

5.3.3 Green Village

The Green Village Program is forged to expand agricultural production with sustainable farming system to be suited to local agro-ecological conditions. The program is composed of the following three sub-programs and their projects and is expected to contribute not only to agricultural production but also to environmental conservation.

Improvement of Rural Environment	<ul style="list-style-type: none">• Introduction of a Sustainable Agriculture Model for Mini and Small Scale Farmers in the Bico do Papagaio Region• Introduction of an Integrated Sustainable Agriculture Model of Buffaloes raising and Fruit cultivation in the Jalapão Region
Distribution of Seeds, Semen and Seedlings	<ul style="list-style-type: none">• Support to Research• Support to the Production of Seeds, Seedlings and Semen• Support to the Production of Matrix of Small Animals• Support to the Commercialization of Seeds, Seedlings and Semen
Sustainable Farming Model	<ul style="list-style-type: none">• Introduction of Pilot Farm of the Horticulture and Livestock Integrated System• Introduction of Pilot Farm of the Grains Production and Beef raising Integrated System• Introduction of Fruit cultivation

(1) Improvement of Rural Environment

1) Outline of the Project

The present project aims at the preservation of Cerrado environment, defining agricultural development models in harmony with the characteristics of each region. Basically, this program comprehends the increase of green areas with the participation of the region inhabitants.

2) Objective of the Project

The objective is to promote environmental conservation among small and mini farmers with introduction of sustainable farming system.

3) Project Rationale

Many landless farmers, petty and small farmers inhabit the Bico do Papagaio region, the northernmost region of the Tocantins State. They make their living through subsistence farming in burnt field due to the lack of or insufficient funds. Their poverty is one of the greatest social problems. Furthermore, the region has various environmental problems, such as burnt field, soil degradation and erosion caused by reckless field management.

It is necessary to solve these problems simultaneously. This program is one of the means of solving these problems and will also contribute for the improvement of the urban environment by making green belts of vegetable and cereals in the suburbs.

On the other hand, the Jalapão region is suitable for buffalo raising because of the existence of scattered lakes and swamps. Buffalo products have high commercial potential in Brazil. In special, buffalo cheese and buffalo low cholesterol meat have an increasing demand by the consumers in big cities of the southern Brazilian states. Buffalo has higher fertility rate, useful life term and increase rate of body weight than the local beef cattle. Raising of buffalo to the whole area of Tocantins, needless to say the region of Jalapão is highly anticipate.

4) Contents of the Project

(Introduction of Sustainable Agriculture by Mini and Small Scale Farmers in the Bico do Papagaio Region)

The pilot farm will be organized in each suburb (zone) of three towns in the Bico do Papagaio Region. The implantation plan of this pilot farm is as follows;

The association of each zone is organized with ten farmers and the association manages the use and the maintenance of farm machinery and irrigation facilities, supply of piglets and formula feed, and selling of cereals and swine. And, each farmer selects the kind of vegetables in each season, considering market prices, and cultivates in two ha of field.

In sum, sustainable farming system with mixed production of vegetables and swine at model farms designed to upgrade small and mini farmers' farming operation to medium farmers' onefor operation of medium shall be put into implementation so as to demonstrate its effect and to serve as guideline for planning rural credit, farm design and farm operation in attracting farmers from outside the state.

(Introduction of Integrated Sustainable Agriculture of Buffaloes raising and Fruit Cultivation in the Jalapão Region)

The pilot farm will be organized in the suburb area of São Félix do Tocantins, an easily accessible place to local main roads where is favored with semi-arid climate, less undulated topography and availability of water resource. Pilot farms shall be incorporated in this place to introduce mixed farming of fruit production of raising of buffalo. These model farms designed to upgrade small and mini farmers' farming operation to medium farmers' onefor operation of medium shall be put into implementation so as to demonstrate its effect and to serve as guideline for planning rural credit, farm design and farm operation in attracting farmers from outside the state.

(2) Distribution of Seeds, Seedlings and Semen

1) Outline of the Project

The project of seeds, semen and seedlings distribution aims at improving the distribution conditions to the producers who want to improve their agricultural activities. This sub-program will be implemented through credit lines related to fixed and semi-fixed investments. Through this project, the following activities will be strengthened:

1. Support to research activities of the producers associations.
2. Production of seeds (soybean, rice, feijão beans, pasture plants).
3. Production of semen
4. Production of seedlings (fruit trees, trees, etc.) and breeding stock of small animals
5. Commercialization of seeds, seedlings and semen.

2) Objective of the Project

The objective of this project is to offer favorable conditions of seeds and seedlings production and commercialization, to producers and traders, specially concerning to the cost.

3) Project Rationale

At present, acquiring good quality agricultural inputs, specially seeds and seedlings, with accessible prices is a very important requisite to obtain profits in the agricultural activities. In Tocantins State, it is difficult to obtain agricultural inputs due to the lack of development in their production. In the case of several agricultural inputs, the State depends on the production of other states, raising the transportation costs as well as the prices. Furthermore, sometimes these inputs are inadequate to the State conditions. Because of that, the Tocantins State agriculture sector is still in the subsistence stage. There is a great need to promote the quality improvement of agricultural inputs, specially seeds and seedlings, in order to improve farming technologies of farmers which benefit an agricultural development of the State.

4) Contents of the Project

(Support to the Research Activities of the Producers Associations)

This action is oriented to those producers who intend to improve the seed production quality in an experimental way comprising the following research fields:

- Introduction of new varieties of seeds for the State
- Introduction of new specimen of seedlings for the State

- Introduction of new cultivation technologies for the State

The items to be financially eligible are the following:

- Land reclamation (land preparation, leveling, fences, etc.)
- Soil improvement for the first 3 years
- Construction of warehouses and silos
- Installation of irrigation systems
- O & M costs which are considered as research activities
- Cost of researchers and workers in the first 3 years
- Procurement of necessary equipment for research
- Procurement of machinery

(Production of Seeds - Soybean, rice, feijão beans, pasture)

In this item, the fixed and semi-fixed investment activities which aims to promote the production of soybean, rice, feijão beans and pasture plant seeds will be financed. The eligible items for financing are as follows:

- Land reclamation (land preparation, leveling, fences, etc.)
- Soils amendment in the first 2 years
- Construction of warehouses and silos
- Installation of irrigation systems
- Procurement of Equipment
- Procurement of Machinery

(Production of Seedlings - Fruit trees, trees, etc.)

In this item, the fixed and semi-fixed investment activities which aims at the promotion of fruit trees and trees seedlings production will be financed. The eligible items for financing are as follows:

- Establishment of nurseries
- Construction of facilities (irrigation systems, buildings, etc.)
- Procurement of Equipment
- Procurement of Machinery
- Procurement of seedlings and seeds in the first year
- Production inputs in the first year

(Production of Breeding Stock for Small Animals)

In this item, the fixed and semi-fixed investment activities which aims to promote the production of for small animals will be financed. The eligible items for financing are as

follows:

- Facilities for small animals raising
- Procurement of Equipment
- Procurement of Machinery

(Commercialization of Seeds, Semen and Seedlings)

In this item, the fixed and semi-fixed investment activities which aims at the promotion of improvement of seeds, seedlings and semen commercialization will be financed. The eligible items for financing are as follows:

- Facilities for commercialization (silos, warehouses, etc.)
- Improvement of the Commercialization System (communication system, transports, etc.)
- Procurement of Equipment
- Procurement of Machinery and locomotives

(3) Sustainable Farming Model

1) Outline of the Project

The proposed models of sustainable farming in the Tocantins State, considering environmental preservation are the following four models.

1. Farming Integrated Vegetables and Swine Production by Small Farmers in Suburbs
2. Farming Integrated Cereals and Beef Cattle Production by Small Farmers
3. Farming Integrated Cereals and Beef Cattle Production by Middle and Large Scale Farmers
4. Fruits Production in Tocantins State

2) Objectives of the Project

This project seeks for provision of rural credit to farmers who embark sustainable farming system in view of dissemination of this sustainable farming system to farmers of other regions.

3) Project Rationale

(Farming Integrated Vegetables and Swine Production by Mini and Small Farmers in Suburbs)

Many small farmers, with farm areas smaller than 320 ha are making their living by subsisting farming at burnt fields because of lack of funds or insufficient funds. Their poverty is one of the big social problems the government is facing, being difficult to be solved through the present financing conditions. Furthermore, many environmental problems are also verified, such as burnt field, soil degradation and erosion caused by reckless field management. This program is one of the means of solving these problems and contributing for the urban environment by making green belt of vegetables and cereals in the suburbs of towns.

(Farming Integrated Cereals and Beef Cattle Production by Small Farmers)

The present condition of meat cattle raising in the State is object of concern. The traditional and extensive way in which it is being conducted is producing several environmental problems, reducing the productivity of pastures and, consequently, stagnating the livestock raising sector. Therefore, the integrated production system of agriculture and livestock and technological upgrade proposed in this Sub-program will contribute to the improvement of the sector present conditions, besides the contribution for the solution of socio-economic problems mentioned in the previous item.

(Farming Integrated Cereals and Beef Cattle Production by Middle and Large Scale Farmers)

At present, the majority of medium and large scale farmers, owning more than 320 ha, are implementing the Nelore cattle raising. Those located in good geomorphological conditions lands are carrying out fattening or integrated raising. The others are carrying out cattle raising for breeding purposes. Nevertheless, in both cases the extensive system, utilizing natural pastures deriving from deforestation or artificial pastures, is utilized. Almost all the pastures, due to mismanagement or erosion, are suffering a reduction in the grazing capacity, which requires an urgent solution. The land burning off process, annually repeated after the dry period, is also another worldwide known environmental problem.

Likewise the previous mentioned Sub-program, this one aims at finding a solution to the present stagnation condition of the livestock raising activity in the State.

(Fruit Production in Tocantins State)

As already mentioned, the small farmers are facing many difficulties in developing their

activities. Therefore, this Sub-program aims at helping them in facing these problems, i.e., poverty and environmental degradation, through the introduction of fruits cultivation in unsuitable land for cereals and vegetables.

4) Contents of the Sub-program

(Farming Integrated Vegetables and Swine Production by Small Farmers in Suburbs)

The pilot farm is organized in each suburb (zone) of Araguaína (North Region), Palmas (Central Region) and Gurupi (South Region). Aiming at significant enhancement in farm income as well as in living standard, an association formed by ten (10) member farmers shall be organized for respective zone shall undertake mixed farming of vegetable production of raising of swine under irrigated fields subject to joint-ownership and use of agricultural machinery and rural installations. This model farm is expected to serve as guideline in disseminating this farming system to farmers of other regions.

(Farming Integrated Cereals and Beef Cattle Production by Small Farmers)

The pilot farm is organized in each suburb (zone) of the North Region, Central-South Region and South-East Region. Aiming at significant enhancement in farm income as well as in living standard, an association formed by ten (10) member farmers shall be organized for respective zone shall undertake mixed farming of grains production of raising of beef cattle under irrigated fields subject to joint-ownership and use of agricultural machinery and rural installations. This model farm is expected to serve as guideline in disseminating this farming system to farmers of other regions.

(Farming Integrated Cereals and Beef Cattle Production by Middle and Large Scale Farmers)

The pilot farm is organized in each suburb (zone) of the North Region, Central-South Region and South-East Region. The model farm is designed to put into implementation sustainable production of pasture and innovative beef cattle farming among largeholders, including devices for environmental conservation of reservation lot of rural land property. The outcome in this model farm is expected to serve as guideline for attracting medium- and largeholders of other states to invest in Tocantins.

(Fruits Production in Tocantins State)

The pilot farm is organized in Bico do Papagaio, eastern part of the North Region, Central-South Region, Jalapão area and South-East Region. The model farm is designed to put into implementation fruit production suited to local agro-ecological conditions

among smallholders, including devises for environmental conservation of reservation lot of rural land property. The outcome in this model farm is expected to serve as guideline for other smallholders under similar conditions..

5.3.4 Demonstration Farm Development Program

(1) Outline of the Program

This program proposes an establishment of demonstration farm for development and extension of sustainable agriculture.

(2) Objective of the Program

The prime objective of the demonstration program is to identify the agricultural development methods and development models which are suitable for each region of the State for sustainable agriculture and livestock development while focusing on the environmental preservation.

(3) Program Rationale

The leading sector for future economic development of the State of Tocantins is agriculture and livestock sector and in promoting development of this sector there is an urgent need to introduce adequate technologies in order to improve this sector in quantity and quality and to prevent the environmental degradation because the State belongs to the Legal Amazonian Region comprising worldwide environmentally precise great swamp and indigenous inhabitants.

By implementing the program, the strengthening of extension activities will be realized, and smooth technical transfer to farm producers also will be feasible. The program also envisages training program aimed at upgrading expertise of personnel of SAG and RURALTINS in charge of technology transfer to farmers. Furthermore, research and test on environmental conservation and soil conservation methods shall be conducted at demonstration farms with objectives to establish an optimum technology as a consequence of assessment of agricultural development on natural environment and to promotion of farming practice in harmony with conservation of natural resources.

In order to disclose fundamental factors leading to low productivity of agricultural sector of the State, the research to be carries out under the present program shall be made at soil analysis laboratory, seeds laboratory, biotechnological laboratory and plants preservation laboratory.

(4) Contents of the Program

In order to demonstrate the technologies to professionals and farmers, it is necessary to construct a demonstration center with all the related facilities of buildings and of permanent equipment (laboratories, automobiles, agriculture implements, irrigation etc.).

(Research and Other Services)

1. Research and demonstration of technology (Agriculture sector, livestock sector, farm management sector, agroindustry sector and a model of sustainable agriculture, including practices such as: green manure, organic manure, nitrogen biological fixation, among others.)
2. Transfer of technology through training (Demonstration and extension of sustainable agriculture model, training for agriculture-related institutions and farming community, qualification in rural management, etc.)
3. Extension and environmental monitoring (Impact assessment of agriculture and livestock on environment, forest conservation and soil conservation including erosion control)
4. Laboratory testing and seed supply service (Soil laboratory - provides services of chemical and physical analysis of soils and recommendations of fertilizer requirements and soil amendments; Seed laboratory - Evaluate the real quality of seeds to verify cultural value, purity and germination index and to supply good quality seeds of high genetic values; Biotechnology laboratory - To produce high genetic quality fruit seedlings as a result of laboratory production through in-vitro micro propagation system; Plant protection laboratory - To analyze the pests and diseases and to recommend suitable plant protection measures)

(Facilities)

1. Research and demonstration farm (Total area: 800 ha, demonstration farm: 400 ha)
2. Irrigation facilities (Central Pivot - 50 ha, Auto propelled irrigation - 10 ha, Drip irrigation - 20 ha, Micro sprinkler - 40 ha, Furrow irrigation - 5 ha)
3. Building and ancillary facilities
4. Machinery and equipment (Farm machinery, livestock equipment, laboratories and vehicles)

(5) Cost of the Program

The cost required for implementation of the program is estimated as follows.

Component	Cost (R\$ x 10 ³)		
	Capital	Recurrent (Initial 3 years)	Total (Initial 3 years)
Demonstration farm	4,000	2,700	6,700

(6) Implementation Schedule of the Program

The program is scheduled to be implemented in the following manner.

Component/Year	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15
Demonstration farm	- P -	- C -							- O/M -

Note: P: Preparatory Period, C: Construction Period, O/M: Operation and Maintenance Period

5.4 Program to Promote Sustainable Agriculture and Livestock Farming

5.4.1 Outline of the Program

This program proposes to establish a demonstration center on development technologies in which research and development on environmental monitoring, green manuring, organic manuring, minimum management, nutrient biological fixation and integrated livestock in order to promote the sustainable agriculture.

5.4.2 Objective of the Program

The objective of the program falls on proceeding technological development which gives an impetus for planning and implementation of sustainable agriculture and livestock in harmony with environmental conservation, within context of better utilization of the fruits of research and development of technologies undertaken by Cerrado Agricultural Research Center (CPAC) under the project-type technical cooperation of the Government of Japan.

5.4.3 Program Rationale

(Present Status of Agriculture and Livestock Farming in the State and Constraints on Development)

In recent years, the large scale farming of soybean and paddy rice has been progressing in some areas of the State by utilizing the favorable conditions of land and abundant resources.

However, most of the farmers are engaged in the traditional farming. The middle and large scale farmers owning more than 320 ha of land carry out breeding of local beef cattle, Nelore. In most of their farms, beef cattle are raised in the extensive pasture area by burning off the field at the end of dry season. Even in tame pasture, the grazing capacity has been declining due to soil erosion and reckless management of pasture. As

a consequence, the livestock farming came to a deadlock situation.

On the contrary, the small scale farmers make their living by subsistence farming at the burnt field, because of lack or shortage of funds. And all of the farmers in the State are in an economical crisis and crave for new opportunities which can break the deadlock situation of the farming.

Besides, the State is facing with various environmental problems, such as the land clearing by burning off the field, soil degradation and soil erosion.

The State of Tocantins is located in the Amazons legal area which has restricted development policies, and an indigenous reservoir, and the Bananal Island, one of the world humanity patrimony. Considering these facts, the State Agriculture and Livestock Farming Development should be planned.

To develop the new farming under these situation in the State, the crop rotation between cereals and pasture, the elaborate soil conservation/management practices to prevent soil erosion and the efficient new technologies of livestock raising should be introduced and promoted positively to transfer the technology to farmers.

However, until now, there has been no systematic research and technological development of the agriculture and livestock farming in the State. The Center (Division) of agronomy of the University of Tocantins (UNITINS), which is the only one research institute in the State, barely fulfills the responsibility of research in the State with a few researchers and poor research facilities in cooperation with EMBRAPA.

(Progress of Researches on Agriculture of Cerrado in Brazil)

The greater part of soil in the Tocantins State is Cerrado. The agriculture development in the Cerrado was commenced in 1970s by the Government of the Federal Republic of Brazil and the Cerrados Agricultural Research Center (CPAC) was set up in 1975. According to the results of the researches on the soil improvement, the development measures such as improvement of soil acidity, application of macro- and micronutrients, etc., were rated high, and the central region of Brazil has become the great granary.

The Japan-Brazil Agricultural Research Cooperation Project which aims at development of the technology for agricultural production in Cerrado was initiated in 1978. The first project, from 1978 to 1985, was carried out to develop the technologies of agricultural production in semi-arid and poorly vegetated region of Cerrado. The second project, from 1987 to 1992, aimed at the development of technologies for agricultural production in acid savanna region of Cerrado.

The agricultural production of Cerrado has made rapid progress as mentioned above, but soil degradation and soil erosion have also progressed in some areas with

insufficient consideration on environment. The third project, from 1994 to 1999, aims at sustainable agricultural development and natural resources conservation in Cerrado. The ongoing project has four main research subjects as follows;

1. Evaluation of agro-environmental resources of Cerrado
2. Development and improvement of technologies to prevent soil degradation by physical, chemical and biological means
3. Development of integrated pest management
4. Improvement of the cropping systems to maintain the field condition sustainable

5.4.4 Contents of the Program

The fruits of technological research and development obtained by CPCA are fundamental ones, but proposed technological research and development to be embarked in this program seeks to be practical ones to be used at farm level.

(1) Technological Development on Environmental Monitoring and Environmental Impact Assessment

1. Monitoring and assessment of the effects of farming (environmental externalities) on the natural environment
2. Trials and Assessment of Forest Conservation
3. Trials and Assessment of Soil Conservation

(2) Technological Development on Sustainable Agriculture and Livestock Farming

1. Trials and Assessment of Rotation between Cereals and Pastures (Optimum terms of cereals cultivation and pasture cultivation in rotation, fertilization method, cultivation method, cropping patterns, etc.)
2. Trials and Assessment of No-tillage Cultivation in the Large Scale Field
3. Trials and Assessment of the Effective Mechanized Cultivation and Use of Cover Crops
4. Selection of Varieties for Cereals, Vegetables and Fruit Trees
5. Selection and Breeding of Pastures for Vegetative Control of Soil Erosion
6. Improvement of Mechanized Cultivation and Establishment of Farm Work Systems
7. Methodology of Farm Design and Farm Management Design, Considering Environmental Preservation
8. Green Manuring
9. Organic Manuring

10. Nitrogen Biological Fixation

(3) Technological Development for New Livestock Farming

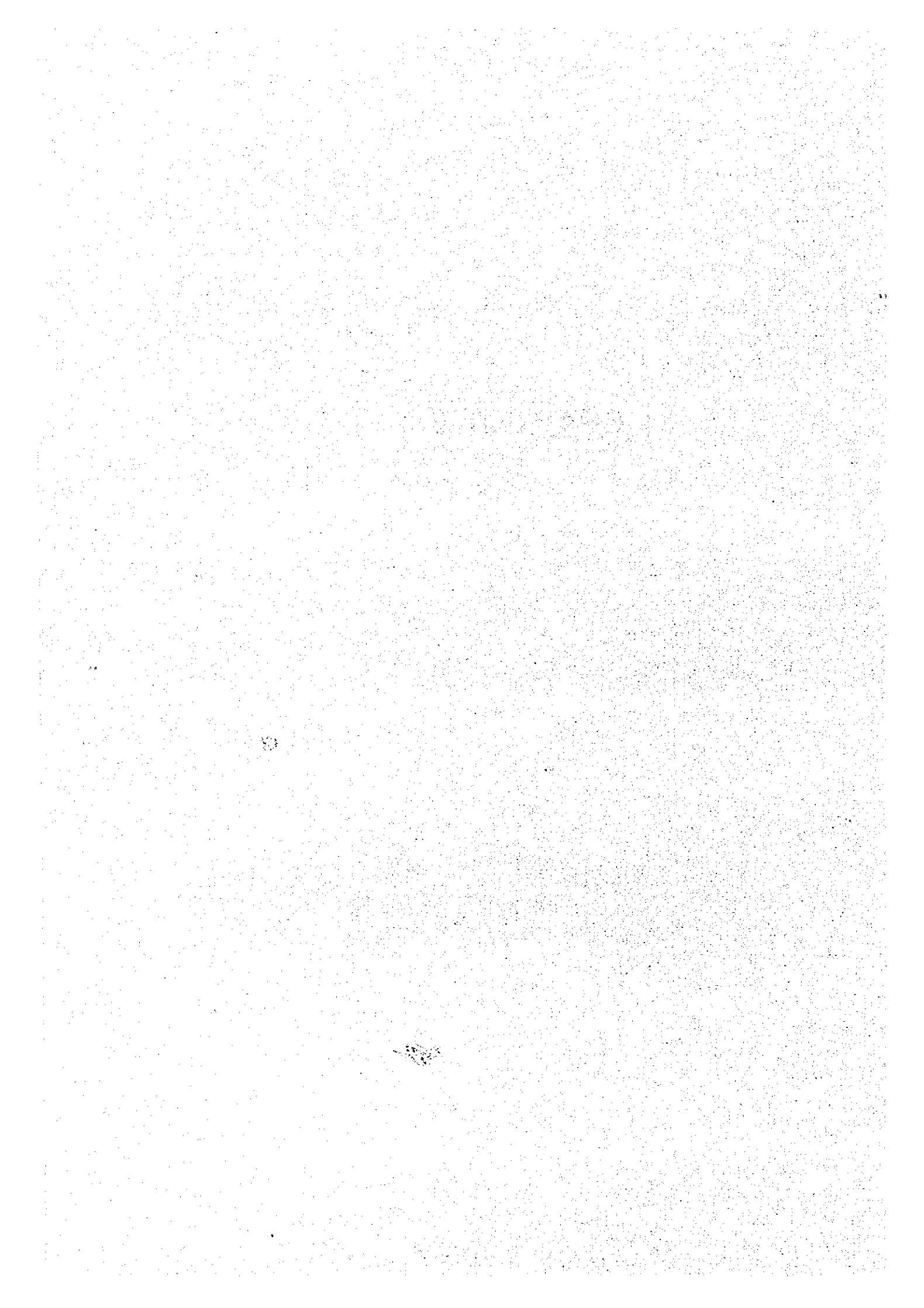
1. Intensive Grazing Methods in the Pasture Areas with Irrigation Facility
2. Improvement of Beef Cattle Production by Introduction of European and American Breeding Stock
3. Improvement of Hog Production by Introduction of European and American Breeding Swine
4. Improvement of Animal Feeding
5. Establishment of Effective Prevention of Animal Epidemics

5.4.5 Organization to Implement the Program

At present, there is no agricultural experiment station to implement the program mentioned above. However, it is anticipated that the research system of the technological development in the real size farm would be established by strengthening of the technology promotion section of SAG as nucleus of the system, and the research station of the technological development would be constructed in a land of 800 ha area in the suburb of Palmas owned by SAG.

CHAPTER 6

IMPLEMENTATION PROGRAM OF THE MASTER PLAN



CHAPTER 6

IMPLEMENTATION PROGRAM OF THE MASTER PLAN

6.1 Implementation Schedule of the Master Plan

6.1.1 Comprehensive Schedule

The Regional Development Program shall be put into implementation following the prioritization for development among ten (10) regions of the State of Tocantins. The highest priority for development is given to the North Region from standpoint of comparative advantage in the realm of geographic position, degree of development of infrastructure and financial capacity of farmers. The development for the rest of regions shall be made step by step taking socio-economic factors of each region together with paying attention to financial capacity of the state government.

It is judged that the state government is anxious for urgent implementation of the Agricultural Production Supporting System Strengthening Program. To comply with this state government's intention, it is essential that preparation of terms of reference for implementation of the program and arrangement for financing required fund of the program should be made as early as possible so that construction and re-construction of necessary facilities together with procurement of equipment and materials should be proceeded in the short-term of the Master Plan.

The Environmental Conservation Program is advised to be implemented at earlier state of the Master Plan so as to decelerate deterioration of environmental condition of the State. Of importance in hastening this program is financing arrangement including source of finance and allocation of fund. Implementation arrangement for the Technological Development Program for Sustainable Agriculture and Livestock Farming, similar to the case of the Environmental Conservation Program, should be made immediately.

Although having lower priority in implementation, the Specific Sectors Development Program is vital program in optimization of natural resources of the State. It is thus recommended that the study on assessment of resources for development should be made at convenient stage of the Master Plan when finance for the program becomes available.

In so far as the Private Sector Incentive Program, the implementation of this program is subject to locally available raw materials for encouragement of privately-operated agro-industry envisaged as an outcome of implementation of the Regional Development Program and other programs. In this context, it is proposed to put the order for its implementation in the medium term of the Master Plan.

The global schedule for implementation of the Master Plan is illustrated in the Fig. 6.1.

(1) Regional Development Program

Large amount of fund is required for implementation of the whole of the Regional Development Schedule, so implementation scheduling of the present program is advisable to be made step by step referring carefully to financing capacity of the state government including its indebtedness capacity.

1. Centralized regional development in compliance with prioritization for development
2. Integrated development with provision of rural credit

The former development method entails development of infrastructure with provision of hefty investment for specific sector, while the latter one conceives to reinvigorate generally agricultural production activity with provision of rural credit; the former proposal is an eligible method in terms of optimum utilization of natural resources but taking into account of the time span required for development of the whole state, the participation of the latter proposal is proposed. Areas for arable land, actually cultivated land and potential development land are summarized in the table below.

Unit: ha

Regions	Total Territory	Arable Land	Cultivated Area(94/95)	Remaining Potential Land
Extreme North	1,596,720	447,500	45,341	402,159
North	2,108,210	543,780	19,179	524,601
North-East	2,403,281	191,450	16,617	174,833
North-West	1,908,099	459,910	18,232	441,678
East	3,411,320	102,327	7,196	95,131
Central-West	3,045,930	303,964	29,743	274,221
Central	2,307,940	541,655	28,721	512,934
South-East	4,743,290	752,245	26,384	725,861
South-West	4,049,679	245,958	73,777	172,181
South	2,267,601	816,070	32,025	784,045
Tocantins	27,842,070	4,404,859	297,215	4,107,644

The implementation of the Regional Development Program shall comply with the global implementation schedule given in Fig. 6.1.1 (I). About 30% of the potential arable lands shall be developed under the centralized regional development method and, in addition, 0.5% and 1.5% of the same shall be developed yearly before and after implementation of the regional development program, respectively. The proposed development area

Table 6.1 Implementation Schedule of the Master Plan

Programs/Projects	Short-term					Medium-term					Long-term					2015 onward		
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012		2013	2014
Multimodal Central-North Transportation Corridor																		
a. Start of Operation: South-North Railroad from Estrelita																		
b. Start of Operation: Tecuantes River Waterway																		
1 ENVIRONMENTAL CONSERVATION																		
- Formulation of implementation plan and financing																		
- Rural credit for the Green Villages Plan																		
- Rural credit for environmental conservation plan																		
- Implementation of environmental conservation programs																		
2 AGRICULTURAL STRUCTURE REFORM																		
Manpower development sub-program																		
- Formulation of implementation plan and financing																		
- Infrastructure development																		
- Implementation of projects and services																		
Agricultural extension and services sub-program																		
- Formulation of implementation plan and financing																		
- Infrastructure development																		
- Implementation of the project																		
Agribusiness development sub-program																		
- Formulation of implementation plan and financing																		
- Infrastructure development																		
- Implementation of the project																		
3 TECHNOLOGICAL DEVELOPMENT FOR SUSTAINABLE AGRICULTURE																		
- Infrastructure development																		
- Technological development																		
4 REGIONAL DEVELOPMENT PROGRAM																		
North Region																		
- Implementation of M/T and F/S																		
- Infrastructure development and start of production																		
- Rendering extension services																		
- Provision of rural credit																		
- Encouragement of agro-industry																		
Extreme North Region (Zone I)																		
- Implementation of M/T and F/S																		
- Infrastructure development and start of operation																		
- Operation of development projects																		
South & Central Regions (Zone II)																		
- Implementation of M/T and F/S																		
- Infrastructure development and start of operation																		
- Operation of development projects																		
Southwest & Northwest Regions (Zone III)																		
- Implementation of M/T and F/S																		
- Infrastructure development and start of operation																		
- Operation of development projects																		
Northeast & East Regions (Zone V)																		
- Implementation of M/T and F/S																		
- Infrastructure development and start of operation																		
- Operation of development projects																		
Southeast Region (Zone IV)																		
- Implementation of M/T and F/S																		
- Infrastructure development and start of operation																		
- Operation of development projects																		
5 SPECIFIC SECTORS DEVELOPMENT PROGRAM																		
- Implementation of M/T and F/S																		
- Infrastructure Development																		

State Government External Cooperation Private Sector

Table 6.1 Implementation Schedule of the Master Plan

Programs/Projects	Short-term						Medium-term						Long-term						2015
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	
Municipal Central North Transportation Corridor																			
a. Start of Operation: South-North Railroad from Parrelito																			
b. Start of Operation: Tocantins River Waterway																			
1 ENVIRONMENTAL CONSERVATION																			
- Formulation of implementation plan and financing																			
- Rural credit for the Green Village Plan																			
- Rural credit for environmental conservation plan																			
- Implementation of environmental conservation program																			
2 AGRICULTURAL STRUCTURE REFORM																			
Manpower development sub program																			
- Formulation of implementation plan and financing																			
- Infrastructure development																			
- Implementation of manpower development																			
Agricultural research strengthening sub-program																			
- Formulation of implementation plan and financing																			
- Infrastructure development																			
- Implementation of the program																			
Modernization of livestock sub program																			
- Formulation of implementation plan and financing																			
- Infrastructure development																			
- Establishment of animal disease free zone																			
Agriculture-related organizations reconstruction Sub Program																			
- Formulation of implementation plan and financing																			
- Infrastructure development																			
- Implementation of development projects																			
3 TECHNOLOGICAL DEVELOPMENT FOR SUSTAINABLE AGRICULTURE																			
- Infrastructure development																			
- Technological development																			
4 REGIONAL DEVELOPMENT PROGRAM																			
North Region																			
- Implementation of MP and FN																			
- Infrastructure development and start of production																			
- Rendering extension services																			
- Provision of rural credit																			
- Encouragement of agro-industry																			
Extreme North Region (Zone I)																			
- Implementation of MP and FN																			
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South & Central Regions (Zone II)																			
- Implementation of MP and FN																			
- Infrastructure development and start of operation																			
- Operation of development projects																			
Southwest & Northwest Regions (Zone III)																			
- Implementation of MP and FN																			
- Infrastructure development and start of operation																			
- Operation of development projects																			
Northeast & East Regions (Zone V)																			
- Implementation of MP and FN																			
- Infrastructure development and start of operation																			
- Operation of development projects																			
Southeast Region (Zone IV)																			
- Implementation of MP and FN																			
- Infrastructure development and start of operation																			
- Operation of development projects																			
5 SPECIFIC SECTORS DEVELOPMENT PROGRAM																			
- Implementation of MP and FN																			
- Infrastructure Development																			
6 PRIVATE SECTOR PROGRAM																			
Promotion of the ZPE																			
Modernization of Logistics of Agro-products																			
Encouragement of agro-industry																			
Effective use of mineral resources																			
Promotion of livestock																			

State Government External Cooperation Private Sector

referring to development precedence among 10 regions of the State is given in the table below.

Proposed Development Area by Region (2 Years)

Regions	Unit: ha										Total
	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	2015	
Extreme North	4,022	4,022	20,108	100,540	12,065	12,065	12,065	12,065	12,065	213,142	402,159
North	5,246	26,230	131,150	15,738	15,738	15,738	15,738	15,738	15,738	267,547	524,601
Northeast	1,748	1,748	1,748	1,748	1,748	1,748	8,742	43,708	5,245	106,648	174,833
Northwest	4,417	4,417	4,417	4,417	4,417	22,084	110,420	13,250	13,250	260,590	441,678
East	476	476	476	951	951	951	4,757	23,783	2,854	59,457	95,131
Central-West	2,742	2,742	2,742	13,711	68,555	8,227	8,227	8,227	8,227	150,822	274,221
Central	5,129	5,129	5,129	25,647	128,234	15,388	15,388	15,388	15,388	282,114	512,934
Southeast	3,629	3,629	3,629	3,629	7,259	7,259	7,259	7,259	36,293	646,016	725,861
Southwest	861	861	861	1,722	1,722	8,609	43,045	5,165	5,165	104,169	172,181
South	7,840	7,840	7,840	7,840	39,202	196,011	23,521	23,521	23,521	446,906	784,045
Focantins(New)	36,111	57,095	178,101	175,944	279,891	288,080	249,160	168,104	137,747	2,537,412	4,107,644
(Accumulated)	36,111	93,205	271,306	447,250	727,141	1,015,220	1,264,381	1,432,485	1,570,231	4,107,644	

It is prerequisite to take the following measures in facilitating implementation of the program.

1. Acquisition of resources for provision of short-term rural credit (at least up to 2001)
2. Execution of the feasibility study on the regional development program (Centralized regional development method)
3. Financing arrangement for implementation of regional development program
4. Acquisition of resources for provision of medium- and long-term rural credit

(2) Agricultural Production Supporting System Strengthening Program

The sub-programs and projects contemplated in this program are indispensable for long-term sustainable development of the State, therefore they are scheduled to be implemented in parallel. Implementation of the present program entails the following measures.

1. Financial arrangement for implementation of the program
2. Detailed design for the project
3. Construction of facilities and procurement of equipment and materials
4. Implementation of respective project

Because all of sub-programs and projects are featured by higher priority for earlier implementation, it is of importance to prepare detailed programming of these sub-programs and projects so that construction of facilities and procurement of equipment and materials could be realized smoothly.

(3) Environmental Conservation Program

It is advisable that action plans should be elaborated prior to implementation of the sub-programs and projects conceived under the present program in view that they are essential in attaining proper conservation of natural resources and cover wide range of activities.

The implementation of the program shall be subject to taking the following measures:

1. Financial arrangement for implementation of the program
2. Detailed programming (Cash flow of loan, implementation method, scope of responsibility of the state government with regard to loan, etc.)
3. Implementation of sub-programs and project (Rural credit and public investment)
4. Implementation of public-financed projects (Environmental education and monitoring)

(4) Technological Development Program for Sustainable Agriculture and Livestock Farming

This program is formulated envisaging technical assistance from foreign countries as well as from other states of the country. The following measures should be taken prior to implementation of the present program.

1. Consolidation of implementation organization (location, manpower, etc.) for research on sustainable agriculture
2. Financing arrangement for implementation of the program
3. Detailed scope for the research

(5) Specific Sectors Development Programs

The specific sectors included in this program are water resources development and fresh water aquaculture and their implementation is subject to execution of the feasibility study. Therefore, the primary requisite shall be procurement of fund for the study and the implementation of the program is postponed to the later (long-term) stage of the Master Plan.

(6) Private Sector Program

This program, which is to be implemented with exclusive participation of the private sector, is also postponed to the latter (long-term) stage of the Master Plan due to the fact that its implementation is subject to significant expansion of agricultural output as a result of implementation of the programs.

6.1.2 Cost Estimation

(1) Regional Development Program

The cost for the program is estimated following the parameters given below.

- | | |
|---|---------------------------|
| 1. Land reclamation: | R\$ 2,000/ha |
| 2. Environmental improvement for land reclamation area: | R\$ 500/ha |
| 3. Infrastructure development | $0.15 \times (1 + 2)$ |
| 4. Implementation of the study | $0.04 \times (1 + 2 + 3)$ |

The cost of the program estimated for every two years to cover the whole implementation period of the Master Plan is as resumed in the table below.

		Unit: R\$ x 10 ³									
Components/Year	96/97	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	Total
Total development area (ha)	0	36,111	57,095	178,101	175,944	279,891	288,080	249,160	168,104	137,747	
1 Land reclamation	0	71,840	113,760	355,760	351,520	559,360	575,760	497,920	335,840	275,200	3,136,960
2 Environmental improvement	0	17,960	28,440	88,940	87,880	139,840	143,940	124,480	83,960	68,800	784,240
3 Infrastructure	0	13,400	21,300	66,700	65,900	104,800	107,900	93,300	62,900	51,600	587,800
4 Study	0	4,100	6,500	20,400	20,200	32,100	33,100	28,600	19,300	15,800	180,100
Total cost	0	107,300	170,000	531,800	525,500	836,100	860,700	744,300	502,000	411,400	4,689,100

Of the above estimate cost, approximately 80% of the sum of the item 1 and the item 2 shall be born by beneficiaries (farmers) and the remaining 20% of the same in addition to the item 3 and the item 4 shall be covered by public investment program. The table below summarizes this breakdown.

Components/Year	96/97	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	
Total cost	0	107,300	170,000	531,800	525,500	836,100	860,700	744,300	502,000	411,400	4,689,100
Private (Production)	0	57,472	91,008	284,608	281,216	447,488	460,608	398,336	268,672	220,160	2,509,368
Private (Environment)	0	14,368	22,752	71,152	70,304	111,872	115,152	99,584	67,168	55,040	627,392
Infrastructure		13,400	21,300	66,700	65,900	104,800	107,900	93,300	62,900	51,600	587,800
Study		4,100	6,500	20,400	20,200	32,100	33,100	28,600	19,300	15,800	180,100
Incentive	0	17,960	28,440	88,940	87,880	139,840	143,940	124,480	83,960	68,800	784,240

(2) Agricultural Production Supporting System Strengthening Program

The cost for respective sub-program and projects for these present program is given in the chapter 5, which is summed up in the table following table.

Unit: R\$ x 10³

Sub-programs/Year	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	Total
Total development area (ha)	36,111	57,095	178,101	175,944	279,891	288,080	249,160	168,104	137,747	1,570,231
1. Land titling and registration system improvement										
Capital cost	600	240	240	240	240	240	0	0	0	1,800
Recurrent cost	200	200	200	200	200	200	200	200	200	1,800
Total cost	800	440	440	440	440	440	200	200	200	3,600
2. Structural reform of SAG										
Capital cost	9,000	2,100	2,310	1,450	0	0	0	0	0	14,860
Recurrent cost	6,600	6,600	6,600	6,600	6,600	6,600	6,600	6,600	6,600	59,400
Total cost	15,600	8,700	8,910	8,050	6,600	6,600	6,600	6,600	6,600	74,260
3. Structural reform of RURALTINS										
Capital cost	1,600	8,750	0	0	0	0	0	0	0	10,350
Recurrent cost	400	400	400	400	400	400	400	400	400	3,600
Total cost	2,000	9,150	400	400	400	400	400	400	400	13,950
4. Plants inspection and quarantine system improvement										
Capital cost	0	1,000	0	0	0	0	0	0	0	1,000
Recurrent cost	200	200	200	200	200	200	200	200	200	1,800
Total cost	200	1,200	200	200	200	200	200	200	200	2,800
5. Agro-products inspection system improvement										
Capital cost	0	1,000	0	0	0	0	0	0	0	1,000
Recurrent cost	200	200	200	200	200	200	200	200	200	1,800
Total cost	200	1,200	200	200	200	200	200	200	200	2,800
6. Establishment of animal disease-free zone										
Capital cost	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	9,000
Recurrent cost										
Total cost	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	9,000
7. Strengthening of animal health laboratory										
Capital cost	0	1,000	0	0	0	0	0	0	0	1,000
Recurrent cost	200	200	200	200	200	200	200	200	200	1,800
Total cost	200	1,200	200	200	200	200	200	200	200	2,800
8. Strengthening of UNITINS agricultural division at Gurupi										
Capital cost	0	4,800	4,800	0	0	0	0	0	0	9,600
Recurrent cost	200	200	200	200	200	200	200	200	200	1,800
Total cost	200	5,000	5,000	200	200	200	200	200	200	11,400
9. Strengthening of school of veterinary medicine of UNITINS										
Capital cost	0	2,700	0	0	0	0	0	0	0	2,700
Recurrent cost	200	200	200	200	200	200	200	200	200	1,800
Total cost	200	2,900	200	200	200	200	200	200	200	4,500
10. Agricultural vocational training										
Capital cost	0	0	0	0	0	0	0	0	0	0
Recurrent cost	800	1,000	1,000	800	600	600	400	400	400	6,000
Total cost	800	1,000	1,000	800	600	600	400	400	400	6,000
11. Educational institutions strengthening										
Capital cost	0	1,800	2,500	0	0	0	0	0	0	4,300
Recurrent cost	100	100	100	100	100	100	100	100	100	900
Total cost	100	1,900	2,600	100	100	100	100	100	100	5,200
12. Farmers' organization promotion										
Capital cost	0	0	0	0	0	0	0	0	0	0
Recurrent cost	800	1,000	1,000	600	600	600	400	400	100	5,800
Total cost	800	1,000	1,000	600	600	600	400	400	400	5,800
Total										
Capital cost	12,200	24,390	10,850	2,690	1,240	1,240	1,000	1,000	1,000	55,610
Recurrent cost	9,900	10,300	10,300	9,700	9,500	9,500	9,100	9,100	9,100	85,500
Total cost	22,100	34,690	21,150	12,390	10,740	10,740	10,100	10,100	10,100	142,110

(3) Environmental Conservation Program

The cost of sub-programs for the Environmental Conservation Program and its breakdown between rural credit portion and public investment portion is summarized below.

Unit: R\$ x 10³

Sub-programs/Year	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	Total
1. Promotion of sustainable forestation	4,000	6,000								10,000
2. Control of burning	5,000	5,000								10,000
3. Mitigation of water contamination	5,000	5,000								10,000
4. Environmental enlightening and education										0
Capital cost	3,700	0	0	0	0	0	0	0	0	3,700
Recurrent cost	600	600	600	600	600	600	600	600	600	5,400
Total cost	4,300	600	600	600	600	600	600	600	600	9,100
5. Establishment of environmental monitoring system										
Capital cost	8,800	0	0	0	0	0	0	0	0	8,800
Recurrent cost	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	24,300
Total cost	11,500	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	33,100
6. Improvement of rural environ.	15,000	15,000								30,000
7. Promotion for seeds and seedlings	5,000	5,000								10,000
8. Sustainable farming model	35,000	35,000								70,000
9. Demonstration program										
Capital cost	4,000	0	0	0	0	0	0	0	0	4,000
Recurrent cost	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	16,200
Total cost	5,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	20,200
10. Fund for rural credit	69,000	71,000	0	0	0	0	0	0	0	140,000
Rural credit to farmers	62,100	63,900	0	0	0	0	0	0	0	126,000
Farmers' own fund	3,500	8,400	6,600	25,200	36,000	36,000	21,600	2,700	0	140,000
Public investment	17,960	22,740	11,400	5,700	5,000	3,200	1,500	700	600	68,800
Total	86,960	93,740	11,400	5,700	5,000	3,200	1,500	700	600	208,800
11. Public investment										0
Capital cost	16,500	0	0	0	0	0	0	0	0	16,500
Recurrent cost	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100	45,900
Total cost	21,400	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100	62,400

(4) Recurrent Cost for Operation of Agriculture-Related Organizations

Prevailing budgetary assignment of the state government to agriculture-related organizations is deficient limiting these organizations in performance of their services to specific fields. In order to implement the programs of the Master Plan in strictly due compliance with their time schedule, it is vital that budgetary allocation to such organizations as SAG, RURALTINS and INTERTINS should be grown in line with the progress of the Master Plan. In this sense, the recurrent cost for operation of these organizations is estimated in the following manner.

Unit: R\$ x 10³

Components/Year	96/97	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	Total
Development area (ha)	0	36,111	57,095	178,101	175,944	279,891	288,080	249,160	168,104	137,747	1,570,231
Arable area (ha)	297,215	333,326	390,420	568,521	744,465	1,021,356	1,312,435	1,561,596	1,729,700	1,867,446	
- SAG	8,000	9,900	11,700	17,000	22,300	30,700	39,300	46,800	51,800	56,000	
- RURALTINS	4,000	6,600	7,800	11,300	14,800	20,400	26,200	31,200	34,500	37,300	194,100
- INTERTINS	4,000	4,900	5,800	8,500	11,100	15,300	19,600	23,400	25,900	28,000	146,500
Total	16,000	21,400	25,300	36,800	48,200	66,400	85,100	101,400	112,200	121,300	634,100

(5) Total Cost of the Master Plan

Total sum of the costs required for implementation of the programs contemplated in the Mater Plan is as estimated below.

Unit: R\$ x 10³

Programs/Year	96/97	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	Total
Regional Development	0	107,300	170,000	531,800	525,500	836,100	860,700	744,300	502,000	411,400	4,689,100
Private (Production)	0	57,472	91,008	284,608	281,216	447,488	460,608	398,336	268,672	220,160	2,509,568
Private (Environment)	0	14,368	22,752	71,152	70,304	111,872	115,152	99,584	67,168	55,040	627,392
Infrastructure		13,400	21,300	66,700	65,900	104,800	107,900	93,300	62,900	51,600	587,800
Study		4,100	6,500	20,400	20,200	32,100	33,100	28,600	19,300	15,800	180,100
Recurrent cost	0	17,960	28,440	88,940	87,880	139,840	143,940	124,480	83,960	68,800	781,240
Agricultural Production Supporting System Strengthening											
Capital cost	0	12,200	24,390	10,850	2,690	1,240	1,240	1,000	1,000	1,000	55,610
Recurrent cost	0	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	76,500
Total cost	0	20,700	32,890	19,350	11,190	9,740	9,740	9,500	9,500	9,500	132,110
Environmental Conservation											
Public investment											
Capital cost	0	16,500	0	0	0	0	0	0	0	0	16,500
Recurrent cost	0	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100	16,800
Total cost	0	21,600	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100	62,400
Agricultural Organizations	16,000	21,400	25,300	36,800	48,200	66,400	85,100	101,400	112,200	121,300	634,100
Total	16,000	171,000	233,290	593,050	589,990	917,340	960,540	860,300	628,800	547,200	5,517,710

6.2 Financing Plan

The required fund for implementation of the present Master Plan is broken down in the following manner.

Unit: R\$ x 10³

Categories/Year	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	Total
Private investment (Production)	57,472	91,068	284,608	281,216	447,488	460,608	398,336	268,672	220,160	2,509,568
Private investment (Environment)	14,368	22,752	71,152	70,304	111,872	115,152	99,584	67,168	55,040	627,392
Public investment	77,760	94,230	200,490	190,270	291,580	299,780	260,980	180,760	150,800	1,746,650
- Capital cost	42,100	45,690	75,530	68,590	106,040	109,140	94,300	63,900	52,600	659,910
- Studies	4,100	6,500	20,400	20,200	32,100	33,100	28,600	19,300	15,800	180,100
- Recurrent cost	31,560	42,040	102,540	101,480	153,440	157,540	138,080	97,560	82,300	906,540
Agriculture-related organizations	21,400	25,300	36,800	48,200	66,400	85,100	101,400	112,200	121,300	634,100
Total	171,000	233,290	593,050	589,990	917,340	960,640	860,300	628,800	547,300	5,517,710

The disbursement schedule for the Agricultural Production Supporting System Strengthening Program and the Environmental Conservation Program which are to be implemented within the short term period of the Master Plan is as indicated below.

(Agricultural Production Supporting System Strengthening Program)

Unit: R\$ x 10³

Categories/Year	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	Total
Public investment										0
Capital cost	12,200	24,390	10,850	2,690	1,240	1,240	1,000	1,000	1,000	55,610
Recurrent cost	8,400	8,400	8,400	8,400	8,400	8,400	8,400	8,400	8,400	76,500
Total cost	20,600	32,790	19,350	11,090	9,640	9,640	9,400	9,400	9,400	132,110

(Disbursement Schedule of the Environmental Conservation Program)

Unit: R\$ x 10³

Categories/Year	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	Total
Credit to production sector	55,000	55,000	0	0	0	0	0	0	0	110,000
Credit to environment sector	14,000	16,000	0	0	0	0	0	0	0	30,000
Financing of public investment	39,360	27,840	16,500	10,800	10,100	8,300	6,600	5,800	5,700	131,000
Capital cost	16,500	0	0	0	0	0	0	0	0	16,500
Recurrent cost	23,060	27,840	16,500	10,800	10,100	8,300	6,600	5,800	5,700	114,700
Total	108,560	98,840	16,500	10,800	10,100	8,300	6,600	5,800	5,700	271,200

The balance of fund required after implementation of the above-mentioned two programs is calculated as given in the table below.

Unit: R\$ x 10³

Categories/Year	98/99	00/01	02/03	04/05	06/07	08/09	10/11	12/13	14/15	Total
Credit to production sector	2,472	36,008	284,608	281,216	447,488	460,608	398,336	268,672	220,160	2,399,568
Credit to environment sector	368	6,752	71,152	70,304	111,872	115,152	99,584	67,168	55,040	597,392
Financing of public investment	17,500	33,500	164,640	168,280	271,740	281,740	244,880	165,460	135,600	1,483,340
Capital cost	13,400	21,300	66,700	65,900	104,800	107,900	93,300	63,900	51,600	587,800
Studies	4,100	6,500	20,400	20,200	32,100	33,100	28,600	19,300	15,800	180,100
Recurrent cost	0	5,700	77,540	82,180	134,840	140,740	122,980	83,260	68,200	715,440
Total	20,340	76,260	520,400	519,800	831,100	857,500	742,800	501,300	410,800	4,480,300

The state government is required to take necessary measures in procurement of the disbursement cost for the years 1998 and 1999 within its budgetary arrangement, meanwhile as for financing of the fund to be disbursed from the year 2000 onward consideration should be made on possibility to get loan from foreign governments and/or international multilateral banking institutions in addition to making access to the transfer of the federal government's budget state governments. Worthy to point out is that the above financing plan is conceived on condition that loans for the Agricultural Production Supporting System Strengthening Program and the Environmental Conservation Program are provided from foreign government and/or international multilateral banking institutions.

Some portion of the rural credit to farmers may be obtained from foreign enterprises interested in investment in Tocantins or from national enterprises which are willing to make a loan to producers with guarantee for provision of harvests. Nevertheless, making use of these credit depends on how effectively attract investment of these enterprises and in this regard an implementation of the Environmental Conservation Program is significant; in particular, proposed investment from local farmers benefited by lower interest rate of rural credit and capital formation of these farmers call attention to farmers and owners of agro-industry outside the State.

Financing of public investment portion is foreseeable owing to growth of state government's income stemmed form increase in ICMC which is expected to be attained as a consequence in expansion of agricultural production.

6.3 Environmental Evaluation

The following items are considered in the Master Plan:

1. Within the Environmental Conservation Program there is an equivalent to 25% to be allocated for the regional development of the production.
2. The environmental monitoring, environmental education and control of fire were taken as priority in the implementation of the Master Plan.
3. The standards of agriculture development were included in the introduction of the sustainable agriculture in order to reach a sustainable development.
4. The introduction of a sustainable agriculture has been programmed through the installation of a demonstrative field for the development of researches and activities of extension for the sustainable agriculture.

Special management of the following points shall be required for the implementation of regional development programs.

Regional Development (Feasibility Study)	Items to be Considered
(Before the Implementation)	<ul style="list-style-type: none"> • Conservation area and Indian Reservation • Study of Environmental Law • Ecological effects caused by Large Scale Development • Conservation Methods of the Nature Reserves (50% of the properties) • Treatment of the production activities in the APAs • Problems in the Quality of Water • Problems of species in extinction • Social Problems • Use of land according to the Soil Aptitude
(Implementation Stage)	<ul style="list-style-type: none"> • Execution of Study Necessary for the implementation • Elaboration of the Conservation Plan and necessary requirements • Specific Monitoring • Monitoring

The implementation of the Strengthening Program for the agricultural production system may not require special attention in the environmental control considering that supply of equipment and implementation of punctual development are only expected.

Considering the characteristics of the program, the attention may focus in the common points between the request and the execution for the implementation of the Environmental Conservation Program. Strengthening of the monitoring institutions, INTERTINS, and the co-participants institutions for the control of the environment that may be required in order to reach the above mentioned goals.

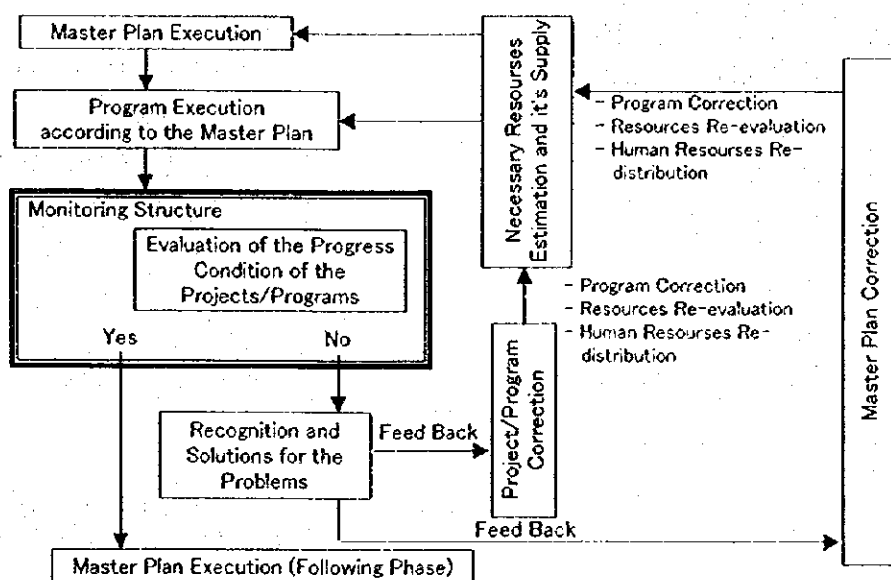
Environmental Conservation	Items to be Considered
Credit System	<ul style="list-style-type: none"> • To avoid provocation of social problems • To avoid the environmental deterioration • Contents of the requested projects and their contribution levels
Program	<ul style="list-style-type: none"> • Elaboration of the beneficiaries environmental control drawings • Supervision of drawings • General Monitoring (Forest, fire, CO₂, and quality of water)
Forest Management	<ul style="list-style-type: none"> • Reforesting species • Preserved Areas • Agriculture and Forest Effects
Control of Fire	<ul style="list-style-type: none"> • Requirement for fire • Study for the contribution of the environment improvement
Improvement of the Rural Environment	<ul style="list-style-type: none"> • Contribution to the community • Community relations
Supply of Seeds and Seedlings	<ul style="list-style-type: none"> • Contribution to the social problems • Communities • In extinction species
Sustainable Agriculture	<ul style="list-style-type: none"> • Social Problems • Communities • Quality of water

6.4 Monitoring for Implementation of the Master Plan

6.4.1 Monitoring Method

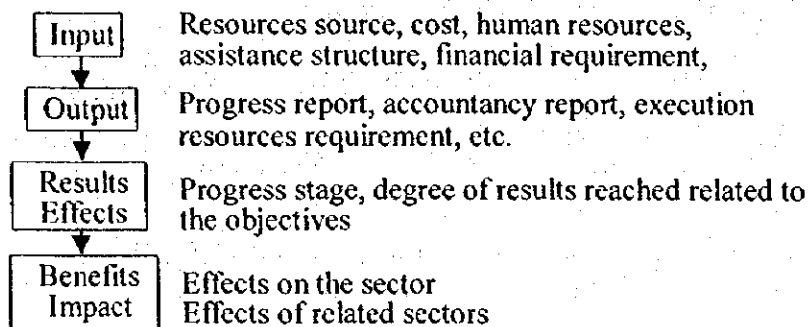
The present Master Plan seeks through introduction of sustainable development methods for invigoration of regional economy, rectification of disparities among regions and conservation of natural resources. This implies that the development programs/projects envisaged in the Master Plan should not be maldistributed to production activities nor should they accelerate regional and social disparities. In this context, periodic monitoring and modification of the Master Plan are necessary. Although these aspects are to be taken into account in scheduling for implementation of the Master Plan that has as objective year the year of 2015, it is probable that, as a consequence of changes in circumstances, contingencies may take place in such a manner as to demand alternation of original plans of programs/projects due to budgetary deficit or delay in procurement of financial resources. So proper monitoring and subsequent modification of on-going programs and projects are necessary.

The monitoring activities will also include certifying the progress conditions of the programs/projects to check whether it is reaching the established objectives, and when a problem is detected, it is necessary to elaborate solutions for a good development of the program. As all programs/projects are linked, it is extremely important to have a satisfactory progress of all programs/projects together. The execution organization and superior organization in the plan will be responsible for the monitoring. When any problem will be detected, the program/project must be corrected by a feed-back.



6.4.2 Monitoring Organization

The present Master Plan is related to the agricultural and livestock sector of the state, but as the general planning and of the financial resources are realized by SEPLAN, the programs/projects shall be monitored by each execution organization having the



SEPLAN as the center of these development organizations.

The contents and progress evaluation of each program/project will be realized utilizing indicators, subdividing the programs/projects into 4 stages. The results must be reported to the central Organization for the next year planing.

The monitoring will be realized by SEPLAN, SAG, RURALTINS, NATURATINS, ITERTINS and UNITINS, and the responsibility of each organization will be as follows:

Organization	Program/Project	Contents
SEPLAN	<ul style="list-style-type: none"> • Regional Development • Environmental Conservation • Related to the Private Sector • Others 	<ul style="list-style-type: none"> • Program General Evaluation • Progress Evaluation of each Program • Problems Recognition and their Solutions • Master Plan Correction • Cost Estimation and Supply
ITERTINS	<ul style="list-style-type: none"> • Establishment of a Land Registration System 	<ul style="list-style-type: none"> • Progress Evaluation of Related Programs • Problems Recognition and their Solutions
SAG	<ul style="list-style-type: none"> • Structural Improvement of SAG • Structural Improvement of Plant Inspection • Structural Improvement of Plant Sanitation and Protection • Establishment of Disease Free Zones • Animal Inspection System Improvement • Demonstration Farm • Sustainable Agriculture Promotion 	<ul style="list-style-type: none"> • Program General Evaluation • Progress Evaluation of each Program • Progress Evaluation of Related Programs • Problems Recognition and their Solutions • Master Plan Correction
RURALTINS	<ul style="list-style-type: none"> • Structural Improvement of RURALTINS 	<ul style="list-style-type: none"> • Progress Evaluation of Related Programs • Problems Recognition and their Solutions
NATURATINS	<ul style="list-style-type: none"> • Environment Education • Environment Monitoring System Establishment 	<ul style="list-style-type: none"> • Progress Evaluation of Related Programs • Problems Recognition and their Solutions
UNITINS	<ul style="list-style-type: none"> • Strengthen the Agricultural Research • Environment Education 	<ul style="list-style-type: none"> • Progress Evaluation of Related Programs • Problems Recognition and their Solutions

6.4.3 Progress Evaluation of Each Program

In order to have a smooth progress of the Master Plan, each program must run perfectly, being evaluated economically and technically in each phase. The following items must be evaluated for this purpose:

(1) Regional Development Program

Phase	Item	Evaluation Item	Execution Organization
Preliminary Studies	Execution Method	<ul style="list-style-type: none"> Required Organization, study contents, process State financing conditions, available human resources 	SEPLAN
	Study Contents	<ul style="list-style-type: none"> Necessity and priority of the study area Study contents 	SEPLAN
During the Study	Study Progress Conditions	<ul style="list-style-type: none"> Objectives reaching grade, studies precision Study results and process Financing methods of the public and private sectors Program fitness in the execution point of view 	SEPLAN
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> Financing method, Required Organization, execution details, process State loan, execution structure 	SEPLAN
Duration of Construction	Conditions of Progress	<ul style="list-style-type: none"> Each construction process, costs and loans Quality 	SEPLAN
Implementation	Private Sector Investment	<ul style="list-style-type: none"> Investment conditions External investment Production conditions of the agricultural and livestock sector 	SEPLAN

(2) Development Program of Agricultural and Livestock Production Structure

1) Structure Improvement Program of the Agriculture Related Organizations

a) Land Registration Improvement

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Methods	<ul style="list-style-type: none"> Required organization, study contents, process State financing conditions, available human resources 	SEPLAN/ ITERTINS
Construction	Construction Progress Conditions	<ul style="list-style-type: none"> Staff number increase Equipment introduction Property law registration 	SEPLAN/ ITERTINS
Implementation	Progress Conditions	<ul style="list-style-type: none"> Land registration experience Land utilization plan Data bank Registration system 	SEPLAN/ ITERTINS

b) Structural Improvement of SAG

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Financing method, required Organization, execution details, process • Resources, staff distribution • Fitness and necessity of each program • Programs details (supply methods elaboration) 	SEPLAN/SAG
Construction	Construction Progress Condition	<ul style="list-style-type: none"> • Construction, equipment supply conditions • Staff and resources increase conditions 	SEPLAN/SAG
Implementation	Progress Conditions	<ul style="list-style-type: none"> • Training and increase of SAG's staff • Resources supply • Quality and quantity of the agricultural and livestock production • Main disease occurrence grade 	SAG/ASTEP
	Structural Improvement Conditions of SAG	<ul style="list-style-type: none"> • Condition improvement in the plans and policy elaboration • Researches structural improvement 	SAG/ASTEP
	Central Installations Strengthening Conditions	<ul style="list-style-type: none"> • Contribution on plans and policy elaboration • Soil analysis conditions • Agricultural information • Quality improvement in the agricultural products 	SAG/ASTEP
	Improvement Conditions of the Regional Offices	<ul style="list-style-type: none"> • Agricultural assistance structure • Quality improvement and maintenance of the agricultural products in a regional level 	SAG/ASTEP
	Structural Conditions of the Agricultural and Animal Protection	<ul style="list-style-type: none"> • Evolution grade of the agricultural and animal protection • Exportation quantity • Occurrence frequency of disease and plagues • Establishment conditions of disease free zones 	SAG-Production Agricultural Division/Animal Production Division
	Agricultural Researches Conditions	<ul style="list-style-type: none"> • Technology development adapted to the state • Research evolution grade for sustainable agriculture • Extension technology conditions for the producers 	SAG - Technical Development Division

c) Structural Improvement of RURALTINS

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Financing method, required Organization, execution details, process • Resources, staff distribution • Office general plan • Preparations for equipment supply for the offices 	SEPLAN/ SAG/ RURALTINS
Construction	Construction Progress Conditions	<ul style="list-style-type: none"> • Equipment supply and construction to link the regional offices • Training center construction 	SAG/ RURALTINS
Implementation	Extension of Structural Improvement in a Regional Level	<ul style="list-style-type: none"> • Number of Extension specialists • Number of producers that received finance • Agricultural production quantity • Number of producers who received information about agricultural production 	SAG/ RURALTINS
	Technical Improvement of Extension Specialists	<ul style="list-style-type: none"> • Number of persons who received the state training • Extension realized quantity for the producers • Number of introduction of new crops • Number of producers that initiated the sustainable agriculture 	SAG/ RURALTINS

d) Structure Development of Agricultural Products Inspection

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Financing method, required Organization, execution details, process • Resources, staff distribution • Structure development of agricultural products inspection 	SAG/ASTEP
Construction	Construction Progress Condition	<ul style="list-style-type: none"> • Inspection offices construction 	SAG/ASTEP
Implementation	Inspection Structure for Agricultural Products	<ul style="list-style-type: none"> • Agricultural products norms definition • Organization fiscalization and inspection execution • Inspection number • Sample number in each inspection station 	SAG/ Agricultural Production Division
	Banco de Datos	<ul style="list-style-type: none"> • Data bank formation • Involved offices linking conditions 	SAG/ Animal Production Division

c) Structural Development of Agricultural Protection and Inspection

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Financing method, required Organization, execution details, process • Resources, staff distribution • Structural Development Plan of inspection and protection 	SAG - ASTEP
Construction	Construction, Progress Condition	<ul style="list-style-type: none"> • Necessary equipment supply 	SAG - ASTEP
Implementation	Inspection Technology	<ul style="list-style-type: none"> • Disease and plague occurrence frequency and inspection conditions at the state limits • Disease and plague detection 	SAG – Agricultural Production Division
	Sterilization technology	<ul style="list-style-type: none"> • Sterilization quantity and number 	SAG – Agricultural Production Division

2) Livestock Modernization Program

a) Establishment of Animal Disease Free Zones

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Financing method, required organization, execution details, process • Resources, staff distribution • Disease free zone establishment plan 	SAG - ASTEP
During the Construction	FMD Free Zone	<ul style="list-style-type: none"> • Vaccine number and promotion events • Importation conditions of not vaccinated animals • Formation conditions of disease free zones in each municipality 	SAG – Animal Production Division
	Swine Cholera Free Zone	<ul style="list-style-type: none"> • Vaccination number • Importation conditions of not vaccinated animals • Formation conditions of disease free zones in each municipality 	SAG – Animal Production Division

b) Improvement of Animal Inspection System

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Financing method, required Organization, execution details, process • Resources, staff distribution • Installation development program progress grade • Construction preparative 	SAG - ASTEP
Construction	Construction Progress Condition	<ul style="list-style-type: none"> • Necessary equipment supply 	SAG - ASTEP
Implementation	Inspection Technology	<ul style="list-style-type: none"> • Virus inspection number, bacterium, plague and toxic products • Livestock products inspection • Mobile stations utilization in the animal inspection • Livestock production quantity 	SAG – Animal Production Division
	Sterilization Technology	<ul style="list-style-type: none"> • Quantity of each livestock products 	SAG – Animal Production Division

3) Strengthening Program of Agricultural Research

a) Strengthening Program of the Agronomy Faculty of UNITINS

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Financing method, required organization, execution details, process • Resources, staff distribution • Preparations for installation increase 	UNITINS
Construction	Construction Progress Condition	<ul style="list-style-type: none"> • Campus increase • Development of experimental fields • Development of meteorological stations • Development of training centers 	UNITINS
Implementation	Instruction Grade	<ul style="list-style-type: none"> • Number of students and graduates • Researches results presentation 	UNITINS
	Experimental Fields Utilization	<ul style="list-style-type: none"> • Research results of experimental fields • Extension for surrounding producers 	UNITINS
	Meteorological Stations Utilization	<ul style="list-style-type: none"> • Meteorological station data • Publication of information 	UNITINS
	Training Center Utilization	<ul style="list-style-type: none"> • Assistance number for vegetable and fruit producers 	UNITINS

b) Strengthening Program of the Veterinary Faculty of UNITINS

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> Financing method, required Organization, execution details, process Resources, staff distribution Preparations of installation constructions 	UNITINS
Construction	Construction Progress Condition	<ul style="list-style-type: none"> Teaching and research equipment supply Veterinary hospital equipment supply Experimental field establishment 	UNITINS
Implementation	Instruction Grade	<ul style="list-style-type: none"> Student and graduates number Research results presentation 	UNITINS
	Experimental Fields Utilization	<ul style="list-style-type: none"> Experimental field research results Surrounding producers extension 	UNITINS
	Livestock Diversification Grade	<ul style="list-style-type: none"> Livestock production variety in surrounding lands 	UNITINS
	Introduction of Crop Rotation Technology	<ul style="list-style-type: none"> Number of producers who introduced the crop rotation 	UNITINS

4) Human Resources Formation Program

a) Agricultural Professional Training Program

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> Financing method, required Organization, execution details, process Resources, staff distribution Preparations for installation construction 	SAG - ASTEP
Construction	Staff Training Conditions	<ul style="list-style-type: none"> Participant number in the training Training duration Trainer number of related Organizations 	SAG - ASTEP
	Field Training and for Living Condition Development	<ul style="list-style-type: none"> Participant number in the training Training duration Trainer number of related Organizations 	SAG - ASTEP

b) Training Organization Strengthening Program

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Financing method, required Organization, execution details, process • Resources, staff distribution • Preparations for installation construction 	SAG - ASTEP
Construction	Progress Condition	<ul style="list-style-type: none"> • Construction conditions 	SAG - ASTEP
Implementation	Teaching Condition	<ul style="list-style-type: none"> • Number of students and graduation • Teacher number and respective curriculum 	SAG - ASTEP
	Medium Producers Condition	<ul style="list-style-type: none"> • Graduated students employment conditions 	

c) Promotion Program of Producer Organization

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Financing method, required Organization, execution details, process • Resources, staff distribution • Training program elaboration 	SAG - ASTEP
Construction	Social Assistance Activities	<ul style="list-style-type: none"> • Number of elaborated programs for extension specialist training • Number of training program for agricultural producers 	SAG - ASTEP
	Producers Association	<ul style="list-style-type: none"> • Number of producers association • Number of regional associations 	SAG - ASTEP
	Rural Women Association	<ul style="list-style-type: none"> • Number of rural women association 	SAG - ASTEP

(3) Environmental Conservation Program

1) General Program

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method (Part C)	<ul style="list-style-type: none"> • Financing method, required Organization, execution details, process • Resources, staff distribution • Negotiation between financing Organizations 	SEPLAN/SAG
	Agricultural Credit Sector (Part A)	<ul style="list-style-type: none"> • Plan elaboration of resources flux • Execution method of the agricultural credit (credit details, credit conditions details, executing Organization, government responsibility, items to be assisted by the federal government, etc.) • Assistance structure 	SEPLAN/SAG/ RURALTINS
	Public Investment Sector (Part B)	<ul style="list-style-type: none"> • Plan elaboration for resources flux • Preparations for the installations and equipment supply 	SEPLAN/SAG/ NATURATINS/ RURALTINS
Construction	Progress Conditions	<ul style="list-style-type: none"> • Construction conditions (disbursement, works, credits, etc.) 	SEPLAN/SAG
	Agricultural Credit Sector	<ul style="list-style-type: none"> • Resources flux • Value and number of agricultural credits • Utilization mode of the credit • Assistance for producers to acquire credits 	SEPLAN/SAG/ RURALTINS/ NATURATINS
	Public Investment Credits	<ul style="list-style-type: none"> • Resources flux • Tendering progress 	SEPLAN/SAG/ RURALTINS/ NATURATINS
After Construction	Construction Results	<ul style="list-style-type: none"> • Fire occurrence, effects on forest areas • Effects on agricultural production increase • Effects on regional activation • Sustainable agriculture introduction 	SEPLAN/SAG
	Agricultural Credit Sector	<ul style="list-style-type: none"> • Producers repayment capacity • Reutilization of the resources • Environmental improvement • Sustainable agriculture introduction • Direct investment of other states • Agricultural and livestock production 	SEPLAN/SAG/ RURALTINS/ NATURATINS
	Public Investment Sector	<ul style="list-style-type: none"> • Fire numbers • Forest area • Water pollution 	SEPLAN/SAG/ RURALTINS/ NATURATINS

2) Environmental Conservation Program

a) Sustainable Forestation Program

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> Each project detail 	SEPLAN/SAG / NATURATINS
Construction	Progress Condition	<ul style="list-style-type: none"> Realized number and proportion of resources utilization Financed items Resources utilization on forestation and reforestation Resources utilization on producers conservation areas maintenance Resources utilization to improve pasture Resources utilization on agro-industry promotion 	SEPLAN/SAG / NATURATINS
After Construction	Effects	<ul style="list-style-type: none"> Maintenance of state forest areas Maintenance of improved pasture 	SEPLAN/SAG / NATURATINS

b) Burning Control

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> Each project details 	SEPLAN/SAG / NATURATINS
Construction	Progress Condition	<ul style="list-style-type: none"> Realized number and proportion of resources utilization Resources utilization to promote burning control Resources utilization on extraction sector 	SEPLAN/SAG / NATURATINS
After Construction	Effects	<ul style="list-style-type: none"> Number of fire occurrence 	SEPLAN/SAG / NATURATINS

c) Water Quality Improvement Program

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> Each project detail 	SEPLAN/SAG / NATURATINS
Construction	Progress Condition	<ul style="list-style-type: none"> Realized number and proportion of resources utilization Resources utilization on measures for water pollution 	SEPLAN/SAG / NATURATINS
After Construction	Effects	<ul style="list-style-type: none"> Water quality improvement 	SEPLAN/SAG / NATURATINS

d) Environmental Education

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Each project detail 	SEPLAN/SAG / NATURATINS
Construction	Progress Condition	<ul style="list-style-type: none"> • Preparations for the environmental education program • Construction of the environmental education center • Construction of the agricultural environment center • Agenda 21 realization 	SEPLAN/SAG / NATURATINS
After Construction	Effects	<ul style="list-style-type: none"> • Participant number (SOS fires, environmental education for Indians, green week, rare specimen conservation, agricultural defensive utilization, water pollution control, etc.) • Center utilization 	SEPLAN/SAG / NATURATINS

e) Establishment of Environmental Monitoring System

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Each project detail 	SEPLAN/SAG / NATURATINS
Construction	Progress Condition	<ul style="list-style-type: none"> • Burning monitoring realization • Construction of the environmental analysis laboratory • Establishment of meteorological stations network • Monitoring realization of industrial activities • Structural improvement of NATURATINS regional offices • Study promotion in environmental conservation areas 	SEPLAN/SAG / NATURATINS
After Construction	Effects	<ul style="list-style-type: none"> • Results of burning activities researches, number of seminars • Analysis results and it's extension • Resource monitoring activities • Environmental control results of NATURATINS regional offices • Number of Seminars related to environmental conservation areas 	SEPLAN/SAG / NATURATINS

3) Green Village Program

a) Environmental Improvement of Degraded Areas

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Each project details • Assistance method for small producers 	SAG/ RURALTINS
Construction	Progress Condition	<ul style="list-style-type: none"> • Realized number and resources utilization • Resources utilization destined to Bico do Papagaio • Resources utilization destined to Jalapão 	SAG/ RURALTINS
After Construction	Effects	<ul style="list-style-type: none"> • Regional improvement results 	SAG/ RURALTINS

b) Promotion Program for Seed and Seedling Production

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparation	Execution Method	<ul style="list-style-type: none"> • Each project detail • Assistance method for small producers 	SAG/ RURALTINS
Construction	Progress Condition	<ul style="list-style-type: none"> • Realized number and resources utilization • Resources utilization in the research sector of seed production • Resources utilization for seed producers • Resources utilization for seedling producers • Resources utilization for small animals producers • Resources utilization for semen, seed and seedling distributors 	SAG/ RURALTINS
After Construction	Effects	<ul style="list-style-type: none"> • Commercialized and produced quantity of improved seeds 	SAG/ RURALTINS

c) Promotion Model for Sustainable Agriculture

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Each project detail • Assistance method for small producers 	SAG/ RURALTINS
Construction	Progress Condition	<ul style="list-style-type: none"> • Realized number and utilization of resources • Resources utilization in each model • Resources utilization in each area • Resources utilization for medium and big producers 	SAG/ RURALTINS
After Construction	Effects	<ul style="list-style-type: none"> • Sustainable agriculture introduction 	SAG/ RURALTINS

4) Demonstration Farm

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Each project detail 	SAG/ RURALTINS/ UNITINS
Construction	Demonstration Farm	<ul style="list-style-type: none"> • Farm establishment • Research theme of the demonstration farm, training program elaboration 	SAG/ RURALTINS/ UNITINS
After Construction	General	<ul style="list-style-type: none"> • Technological researches development • Technological transference through training • Extension related to environmental monitoring 	SAG/ RURALTINS/ UNITINS

(4) Promotion Program of Sustainable Agriculture

Phase	Item	Evaluation Item	Execution Organization
Construction Phase Preparations	Execution Method	<ul style="list-style-type: none"> • Resources supply method, requesting Organization, execution details, process • Resources, staff distribution • Resources supply progress • Research contents 	SEPLAN/SAG/ RURALTINS
Construction	Development Technology	<ul style="list-style-type: none"> • Technological development of environmental monitoring • Technological development related to the sustainable agriculture • New technology development in the livestock sector to contribute for the sustainable agriculture • Resources results (recognition of vegetation, soils and water resources, soil degradation, disease and plague occurrence, soil conservation) • Utilization of the developed technology in the state agriculture 	SEPLAN/SAG/ RURALTINS

(5) Specific Sectors Development Program

1. Implementation method of the program; financing plan
2. Adequacy of the program implementation
3. Contribution of the program to regional economic development

(6) Private Sector Program

1. Financing plan and cash flow
2. Credit conditions to attract investment
3. Disbursement of the program's finance

4. Repayment of credit
5. Justification of finance for credit sector within context of development strategies of the state.
6. Contribution for economic development of the state

6.4.4 Identification of Problems and Suggestion for their Solution

It is indispensable to identify problems and to propose measures for their solution in the course of the assessment of the progress of programs.

Problems are to be identified with respect to the following items:

- ① Finance (Cash flow, amount, conditions for procurement)
- ② Operation (Implementation organization, supporting and coordination system)
- ③ Technical aspect (Technical justification for respective program)
- ④ Coordination with the Master Plan

6.4.5 Modification of the Master Plan to comply with Identification of Problems

With identification of problems and suggestions for their solution, revision on contents of the programs shall be made so as to judge whether modification of the programs is needed or not. Bearing in mind that the delay in implementation of some program(s) may affect substantially the global implementation schedule of the Master Plan, periodical revision on the contents and progress of the programs is essential in order to complete the Master Plan which seeks for coordination and harmony between production and environment as well as between private investment and public investment.

In revising and modifying the Master Plan, attention shall be paid to the following targets of the Master Plan.

- ① Invigoration of regional economic activities
- ② Accomplishment of sustainable farming
- ③ Consistent farm production
- ④ Rectification of inter-regional disparities
- ⑤ Enhancement of social services

6.4.6 Financing Plan and Budgetary Arrangement

Proposed sources for financing of the present Master Plan are budgetary arrangement of the state government and extra-state agencies/institutions and it is a prerequisite to specify these sources prior to implementation of the programs. Since the investment for the programs is subject to fluctuation according to modification of the contents of the

programs, additional budgetary arrangement of the state government and procurement of additional finance from extra-state agencies/institutions may be considered. Hence, the following measures should be taken:

- ① Revision of programs' budget allocated by the state government according to modifications of the contents of the programs and appropriation of additional amount in subsequent fiscal years
- ② Preparation of financing plan for extra-state sources to cover four or five years later
- ③ Procedure for procurement of finance from extra-state sources and establishment of implementation agency for this procurement

6.5 Project Evaluation

6.5.1 Principles for Evaluation

The Integrated Development Master Plan Study for Agriculture and Livestock of the State of Tocantins is expected to be carried out for the target year of 2015 comprising the following six major programs, namely:

- Regional Development Program
- Agricultural Production Supporting System Strengthening Program
- Environment Conservation Program
- Technological Development Program for Sustainable Agriculture and Livestock Farming
- Specific Sectors Development Program
- Private Sector Incentive Program

Amongst these programs, the Regional Development Program is a heterogeneous program, because the content of which has not been materialized yet but to be formulated in the coming near future subject to implementation of detailed field survey as well as compiling and making analysis of the survey result. Hence, this program shall be alienated from the task of project evaluation. Similarly, the Specific Sectors Development Program which envisages to encourage two specific sectors that are considered to be important sectors for future agricultural development of the State of Tocantins, is excluded from economic evaluation because of its rudimentary status of project formulation.

In so far as the Agricultural Production Supporting System Strengthening Program is concerned, the program consists of four subprograms and all of them are featured by the component for strengthening including beefing up of human resources. The cost for these subprograms has been estimated, but the benefits accrued from them are hard to be quantified. In the light of this difficulty, the economic evaluation which accompanies

inevitably calculation of the internal rate of return shall not be conducted for this program.

The Technological Development Program for Sustainable Agriculture and Livestock Farming has been formulated in view of attaining sustainable farming system through establishment of a development technology demonstration center. This program, which is proposed to be put into implementation under project-type technical cooperation, aims to disseminate technologies to be developed there to indefinite "cerrado" lands extended over the state territory and its direct benefits are difficult in quantification because it is not easy to identify the program's direct beneficiaries, as the case of the Agricultural Production Supporting System Strengthening Program. Due to the reason mentioned herewith, this program shall not be evaluated economically.

The Private Sector Incentive Program, meanwhile, is composed of five subprograms to be implemented by the private sector with supports rendered by the public sector for their encouragement. Due to this characteristics, which is dissimilar to economic evaluation to be made for evaluation of a project's contribution to the national economy, this program shall be also alienated from economic evaluation.

Finally, the Environmental Conservation Program which consists of two subprograms: the Environmental Preservation and the Green Village, shall be subject to economic evaluation in so far as tangible benefits are comprised. It is worth to point out that projects included in the sup-program of Environmental Preservation (Sustainable forestation and reforestation, control of burning, environmental education and enlightening, environmental monitoring) and the Seeds and Seedlings Promotion Project in the sub-program of Green Village are excluded from economic and financial evaluation because they envisage a great number of indiscriminate beneficiaries and face difficulty in quantification of benefits accordingly.

To comply with above-mentioned principles, the subsequent economic and financial evaluation of the present Master Plan shall be made limiting to some projects contemplated in the Environmental Conservation Program.

6.5.2 Economic and Financial Evaluation of Selected Projects

As explained in the sub-section 6.5.1, the economic and financial evaluation shall be made regarding some projects included in the Green Village Program of the Environmental Conservation Program in view of the fact that the benefits accrued from the program are easily quantifiable; the Green Village Program is constituted by four subprograms, of which two subprograms, Improvement of Rural Environment and Sustainable Farming Model, contains the components which serve to estimate project's costs and benefits tangibly. The general features of these projects are given in the Annex XVIII, which may be resumed: total development area – 9,640 ha, total number of

beneficiaries – 103, estimated total project cost – R\$ 20,173,050.

The economic and financial evaluation is carried out in compliance with the conventional methodology that is commonly applied for evaluation of development projects in Brazil under finance of the World Bank and other bilateral and multilateral financing institutions. The indicators used for evaluation are Internal Rate of Return (IRR) and apart from this indicator, the Net Present Value has been calculated so as to present the magnitude of the projects' incremental benefits.

The prices of agricultural commodities, farm inputs and machinery, materials and labor force for civil works to be used for financial evaluation are based on market prices prevailed in Brazil. For the purpose of economic analysis, border price were estimated for all tradable commodities to be produced by the projects, based on the World Bank projections (February 1996), while the price of non-tradable commodities was set the same as prevailing domestic market prices; in addition such transfer items as tax, interest and subsidy are deduced and economic price for farm inputs, manpower and materials and equipment for civil works are obtained with application of conversion factors to their market prices. The opportunity cost of capital was estimated to be 12% referring to World Bank-financed projects in Brazil.

In the without-project situation, in which marginal and small farmers conduct subsistence farming without producing cash crops to be traded at market the profit and loss of farm operation is assumed to be balanced, although there are indications that, in the absence of soil conservation measures, yields have been declining as a result of degradation of soil fertility. Meanwhile, farm operation balance with-project situation has been prepared on the basis of the target yields attained by agriculturally developed regions in Brazil together with farm-gate price and production cost prevailed in the country.

Bearing durable years of projects' major facilities (irrigation system and rural installations) in mind, the project life for all projects has been set forth as twenty (20) years.

With annual inflow (benefits) and outflow (costs) at market and economic price estimated to comply with the methodology presented in the previous sub-sections, an annual incremental net benefits (annual benefits minus annual costs) have been incorporated to cover the whole project life (20 years). These incremental benefits constitute the basis for calculating an IRR for both economic and financial term and a NPV with discount rate of 12%.

The result for calculation of ERR for respective project varies between 19% and 96% (28% for combined component) and it is thereby concluded that the implementation of all of projects is justified from the standpoint of the national economy because of these values' superiority to the opportunity cost of capital.

The cost for the six projects in question, both for construction works and for procurement of equipment and materials, shall be borne by beneficiaries, it is therefore important to underline financial returns of project. The FRRs of the six projects are in the range of 9% - 28% (14% for combined component) and all projects except for one (Integrated cereals and beef cattle production by medium and large farms) show financial feasibility supported by their FRR in excess of the opportunity cost of capital.

Detailed information relevant to calculation of IRR and NPV is provided in tables of the Annex XVIII.

Based on the results of the State Government's financial capability in relation to the required investment capital for the implementation of the proposed program/project in the Master Plan, it was judged that the state government has sufficient financial capability for the implementation of the proposed program/project requiring the financial amount from 23 to 55% of the state capacity.

6.5.3 Farmers' Income Analysis

The farmers' income analysis under the present Master Plan is carried out on two model farms chosen from six projects presented herewith. The principal reason to realize this farm income analysis falls on assessing whether farmers by different categories of farm size and farming system are capable of realizing financially sound farm operation with attaining sufficient returns even being in debt to banks in the form of rural credit for capital and recurrent expenses of farm properties and crops and livestock farming.

The two model farms are chosen from the projects of: Integrated Cereals and Beef Cattle Production by Small Scale Farmers (Agricultural land use area: 160 ha) and Integrated Vegetable Production and Swine Farming by Small Farmers (Agricultural land use area: 35 ha).

In build-up of crop budget all prices are quoted in market price as of mid-1997. Crop and livestock yields coincide with those which have been applied for economic and financial evaluation, meanwhile farm-gate prices are calculated in actual term.

Landholders of model farms are supposed to be deficient in financial resources for realizing farm operation, establishment of rural installations and purchase of agricultural machinery with their own fund. Thus, they shall have depend on rural credit rendered by relevant banks.

It is assumed that both landowners of model farm have to undertake without rural property represented by agricultural machinery and equipment, so large amount of capital cost is required for procurement of on-farm irrigation facilities, agricultural machinery

and rural installations. Under the situation, it is predicted that the farm operation would result in deficit for the for some years from the commencement of farm operation, and accumulated debt would not be written off until 13th year for the case of the model farm No.1 and 15th year for the case of the model farm No.2. Nevertheless, owing to intensification of land use and application of advanced farming technologies, these two model farms can anticipate substantial farm profits per year

Indicators of IRR and NPV obtained as an outcome of farm income analysis of model farms are as follows: 12% and R\$ 6,477 (Integrated Cereals and Beef Cattle Production by Small Scale Farmers) and 19% and R\$ 39,021 (Integrated Vegetable Production and Swine Farming by Small Farmers). The balance sheet for operation of these two model farms is as per tables of the Annex XVIII. Referring to the current interest rate of rural credit – 6%/year + TJLP (50% of discount), it is predicted that farmer undertaking these farm models may be faced with an austerity in their farm operation.

6.5.4 Master Plan's Socio-economic Impacts

Albeit having high potentials for agricultural development endowed with fertile soil condition, abundant water resources, favorable climatological conditions, etc., the State of Tocantins has not attained anticipated agricultural development up to date. Major constraints which have braked the development of the agriculture sector are geographical disadvantageous position of the State located far away from leading marketing entry ports for agricultural commodities and inputs of the country and deficient provision of institutional supporting services to producers; the former constraint is expected to be mitigated with progress of the Multimodal Central-Northern Transportation Corridor which is highly beneficial to the agricultural sector of the State in hastening export of agricultural products of the State not only to other states of the country but also to the international market. Meanwhile, in so far as the latter constraint is concerned, despite both federal and state governments have proposed policies to invigorate agricultural and livestock productive activities of the State, no outstanding outcome has been shown up to date.

Under the circumstances, the present master plan has forged a number of programs and projects in relation with strengthening of institutional capacity including manpower development of public organizations in charge of supporting services to producers. These programs and projects have been designed to contribute to improvement of agricultural production, both in quality and quantity, and they are proposed to benefit directly unspecified number of farmers in Tocantins. Therefore, they shall bring about immeasurable direct benefits to the economy of the State of Tocantins.

Besides said institutional strengthening programs and projects, the Master Plan also comprises programs and projects which have been formulated aiming at ameliorating environmental condition and introduction of unconventional farming practice that leads

to realize sustainable agricultural production in harmony with conservation of natural resources. Farming system proposed in these programs and projects does not seek for intensive use of land with excessive application of fertilizers and agro-chemicals, but is designed to make it viable for farmers to use land resources as sustainable as possible with introduction of crop-pasture rotation, agro-forestry, etc. so that future generations can also gain considerable livelihood depending on them. Apart from these environmental implication, the programs and projects envisages innovated farming system for the State of Tocantins such as mixed farming of crops and cattle or minor animals like buffalo and hog, fruit cultivation and export-oriented grains production. Furthermore, the integrated agricultural and livestock plan shall have significant impact on alleviation of rural poverty, because one of the objectives of some projects is to enhance living standard of marginal peasants who are actually conducting nothing but subsistence farming.

It is accordingly judged that the integrated agricultural and livestock development plan is justified from institutional, environmental and socio-economic points of view. In addition, some projects which have definitely quantifiable benefits have been proved to be economically and financially feasible. Nevertheless, it is advisable that the government should propose some exceptional policy applied to producers who embark environmentally sustainable farming practice sacrificing economic profitability of farm operation.

Apart from above direct benefits, it is anticipated that the following indirect benefits are to be accrued through implementation of the integrated agricultural and livestock plan.

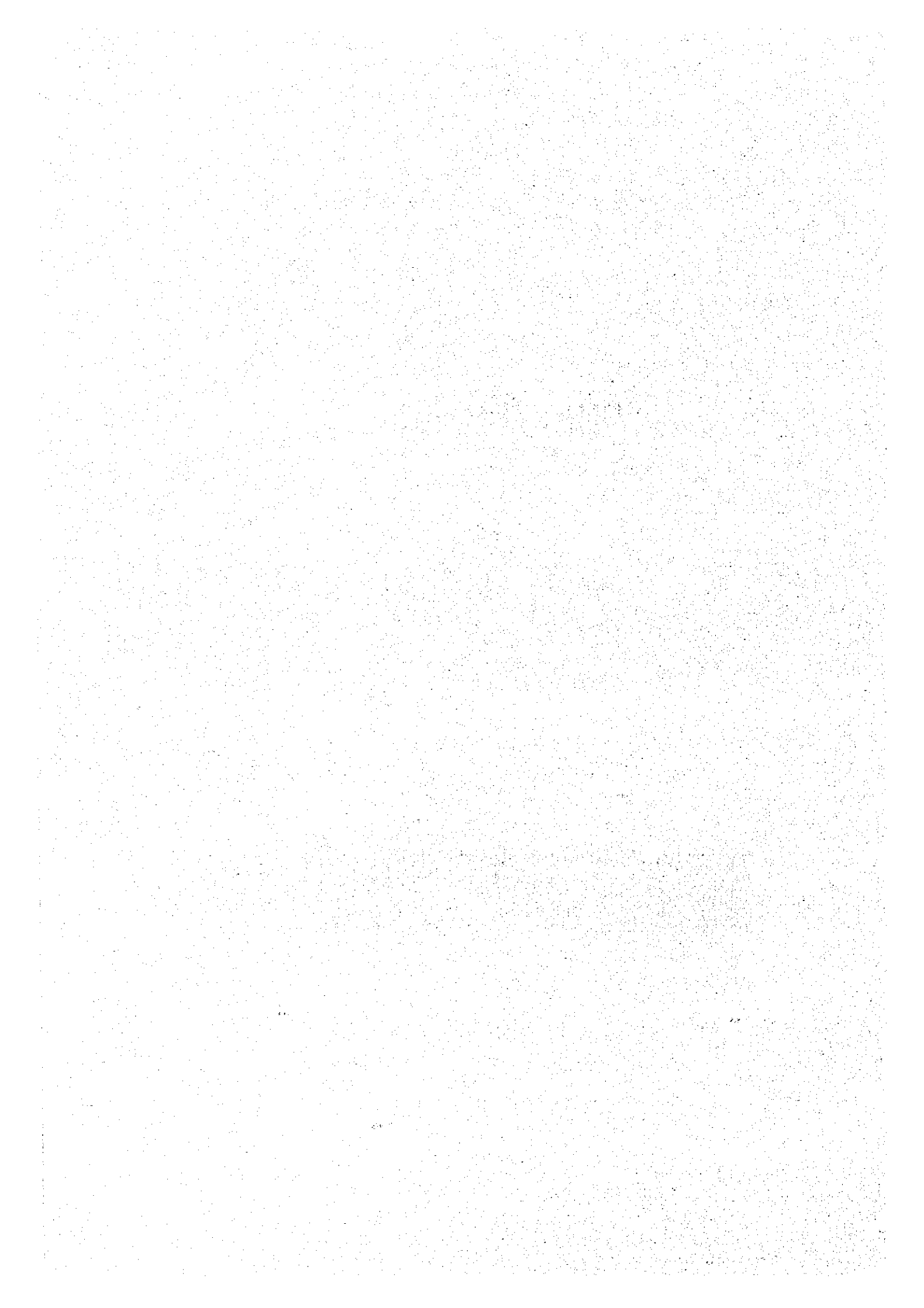
- Generation of job opportunity owing to expansion of agricultural activities
- Development of agriculture-related industry (processing of agro-products, manufacturing of fertilizers, rural small-scale industry, etc.) attributable to increase of agricultural output.
- Earning of foreign exchange as an outcome of growth in production of export-oriented grains and livestock products.
- Alleviation of exodus of rural population toward urban area
- Mitigation of socio-economic disparity between the State of Tocantins and other states of the country.
- Relaxation of social conflict owing to elevation of income among marginal peasants and generation of job opportunity among landless farmers.
- Dissemination of farming system suited to the "Cerrado" area to other states.
- Contribution to constrain global warming as a consequence of curbing in emission of carbon dioxide gas.

Due to above-mentioned direct and indirect benefits, it is expected that the fiscal income of the state government of Tocantins would be grown substantially, which, in turn, contributes to ameliorate living circumstances of local population, as a result of switching

state government's policy for earmarking budget to development of social infrastructure for education, public health, water supply and sewerage from prevailing major allocation of finance to economic infrastructure represented by highways and roads, electric generation works and communication network. The State of Tocantins thereby may manage to get rid of the situation of socio-economic under-development in economic term (the second lowest GRP per capita in Brazil) and in social term (22nd position in HDI value among the country's 27 states and federal district).

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS



CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

The Integrated Development Master Plan for Agriculture and Livestock in the State of Tocantins has been forged in an attempt to putting into force development of unexploited far-reaching land resources in harmony with appropriate management and conservation of natural resources by the year 2015, in view that an agricultural and livestock production stemmed from these land resources should be made sustainable to future generations .

The Master Plan is composed of six (6) programs pertaining to agricultural and livestock development as well as management and conservation of natural resources. The implementation of these programs is expected to put spurs to invigoration of the agriculture and livestock sector, which has been depressed up to date despite being played an important role within economic activities of the State of Tocantins. Similarly, it shall promise to realize proper management and conservation of natural resources and give a conspicuous impact over the regional society attributable to their direct and indirect benefits of these programs. It is thus concluded that the Master Plan would serve as an impetus for the State of Tocantins to get rid of the status of under-development.

In order to implement the Master Plan as opportune as possible, it is advised that the state government of Tocantins undertakes the following actions.

1. Earlier implementation of priority programs/projects

The projects involved in three programs (Agricultural Production Supporting System Strengthening, Environmental conservation and Technologies Development for Sustainable Agriculture and Livestock Farming) are anticipated to be put into implementation taking speedy action for materialization of their contents. In particular, an immediate procedure is in need as for application of technical and financial assistance on the Technologies Development Program for Sustainable Agriculture and Livestock Farming and for acquisition of loan for the Environmental Conservation Program.

In addition, an application for technical assistance of the North Region Development Plan, a model plan for spatial development of the State of Tocantins, needs to be made urgently so as to carry out necessary studies for formulation of the development plan.

2. Phasing for implementation of programs

The projects other than those identified as priority project should be implemented by phasing; this is especially the case when it comes to the Regional Development Program because its implementation calls for extremely large amount of investment and distorted implementation scheduling may accelerate socio-economic disparity among regions of the State. In this context, formulation of detailed programs to enable elaboration of adequate implementation schedule is essential.

3. Executing agency

SAG shall play as core agency responsible for implementation of the Master Plan, subject to active collaboration from such other public institutions as SEPLAN, RURALTINS, INTERTINS, UNITINS and NATURALTINS which are concerned with implementation of programs envisaged in the present Master Plan. In this sense, structural reform of SAG is a pressing issue so that its managerial capacity of programs/projects should be upgraded.

4. Budgetary allocation arrangement

Institutional strengthening of SAG and other public institutions responsible for implementation of programs and projects involved in the Master Plan would not be attained if the state government is reluctant to make necessary financial arrangement for this purpose. It is thus recommended that the state government should earmark more annual budget to these institutions than the actual level.

5. Financing agency

The Environmental Conservation Program is proposed to be implemented with provision of rural credit to farmers by using funds originated from external loans. The recipient agency of these funds shall be Brazilian credit banks established in Tocantins and these banks need to be administratively reinforced in such manner as are capable of performing proper managerial functions as recipient agency of external loans.

6. Rural credit system

In order to motivate farmers to embark on sustainable development of natural resources as well as on farming practice paying attention to environmental conservation, it is prerequisite to grant these farmers privilege of getting rural credit of exceptionally favored conditions such as lower interest. In this regard, it is strongly suggested that the state government of Tocantins should review prevailing

rural credit system so that an unconventional credit lines to benefit said farmers would be forged, on condition that the state government undertake subsidies and other relevant measures.

ANNEX

LIST OF PARTICIPANTS

GOVERNMENT OF TOCANTINS STATE

Name	Position
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	President of the Development Bank of Tocantins
Joaquim Cesar Schaidt Knewitz	Executive Secretary – GEDE

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Vera Lúcia Barbosa	Director
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Kênia Ferreira Rodrigues	Director of the Gurupí University Campus

SICTUR

Name	Position
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João Aparecida da Cruz	Advisor
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Fátima Maria Lima	Socio-economic Study
Fred Newton da S. Souza	Socio-economic Study
José Filadelfo da Silva	Socio-economic Study
José Wilson R. de Melo	Socio-economic Study
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Carlos Benitez	Support for the Team
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Ermínio Sato	Support for the Team
Dino Esasika	Support for the Team
Dirceu Sato	Support for the Team
Kango Ohashi	Support for the Team

COLLABORATIVE ORGANIZATIONS

The following organizations have collaborated in the elaboration of studies;

- M.A. - Ministry of Agriculture and Supply
- M.T. - Ministry of Transports
- M.I.C. - Ministry of Industry, Commerce and Tourism
- EMBRAPA - Brazilian Company of Agricultural Researches
- SUDAM - Superintendence of the Amazon Development
- CONAB - National Company of Supply
- AHITAR - Tocantins-Araguaia Waterway Management
- SEPLAN - State System of Planning and Environment
- SICTUR - Secretariat of Industry, Commerce and Tourism
- SETO - Secretariat of Transports and Civil Works
- SETAS - Secretariat of Labor and Social Action
- SEDUC - Secretariat of Education
- SEFAZ - Secretariat of Finances
- SESAU - Secretariat of Health
- SEI - State System of Computerized Information
- SAG - Secretariat of Agriculture
- RURALTINS - Institute of Rural Development of Tocantins State
- ITERTINS - Institute of Lands of Tocantins State
- NATURATINS - Institute of Nature of Tocantins State
- UNITINS - University of Tocantins Foundation
- INCRA - National Institute of Colonization and Agrarian Reform
- IBAMA - Brazilian Institute of Environment and Renewable Natural Resources
- SEBRAE - Assistance Service to the Micro and Small Enterprise
- FETAET - Federation of Rural Workers of Tocantins State
- FAET - Federation of Agriculture of Tocantins State
- FUNAI - Indio National Foundation
- FIETO - Federation of Industry of Tocantins State
- FECOMERCIO - Federation of Commerce of Tocantins State
- C.V.D. - Vale do Rio Doce Company
- IBGE - Brazilian Institute of Geography and Statistics
- CELTINS - Tocantins State Electric Energy Company
- - Legislative Assembly of Tocantins State
- BASA - Bank of Amazon
- B.B. - Bank of Brazil
- - Pará State Government
- EMATER GO - Technical Assistance and Rural Extension Company of Goiás State and Federal District
- - Private Companies of the Agricultural, Livestock, Commercial and Agroindustrial sectors of the Tocantins, Pará, Maranhão, Goiás and São Paulo States
- - Municipal Prefectures of Tocantins, Goiás and Maranhão States
- CIMI - Indigenist Missionary Council
- - Producers and Rural Workers Syndicates
- - Cooperatives of Rural Production and Association of Producers
- - Agrotechnical Schools
- - Rural Producers of Tocantins/Goiás/Pará States and Federal District

