.24
1983		1,793,227	114.58	457,384	88.05	6,275	-	133,261	59.21	2,390,147	71.97

FONTE : Setor da Analise-CPAC

ABRIL/83

（参考資料　9）

ＣＰＡＣ概要及び新館見取図

（含協力機関概要）

RESEARCH PROGRAM

The research program at CPAC is oriented towards resolving the problems of agriculture in the Cerrados In this context, three major research projects have been formulated:

1. Evaluation of natural and socio-economic resources - the basic approach is to put together the necessary knowledge to make better use of the natural resources of the Cerrados for agricultural purposes With a series of surveys it will be possible to classify the area according to its land use potential and suitability for the different levels of technology The surveys will include soils, native vegetation, climate, location of water and mineral resources for agricultural use, rural properties and markets

2. Utilization of soil/climate/plant resources - the aim of this project is to solve or overcome the problems which make agricultural development difficult in the Cerrados. Essentially, the limiting factors are low natural soil fertility, irregular rainfall distribution, poor adaptation of crop species and cultivars, and erosion. The low soil fertility results primarily from the phosphorus fixation capacity, aluminum toxicity and general nutrient deficiency.

3. Development of management systems - the strategy of this project is to improve the traditional methods and develop new farming systems in the Cerrados at farm level Priority is given to the following commodities maize, beans, sorghum, soybeans, wheat, cassava, eucalyptus, pinus, mangoes, citrus, coffee, pasture and beef production.

FUNCTIONAL STRUCTURE

At CPAC, there are three basic areas of administration:

Directorate: Advisory board, director and associate directors

Technical: Coordination of projects, diffusion of technology, training, statistical analysis and economic evaluation.

Support: Coordination of documentation and information, laboratories, experimental fields and general support services.

A multidisciplinary team conducts research in the areas of genetics, plant pathology, entomology, agroclimatology, soils, ecology, plant physiology, soil microbiology, crop agronomy, fruitculture, economics, forestry, pasture and animal production.

CERRADOS AGRICULTURAL RESEARCH CENTER

SETTLEMENT AND DEVELOPMENT OF THE CERRADOS REGION

Exhaustion of fertility in the arable lands around the former forested areas of Southern Brazil has been primarily responsible for the start of agricultural development of the Center-West region of the country. Original settlement in this area was concentrated in the more fertile forest areas of the Paraná-Paraguai, Tocantins-Araguaia basins and the pre-Amazonian basin of the State of Mato Grosso. The recent construction of the Federal capital of Brasília in this region has accelerated development and led to large-scale human migration from North and Northeast of Brazil.

The Cerrados region is extremely important to the economy of Brazil. It occupies 180 million hectares (21 per cent of the national territory) of which 50 million hectares are potentially suitable for arable crop production. The Cerrados region carries 36 per cent of the bovine population of Brazil, 24 per cent of the swine population and 36 per cent of the equine population. Rice is sown on 48 per cent of the cultivated land, which yield 39,7 per cent of national production. Corresponding figures for corn are 19 and 16 per cent, respectively, and for beans 20,4 and 18,3 per cent, respectively.

Despite the enormous natural resources, the Cerrados region has still hitherto been little exploited. The principal limitation to agricultural production has been the low natural soil fertility, inadequate for the development of an intensive agriculture. However, this difficulty can be overcome by diversification of crop production and the introduction of modern technology. In addition, it will be necessary to solve other important problems, notably water stress during dry periods, pest and disease control, soil erosion, and lack of knowledge of suitable farming systems.

A SPECIALIZED CENTER

In accordance with the directives of Government, which considers development of the region a major priority, the Brazilian Agriculture Research Enterprise (EMBRAPA) created the Cerrados Agricultural Research Center (CPAC). The objective of the Center is to coordinate and promote the necessary research for the profitable and permanent utilization of the natural resources of the region.

The Center collaborates with other research units, state extension services, universities, private enterprises, regional organizations, international and foreign institutions to avoid unnecessary duplication of effort. Research is not only conducted at and in the immediate vicinity of CPAC, but also in other ecological areas of the Cerrados.

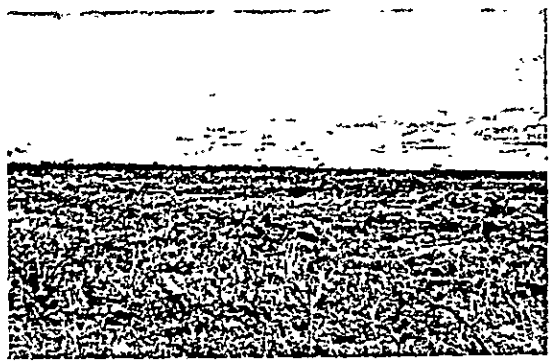
THE POLOCENTRO PROGRAM

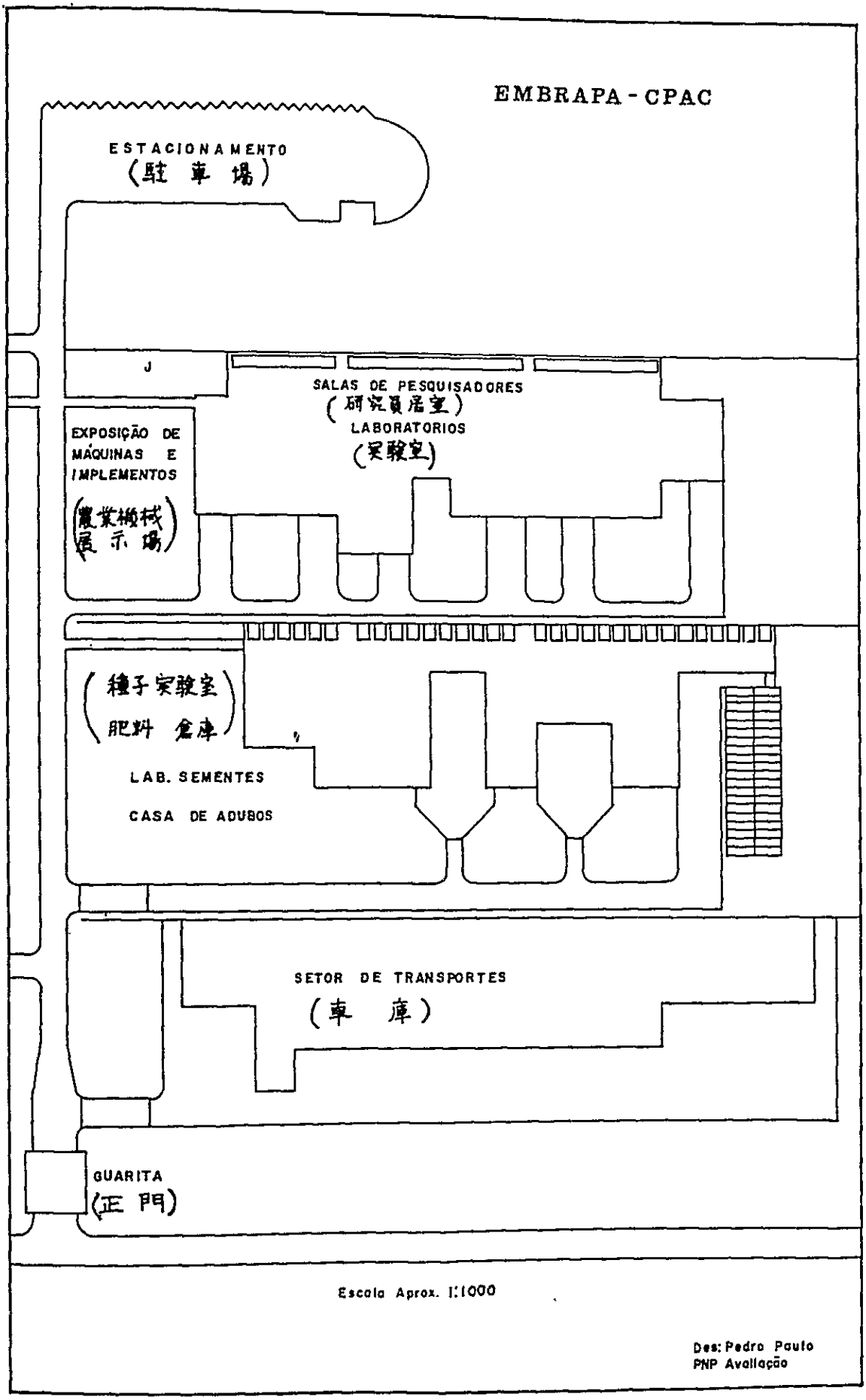
During the 1970's the Federal Government created POLOCENTRO, a program for the development of the Cerrados. The main objective of this program was not only to encourage settlement of the region, but also to create the best conditions for integrated development. Agroforestry research and agricultural extension were promoted, oriented rural credit allocated and basic infra-structure developed in support of production. From 1975 to 1979, 2 million ha were brought into agricultural production; 280,000 ha were planted or replanted to forestry; storage capacity for 262,000 ton of grain was built; 2,203 km of road constructed and 1,213 km of electricity lines were installed.

LOCALIZATION

The Center is located at Planaltina in the Federal District (at km 18 on the BR-020 highway). The Federal District and surrounding areas are typical of greater part of the Cerrados. Brasília is situated at the geographical center of the Cerrados region and constitutes a focus for development of that region.

The Center has 3,500 ha of land, 5,000 m^2 of buildings and approximately 3,000 m of open canals allowing irrigation of a 200 ha area. The buildings consist of a library, glasshouses, seed and fertilizer stores, plant nurseries and laboratories for soil fertility, soil physics, plant physiology, plant pathology, animal nutrition, entomology, nematology, microbiology and photography.




EMBRAPA - CPAC
ESTACIONAMENTO
(駐 車 場)
J
SALAS DE PESQUISADORES
(研究員居室)
LABORATORIOS
(実験室)
EXPOSIÇÃO DE MÁQUINAS E IMPLEMENTOS
(農業機械展示場)
(種子実験室
肥料 倉庫)
LAB. SEMENTES
CASA DE ADUBOS
SETOR DE TRANSPORTES
(車 庫)
GUARITA
(正 門)
Escala Aprox. 1:1000
Des: Pedro Paulo
PNP Avaliação

CERRADO AGRICULTURAL RESEARCH CENTER: A NEW INSTITUTION FOR THE DEVELOPMENT OF THE SAVANNAS OF BRAZIL[1/]

Wenceslau Goedert[2/]
Empresa Brasileira de Pesquisa Agropecuaria

Brazil has an immense area of tropical savannas which are called the Cerrado. The Cerrado region occupies approximately two million square kilometers, or 20 percent of Brazil's territory. Approximately 70 percent of this area is located in the states of Goiás, Mato Grosso and Minas Gerais in the central part of the country. The flat or gently undulating topography favors the use of mechanization.

Despite its favorable topography and climate, agricultural development in the Cerrado has been limited. The main obstacle to agricultural production is the low soil fertility of the highly weathered Oxisols which is inadequate for the primitive management systems. However, for certain crops this problem may be surpassed by technological inputs into management systems with strong capital investment. There is also a need to solve the problems of water shortage, adaptation of crops used and pest and disease controls, among others.

In central Brazil alone the use of advanced techniques should introduce 50 million hectares of Cerrado land into agricultural production. The development of this land should be benefited by the transportation and other facilities provided for the center of the country where Brasilia and other important urban areas are located.

[1/] Paper presented at the Meeting of Savanna Soils of Africa and their Management, sponsored by Commissions I, IV, V, VI of the International Society of Soil Science, Accra, Ghana, November 20-December 6, 1975.

[2/] Associate Director, Centro de Pesquisa Agropecuaria dos Cerrados - EMBRAPA, Km 18/BR-20, Caixa Postal 07-0084, Brasilia, D. F., Brazil.

For an adequate and orderly occupation of the Cerrados in the states of Goiás, Mato Grosso and Minas Gerais, the federal government established the Program for the Development of the Cerrados (POLOCENTRO). Investments are estimated in the order of Cr.$2 billion ($250 million U.S.) for the period of 1975-1977 with an additional global resource of Cr.$10 billion ($1.25 billion U.S.) for the next three years. POLOCENTRO will strengthen the infra-structure by building roads, electrical plants, financing research, extension, technical assistance and supervised rural credit.

According to the Second National Development Plan which considers the development of the Cerrado a priority, EMBRAPA, the national agricultural research organization, created in 1975 the Center for Agricultural Research of the Cerrados (CPAC), with headquarters 40 km north of Brasilia. This center has the responsibility of coordinating and promoting the research necessary for developing the natural resources of the Cerrado.

Objectives.

The Cerrado Center plans to develop production systems which will provide a lucrative and permanent utilization of the natural resources in the area. The principal objectives are:

1. Evaluation of the natural resources in the Cerrado for agricultural development.
2. Identification and quantification of factors which may limit this development.
3. Research with the objective of controlling or eliminating the effects of the limiting factors.
4. Development of agricultural systems which are adequate for the different Cerrado regions.
5. Development of guidelines to permit an orderly and gradual occupation of the Cerrado region.

6. Dissemina ion of results by means of technical-scientific publications and other methods.
7. Collaboration in the training of research and extension personnel for the Cerrado area.

Location and Description

The CPAC headquarters are located in the north-central portion of the Federal District, on the 18th kilometer of highway BR-020, between the satellite cities of Sobradinho and Planaltina. It has approximately 1,600 hectares with a semi detailed soil survey, 5,000 square meters of facilities and approximately 3,000 meters of open canals allowing the irrigation of 200 ha.

The Federal District and the surrounding areas included provide most of the Cerrado physiognomic types whose potential should be studied. In addition to being the regional development center, Brasilia is also situated in the geographic center of the Cerrado area.

Organization.

Characterized by a large concentration of human and financial resources for the studies on Cerrado development, the structure of the Cerrado Center is composed of three basic sectors:

1. Administrative Sector: Director, Associate Directors, Advisory councils, administrative apparatus.
2. Technical Sector: Project Coordinators, Systems Coordination of Satellite Activities of Dissemination of Technology and Training.
3. Support Sector: Coordination of Documentation and Information, Administration, Laboratories, Field Experiments, and Supporting Services.

In addition to the programs which will be developed in the CPAC experimental areas and its surroundings, satellite activities in the Cerrado regions with different ecological conditions will also be promoted.

The technical staff is multidisciplinary, encompassing plant breeding, plant pathology, entomology, agroclimatology, soil chemistry, soil physics, soil fertility, ecology, plant physiology, microbiology, cultural practices, technological dissemination, hydrology, pedology, geology, botany, forages, animal nutrition, animal management, animal reproduction and veterinary science, fruitculture and forestry engineering.

Research Program.

The program will be dynamic and flexible, conforming to the problems which limit the use of the Cerrado for agricultural activities. Initially, it shall consist of three projects:

1. Inventory of the Natural and Socio-Economical Resources: The basic objective is to obtain the necessary information to improve the utilization of the resources for agriculture. The surveys will enable a zoning of the area according to their potential use as a function of different levels of technology. The surveys will involve, among others, soils, vegetation, climate, hydrological resources, market inputs, mineral resources pertinent to agriculture, present farming systems and farm structures.

2. Use of the Soil-Climate-Plant Resources: The research in this program will try to solve or bypass the basic factors which limit the agricultural utilization of the Cerrados. Essentially, these factors are: low natural soil fertility, lack of water and lack of adaptation of the various species and varieties of crops and grasses.

3. Development of Production Systems: This project will try to improve the current production systems used in the Cerrados. The strategy consists of developing and comparing potential agricultural systems for a region by means of research at the local level. In this project the priorities will be on rice, beans, corn, sorghum, soybeans, wheat, peanuts, cassava, eucalyptus, citrus,

pineapples and cattle. The specific problems of each system will be studied jointly with the Commodity Centers of EMBRAPA.

Cooperation with Other Institutions.

The problems facing the Cerrado are also common to other regions. The Cerrado Center, therefore, wishes to collaborate with other institutions having mutual interests. Within Brazil, the Center will work closely together with the other national research centers of EMBRAPA and the state research institutions and universities. In the soils area the Center has been working together with North Carolina State University and Cornell University on a cooperative program for soil management in the region. The Center wishes to invite other institutions and individuals concerned with the agricultural research in tropical savannas to collaborate in solving these important problems.

本プロジェクト開始前の関係研究機関の概要は次のとおりである。

1) セラード農業研究センター（CPAC）

EMBRAPAの組織モデル及びCPAC設立計画に基づき1974年に前の国立畜産研究センターを改組のうえ設立されたものである。本場は，ブラジリア連邦区の北約40Kmの衛星都市Planaltina市とSobradinho市の中間に位置しており，1600haの圃場と5,000m^2の施設を有している。なお，このうち200haはかんがい施設が整っている。

このセンターの主要な設置目的は，①農業開発のためのセラードの天然資源評価 ②開発を制限する要因の解明 ③この制限因子をコントロール又は活用するための研究 ④セラードの異った区域ごとに適用される農業システムの開発 ⑤セラードの開発の指針となるガイドラインの開発 ⑥科学的技術の普及 ⑦セラード地域のための研究者及び普及員の教育訓練等であり，次図の機構を有している。

この機構のもとに研究が実施されるが，特徴的なことは，前述したように研究分野ごとの組織は設置されず，設定されたテーマないしプロジェクトに対し関係分野の研究者をもって複合チームを形成し，これが一体となって1つの問題解決がなされるまで研究遂行を集中するというシステムをとっていることである。CPAC計画では当面の研究プロジェクトとして，①セラードにおける自然的，社会経済的資源の目録化 ②土壌，気象植物資源の利用 ③生産システムの開発及び完成の3つが設定されており，このそれぞれに対し研究チームが形成されることになる。この研究システムのフロー及び関連分野を図示すると次のとおりである。

なお，現在CPAC本場で行われている主要な試験研究は次のとおりである。

a．小麦栽培の経済性に関する研究

かんがい区，無かんがい区に分け，全国各地から約4,000系統の品種を集めて選択，交配を行うとともに，慣行法－機械化法，栽培適期，施肥量，播種様式等を組み合せて比較試験を行っている。

b．作物比較試験

小麦，陸稲，フェジョン，落花生，ソルガム，大豆，綿について，輪作組合せ及びかんがい効果試験を行っている。圃場では，このうち大豆の生育の良いのが目立っていた。

c．トウモロコシ栽培試験

施肥法及び施肥位置並びにマルチによる蒸発防止試験を行っている。栽培上の問題としては，燐酸欠乏，Alの毒性及び水不足が大きいが，水不足では，雨期中の乾期（Vernico）対策が大きな問題とされている。

CPAC本場の施設は，Administration Office（所長室，次長室，コーディネイター室，タイプ室，図書資料室etc），研究室（土壌栄養，生理，病理，昆虫，気象，畜産），カラス室，倉庫，食堂，機材修理場，作業場等であり，圃場管理用資機材を除いた研究機器はおおむね次のとおりである。

＜土壌関係＞

ファーホトメーター

オートピペッター

恒　温　機

シェーカー（振とう機）

乾　燥　機

遠心分離機（600回転）

窒素分析機（ゲルダール法）2基（6×2）

ホトメーター

ＰＨメーター

トラフトチャンバー2台

Ｎ蒸留装置

ＮＰＫ微量要素の分析機（カスクロマトグラフィ）

電　気　炉　2個

電導度計（塩類濃度測定）

遠心分離機

冷　蔵　庫

＜アイソトープ室＞

研究室となっている

乾燥機（恒温機か？）

洗　滌　機

冷　蔵　庫

現在は実施していない。　　本館が出来れば実施する。

（ルテニューム……根の分布をみる）

PERKIN-ELMER 303

Atomic Absorption Specl rophotometer

Galvo meter　　炎光光度計

Flame nhotometer

＜動物，昆虫実験室＞

写真機付顕微鏡（ライツ）

オリンパス　HLS－2　　双眼顕微鏡

ホモゲナイザー

顕　微　鏡　　4～5台

解培顕微鏡　，遠心分離機

＜動物実験室＞

蒸留水発生装置

吸引式沪過装置

ドラフトチャンバー

乾　燥　機（105℃）

電　気　炉（マッフル）　灰分の測定

脂肪抽出装置

粗繊維煮沸装置

直示テンビン

遠心分離機

恒　温　機

N分析機（インキベータ）

FANEMLTDA

サングル切断，粉粋機

代謝ケージ

2）ミナス・ジェライス州農業研究公社（EPAMIG）

この機関は前述State Systemの1つにあたりEMBRAPA研究モデルに基づく州の中核組織としては，全国で最も早く設立された公社である。本公社は，1974年7月に設立された州農務局直属の機関であるが，性格的には，私企業と同様であり，財政，人事等運営管理は自決権をもっている。なお，この組織の構想は，1971年にイソーサ農科大学，ラブラス大学，ミナスジェライス大学と州農政局が策定した州農畜産総合計画において規定され，実質的に現在の活動は1971年から実施されている。

EPAMIGの活動目標は，もちろん農業生産の拡大のための農業研究の充実であるが，あわせて，経済的な側面から，生産者価格，流通関係の調査，生産予測，経済評価等も行っている。EPAMIGの組織は，第7図の構成となっており，この組織全体で現在の職員数は850名，うち220名が技術者で，このうち約90名が大学又は大学院卒である。

また，公社設立時に州政府から9カ所，連邦政府から6カ所の農場が移管され公社の附属機関となっているが，後述するPatos de Minas農事試験場，Uberaba農事試験場及びFlexirandia農事試験場等のように圃場，実験室，機器材のある程度整っているものから圃場のみで採種圃に共されるものまであり，概して現段階では施設々備の不備なものが多い。

EPAMIGにおける研究システムは第8図のとおりであり，連邦レベルでのEMBRAPA及び

州政府のneedsがとり入れられたうえで研究プロジェクトが形成され，さらに，大学，試験場，普及所及び生産者等関連する総てのチェックがなされるシステムとなっている。また，このプロセスでは，研究成果のフィード・バックを繰り返えすとともに，それを実際に展示圃において実験し，あらゆる層の意見がとり入れられる。これによって，基礎研究を実用段階まで発展させるとともに，実用研究の結果を再度基礎研究に反映させることができる。

3) ウベラーバ農事試験場（EEAU）

この試験場は，EPAMIG管下の機関であり，EMBRAPA研究モデルのState Research Unitにあたるものである。当場は約３０年前に，肉牛，乳牛の飼育改良のために設立され，現在は総面積1,000ha（牧草，試験圃場２５０ha，実験用牛用４５０ha，種子増殖用200ha大豆・米・ソルガム・トウモロコシ用１０ha，残建物その他）の用地と約６０名のスタッフ（大卒以上研究者６名，中等以上研究者４名，残事務員，人夫等）をもって，EPAMIG の研究プログラムに沿った作物関係の試験にウェイトを移行しつつある。

EPAMIGは，M･G州を４つの地域－北部，東部，南部，三角ミナス・アルトパラナイバーに分け，それぞれに適応する作目を設定のうえ研究を進めているが，当場は，三角ミナス・アルトパラナイバ地域に属し，大豆，綿，陸稲，牧草等が対象作目とされており，１９７４年には，これら作目について約１００件の試験を実施している。

しかし，研究の水準は，未だ初期の段階にあり，試験研究の大部分は，この地域の農業者の必要性に応じた栽培関係（例えば施肥量の決定，適正な播種時期etc）で占められ，高度な研究には着手していない。また，人容的な不備のほか，施設々備，種子分析室，品種保存，精子保存室及び病虫害の同定実験室程度の簡単なものであり，現段階では高度な試験研究は困難のようである。

なお，本地域は，Polocentro（三角ミナス）の区域に含まれており，この予算で土壌分析，病害虫実験，種子対策，ガラス室等の近代的施設及び機器材の整備が予定されるとともに，研究スタッフもこの６カ月～１カ年の間に２倍に増員される計画となっている。

4) パトス・デ・ミナス農事試験場（EEAP）

現在は，EMBRAPAに属しているが，近くEPAMIG 管下に移管されることをなっている。当場は現状では1,600haの圃場と２４名のスタッフ（大学卒は場長のみ，３名の農業技師，オペレーター３名，修理技師１名，他は農夫及び事務職員）を有しており，EMBRAPA に指定されたフェジョン，トウモロコシ，米，バレイショ，小麦等を対象に試験研究を実施している。試験研究では，フェジョン及びトウモロコシを対象とするものが全体の約８０％を占めており，その概要は次のとおりである。

・フェジョン豆

種子比重の収量に及ぼす影響，燐酸肥料の施肥残留効果試験，ＮＰＫの肥料濃度差と植栽様式に関する試験，トウモロコシとの混作に関する試験研究を主に行っている。また，EPA-

MIG研究モデルの一つとして，州内１０地域においてフェジョン豆２０品種を対象とする気象・土壌適性及び生産性比較試験があり，EPAMIGが１０地域の代表的農家との契約試験を行っているので当場でもこれと同一方法による試験を実施している。

なお，品種改良については，現在本格的な試験は行っていないが，方向としては，タンソ病，カサガレ病，サビ病，ウィルス等病害に対する抵抗性品種の育成が重要である。

◦トウモロコシ

株間隔，栽植密度に関する試験，カリ肥料の施用法に関する試験，蛋白質，リジンの含有量に関する研究，種子比重と発芽・生育に関する試験等を実施している。栽植密度に関する試験については，当場の試験方法が全国のモデルとして使用されている。

また，当場においては，試験研究の他に重要な業務として原種の生産供給事業がある。即ち，大学，国立品目別センター等から供給された原々種をもとに当場で原種を生産し，これを連邦農務省登録農家に提供のうえ増産し，栽培農家に配布する。この事業は，当場でかなり古くから実施されており，原種生産の方法，設備の点では全国有数のものである。とくにフェジョン豆については，優良種子の９０％は当場において生産される。

当場の主な生産原種は次のとおりである。

◦フェジョンマメ	Rico 23号（全体の70%）
	JAIO EEP 558号 （ここで育成）
	Roxas EEP（Jaloはシコウ性を考えて作り出したもので，生産性はやゝ低いが価格が良い）
	Multinko
	PAULAST（サンパウロ地方の普通の品種）
米	IAC-1246
	GEN-5544
トウモロコシ	IAC－7号
	MAY－9号
大　豆	IAC－2号

5) アルトパラナイバ農業試験場（EEAPADAP）

当試験場は，コチア産業組合（本部はサンパウロ）が連邦政府の承認を得て策定実施しているアルト・パラナイバ地域農業開発計画（PADAP）に基づき開発される約2,500haの農地に入植する農業者の技術及び経営をバックアップするために設置されたものである。当場は，アルト，パラナイバ地域の中心都市であるサンゴタルドの近郊に開こんされた入植地（現在約750ha）内に70haの用地（試験研究用15ha，残は展示圃場）と，5名のスタッフ（農業技師3名，研究者は不在）をもって，１９７３年１０月から試験を開始した。試験内容は，当地域に対する作物及び品種の適応試験，土壌改良のための作物の組み合せ及びローテーション

に関する試験が主であり，これと併行して，優良種子の生産と入植農家への配布，モデル作付方式の展示等を行うこととなっている。

なお，当場の事務所，実験室等は現在建築中であり，本格的な活動は７６年度からである。

また，当場はコチア産業組合の附属機関であるが，試験研究その他の活動は，EPAMIG, EMBRAPA及びＭＧ州農務局（ACAR）と共同して実施されることとなっており，すでに，EPAMIG総裁と組合会長との間には契約が締結されている。

ちなみに，コチア産業組合は日本人を主体とする農業組織であるが，ブラジル国内に約６６万haの土地を所有し，早くから組織的な農業開発にとり組んだこともあって農業開発に対する経験，農業技術及び関連データのストックの面ではブラジル随一といわれており，今後，この組合がセラードの開発に果す技術的役割はかなり重要なものとなることが予想される。

（参考資料 10 ）

ＣＰＡＣ の 研 究 課 題 一 覧

1980 — 1981

PROGRAMA DE PESQUISA

CPAC

1980 — 1981

Ady Raul da Silva ..... AR
Alberto Carlos de Queiróz Pinto ..... AP
Alípio Correia Filho ..... AC
Allert Rosa Suhet ..... AS
Antonio Carlos de Souza Medeiros ..... AM
Ariovaldo Luchiari Júnior ..... AL
Carlos Alberto dos Santos ..... CA
Carlos Magno Campos da Rocha ..... CM
Carlos Roberto Spehar ..... CR
Celso Roberto Crócomo CC
Cláudio Sanzonowicz ..... CS
Coy Patrick Moore ..... CP
Daniel Pereira Guimarães ..... DG
Dante Daniel Giacomelli Scolari ..... DS
Darrick Thomas ..... DE
Darci Tércio Gomes ..... DT
Delmar A.B. Marchetti ..... DM
Dimas Vital Siqueira Rosck ..... DR
Djalma M. Gomes de Souza ..... DJ
Eduardo Reis ..... ER
Edson Lobato ..... EL
Elmar Wagner ..... EW
Emivaldo P.Santana ..... ES
Enéas Z.Galrão ..... EZ
Eurípedes Alves Pereira ..... EP
Euzébio Medrado da Silva ..... EM
Fernando Cardoso ..... FC
Gilberto Gonçalves Leite ..... GL
Gilson Westin Cosenza ..... GC
Gottfried Urban Filho ..... GU
Henrique Otávio Silva Lopes ..... HL
Ivo R.S.Costa IC
Jamil Macedo ..... JI
Jeanne Christine Claessen ..... JC
João Batista Ramos Sampaio ..... JS
João Pereira ..... JP
Jorge Adámoli ..... JG
Joaquim Bartolomeu Rossini ..... JB
José Antônio Silva ..... JT
José Carlos Souza Silva ..... JO
José Cláudio Albino ..... JA
José Eurípedes da Silva ..... JE
José Felipe Ribeiro ..... JF
José Heitor Urdangarin Vianna ..... JV
João Luiz Homem de Carvalho ..... JH
José S.Madeira Netto ..... JN
José Maria Vilela Andrade ..... JD
José Roberto Peres ..... JR
José Teodoro de Melo ..... JT
Júlio Cézar A.J. de Magalhães ..... JM
Juscelino Antônio de Azevedo ..... JU
Juvenal Caldas Leite ..... JL
Kenneth Dale Ritchey ..... KR
Kazunori Igita ..... KI
Leo Nobre de Miranda ..... LM
Lourival Vilela LV
Luiz Alberto Rocha Batista ..... LR
Luiz Guimarães de Azevedo ..... LA
Luiz Hernán Rodrigues de Castro ..... LH
Manoel Vicente de Mesquita Filho ..... MM
Marcio Antonio Naves ..... MA
Maria Ferreira de Melo ..... ML
Maria José D'Ávila Chorchar ..... MJ
Morishige Iko ..... MI
Milton Alexandre Teixeira Vargas ..... MV
Michikazu Fukuhara ..... MF
Moacir G.Sauressig ..... MS
Morethson Resende ..... MR
Noboru Abe ..... NA
Paulo de Souza ..... PS
Pedro Jaime de Carvalho Genú ..... PG
Ravi Datt Sharma ..... RS
Renato Antonio Dedecek ..... RD
Roberto Luiz Caser ..... RC
Rolf F.H. Minhorst ..... RM
Ronaldo Pereira de Andrade ..... RA
Rosemary M.J. Longo ..... RL
Samiramis Pedrosa Almeida ..... SA
Sérgio Antonio Comastri ..... SC
Sérgio F.P. de Oliveira Penna ..... SO
Sérgio Mauro Folle ..... SF
Sirval Perim ..... SP
Sueli M.Sano ..... SS
Tamotsu Ogata ..... TO
Waldo Espinoza Garrido ..... WE
Walter Couto ..... WC
Wenceslau J.Goedert ..... WG
Vicente Pongitory Gifoni Moura ..... VM
Thelma M.Sauressig ..... TS
Yasuo Sonku ..... YS

PNP - Avaliação de Recursos Nat. e Sócio-Econômicos do Cerrado
(Coord. Dr. Luiz G. Azevedo)

PROJETO 02680001/1 - " Recursos naturais dos cerrados - Análise, ampliação e adequação de informações "
(JI, LA, JF, JO, ME, JN, JG, SS, JT)

PROJETO 02680002/9 - " Avaliação dos recursos hídricos superficiais e subterraneos dos cerrados "
(LA)

PROJETO 02680003/7 - " Desenvolvimento e implantação de um banco de dados ambientais da região dos cerrados "
(JN, LA, JI, JO, SA, SS, FF, JG, FC, Oliveira, A.)

PROJETO 02680004/5 - " Identificação, descrição e conhecimento da distribuição, por tipologia, das espécies nativas com potencial econômico do cerrado "
(JF, LA, SA, SS, JT, JO)

PROJETO 02680005/2 - " Representatividade dos solos do CPAC em relação à região dos cerrados "
(JI, JN)

PROJETO 02680006/0 - " Efeito das queimas na qualidade e nas características ecológicas das pastagens nativas dos cerrados "
(JG, SS, GL, LM, LA, JT, JI, JR, Mairelles, L.)

PROJETO 02680007/8 - " Sistemas de avaliação para uso agro-silvo-pastoril das terras da região dos cerrados "
(LA, JI, RC, JG, JN)

PROJETO 02680008/6 - " Zoneamento agrícola na região dos cerrados "
(JI, LA, RC, JN, JG)

PROJETO 02680009/4 - " Uso e manejo de bacias hidrográficas "
(JN, LA, JG, JI, AL)

Subprograma - Fertilidade do Solo (Coord. Dr. Allert R. Suhet)

PROJETO 02980001/6 - " Controle de acidez do solo e seus efeitos em solos do Cerrado "
(KR, LM, MM, JE, CR, GU)

Experimentos Componentes:

AAF203CR - " Triagem de cultivares e Linhagens de soja ao Al tóxico e baixos níveis de fósforo "
AAF209LM - " Níveis de Calagem e profundidade de incorporação de calcário "
AMM255KR - " Estudos sobre lixiviação de alguns nutrientes em solos do Cerrado, sob condições de campos e laboratório "

PROJETO 02980002/6 - " Deficiências nutricionais em solos do Cerrado "
(EZ, IC,, WC, CC, WG, KR, EL, MM, JC, LM, CS, JE, AS, DJ)

Experimentos Componentes:

AAF206WG - " Avaliação de fontes de fósforo, com ênfase em fosfatos naturais ".
AAF210EL - " Resposta inicial e residual de níveis de adubação fosfatada aplicados a lanço ".
AAF211LM - " Calibração de métodos de análise, visando recomendar adubação fosfatada ".
AAF212LM - " Calibração de métodos de análise visando recomendar adubação fosfatada ".
AAF215CS - " Resposta de Brachiaria Decumbens - STAPF. à calagem e a níveis e fontes de fósforo num LVE do cerrado ".
AMM221EZ - " Determinação da deficiência de micronutrientes em solos do cerrado ".
AMM223JE - " Efeito residual a níveis de Potássio e Magnésio em solos do cerrado ".
AMM224KR - " Efeito de níveis, fontes e épocas de aplicação de adubos nitrogenados com avaliação de nitrogênio natural no solo ".
AMM230MM - " Avaliação de fontes de zinco em latossolo vermelho amarelo "
AAF235WC - " Manejo do fósforo e do calcário em pastagens consorciadas estabelecida em um solo LVA do cerrado " .
AAF240JC - " Manejo de fósforo em culturas anuais e perenes em Latossolo Vermelho Amarelo do Cerrado "
AAF241IC - " Efeito de níveis e métodos de aplicação de fósforo no rendimento de mandioca em solo sob Cerrado ".

AAF244EZ - " Resposta a adubação fosfatada em função de níveis de fertilidade ".
AMM248JE - " Adubação de formação para cafezais em solos de cerrado ".
AMM252JE - " Adubação de manutenção em cafezais em solos de cerrado ".
AAF256IC - " Efeito da calagem e de nutrientes no rendimento de mandioca em solo de cerrado ".
AAF261WC - " Deficiências nutricionais em leguminosas forrageiras em solos de cerrados ".
AAF262WC - " Correção de deficiências nutritivas para o estabelecimento de leguminosas em solos de cerrados ".
AAF263WC - " Níveis de adubação fosfatada para o estabelecimento e manutenção de pastagens cultivadas nos cerrados " (LVA).
AAF266DJ - " Influência do sistema de preparo do solo no efeito residual de adubação fosfatada ".
AMO270AS - " Dinâmica do nitrogênio em solos de cerrados ".
AMM292KR - " Níveis e fontes de enxofre com avaliação do enxofre natural no solo ".
AAF293WC - " Correção de deficiências nutricionais para o estabelecimento de pastagens consorciadas em solos de cerrado " (LVE).
AAF296WG - " Avaliação agronômica de fontes de fósforo ".
AAF297WC - " Adubação fosfatada para o estabelecimento e manutenção de pastagens cultivadas num Latossolo Vermelho Escuro ".
AAF298CS - " Níveis de calcário, fósforo e potássio para Brachiária decumbens Stapf. num Latossolo Vermelho Amarelo de cerrado ".
AAF299CS - " Resposta de Leucaena leucocephala à calagem, fósforo, potássio e enxofre em um Latossolo Vermelho Escuro ".

PROJETO 02980012/9 - " Deficiências Nutricionais de espécies florestais na região dos cerrados ". (SC, VM, EL, JA, DG, AS)

Experimentos Componentes:

AAF231SC - " Fontes e níveis de fósforo em Pinus oocarpa ".
AMM257JA - " Resposta a aplicação de Macro e Micronutrientes na produção de madeira de E.camaldulensis em solo de cerrado do DF. "
AMM258JA - " Resposta a aplicação de Macro e Micronutrientes na produção de madeira de E. grandis em solo de cerrado do Distrito Federal ".
AMM295SC - " Levantamento do estado nutricional de algumas espécies de Eucalyptus em diferentes áreas representativas do cerrado ".

PROJETO 02980003/4 - " Seleção de estirpes de Rhizobium e métodos de inoculação para leguminosas em solos de cerrados "
(MV, AS, JR, Scotti, M., Drozdowicz, A., Doberainer J., Sa, N.)

Experimentos Componentes:

AM0219JR - " Efeito de formas de inoculação e de armazenagem na sobrevivência do R. japonicum na superfície de semente de soja inoculada ".
AM0254JR - " Introdução de estirpes de R. japonicum no solo pela inoculação de semente de arroz "
AM0269MV - " Seleção de estirpes de R. japonicum adaptados às condições dos solos de cerrados ".
AM0279MV - " Seleção de estirpes de Rhizobium sp nativas nos cerrados, para leguminosas forrageiras ".
AM0280JR - " Efeito da concentração de células de Rhizobium japonicum sobre a competição por sítios de infecção nodular na soja ".

PROJETO 02980004/2 - " Efeito de Endomicorrizas no rendimento de plantas cultivadas em áreas de cerrado ".
(JC e Mosse B.)

Experimentos Componentes:

AAF213JC - " Efeito de fontes e níveis de adubação fosfatada no comportamento de fungos endomicorrízicos nativos e exóticos em solos de cerrado ".
AAF214JC - " Estudo de alguns fatores que afetam a multiplicação de fungos endomicorrízicos em solos de cerrado ".
AAF217JC - " Efeito de fungos endomicorrízicos no rendimento de Stylosanthes cultivado em solos de cerrado ".
AAF218JC - " Ocorrência de fungos endomicorrízicos nativos em solos de cerrado em diferentes épocas do ano, culturas e manejo do solo ".

PROJETO 02980005/9 - " Manejo da matéria orgânica em solos do Cerrados ".
(JP, OR, EL, AS)

Experimentos Componentes:

AM0227JP - " Produção e manutenção da matéria orgânica em solos do cerrado ".
AM0243JP - " Efeitos da adubação verde e de restos culturais em LVA de cerrado ".
AM0267TO - " Study on the efficiency of nitrogen of green manure for wheat at the latosol ".
AM0281JP - " Avaliação da interação M.O x P disponível após incorporação de adubo verde ".
AM0282JP - " Avaliação agronômica de leguminosas "adubo verde ".
AM0284JP - " Avaliação da dinâmica da matéria orgânica em solo do cerrado cultivado ".

PROJETO 02980006/7 - " Fatores determinantes e práticas de controle da erosão em solos da região dos cerrados ".
(OR, JP, SF, RD, Seixas J.)

Experimentos Componentes:

AMC239DR - " Quantificação de alguns fatores determinantes da erosão em LVE da região de Brasília-DF
AER245DR - " Avaliação de diferentes sistemas de manejo no controle da erosão e seus efeitos nas propriedades físicas, químicas e microbiológicas do solo ".
AMC246DR - " Determinação das perdas de solo e nutrientes dos latossolos de cerrados sob diferentes coberturas vegetais, utilizando o simulador de chuva ".
AER272MI - " Influência de sistemas de preparo do solo e modos de aplicação da adubação corretiva na produção de soja ".
Effects of land utilization and tillage upon the physical

PROJETO 02980007/5 - " Adequação do sistema de mecanização agrícola à região dos cerrados ".
(SF, DR, ER, RD, Seixas J.)

Experimentos Componentes:

AER220SF - " Determinação experimental de parâmetros básicos mecânicos - sua análise operacional e mecânica ".
AER222SF - " Desenvolvimento e adaptação de máquinas agrícolas ".

PROJETO 02980008/3 - " Aproveitamento de fontes alternativas de energia a nível de propriedade agrícola na região dos cerrados ".
(OM, SF, Seixas, J.)

Experimentos Componentes:

AER226SF - " Desenvolvimento e adaptação de fontes alternativas de energia ".

Subprograma - Deficiência Hídrica (Coord. Dr. Euzébio M. da Silva)

PROJETO 02980009/1 - " Parâmetros operacionais e manejo da água em diferentes métodos de irrigação em solos de cerrado "
(EM, PG, JU, JD, JE, MR, Olitta, A.)

Experimentos Componentes:

ADH236JU - " Determinação dos parâmetros operacionais da irrigação por infiltração em sulcos em Latossolo Vermelho Escuro do Cerrado ".
ADH250JU - " Estudo das propriedades físico-hídricas e de suas variações em solos representativos da região de cerrado ".
ADH251JU - " Efeito da irrigação por gotejamento no desenvolvimento e produção do café em solos sob cerrado ".
ADH288JU - " Efeito da irrigação por gotejamento no desenvolvimento e produção de citrus em solo sob cerrado ".

PROJETO 02980010/9 - " Manejo do sistema solo/planta/água visando reduzir os efeitos do Déficit Hídrico na região dos Cerrados ".
(WE, AL, JE, MR, JU, KR, Barreto J.)

Experimentos Componentes:

ADH201AL - " Níveis e forma de aplicação da vermiculita em solo sob cerrado ".
ADH202WE - " Efeito da modificação em profundidade (até 150 cm) das características químicas do perfil de um solo LE sobre a resistência do milho do déficit hídrico ".
ADH234JE - " Efeito da incorporação do gesso na resistência da planta ao déficit hídrico, durante os períodos de seca ".
ADH247WE - " Efeito da incorporação no sub-solo de adubos e corretivos com o escavador duplo visando o controle de veranicos ".
ADH259AL - " Avaliação da influência ou danos causados pelo veranico na produção das culturas ".
ADH271AL - " Manejo do sistema solo/planta/água visando a reduzir os efeitos do déficit hídrico ".
ADH285WE - " Comparação de culta. de soja em relação as características de extração de água e resistência do déficit hídrico num solo LVE de cerrados ".

ADH286WE - " Comparação de culta. de milho em relação as características de extração de água e resistência ao déficit hídrico num solo LVE do Cerrado ".
ADH287WE - " Elaboração de modelos de simulação de desenvolvimento e produção das culturas (trigo, milho e soja) em função das características ambientais dos cerrados ".

PROJETO 02980011/7 - " Incorporação de várzeas ao processo produtivo dos cerrados ".
(ER,EM, SF, LM, MV, JB, JU, AS, EL, JR).

Experimentos Componentes:

ADH207JB - " Sistema de produção para as várzeas, em região de cerrado ".
AAF208JB - " Adubação fosfatada e calagem em solos de várzea, nas regiões de cerrado ".
ADH289ER - " Drenagem e subirrigação em várzeas ".
ADH290ER - " Caracterização física e química dos solos de várzeas em cerrados ".

PROGRAMA SISTEMA DE PRODUÇÃO - 80/81 (Coord. Dr. Darci T. Gomes)

Subprograma - Culturas Anuais (Coord. Dr.

PROJETO 03280001/3 - " Adaptação de cultivares e linhagens de soja à região dos cerrados ".
(CR, GU, KI, Kiihl, R.; Rolim, R.; Sediyama, T. ; Arantes, N.)

Experimentos Componentes:

MCA347CR - " Competição preliminar de cultivares e linhagens de soja ".
MCA348CR - " Introdução e Seleção de cultivares e linhagens de soja ".
MCA350CR - " Competição regional de cultivares e linhagens de soja ".
MCA351CR - " Campos Pilotos: Alternativas de sistemas de produção de soja ".
MCA517CR - " Estudo do comportamento de cultivares de soja na área recém-desbravada do cerrado do Estado de Minas Gerais ".

PROJETO 03280002/1 - " Manejo da cultura de soja sob condições de cerrados "
(GU, CR, KI, Monteiro, P.; Resende, A.)

Experimentos Componentes:

(*) ✓ MCA434KI - " Efeito de diferentes espaçamentos e níveis de fertilidade sobre variedades de soja ".
✓ MCA498KI - " Estudo sobre o desenvolvimento de variedades de soja "
MCA499GU - " Época de semeadura de cultivares de soja ".
MCA500GU - " Espaçamento e densidade de plantio sobre variedades de soja ".
MCA518GU - " Efeito da adubação potássica e fosfatada, com dois níveis de incorporação dos mesmos no solo, no sistema de produção de soja. (Campo de observação-Demonstração)

PROJETO 03280003/9 - " Avaliação e criação de cultivares de trigo para os Cerrados ".
(AR, JL, JD)

Experimentos Componentes:

MCA354AR - " Melhoramento genético e comparação de variedades de trigo ".

PROJETO 03280004/7 - " Manejo do trigo em sistemas de produção nos cerrados ".
(AR, JL, JD)

Experimentos Componentes:

MCA356AR - " Sistema de Produção incluindo trigo e outras espécies de verão e inverno com e sem irrigação ".

PROJETO 03280005/4 - " Caracterização, localização e avaliação das regiões para trigo nos cerrados ".
(AR, JL, JO)

Experimentos Componentes:

MCA355AR - " Campos Pilotos de pesquisa de trigo com variedades e doses de adubação ".
MCA519JO - " Estudo de adubação verde e seu efeito nos dois sistemas de produção de trigo em diferentes níveis de adubação ".

PROJETO 03280006/2 - " Estabelecimento das culturas de milho e sorgo na região dos cerrados ".
(LR, AM, Naspolini, V. Miranda, J. Borgonovi, R. Vencovsky, R., Chaves, L., Santos, F.)

Experimentos Componentes:

MCA501LR - " Comportamento diferencial de germoplasma de milho em solos de cerrado ".
MCA502LR - " Formação de composto básico de milho para as condições específicas dos cerrados brasileiros ".
MCA503AM - " Comportamento de genótipos de sorgo sacarino sob condições de cerrados ".
MCA504AM - " Comportamento de cultivares e híbridos de sorgo granífero sob condições de cerrados ".
MCA516AM - " Competição de cultivares comerciais de sorgo granífero sob condições de cerrados ".
(CPACampo).

PROJETO 03280007/0 - " Estabelecimento da cultura do Citros na região de Cerrados ".
(PG, AP, Pedrazzi, R.; Mattos, J.; Azevedo, J.; Passos, O.; Barros, J.; Sanches, A.; Ogata, T.; Matos, F. ; Vaz, R.; Monteiro Netto, A.)

Experimentos Componentes:

MCP310PG - " Introdução e avaliação de variedades de citrus ".
MCP311PG - " Ensaio de diferentes porta-enxertos para laranja pera ".
MCP312PG - " Ensaios de diferentes porta-enxertos para laranja Hamlin ".
MCP405PG - " Caracterização física e química de frutos cítricos ".
MCP438AP - " Diagnóstico cultural e fitos-sanitária da fruticultura na região dos cerrados de Goiás e Distrito Federal ".
MCP439AP - " Campos Pilotos de Pesquisa sobre fruticultura da região ecológica dos cerrados de Goiás ".

PROJETO 03280008/8 - " Estabelecimento da cultura da mangueira (Mangífera indica L.) nos cerrados brasileiros "
(AP, PG, Ogata, T.; Barros, A. ; Vaz, R.; Monteiro Neto, A.; Sampaio, J. Rodrigues, J.; Matos, F. Pedrazzi, R.)

Experimentos Componentes:

MCP305AP - " Introdução e avaliação de mangueira (Mangífera indica L.) na região dos cerrados ".
MCP383PG - " Introdução e avaliação de germoplasma de cajueiros ".
MCP437AP - " Unidade de observação sobre adubação e controle fitossanitário em mangueira CV. "Haden" nos cerrados ".
MCP475AP - " Caracterizações físicas e químicas de variedades de Manga e Abacate introduzidas nos cerrados ".
MCP476AP - " Efeito de uréia na queda prematura de flores e frutos de mangueira (Mangífera indica L.) no cerrado ".
MCP477AP - " Introdução, avaliação e seleção de annonaceas na região de cerrados ".
MCP478AP - " Introdução, avaliação e seleção de variedades de goiabeira (Psidium guajava, L.) na região de cerrados ".

PROJETO 02380005/4 - " Banco Ativo de germoplasma de abacate "
(PG, AP, Morales, E. Padrazzi, R.; Luna, J.; Ferreira, F.; Pereira, D.)

Experimentos Componentes:

MCP308PG - " Introdução e avaliação de variedades de abacateiros nos cerrados "

PROJETO 03280009/6 - " Estabelecimento de cafeicultura na região dos cerrados ".
(JE, EL, MJ, PS)

Experimentos Componentes:

MCP380JE - " Competição de linhagens e cultivares de café para resistência a ferrugem ".
MCP381JE - " Competição de linhagens e cultivares de café para resistência a seca ".
MCP406JE - " Competição de cultivares de café ".
MCP 407 -- " Levantamento de informações sobre a cafeicultura na região Geoeconômica de Brasília-DF ".

PROJETO 03280010/4 - " Adaptação de variedades de mandioca na região dos cerrados ".
(IC, SP)

Experimentos Componentes:

MCP340SP - " Introdução, Avaliação preliminar e multiplicação de variedades de mandioca para cerrado ".
MCP386SP - " Competição de variedades de mandioca para o cerrado ".

PROJETO 03280011/2 - " Caracterização do potencial de produção de sementes de algumas espécies e procedências de "Eucalyptus".
(VM, JT, DG, RC, JA, Coutinho, S.; Cabral, R.)

Experimentos Componentes:

MCP479VM - " Formação de áreas produtoras de sementes de Eucalyptus spp "
MCP485VM - " Banco Clonal de Pinus Kesiya - Vietnam ".

PROJETO 02380012/0 - " Manejo de florestas implantadas para fins energéticos na região dos cerrados ".
(DG, RC, SC, VM, JA, JT, Cabral, R.)

Experimentos Componentes:

MCP483DG - " Lotação, ideal em povoamentos de Eucalyptus sp para a produção de Biomassa ".

PROJETO 03280013/8 - " Aproveitamento de áreas marginais para fins florestais ".
(JT, SC, JI, RC, VM, LA)

Experimentos Componentes:

MCP484JT - " Avaliação de espécies nativas para fins silviculturais em plantios puros ".

PROJETO 03280014/8 - " Seleção de espécies e procedências de essências florestais nativas e exóticas na região dos cerrados ".
(RC, JA, JT, VM, DG, SC)

Experimentos Componentes:

MCP416VM - " Ensaio de comportamento de espécies e procedências de Pinus para a região do Cerrado de altitude elevada ".
MCP417VM - " Ensaio de comportamento de espécies e procedências de Pinus na região do cerrado e mata de baixa altitude ".
MCP412VM - " Ensaio de comportamento de espécies e procedências de Pinus para região de altitudes elevadas ".
MCP420VM - " Ensaio básico de comportamento com espécies e procedências de Eucalyptus (I)
MCP241VM - " Ensaio básico sobre comportamento com espécies e procedências de Eucalyptus (II)
MCP422VM - " Ensaio de comportamento com espécies e procedências de Eucalyptus em região com maior e menor déficit hídrico ".
MCP426VM - " Ensaio de comportamento com espécies e procedências de Eucalyptus para a região de mata de baixa altitude ".
MCP427VM - " Ensaio de comportamento de espécies e procedências de Eucalyptus para região de mata de elevada altitude e cerrado central ".
MCP428VM - " Ensaio de comportamento de espécies e procedências de Eucalyptus para as regiões do cerrado e Triângulo Mineiro ".
MCP429VM - " Ensaio com espécies e procedências de Pinus ".
MCP444DG - " Ensaio de competição entre procedências de Eucalyptus grandis (II)".
MCP445DG - " Ensaio de competição entre procedências de Eucalyptus cloeziana (II) ".
MCP446RC - " Ensaios de competição de procedências de Eucalyptus brassiana ".
MCP447RC - " Ensaio de competição de procedências de E. camaldulensis II ".
MCP448VM - " Ensaio de competição entre procedências de Eucalyptus toreticornis ".
MCP449VM - " Ensaio de competição entre procedência de Eucalyptus pilularis ".
MCP450VM - " Ensaio de competição de procedências de Eucalyptus pilularis (I)
MCP452VM - " Ensaio de competição de procedência de Eucalyptus cloeziana (I) ".
MCP453VM - " Ensaio de competição entre espécies e procedências de Pinus ".
MCP480VM - " Teste de procedência de E. urophylla S.T. Black de Flores ".
MCP481VM - " Teste de procedência de E. urophylla S.T. Black de Lomrblen, Alor, Adonara e Pantar ".
MCP482VM - " Teste de procedência de Eucalyptus urophylla S.T. Blake de timor ".

MCP486VM - " Teste de progenie de Pinus Kesiya Procedência filipinas ".
MCP487VM - " Teste de progenie de Pinus Kesiya Vietnam ".

PROJETO 03280015/3 - " Sistemas consorciados para obtenção de produtos florestais e alimentos ".
(JA, SP, RA, IC, SC, DT, GL, Brumckhorst, H.)

Experimentos Componentes:

MCP440JA - " Pinus oocarpa consorciado com mandioca na região dos cerrados ".
MCP441JA - " Consorciação de Eucalyptus camaldulensis com gramíneas forrageiras ".
MCP442JA - " Eucalipto consorciado com mandioca na região dos cerrados ".
MCP443JA - " Consorciação de Pinus oocarpa com leguminosas forrageiras ".

Subprograma - Forrageiras e Pastagens - Coord. Dr. Carlos Magno C. Rocha)

PROJETO 0238007/2 - " Banco ativo de germoplasma de forrageiras para a região dos cerrados ".
(RA, OE, GC, SS, MJ, YS, JT, Cameron, D.; Primo, A.)

PROJETO 03280016/1 - " Identificação e avaliação de forrageiras para formação de pastagens consorciadas na região dos cerrados ".
(RA, OE, CM, GL, MS, GC, DT, MJ, CP, Cameron, D. Fergusson J.)

Experimentos Componentes:

MFP400DE - " Avaliação biológica de plantas forrageiras (Estágio 0 e I)
MFP401RA - " Avaliação agronômica de gramíneas forrageiras tropicais (Estágio II)
MFP402DE - " Avaliação agronômica de leguminosas forrageiras tropicais (Estágio II) ".
MFP391CP - " Avaliação de uma pastagem de gramínea adubada com nitrogênio versus pastagem consorciada com leguminosa utilizando bezerros desmamados ".
MFP472CP - " Estágio III de avaliação de pastagens ".

PROJETO 03280017/9 - " Produção de sementes de forrageiras na região dos Cerrados ".
(RA, OE, Fergusson, J.)

Experimentos Componentes:

MFP403RA - " Produção de sementes de gramíneas e leguminosas promissoras nos Cerrados ".
MFP497RA - " Efeito de épocas de diferimento ao pastejo sobre a produção de sementes de A. gayanus ".

PROJETO 03280018/7 - " Estabelecimento de espécies forrageiras na região dos cerrados ".
(GL, DT, CS, AS, MS, RA, WC, EL, CM, JV, LA, EP)

Experimentos Componentes:

MFP319WL - " Métodos de estabelecimento de forrageiras em campos naturais do Cerrado ".
MFP466GL - " Curvas de produção e de valor nutritivo de gramíneas forrageiras ".
MFP467DT - " Estabelecimento de gramíneas e leguminosas forrageiras em campo nativo ".
MFP492WE - " Avaliação sob pastejo do campo nativo melhorado ".
MFP493WC - " Implantação de leguminosas em pastagens cultivadas ".

PROJETO 03280019/5 - " Uso estratégico de pastagens na recria de fêmeas zebuinas na região dos cerrados ".
(CM, CP, DT, WC, RA, MS, DE, JV)

Experimentos Componentes:

MFP473CM - " Efeito de diferentes proporções de gramíneas e leguminosas na pastagem sobre o desempenho de bezerras desmamadas precocemente ".
MFP474JV - " Produtividade de pastagens nativas, melhoradas e cultivadas em áreas dos Cerrados na recria de fêmeas zebuadas ".

PROJETO 03280020/3 - " Performance de rebanhos de gado de corte na região dos cerrados em função da época de monta e idade à desmama dos bezerros ".
(CM, MS, CP,JV, TS)

Experimentos Componentes:

MFP393EP - " Avaliação dos Sistemas de Produção de Gado de Corte nos Cerrados com relação à *performance* reprodutiva ".
MFP394CM - " Efeito da duração da estação de monta, idade à desmama e uso estratégico da pastagem cultivada sobre a performance reprodutiva de vacas zebu ".
MFP488MS - " Sistemas de manejo a nível de propriedade rural ".
MFP489MS - " Rebanho comercial ".
MFP490TS - " Ecologia de larvas dos nematóides gastrointestinais de bovinos em pastagens da região dos Cerrados (DF.)". Estudo em parcelas experimentais ".
MFP491TS - " Ecologia de larvas de nematóides gastrointestinais de bovinos em pastagens da região dos Cerrados (DF.) " II. Estudo com animal em pastejo ".

PROJETO 03280021/1 - " Utilização de forragens conservadas e de subprodutos agrícolas e agro-industriais dos cerrados "
(JH, GL, SP, EP, IC)

Experimentos Componentes:

MFP469JH - " Efeito de diversos tipos de conservantes sobre a conservação de ensilagem de capim elefante (Pennisetum purpureum Schum) com diferentes níveis de matéria seca ".

MFP470JH - " Avaliação d valor alimentar da palha trat. a nível de fermentação ruminal e da digestibilidade dos nutrientes ".
MFP471JH - " Avaliação do valor nutritivo da parte aérea da mandioca ".
MFP494EP - " Efeito do estágio de crescimento do capim elefante (Pennisetum purpureum Schum) sobre o valor nutritivo".
MFP495JH - " Efeito do tratamento da silagem do capim elefante Pennisetum purpureum Schum com hidróxido de sódio ".
MFP496JH - " Influência da poda sobre o valor nutritivo da parte aérea da mandioca para ruminantes "

Subprograma - Fitossanidade (Coord. Dr. Gilson W. Cosenza)

PROJETO 03280022/9 - " Controle integrado das cigarrinhas das pastagens ".
(GC. DT, CM, MA, RA, Bolkan, H., Roberts, D., Brandini, A., Daoust, R.)

Experimentos Componentes:

MFS370MA - " Efeito de manejo da Brachiária decumbens na população da cigarrinha das pastagens, Deois spp. "
MFS459GC - " Utilização da resistência de gramíneas em sistema de manejo de pastagens para o controle da cigarrinha (Deois flavopcta, Zulia entrerriana)".
MFS460GC - " Avaliação da resistência de gramíneas à cigarrinha das pastagens (Deois flavopcta, Zulia entrerriana).
MFS462MA - " Desenvolvimento de equipamento para dispersão do fungo Metarhizium anisopliae para controle da cigarrinha das pastagens ".
MFS463MA - " Determinação da eficiência patogênica das raças de Metarhizium anisopliae em cigarrinhas das pastagens"".

PROJETO 03280023/7 - " Pragas de potencial importância em plantas cultivadas nos cerrados ". of wheat
(GC, NA, IC) study on the ecology of Elasmopalpus lignosellus and it. control.

Experimentos Componentes: study on the ecology of Soy bean sucking bugs and their control.

MFS409NA - " Biologia e controle da Elasmopalpus lignosellus."
MFS410NA - " Biologia e controle do percevejo da soja ".
MFS458GC - " Criação massal em laboratório de Elasmopalpus lignosellus, Spodoptera spp e Heliothis spp para fins de infestação ".
MFS461GC - " Resistência de variedades de mandioca ao percevejo de renda (Vatiga illudens) ".

PROJETO 03280024/5 - " Doenças fúngicas de potencial importância em plantas cultivadas nos cerrados ".
(MJ, AP, DE, PG, RA, YS, Cameron, D.)

Experimentos Componentes:

MFS411YS - " Studies on Anthracnose of Stylosanthes sp. in Cerrados"".

MFS455MJ - " Reação de cultivares de soja a Antracnose ".
MFS456MJ - " Ciclo de hospedeiras de Helminthosporium sativum ".
MFS457MJ - " Verrugose em abacateiro ".
MFS521YS - " Forecasting on occurence of important dicase for main crops introducad in Cerrados ".
MFS522MJ - " Antracnose em Stylosanthes spp. nos Cerrados ".

PROJETO 03280025/2 - " Nematóides em plantas cultivadas nos cerrados ".
(RS, JL, CR, Aidar, H., Prabhu, K.)

Experimentos Componentes:

MFS376RS - " Seleção de cultivarés e linhagens de soja resistente ou tolerante a nematóide formador dés galhas ".
MFS378RS - " Avaliação de resistência de culturas e linhagens de feijão ao nematóide, Meloidogyne spp. (M. javanica) ".
MFS505RS - " Avaliação de resistência de cultivares de arroz ao nematóide Meloidogyne javanica "
MFS506RS - " Avaliação de resistência das cultivares e linhagens do trigo ao nematóide, Meloidogyne spp. (M. javanica)."
MFS507RS - " Efeito da rotação das culturas no controle dos nematóides fitoparasitas em solo de Cerrado ".
MFS508RS - " Métodos culturais, biológico e químico no controle dos nematóides fitoparasitas em Latossolo Vermelho Escuro (LVE) ".

Subprograma - Sistema de Manejo (Coord. Dr. Elmar Wagner)

PROJETO 03280026/0 - " Sistema de produção e testes em larga escala ".
(CC, GU, DS, AC, DT, CA, EL, AS, ES, RS, CM, CR, LH, EZ, SO, RA, JV, MV, GC, MJ)

Experimentos Componentes:

MSP357CM - " Experimento Central sobre sistema de produção agropecuária ".
MSP358GU - " Experimento Central com enfoque de sistemas de produção ".
MSP204AM - " Teste dos sistemas de produção de soja e trigo ".

PROJETO 03280027/8 - " Avaliação de sistemas de produção agrícola na região geoeconômica de Brasília ".

Experimentos Componentes:

MSP515DS - " Avaliação de sistemas de produção agrícola na região geoeconômica de Brasília "

PROJETO 03280028/6 - " Avaliação dos processos de transferência e de adoção de tecnologia por produtores rurais na região dos cerrados ".
(AC, CA, ES, SO, RL, MF)

Experimentos Componentes:

MSP433SO - " Acompanhamento e avaliação de tecnologia gerada pelo CPAC, (I) a nível de extensionistas, (II) a nível de produtores e (III) a nível de pesquisadores.
MSP509JS - " Uso de transformações estabilizadoras de variância ".
MSP510CA - " Uso de veículos de comunicação de massa e influência das suas mensagens na adoção de tecnologia na região geoeconômica de Brasília ".
MSP511CA - " Adoção de tecnologia por produtores do PAD-DF ".
MSP512AC - " Caracterização das unidades produtivas da região geo-econômica de Brasília aspectos da adoção de tecnologia ".
MSP513RL - " Diagnóstico da produção de publicações técnico-científica do CPAC ".
MSP514RL - " Guia dos pesquisadores que atuam em área de cerrado ".

PROJETO 03280029/4 - " Modelagem em análise de sistemas para culturas anuais ".
(LH, DJ, EM, JS, AL, CC, NC, WE, Richie, J.)

（参考資料 11 ）

本プロジェクト関連報告書一覧

1. ブラジル農業開発協力事業基礎調査報告書（昭和５０年７月）
国際協力事業団（農林）　５０－３０

2. ブラジル農業開発協力事業基礎調査報告書　－附属資料－　（昭和５０年７月）
国際協力事業団（農林）　５０－３７

3. ブラジル・セラード一次産品開発技術協力実施計画調書及びブラジル農業研究協力実施調査報告書　（昭和５１年４月）
国際協力事業団農業開発協力部　AF５１－５８

4. ブラジルの主要作物害虫名一覧表　（昭和５２年９月）
国際協力事業団農業開発協力部，農林５２－５２

5. ブラジルの農業事情と農業研究　（昭和５２年１２月）
国際協力事業団農業開発協力部　農林（52）－７９

6. ブラジル農業研究協力プロジェクト業務報告書　（Vol.１）（１９７８年１０月）
国際協力事業団農業開発協力部，農開技（ＪＲ）　７８－１１

7. ブラジル農業研究協力プロジェクト業務参考資料　－ブラジルの一般事情－
（１９８０年３月）　国際協力事業団農業開発協力部

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