12　プロジェクト紹介パンフレット（英文）

TECHNICAL COOPERATION BY THE GOVERNMENT OF JAPAN
JICA

Embrapa
Cerrados

Japanese Techinical Cooperation Between Jica and Embrapa

1994/1999

Tadaaki Yamashita

Planaltina, DF
1999

Planejamento e Texto
Tadaaki Yamashita

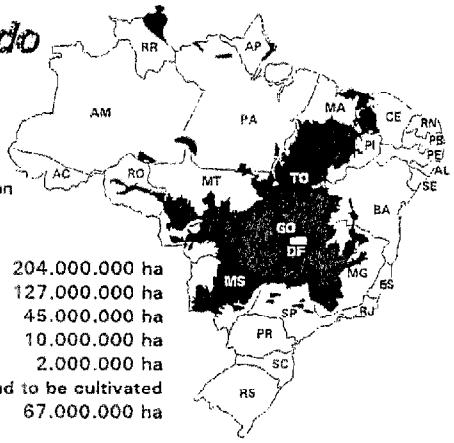
Criação e Arte
Chaile Cherne S.Evangelista

Fotos
Tadaaki Yamashita

Jica and Embrapa

Brazilian Cerrado

Distribution of the Cerrado



Cerrados Region

Total area:	204.000.000 ha
Arable land:	127.000.000 ha
Cultivated pastures:	45.000.000 ha
Annual crops:	10.000.000 ha
Perennial crops and forestry:	2.000.000 ha
Potential area - cultivated area =	Land to be cultivated
127.000.000 ha - 47.000.000 =	67.000.000 ha

Typical scenery and vegetation in Cerrado

Jica and Embrapa

1. The Brazilian Cerrado

Commodities production in the Cerrado

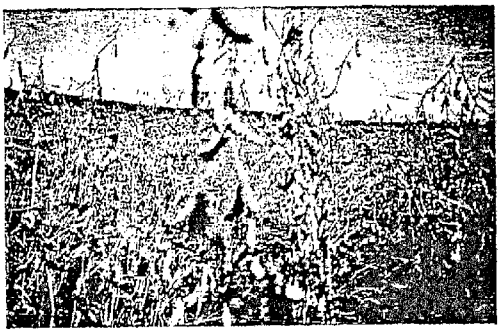
Commodities	Absolute and relative* Production 1,000 tons (percentage)					
	1975	1980	1985	1990	1995	1997**
Soybeans	310 (3.1*)	1 833 (12.1)	5 961 (32.6)	6 348 (31.9)	11 322 (44.2)	12 000 (46.2)
Corn	2 824 (17.3)	3 706 (18.2)	4 132 (18.8)	4 352 (20.4)	8 687 (24.0)	8 000 (25.8)
Rice	2 335 (30.0)	3 555 (36.4)	2 634 (29.2)	1 464 (19.7)	2 404 (21.4)	1 300 (16.3)
Beans	300 (13.1)	231 (11.7)	277 (10.8)	390 (17.5)	511 (17.4)	700 (23.3)

*Percentage of Brazil's production **Estimated figures
Source: Embrapa Cerrados, 1997

Animal production in the Cerrado

Product	Percentage of Brazil's Production					
	1975	1980	1985	1990	1993	1997
Beef cattle	31.4	32.9	36.4	37.5	38.5	40.2
Swine	21.2	17.3	20.0	20.8	20.4	20.0
Poultry	14.0	13.6	12.6	13.0	12.3	12.3
Goats	14.7	13.8	13.4	9.7	15.4	—
Milk	22.9	25.3	28.9	28.1	30.3	33.1
Eggs	12.7	11.7	14.2	14.2	14.7	17.2

* estimated figures
Sorce: Embrapa Cerrados, 1997



Soybean production

Distribution of the Nucleus of the Cerrado Among the Brazilian States

States	In thousands of square kilometers		
	Total Area	Cerrado Area	Percentage
Minas Gerais	582	384	66,0
Tocantins	287	249	86,8
Mato Grosso	881	421	47,8
M. Grosso do Sul	350	216	61,7
Piauí	250	162	64,8
Bahia	559	82	14,7
Maranhão	324	141	43,5
Ceará	146	2	1,4
Pará	1,227	11	0,9
Rondônia	243	41	16,9
Goiás	355	355	100,0
Distrito Federal	5	5	100,0
Total Brazil	**8,456**	**2,069**	**24,5**

Trees with twisted trunks

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PROGRAM FOR AGRICULTURAL DEVELOPMENT AND RESOURCES CONSERVATION IN CERRADO

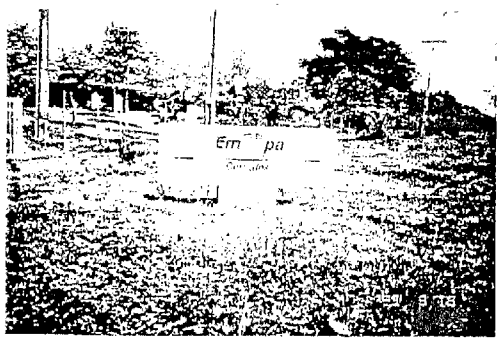
FROM AUGUST 1st, 1994
TO JULY 31st, 1999.

To improve, in Cerrado, technologies for sustainable agriculture which take the environment into account.

GENERAL ACTIVITIES OF THE PROJECT

1. Evaluation of agro-environmental resources
2. Soil deterioration: causes and control technologies
3. Crop protection: control methods
4. Crop production system: selection and development

Japanese expert in experimental field



Counterpart organization
Embrapa Cerrados

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EVALUATION OF AGRO-ENVIRONMENTAL RESOURCES

1. CLARIFYING THE DISTRIBUTION OF PLANT SPECIES AND DEFINING THE LAND USE CONDITIONS
   - Qualification and evaluation of natural flora resources and land use of Cerrados by using the remote sensing technology and ecological approaches (ST*)
2. CLARIFYING THE CONDITIONS OF SOIL EROSION
   - Estimation of soil erosion in cultivated lands in Cerrados (ST*).
3. CLARIFYING THE ACTUAL CONDITION OF WATER RESOURCES AND WATER QUALITY
   - Evaluation of water quality of Cerrado Water System (ST*).

*ST = Japanese short term consultant.

Natural flora resources and land use

Japanese Technical Cooperation Between Jica and Embrapa

Water resources and examination of water quality

Jica and Embrapa

SOIL DETERIORATION

1. ANALYZING THE PRIMARY IMPEDING FACTORS OF SOIL PRODUCTIVITY AND IMPROVING COUNTERMEASURES

- Improvement of soil management technology to control soil degradation (LT*).

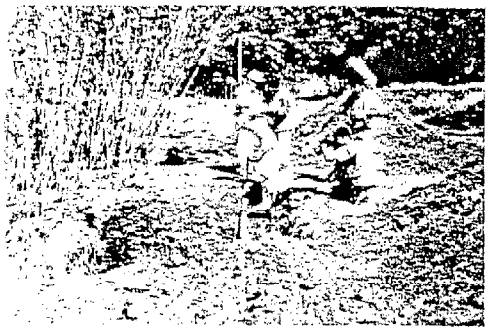
- Development of tillage system to lessen soil compaction (LT*).

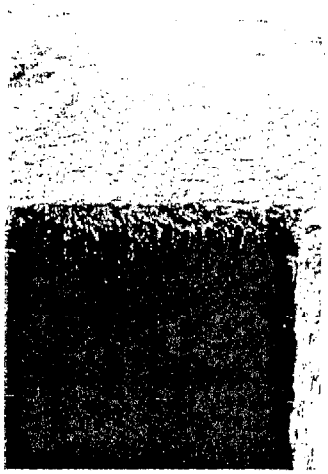
2. SEARCHING FOR THE CAUSE OF CHEMICAL AND BIOLOGICAL SOIL DEGRADATION AND DEVELOPING METHODS FOR THE IMPROVEMENT OF THE NUTRIENT AND WATER SUPPLYNG ABILITY.

- Diagnosis of degradation in soil chemical and biological properties and efficient improvement (LT*).

*LT = Japanese long farm consultant.

Japanese Technical Cooperation Between Jica and Embrapa





Soil profile for survey of productivity

Experiment of soil management

Examination of soil physical propreties

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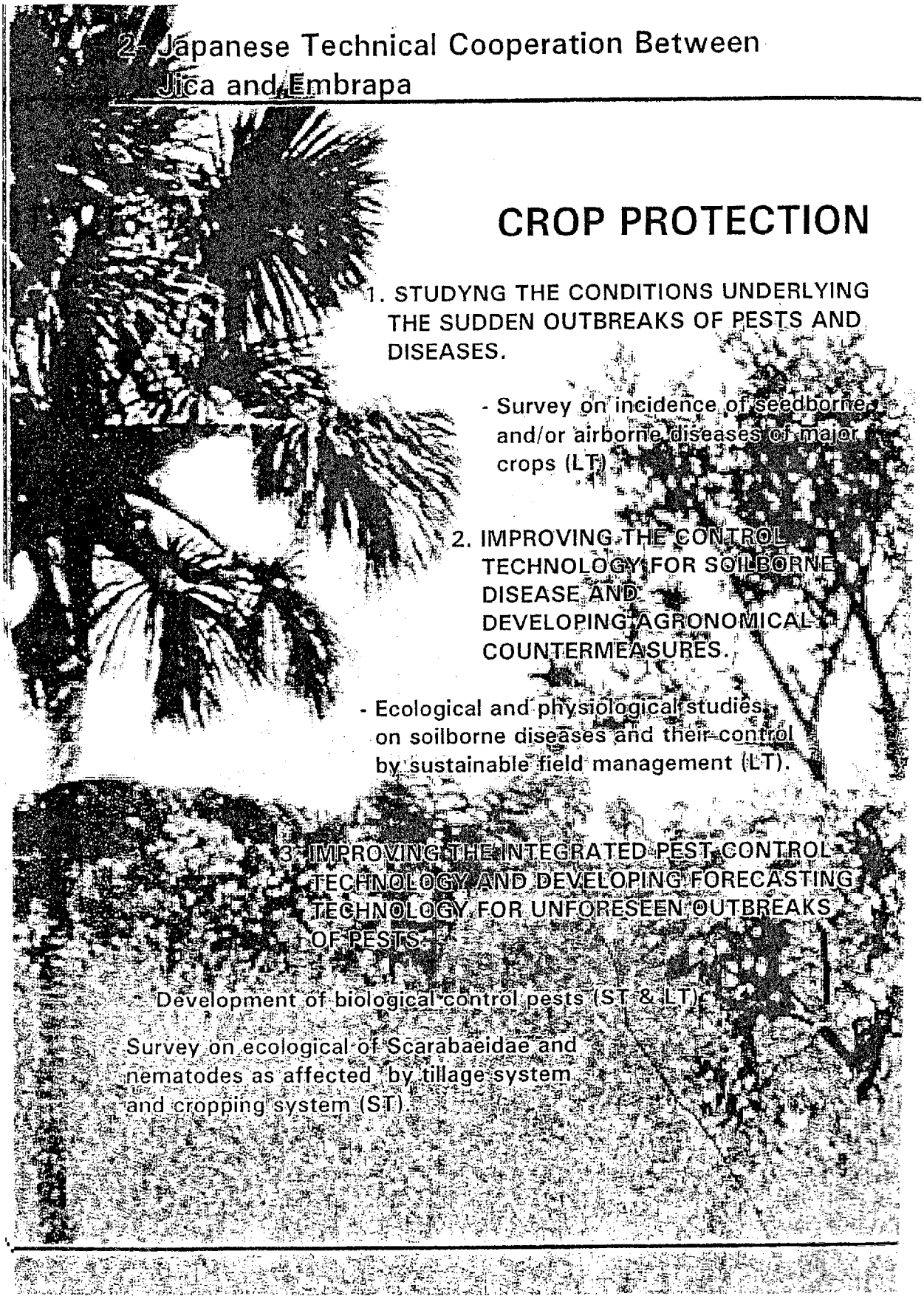


CROP PROTECTION

1. STUDYNG THE CONDITIONS UNDERLYING THE SUDDEN OUTBREAKS OF PESTS AND DISEASES.

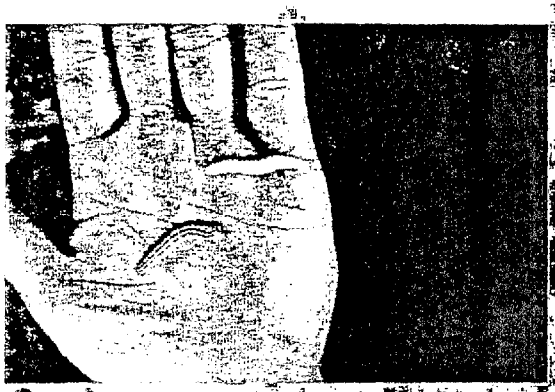
- Survey on incidence of seedborne and/or airborne diseases of major crops (LT).

2. IMPROVING THE CONTROL TECHNOLOGY FOR SOILBORNE DISEASE AND DEVELOPING AGRONOMICAL COUNTERMEASURES.

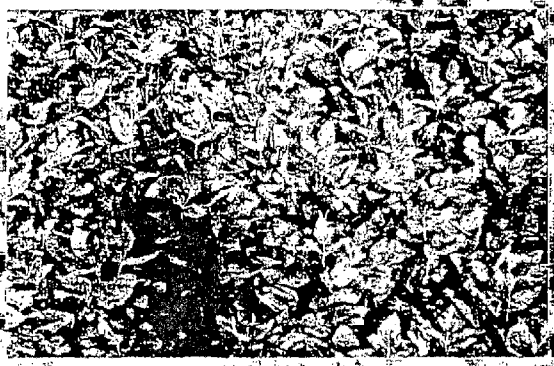
- Ecological and physiological studies on soilborne diseases and their control by sustainable field management (LT).

3. IMPROVING THE INTEGRATED PEST CONTROL TECHNOLOGY AND DEVELOPING FORECASTING TECHNOLOGY FOR UNFORESEEN OUTBREAKS OF PESTS.

- Development of biological control pests (ST & LT).
- Survey on ecological of Scarabaeidae and nematodes as affected by tillage system and cropping system (ST).



Soybean pest,
Anticarsia gemmatalis



Soybean leaves damaged
by Anticarsia gemmatalis

Graviola damaged
by pests

Rearing of A. gemmatalis
for preparation of biological
pesticide

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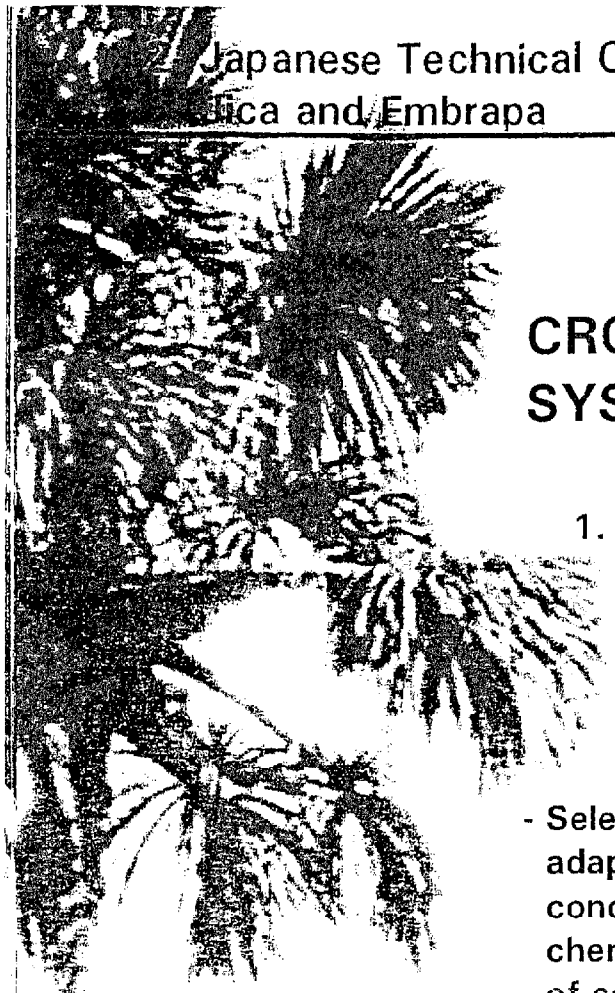

CROPPING PRODUCTION SYSTEM

1. SELECTING AND INTRODUCING CROPS ADAPTABLE TO THE ENVIRONMENT.

- Selection of functional plants adaptable to Cerrado environmental conditions to improve physical, chemical and/or biological properties of soil (ST).

2. DEVELOPING THE CROPPING SYSTEM

- Development of production system of optional crops to soybean cultivation based on their growth response and sustainability (LT).

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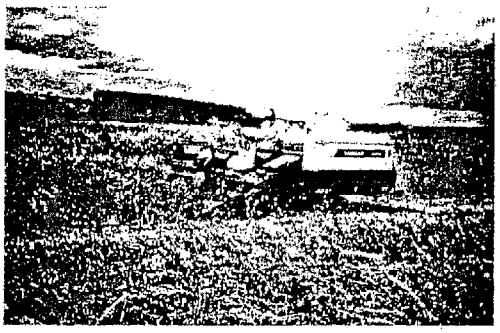
Soybean field in Cerrado



Development of production system

Selection of functional plant (Pearl Millet)

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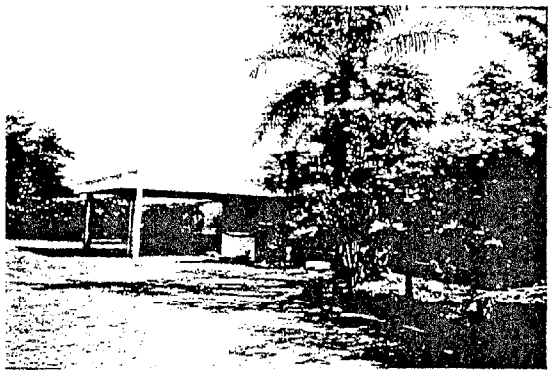
ACCOMPLISHMENT IN TERMS OF INPUTS

JAPANESE INPUTS

1. Dispatch of Japanese experts
2. Acceptance of Brazilian counterparts
3. Provision of machinery and equipment
4. Supplementary fund to cover local costs
5. Dispatch of team

BRAZILIAN INPUTS

1. Provision of land, buildings and facilities
2. Budgetary allocation
3. Assignment of counterparts and other personnel
4. Supply and replacement of machinery and equipment



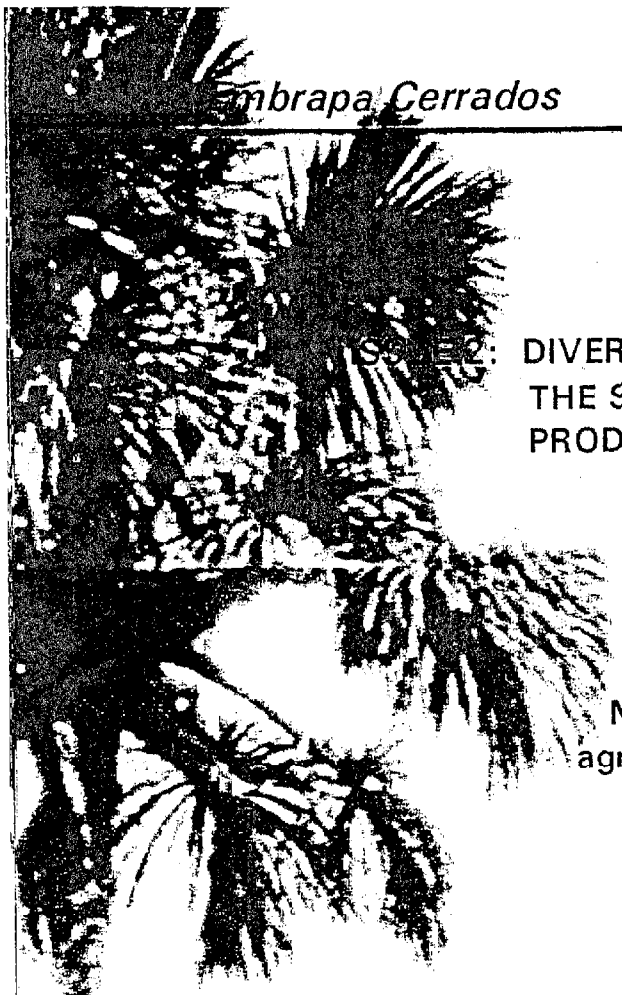
INSTITUTIONAL GOAL OF *Embrapa Cerrados*

TO MAKE POSSIBLE TECHNOLOGICAL, COMPETITIVE AND SUSTAINABLE SOLUTIONS FOR AGRIBUSINESS OF THE REGION OF CERRADO, IN BENEFIT OF THE SOCIETY.

ISSUE 1: IMPROVEMENT OF THE CURRENT PRODUCTION SYSTEMS

1. To study in details the performance of some used production systems, such as:
   - Beans
   - Corn
   - Soybean
   - Wheat

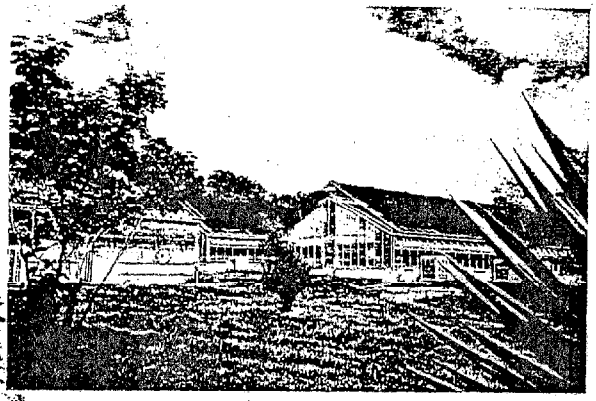
2. To identify the main constraints in the crop production scheme, aiming to give answers, such as:
   - Reduction of production costs
   - Increasing of crop productivity
   - Irrigation usage
   - Analysis of market tendencies



ISSUE 2: DIVERSIFYING THE COMPONENTS OF THE SUSTAINABLE AGRICULTURAL PRODUCTION SYSTEMS

New options to make up possible agriculture systems will be studied looking at the follow issues:

- Introduction of fruit crops
- Integration of crop production and livestock
- Integration of crop production and forestry
- Exploring the potentialities of native plant species, related to:
  - Woody species
  - Fruit species
  - Aromatic species
  - Ornamental species
  - Medicinal species



ISSUE 3: STUDIES FOR EVALUATING THE OVERALL AGRICULTURE EFFECTS ON THE ENVIRONMENT

- To compare traditional crop systems against alternative one's
- To evaluate the environmental degradation
- To evaluate the economical and social impacts of agriculture in the Cerrado's ecosystem
- To evaluate the biodiversity, as related to flora, macrofauna, mesofauna, and microfauna
- To quantify the CO_2 absorption and emission from Cerrados's ecosystem

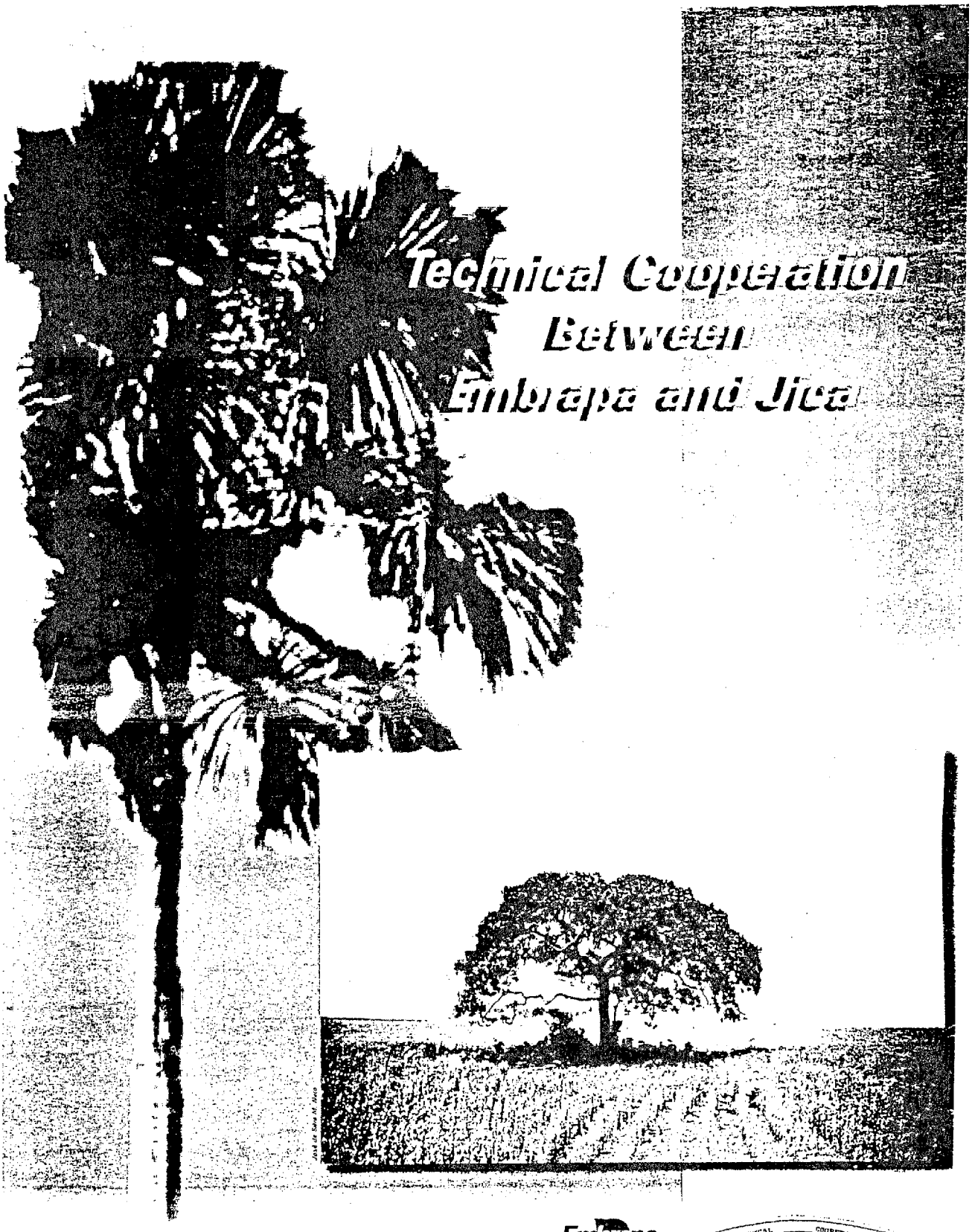
Lagoa Bonita
View from Embrapa Cerrados

HUMAN RESOURCES

Embrapa Cerrados has a total of 428 employees distributed as follows:

Researches		93
	BSc	02
	MSc	50
	PhD	37
	Pos-Doctor	04
Support for Research and Development		330

Empresa Brasileira de Pesquisa Agropecuária
Embrapa Cerrados
Ministério da Agricultura e do Abastecimento
BR 020, km 18, Rodovia Brasília/Fortaleza
CEP 73301-970 Planaltina, DF
Fone: (061) 389-1171 Fax: (061) 389-2953



Technical Cooperation Between Embrapa and Jica

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JICA

EVALUATION OF AGRO-ENVIRONMENTAL RESOURCES

IDENTIFICAÇÃO DE DIFERENTES COBERTURAS DO SOLO UTILIZANDO CLASSIFICAÇÃO DE IMAGEM DE SATÉLITE LANDSAT-TM

EVALUATION OF WATER QUALITY FOR IRRIGATION IN FEDERAL DISTRICT

Water resources in Cerrado

Color composite of Landsat/TM image

Embrapa
Cerrados

IDENTIFICAÇÃO DE DIFERENTES COBERTURAS DO SOLO UTILIZANDO CLASSIFICAÇÃO DE IMAGEM DE SATÉLITE LANDSAT-TM

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INTRODUÇÃO

O monitoramento de uso da terra é fundamental para o conhecimento de sistemas de manejo e conseqüente previsões de safra, uso racional de insumos, identificação de áreas de ocorrência de pragas, dentre outros. Várias ferramentas tem sido usadas para aumentar sua eficiência e uma delas é o sensoriamento remoto. Associando técnicas de sensoriamento remoto, em especial análise e interpretação de imagens de satélite, às observações de campo, é possível fazer um estudo temporal do uso do solo em uma dada região.

OBJETIVO

Identificar o uso atual do solo, especialmente procurando diferenciar as áreas com cobertura morta das áreas de pastagem, vegetação natural e áreas úmidas, usando o processo de classificação de imagem de satélite.

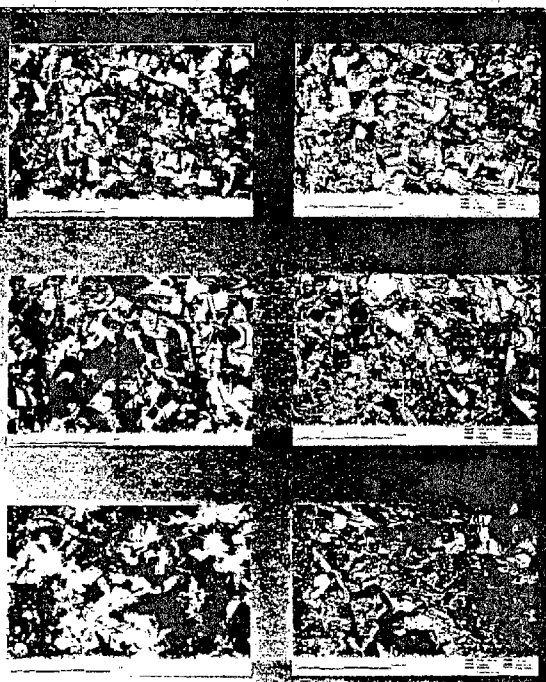
MATERIAL E MÉTODOS

Localização - Região noroeste do município de Rio Verde, Estado de Goiás (51°30'W a 51°42'W; 17°18'S a 17°45'S)

- Observações de campo (novembro de 1997)
- Escala - 1:100.000
- Imagem de satélite Landsat, cena 223.072 de 27 de agosto de 1995

Classificação não supervisionada, utilizando-se as bandas 1, 3, 4 e 5 - 40 diferentes classes agrupadas em 7 diferentes categorias: Mata/Cerradão, Cerrado, Pastagem, Cobertura morta, Solo nu, Área úmida, Área irrigada.

RESULTADOS



CONCLUSÃO

O produto final da classificação demonstrou que essa ferramenta é muito útil na separação das áreas de cobertura morta daquelas com outros tipos de cobertura, em especial no município de Rio Verde onde a prática do plantio direto vem sendo muito utilizada.

Com essa informação é possível fazer um estudo temporal da evolução do plantio direto na região, podendo inclusive serem diferenciadas as áreas com adequada cobertura do solo daquelas sem uma cobertura eficiente. Tomando-se imageris de diferentes períodos, pode-se ainda fazer uma avaliação temporal da evolução do plantio direto na área.