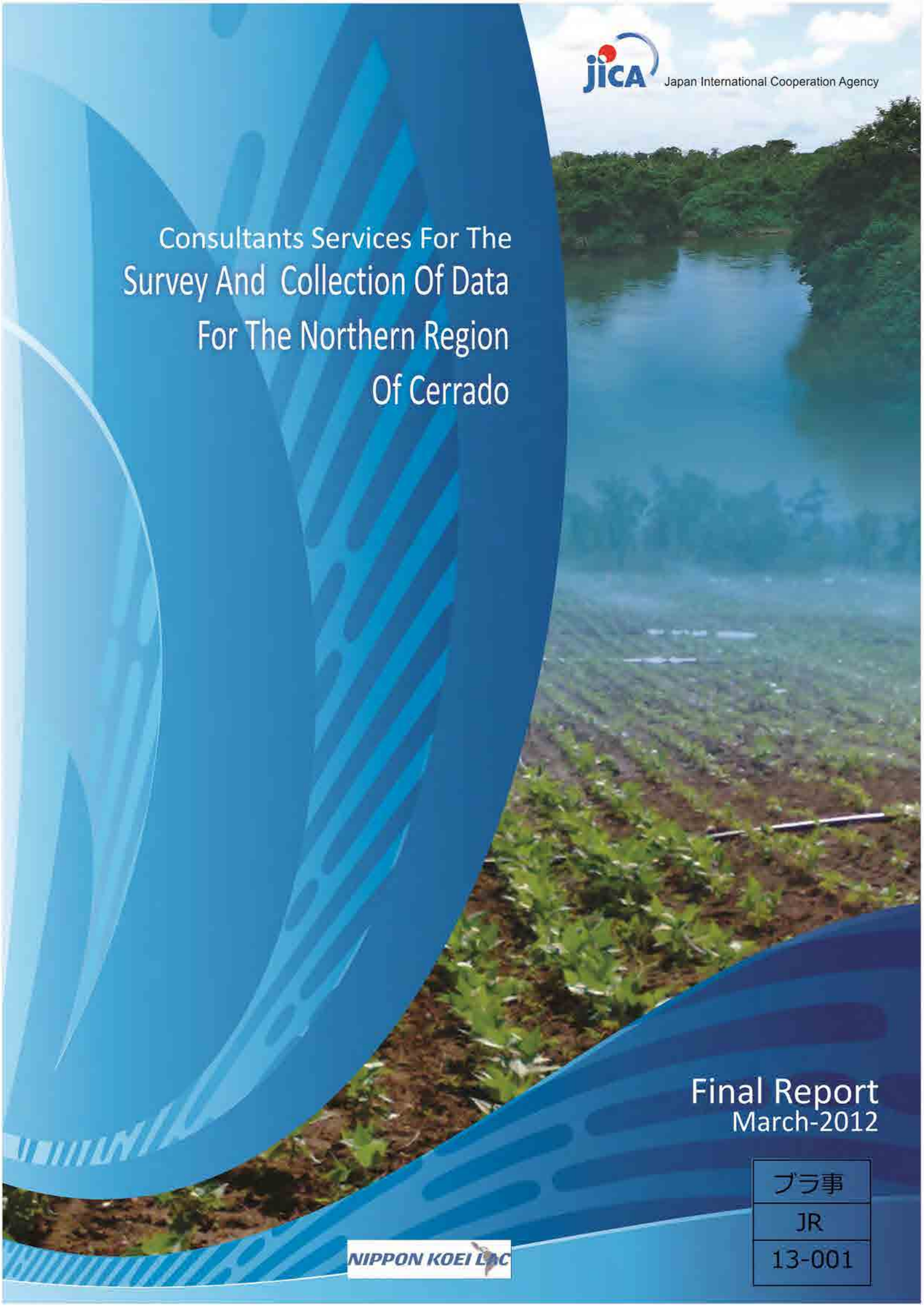
Japan International Cooperation Agency

Consultants Services For The Survey And Collection Of Data For The Northern Region Of Cerrado



Final Report
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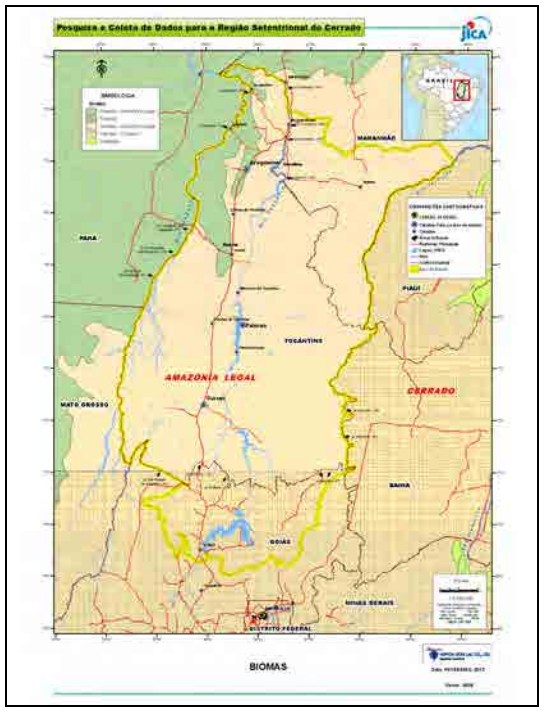
1. Introduction

This study aims to collect and analyze information useful for the planning the agricultural development, thus creating a propitious environment for private investment, with a spirit of partnership among international agencies, local governments and the private initiative. Considering the current implementation of important infrastructure components of the Country, such as the North-South Railway and the Araguaia-Tocantins Waterway, it is evident the possibility of creating an important development center in the region that covers the south of Maranhão state, the north of Goiás state and the whole territory of Tocantins state, where there is a great development potential, with competitive advantages. The Study was conducted during the period from December 19, 2011, to March 10, 2012, with the whole support from the Government of Tocantins State, comprising the provision of necessary geographic information and of data regarding structuring projects proposed by the government.

2. Physical location and natural resources



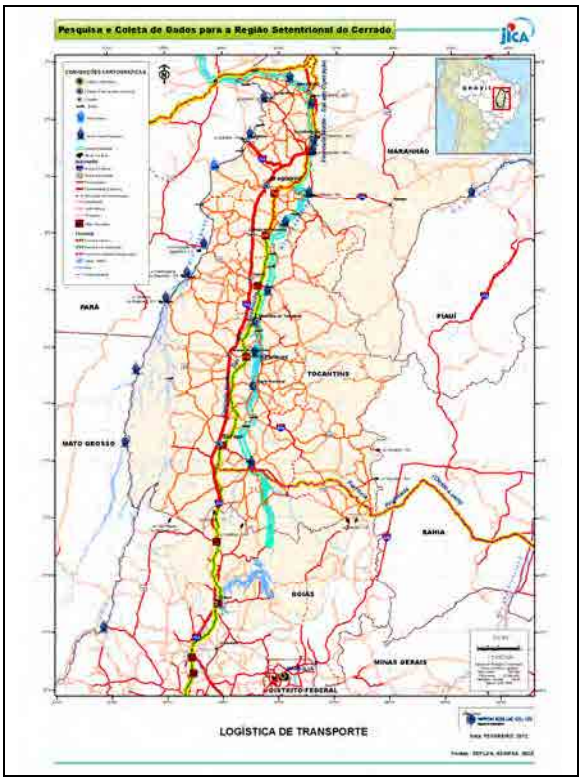
Until the 90´s, the region had a very modest economic activity. After that, there were various interventions of the Federal Government and of state governments, aiming to change such scenario: implementation of Prodecer III (Pedro Afonso and Balsas), construction of North-South Railway, construction of federal and state roads, construction of hydroelectric power plants, installation of the electrical grid, among other works and services. Even though the exploitation of available agricultural soils is still modest, when compared to what takes place in other regions.

The climate of the region is humid, with a dry season. The annual average rainfall of the study area varies from 1200 to 2100 mm, and the division between the dry and rainy seasons is well defined. The region is inside the hydrograph basins of Tocantins and Araguaia Rivers, which have abundant but underutilized water resources, since the use is only for hydro-energy generation. There are also the sub-basins of these two big rivers´ tributaries, allowing the interesting use of water resources, through the perennation of such tributaries. This is the basic proposal of PROPERTINS and PRODOESTE.

The land use is extensive, and the average area of properties range from 130 ha/unit to 480 ha/unit. The total area of the study region is 412 thousand km², that is, 41.2 million ha, and short cycle crops occupy less than 3% of this area. Most of it is used in extensive low productivity livestock husbandry. The area of pastures in the Study region is estimated as being approximately 14 million ha, representing 34% of the area of the Study.

If unexplored or underexplored water resources and soils are explored, there is great potential for the production of grains, fruits, cattle, etc. To attain such objective, though, important interventions are required, which are necessary to allow the exploitation of natural resources, and to structure the logistic channeling system, bearing always in mind the importance of the Environment preservation issue.

2. Infrastructure



The current transportation system of the region is basically dependent on the roads system, considering that the railway system is in stage of construction, and the waterway one, is still in phase of planning.

The main trunk ways are the Highways BR-153 (Belém-Brasília), the North-South Railway and, in the future, the Tocantins waterway. The North-South Railway was designed to promote the national integration, and to minimize the transportation costs. So far, the stretches between Açailândia and Palmas were opened. At present, the 570 km stretch connecting the State of Tocantins to the State of Goiás is under construction, and will minimize the disadvantage of being located in the countryside. There is also the need to implement means of access between agricultural properties and such trunk lines, as well as to provide them with electric energy. In case of Tocantins State, through the initiative of the State government, the electric and roads infrastructure is well implemented, capable of receiving investments which will trigger a phase of fast development. There is also a very well distributed system of asphalted state roads, and electric energy substations in the main points of the state. It is noteworthy that there is, distributed in the countryside of the Study region, 4 major hydroelectric power plants and various small ones.

Currently, the logistics directly depends on the roads system, which results in high transportation costs. The cost of transportation through the roads system (2005) was estimated as being approximately R$ 0.08/km/ton. Correcting this value by the IPCA index (3354/2435), it would be R$ 0.11/km/ton, which indicates the need to minimize the cost through a better use of transportation systems, including railways and waterways.

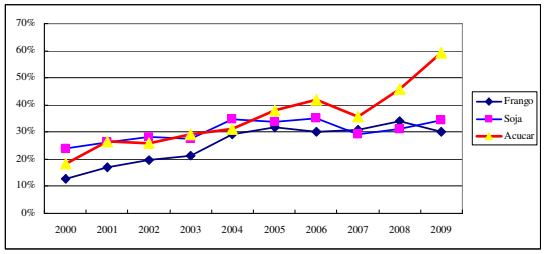
This factor left the region behind in terms of agricultural expansion of Brazil, which has an important role in the scenario of world food trade. However, through governmental initiatives, especially the construction of the North-South Railway, this disadvantage is being minimized. The great potential for food production will also be expanded after the implementation of the Araguaia-Tocantins Waterway and of the West-East Railway, connecting the region with Bahia state coast. Upon the conclusion of such interventions, the region shall become the main logistic axis of the production of food in the Mid-North Region of Brazil.

For such purpose, it is very important and interesting for the production of food:

- To implement a network of intermodal terminals, mainly using the possibility of combining railways with river navigation, structuring a strategic network of silos.
- Opening of local roads to facilitate the production channeling.

3. Context of the Agricultural Production

Brazilian agriculture progressed a lot in recent years, especially the cultivations of soybean, sugarcane and poultry raising. The amount of soybean exports has increased 5.2 times, and the sugar exports, 7.8 times, showing the great competitiveness of Brazilian agribusiness, which has assumed, in recent years, an extremely important role in the international food market, absorbing the increasing demand of emerging countries. The evolution of the Brazilian share in the international exports of food products has the behavior shown in the figure to the left.

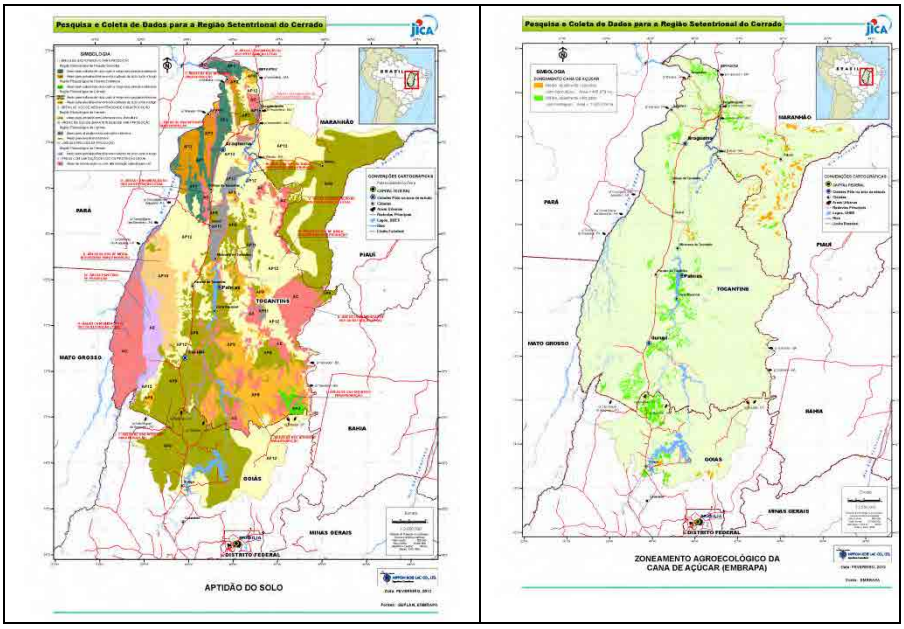


Evolution of the Brazil share in the international exports of food products

Brazilian sugar represents approximately 60% of the whole amount traded of this product in the international market. Chicken and soybean represent approximately 30% of the international trade. The contribution of the Study region though is still very small, approximately 3%, as the result of the disadvantage of the transportation cost, which results in the increase of the production cost and difficulties for commercialization.

Despite these facts, in recent years, the initiative of undertakers is giving rise to important success cases of food production in the region, such as the installation, in Pedro Afonso, of a large sugar and ethanol Plant, and in the region of Balsas, the implementation of an important center of large scale soybean production.

As advanced agriculture regions, such as São Paulo and Paraná, do not have enough area for the necessary agricultural expansion to absorb the increasing food demand in the international market, undertakers search for new agricultural frontiers. Under such circumstances, the Study region is considered of great potential, and is the new agricultural frontier.



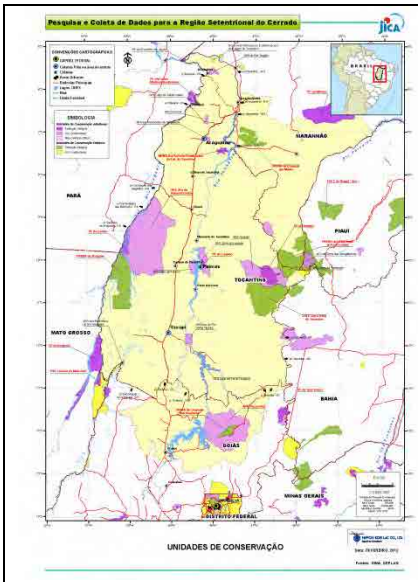
At the figure to the left, there are the Maps of land use zoning and sugarcane zoning elaborated by EMBRAPA.

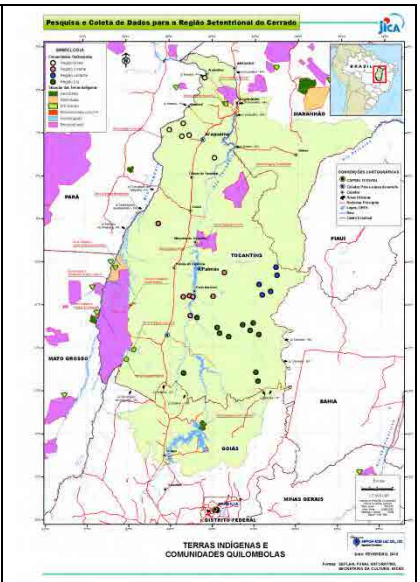
Within the zoning, we can identify large areas to the south of Tocantins and north of Goiás, in the region of Balsas, and to the north of Tocantins, with great potential for agricultural exploitation. It is noteworthy that the potential areas for sugarcane coincide with potential areas for agricultural exploitation.

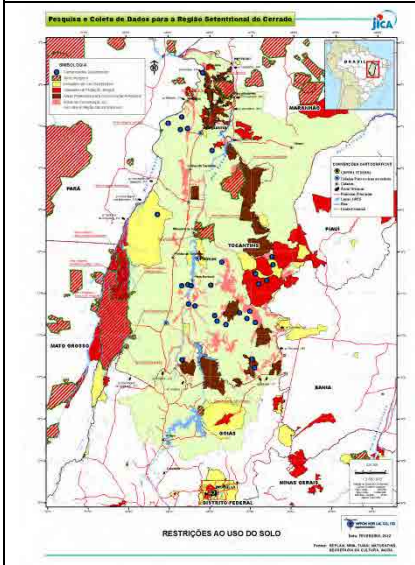
4. Areas with restriction and areas possible for agricultural exploitation

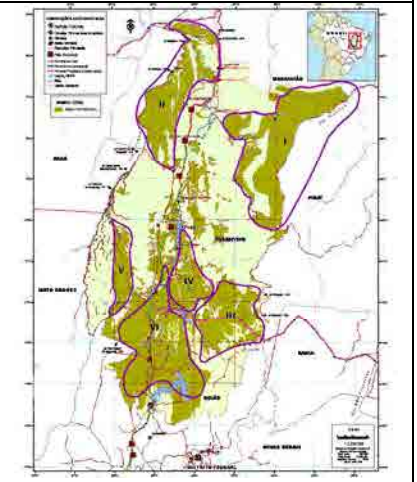
In the Study region, there are areas with restriction to agricultural production, which

are: units of integral protection, units of sustainable use, indigenous land, Quilombo communities, and potential areas for environmental conservation. It is noteworthy that those areas are concentrated at the Bananal Island, at Jalapão and at Bico do Papagaio.








Potential Areas

Within this region, there are 3 ecological centers: Jalapão, Cantão, and Chapada dos Veadeiros.

Among the conservation units, there are 8 parks and 10 environmental protection areas.

There are also indigenous land and Quilombo communities that have a different attention as for agricultural exploitation.

There are 10 units of indigenous lands, and another 3 under study.

Only in the territory of Tocantins state, there are 29 Quilombo communities.

In the figures above, the conservation units, indigenous lands, areas with restrictions and areas with potentials for agricultural exploitation are shown. The areas available, already excluding the conservation unit, were grouped as follows:

- Area I; Balsas Region (large scale agriculture practiced, with intensive use of mechanization and high technology)
- Area II; Araguaína Region (producing cattle and subsistence agriculture)
- Area III; PROPERTINS (area totally underutilized)
- Area IV; Middle Tocantins (area totally underutilized)
- Area V; PRODOESTE (an area of very developed rice cultivation)
- Area IV; Gurupi and Northern Goiás (cattle husbandry, and the predominance of large agricultural properties)

5. Zone of Processing for Exportation

The operation of one ZPE is based on the concession of different forms of incentives. In the fiscal scope, these are given for the acquisition of goods and services, in domestic and foreign markets. Incentives especially cover IPI, COFINS and PIS/PASEP. In the currency exchange scope, companies installed in a ZPE are exempt from the fulfillment of limits determined by the National Monetary Council regarding the maintenance of currency obtained in its exports. Thus, they are free from the obligation of converting in Reals the currency obtained with exports. In addition to those, the companies can also have administrative incentives, which allow them to operate without the license or authorization from federal agencies, except for controls of sanitary nature, of national security interest and of environment protection. At last, the legislation facilitates companies to obtain processes, equipment and researches that can increase their competitiveness.

6. Regulatory Frameworks

The regulatory frameworks are the following:

Topic	Description
Environment	Responsible Agencies Federal: IBAMA Maranhão: State Secretariat of Environment and Natural Resources - SEMA Tocantins: NATURATINS, Goiás: Secretariat of Water Resources and Environment Prefectures (local governments)
Environmental Licensing	Broad studies regarding environmental aspects related to location, installation, operation and expansion of an activity or undertaking are required. ・ In addition to those actions intended to the prevention and mitigation of the impacts of the activities, it shall also ensure the conduction and compliance with all the conditions set forth by environmental agencies to obtain previous license (LP), Installation license (LI), Authorization for the Suppression of Vegetation (ASV) and Operation license (LO).
Forestal Code	Federal law no. 4.771/1965 instituted the Brazilian Forestal Code that gathers a set of rules on environmental preservation in rural properties, with the specification and regulation of Permanent Protection Area (APP), Legal Reserve (RL), Small Rural Property (PPR), in addition of providing other specific determinations for the environmental preservation.
Code of waters	The Code of Waters was established by Decree no. 24.643, of 10/07/34, and like other legal instruments that rule the activities of the sector, result from a water management model guided by types of use.
Land Ownership Issue	Law no. 601/1850, Law of Lands, regulated that from that date on land could only be occupied upon purchase or sale, or with the authorization from the King.

7. Good practices

Two concepts are involved in the topic of good agribusiness practices: the intrinsic quality of products and the set of extrinsic qualities increasingly demanded from them in the international markets - sanitary quality, environmental quality, social quality.

- Production of soybean seeds conducted at the Southeast region in the dry period, through sub-irrigation.
- Production of high productivity grains with less application of agrochemicals.
- Production of high productivity sugarcane under irrigation (BUNGE)
- Introduction of intensive milk production using the irrigation system (Leitissimo)

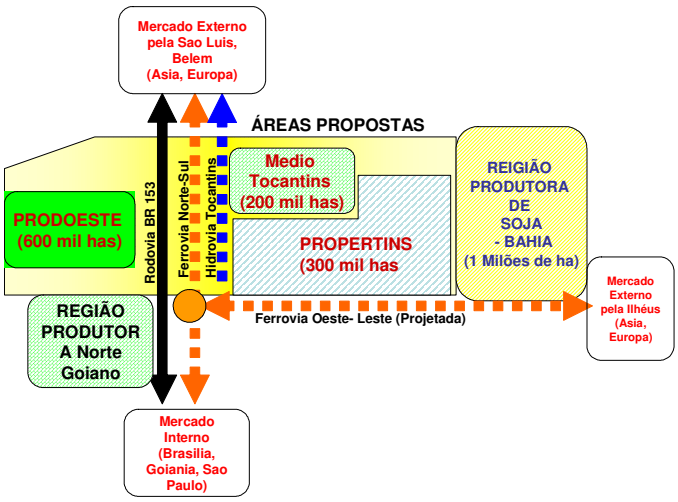
8. Identification of bottlenecks for the agribusiness development in the region

A clear bottleneck of agricultural products for exportation is related to logistics. The poor transportation among the production zones for exportation represents a huge loss. The improvement of highways and railways, and the better use of waterway transportation are key and urgent, in addition to the enhancement of productivity of ports and storehouses.

9. Proposal

In a scenario of the world economic growth resumption, the role of territories where it is possible to open new agricultural frontiers is increasing. In the study region, the opportunities for agribusiness are also increasing, especially for exports, such as soybean, sugar and In the study region, currently approximately 800 thousand ha of soybean, 170 thousand ha of corn, 170 thousand ha of rice and 40 thousand ha of feijão beans are cultivated. The total area of the study region is 412 thousand km², that is, 41.2 million ha. The short cycle crops thus occupy less than 3% of the total area.

This region has a great potential, because of its geographic position and the abundance of natural resources, especially water resources, with possibility of becoming strategic in the development policy of the Country. In addition to the progress of agricultural activities and mining exploitation, the use of the great hydroelectric energy generation potential to supply the national market, and the possibility of railway transportation development, to channel the regional agricultural production for export purposes towards the ports of the north (São Luís and Belém), represent opportunities of investment.



Source: Jica Study Team

Overview of the Proposal

It is noteworthy that this region, which is at the center of an area containing producing regions of the southern Maranhão, western Bahia, northern Goiás and eastern Mato Grosso, and also of Tocantins, will become the Logistics Center of this whole huge producing region, and thus the new Center of international production of food. To shorten the time for the realization of such potentials, the following are proposed:

- Provision of water sources for producers, through the implementation of hydro-agricultural infrastructure (dams, canals, etc.)
- Construction of roads to channel the production
- Support to the improvement of channeling systems
- Establishment of a reliable flow of grains acquisition

To receive such support, three production centers were selected: PRODOESTE, PROPERTINS and Middle Tocantins.

The proposals for each area are as follows:

AREAS	Activities
PRODOESTE	Along the banks of the rivers located in the PRODOESTE area, there are approximately 3.4 million ha of dales, called "Varjões", out of which 2 million ha are natural reserves, and the rest is regarded as usable in farms. Varjões are areas that allow irrigation through inundation during the rainy season, and through sub-irrigation during the dry season. This technique operates through the maintenance of water in channels and drainage systems, elevating the groundwater and allowing it to raise by capillarity to the area where the radicular system of plants is. The selected region contains approximately 300,000 ha of dales, which can be irrigated in dry periods, utilizing the sub-irrigation technique. For such purpose, the following is required: • Construction of 10 elevation dams in Formoso, Xavantes and Dueré rivers. • Construction of collective distribution canals: main canals and secondary canals in Formoso, Xavante and Riozinho Rivers. • Construction of drainage systems in Xavante, Formoso and Dueré rivers. • Complementary infrastructure: • Improvement and expansion of the roads system to channel the production. Existing projects: • Pium-Riozinho (Financed by IDB – Basic Design to be started) • Dueré (8,000 ha to 28,000 ha) • Formoso River (94,400 ha to 120,000 ha) • Xavante River (7,200 ha to 15,000 ha) • Urubu River (up to 9,000 ha) Crops planned are: • Rice • Soybean • Soybean seeds
PROPERTINS	PROPERTINS foresees a long term plan for irrigated agriculture in more than 380,000 ha of land, plus the water supply for the municipalities and villages of the Southeast region. The project consists of three components as follows: • Construction of 25 (twenty five) water reservoirs and related infrastructure for the development of an irrigated area of 250,000 ha; • Extensive production of biofuel by the private initiative in agricultural undertakings of approximately 300,000 ha, at the southern half of the project area, which will be allowed through the perennation of waters, which in turn will be regulated by 25 reservoirs; • Environmental conservation, particularly in the Jalapão region, at the northern half of the project area. Existing projects: • Chapada da Natividade Irrigation Project (15,000 ha) • Palmeira River Irrigation Project • Sobrado River Irrigation Project Crops planned are: • Fruits • Sugarcane • Grains
MIDDLE TOCANTINS	This region comprises approximately 400,000 (four hundred thousand) hectares. Inside it, considering the most favorable features, a total area of 60,000 (sixty thousand) hectares will be selected, of which, deducting the areas of Permanent Preservation and Legal Reserve, 50% will be effectively used for the implementation of agricultural projects, i.e. approximately 30,000 (thirty thousand) hectares. These areas are located at the right bank of Tocantins River, in the municipalities of Santa Rosa do Tocantins, São Valério da Natividade and Peixe, between the 11th and 12th South Latitudes. This region is bathed, throughout 150 km, by Tocantins River, which average discharge in this stretch is 2,500 m3/s, which will allow the analysis of various alternatives for the location of the pumping stations, and the analysis of various alternatives in terms of soil quality and topography adequacy. The crop planned is: • Sugarcane

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ACRONYMS

ABC – Low Carbon Agriculture
ADAPEC – Agricultural Defense Agency of Tocantins State
ANA – National Agency of Water
ANEEL – National Agency of Electrical Energy
APA – Environmental Protection Area
APL – Development of Local Productive Arrangement
APP – Permanent Preservation Area
ATER – Technical Assistance and Rural Extension
BB – Bank of Brazil
BID – Development Inter American Bank
BIRD – World Bank
BNDES – National Bank of Social and Economic Development
BSC – Balanced Scorecard
CELG – Electrification Company of Goiás State
CELTINS – Electric Power Central of the Tocantins State
CEMAR – Energy Company of the Maranhão State
CNA – Brazil Confederation of Agricultural and Livestock
COEMA – Environmental State Board
CODEVASF - Development of Valleys of San Francisco and Parnaíba
CONAMA - National Council of the Environment
CONSAD - Consortium Food Safety and Local Development
DATER - Department of Technical Assistance and Rural Extension
DNIT - National Department of Transport Infrastructure
EIA - Environmental Impact Study
EMATER – Goiana Agency of Technical Assistance, Rural Extension and Agricultural Research
FAET - Federation of Agriculture and Livestock of Tocantins State
FCO – Midwest Constitutional Fund
FDA – Amazon Development Fund
FINAME - Industrial Funding
FNE – Northeastern Constitutional Fund
FNO – Northern Constitutional Fund
FUNAI - National Foundation of Indians
FUNASA - National Health Foundation
GEF - Global Environment Fund
IBAMA - Brazilian Institute of Environment and Natural Resources
IBGE - Brazilian Institute of Geography and Statistics
ICMBio – Chico Mendes Biodiversity Conservation Institute
IDH - Human Development Index
INCRA - National Institute of Colonization and Agrarian Reform
INPI-National Institute of Industrial Property
IPM - Integrated Pest Management
IPPF - Planning Framework for Indigenous Peoples
ITERTINS – Lands Institute of Tocantins State
LDO - Budget Guidelines Law
LI – Installation License
LO – Operation License
LOA - Budget Law
LP – Preliminary License
MAPA - Ministry of Agricultural, Livestock and Supply
MDA - Ministry of Agrarian Development
MDIC - Ministry of Development, Industry and Commerce
MDS - Ministry of Social Development and Hunger
MI - Ministry of National Integration
MJ - Ministry of Justice
MMA - Ministry of Environment
MPF - Federal Public Ministry
MPO - Ministry of Planning, Budget and Management
NATURATINS - Nature Institute of Tocantins
PAA - Food Acquision Program
PAS - Sustainable Amazon Plan
PCA - Environmental Control Plan.

PDCO - Strategic Plan of Midwest Development
PDRIS - Integrated Regional Development and Sustainable Plan of Tocantins
PDITS – Integrated Development Plan of Sustainable Tourism
PDFF - Development Program of Ribbon Border
PDNE - Strategic Plan for Sustainable Development of the Northeast
PDOT - Territorial Planning of Master Plan
PEI – State Plan of Tocantins Irrigation
PERTINS - Rural Electrification Program in the Tocantins State
PERHAT - Strategic Plan of Araguaia River Basin in Tocantins State
PGA-Environmental Management Plan
PNAE - National Program of School Food
PNDR - National Policy for Regional Development
PNMC - National Policy on Climate Change
PNOT - National Spatial Policy
PNPSB - National Plan to Promote Commodity Chains of Socio biodiversity
PUND - United Nations Development Program
PPA - Multiannual Plan
PPP - Partnerships Public-Private
PRODECER - Development Program of Cerrado
PRODIAT – Integrated Development Program of the Araguaia Basin - Tocantins
PRODOESTE - Development Program of the South West of Tocantins
PRODEEM - Energy Development Program of States and Cities
PRODETUR - Development Program of Sustainable Tourism
PROMESO - Sustainability Program of Sub-Regional Spaces
PRONAF - National Program for the Strengthening of Agriculture Family
(PRONAT) - National Program for Development of Rural Areas
PROPERTINS – Perenization Program of Tocantins Water
PSA – Payment for Environmental Services
RIMA – Environmental Impact Report
RL – Legal Reserve
RURALTINS – Rural Development Institute of Tocantins
SAF – Family Agricultural Secretariat
SANEATINS – Sanitation Company of Tocantins State
SBCQ - Selection Based in Quality and Cost
SAGRIMA - Secretary of State for Agriculture, Livestock and Fishing of Maranhão
SDT - Territorial Development Secretariat
SEAGRO – TO Secretariat of Agriculture, Livestock and Agrarian Development of the State of Tocantins
SEAGRO - GO - State Secretariat of Agriculture, Livestock and Irrigation in the Goiás State
SECAFES - State Systems of Marketing of Small Family Agriculture Products and Ventures of the Solidarity Economy
SEINFRA – Infra Structure Secretariat
SEMARH – Secretariat of Environmental and Hydric Resources of Maranhão
SEPLAN – Secretariat of Planning and Modernization of Public Management
SEUC – State System of Conservation Units
SIBRATER - Decentralized Brazilian System of Technical Assistance and Rural Extension
SINGREH - National Water Resources Management System
SISNAMA – National System of Environment
SNUC - National System of Conservation Units
SPU - Secretariat of Union Patrimony
SUASA - Unique System of Agricultural Health Attention
SUDAM - Amazon Development Superintendence
ZEE - Ecological Economic Zoning

CHAPTER 1 INTRODUCTION

1.1 Background of the Study

Having the Japanese-Brazilian cooperation for the Development of Cerrados (Prodecer), started in the 70´s, as the fundamental landmark for development, the region of cerrados is being developed as a great area of agricultural production in Brazil and in the world, currently being one of the main centers of the production of soybean, sugarcane, cotton, among others. This fact, along with the current trend of food price increase via demand growth in emerging countries plus the world population growth, indicates a higher need to increase production in a worldwide scale to allow a higher balance between supply and demand, thus allowing a higher balance between supply and price. Under such circumstances, international companies, including the Japanese ones, are alert for the great productive potential of cerrados region, also expecting to actively take part in the development of its production, transport and commercialization of agricultural produces and by-products (sugar, ethanol, for instance).

On the other hand, most of the cerrados region is in the interior of States, where the transports infrastructure is poor, raising the costs of transports and weakening the competitive capacity of products coming from these locations. The existence of legal restraints, both environmental and related to land ownership, also hinders the entrance of international companies in production development. Thus, in order JICA can perform the effective international cooperation concerning the agricultural development along with international agencies, it is key to correctly understand the legal system which also includes the infrastructure situation, and other factors influencing the development of businesses, thus creating a positive environment for the private investment, developing adequate activity plans, and strengthening the partnership with the private initiative.

Considering the situation above described, this study aims to gather and analyze useful information for the agricultural development planning in partnership with private investment and technology, bearing in mind the infrastructure, such as the North-South Railway and Araguaia-Tocantins Waterway, creating a development center, initially in the regions comprising southern Maranhão, northern Goiás and the whole territory of Tocantins. There are great development potentials with high competitive edge in these regions.

1.2 Objective of the Study

The objectives of the study are as follows:

(1) Collection and analysis of conjuncture data of the study region (edaphoclimatic, environmental and socioeconomic data, especially data regarding the existing agribusiness in the region).

(2) Collection and analysis of data regarding the legislation relevant for the agricultural development of the region (laws concerning the environment and land ownership, among others)

1.3 Area of the Study

The Areas to be covered by the study are as follows;

Table 1.3.1 - Scope of the Study

State and Region		Municipalities
Maranhão	Chapadas das Mangabeiras	• Benedito Leite, Fortaleza dos Nogueiras, Loreto, Nova Colinas, Sambaíba, São Domingos do Azeitão, São Félix de Balsas, São Raimundo das Mangabeiras;
	Gerais de Balsas	• Alto Parnaíba, Balsas, Feira Nova do Maranhão, Riachão, Tasso Fragoso;
	Porto Franco	• Campestre do Maranhão, Carolina, Estreito, Porto Franco, São João do Paraíso, São Pedro dos Crentes;
Tocantins	Bico do Papagaio	• Aguiarnópolis, Ananás, Angico, Araguatins, Augustinópolis, Axixá do Tocantins, Buriti do Tocantins, Cachoeirinha, Carrasco Bonito, Darcinópolis, Esperantina, Itaguatins, Luzinópolis, Maurilândia do Tocantins, Palmeiras do Tocantins, Nazaré, Praia Norte, Riachinho, Sampaio, Santa Terezinha do Tocantins, São Bento do Tocantins, São Miguel do Tocantins, São Sebastião do Tocantins, Sítio Novo do Tocantins, Tocantinópolis;
	Araguaína	• Aragominas, Araguaína, Araguanã, Arapoema, Babaçulândia, Bandeirantes do Tocantins, Carmolândia, Colinas do Tocantins, Filadélfia, Muricilândia, Nova Olinda, Palmeirante, Pau D'Arco, Piraquê, Santa Fé do Araguaia, Wanderlândia, Xambioá;
	Miracema do Tocantins	• Abreulândia, Araguacema, Barrolândia, Bernardo Sayão, Brasilândia do Tocantins, Caseara, Couto Magalhães, Divinópolis do Tocantins, Dois Irmãos do Tocantins, Fortaleza do Tabocão, Goianorte, Guaraí, Itaporã do Tocantins, Juarina, Marianópolis do Tocantins, Miracema do Tocantins, Miranorte, Monte Santo do Tocantins, Pequizeiro, Colméia, Presidente Kennedy, Rio dos Bois, Tupirama, Tupiratins;
	Rio Formoso	• Araguaçu, Chapada de Areia, Cristalândia, Dueré, Fátima, Formoso do Araguaia, Lagoa da Confusão, Nova Rosalândia, Oliveira de Fátima, Paraíso do Tocantins, Pium, Pugmil, Sandolândia;
	Gurupi	• Aliança do Tocantins, Alvorada, Brejinho de Nazaré, Cariri do Tocantins, Crixás do Tocantins, Figueirópolis, Gurupi, Jaú do Tocantins, Palmeirópolis, Peixe, Santa Rita do Tocantins, São Salvador do Tocantins, Sucupira, Talismã;
	Jalapão	• Barra do Ouro, Campos Lindos, Centenário, Goiatins, Itacajá, Itapiratins, Lagoa do Tocantins, Lizarda, Mateiros, Novo Acordo, Ponte Alta do Tocantins, Recursolândia, Rio Sono, Santa Tereza do Tocantins, São Félix do Tocantins;
	Porto Nacional	• Aparecida do Rio Negro, Bom Jesus do Tocantins, Ipueiras, Lajeado, Monte do Carmo, Pedro Afonso, Porto Nacional, Santa Maria do Tocantins, Silvanópolis, Palmas, Tocantínia;
	Dianópolis	• Almas, Arraias, Aurora do Tocantins, Chapada da Natividade, Combinado, Conceição do Tocantins, Dianópolis, Lavandeira, Natividade, Novo Alegre, Novo Jardim, Paranã, Pindorama do Tocantins, Ponte Alta do Bom Jesus, Porto Alegre do Tocantins, Rio da Conceição, Santa Rosa do Tocantins, São Valério, Taguatinga, Taipas do Tocantins;
Goiás	Porangatu	• Alto Horizonte, Amaralina, Bonópolis, Campinaçu, Campinorte, Campos Verdes, Estrela do Norte, Formoso, Mara Rosa, Minaçu, Montividiu do Norte, Mutunópolis, Niquelândia, Nova Iguaçu de Goiás, Porangatu, Santa Tereza de Goiás, Santa Terezinha de Goiás, Trombas, Uruaçu;
	Chapada dos Veadeiros	• Alto Paraíso de Goiás, Campos Belos, Cavalcante, Colinas do Sul, Monte Alegre de Goiás, Nova Roma, São João d'Aliança, Teresina de Goiás;

Source: SEPLAN-TO, SEPLAN-MA, SEPLAN-GO

1.4 Scope and Time Schedule of the Study

1.4.1 Scope of the Study

The scope of the study is indicated as follows;

In order to attain the above mentioned objectives, the contractor shall conduct the following activities:

(1) Collection and analysis of data (primary and secondary) regarding natural, socioeconomic, infrastructure conditions and others relevant for the region:

- Meteorological data (annual rainfall, seasonality and other particularities important for agriculture)
- Geography and soil information: irrigation sources and water resources, concluding in clear format into maps;
- Energetic situation of the state (mainly supplement of electric energy for agriculture), transportation modals (roads, railways, water ways and air ways), formatted in maps;
- Population situation of the state: main urban or rural agglomerates (population, income, educational level, employed population, main employments), formatted in maps;
- Situation of transports modals development, especially waterway and North-South railway, East-West railway, confirming the data of the managing/constructing organization, projection of works, tariffs for the use, and other data important to calculate the cost of implementation and operation of the agribusiness activity, formatted in maps;
- Asphalting, electric energy and other existing bottlenecks that influence the commercialization cost;

(2) Collection and analysis of data (primary and secondary) of cultivated produces (current and in the past 10 years), situation of agricultural inputs use (irrigation, agricultural machinery, fertilizers, agrochemicals and other relevant items), types and contents of agricultural financing available:

- Verification of the situation of the agricultural Zoning (federal and state), formatted in explanatory materials with detailed and clear contents;
- Main cultivated produces: production data, characterization of regions per produce, situation of the combination of various produces and production manners (example: crop-livestock husbandry integration, comparison among grains, fruits cultivation, greenery, among others);

(3) Collection and analysis of data (primary and secondary) regarding the current situation and the situation in the past 10 years of the domestic commercialization and exportation of the region´s produces (destination, price and other relevant items). Utilization of the Zone of Processing for Exportation (ZPE):

- Information about the commercialization manners: direct to final users, via multinational companies, international marketplace (Chicago stock exchange, for instance), and others;

(4) Collection and detailed analysis of federal legislations (environment, land ownership, and others) key for the regularization of the operation of companies, elaborating a summary report. Summary of the debate about the reformation of the Forestal Code:

- Legal restraints for the agricultural production, such as the law of water, the Forestal Code, and other restraints for the production;
- Land ownership laws and other legal restraints for the inflow of international companies;

(5) Collection and detailed analysis of state legislations (environment, land ownership, and others) key for the regularization of the operation of companies, elaborating a summary report:
- Environmental and other restraints for the agricultural production;
- Contents of the restriction for the acquisition and/or leasing of land by international companies;

(6) Collection and analysis of data (primary and secondary) regarding the situation, trend and good agribusiness practices of national and international companies (United States, China, Japan, Korea and others), via survey of existing data and interviews with companies, governments of various levels, cooperatives and associations:
- National and international agribusiness practice to deal with formal and non-formal difficulties and restraints of the marketplaces: currency exchange, restriction to genetic modification, restrictions to the acquisition and/or accreditation of land, taxes, and others. Good practices of appreciation of the company, sustainable and responsible production, activity or produces (certification and others).

(7) Presentation of the situation of land use, land ownership, cultivation of produces and other relevant data in schemes, graphs, maps and tables.

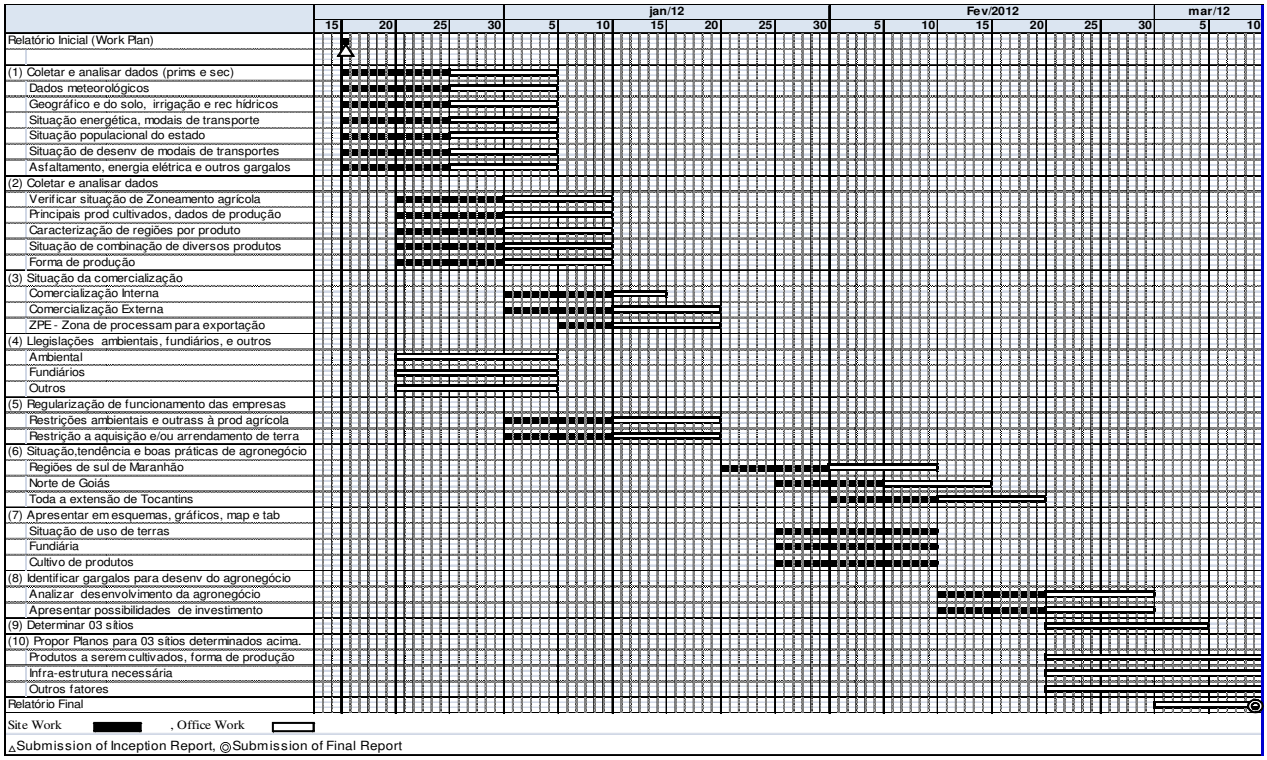
(8) Identification of bottlenecks for the development of agribusiness in the region, analyzing the demand for assistance:
- Considering the data obtained in the above items, analysis of such data and presentation of concrete possibilities of technical and financial investment for the development of agribusiness.

(9) Determination of 03 (three) sites for the development of the project with the highest agricultural development potential, in view of the previous determination of criteria considering the water potential, infrastructure situation, natural conditions, manpower and other relevant topics:

(10) Determination of produces to be cultivated, production manner, necessary infrastructure, and other factors for the 03 (three) sites above determined.

1.4.2 Time Schedule of the Study

The study time schedule is as follows;

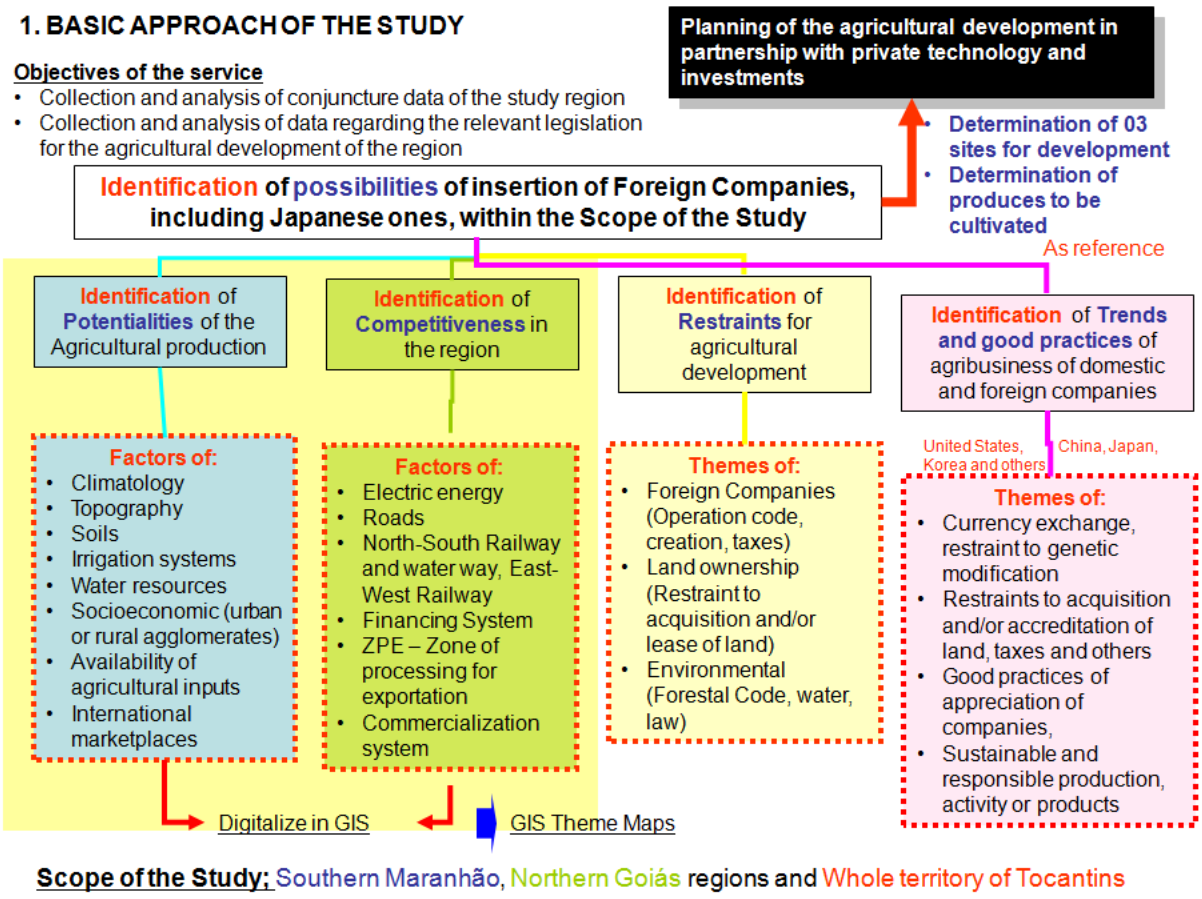


Source: JICA Study Team

1.5 Methodology of the Study

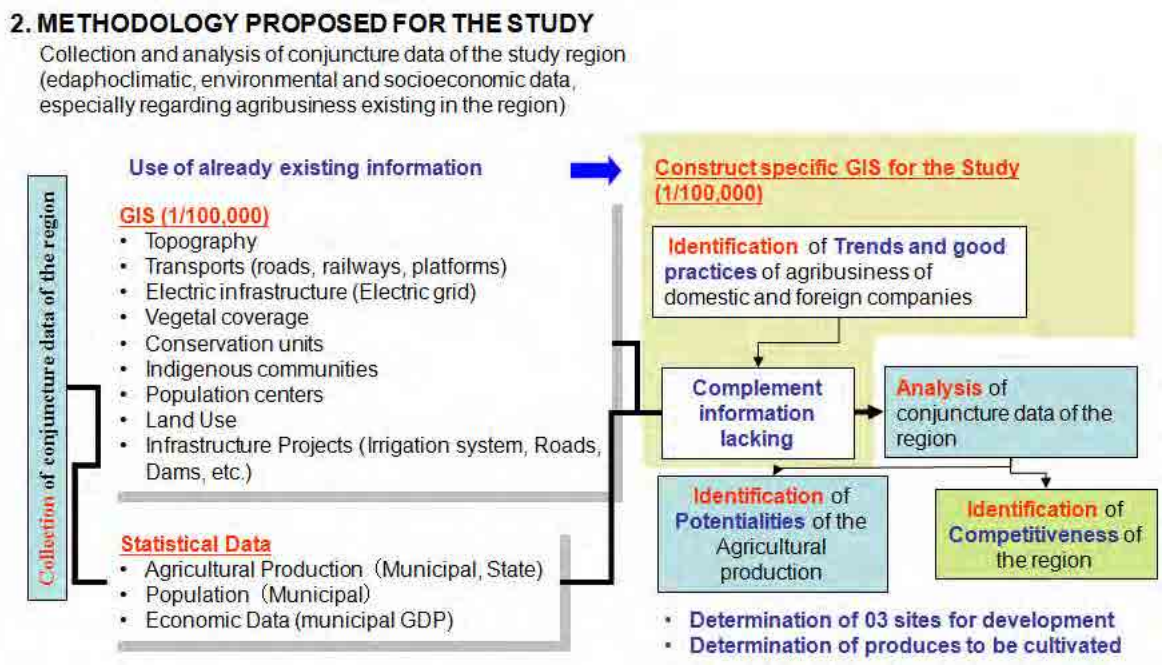
Nippon Koei LAC do Brasil LTDA (Nippon Koei LAC) submits this report for the Survey and Collection of data for the Northern Region of Cerrado, in compliance with the JICA´s Proposal Request, published on 11/25/2011 in its website.

Nippon Koei LAC, in order to comply with the Terms of Reference, has defined the following criteria illustrated in the following figure:



Source: JICA Study Team

Nippon Koei LAC, considering the amplitude of this study that requires time saving due to the short time available for the survey of information and analyzes, propose the utilization of various data already elaborated by *Nippon Koei LAC*, and to make a bigger effort and give a bigger focus on analyses of important topics to identify restrictions and potentialities. The methodology proposed by *Nippon Koei LAC* in terms of data collection and analysis is as follows;



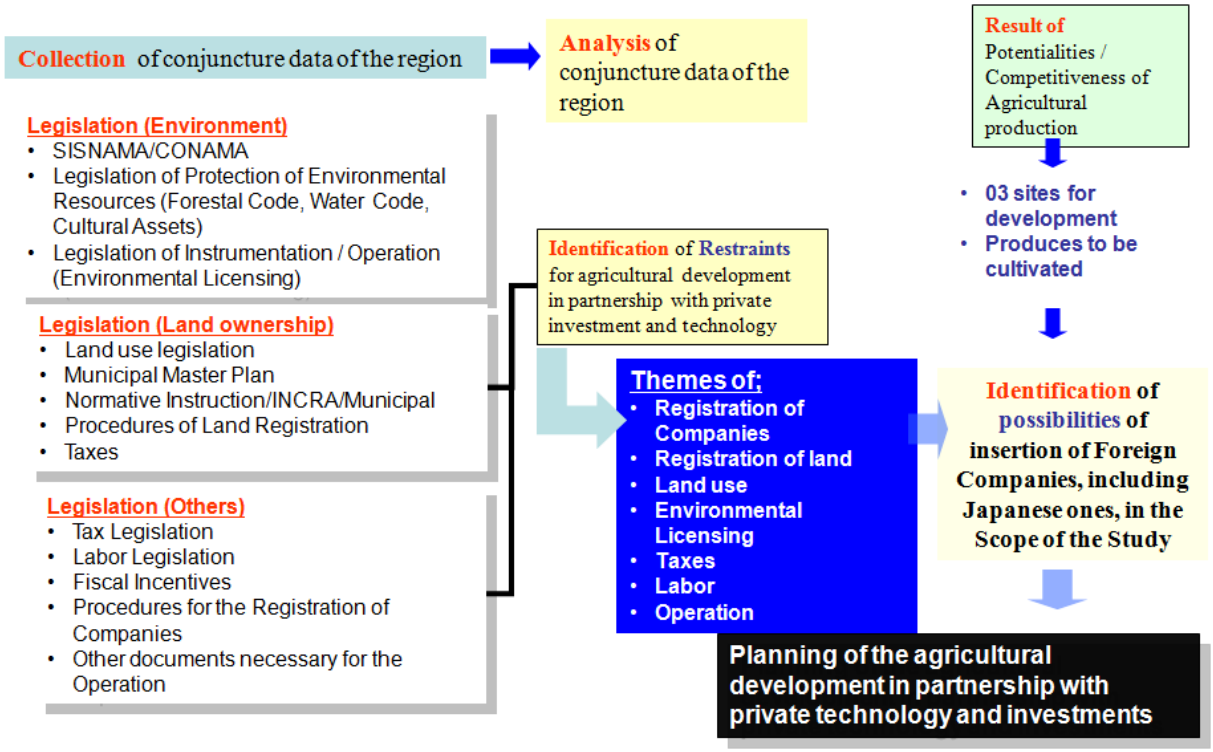
Source: JICA Study Team

The methodology applied for the collection and analysis of information to identify potentials and competitiveness is as follows;

- Utilization of information already existent in the scope of the study, building a specific GIS for the study with the information materials;
- Feeding of necessary supplemental information;
- Facilitation of decision-making by investors through the use of visual information;
- Conduction of consultations to State/Municipal Governments about investment projects in the areas of agricultural development;
- Conduction of researches at institutions conducting this type of study, and exchange of opinions about this topic;
- Conduction of technical visits in the private investment projects, and analysis of the reasons for the investments;
- Analysis of international marketplaces trends with complementary information to identify potentials in the agricultural productions within the scope of the study;

The following figure shows the methodology proposed to identify the restrictions:

2. METHODOLOGY PROPOSED FOR THE STUDY



Source: Jica Study Team

Brazil, being a federalized country, has legislations about the same topic at federal, state and municipal levels, regarding the environment, land ownership, among other topics. Such laws shall be complied with to make the operationalization viable. Therefore, *Nippon Koei LAC* has used the following criteria:

- Analysis of topics regarding the environment, including federal, state and municipal laws and regulations, to obtain the environmental licensing for agricultural development. In addition to the environmental legislation, there are other topics not related to the environment that need to be analyzed in detail to comply with the environmental licensing procedures at federal, state and municipal levels.
- Analysis of the land ownership topic, including federal, state and municipal legislations. There are complex regulations in land ownership registration procedures that shall be clarified within this study.
- Analysis of other topics important for foreign investments. There are various topics necessary to operationalize and operate undertakings, such as: registration of companies, articles of incorporation, tax and inspection issues, in addition to mechanisms of financial remittances.

CHAPTER 2 SCOPE OF THE STUDY

2.1 Geographic location

The study comprises the following regions:

Table 2.1.1 - Scope of the Study

	Areas surveyed (km^2)	Number of Microregions	Number of Municipalities	Population (2009)
Southern region of Maranhão	67,607	3	19	299,483
State of Tocantins	277,620	8	139	1,203,011
Northern Goiás	61,472	2	27	290,160
Total				

Source: JICA Study Team

Regions shown in the table above are characterized as with non-explored economic activities until the 90´s. After the emancipation of Tocantins State (1989), with the efforts of Tocantins Government, governmental interventions, both federal and state, were started. Main interventions were: implementation of Prodecer III (Pedro Afonso and Balsas), construction of North-South Railway, construction of federal and state roads, construction of hydroelectric power plants, installation of the electrical grid, among other works and services. Along with such interventions, there were great progresses in the economic activities of these regions, agricultural development, cattle husbandry and agro-processing.

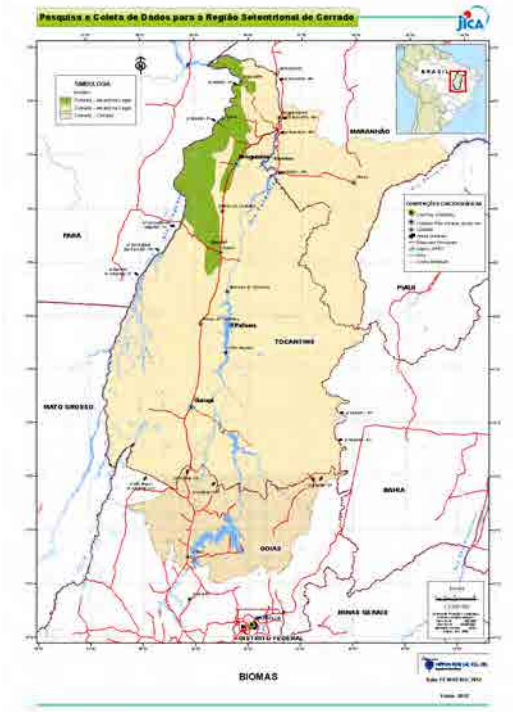


Fig. 2.1.1 Geographic Location

It is noteworthy that the areas comprised in the study are located in regions of transition between the legal Amazon Region and cerrado region, where there are differences in land exploitation. The study region is classified in the following categories, according the Biomes Map classification:

- Cerrado (Goiás State and part of Southern Tocantins state)
- Cerrado within the Legal Amazon
- Biome of the Legal Amazon

The Legal Amazon was constituted by Laws no. 1.806 as of 06/01/1953, no. 5.173 as of 27/10/1966, and Complementary Law no. 31 as of 11/10/1977

In the map (Fig. 2.1.1), the relations between the study region and the biomes classification are shown.

2.1.1 Southern Maranhão State

The southern region of Maranhão State is composed of three microregions (Chapada das Mangabeiras, Gerais de Balsas and Porto Franco) and of 19 (nineteen) municipalities, with a total area of 67,607.081 km^2. In 2006, it had a population estimated by the Brazil Institute of Geography and Statistics (IBGE) as 281,692 (two hundred and eighty one thousand and six hundred and ninety two) inhabitants.
The region borders the states of Piauí and Tocantins, and has as main urban center the city of Balsas, which, in 2010, had 83,459 (eighty three thousand and four hundred and fifty nine) inhabitants, according to IBGE.
The main rivers of the region are Parnaíba river, at the border with Piauí state, Manuel Alves Grande and Tocantins rivers, both at the border with Tocantins state, and Balsas River, that crosses the region until it mouth, into Parnaíba river. The predominant vegetation is Cerrados.
In mid 90´s, the area comprised by microregions of Chapada das Mangabeiras and Gerais de Balsas started to develop as a very dynamic center of grains production. Currently, approximately 500 thousand hectares are cultivated, mostly in big properties that use intensive agricultural technology. There is also an alcohol producing plant in operation in this region, located in the municipality of São Raimundo das Mangabeiras. In the microregion of Porto Franco, a sugarcane production center is starting to develop.

2.1.2 Tocantins State

Tocantins State is located in the North region of Brazil. It borders the States of Bahia and Piauí, to the east, Maranhão, to the north, Goiás and Mato Grosso, to the south and southwest, and Pará, to the west. It has a territory of 277,620.914 km^2, which represents 3.26% of the national territory. This is the last state created by the 1988 Constitution, after being detached from Goiás state. The State is organized in 18 administrative regions and 139 municipalities, most small, with less than 10 thousand inhabitants. Historically, the cities of Araguaína and Gurupi play the role of urban centers, where most of services are concentrated. After the construction of the capital city, Palmas, the new city started to play a similar role for the whole State, as the result of having the administrative and political center of the state.

Tocantins is part of the Legal Amazon, despite having only a small part of the State, known as Bico do Papagaio at the northernmost part of the State, within the Amazon biome. Most of the State (87%) belongs to the Cerrados Biome. The rest of the state consists of fragments of deciduous stationary forest, to the north, mid-west and southeast of the State, semi-deciduous stationary forest, in altitude areas, to the south and southeast of the State. There is also a region of dense ombrophilous forest, to the northwest of the state, a strip of open ombrophilous forest, at the northwest region, in the transition zone between Cerrados and the Dense Ombrophilous Forest (SEPLAN-TO, 2005).

The State is located in the Basin of Tocantins River, formed by the hydrograph system composed of Araguaia river (west portion) and Tocantins river (east portion), and their tributaries. These two river axes unite at the northernmost region of the basin, forming the lower Tocantins, which flows into Pará river that belongs to the estuary of Amazon river. Tocantins river, formed by Maranhão and Almas rivers, is born in northern Goiás State, near the Federal District, and flows towards the north of the country throughout approximately 2,500 km. Araguaia river is born in Serra Selada, at the border between Goiás and Mato Grosso, also flowing in the south-north direction, and its confluence with Tocantins River represents the border between the mid and lower Tocantins. At lower Tocantins, the main

tributary, after Araguaia, is Itacaiúnas River, also through the left bank. According to the Tocantins State Plan of Water Resources, the hydrograph system of the State totalizes 172,828.2 km^2, representing 62.3% of the State territory.

2.1.3 Northern Goiás State

The Northern Goiás comprises 27 municipalities, occupying a territory of 61,472 km^2, which corresponds to 17.51% of the whole territory of the State.

The region has a clear competitiveness among industries such as cattle husbandry, energy and mining. Its economic relevance in the mining activity mainly rests on the vast potential to contribute for the growth of added value product, and consequently for the tax revenue.

The impacts on the growth of other industries commerce, and goods and services, as well as the incentive to the generation of other undertakings, confirm the importance of the mining industry in the creation of new job opportunities, possibly fixing the manpower in regions with economic and demographic deficiencies.

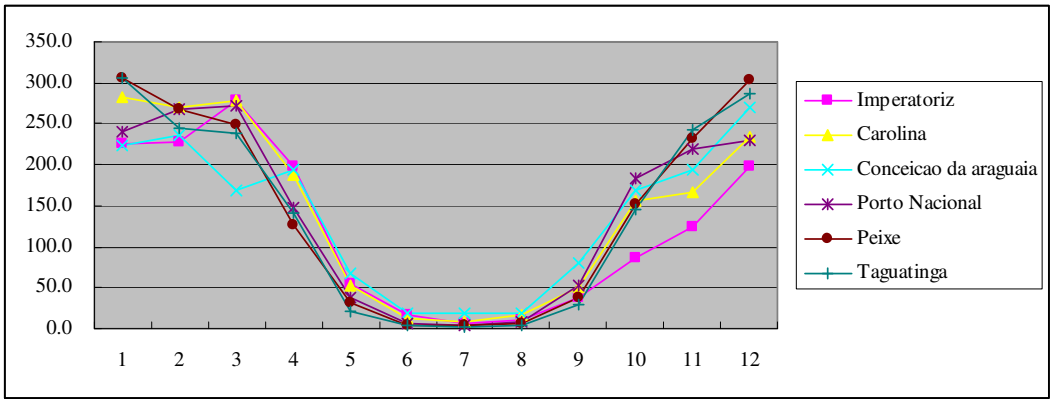
The northern Goiás is included in the axis of North-South Railway, which is inside Brazil, interconnecting the North and the Northeast regions to the South and the Southeast regions, crossing the Mid-West region of the country. This undertaking propagates dynamism to the whole State, but mainly for the regions where it is set, with direct influence in the northern region.

2.2 Natural Resources

2.2.1 Climatic resources

The study area has a humid climate with moderate water deficiency (B1wA'a') and sub-humid humid climate with small water deficiency (C2rA'a'). The annual average rainfall of the study area varies from 1200 to 2100 mm, and the division between the dry and rainy seasons is well defined. The following figure shows the average rainfalls, per month of the year, at the main stations:

Fig. 2.2.1 Average rainfall, per month, at main stations

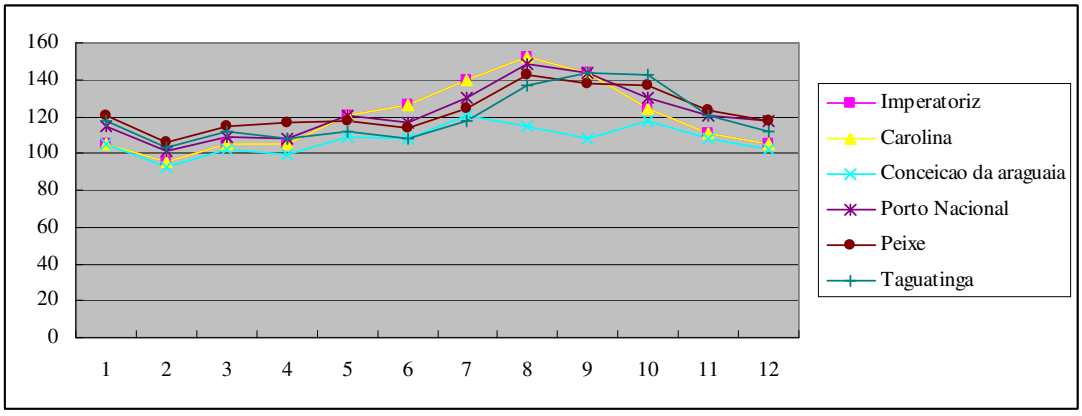


Source: JICA Study Team based on INMET data

The rainfall trends in main stations have the same pattern, the rainy season being in the months from October to April, and the dry season, from April to October. Concerning the concentration of rainfall, 85% of the annual rainfall is concentrated in the rainy season.

As for evaporation, the value varies: between 100 and 140 mm/month. There is high evaporation in dry season months. The following figure shows the values of evaporation at the main stations:

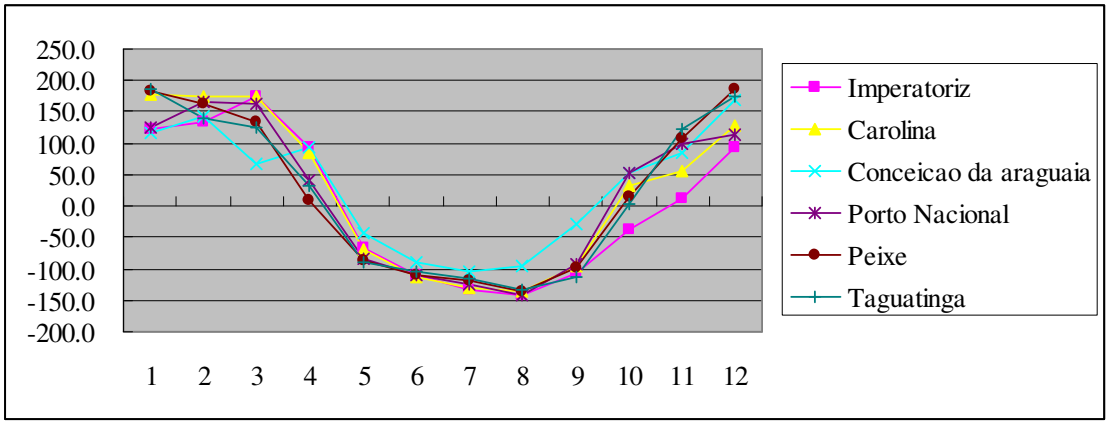
Fig. 2.2.2 Average rainfall, per month, at main stations



Source: JICA Study Team based on INMET data

Due to this relation between rainfall and evaporation, the region requires irrigation for cultivation. The following figure shows the water balance situation at the main stations:

Fig. 2.2.3 Average rainfall, per month, at main stations



Source: JICA Study Team based on INMET data

The rain fed agriculture is possible during the period from October to April. It is noteworthy that the main crops (soybean, corn, rice) are cultivated in this rainy season, except for the southeast region of Tocantins, with the sub-irrigation system.

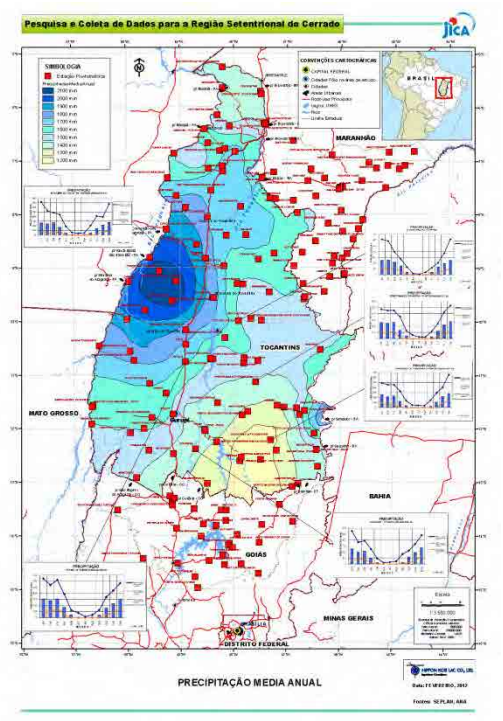


Fig 2.2.4 Distribution of the annual average rainfall

As for the rainfall distribution, the trend is of higher rainfall. The Araguaia basin has the higher rainfall, concentrated in the Bananal APA area. The northern region of Goiás has the smaller rainfall within the study scope. The annual average rainfall at main meteorological stations is presented in Fig. 2.2.4.

The annual average temperature varies between 24°C and 26°C. Maximum temperature coincides with the peak of dry season, at the end of September and beginning of October, reaching 40°C and up to 42°C, at the north of the State. The temperature highly varies during the day, with a drop during the night due to the continental position of the State, mainly in the dry season. The relative humidity of the air is higher in the rainy season, with monthly averages between 60% and 85%. Wind system is characterized by the predominance of calmness during most of the year, and by the absence of strong winds.

2.2.2 Water Resources

The study region is comprised within the hydrograph basin of Tocantins river. Tocantins river has 2,400km of length, with a maximum discharge of 7,800 m³/s. Its main tributary, Araguaia river, has 2,672km of length, with an average discharge of 5,500 m³/s. These water resources are underutilized, only being used for hydro-energy generation.

The State Plan of Water resources highlights that the extreme east and west regions of Tocantins state have specific discharge of approximately 20 to 30 l/s.km², as well as an area to the north The regions located at the mid-south of the state have lower specific discharges, of approximately 10 to 15 l/s.km². Table 2.2.5 shows average discharges corresponding to each hydrograph basin that belong to the state of Tocantins:

Table 2.2.5 Specific Average Long Term Discharge

BASIN	DRAINAGE AREA IN TOCANTINS (Km²)	AVERAGE SPECIFIC LONG TERM DISCHARGE (L.S/Km²)
Ribeirão Corda Basin	3,508.6	15.02
Ribeirão dos Mangues Basin	2,797.8	10.31
Araguaia River Basin	18,063.8	15.27
Bananal River Basin	2,853.9	16.43
Barreira River Basin	1,738.2	15.68
Caiapó River Basin	5,382.1	20.46
Crixás River Basin	3,407.1	18.00
Balsas River Basin	12.352.5	15.07
Cunhãs River Basin	2,776.3	14.06
Coco River Basin	5,022.4	16.06
Formoso River Basin	20,654.3	15.61
Javaés River Basin	12,329.6	14.85
Jenipapo River Basin	1,576.5	11.49
Lajeado River Basin	5,985.1	14.74
Lontra River Basin	3,835.9	15.51
Manuel Alves da Natividade River Basin	14,917.1	10.81
Manuel Alves Grande River Basin	8,500.7	16.44
Manuel Alves Pequeno River Basin	1,552.6	18.48
Muricizal River Basin	3,375.6	17.76
Palma River Basin	17,055.2	20.04
Paranã River Basin	8,175.5	19.20
Perdida River Basin	9,522.7	12.94
Piranhas River Basin	1,741.3	15.26
Pium River Basin	5,044.5	16.06
Riozinho River Basin	10,923.7	18.23
Santa Tereza River Basin	5,950.9	17.96
Santo Antônio River Basin	3,057.4	15.11
Sono River Basin	25,572.5	12.56
São Valério River Basin	2,189.2	10.00
Tocantins River Basin	59,776.7	15.69

Source: PERHTO

Tocantins State Irrigation Plan[1] (PERHTO) highlights that the superficial water availability of the state is approximately 4.38 l.s/km². This availability was calculated on the value corresponding to the discharge of 90% permanence, which is the reference discharge for the concession of water use right, as defined at Decree no. 2.243/05 that regulates the

[1] State Irrigation Plan of Tocantins – Secretariat of Sustainable Development and Water Resources – SDSRH and Secretariat of Agriculture, Fishing and Agrarian Development – SEAGRO, 2011.

[2] State Irrigation Plan of Tocantins – Secretariat of Sustainable Development and Water Resources – SDSRH and Secretariat

concession in Tocantins, found from the average of discharge values of 90% of permanence time in the whole state.

The same study (PERHTO) also addresses the groundwater availability that represents the maximum amount of water that can be explored from an aquifer, with no harm to the spring, since the whole water volume accumulated in the aquifers is not available for use, because part of it shall be kept to feed water bodies. After the calculation and estimation of the water availability, results show a value of 1,999,282.55 x 10^6 m^3/year corresponding to the permanent reserve, 37,018.28 x 10^6 m^3/year of regulating reserve, and 9,254.57 x 10^6 m^3/year as exploitable reserve of aquifer systems of Tocantins state. The following were not evaluated by the study, the alluvial aquifer systems and Marine Fluvio-Lacustrine Deposits, Detrital-Lateritic coverage and Colluvia-Eluvia, Barreiras River and isolated Aquifers, due to the absence of hydro-geological information about them. Perhto indicated good quality of groundwater.

of Agriculture, Fishing and Agrarian Development – SEAGRO, 2011.

2.2.2 Soils

The study region soils have a great variety, with the Jalapão region called quartzose sand (AQd) and the Araguaia region, petroplinthic soils (Spa). The soils found in the study region are as follows:

Table 2.2.6 Soils Found in the Study Region

Type of soil		Description
Rocky outcrop (AR)		These are unit rocks found exposed at the surface of the ground, both in a discontinuous form (large loose stone and/or boulders) and in a continuous form (rocky bed).
Quartzose sand (Aqa, Aqd, HaQa)		Generally deep soils, essentially quartzose, with sand or sandy loam texture along at least a depth of 2 meters from the surface. It has profiles of extreme simplicity, with a maximum clay value of 15%, when silt is zero, and a maximum silt value of 30%, when clay is zero.
Reddish brunizen (BV)		These are mineral non-hydromorphic soils, little deep, with chernozemic A horizon over reddish textural B horizon, with high activity clay and saturation by bases over 50%.
Cambisols (Ca, Cd, Ce)		Non-hydromorphic mineral soils, little deep to shallow, with small horizon differentiation, absence of clay accumulation, sandy loam – sandy texture or finer texture.
Yellow latosol (Las, Lad)		These are well drained soils, characterized by the occurrence of Latosol B horizon of red to red-yellow colors, with Fe2O3 contents equal or lower than 11%, and usually bigger than 7%, when texture is clayey or very clayey.
Purple latosol (Lra, Lrd)		These are mineral soils, non-hydromorphic, with Latosol B horizon of dark red color, with purple tons, and Fe2O3 contents, resulting from sulfuric attack bigger than 18%. They usually have strong magnetic attraction.
Red-yellow latosol (Lva, Lvd, Lea, Le)		These are well drained soils, characterized by the occurrence of Latosol B horizon of red to red-yellow colors, with Fe2O3 contents equal or lower than 11%, and usually bigger than 7%, when texture is clayey or very clayey.
Planosol (PL, Ple)		Hydromorphic mineral soils, with abrupt texture change between horizons A or E and B textural that has high apparent density, reduction and/or spotted colors, resulting from imperfect or bad drainage.
Plinthosol (Pta, Ptd)		These are hydromorphic mineral soils, or at least soils with serious drainage restrictions, having as main feature the presence of plinthic horizon within 40 cm of surface or in higher depths.
Yellow podzol		These are mineral, well drained, deep soils, characterized by the occurrence of a textural B horizon under an A horizon, that is of the moderate type in the area.
Red-yellow podzol (Pvld, Pva, Pvd, Pve)		These are mineral, non-hydromorphic soils, with textural B horizons, red-yellow ones, and distinct differentiation between horizons as for the color, structure and texture, mainly. They are deep and covered by Forest and Cerrado vegetation, in which the main use is pasture.
Dark red podzol (Pea, Pee)		They are different from the other Podzols mainly because of the more reddish color of B horizon. They occur in slightly to strongly undulated relief, and the natural vegetal coverage is the Forest.
Alluvial soil (Ad, Ae)		Mineral, non-hydromorphic soils, little evolved, formed in recent alluvial deposits, at the banks of water courses.
Litholic soil (Ra, Rd, Re)		These are non-hydromorphic mineral soils, little developed, very shallow to shallow, with variable texture, frequently sandy or average, with the occurrence of clayey texture and rarely silty texture. They are also heterogeneous as for chemical properties, and occur under Campestral, Cerrado and Forest vegetation, in highly steep locations, generally hillsides and borders of tablelands.
Petroplinthic soils (Spa, Spd)		These are non-hydromorphic mineral soils, characterized by the high occurrence of ferruginous concretions (> 50% of petroplinthite) along the profile; with latosol or cambic B horizon.
Vertisols (V)		These are soils constituted of mineral material with vertic horizon between 25 and 100cm of depth.

Source: http://www.qmdmt.cnpm.embrapa.br/715.htm

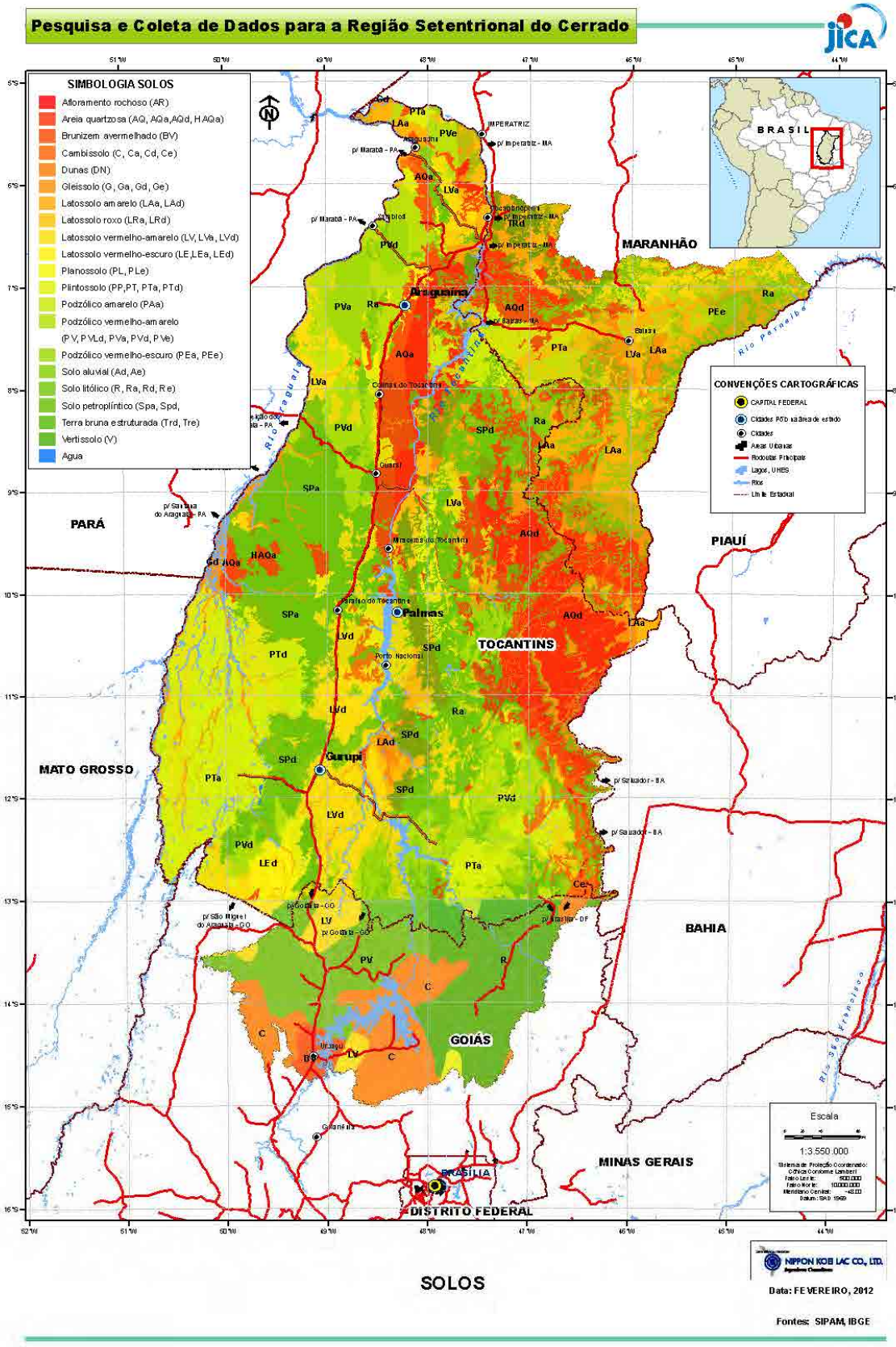


Fig 2.2.6 Map of Soils

Soils under the Cerrados, at the study region, are generally characterized by having very critical levels of macronutrients. They generally have a high concentration of aluminum, and also a high level of acidity, translated into a low pH, that these soils usually sustain. Due to the existing balance dynamism in these ecosystems, the organic matter contents are mostly at levels varying from middle to high, "everything indicating that this is the main function involved in the formation of negative loads and cation exchange" (Lopes, op. cit. P. 25).

In case of Cerrados located in Southern Maranhão, the difficulties are worsened by the intense rainfall system, occurring during the rainy season. Intense rainfall leaches the calcium existing at the surface towards inside the soil, reducing the availability of this nutrient (already scarce) at the upper part, which would be used by crops. Such features, nutrients deficiency, presence of a high acidity level, high contents of aluminum, and acidic pH of these soils, difficult their utilization in agricultural activities, making them more expensive if the objective is to use them in large scale production.

Concretionary and latosols are the predominant soils in Tocantins State, at the mid-south and mid regions. Quartzose sands occur to the east and to the mid-north. Most of the soils have weak to moderate erosion potential, except for a stripe crossing the State from the southeast to the northwest, with soils having strong to very strong erosion potential. According to the soils erosion classification (SEPLAN, 2008), almost two thirds of the State consist of areas with erosion potential classified as "slight". They are deep soils occurring in smooth relief. The superficial runoff processes are diffuse and slow, with incidental concentrated runoffs. Around 20% of the area consists of soils with strong or very strong erosion potential. These are little deep soils in strongly undulated or mountainous relief, with gradient above 20%.

According to Lopes, soils under cerrados have a series of limiting factors for their use in large agricultural undertakings. These limitations could be listed as follows:

- i – they are extremely acidic soils, with aluminum toxicity problems and, in some cases, of manganese;
- ii – they are soils with extremely reduced contents of phosphorus, calcium, magnesium, zinc, sulphur, nitrogen, and reduced contents of potassium, copper and boron; iii – they have a extremely low cation exchange capacity, both at the farmable layer, as well as in the subsuperficial layers;
- iv – they have aluminum toxicity at the layers located under the farmable layer, which associated to the low levels of calcium is certainly the most limiting factor for the radicular development in depth;
- v – occurrence of "Indian summers" in the rainy season with variable duration and incidence. Because of all of these aspects, there will be a very significant need to use high initial investments to correct the acidity, the aluminum toxicity, and to increase the low and generalized deficiency of nutrients.

2.2.3 Land Use

(1) Land Use

The study region has an expansive land use, with average property areas varying from 130 ha/unit to 480 ha/unit. Gurupi microregion has the biggest areas: 482 ha/property. The following table shows the land use situations. In Rio Formoso, Gurupi and Dianópolis microregions, there are expansive areas of agricultural properties.

Table 2.2.7 Land Use

Microregion	Total Area (ha)	Percentage of Property Area	Total Property Area (ha)	Average Property Area (ha)	Percentage Area of Pasture
Chapadas das Mangabeiras	1,687,696	44.4%	748,831	142	43.1%
Gerais de Balsas	3,650,311	38.0%	1,388,931	247	28.5%
Porto Franco	1,422,701	50.2%	713,931	130	48.2%
Bico do Papagaio	1,729,238	65.7%	1,135,949	134	60.8%
Araguaína	2,649,350	87.1%	2,308,466	261	74.9%
Miracema do Tocantins	3,898,501	78.9%	3,075,749	295	59.6%
Rio Formoso	5,140,534	38.6%	1,982,729	351	59.4%
Gurupi	2,744,529	84.8%	2,326,127	482	64.1%
Porto Nacional	2,081,534	44.4%	923,320	190	52.6%
Jalapão	5,341,644	35.0%	1,870,897	314	49.6%
Dianópolis	4,717,264	67.9%	3,202,497	409	61.0%
Porangatu	4,013,446	69.6%	2,793,631	210	68.3%
Chapada dos Veadeiros	2,133,754	56.3%	1,202,180	266	50.1%

Source: IBGE: Land use in agricultural properties as of 31/12 according to the Federation Units, mesoregions, microregions and municipalities – 2006;

Table 2.2.8 Land Use

Microregion	Municipality Area (ha)	Total properties	Total Area (ha)	Land use of agricultural properties					
				Crops (1)		Pastures (2)		Woods and forests (3)	
				Properties	Area (ha)	Properties	Area (ha)	Properties	Area (ha)
Chapadas das Mangabeiras	1,687,696	5,283	748,831	4,348	95,566	3,583	322,402	2,572	269,377
Gerais de Balsas	3,650,311	5,626	1,388,931	3,674	309,856	3,343	396,393	3,429	595,444
Porto Franco	1,422,701	5,507	713,931	4,015	43,601	4,580	344,275	4,141	292,791
Bico do Papagaio	1,729,238	8,462	1,135,949	6,113	169,422	7,344	690,892	4,998	411,208
Araguaína	2,649,350	8,855	2,308,466	4,105	45,437	7,825	1,729,812	6,484	498,048
Miracema do Tocantins	3,898,501	10,436	3,075,749	3,377	148,024	9,648	1,833,659	7,623	1,034,697
Rio Formoso	5,140,534	5,656	1,982,729	1,461	90,816	5,010	1,178,304	4,123	656,988
Gurupi	2,744,529	4,830	2,326,127	2,259	72,718	4,491	1,490,583	3,932	657,055
Porto Nacional	2,081,534	4,866	923,320	2,764	71,366	3,985	485,367	3,650	349,082
Jalapão	5,341,644	5,957	1,870,897	2,661	109,688	5,357	928,371	4,364	692,577
Dianópolis	4,717,264	7,834	3,202,497	3,750	104,403	6,412	1,953,869	4,371	950,995
Porangatu	4,013,446	13,314	2,793,631	7,048	105,846	11,892	1,907,727	9,235	713,290
Chapada dos Veadeiros	2,133,754	4,524	1,202,180	2,972	191,013	3,673	602,500	2,669	294,679

Source: IBGE: Land use in agricultural properties as of 31/12 according to the Federation Units, mesoregions, microregions and municipalities – 2006;

The areas of agrarian reformation Settlements (Incra) are distributed in the whole state of Tocantins, however with a higher density in the microregion of Bico do Papagaio and Araguaína. The agrarian reformation settlements in the study region are few, compared to the State of Pará.

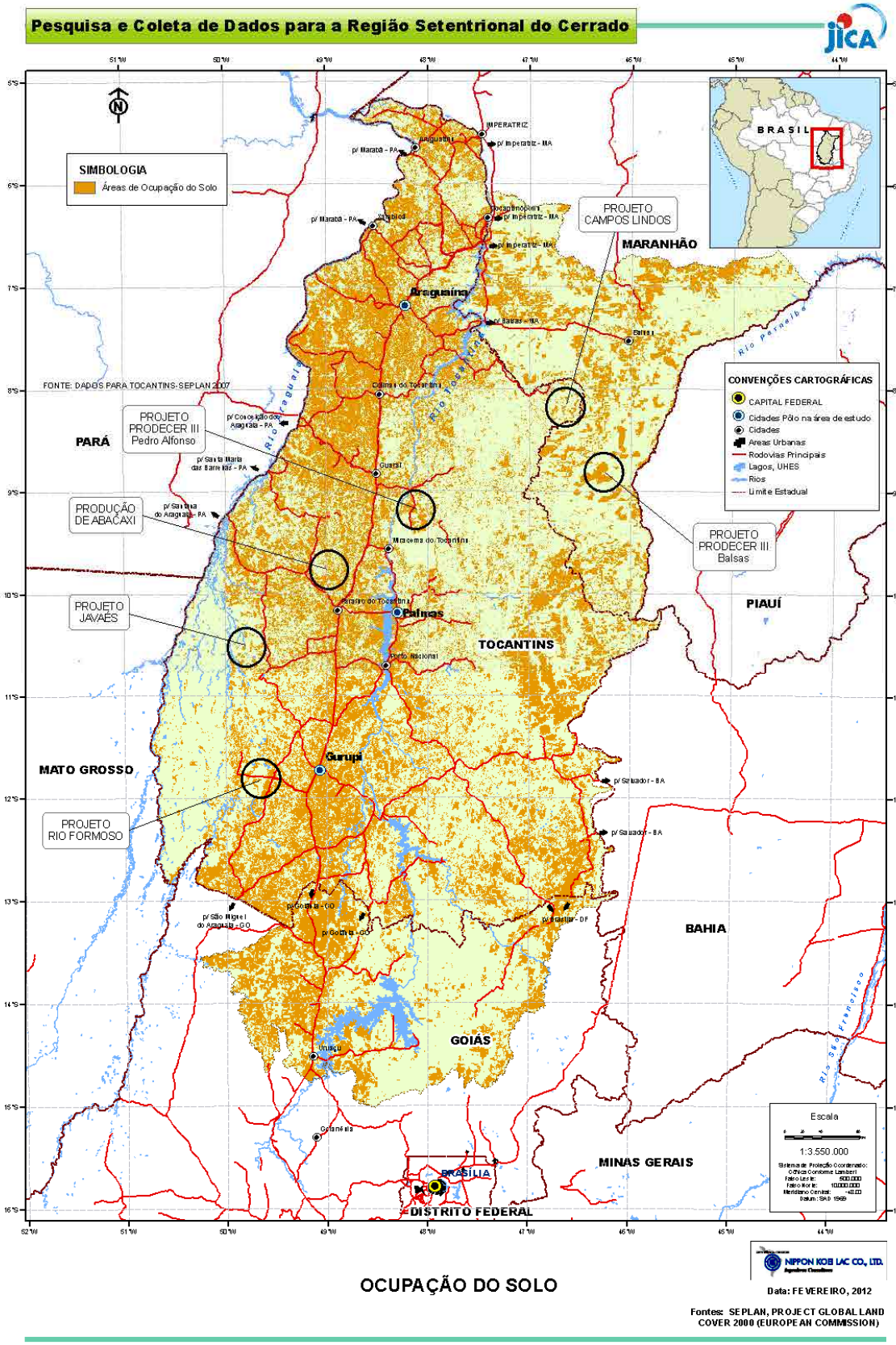


Table 2.2.7 Land Use

2.2.4 Vegetal coverage

The vegetal coverage depends on the geomorphological conditions and on the rainfall variation. The northern region of the State is covered by dense babaçu vegetation, and the south and southeast regions are covered by cerrado vegetation, predominantly in the Central Plateau of Brazil. The vegetal coverage of the State can be represented by Cerrados that occupy most of the state territory. Dense forests are predominant in the North portion, and open mixed forests, in the Extreme-North portion. The main vegetal coverage is shown as follows:

Table 2.2.5 Description of Vegetation

Domain	Symbol	Dominant Formation or Subformation
Rainforest	Fp1	Hydrophilous Forest
	Fp5	Dense Forest
	Fp6	Mixed Open Forest
Savannah	C1	Cerrado
	C2	Dirty Field and Clean Field
	C3	Field with Murundú
	Ce	Cerradão
Stationary Forest	Fsd1	Upper Xingú Broadleaved Forest
	Fsd2	Mixed Forest
	Fd	Deciduous Forest

According to Tocantins State Plan of Water Resources, based on studies conducted from the Strategic Plan of Water Resources of Tocantins and Araguaia Rivers Basin (PERHTA), it was observed that the Cerrado field occupies an area corresponding to 51.10%, the Riparian Forest, an area of 25.35%, and the Pasture Fields, an area corresponding to 17.16%. Those three types of vegetations occupy the biggest areas. Changes in the land use of Tocantins were also observed, following national trends regarding the increase of crop areas and the reduction of pasture areas. The expansion of crop areas in Tocantins has exceeded the expansion in all Mid-West states, however being below the expansion in Maranhão, among others of the North and Northeast region.

Table 2.2.6 Land Use in Tocantins State in 2005 - PERHTA

Land Use	% of the State
Agricultural Area	0.54
Irrigated Area	0.11
Cerrado Field	51.10
Field/Pasture	17.16
Pantanal Cerrado	4.69
Riparian Forest Formation	25.35
Water	1.00
Urban Zone	0.05

Source: PERH-TO – SDSRH (2011)

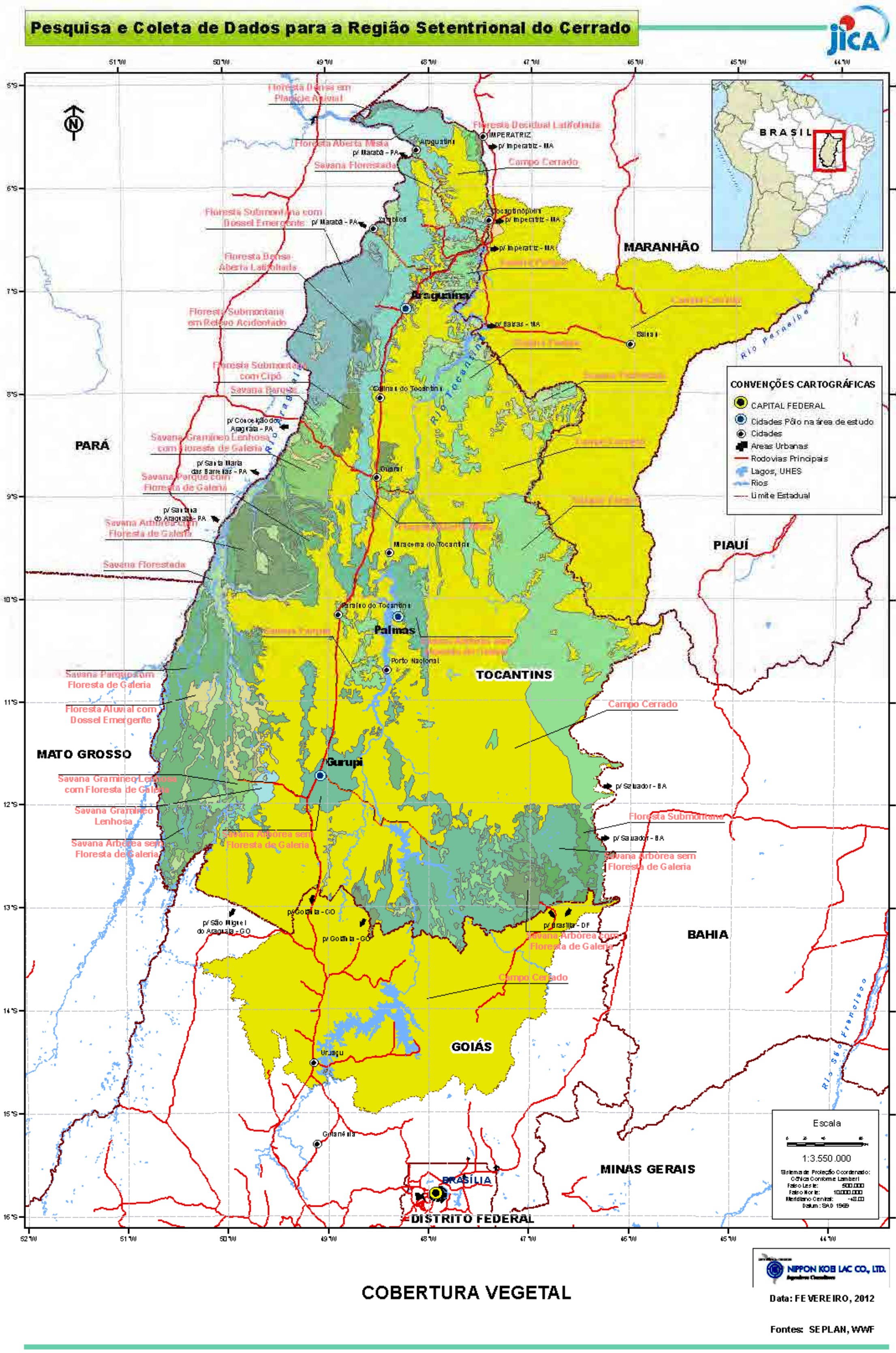


Fig. 2.2.8 Vegetal Coverage

The areas under Cerrados vegetation, in Brazil, according to studies conducted by the Brazilian Company of Agricultural Research (Embrapa), in 1978, occupy an area of 1.8 million square kilometers, which represents approximately 20% of the whole Brazilian territory. The climatic systems that prevail in these areas are variable and heterogeneous, and can be characterized in five regions. According to AZEVEDO & CASER (1980), the first region has the influence of the Amazon climate, which is hot and humid, and covers the states of Tocantins, northern Mato Grosso and Southern Maranhão. The other regions under Cerrados spread over the states of Goiás, Piauí, Bahia, Mato Grosso do Sul, Minas Gerais and São Paulo.

The predominant vegetations in cerrado areas can be classified in four types, based on ecological, physiognomic aspects, and according to the increasing order of shrubby or arboreous biomass, namely: clean field; cerrado field; cerrado and cerradão (LOPES, 1983).

The regions under cerrado have as one of their remarkable features the presence of dense herbaceous stratum, in which grasses that support well the drought regimens are predominant. Cerrado landscape is complemented with the presence of woody trees, with a shrubby under-wood which is basically composed of deciduous plants, or plants that are always with a green color, regardless of the rainfall regimen (GUTBERLET, 1998).

The forest species found in Cerrados generally have a radicular system with very deep roots. The stability of cerrado plants is pretty much related to the intensity and type of exploitation that affects this type of ecosystem.

Cerrado occupies 87.8% of Tocantins State. The rest is covered with Stationary Forests (2.5%) and Ombrophilous Forests (9.7%). *Sensu lato* cerrado, which comprises the campestral formations (dirty field and clean field), the *sensu stricto* cerrado (thin cerrado, typical cerrado, dense cerrado and rupestrian cerrado) and the Cerrado, associated or not, the riparian woods and stationary forests, cover almost the whole State.

To the west, near Araguaia River, Forest Formations and the Ecotones Zone are identified, where there is the transition between cerrado and forests and humid areas. In the later, big species such as cedar, angico, and a typical plant of North region, babaçú, are highlights.

In the southwest portion of the State, at the Araguaia River Basin, there is vegetation similar to the pantanal of Mato Grosso state. In the southeast and east regions, the contact between cerrado and caatinga, deciduous cerrado, brushwood and dry woods, can be observed. To the north, cerrados, forests, and cerrado and forest contacts are found, while at the center of the state, cerrados and stationary forests are predominant.

2.3 Socioeconomic aspects

2.2.1 Population

Southern Maranhão State

According to the Demographic Census of IBGE (2010), Maranhão State recorded a total population of 6,574,789 inhabitants, corresponding to a growth of 16.21% in relation to the 2000 Census. The study area in Maranhão State, the Southern Maranhão Region, is composed of 23 municipalities, which in 2010 had a population of 308,393 thousand inhabitants, approximately 4% of the total State population. This population concentrates in the urban zone, 69%, and mainly composed of men, 50.8%.

The demographic density of the region is 4.5 inhabitants per km², considered very low when compared to the national density, 22 inhabitants/km² (IBGE, 2010). Most of the municipalities composing the region are small, with territories of up to 3,000 km^2. The largest population concentrations are in the municipalities of Carolina (83,528 inhabitants) and Estreito (35,835 inhabitants).

The age structure of the population is composed of more than 60% of adults, people in between 15 to 64 years old (IBGE, 2010). The age range corresponding to this population in 2000 corresponded to 56%. Figure 2.3.1 shows the aging trend of the population.

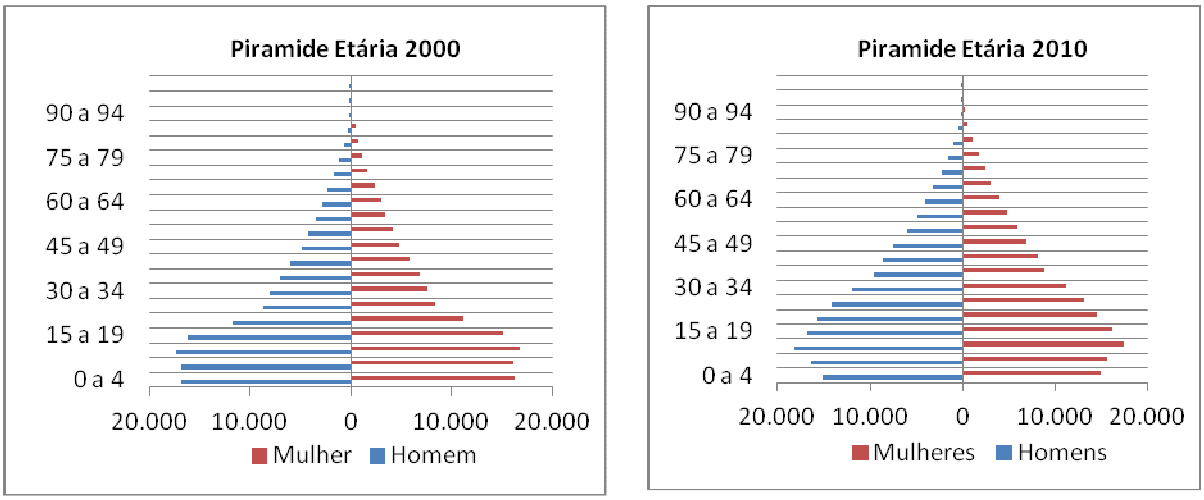


Figure 2.3.1: Age structure of the population of Southern Maranhão in 2000 and 2010 according to IBGE Census data.

In Maranhão State, the main occupation for most of the people is the agricultural activity, with 34.32% people occupied in the reference week, followed by the Commerce and Repair activity, with 17.87%. The Construction Industry comes in third place, with 8.64%. In the agricultural industry, the municipalities of Southern Maranhão that are highlights are São Raimundo das Mangabeiras, Balsas and Tasso Fragoso.

Table 2.3.2: Demonstration of occupation per group of activity – persons 10 years old or more, occupied in the week, per class of monthly income of the main work at Maranhão (2010).

Groups of activity of the main work	Population (1000 persons)
Total	2,742
Agriculture	941
Manufacture	176
Transformation industry	154
Construction	237
Commerce and repair	490
Lodging and food	79
Transports, storage and communications	95
Public administration	117
Education, health and social services	232
Domestic services	190
Other collective, social and personal services	83
Other activities	99
Poorly defined or not declared activities	-
Poorly defined activities	4

Note:

The data of this table were re-weighted by the weight defined by the Population Counting of 2007.

Source: IBGE – National Survey per Sample of Domiciles

According to the 2010 Demographic Census, the southern region of Maranhão has 78,459 domiciles, which represents 4.74% of the total domiciles of Maranhão State. Of those, 31.21% received a monthly household income per capita of up to ¼ of the minimum wage, which is considered as Extreme Poverty situation, 25.26% had incomes between ¼ and ½ of the minimum wage (situation of absolute poverty), and 26.95% attained ½ to 1 minimum wage per month (which are considered to be at the Poverty line). Only 15.17% of domiciles had monthly average income per capita of 1 to 5 wages, and a minority (1.34%) attained more than 5 minimum wages.

The literacy rate of persons 10 years old or older calculated by IBGE for 2010 in Brazil corresponds to 91% of the total persons capable of reading and writing. Maranhão State had the fourth worst literacy rate of the Country, although southern Maranhão had a literacy rate of 84.2% in 2010, higher than the state one of 80.69%.

Regarding the Human Development Index[3] (HDI), all the municipalities of Southern Maranhão have a medium HDI, which increased from 1991 to 2000. The municipality of Nova Colinas had the biggest HDI growth from 1991 to 2000, 32% increasing from 0.45 to 0.594. This municipality was the only one in the region with a low HDI. Balsas is the municipality with the best HDI of southern Maranhão, and Feira Nova do Maranhão had the smallest HDI of the region in 2000.

Tocantins State

In 2010, Tocantins State had a population of 1,383 thousand inhabitants (IBGE, 2010), of which more than one third lives in the five biggest cities. In comparison with the 1991 census, this represents a growth of 50%. Substantial part of this growth is the result of

[3] The Human Development Index is a measure of the wellbeing of a population, using the indicators of Literacy, Life Expectancy and Income of the population. It is used by the United Nations Development Programs – UNDP, which considers a low level when under 0.5, a middle level when between 0.5 and 0.8, and a high level when above such figures.

migration, mainly coming from the States of Goiás, Maranhão and Pará. Nearly 80% of the population is urban. Most of the municipalities of the State are relatively small, with territories of up to 3,000 km² and/or with population smaller than 10,000 inhabitants (IBGE, 2010). Only two municipalities have a population of more than 100,000 inhabitants, Palmas and Araguaína, which together are home for nearly one third of the total population. Since the creation of the State, back in 1988, the population has grown more than 50%, partially due to a big migration flow coming from other states, mainly Maranhão, Pará and Goiás. This migration was fostered by occupation and economic extension policies, by federal and state programs of tax incentives and regional development, by the low price of land, but, above all, by the creation of new jobs in the government and in the civil construction industry.

The demographic density of Tocantins State is below 5 inhabitants per km², very low when compared to the national average, of 22 inhabitants per km² (IBGE, 2010). The urbanization rate, 79%, is also below the national average (IBGE, 2010). The main population centers are the cities of Araguaína (North region), Gurupi (south region), and Palmas (State capital, Central region). Together, they concentrate more than 32% of the State population. However, this population mainly concentrates in the urban zone (Figure 2.3.2). The biggest concentrations of rural population in relation to the population of the municipality are found in the municipalities of Monte Santo do Tocantins – Central region, São Miguel do Tocantins – North region (Bico do Papagaio) and Jaú do Tocantins – Southeast region.

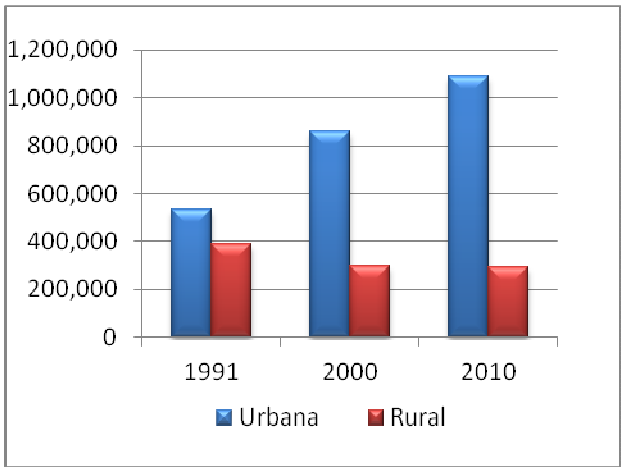


Figure 2.3.2: Distribution of Tocantins´ population into rural and urban. Source: IBGE - Demographic Censuses, 2000 and 2010.

The age structure of the population has had changes along the past decade. According to IBGE, in 2000, the adult population (15 to 64 years old) was already predominant, with 60.3% (Figure 2.3.3). In 2010, it represented more than 65% of the total population. In this same period, the population of youths (0 to 14 years old) reduced a little more than 6%. This increase of the adult population reflects a trend taking place in the population at national level.

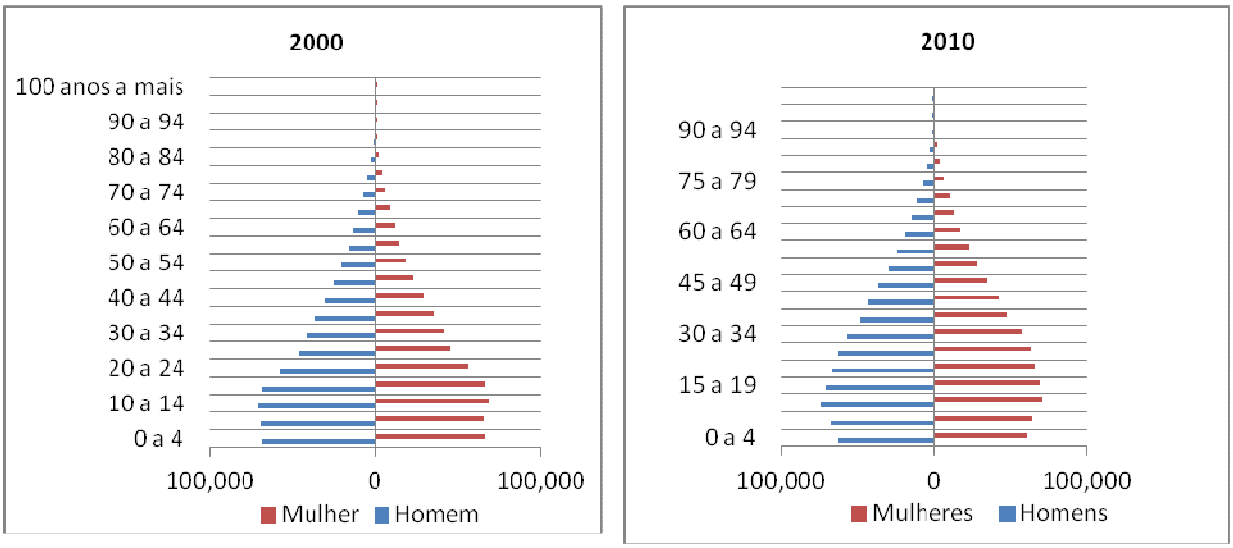


Figure 2.3.3: Age structure of the population of Tocantins in 2000 and 2010 according to IBGE Census data.

In terms of occupation, the economically active population of the State has increased in the past ten years, from 42% in 2000 to more than 55% in 2010. Of these, more than 51.6% are employed (IBGE, 2010). The economic sector employing the most is the agricultural sector, despite presenting reductions in the past few years. In 2002, it was responsible for more than 37% of the jobs, and in 2009 this was reduced to 30%. On the other hand, commerce is gaining space, in 2002 it was responsible for 13%, increasing to 15% in 2009 (IBGE, 2009). The income has decreased in the past ten years when compared to the monthly average income, which in 2000 was equal to 3.1 minimum wages, decreasing to 1.9 wages in 2010 (IBGE, 2010). In turn, the Gini Index for this distribution of income has improved, decreasing from 0.61 in 2000 to 0,53 in 2010 (IBGE, 2010).

In general, the educational level of the population has improved, the rate of the population with no education or with incomplete fundamental level education decreased from 75% in 2000 to 53% in 2010. The literacy rate of the population with 10 years or more of study remained 88.11%, close to the North Region rate, of 89.40%. In addition to this reduction, the population with 15 years or more of study increased from 1.6 in 2000 to 7%.

Since its creation, the State has improved concerning its socioeconomic situation. The Human Development Index – HDI of Tocantins State was, in 1991, the lowest of the North region. Between 1991 and 2001, the index increased 16%, from 0.611 to 0.710. With this growth, Tocantins surpassed the State of Acre. The dimension that contributed the most for this growth was education with 54.4%, followed by longevity, with 27.7%, and income, with 17.9%. The increase of this index represents, among others, the increase of life expectancy at birth from 60 to 65 years (PNUD, 2001).

Between 1991 and 2000, the access to basic services, such as piped water, garbage collection and electric energy, has progresses. In the case of access to piped water, probably one of the most important indicators, considering its inverted relation with the incidence of diseases, the access nearly doubled from 30% of the population in 1991 to 55%, in 2000 (PNUD, 2001).

Northern Goiás State

The State of Goiás, according to the 2010 Census, had a population of 6,003,788

million, corresponding to a growth of 19.97% in relation to the 2000 Census. The Northern Goiás, composed of 27 municipalities, had a population of 294,110 thousand inhabitants in 2010 Census, representing 4.90% of the total population of Goiás State. The Urban population of the Northern Goiás region represents 4.19% of the total urban population of the State, while the Rural population represents 11.47% of the total rural population of Goiás State.

The population is mostly concentrated in the municipalities of Niquelândia (42,361 inhabitants), Porangatu (42,355 inhabitants) and Uruaçu (36,929 inhabitants). In general, most of the municipalities are small, with territories smaller than 3 thousand km^2. Even with municipalities with small territories, the demographic density of the region is only 5.2 inhabitants/km² (IBGE, 2010).

In relation to the age structure of the population, 2010 Demographic Census revealed that it is mostly formed by adults (67%). In 2000, this same age range corresponded to 63%. The population of youths (0 to 14 years) decreased, going from 32% in 2000 to 25% in 2010. Figure 2.3.4 shows the aging trend of the population.

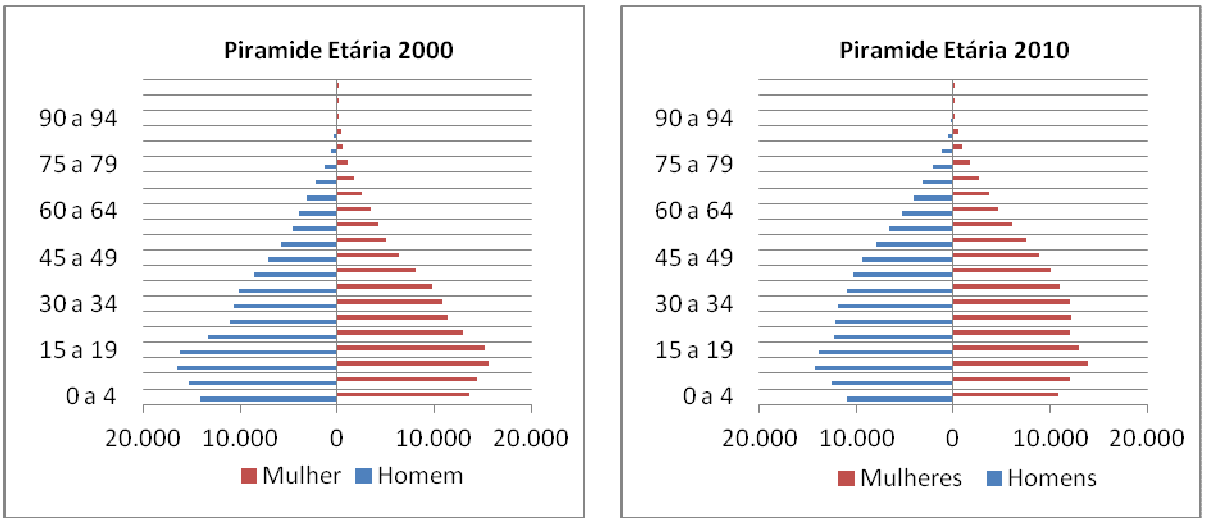


Figure 2.3.4: Age structure of the population of Northern Goiás in 2000 and 2010 according to IBGE Census data.

In Goiás State, most of the population works in the Commerce and Repair segment (17.78%), followed by the Agricultural activity (15.64). The Industry segment comes in third place, with 14.82%. However, considering the relation with the Northern Goiás Region, the highlights in terms of percentage of Occupied population are the following municipalities: Niquelândia, with highlight in the Services and Industry segment; Porangatu, with highlight in the Services and Commerce segment; and Uruaçu, also with highlight in the Services and Commerce segment.

According to the 2010 Demographic Census, the northern region of Goiás has 91,456 domiciles, which represents 4.84%% of the total domiciles of the State. Of those, 16.46% received a monthly household income per capita of up to ¼ of the minimum wage, which is considered as Extreme Poverty situation, 22.48% had incomes between ¼ and ½ of the minimum wage (situation of absolute poverty), and 34.29% attained ½ to 1 minimum wage per month (which are considered to be at the Poverty line). A little over 24% of domiciles had monthly average income per capita of 1 to 5 wages, and less than 2% attained more than 5 minimum wages.

The literacy rate of persons 10 years old or older calculated by IBGE for 2010 in

Brazil corresponds to 91% of the total persons capable of reading and writing. Goiás State had a rate higher than the National average, reaching 92.7%. However, the Northern Goiás region had a rate of 87.5 in 2010, smaller than the national and state averages.

Concerning the HDI, all the municipalities of Northern Goiás region had growths in their indexes from 1991 to 2000. The municipality of Nova Iguaçú de Goiás had the biggest growth in the period, with 22.33%, followed by the municipality of Alto Horizonte. The municipality of Terezina de Goiás obtained the smallest growth in the 1991-2000 period, 5.99%.

2.2.3 Economic Aspects

Southern Maranhão State

In the past four years, both the Stage GDP and Maranhão Southern region GDP had a constant growth, however from 2008 to 2009, the growth was smaller than in previous years, 3.56%. In 2008, Southern Maranhão GDP represented 7.25% of the total GDP of the State, while in 2009 it represented 7.95%.

As for the GDP of Southern Maranhão municipalities, in 2009, the municipality of São Raimundo das Mangabeiras became the first in the Agricultural Sector participation, with Balsas in the second place, and Tasso Fragoso in the fourth place, considering the whole State.

Tocantins State

The Gross Domestic Product (GDP) of Tocantins in 2009 was approximately R$ 14.5 billion, a growth of 365% since 2000, when the GDP was R$3.67 billion. The biggest sector is the services one, responsible for approximately half of the GDP. The secondary sector generates nearly 23% of the wealth of the State. The primary sector, mainly agriculture and cattle husbandry, is responsible for a little over 20% of the state economy. The Per Capital GDP of 2000 was R$ 3,132.00, increasing to R$ 11,278.00 in 2009 (IBGE/SEPLAN-TO).

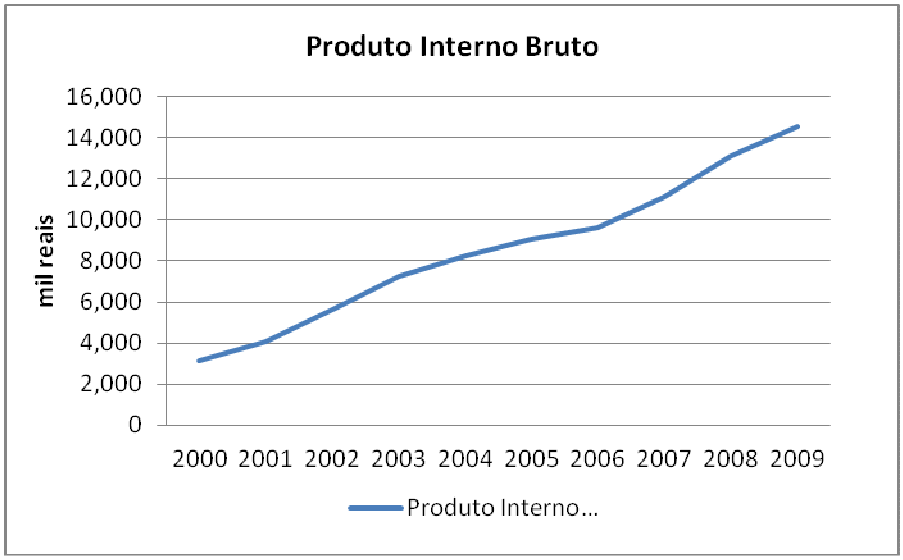


Figure 2.3.3 Evolution of the Gross Domestic Product in the past ten years.

However, these figures hide the importance of the agricultural sector in the interior of the State. The north of the State has the predominance of family agriculture, attracted by settlement projects within the scope of development projects implemented in the 70´s. In general, the white crop prevails, mixed with permanent crops such as coffee, cocoa, pepper

and banana. In the past years, there was a process of increase of cattle husbandry for milk or meat production. Recently, in the Bico do Papagaio region, there were also initiatives of silviculture to meet the demand for vegetal charcoal of the metallurgic plants of Maranhão and Pará (Tocantins, 2009).

In the Araguaína-Colina region, the initial occupation was similar to the Bico do Papagaio region occupation. However, today, there is a bigger mix of small and middle scale properties. The production in this region is characterized by a bigger dynamism and a more intensive production.

In the Central region, along Highway BR-153, and in the southwest of the State, initially the extensive cattle husbandry prevailed, being replaced by intensive cattle husbandry and more modern agriculture, such as the production of grains, fruits and sugarcane. In the past years, this region expanded in direction of BR-010, of TO-050 and isolated tablelands of the Campos Lindos region (Tocantins, 2009).

The State has 7,994,200 heads of cattle. This represents more than 18% of the total herd of the Brazilian North Region (IBGE, 2010). According to SENAI (2006), this herd is raised for meat purpose, comprising the activities of raising, re-raising, fattening and combination of these. Only a small portion is intended to milk production.

Of the crops, soybean is a highlight, having tripled between 2000 and 2010, in terms of cultivated area, from 57 thousand hectares to 352 thousand hectares in 2010, and in terms of production (144 thousand ton in 200 to 991 thousand ton in 2010) (IBGE, 2010). Soybean production is concentrated in the mid-south (regions of Gurupi, Porto Nacional) and to the east of the State, at the borders with Bahia and Maranhão (regions of Dianópolis and Jalapão). The information on harvested soybean area per sub-region seems to indicate that soybean is also being planted in the mid-north area, recently. The regions of Araguaína, Miracema do Tocantins and Bico do Papagaio are regions where the cultivation of soybean has increased in the past years.

In addition to cattle husbandry and soybean, the State is also one of the biggest producers of rice, concentrated in the southwest of the State, where the yield per hectare is relatively high, due to the possibility of irrigation. Irrigated agriculture is strongly supported by the State government. There are four major irrigation projects in operation (Formoso, Gurita, Manoel Alves and São João), and one in phase of implementation (Sampaio), and another one in design stage (PRODOESTE – Riozinho and Pium Stage).

Between the two agricultural censuses of 1995 and 2006, the number of properties increased from 45 thousand to 57 thousand. This increase occurred mainly in properties with less than 100 hectares, which number increased between the two censuses from 20 thousand to 37 thousand. In 1995, properties with less than 100 hectares represented 44% of the total properties. In 2006, this percentage increased to 66%. While the properties up to 100 hectares occupied, in 1995, a little over than 5% of the cultivated area, in 2006, they occupied a little more than 9.2% of the area. The relation between the area occupied with properties smaller than 100 ha and the area occupied with properties bigger than 1000 ha decreased from 1:10.5, in 1995, to 1:6.2, in 2006, suggesting a bigger distribution of land in 2006.

Northern Goiás State

In the past four years, both the State GDP and the GDP of Goiás Northern region had a growth, although from 2008 to 2009 the GDP of Goiás Northern region had a small drop of 2.14%. In 2008, the GDP of Northern Goiás represented 4.74%, while in 2009 it represented

4.07%. This difference corresponds also to other municipalities that grew and started to be more representative in 2009.

In the GDP of Goiás State municipalities, in 2009, the municipality of Alto Horizonte that is part of the North Region was a highlight, with a Copper sulfide processing and extraction industry*.

Table 2.3.3 GROSS DOMESTIC PRODUCT at Current Prices				
Variable = Gross Domestic Product at current prices (Thousand Reals)				
Federation Unit and Geographic Mesoregion	Year			
	2006	2007	2008	2009
Goiás	57,057,072	65,210,147	75,271,163	85,615,344
Northern Goiás - GO	2,584,876	3,358,305	3,565,651	3,489,059

Note:
The data of the last year available are subject to revision on the next divulgation.
Source: IBGE, in partnership with State Bodies of Statistics, State Secretariats of Government, and Superintendence of Manaus Free Zone -
*Planning Secretariat of Goiás State

2.4 Logistics infrastructure

2.4.1 Transportation System

The current transportation system of the region is basically dependent on the roads system. The federal government is evaluating the following items, fearing the stagnation of the transports sector development:

- institution of Law 11.079 of Public-Private Partnerships (PPPs);
- involvement of the Army in the execution of infrastructure works, followed by employment;
- Logistics Project of the Ministry of Agriculture, Fishery and Supply (MAPA) and the National Supply Company (Conab) on the agricultural production channeling corridors with focus on the Brazilian mid-north region;

Within the scope of the Public-Private Partnerships (PPPs), with a mechanism to foster investments in infrastructure that promote regional integration and logistics improvement, the government has determined the following projects as priority in the study region:

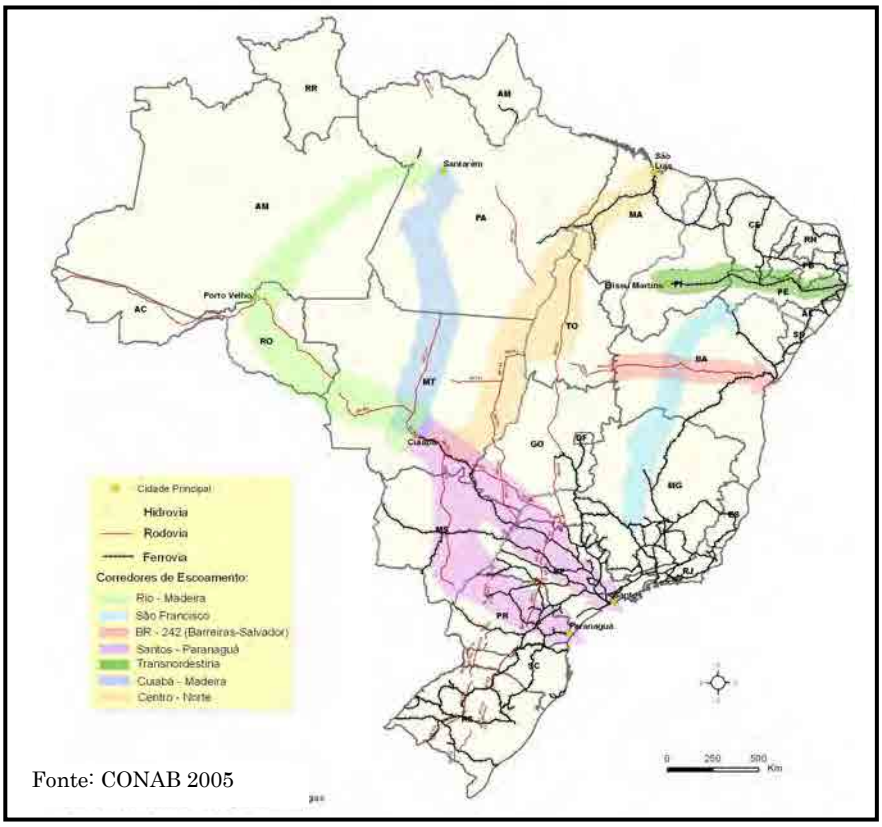
- North-South Railway;
- East-West Railway;
- Waterway;

Behind the "Mapa and Conab Logistics Project", there is a pressure on the flow of products, due to the increase of the demand and of agricultural products for exportation. This pressure can be observed in the current conditions of the transportation of products to the south and southeast ports. This situation has led the Ministry and Conab to create the "Logistics Project – Agricultural Production Channeling Corridors with Focus on the Brazilian Mid-North Region".

The Project was created in the late 2004 to identify, in the main corridors of the production channeling, the bottlenecks concerning the existing infrastructure, and to pursue the creation of alternatives in the direction to the north of the country, where there is already the action of the private sector. Hence, 7 (seven) channeling corridors were selected for analysis. These are:

- Mid-North Corridor (Mato Grosso, Pará, Tocantins, Maranhão, Goiás, Bahia and Piauí, having the destination of Itaqui port – Maranhão);
- São Francisco river Corridor;
- Madeira/Amazonas/Tapajós River Corridor;
- Cuiabá-Santarém Corridor;
- Br-242 Corridor (Barreiras – Salvador);
- Transnordestino Corridor;
- Santos/Paranaguá Corridor.

Fig. 2.4.1 Brazil´s Channeling Corridors



Fonte: CONAB 2005

In the Mid-North Corridor, the highway routes are basically used for the internal supply of component states. Highways have various stretches with deteriorated paved surface, and traffic capacity nearly saturated, needing conservation and vehicles weight control.

The transports corridor formed by North-South and West-East Railways, and by navigable stretches of Araguaia, Mortes and Tocantins rivers (jointly referred to as Araguaia-Tocantins Waterway), when totally implemented, will represent the rupture of the highway priority that was installed in the Brazilian logistic model, which not even the privatization process was capable of reverting. The 4,000 km of railways and another 2,500 km of waterways expected to form the so-called Mid-North Corridor will interconnect the railway grids of the South and the Southeast regions with the railway grid of the North region (Carajás Railway) and of the Northeast region, as well as with the waterway grid of the Amazon, making those systems capable of offering a long distance transportation, and thus a highly competitive option with trucks, even for general cargo.

The Corridors have the following features:

- it is a corridor intended to the exportation development. Upon interconnecting the Mid-North region (Eastern Mato Grosso,Western Bahia, Goiás and Tocantins) with the ports of São Luís (Itaqui and Ponta da Madeira), of Belém (Vila do Conde and Barcarena), and of Ilhéus, in the future, there Will be a significant increase of competitiveness due to the reduction of transportation costs for the exportation of various products (especially grains, but with potential to add ores and biofuels at short and middle terms) coming from production areas of the Brazilian Northern Cerrado;
- it is a corridor intended to the development of the domestic market. Through Amazon Waterways, including Tocantins waterway and North-South and West-East railways, there will be smaller costs for the exchanges of Amazon and northeastern products for products coming from the

South, Southeast and the whole Mercosur region; on the other side, the Northeast region will demand, in first place, products coming from Tocantins, due to the proximity; with due consideration of the importation of products upon the return of ships and locomotives;

- it is a corridor intended to the regional development. Upon crossing areas that can still be considered "economic blanks", such as Eastern Mato Grosso, Northern Goiás, Tocantins, Eastern Pará and Southern Maranhão, it will certainly catalyze new and modern productive investments, in its whole influence area, exceeding 1.5 million km^2 of farmable land;
- It is a corridor that improves the economic performance of the whole national railway and waterway grid, considering that it will allow all the concessionaires to offer long distance connections that are unbridgeable today, simply using the right of passage through the new railways [ ].

The set of functions exposed, shown in the following figure (Fig. 2.4.2), is enough to provide the Corridor with a highly relevant strategic importance for the integrated development of regional and national levels, justifying the initiatives of governments in the pursuit to define a model that financially allows its implementation as soon as possible. The State of Tocantins, since mid 90´s, is making a huge political effort for that.

Fig. 2.4.2

2.4.2 Roads

According to GEIPOT (2000) and IMESC (2007) data, of the 53,001 km of roads of Maranhão, approximately 3,400 km are federal, 7,200 km are state, and 44,376 km are municipal roads. Among main federal roads, there is the BR-010 connecting the southern Maranhão to the south of the country. Br-222 is also a highlight, crossing the State connecting Açailândia (entrance to the Br-010) to the northeast region of Maranhão. There is also the BR-226 crossing the state, at the region of Porto Franco, passing through the border with Tocantins until Timon, at the border with Piauí, which also occurs with BR-230, which crosses the south of the State until the state of Piauí.

The roads grid of Tocantins has an extension of 11,585.8 km, of federal and state roads. The paved roads grid corresponds to 45%, with 5,210.84 km. Non-paved roads prevail in the state, with 55%, that is, 6,374.96 km (SEINF, 2010). In this grid, in the north-south direction, the BR-153 (Belém-Brasília) is a highlight, known as the dorsal axis of the State, and located at the left bank of Tocantins river. In the east-west direction, the interconnection of Tocantins with the other states of the Country is done with the conclusion of BR-235 and BR-242. The BR-235 route directly benefits the central region of Tocantins, with great agricultural potential, and the southern Pará and northern Mato Grosso regions, interconnecting various state roads along its way.

This roads grid structure ensures the integration of the State in the national economy. The roads grid that should ensure the integration of the interior of the State with other local economic centers is deficient. Mostly, local roads are built through agreements between local governments, farmers and, in some cases, the state or federal government. Many of them are deficient in terms of basic infrastructure, having, for instance, wooden bridges that do not allow the passage of heavier traffic, or in terms of signaling systems.

2.4.3 Railways

The initial route of North-South Railway had the construction of 1,550 km of tracks planned, crossing the states of Maranhão, Tocantins and Goiás. In 2008, through a provisional presidential decree, the stretches of Açailândia-Belém and Anápolis-Panorama were incorporated to the initially designed route. With that, the North-South Railway will have, upon conclusion, 3,100 km of length.

The North-South Railway was designed to promote the national integration, and to minimize the transportation costs. So far, the following stretches were opened: Aguiarnópolis-Araguaína (146 km); Araguaína- do Tocantins (96 km); Colinas do Tocantins-Guaraí (132 km); and Guaraí-Palmas (150 km). Currently, the stretch of 570 km connecting the States of Tocantins and Goiás is under construction.

The railway stretch connecting the cities of Estreito and Açailândia, in Maranhão, was already concluded, and is commercially operating since 1996. These 215 km of railway are connected to the Carajás Railway, allowing the access to Itaqui Port, in São Luís (Maranhão). The stretch between Estreito (MA) and Colinas (TO) was also put into operation, totalizing approximately 600 km.

The cargo volume transported by the North-South Railway is attaining, year after year, an expressive increase, reaching the level of 8 million ton since the beginning of its commercial operation. The production channeling through the railway represents, for the local

producer, a freight cost reduction calculated as 30%, in relation to the cost of the roads mode (VALEC, 2012). However, according to information from local producers, the cost is becoming 60 to 70% of the freight value. The operation of the stretch between Estreito and Palmas was destined to Vale S.A., corresponding to 720 km. The concession of the other stretches shall be subject to a bidding process. It is noteworthy that, in Tocantins, the following multimodal yards are planned: Aguiarnópolis, Araguaína, Colinas do Tocantins, Guaraí, Porto Nacional, Gurupi.

Another railway in planning stage, and that will interconnect with the North-South Railway, is the West-East Railway, which will dynamize the channeling of the production from Bahia state, serving as connection of this region to other centers of the Country. The Railway will connect the cities of Ilhéus, Caetité and Barreiras – in the state of Bahia – to Figueirópolis, in the state of Tocantins, forming a transportation corridor that will improve the operation of Ponta do Tulha Port, and will also open new logistics alternatives for the ports of northern Brazil, served by North-South and Carajás Railways.

2.4.4 Waterways

The project of Tocantins-Araguaia Waterway dates back to the 60´s, and was resumed in the 80´s with the purpose of implementing commercial navigation in Araguaia-Tocantins basin, in stretches already navigable in most of the year (Almeida, 2004). The waterway will benefit the transports in five states: Mato Grosso, Goiás, Pará, Tocantins and Maranhão. However, the project is very controversial due to possible environmental impacts. Today, the transportation carried out in both rivers is done only through the crossing of small ships and middle size barges.

In Araguaia River, there is a river port located in the municipality of Xambioá (TO). For the same river, the installation of seven port terminals, in addition to a port in Aguiarnópolis, is being planned. The port shall operate as an integrated logistics center. Araguaia river is navigable throughout 1,230 km, from the municipal center of Aruanã (GO) until Xambioá.

Tocantins River, in turn, is considered strategic for the navigation in the basin, and more viable within the time horizon of PERHTA (until 2025) due to its larger navigable length, and for allowing a connection with the Atlantic Ocean. Hence, the conclusion of Tucuruí sluices, planned in the Growth Acceleration Program (PAC), of the federal government, is key to ensure the navigation in the region, allowing the navigation from Marabá (PA) to Vila do Conde (PA), 580 km, and after that the exportation to other countries. It is noteworthy that approximately 50% of the work was already executed along the past 20 years.

The future navigation of Tocantins River, the stretch above Marabá, however depends on the construction of sluices in two dams: at the Estreito Plant, currently not scheduled, and at Lajeado, which work was already started. Although the construction of Estreito dam and the discharge regulation allowed minimize the problems of rapids in Tocantins River (mainly the waterfalls of Santo Antônio and Serra Quebrada, located between Estreito and Imperatriz, MA, where safe navigation only occurs during floods), the lack of a schedule for the construction of the sluices threatens the possibility of navigation above Marabá.

At Peixe Angical HPP, the construction of a sluice is also planned, only lacking the

schedule of the construction of a sluice at Tocantins HPP (former Ipueiras) to make the waterway navigable with large scale convoys from Belém (PA) to the city of Paranã (TO).

Another important aspect for the development of the region´s navigation, identified in the scenarios, is the implementation of other hydroelectric power plants planned by the electric industry in the PDE 2007-2016 (EPE, 2007b), for Tocantins River. Although the construction of dams allows the raising of water levels upstream, and even downstream in dry seasons, with regularization benefits, in some cases eliminating natural restrictions to navigation (stone levels and sandbanks), on the other hand, if built without sluices, they become hindrances to the development of river transportation.

2.4.4 Airports

Tocantins State has an international airport located in the capital, with a capacity to transport 200 thousand passengers per year, and an airport in Araguaína, for domestic flights. It also has 67 aerodromes, mostly with land or gravel runway, only 10 with paved runway.

Airports used for regular domestic flights in Tocantins State are located in Palmas and Araguaína.

"Lysias Rodrigues" Airport of Palmas has the biggest airport area of the Country, with 2,374 ha or 23 million m^2. Facilities totalize a built area of 12.3 million m^2, and capacity to serve up to 370 thousand passengers per year, while the runway is 1,800 m long. However, the number of flights is still limited, operated by the following companies:

Table 2.3-3 Air company and its destinations at Palmas Airport (2010)

Company	Destination
Azul	Campinas (starting on June 10, 2011) and connections
GOL/VARIG	Brasília, Goiânia, São Paulo-Congonhas.
Passaredo	Goiânia, Curitiba, Rio de Janeiro, São Paulo-Guarulhos, Uberlândia, Araguaína (seasonal flights).
SETE	Altamira Araguaína, Belém, Goiânia, Marabá.
TAM	Brasília, São Paulo-Congonhas
TRIP	Belo Horizonte-Confins, Goiânia.

Table 2.3-4 Air company and its destinations at Araguaína Airport (2010)

Company	Destination
Passaredo	Curitiba, Goiânia (direct flight), Porto Alegre, Recife, São Paulo, Uberlândia
SETE	Altamira, Belém-Val de Cães, Goiânia, Marabá (direct flight), Palmas (direct flight)
TRIP	Altamira, Belém-Val de Cães, Brasília (direct flight), Carajás (direct flight), Itaituba, Manaus, Parintins, Santarém, Tucuruí, Uberaba, Uberlândia, Belo Horizonte – Pampulha

In addition to these airports, there is a runway in the south region of Maranhão, at the city of Imperatriz.

2.5 Energetic situation

2.5.1 Electrical plants

Tocantins has a great potential for the production of electric energy, comprising both hydroelectric plants and the production of cleaner sources of energy, such as solar and eolic energy. According to SEPLAN (2008), the State has 14 hydroelectric undertakings in operation, generating 1,403.35 MW, 8 (eight) undertakings under construction, which will generate 1,212.59 MW, and another 13 planned undertakings with capacity to generate 6,422.00 MW.

In the 70´s, the inventory elaborated for the Middle Tocantins River Basin forecasted the construction of 3 (three) hydroelectric power plants with a total reservoir area of 7,564 km², in addition to Tucuruí and Santo Antonio, in the Lower Tocantins, and Serra da Mesa and Cana Brava, in the Upper Tocantins.

The increasing environmental concern gave rise to two revisions of the Middle Tocantins inventory: the first one conducted in the 80´s, with the reduction of the area intended to the reservoir to 4,548 km², and the second one between 1999 and 2000, with the reduction to 3,382 km². That is: the area planned to form the reservoirs at the Middle Tocantins Basin between Cana Brava and Estreito is today 55% smaller than that planned in the 70´s. To allow such reduction, the three plants, initially planned in the 70´s, became five in the 80´s, and then eight in the beginning of 2000.

The main hydroelectric centers are as follows:

Hydroelectric Power Plant of Serra da Mesa (1,275MW)	Three generating units (1,275 MW) Type: rock-fill with clay core Maximum Height: 154 m Total volume: 12,057,558 m³ RESERVOIR: Maximum storage level: 460.00 m Maximum flood level: (maximorum) 461.50 m Minimum operation level: 417.30 m Flooded area: (elevation 460.00 m) 1,784 km² Total volume: 54.4 billion m³ Useful Volume: 43.25 km³
Hydroelectric Power Plant of Peixe Angical (452 MW)	Three turbines, installed power of 452 MW Dam: Roller-Compacted Concrete (RCC) in the river bed Maximum Height: 41.35 m Total concrete volume: 893,439 m³ Earth Dam: Left and right banks, with homogeneous section in compacted embankment, with vertical and horizontal filters of sand and rock-fill Maximum height at the left bank: 39 m Maximum height at the right bank: 30.5 m Volume of soil/filter/rock-fill compacted at the left bank: 6,217.066 m³ Volume of soil/filter/rock-fill compacted at the right bank: 884,164 m³
Hydroelectric Power Plant of Lajeado	Luís Eduardo Magalhães HPP (Lajeado) ; Capacity: 902 MW Name: Luís Eduardo Magalhães HPP (Lajeado) Capacity: 902 MW Dam: - Height 74 m - Length 2,100 m Flooded area: 630 km2 Location: Lajeado and Miracema do Tocantins / TO River: Tocantins Construction period: 1998-2002
Hydroelectric power plant of Estreito	generating capacity of 1,050 MW Reservoir Area: 590 Km² (RIMA) and 555 Km² (CESTE) Height: 40 m

	Installed Power: 1000 to 3000 MW Discounted Installed Power: 1087 MW Stable Energy: Average 584.9 MW Flooded area: 200 to 500 km² Flooded municipalities: RURAL: Estreito (MA) 39.8 km², Carolina (MA) 141.9 km², Aguiarnópolis (TO), Babaçulândia (TO), 76.6 km², Barra do Ouro (TO) 20.5 km², Darcinópolis (TO) 28.4 km², Filadélfia (TO) 64.3 km², Goiatins (TO) 1.8 km², Itapiratins (TO) 0.9 km², Palmeirante (TO) 3.2 km², Palmeiras do Tocantins (TO) 22.4 km², Tupirantins (TO) 0.2 km². URBAN: Babaçulândia (TO)
Hydroelectric power plant of Tucurui	Reservoir Area: 2850 km² Height: 78 m Installed Power: more than 3,000 MW Discounted Installed Power: 8370 MW (Tucuruí I and II) Energy generation: 7,943,000 MWh/ year Stable Energy: Average 4140 MW (Tucuruí I and II) Flooded area: more than 1000 km² Flooded municipalities: Breu Branco, Goianésia do Pará, Itupiranga, Jacundá, Marabá, Nova Ipixuna, Novo Repartimento and Tucuruí. Affected Population: 32,000 persons Affected Indigenous Populations: Gavião and Parakanã. With the installation of the high voltage transmission lines, the indigenous group of Guajajara was also affected. (Santos, Nacke, 2003).

Source:

2.5.2 Electric energy grid

According to MARTINS ET AL (2006), data from the Ministry of Mines and Energy (MME) inform that approximately 12 million Brazilians do not have access to electric energy. With that, electric energy to the rural communities of Brazil is still a huge barrier to overcome. The lack of electric energy creates very serious implications to rural populations in need of basic resources and services in the daily life, such as: improvement of education, health, communication, leisure and, above all, of working conditions. Also according to MME data, the State of Tocantins has approximately 50 thousand rural households that do not have access to electric energy, which is translated in huge difficulties for their development.

In the past ten years, various rural electrification projects were created in the pursuit to reduce the problems caused by the lack of energy. Among them, the following are noteworthy: Program of Rural Electrification in the State of Tocantins (Pertins), the Program of Energetic Development of States and Municipalities (Prodeem), and currently the Program of Universalization of Electric Energy, Light to Everyone.

The energy transmission and distribution grid has 58,831 km of length, divided into middle voltage grids (13.8 and 34.5 kV) and high voltage grids (69 and 138 kV). 95% of the system belongs to the middle voltage grid. The distribution of electric energy in the State is carried out by the concessionaire called Company of Electric Energy of Tocantins State (Celtins). The Company belongs to the Rede Group and serves the 139 municipalities of Tocantins.

The southern Maranhão is served by the Regional System of Porto Franco, composed of the microregions of Porto Franco, Gerais de Balsas and Chapada das Mangabeiras. The electric system is radially supplied in 138 kv and 69 kV by Porto Franco ES (Eletrobrás/Eletronorte), 2 x 100 MVA – 230/138 kV, 2 x 33.0 MVA – 230/69 kV, and comprises the southwest and mid-south region of Maranhão, composed of a substation at the voltage of 138 kV, 40 MVA, six substations at 69 kV, 113.75 MVA, and four substations at 34.5 kV, 16.25 MVA.

2.5.3 Energy tariff collection system

According to the National Agency of Electric Energy (Aneel), electric energy consumers, who are determined by the Normative Instruction # 424/2010, pay through a bill received from the energy distributing company an amount corresponding to the amount of electric energy consumed, in the previous month, defined in kilowatt-hour (kWh), and multiplied by an unit value, called tariff, measured in Reais per kilowatt-hour (R$/kWh), and that corresponds to the value of 1(one) kilowatt (kW) consumer in one hour.

Aneel defines a tariff that ensures to the consumer the payment of a fair value, as well as ensuring the economic-financial balance of the distribution concessionaire.

The value of the electric energy tariff is updated through annual tariff adjustment, periodic tariff revision, and extraordinary tariff revision. The annual tariff adjustment defines the purchase power of the revenue collected by the concessionaire that, in turn, is composed of two parcels: Parcel A, which represent the non-manageable costs of the Company, and Parcel B, which corresponds to the remaining value of the revenue representing the manageable costs.

The periodic tariff revision is the process of analyzing the economic-financial balance of the concession each four years. In this revision, the revenue necessary to cover efficient operation costs and the proper remuneration of investments carefully conducted is calculated.

In addition to mechanisms of annual and period tariff revision, the concession contract of Aneel also stipulates the adjustment of the Extraordinary Tariff Revision, when the Agency might, at any time, upon request of the distribution company, and when duly evidenced, review the tariff with the aim to keep the contract economic-financial balance. The revision might occur if there are significant alterations in the costs of the distribution company, including the modifications of tariffs to purchase energy, sector charges or charges on the use of electric grids that might be established during the period.

For the rural sector, Aneel has published the Normative Resolution # 207/2007, with a special discount of 80% to consumers with high voltage service, for the North region, to be used in agricultural irrigation pumping stations. In case of low voltage consumers, without their own transformer, the discount is of 60%. The measure is valid only to the hours between 9:30 pm to 6:00 am, out of peak consume hours.

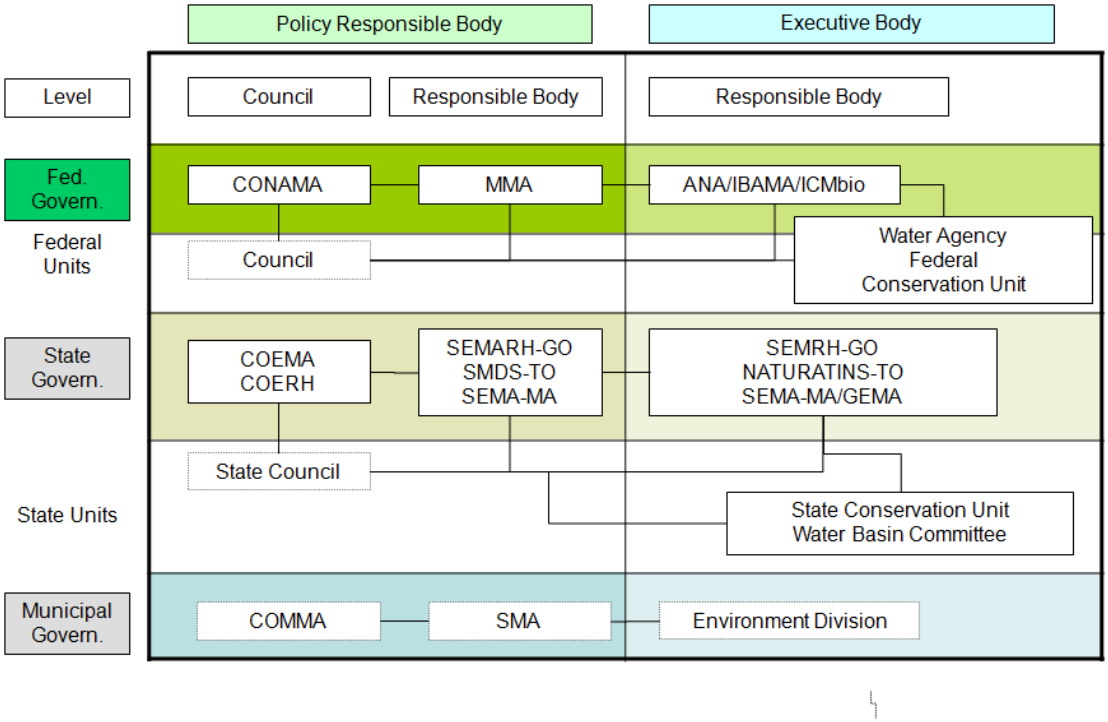
For the states of Maranhão and Goiás, the discounts are smaller, since they are part of the Northeast and Mid-West regions, respectively.

In case of possible requests to install a grid, there is a period of 30 days, after the submission of the request, for manifestation of the electric energy concessionaire about how the consuming unit will be served. Upon the approval by the interested party, the energy grid extrension project will be contracted, with the contract including the value, timeframe, and commitment of consumption and supply of energy.

2.6 Protected Areas

Brazil has been promoting the decentralization based on the federative system, establishing institutions responsible for the elaboration and execution of plans. Such institutions are formatted at federal, state and municipal levels, basic as Councils, with focus on monitoring:

Fig 2.6.1 Institutional Structure of Protected Areas



2.6.1. Conservation Units

The State System of Nature Conservation Units (SEUC), instituted by State Law # 1560/2005, and the National System of Nature Conservation Units (SNUC), instituted by Federal Law # 9985/2000, provided for the restriction of use, dividing the UCs into two groups: Integral Protection Units (UPI) and Sustainable Use Units (UUS).

The Integral Protection Units are divided into five categories described as follows:

- Ecological Station
- Biological Reserve;
- National Park;
- Natural Monument;
- Refuge of Wild Life;

Table 2.6.1 Concept of Integral Protection Unit

1. Integral Protection Units	The integral protection units have the basic objective to preserve nature, with possible indirect use of its natural resources, except for the cases provided for in law;
1.1 Ecological Station	The objective of the ecological station is to protect nature, conduct scientific researches, and environmental education. However, environmental education is based on the administration plan defined by the ecological station. For the conduction of scientific research, a prior authorization is necessary. The land condemnation is done for public utilization. Exceptions: - Measure for the recuperation of ecological system; - Execution of measures to protect the variability of plants; - Sampling of ecological system for scientific study; - Work with science objective (less than 3% of the total area, and less than 1500 hectares);
1.2 Biological Reserve	Region of ecological protection is object of a complete protection without direct interference of humans on the natural features of the region and without alteration of the environment. Except for authorized work, it is the activity of administration necessary to treat the ecological recuperation and nature balance, protection and recuperation of the ecological process. Activity allowed in the protection region is only with the purpose of education. For scientific study, a prior approval is necessary. Regarding to the land, the land condemnation is conducted for public utilization.
1.3 National Park	It has the basic objective of preserving natural ecosystems with great ecological relevance and scenic beauty, allowing the conduction of scientific researches and development of environmental education and interpretation activities, recreation in contact with nature and ecological tourism;
1.4 Natural Monument	It has the basic objective of preserving rare, singular or extremely beautiful natural sites. The land possession within the park is authorized. However, the activity shall be adjusted to the same objective of the park. If the objective of utilization is different from the standard defined in the park, there will be land condemnation. The control of visitors shall be done according to the administration plan defined by the park;
1.5 Refuge of Wild Life	Sustainable use units have the basic objective to harmonize nature conservation with the direct use of the natural resources of the plot; that is, allowing the exploitation of the environment, yet keeping the biodiversity of the site and its renewable resources. Land possession is allowed in the park. However, the activity shall be in accordance with the rules established by the park. If the objective of use is different from the standard defined by the park, there will be land condemnation. The control of visitors shall be done according to the administration plan defined by the park.

The Sustainable Use Units compose SEVEN protection regions:

- APA（Environmental Protection Areas）;
- Area of Relevant Ecological Interest;
- National Forest;
- Gathering Reserve;

- Fauna Reserve;
- Sustainable Development Reserve;
- Private Reserve of Natural Heritage;
-

Table 2.6.2 Concept of Sustainable Use Unit

2. Sustainable Use Units	The basic objective of sustainable use units is to harmonize natural protection and sustainable use of part of the natural resources.
2.1 Environmental Protection Area	It is generally a large area, with a certain degree of human occupation, with abiotic, biotic, aesthetic or cultural attributes, especially important for life quality and wellbeing of human populations, and has the basic objectives to protect the biological diversity, organize the occupation process, and ensure the sustainability of natural resources use. This area is composed of public and private land, with production activity allowed. The regulation of scientific study and visits is defined by the administration institution. The area has a council composed of supervision body, civil bodies and representatives of the communities.
2.2 Area of Relevant Ecological Interest	It is a generally small area, with little or no human occupation, with extraordinary natural features, or being the shelter to rare especimes of the regional biota, having the objective to keep natural ecosystems with regional or local importance, and to regulate the possible use of such areas, in order to harmonize them with the objective of nature conservation. The use of the area shall be compatible with natural protection. This is public and private area. Land owners might conduct activity with some limitations.
2.3 National Forest	It is an area with forest coverage of predominantly native species, and has the basic objective to allow the sustainable multiple use of forest resources and scientific research, with focus on methods for the sustainable exploitation of native forests. In this area, there is a consultative council formed by a supervision body, civil body, and representatives of residents. In the same category, there are state and municipal forests.
2.4 Gathering Reserve	It is an area used by local populations, which subsistence is based on gathering, completed by substance agriculture and small animals husbandry, and has the basic objectives to protect means of life and culture of such populations, and to ensure the sustainable use of the unit natural resources. Private land is object of land condemnation. There is a consultative council formed by a supervision body, civil body, and representatives of the communities. Visitors are allowed upon authorization of the park management. Scientific studies shall have prior authorization. The park management plan shall be approved by the council. Extraction of mining resources is forbidden, as well as hunting by residents of other areas. Deforestation is possible if done within the limits defined in the management plan.
2.5 Fauna Reserve	It is a natural area with populations of native species animals, terrestrial or aquatic, resident or migratory, proper for technical-scientific studies about the economic and sustainable management of fauna resources. If the area is private, it is subject to land condemnation. Visitors are allowed within the limits defined by the plan of the park administration. Hunting is forbidden.
2.6 Sustainable Development Reserve	It is a natural area sheltering traditional populations, whose existence is based on sustainable systems of natural resources exploitation, developed along generations, and adapted to the local ecological conditions,

	performing a key role in the protection of nature and in the maintenance of the biological diversity. This area can provided for the protection of nature and the improvement of residents´ lives conditions at the same time. However, if the area is private it is subject to land condemnation. The area shall have a council. The economic activity shall be based on the following criteria. - Open to the general public according to the administration plan. - Scientific studies - Development of natural resources, allowing the maintenance.
2.7 Private Reserve of Natural Heritage	It is a private area, encumbered with perpetuity, with the objective of conserving the biological diversity.

In the first item, the following are included: ecological stations, parks, natural monuments, biological reserves and refuge of wild life.

In the group of sustainable use units, there are the following categories: Environmental Protection Area (APA), Area of Relevant Ecological Interest (ARIE), National Forest, Gathering Reserve, Fauna Reserve, Sustainable Development Reserve, Private Reserve of Natural Heritage (RPPN), Scenic River and Road Park. Except for the APAs and RPPNs, the Conservation Units also have a buffer zone where, as provided for in Law 9.985/2000 – SNUC, activities that might affect the biota need the authorization from the Chico Mendes Institute of Biodiversity Conservation – ICMBio or Naturatins.

Among the state UCs, there are eight highlights of sustainable use, and six highlights of integral protection (according to the following table), with specific features of each Unit. In the State, there are also four UNs of integral protection and one of sustainable use, all federal, under the responsibility of ICMBio: Gathering Reserve of Babaçu, National Park of Araguaia, Ecological Station of Serra Geral do Tocantins, National Park of Springs of Parnaíba River, and APA of Serra da Tabatinga.

Table 2.6.3 State Conservation Units under the responsibility of Naturatins

UC's	MUNICIPALITIES	AREA (hectares)	LAW / DECREE	CLASSIFICATION
APA – Santa Tereza River Mouth	Peixe	51,000	Created on May 1997, through State Law no. 905.	Sustainable Use
APA Bananal Island / Cantão	Abreulândia, Araguacema, Caseara, Chapada de Areia, Divinópolis, Dois Irmãos, Marianópolis, Monte Santo and Pium.	1,678,000	Created on May 20, 1997, through Law no. 907	Sustainable Use
APA – Jalapão	Mateiros, Novo Acordo and Ponte Alta do Tocantins.	461,730	Created on June 2000, by Law no. 1.172	Sustainable Use
APA – Lago de Palmas	Porto Nacional	50,000	Created by State Law no. 1.098 in October 1999	Sustainable Use
APA – Lago de Peixe / Angical	Peixe, Paranã and São Salvador do Tocantins.	80,000	Created on March 18, 2002.	Sustainable Use
APA – Lago de Santa Isabel	Ananás, Riachinho, Xambioá and Araguanã.	18,608.15	Created by decree no. 1558 of August 1, 2002	Sustainable Use
APA of Araguaína Springs	Araguaína	16 thousand	Created on 09/12/1999, through Law no. 1.116.	Sustainable Use

UC's	MUNICIPALITIES	AREA (hectares)	LAW / DECREE	CLASSIFICATION
APA – Serra do Lajeado	Palmas, Aparecida do Rio Negro, Tocantínia and Lajeado do Tocantins.	121,417.7659 ha	Created through Law no. 906, on May 20, 1997	Sustainable Use
Natural Monumento f Fossilized Trees	Filadélfia.	32,152.00	Created by Law no. 1.179 on October 04, 2000	Integral Protection
State Park of Cantão	Piúm.	88,928	Created in June 1998 – law no. 996/98	Integral Protection
State Park of Jalapão	Mateiros.	150,00	Created by Law no. 1.203, of January 12, 2001	Integral Protection
State Park of Lajeado	Palmas	111,484.58	Created by Law no. 1.244, in May 2001	Integral Protection

Table 2.6.4 Conservation units under Federal – ICMBio administration

UC's	LOCATION	AREA (hectares)	LAW / DECREE	CLASSIFICATION
Serra Geral do Tocantins Ecological Station	Almas, Ponte Alta do Tocantins, Rio da Conceição, Mateiros no Tocantins and Formosa do Rio Preto na Bahia	716,306	Created by Presidential Decree on September 27, 2001	Integral Protection
National Park of Araguaia	Pium and Lagoa da Confusão	557,714	Created by Decree no. 47.570 of 31.12.1959, and amended by the following Decrees: n.º 68.873 of 05.07.1971; n.º 71.879 of 01.03.1973 and n.º 84.844 of 24.06.1980.	Integral Protection
National Park of Parnaíba River Springs	Borders of the states of Piauí, Maranhão, Bahia and Tocantins	729,814	Decree of July 16, 2002	Integral Protection
APA Chapadas das Mangabeiras	Rio Sono, Novo Acordo, Ponte Alta, Almas, Porto Alegre do TO, Dianópolis, Rio da Conceição, Lizarda, São Felix do TO, Mateiros / Formoso do Rio Preto - BA / Alto Parnaíba - MA/ Barreiras do Piauí, São Gonçalo do Gurgueia, Corrente, Santa Filomena, Gilbués Piauí.	65,693	Created by decree no. 5329 of February 08, 2002	Sustainable Use
Gathering Reserve of Tocantins Extreme North	Located to the north of TO – 496 road and to the south of Tocantins River, covering almost the entire municipality of Carrasco Bonito at the Extreme North of Tocantins	9,280	Created by Presidential Decree no. 535 on May 20, 1992	Integral Protection

Table 10: State Conservation Units of Goiás.

CONSERVATION UNITS OF SUSTAINABLE USE						
Name	**Creation**	**Other Legal Instruments**	**Initials**	**Category**	**Municipalities**	**Area (ha)**
APA Pouso Alto	Decree 5.419 of07/05/2001	Decree 5.500 of 15/10/2001	APA Pouso Alto	Area of Environmental Protection	Alto Paraíso de Goiás, Cavalcante, Teresina de Goiás, Colinas do Sul, São João D'Aliança and Nova Roma	872,000.00

Source: Management of Protected Areas/SUCON/SEMARH, 2011.

Table 11: Federal Conservation Units of Goiás.

CONSERVATION UNITS OF INTEGRAL PROTECTION					
Name	**Municipalities**	**Fed. Unit**	**Category**	**Legal Instruments**	**Area of the decree (ha)**
Parna da Chapada dos Veadeiros	Alto Paraíso de Goiás, Cavalcante	GO	PN	Decree no. 49.875 as of January 11, 1961; Decree no. 70.492 as of May 11 1972; Decree no. 86.596 as of November 17, 1981; Decree w/o no. as of September 27, 2001	W/o decree area – Dec 1961,171,924,5400 – Dec of 1972,60,000.0000 – Dec of 1981,176,570.0000 Incorporated by Dec of 2001

Source: ICMBio

2.6.2. Characterization of Indigenous Peoples

Indigenous territories, demarcated or yet to be demarcated, live under constant pressure of development projects, such as railways, hydroelectric power plants, agricultural projects, in addition to the construction of roads and bridges.

The progress of irrigated soybean and rice production, for instance, is causing deforestation within the limits of various indigenous lands in Tocantins, such as at the *Inãwébohona* indigenous land, at Bananal Island. In this area, agrochemicals and other chemicals being used can be contaminating the water of rivers and water streams that supply those territories, becoming a serious problem, considering that the areas available for the sociocultural reproduction of the indigenous peoples are restricted to their respective territories.

However, for the land close to the indigenous lands, the legislation regarding the conservation units, especially Decree no. 99.274 as of June 06, 1990, are being applied. This decree stipulates in its article 27 that "in areas surrounding Conservation Units, within a 10km radius, any activity that might affect the biota is subject to the rules issued by Conama". Indigenous peoples have the right to use them, according to their habits and traditions, for their social and cultural reproduction, but the extraction of surplus with commercial purposes shall comply with the legal standards of national environmental protection (Souza Filho, 1999). Thus, indigenous lands also have the statute of permanent environmental protection areas. Therefore, any undertaking in the surroundings of such areas shall comply with the legislation in force.

Currently, eight indigenous lands had their demarcation proceedings homologated by presidential decrees, and another five areas are claimed by indigenous peoples or wait for the conclusion of their demarcation proceedings. Despite having a specific legal framework, the above summarized scenario suggests the need to create strategies for the management and inspection of natural resources exploitation around such lands, considering the participation of indigenous peoples and their representative institutions in the process, also seeking to conciliate economic development with environmental and social sustainability.

Table 6: Summary of the current legal-administrative situation of indigenous lands in the study region

INDIGENOUS PEOPLE	INDIGENOUS LAND	AREA	SITUATION	LOCATION
Apinajé	Apinajé	141,904 hectares	Homologated by Presidential Decree w/o no. as of November 04, 1997.	Municipalities of Cachoeirinha, Maurilândia do Tocantins, São Bento do Tocantins and Tocantinópolis.
Apinajé	Apinajé II		Under study.	Municipalities of Tocantinópolis and Nazaré.
Krahô	Kraolândia	302,533 hectares	Homologated by Presidential Decree no. 99.062 as of March 08, 1990.	Municipalities of Goiatins and Itacajá.
Karajá, Javaé, Tapirapé and Avá-Canoeiro	Araguaia Park	1,358,499 hectares	Homologated by Presidential Decree w/o as of April 15, 1998.	Municipalities of Formoso do Araguaia, Lagoa da Confusão and Pium.
Karajá	Maranduba	375 hectares.	Homologated by Presidential Decree w/o as of April 20, 2005.	Municipalities of Santa Maria das Barreiras (PA) and Araguacema (TO).
Avá-Canoeiro, Javaé and Karajá	Inãwébohona (Boto Velho)	377,114 hectares.	Homologated by Presidential Decree w/o as of April 19, 2006.	Municipalities of Lagoa da Confusão and Pium.
Javaé and Karajá	Utaria Wyhyna/Iròdu Iràna	177,466 hectares.	Declared as permanent indigenous possession through MJ Ordinance no. 3.574 as of November 03, 2010.	Municipality of Pium
Javaé	Wahuri		Under study.	Municipality of Sandolândia.
Javaé	Canoanã		Under study.	Municipality of Formoso do Araguaia.
Xambioá and Guarani Mbya	Xambioá	3,326 hectares.	Homologated by Presidential Decree w/o no. as of November 03, 1997.	Municipality of Santa Fé do Araguaia.
Krahô-Kanela	Krahô-Kanela	7,613 hectares.	Forwarded as R.I.	Municipality of Lagoa da Confusão.
Xerente	Xerente	167,542 hectares.	Homologated by Presidential Decree no. 97.838 as of March 19, 1989.	Municipality of Tocantínia.
Xerente	Funil	15,704 hectares.	Homologated by Presidential Decree no. 269 as of October 30, 1991.	Municipality of Tocantínia.
Avá-canoeiro	Avá-canoeiro	38,000 ha	Ministry Ordinance 598 as of 02/10/96 declares permanent	Minaçu and Cavalcante - GO

INDIGENOUS PEOPLE	INDIGENOUS LAND	AREA	SITUATION	LOCATION
			indigenous possession	

Source: FUNAI (2011).

2.6.3. Characterization and Identification of Quilombo communities (former slaves´ communities)

The escape of slaves from the slavery and *senzalas* (large rooms where they used to be kept by the owners) originated the formation of Quilombo communities, in geographic sites with difficult access in Brazil. Currently, these areas are still inhabited by communities of slaves´ descendents.

It was mainly because of the 1988 Federal Constitution that the Quilombo issue became part of the agenda of public policies. In Tocantins state, through a presidential decree of 2003, 15 Quilombo communities were recognized, distributed from the north to the south of the State, in ten municipalities.

Through Ordinance no. 06 as of May 1, 2004, the Federal Government recognized as remaining of Quilombos 25 communities in Tocantins, through Palmares Foundation. Currently, there are 29 communities of Quilombos remnants, which are located in the north, south, southeast and mid regions of Tocantins. However, of these, 19 have filed legal suits to get land titles from Incra.

The biggest Quilombo of Latin America is located in northern Goiás state, the Kalunga community, with approximately 4 thousand inhabitants, occupying an area of 237 thousand ha. The community extends through the municipalities of Cavalcante, Teresina de Goiás and Monte Alegre de Goiás. The State created, through the State Complementary Law no. 19, as of 05/01/1995, the Kalunga territory, as a Cultural Heritage and Historic Value Site.

CHAPTER 3 CONTEXT OF THE AGRICULTURAL PRODUCTION SITUATION

3.1 Situation in General

3.1.1 Brazil Level

Brazilian agriculture progressed a lot in recent years, especially the cultivations of soybean, sugarcane and poultry breeding. The following tables show the development of agricultural activities in Brazil.

Table 3.1.1 Cultivated Area per main crop (ha)

Crop	2000	2005	2010	2010/2000
Soybean (in grain)	13,656,771	22,948,874	23,327,296	1.71
Maize (in grain)	11,890,376	11,549,425	12,703,373	1.07
Sugarcane	4,804,511	5,805,518	9,076,706	1.89
Feijão bean (in grain)	4,332,545	3,748,656	3,423,646	0.79
Rice (with husk)	3,664,804	3,915,855	2,722,459	0.74
Wheat (in grain)	1,138,687	2,360,696	2,181,567	1.92
Cassava	1,709,315	1,901,535	1,787,467	1.05
Herbaceous cotton (with core)	801,618	1,258,308	829,753	1.04
Sorghum (in grain)	528,061	789,186	661,180	1.25
Others	1,495,524	2,116,013	1,641,249	1.10
Total Area of Temporary Crop	44,022,212	56,394,066	58,354,696	1.33

Source: IBGE

Table 3.1.2 Number of Heads of Raised Herds

Herds	2000	2005	2009	2010/2000
Bovine	169,875,524	207,156,696	205,260,154	1.21
Swine	31,562,111	34,063,934	38,045,454	1.21
Goats	9,346,813	10,306,722	9,163,560	0.98
Sheep	14,784,958	15,588,041	16,811,721	1.14
Roosters, chickens and chicks	659,245,547	812,467,900	1,024,992,542	1.55
Hens	183,494,626	186,573,334	208,871,491	1.14
Quails	5,775,181	6,837,767	11,485,093	1.99

Source: IBGE

As for exports, Brazilian agriculture has shown a big progress in the past 10 years. Soybean exports amount increased 5.22 times, and sugar exports increased 7.8 times.

Table 3.1.3 Value of Exports of main Brazilian products (US$ 1,000)

	2000	2005	2009	2009/2000
Soybean	2,187,880	5,345,050	11,424,300	5.22
Demerara sugar	761,792	2,382,150	5,978,590	7.85 フォームの始まり
Chickens	805,764	3,324,210	4,817,760	5.98
Coffee	1,559,610	2,516,610	3,761,610	2.41
Cattle meat	502,905	2,417,060	3,015,730	6.00
Refined sugar	437,633	1,536,700	2,399,240	5.48
Maize	9,366	120,862	1,302,150	139.03
Soybean oil	359,031	1,266,640	1,233,930	3.44
Swine	143,850	836,194	982,913	6.83

Source: FAOSTAT

There is an increasing demand for these products in the international market. With bigger volumes being demanded. It is noteworthy that international markets of soybean products, by-products, meat and sugar are increasing in a very fast pace. The following table shows the share of Brazil products in the international exports market.

Table 3.1.4 Share of Brazilian products in the worldwide exports

	2000	2005	2009
Sugar Raw Centrifugal	18.3%	38.1%	59.1%
Soybeans	23.8%	33.9%	34.5%
Preparations of Beef Meat	27.1%	31.3%	30.3%
Chicken meat	12.6%	31.9%	30.1%
Coffee, green	18.4%	25.9%	26.5%
Sugar Refined	9.3%	17.8%	22.3%
Soybean oil	13.4%	23.8%	15.7%
Meat-Cattle Boneless(Beef & Veal)	4.7%	14.7%	14.0%
Meat of Beef, Drd, Sltd, Smkd	8.0%	6.6%	11.7%
Pork	4.2%	11.7%	10.5%

Source: FAOSTAT

Worldwide consumer markets of sugar, meat and soybean are increasingly dependent on Brazilian exports, which in turn depend on the opening of new agricultural frontiers in Brazil. It is noteworthy that the expansion of new agricultural areas is related to crops that had great progresses, especially soybean and sugarcane.

In the case of soybean, such expansion was observed in the states of Mato Grosso, Paraná, Rio Grande do Sul and Goiás, and São Paulo state contributed for the advance of sugarcane cultivation.

Table 3.1.5 Expansion of soybean cultivated area (ha)

Fed. Unit	2000	2005	2010	Areas increased during 2000/2010 (ha)
Mato Grosso	2,906,448	6,106,654	6,226,452	3,320,004
Paraná	2,857,968	4,154,667	4,479,869	1,621,901
Rio Grande do Sul	3,001,836	3,733,822	4,013,616	1,011,780
Goiás	1,491,066	2,663,380	2,445,600	954,534
Mato Grosso do Sul	1,099,359	2,025,155	1,732,297	632,938
Minas Gerais	600,054	1,118,867	1,020,611	420,557
Bahia	628,356	870,000	1,017,250	388,894
Maranhão	178,716	372,074	494,236	315,520
Piauí	40,004	198,547	343,092	303,088
Tocantins	57,919	355,300	352,875	294,956
Others	260,035	568,868	706,294	446,259
São Paulo	535,010	781,210	495,104	-39,906
	13,656,771	22,948,544	23,327,296	9,670,525

Source: IBGE

The states of Mato Grosso, Paraná, Rio Grande do Sul and Goiás were responsible for 82% of the national production. There is an expansion to new areas of Maranhão, Tocantins, Piauí and Bahia, which now are responsible for 13% of the Brazilian production. The expansion in the States of Maranhão and Tocantins were modest, contributing with only 6% of the total expansion.

In the case of sugarcane, the State of São Paulo showed a big progress, contributing with nearly 60% of the expansion in the past 10 years. Others states having expansion were Minas Gerais, Goiás, Mato Grosso do Sul and Paraná. The following table shows the expansion of sugarcane cultivated areas.

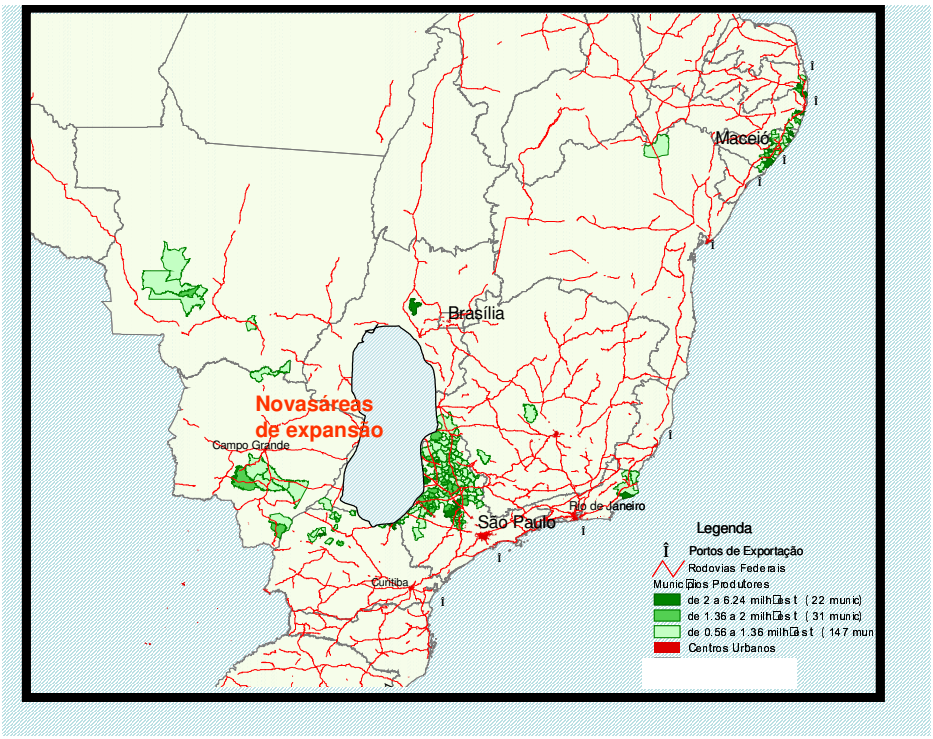
Table 3.1.6 Expansion of sugarcane cultivated area (ha)

Fed. Unit	**2000**	**2005**	**2010**	**Areas increased during 2000/2010 (ha)**
São Paulo	2,484,790	3,084,752	4,986,634	2,501,844
Minas Gerais	291,083	349,104	746,527	455,444
Goiás	139,186	196,596	578,666	439,480
Mato Grosso do Sul	98,938	136,803	399,408	300,470
Paraná	327,165	404,520	625,885	298,720

Mato Grosso	135,029	205,961	212,498	77,469
Pernambuco	304,499	367,022	361,253	56,754
Espírito Santo	43,914	64,373	81,393	37,479
Paraíba	90,964	105,403	123,691	32,727
Maranhão	19,912	31,728	50,477	30,565
Sergipe	21,048	26,867	46,665	25,617
Rio Grande do Norte	43,380	53,914	65,320	21,940
Ceara	34,535	35,098	43,024	8,489
Tocantins	3,562	2,762	9,780	6,218
Santa Catarina	15,980	16,714	9,511	-6,469
Alagoas	448,155	406,788	433,725	-14,430
Rio de Janeiro	158,824	168,279	133,286	-25,538
Others	143,547	148,834	168,963	25,416
	4,804,511	5,805,518	9,076,706	4,272,195

Source: IBGE

It is noteworthy that sugarcane is now cultivated where soybean was previously cultivated. The main centers of new expansion areas are illustrated in the following map.



Source: JICA Study Team

Fig. 3.1.1 Important Regions of Sugarcane Production

In case of chicken breeding, the states with production increase were Paraná, São Paulo, Santa Catarina, Rio de Janeiro, with location at the proximities of exportation points.

Table 3.1.8 Evolution of chicken raising (units)

Fed. Unit	2000	2005	2009	Figures increased during 2000/2010 (head)
Paraná	123,293,408	151,814,509	229,718,771	106,425,363
São Paulo	106,465,342	133,671,738	184,577,303	78,111,961
Santa Catarina	111,561,860	142,411,820	161,001,648	49,439,788
Rio Grande do Sul	91,760,700	108,730,854	121,121,144	29,360,444
Mato Grosso	11,617,098	15,959,146	38,699,283	27,082,185

Goiás	18,664,421	31,801,276	42,988,052	24,323,631
Tocantins	1,599,269	2,402,603	3,101,570	1,502,301
Maranhão	8,545,249	8,368,394	8,092,004	-453,245
Others	185,738,200	217,307,560	235,692,767	49,954,567
Others	659,245,547	812,467,900	1,024,992,542	365,746,995

Source: IBGE

These data show the disadvantage of the Study region areas, with moderate contribution to the agricultural development scenario of Brazil. To be inside this agricultural expansion scenario, it is necessary to attract investors, strengthening the logistics of the agricultural production and local government institutions.

3.1.2 State Level

(1) State of Maranhão

The agriculture of Maranhão, that used to be based on rice and corn in the past, is showing changes in the cultivation of soybean. The cultivated area of soybean (178,716 ha) in 2000 was increased to 494,236 ha. The following table shows the evolution of crop areas in the State of Maranhão.

Table 3.1.9 Evolution of temporary crop areas in the State of Maranhão (ha)

	2000	2005	2010	Areas increased during 2000/2010 (ha)
Soybean (in grain)	178,716	372,074	494,236	315,520
Cassava	134,688	191,852	210,060	75,372
Maize (in grain)	319,759	376,213	375,486	55,727
Sugarcane	19,912	31,728	50,477	30,565
Feijão bean (in grain)	70,204	78,025	87,224	17,020
Herbaceous cotton (with core)	466	8,385	13,030	12,564
Rice (with husk)	478,839	527,013	476,255	-2,584
Others	10,301	7,336	7,166	-3,135
	1,212,885	1,592,626	1,713,934	501,049

Source: IBGE

It is noteworthy that the main production centers are in the south of Maranhão.

(2) State of Tocantins

The agriculture of the State is showing great progress in recent years. Agriculture that was an moderate activity is transforming the state in a center of food production. Soybean and sugarcane areas are progressing in the State, changing its landscape. The following table shows changes of cultivated areas in the State.

Table 3.1.10 Evolution of temporary crop areas in the State of Tocantins (ha)

CROP	2000	2005	2010	Areas increased during 2000/2010 (ha)
Soybean (in grain)	57,919	355,300	352,875	294,956
Maize (in grain)	58,575	78,182	83,229	24,654
Feijão bean (in grain)	4,472	12,695	26,134	21,662
Sorghum (in grain)	520	9,350	18,170	17,650
Cassava	12,023	17,694	18,612	6,589
Sugarcane	3,562	2,762	9,780	6,218
Herbaceous cotton (with core)	0	1,237	4,200	4,200
Peanuts (with husk)	0	1,630	3,870	3,870
Watermelon	2,235	3,109	3,416	1,181
Pineapple	1,667	2,049	2,077	410

Rice (with husk)	148,543	198,038	137,946	-10,597
	289,516	682,046	660,309	370,793

Source: IBGE

The expansion occurred in the borders with the states of Maranhão and Bahia, as the result of the agricultural expansion of existing areas.

(3) State of Goiás

The development of Goiás State in the past twenty years is undeniable, mainly in the Southwest region that has agriculture as its main growth sector. The growth of the Mid-West region is been levered by various growth centers spread by the region. One of the most expressive centers is the microregion of Southwestern Goiás, which main municipality is Rio Verde, which as the production of soybean, cotton, rice, corn, cattle, swine and chicken meat as its main agricultural activities. At the southeast region of Goiás, the growth of soybean and corn areas was followed by the growth of chicken and swine production. Despite the great advance of the agricultural production at the Southeast region, the North region could not follow the same growth trend. The following table shows the evolution of crop areas in the State of Goiás.

Table 3.1.11 Evolution of temporary crop areas in the State of Goiás (ha)

	2000	2005	2010	Areas increased during 2000/2010 (ha)
Soybean (in grain)	1,491,066	2,663,380	2,445,600	954,534
Sugarcane	139,186	196,596	578,666	439,480
Sorghum (in grain)	175,850	276,065	245,308	69,458
Maize (in grain)	839,844	614,709	860,041	20,197
Wheat (in grain)	6,887	11,114	15,824	8,937
Tomato	10,196	10,792	18,437	8,241
Feijão bean (in grain)	112,179	118,242	118,948	6,769
English potato	1,172	3,800	6,791	5,619
Cassava	16,956	20,091	21,157	4,201
Herbaceous cotton (with core)	96,718	149,114	43,909	-52,809
Rice (with husk)	150,334	184,950	90,382	-59,952
Others	10,083	7,104	13,989	3,906
	3,050,471	4,255,957	4,459,052	1,408,581

Source: IBGE

3.2 Situation of agriculture

3.2.1 Short Cycle Crops

At the Study region, the main short cycle crops are soybean, corn, rice and feijão beans. Soybean is being the dominant crop, especially at the microregions of Balsas, Chapadas das Mangabeiras. The following table shows the distributions of short cycle crops.

Table 3.2.1 Distributions of main short cycle crops (ha)

	Microregion	Soybean	Maize	Rice	Feijão Beans
Southern Maranhão	Chapadas das Mangabeiras	128,453	30,242	8,709	1,610
	Gerais de Balsas	263,942	11,102	11,978	997
	Porto Franco	13,882	5,274	4,811	603
Tocantins	Araguaia	12,270	9,700	9,110	2,800
	Bico do Papagaio	5,830	2,964	5,116	979
	Dianópolis	43,790	18,250	14,340	800
	Gurupi	40,310	9,720	11,400	765
	Jalapão	105,500	20,700	8,890	2,215
	Miracema do Tocantins	34,450	9,780	9,390	2,890
	Porto Nacional	79,375	7,380	11,950	4,195

	Rio Formoso	31,350	4,735	67,750	11,490
Northern Goiás	Chapada dos Veadeiros	26,800	15,152	2,305	5,895
	Porangatu	53,700	23,349	8,360	4,430
		839,652	168,348	174,109	39,669

Source: IBGE

(1) Soybean

Different from rice and corn productions, soybean production started later, after PRODECER Project, with the implementation of Pedro Afonso Project in the State of Tocantins, and Balsas in the State of Maranhão. After the implementation of these PRODECER projects, the production became visible in 1998, revealing intense expansion ever since. The creation of the Agricultural Cooperative of Pedro Afonso (COAPA) in this same year was significant for the consolidation of the production process and performance of soybean, as well as for its production and productivity results.

Data about soybean production in Tocantins between 2000 and 2010, presented at Table 3.2.2, show an expressive increase (nearly 5 times) of harvested and production areas. This concomitant increase kept the productivity above 2.00 t/ha, marking a growth of 12% that culminated in 2.81 t/ha, in 2010. The evolution of productivity is illustrated at Fig. 3.1.2.

As for the distribution of the production, we observe that, in 2010, the production was localized at the regions of the municipalities of Pedro Afonso and Campos Lindos to the north, Palmas and Mateiros to the center, and Lagoa da Confusão and Formoso do Araguaia to the south. It is noteworthy that the productivity attained in these municipalities, approximately 3.00 t/ha, was above the state average.

Table 3.2.2 Harvested Area, Production and Productivity of Soybeans, Tocantins, 2000-2010.

Harvest Year	Harvested Area (ha)	Production (t)	Productivity (t/ha)
2000	57,919	144,362	2.49
2001	82,098	188,226	2.29
2002	107,377	244,329	2.28
2003	153,048	377,638	2.47
2004	253,466	652,322	2.57
2005	355,300	905,328	2.55
2006	321,090	742,891	2.31
2007	304,096	731,672	2.41
2008	329,508	894,309	2.71
2009	315,560	875,428	2.77
2010	352,875	991,326	2.81

Source: IBGE

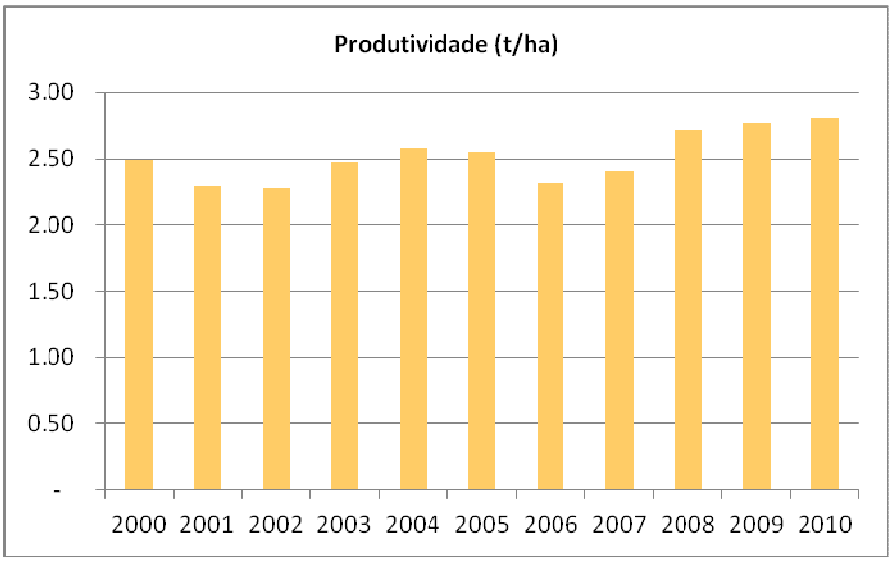


Fig. 3.1.2 Productivity of soybean cultivation, State of Tocantins, 2000-2010. Source: IBGE

The areas are distributed apart from the Study region. Soybean is one of the most important international commodities. Soybean is the agricultural product that generates the higher (in tons) exportation volume for Brazil, requiring a lot of the logistic structure of the country. Despite this, the regions do not have enough logistic infrastructure, especially the southern region of Maranhão.

3.2.2 Sugarcane

The sugarcane production in Tocantins has always raised lots of doubts among technicians, producers and institutional representatives. The capacity of sugarcane to endure the local dry period, identified as "Tocantins summer" that covers the months of May to September, is a recurring issue. The absence of rainfall and the low rate of relative humidity of the air in the "summer" mean substantial water deficits to sugarcane, jeopardizing the production and the productivity of the crop. This has turned more difficult the installation of more robust industrial projects of sugarcane cultivation for the production of sugar and carburant alcohol (ethanol), since the industrial yield of the field would not sustain the competitive production in local plants. Considering that, the most appropriate thing to do would be to evaluate the technical, economic and financial feasibility of producing irrigated sugarcane.

Despite the above doubts, it is undeniable that sugarcane cultivation is increasing in the State. The data presented in Table 3.2.3 reinforce such observation. As observed, between 2000 and 2010, the harvest area increased 175% and the production, 378%, showing that, if there are climatic and agronomic limitations, the technological development is managing to overcome them. Hence, the productivity had a leap of 74%, from 42 t/ha in 2000 to 73 t/ha in 2010. This performance is illustrated in Fig. 3.1.4.

In terms of dispersion, however, the sugarcane production shows to be still small and restricted to the mid-south region of the State. Only the municipalities of Arraias and Gurupi manage to attain productivity (a little) above the state productivity in 2010. Other producers have shown results way lower than the reference results.

Table 3.2.3 Harvested Area, Production and Productivity of Sugarcane, Tocantins, 2000-2010.

Harvest Year	Harvested Area (ha)	Production (t)	Productivity (t/ha)
2000	3,562	149,523	41.98
2001	3,740	216,173	57.80
2002	2,763	151,801	54.94
2003	2,745	156,815	57.13

2004	2,722	160,096	58.82
2005	2,762	161,873	58.61
2006	3,538	193,390	54.66
2007	3,714	202,620	54.56
2008	6,306	392,071	62.17
2009	8,651	664,284	76.79
2010	9,780	715,317	73.14

Source: IBGE:

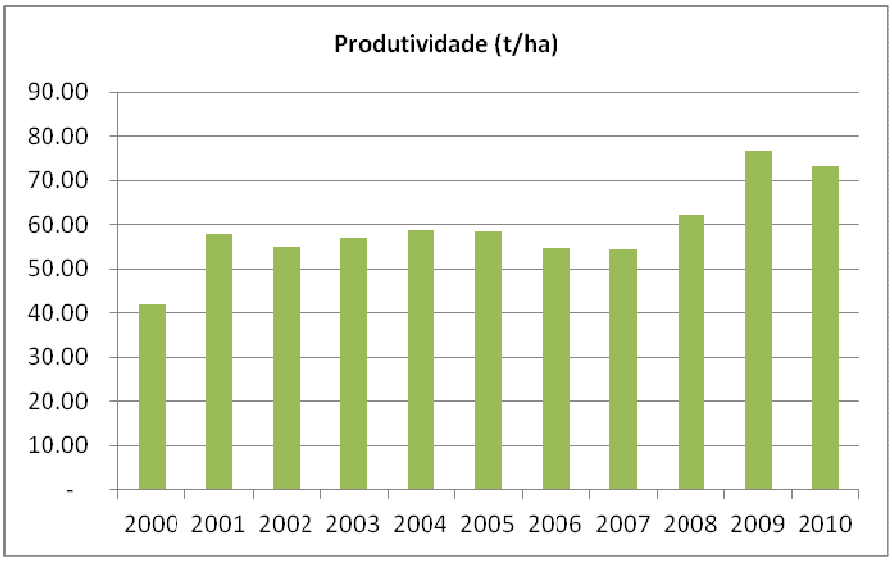


Fig. 3.1.4 Productivity of sugarcane cultivation, State of Tocantins, 2000-2010. Source: IBGE:

According to Bunge information, which has installed a new plant in the region of Pedro Afonso, sugarcane is showing better results, attaining a productivity of 85 t/ha. It is noteworthy that the irrigated areas of sugarcane at Bunge Plant totalize 4,000 ha, out of a total of 27,000 ha of sugarcane plantation.

Table 3.2.4 Information of BUNGE Project

Sugarcane	**Ethanol**	**Source:**
Area cultivated with sugarcane	**27 thousand ha**	**Bunge 2012**
Area to be cultivated with sugarcane 2012/13	**7.5 thousand ha**	**Bunge 2012**
Irrigated area	**4 thousand ha**	**Bunge 2012**
Ferti-irrigated area	**4 thousand ha**	**Bunge 2012**
Triturated cane 2011/12 harvest	**1,367 (million ton)**	**Bunge 2012**
Sugarcane productivity per hectare - Tocantins	**85 t/ha**	**Bunge 2012**
Sugarcane average productivity per hectare – Tocantins	**68 t/ha**	**Unica 2012**
Liters of alcohol per triturated sugarcane ratio	**90 liters/ton**	**Bunge 2012**
Average ATR	**150 kg/ton**	**Bunge 2012**
Plants in Brazil	**428**	**MAPA 2011**
Plants in Tocantins	**1**	**MAPA 2011**

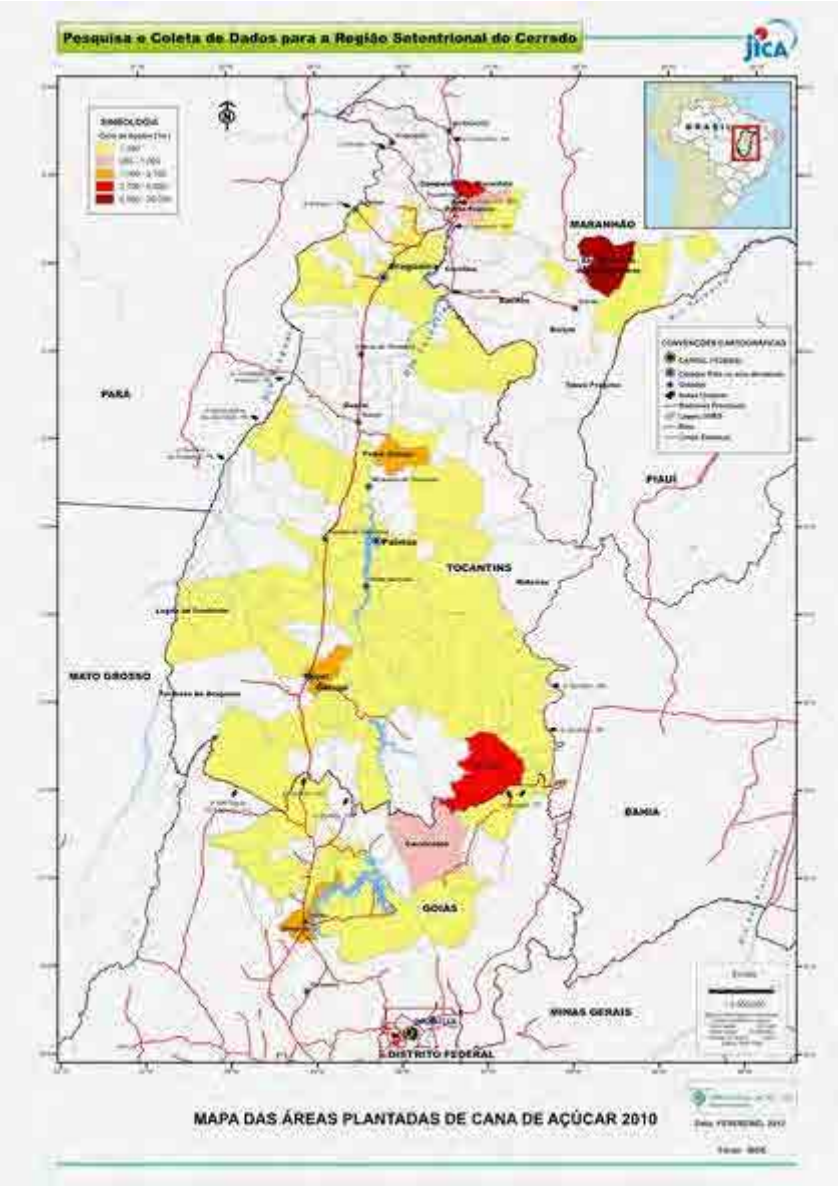


Fig 3.1.5 Area cultivated with sugarcane

3.2.3 Fruits

Among agricultural activities, the cultivation of fruits developed in Tocantins is showing a significant performance, stimulating the interest of producers and distributers on it. Under such circumstances, the productive aspects of the cultivations of pineapple, banana, watermelon, Bahia coconut, passion fruit, guava and citrus will be evaluated as follows. In addition, other fruits which production potential in the State is significant will also be mentioned.

3.2.5 Cattle husbandry

(1) Beef cattle

Cattle husbandry is the one with higher activity volume and economic importance, among various livestock productions in the State. Especially oriented to meat production, meat cattle husbandry represents most of this activity.

Considering the effective herd according to IBGE, it had a 30% growth in the period 2000-2010, reaching approximately 8 million heads. It is noteworthy that, according to the State Secretariat of Agriculture and Livestock Husbandry of Tocantins, vaccination currently protects 98% of the total effective state herd. This level classifies Tocantins as a foot-and-mouth disease free zone

through vaccination, increasing the chances of market for the local meat. This also explains the interest of big meat processing industries recently installed in the State. Fig. 5.1.6 shows the evolution of the cattle herd of Tocantins.

Although cattle husbandry is being developed in the whole State, most of the herd is found at north and southeast regions, the areas of Araguaia River influence, where land has higher natural fertility and is capable of sustaining a higher animal/ha rate. Under such circumstances, the highlights are the municipalities of the regions of Araguaína, Miracema do Tocantins and Formoso do Araguaia. Municipalities of the regions of Gurupi and Dianópolis can also be included as relevant.

The activities of the meat cattle production chain of Tocantins have been financed by funds from the Constitutional Fund of the North (FNO)

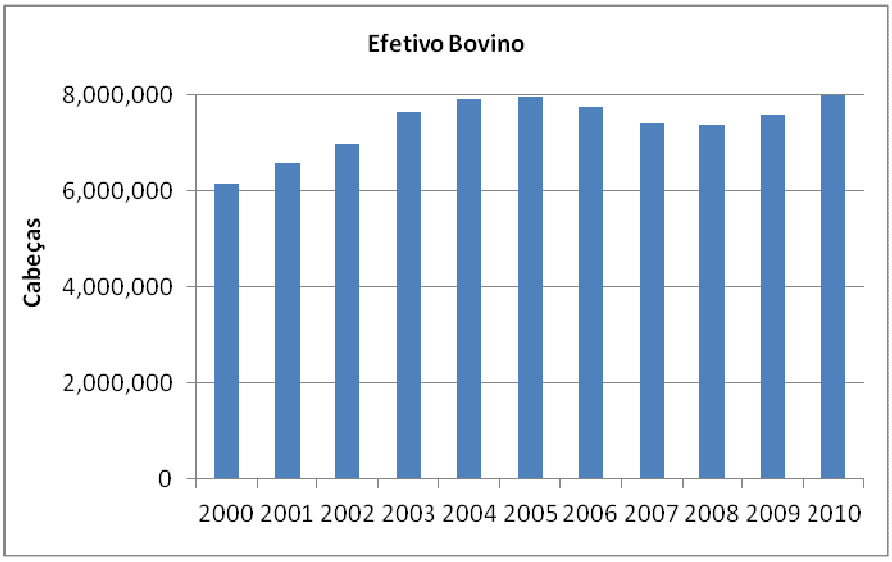


Fig. 3.1.6: Effective herd of meat cattle in Tocantins, 2000-2010. Source: IBGE:

(2) Milk cattle

Milk production in Tocantins State is a very diffused activity. Either by private initiative or government action, it is present in all the regions of the State, and in properties of all sizes.

Private investment has taken place individually or in a cooperative manner. In this case, the highlight is the Agricultural Cooperative of Tocantins (CAT) that operates the collection and processing of milk at the central region of the State, from the municipality of Paraíso do Tocantins. Public investment, in turn, came through the technical assistance from Ruraltins, and through the donation of mechanized set for milk cooling by the State Government. In view of such actions, the production has continuously and consistently increased, as shown in Fig. 3.1.7. Despite of that, the activity still has a low productivity, little diversification in by-products, and faces serious risks of prices due to its strong seasonal nature.

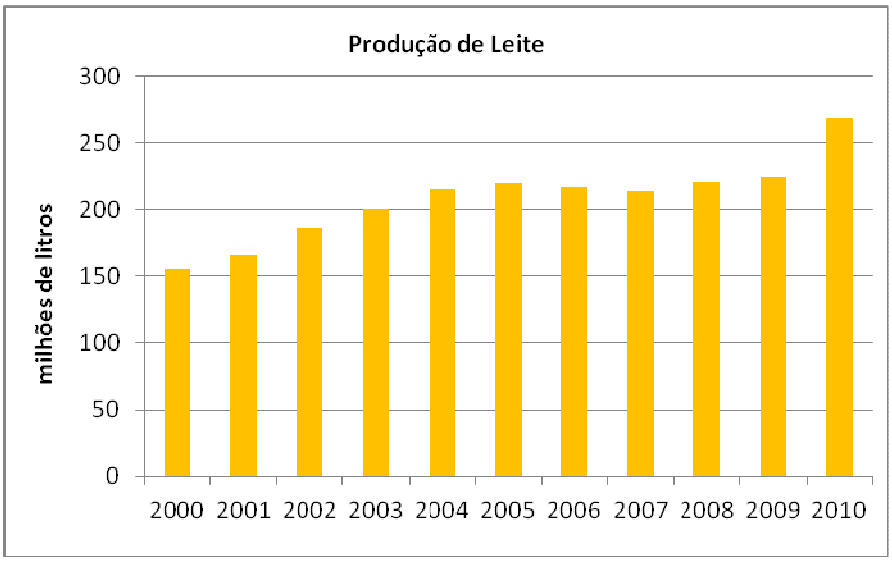


Fig. 3.1.7: Milk production in Tocantins, 2000-2010, in millions of liters. Source: IBGE:

(3) Poultry

The technical and professional production of birds is recent in Tocantins, through the application of integrated production systems, stimulated by the action of middle scale integrating companies of the State in 1999-2000.

In the integrated production system, the company provides 1-day chicks, rations and technical assistance. In turn, the integrated producer shall take part with facilities, equipment, manpower and operation.

The main advantages for the producer in this system are the regular revenue frequency, the reduction of market oscillations, the facility to by inputs and to sell the production, and the technical and administrative advisory. For the integrating company, the main advantages are the guarantee of quality and availability of raw material (chicken), the regularity of slaughter programs, and the highest efficiency of operations logistic. As drawbacks, there is the lost of opportunity for other gains by the producer due to the operational and commercial exclusivity, and the bigger need of operating capital for the integrators in order to sustain the activity as a whole.

Surely the integration environment has stimulated the significant growth of birds production, as we can observe in Fig. 3.1.9, almost doubling the number of animals in the period 2000-2010.

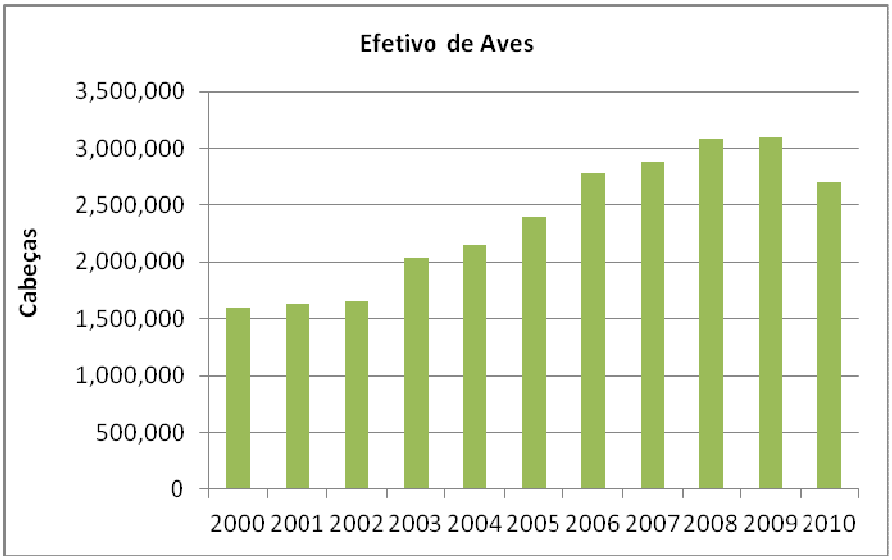


Fig. 3.1.9: Effective herd of birds in Tocantins, 2000-2010. Source: IBGE:

(4) Swine

Although it is not a daily habit of the Brazilian people, the consumption of swine meat is increasing in the Country as a whole, especially because of the recent improvement of income conditions of the middle class people. This is stimulating swine husbandry in areas more distant from big urban centers, where meat and milk cattle husbandry were dominant. This is the case of the State of Tocantins.

Swine husbandry in Tocantins, in the period 2000-2010, shows two different moments. The first, up to 2005, there is a strong decline, and then it grows again significantly until 2010, reaching an effective herd 8% bigger than in the beginning of the series. This performance of the production reflects the influence of the economic environment on the activity, considering that this is an activity that requires significant technical composition and the industrial regimen of the production, with a receptive and sustainable consumer market. Fig 3.1.10 shows the evolution of swine herd in the State.

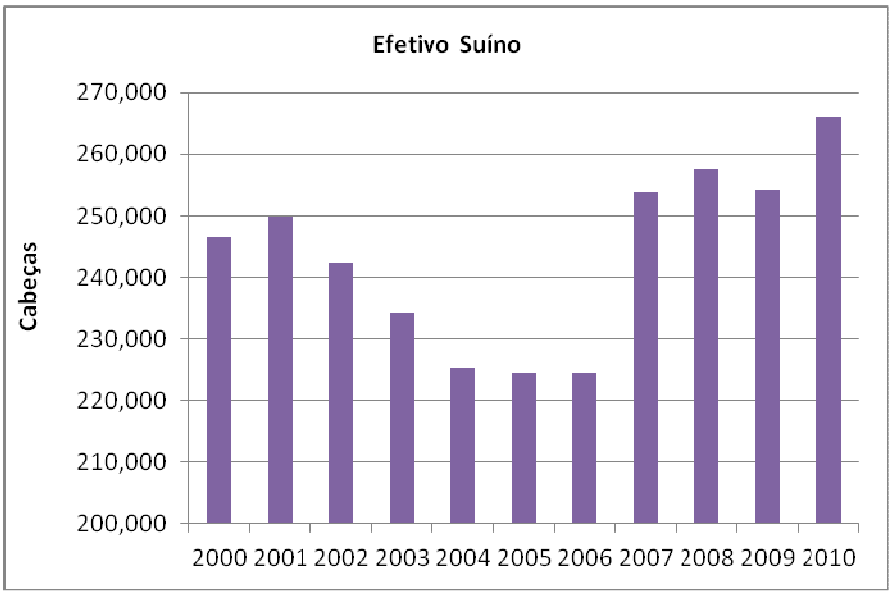


Fig. 3.1.10: Effective herd of swine in Tocantins, 2000-2010. Source: IBGE:

3.3 Agricultural zoning

3.3.1 Soil potentials

According to SEPLAN data (2000), the ecological economic zoning of Tocantins has classified the following soil use potentials into the following use categories: intensive production areas; middle intensity production areas; low intensity production areas; special production areas, and critical areas.

Thus, 9 (nine) units were classified for the intensive production, totalizing 107,423.7 km² (38.5% of the total State area). Land belonging to this category is equal to those intended to agricultural purposes (short and long cycle crops). The study area corresponds to the phyto-ecological region of Cerrados, for the development of activities for agricultural purposes, is sub-divided into three units distributed in 51,851.9 km², AP6, AP7 and AP8.

AP6 comprises area characterized by a very stable to moderate eco-dynamics, soils are predominantly red-yellow Podzols and Plinthosols in associations with Cambisols and Lithosols, having sandy to medium sandy and clayey to medium clayey texture, in flat to undulated relief. The lands of this class do not show significant constraints for sustainable production, requiring virtually no application of capital.

AP7 are areas characterized by a stable to intermediary eco-dynamics, with predominance of dark red Podzols in associations with dark red Latosols, red-yellow Latosols and quartzose sand, having clayey texture in a predominantly flat to slightly undulated relief (locally strongly undulated). The lands in this class have with moderate to severe limitations for sustained production, and might require intensive use of capital.

And, finally AP8, which is also characterized by a very stable to intermediary eco-dynamics, with dominating effects of laminar erosion, in grooves and ravines with fast land masses displacement. As for soils, it comprises red-yellow Latosols, red-yellow Podzols, concretionary soils, Lithosols, dark red Latosols, yellow Latosol and quartzose sand in various associations among each other, having middle to clayey, sandy to medium sandy, clayey and very clayey texture, in flat relief (locally strongly undulated). The lands in this class have with moderate to severe limitations for sustained production, and might require intensive use of capital.

The other two units of this category refer to land for cattle husbandry purposes (cultivated pasture), despite this activity being less intensive than agricultural crops, and requiring a modest capital investment. Among the units indicted for cattle husbandry, there are the lands located in the regions of the Ombrophilous Forest (8,658.8 km^2 - AP3) and Cerrado (30,975.7 km^2 - AP9).

In this category´s units, there is already vegetal gathering, both in the forest as well as in the Cerrados, with other activities also possible, namely: forestation and reforestation, sustainable management of forest (forest remnant areas), and the introduction of agroflorestal system.

3.3.2 Agricultural zoning

Very exposed to climatic adverse conditions, agriculture is a high risk activity. To minimize damages related to the climate, the Ministry of Agriculture, Livestock Husbandry and Supply (Mapa) has developed the climatic risk agricultural zoning.

According to Mapa, the Brazil Company of Agricultural Research (Embrapa) has developed a study indicating the minimum requirements for each crop to be zoned. Based on this study, on climatic historical series of at least twenty years and on the characteristics of soils, the calendar of cultivation per municipality, per type of soil and per crop was elaborated.

The objective is to avoid that recurring climatic adversities affect the crops in their most sensible development phases. These estudies are revised on an annual basis, and also indicate the crops and respective cycles adapted to various regions.

The producer shall use the tool because it indicates that in ten harvests there is the possibility

of being successful in at least eight. To be entitled to the Proagro, the Proagro Mais and to federal subvention, and to the rural insurance premium, the producer has to observe the recommendations of this technological pack. In addition, some financial agents are already conditioning the provision of rural credit to the use of the zoning.

Conducted in almost all Units of the Federation, the zoning already covers 37 crops. Mapa annually expands the number of crops analyzed, including, in 2009, pineapple, cocoa, sugar cane, eucalypt, papaya, passion fruit, millet, cotton and caupi beans consortium, coffee and feijão beans consortium, coffee and corn consortium, feijão beans and corn consortium, corn and brachiaria consortium, and soybean and brachiaria consortium.

Among the annual cycle crops already covered with the zoning, there are rice, peanuts, canola, barley, phaseolus beans, caupi beans, sunflower, cassava, corn, sorghum and wheat. The permanent cycle crops include plum, banana, coffee, castor bean, nectarine, pear, peach and grapes.

The agro-ecological zoning of Tocantins had the aim of subsidizing state and municipal governments, and private entities in public and private projects with the objective to conduct the correct development of the agricultural potential in the most diverse regions of the State. Thus, it has the objective of allowing a diagnosis of the agricultural production, with the purpose of offering action guidelines, which shall reflect different social interests. Therefore, it contributes for a more efficient planning system, where government and the private initiative can act according to the peculiarities of the zones, which are now treated as planning units.

It is intended for a better orientation of agricultural activities in Tocantins State, and to first identify land use potentials, geographically dividing hierarchized units.

Thus, as analysis methodology, certain parameters were aligned indicating the potential desired for the respective crop, out of which the following information can be correlated: gradient, eco-dynamics, soil associations, effective soil depth, erodibility, soil potential, land coverage and use, limiting factors for agricultural use, with the aim of identifying the equi-problematic and equi-potential situations in terms of development and environmental conservation/preservation.

Thus, the land use in Tocantins for agricultural zoning can be classified as follows: intensive production areas; middle intensity production areas; low intensity production areas; special production areas, and critical areas.

It is important to highlight that the intensive, medium and low intensity use analysis depends on the necessary use of technology that allows the economically feasible use of the area at issue. However, DECREE no. 7378, as of December 1, 2010, states that the Ecological-Economic Zoning (ZEE) is planned to end in 2011, however, so far, there is no document showing the ZEE as a whole of Tocantins State.

3.3.3 Sugarcane Agro-ecological Zoning

EMBRAPA has elaborated the Sugarcane Agro-ecological Zoning for the production of ethanol and sugar, for the purpose of providing technical subsidies for the formulation of public policies aiming at the expansion and sustainable production of sugar cane in the Brazilian territory. The zoning result is indicated in the Map of Figure 3.3.2.

Identified regions of sugarcane areas are the following municipalities:

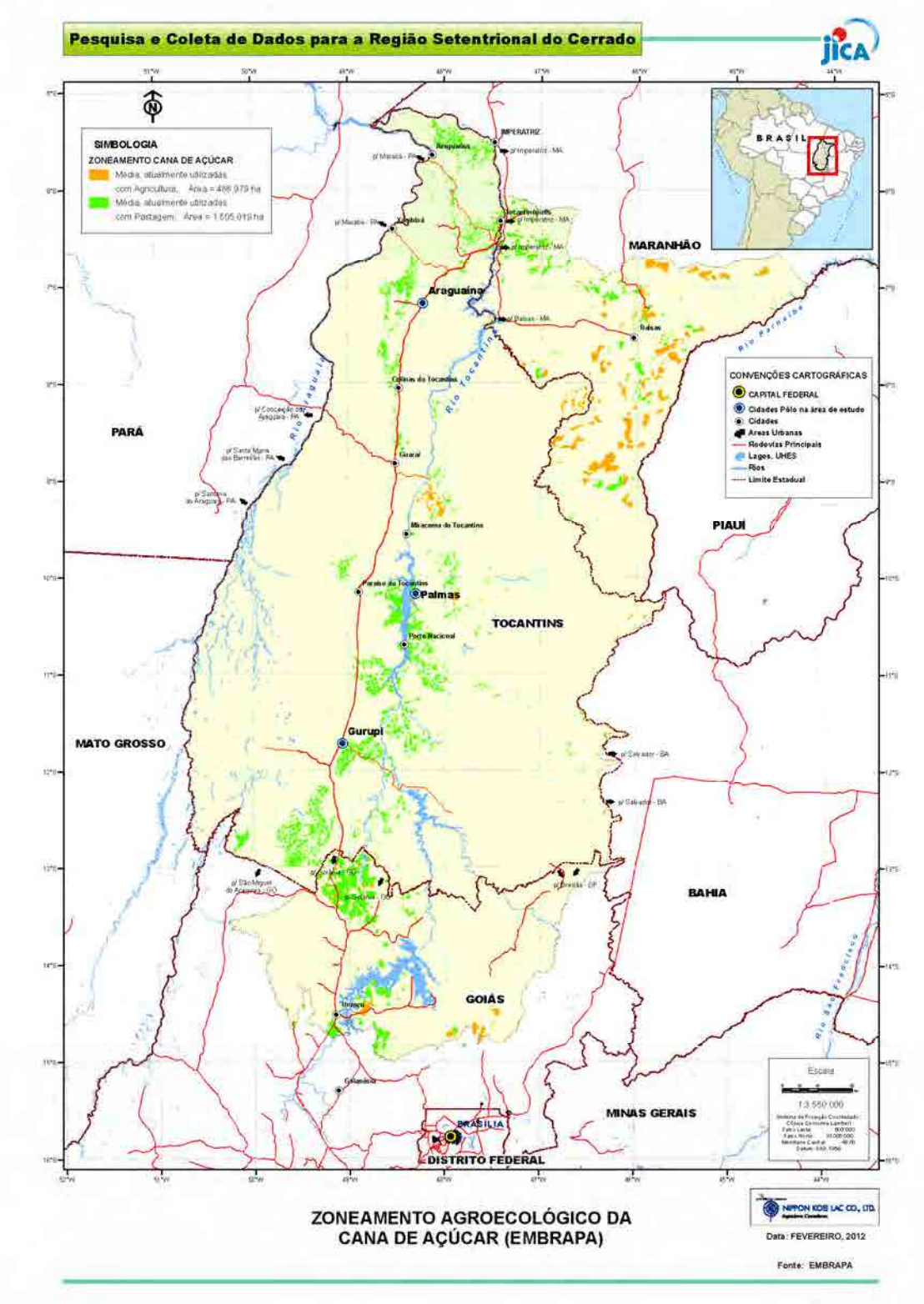


Fig. 3.3.2 Agro-ecological Zoning of Sugarcane

3.4 Agricultural production environment

3.4.1 Land Ownership Situation

The land ownership situation of the Study region is the following. Agricultural properties occupy approximately 57.4% of the region. Crop area occupies only 3.8% of the region. Most of

properties are occupied with pastures.

Table 3.4.1 Distribution of land

Micro Region	Municipality Area (km2)	Total properties (Unit)	Total Area (ha)	Crops (ha)	Pastures (ha)	Woods and forests (ha)
Chapadas das Mangabeiras	16,876.96	5,283	748,831	95,566	322,402	269,377
Gerais de Balsas	36,503.11	5,626	1,388,931	309,856	396,393	595,444
Porto Franco	14,227.01	5,507	713,931	43,601	344,275	292,791
Bico do Papagaio	17,292.38	8,462	1,135,949	169,422	690,892	411,208
Araguaína	26,493.50	8,855	2,308,466	45,437	1,729,812	498,048
Miracema do Tocantins	38,985.01	10,436	3,075,749	148,024	1,833,659	1,034,697
Rio Formoso	51,405.34	5,656	1,982,729	90,816	1,178,304	656,988
Gurupi	27,445.29	4,830	2,326,127	72,718	1,490,583	657,055
Porto Nacional	20,815.34	4,866	923,320	71,366	485,367	349,082
Jalapão	53,416.44	5,957	1,870,897	109,688	928,371	692,577
Dianópolis	47,172.64	7,834	3,202,497	104,403	1,953,869	950,995
Porangatu	40,134.46	13,314	2,793,631	105,846	1,907,727	713,290
Chapada dos Veadeiros	21,337.54	4,524	1,202,180	191,013	602,500	294,679
Total	412,105.00	91,150	23,673,238	1,557,756	13,864,154	7,416,231
			57.4%	3.8%	33.6%	18.0%

In recent years, the government is promoting the land ownership regularization, which is the public intervention process, of legal, physical and social aspects of properties, with the aim of allowing the permanence of people occupying land against the law. This regularization is strictly related to the changes of the legal framework, especially in the forest code, requiring annotation of regularity in the ownership document.

Tocantins has 27.7 million ha, and until December 2010, 18.2 million ha were already regularized. Approximately 65% of the area was regularized. Data are from the Institute of Land of Tocantins (Itertins), the state agency created by Law no. 87/1989 with the mission of promoting the execution of land policy in the State.

The state and federal governments, considering that many of the areas lacking regularization are the responsibility of the Federal Government, still have the challenge to promote the land ownership regularization in Tocantins. The situation involving properties without ownership title in rural zones, and the inaccurate situation at the borders of the State with Piauí, Goiás and Bahia, are some of the main problems.

Thus, Itertins is responsible for executing all the activities concerning the organization of the land ownership structure, with the deliberation about public land and land without clear ownership (*terras devoluta)*, the recognition of legitimate possessions, the alienation of its domain lands, the exercise of various forms of land acquisition, the promotion of discriminatory process, among others.

Points of improvement

One of the difficulties to regularize the land is, according to Itertins, the diversity of measurement systems used in Brazil, almost all accepted by official registers of land. The absence of a legal registry and the non-obligatoriness of the property plan registration, are also pointed out as difficulties.

Thus, it should be added that discriminatory proceedings in progress in the Justice system area also considered as contributors for the lack of speed in the regularization proceedings. With no figures, the state body highlights that most of the proceedings is in progress in the Justice system, pending judgment, and many of those already judged depend on demarcation of land.

The Institute of Lands of Tocantins State – Itertins is negotiating with the federal government, through the Ministry of Agrarian Development (MDA), with the aim of promoting, with the support from the federal government, the land ownership regularization of areas diagnosed and identified as

possible of legalization. The example of this proactive relationship of Itertins is the regularization of areas in the municipality of Paranã, 304 km from Palmas, to the southeast of the State.

A diagnosis of such municipality was concluded in 2010, when the existence of rural properties of approximately 640 thousand ha with no documentation or registration in the property registration office was observed.

According to data from the Transparency Portal of the state government[1], in 2011, R$ 3.9 million were paid in Tocantins in actions of the State Land Ownership Regularization Program. The amount paid is bigger than that of the previous year, 2010, when payments within this program were approximately R4 1.5 million.

3.4.2 Production Centers

In the southern region of Maranhão, the production centers of two concentration areas, Balsas and Imperatriz, are the highlights. The region of Balsas (MA) and the municipalities neighboring Riachão had an impulse for the activity of grains production started by PRODECER III, in 1996, through JICA financing, outstanding as soybean production center. Imperatriz, in southern Maranhão, stands out as a wood production area, currently expanding due to the demand for the metallurgical plant installed in Açailândia.

According to information from the State Secretariat of Agriculture, Livestock Husbandry and Agrarian Development, yet there is not an institutionalization for Production Centers in the State of Tocantins, however, there are regions considered as production centers of certain crops/livestock or production systems, considering the current use.

The highlight regions in the production of grains, silviculture, cattle husbandry and poultry husbandry are as follows:

Grains (soybean and corn):

- Campos Lindos and surrounding – Goiatins and Barra do Ouro;
- Mateiros;
- Pedro Afonso and surroundings;
- Santa Rosa do Tocantins and surroundings (Silvanópolis, Monte do Carmo, Porto Nacional);
- Dianópolis and surroundings.

Silviculture:

- Bico do Papagaio Region.

Cattle Husbandry:

- Araguaína and Arapoema;
- Araguaçu has the biggest cattle herd.

Poultry husbandry:

- Aguiarnópolis;
- Paraíso do Tocantins and Porto Nacional.

In addition to the above mentioned regions, there are hydro-agricultural projects having high grains and fruits productions:

[1] Consultation done on February 08, 2012 at 11h38min a.m.

(1) Formoso Irrigation Project

Located in the municipality of Formoso do Araguaia, the project implemented by the government of Goiás, which infrastructure of common use remained approximately 20 years with no maintenance, is now managed by Tocantins State. With 27,787 ha, it has already produced in approximately 20,000 ha. Without proper maintenance of the structure, production was jeoparzied, dropping from 16,000 to 18,000 ha of cultivated area. According to the State Irrigation Plan (2010), the project region is a state highlight in the production of rice, soybean and watermelon.

(2) Prodoeste Irrigation Project

The Project of Tocantins State Southwest Development – PRODOESTE – Riozinho Phase, is still not operational, however, the region where it is installed (municipalities of Lagoa da Confusão, Pium and Cristalândia) is a highlight of the State irrigated agricultural production. This region is regarded as an irrigated production center, mainly with the crops of rice, feijão beans, watermelon and soybean. The elevation of the area is approximately 200 m, and the relief has gradient smaller than 0.05%, which favors periodical inundations, giving rise to poorly drained soils. Therefore, irrigation is key for the feasibility of agricultural activities.

(3) Manoel Alves Irrigation Project

Irrigation project done through the regularization of Manoel Alves River discharge, with the implementation of multipurpose dam, specially intended for irrigation of 4,399.26 ha. The project is located in the municipalities of Dianópolis and Porto Alegre do Tocantins, and will soon become an important fruits cultivation center of the State. (PEI/TO, 2010)

(4) São João Irrigated Fruits Cultivation Project

The São João project of Irrigated Fruits Cultivation is done through the implementation of perimeter for the hydro-agricultural use of 3,582 ha, located in Porto Nacional, Tocantins, at the banks of the reservoir of Lajeado Hydroelectric Power Plant. It is divided into land plots for small producers and entrepreneurial producers. Like the Manoel Alves Project, São João project as the necessary aptitudes to become a fruits cultivation center in the State of Tocantins.

(5) Pedro Afonso Hydro-Agricultural Development Project

The use of Tocantins River, which baths the whole west portion of the municipality, and is the biggest natural source of water resources for the implementation of irrigation projects in the municipality, is already being implemented by sugarcane plantations. In addition to Tocantins River, one of its main tributaries, Sono River, is used in the project that allows the cultivation of grains in the municipality.

Concerning the northern Goiás region, the livestock husbandry activity is the highlight in the municipality of São Miguel do Araguaia. It is mostly done in an extensive or semi-extensive way, intended to the meat processing plant in Mozarlândia. The cultivation of sugarcane for the production of sugar and alcohol of the Jales Machado company, and the rubber tree plantation in the municipality of Goianésia for the extraction of latex, in addition to the Luiz Alves Irrigation Project, are also highlights.

(1) Irrigation Project in Luiz Alves (GO)

Located at the dales of Araguaia River, grains are the main production of this project, with rice, corn and soybean, totalizing 2,200 ha of irrigated area, with a total area of 15,000 ha.

3.4.3 Use of agricultural inputs

Fertilizers

The capitalization of the field, in 2011, has led to a record consumption of fertilizers of nearly 28 million ton in the country. For 2012, there is a growth trend of 3%.

Up until November 2011, sales attained 26.509 million tons. The higher figure regards to sales during the whole year of 2010, which was of 24.5 million ton. Specialists show the reason for this growth in sales to the expansion area cultivated with corn, soybean and cotton, in addition to heavy investments done by farmers to enhance productivity. Specialists also consider coffee production as decisive, for being a profitable crop stimulating the farmer to renew the coffee plantation, as well as the increase of the sue of inputs to reinvigorate sugarcane plantations.

Agrochemicals

The forecast is that in 2012 the industry records a reduction of 8.5% in relation to 2011 sales, when total sales totalized US$8,2 billion. However, in 2011, there was a 11% growth in the sales in comparison to 2010.

3.4.5 Agricultural machinery

According to Anfavea, in 2011, 65.7 thousand agricultural machines were marketed in the domestic market, including tractors, harvesters, planter machines and backhoes. Exportations totalize 18.2 thousand units, a drop when compared to the same period in 2010.

With the renewal of the fleet in the past two years, the expectation for 2012 is that the industry repeats the same figure of last year: 65.7 thousand units. The forecast, mentioned by Globo Rural TV show, is of the National Association of Automotive Vehicles Makers (Anfavea), which estimates stable sales both in the domestic and in the foreign markets.

In 2011, an increase of 20% was observed in the trade of machines in Tocantins state, as informed by shops of machines and vehicles.

3.4.6 Agricultural financing

Specific credits for actions related to agribusiness, either for a big undertaking or for family agriculture, are offered by financial institutions in Tocantins. Bank of Brazil and Bank of Amazon are among the partner institutions in this process, and with recognized performances.

Tocantins has a branch of the National Bank of Economic and Social Development (BNDES), related to the Ministry of Development, Industry and Foreign Trade, with long term financing lines for the conduction of investments in all segments of the economy.

To have an idea of results obtained, it is noteworthy that the Bank of Amazon financed, in Tocantins, more than R$ 43 million in the last agricultural period alone (01/07/2010 to 30/06/2011), corresponding to the Harvest Plan 2010/2011, and within the National Program of Family Agriculture Strengthening (Pronaf). There were more than five thousand families financed, as shown in Table 3.4.2.

Table 3.4.2 : Number of families financed by Pronaf.

Group	Number of families financed	Financed Amount (R$)
Pronaf A	3,075	15,729,842
Pronaf A/C	69	170,890
Pronaf Family Farmer	1265	16,147,432
Pronaf B	351	415,524
Pronaf Youth	2	10,129
Pronaf More Food	302	10,566,113
Pronaf Woman	25	229,084
TOTAL	5,089	43,269,014

Source: Bank of Amazon – Sept/2011

In its turn, the Bank of Brazil, within the operations related to rural credit, Harvest 2010/2011,

financed R$ 389.9 million for business/family agriculture, financing nearly seven thousand projects/contracts. The following Tables show the details:

Table 3.4.2 : Rural Credit – Harvest 2010/2011 – Summary of controlled applications (Business + Family Agriculture).

	Total		Agriculture		Cattle husbandry	
Purpose	**Contracts**	**Value (R$)**	**Contracts**	**Value (R$)**	**Contracts**	**Value (R$)**
OPERATION COST	3,939	229,330,145.00	1,275	67,089,080.00	2,664	162,241,066.00
INVESTMENT	3,014	152,922,824.00	554	16,698,728.00	2,460	136,224,096.00
COMMERCIALIZATION	45	7,687,015.00	43	7,544,223.00	2	142,792.00
TOTAL	**6,998**	**389,939,984.00**	**1,872**	**91,332,031.00**	**5,126**	**298,607,954.00**

Source: Bank of Brazil – Oct/2011

Table 3.4.3 : Rural Credit – Harvest 2010/2011 – Summary of controlled applications (Family Agriculture).

	Total		Agriculture		Cattle husbandry	
Purpose	Contracts	Value (R$)	Contracts	Value (R$)	Contracts	Value (R$)
OPERATION COST	1,889	18,774,791.00	947	8,306,410.00	942	10,468,381.00
INVESTMENT	1,955	57,854,616.00	522	13,310,463.00	1,433	44,544,154.00
TOTAL	**3,844**	**76,629,407.00**	**1,469**	**21,616,873.00**	**2,375**	**55,012,535.00**

Source: Bank of Brazil – Oct/2011

At last, among the financial agents, the Cooperative Credit System (Sicredi) should be mentioned, which operates with 119 credit cooperatives and more than 1.1 thousand service points in ten Brazilian states, Tocantins among them. Sicredi has four central cooperatives, confederation, cooperative bank and controlled companies (card administrator, consortium administrator and insurance company), in addition to Sicredi Participações S.A.

3.5 Tax incentives and financing

3.5.1 Federal

At the federal level, undertakings have the possibility of being financed by the Amazon Development Fund – FDA and getting Tax Incentives administered by SUDAM (Superintendence of the Amazon Development). Funds and incentives are intended to undertakings considered as priority for the regional development (Decree no. 4212 as of April 26, 2002, and Decree no. 6810, as of March 2009) in the fields of infrastructure, tourism, agroindustry, irrigated agriculture, gathering industry of metallic minerals, transformation industry, electro-electronics, components industry, package manufacturing and conditioning, manufacture of pharmaceuticals, manufacture of toys, manufacture of optical products and or clocks and watches.

Tax incentives administered by SUDAM (Resolution no. 20 as of April 14, 2010) are as follows: fixed reduction of 75% of the income tax, and non-reimbursable additional; staged reduction of income tax and non-reimbursable addition of 12.5% from 2009 to 2013; deposits for re-investment; accelerated depreciation, stimulated for the purpose of calculation of income tax; discount, within 12 months from credit acquisition, of PIS/PASEP and COFINS contribution; Addition Exemption of Freight for Renewal of Merchant Ships – AFRMM; and exemption of Financial Operations Tax (IOF) of exchange operations conducted for the payment of imported goods. Reductions and incentives are obtained upon filling out the requirement and submission to SUDAM, along with the necessary documentation for each modality.

FDA is an accountant nature fund, created by Provisional Presidential Decree no. 2157-5, as of 24/08/2001, regulated by Decree no. 4254, as of 31/05/2002, and managed by the Amazon

Development Agency – ADA. It has the purpose of ensuring funds for the conduction of private investments in the Amazon, encouraging the development of the Region. Funds are intended to implementation, expansion, modernization and diversification of private undertakings located in the Legal Amazon, according to the guidelines and priorities approved by the Deliberative Council for the Development of the Amazon, limited to 60% of the total investment, and 80%, of the fixed investment of the project.

To obtain access to FDA funds, the undertaker shall submit a consultation letter to ADA. The consultation letter shall follow the parameters required by the Agency, and have a qualified technically responsible professional signing it.

The consultation letter shall be accompanied with at least the following documents of the undertaker or of the business group, of partners or of controlling shareholders:

- Debt Clearance Certificate from the Internal Revenue;
- Clearance Certificate of Enrollment in the Federal Active Debt;
- Fgts Regularity Certificate;
- Debt Clearance Certificate from INSS;
- Articles of incorporation and amendments including the original composition of the capital, business purpose, capital stock, with consolidated bylaws;
- Certificate of regularity of responsible technical professional(s) before their respective professional associations;
- Minutes of the election of the representatives of the proponent who sigh the Consultation Letter;
- Bank Idoneity Statement from the operator agent – the Operator Agent Registration or the Operator Agent Statement is accepted;
- Statement of compliance with sub-items of § 5 of art. 13, Decree no. 4254/02;
- Regularity statement issued by DGFI (FINAM and FINOR), ADENE and FUNRES;
- Environmental license, in case of already existing undertaking (in case of undertaking in implementation phase, it will be obligatory upon the submission of the project).

The consultation letter appreciation process takes 30 days from its submission to ADA. If the letter has some mistake or insufficient information, it will be returned to the requestor, who shall have the opportunity to submit it again duly corrected. Upon the new submission to ADA, it will have 30 days to issue the opinion, plus five working days to communicate the decision to the company or group of companies, which will have 120 days to submit the definite projects. If the company or group of companies does not submit the definitive project within the determined period of time, it can only submit a new consultation letter after two years of the last expired deadline.

The definitive project shall contain information on the characterization of the company, the financing amount with the application plan to be done, guarantees, inventory of partners/guarantors assets, capacity of own resources investment, technical aspects of the company, location, market studies with the undertaking feasibility, supply of inputs, working capital indicators, profitability and payment capacity, use and sources, balance schemes, economic and financial indicators, project merits, social benefits granted to the employees, documents regarding the company or group of companies, presentation of accounting documents, and criteria for the projection of working capital needs.

Upon approval of the definitive project, which could take 30 days if there is no mistake or lacking information, the company will have 30 days to contact the operator agent to sign the investment transference contract.

In addition to the financing possibilities above described, there are other lines, as described as follows:

(1) FNE

The Constitutional Fund of Northeast Financing (FNE) is a federal public policy instrument operated by the Bank of the Northeast, with the aim of contributing for the economic and social development of the Northeast region, through the execution of financing programs to productive sectors, in harmony with the regional development plan, thus allowing the reduction of poverty and inequalities. The investment limit varies according to the borrower size, and it can be over R$ 35 million, with the maximum of 100% financeable by FNE. Charges are 6.75% per year to 10% per year.

(2) BNDES

National Development Bank (BNDES) has six financing programs:

- Agricultural Automatic: finances up to R$ 10 million at each 12-month period, with financing limit of 60% to 100%, with maximum duration of 144 months, with variable grace period. Charges are TJLP plus interest rate of 0.9% per year up to 1.3% per year;
- Agriculture Modernization and Natural Resources Conservation Project – MODERAGRO: fostering of bee-keeping, aquiculture, poultry husbandry, chinchilla husbandry, rabbit breeding, flower and fruits cultivation, greenery cultivation, goats and sheep breeding, milk cattle husbandry, fishing, frog breeding, silkworm breeding and swine breeding; actions related to animal defense, particularly the National Program of Control and Eradication of Brucellosis and Tuberculosis (PNCEBT), and the implementation of the animal traceability system for food purposes; support to the recuperation of soils through financing the acquisition, transportation, application and incorporation of soil correction substances. It finances up to R$ 250 thousand per beneficiary, for individual undertaking, and up to R$ 750 thousand for collective undertaking, respecting the individual limit per participant. The total investment is financeable, with up to 96 months of repayment period, and 36 months of grace period. Charges correspond to 6.75%;
- Program of Cooperative Development for Aggregation of Value to the Agricultural Production – PRODECOOP: it has the objective to enhance the competitiveness of the agro-industrial complex of Brazilian cooperatives, through the modernization of production and commercialization systems. Through this credit line, it is possible to finance up to R$ 35 million per Federation Unit, with coverage of up to 90% of the project value, with 144 months to repay, including grace period of up to 36 months. Charges correspond to 6.75%;
- Program for the Maintenance of Agricultural Equipment Recuperation: This line has no financing limit, and finances up to 100% of the amount, with repayment period of 60 months and charges of 12.35% per year;
- Proflora Program: Implementation and maintenance intended to the commercial, industrial and energetic use; recomposition and maintenance of preservation areas and legal forest reserves. Financeable amount of up to R$ 200 thousand per beneficiary (“Natural Persons and Legal Entities” Rural Producers, associations and cooperatives of rural producers), up to 80% of the budget amount financeable, with 144 months of repayment. Charges correspond to 6.75%;
- Agricultural Finame: corresponds to the financing, through accredited financial institutions, of the production and commercialization of agricultural machinery and attachments, and computer and automation goods, intended to the agricultural production, new and domestically manufactured, accredited by BNDES. It has another four financing sub-lines: Agricultural, Special, Fleet modernization (Moderfrota) and Infrastructure modernization (Moderinfra). Amounts possible to finance start at R$ 20 thousand per beneficiary, with no limit restriction. Values possible to finance correspond to up to 100% of the investment amount, with 96 months for repayment, and charges from 6.75% to 12.35% per year.

(3) FCO

The Mid-West Financing Fund (FCO) is a credit fund created by the 1988 Federal Constitution, with the objective of promoting the economic and social development of Mid-West Region. The companies and rural producers wishing to start, expand or modernize production activities, in the Region, can count on the support of FCO to finance their undertakings, with long term repayment and low interest rates.

To request FCO finance, the interested party shall be a businessman or rural producer developing activities in the Federal District, Goiás, Mato Grosso or Mato Grosso do Sul. In some cases, the concession of credit is conditioned to the existence of the proponent´s own resources, corresponding to his participation in the investment. The financeable amount if R$ 10 million per

borrower, companies group or agricultural group, and per rural producers production cooperative or producer association, with 100% of the investment amount financeable, 12 months of investment and up to 3 years of operation costs financeable. Charges are 5% per year to 8.50% per year.

(4) PRONAF

The National Program of Family Agriculture Strengthening – Pronaf, created in 1995 by the Federal Government, is intended to provide financial support to agricultural and non-agricultural activities exploited by using the direct manpower of the rural producing family. Pronaf has the objective of strengthening family farmer activities, integrating them to the agribusiness chain, increasing their income and adding value to the product and to the property. PRONAF has 11 sub-programs with different financing values, from R$ 1.5 thousand to R$ 25 million to cooperatives. There is not financing limit, with 12 months for repayment, and charges of 5% per year.

(5) PROGER

The Program for the Generation of Rural Employment and Income addresses the rural producer and the agroindustry, of micro and small scale, in addition to cooperatives, which members are micro and small scale producers. It was created by the Federal Government in 1995, with the objective of promoting the development of rural activities of small producers, allowing the increase of income and the generation of employment in the countryside. The financeable amount is R$ 150 thousand, with financing limit of up to 100% of the investment value, 8 years for repayment, with 3 years of grace period, and charges of 6.25% per year.

(6) Traditional Agricultural Investment and COOPBENS

It occurs in accordance with the budget and subject to the limit of R$ 131 thousand per beneficiary, at each harvest year, and COOPBENS has limit of 65 thousand per harvest, and up to R$ 130 thousand per beneficiary of credit/harvest. Financing limit is up to 90% of the budget submitted, with repayment in at most three years.

3.5.2 State of Tocantins

Currently, the State of Tocantins, through the Secretariat of Industry and Commerce (SIC) and the Economic Development Council of the State, has 10 incentive programs to attract new investments – Prosperar, Proindústria, Wholesale Commerce, Meat Production, Fruits and Fish Production, Automotive Industry, Agroindustrial Complex, e-Commerce, Wholesale Commerce of Medicines, and Clothing Industry.

The programs Prosperar (Law no. 1335 as of 19/12/2002), Production of Fruits and Fish (Law no. 1303 as of 20/03/2002), Meat Production (Law no. 1173 as of 02/08/2000, and Agroindustrial Complex (Law no. 1695 as of 13/06/2006) are those having objectives related to the agribusiness. All of them have the incentive of exemption or reduction of ICMS, and some the financing of ICMS partial value, due in the finance period, Table 10. As counterpart of the received benefits, the beneficiaries have to contribute with 0.3% of the monthly revenue to the Economic Development Fund. The way to grant benefits is through analysis and approval of documents, Consultation Letter and Economic-Financial Feasibility Project of the undertaking by the Economic Development Council of the State, and afterwards formalization of the Special Regimen Agreement Document – TARE. The average time to obtain the council´s approval is 60 days.

Beneficiaries	Purpose	Incentives	Manner of Concession
Prosperar – Law no. 1335 as of 19/12/2002			
Companies with projects submitting economic-financial feasibility, with interest in implementation, revitalization or expansion of industrial, agroindustrial,	To finance the tax due; Generation of employment and income; To enhance the distribution of wealth in the State.	▪ It finances: 75% of ICMS due in the period of concession to implementation and revitalization projects. ▪ Exempts ICMS: In benefit of company accredited by the state tourism body, tax on: ✓ Acquisition of goods for permanent assets; ✓ Consumption of electric energy and use of communication services in the first five years of the PROSPERAR program incentive.	Benefits shall be granted: ✓ Upon analysis and approval: of the required documentation, Consultation Letter, and economic-financial feasibility project of the undertaking, by the Executive Secretariat and the Economic Development Council of Tocantins State; ✓ Formalization of the Special Regimen Agreement Document –

Beneficiaries	Purpose	Incentives	Manner of Concession
wholesale commercial and touristic unit.		✓ ICMS due for the difference of rates in the acquisitions of goods for fixed assets; ✓ Internal operations with equipment and goods intended to fixed assets, maintaining the ICMS credit for the shipper; ✓ Imports of equipments and goods for fixed assets. ▪ ICMS reduction: In benefit of company accredited by the state tourism body, after five years of implementation of such company: ✓ 50% of ICMS value applicable on the consumption of electric energy and communication services. ✓ Up to 95% of the incentive target installment, for cash payment. ▪ Application: Contribution of 0.3% (on monthly revenue), to the Economic Development Fund.	TARE.
Production of Fruits and Fish – Law no. 1,303 as of 20/03/2002			
Taxpayers established in this State in the fields of industry, commerce, gathering and rural production, as well as the provision of services of highway transportation of passengers.	To develop industrial, commercial, rural production and transports activities; Generation of employment and income.	▪ Exempts from ICMS until December 31, 2015: Internal operations: ✓ Conducted by rural producers, with: Cotton, peanuts, sugar cane, feijão beans, sesame seed, sunflower, greenery, castor bean, cassava, corn, sorghum, tomato and fresh fruits, all in natural conditions and produced in this State; ✓ Fresh water fish and primary products intended to animal ration in operations with rural producers. In operations with agricultural machinery and attachments intended to rural producers. Application: ▪ ICMS of: ✓ 12% for industry and commerce taxpayers; ✓ 7 %: At interstate exits of: ✓ Fresh water fish, conducted by rural producers; ✓ Products resulting from the processing of husk rice, conducted by industrial establishments; ✓ Dairy products, conducted by dairy processing industries. ✓ .For industry and commerce taxpayers, at exits of rice and dairy products; ✓ For gatherers and producers, in agriculture and livestock husbandry; ✓ For commerce taxpayers, at the exits of edible products in natural state, cooled, frozen or seasoned products, resulting from the slaughter of cattle, buffalos and swine. ▪ Application: ✓ 5% for providers of highway transportation services of passengers, at intermunicipal and interstate exits; and for providers of alternative highway transportation services of passengers. ▪ 0% until December 31, 2015: ✓ At interstate exit operations conducted by rural producers, with cotton, peanuts, feijão beans, sesame seed, sunflower, greenery, castor bean, cassava, corn, sorghum, tomato and fresh fruits, produced in this State; ✓ At internal and interstate exit operations with products resulting from the industrialization of cotton, peanuts, feijão beans, sesame seed, sunflower, greenery, castor bean, cassava, corn, sorghum, tomato, fresh fruits and fresh water fish. ✓ Contribution of 0.3% (on monthly revenue), to the Economic Development Fund.	Benefits shall be granted: ✓ Upon formalization of the Special Regimen Agreement Document – TARE.

Beneficiaries	Purpose	Incentives	Manner of Concession
Meat Production – Law no. 1173 as of 02/08/2000			
Freezing and Slaughter plants duly registered and that have the Agreement Document of Special Regimen - TARE, and that meet the following requirements: Having paid: ✓ Tax obligations ✓ Be in compliance with the determinations of the Agricultural Defense Agency of Tocantins State – ADAPEC-TO Contribution of 0.3% (on monthly revenue), to the Economic Development Fund.	To develop the production of meat; Incentive to the industrialization of leather; Incentive to the exportation of local product; Generation of employment and income.	▪ It grants: ✓ Assumed tax credit of: ✓ .75% of tax due at the exits of wet blue and industrialized leather, grease, bones, internal organs, horns, animal hooves and other non-edible by-products and wastes; ✓ 12% of the operation value, at interstate exits conducted by slaughter unit with meat cattle (bovine, bubaline, swine) in natural state, cooled or frozen; ✓ .9% of the operation value, at interstate exits with boneless meat resulting from cattle slaughter (bovine, bubaline and swine), vacuum packed and with registration at the Federal Inspection Service – SIF of the Ministry of Agriculture; ✓ 9% of the operation value, at interstate exits, conducted by producers duly registered, with cattle alive (bovine, bubaline and swine), intended to slaughter in another federation unit; ✓ 7% of the operation value, at acquisitions of slaughter plants, by a taxpayer of this State, of meats in natural state, cooled or frozen, and of edible by-products resulting from cattle slaughter (bovine, bubaline and swine); ✓ 5% of the operation value, at interstate exits of living cattle (bovine, bubaline and swine) conducted by a producer of this State. ✓ Application: ▪ ICMS of: ✓ 3% at internal operations: ✓ With living cattle (bovine, bubaline and swine) intended to slaughter; ✓ With boneless or fractioned meat resulting from slaughter (bovine, bubaline and swine), vacuum packed and with registration at the State Inspection Service – SIE; ✓ With cattle (bovine, bubaline and swine) intended to slaughter, upon request and under the responsibility of the butcher shop. ✓ Contribution of 0.3% (on monthly revenue), to the Economic Development Fund.	Benefits shall be granted: ✓ Upon formalization of the Special Regimen Agreement Document – TARE.
Agroindustrial Complex – Law no. 1695 as of 13/06/20			
Company or group of companies with location in the State that: ✓ Have balanced ration factories and preferably use raw material and inputs produced in the State; ✓ Conduct, even in partnership, the process of reproduction, breeding, slaughter, industrialization and commercialization of eggs, including fertile ones, birds, one-day	To implement the growth and modernization of the agricultural sector of the State; To expand the segment exports, through the achievement of new markets; To generate employment and to better distribute the income.	▪ Exempts ICMS of: ✓ Internal operations with birds, one-day chicks, swine, goats and sheep; ✓ Products and inputs intended to the manufacture of animal ration; ✓ Internal operations of fertile or non-fertile eggs; ✓ At internal exits of goods intended to the company of the agroindustrial complex to be used as raw material; ✓ ICMS due for the difference of rates in the acquisitions of goods for fixed assets; ✓ Internal operations with vehicles, machinery and equipment intended to fixed assets, maintaining the ICMS credit for the shipper; ✓ Electricity; ✓ Internal sales intended to public bodies; ✓ Imports of machinery and equipments for fixed assets. ✓ Imports of products used in industrialization processes, comprising: Raw materials, inputs, package or presentation of the product, vaccines and medicines; INCENTIVES ▪ Exemption of ICMS: ✓ At internal exits of ration; ✓ Provision of internal or interstate transportation services with birds alive, fertile or	Benefits shall be granted: ✓ Upon analysis and approval of the required documentation, Consultation Letter, and economic-financial feasibility project of the undertaking, by the Executive Secretariat and the Economic Development Council of Tocantins State; ✓ Upon formalization of the Special Regimen Agreement Document – TARE.

Beneficiaries	Purpose	Incentives	Manner of Concession
chicks, swine, goats and sheep; Conduct studies on: ✓ Birds, swine, goats and sheep genetics; ✓ New production, breeding and industrialization technologies of birds, swine, goats and sheep.		non-fertile eggs, one-day chicks, and products resulting from the slaughter of ✓ birds, swine, goats and sheep, and ration. ✓ There is the option of the assumed credit of: ✓ 16.5% of the calculation basis, in internal operations with products resulting from the slaughter of birds, swine, goats and sheep; ✓ 11.5% of the operation value, at interstate exits of eggs, including fertile eggs, one-day chicks and products resulting from the slaughter of birds, swine, goats and sheep, and ration; ✓ 11% of the operation value, at interstate exits of living birds. ✓ ICMS credit at the interstate acquisitions, for effect of Tax Replacement ICMS to be paid, corresponding to the percentages of: ✓ 7% on the value of goods at acquisitions coming from regions South and Southeast, except for Espírito Santo; ✓ 12% at acquisitions coming from regions Mid-West, North and Northeast, and the State of Espírito Santo, regardless of the tax highlighted at the invoice. ▪ Application: ✓ 1% of the ICMS value, at interstate exits of living birds. ✓ 0.5% on the ICMS value at internal operations and interstate exits of industrialized products; ✓ Contribution of 0.3% (on monthly revenue), to the Economic Development Fund.	

Source: Tocantins State Council of Economic Development

3.7.3 State of Goiás

According to information from the State Secretariat of Management and Planning, Seplan, GOIÁS (2012), Goiás State Program of Industrial Development (Produzir) was created to contribute for the expansion, modernization and diversification of the industrial sector of Goiás, stimulating the conduction of investments, technological renovation and increase of the state competitiveness. It allows the reduction of the company´s production cost, through financing of up to 73% of ICMS due for the period of up to 15 years. Produzir has the following versions:

- Microproduzir (incentive to microcompanies),
- Teleproduzir (incentive for the implementation of call-centers,
- Centroproduzir (incentive to the installation of single distribution centers),
- Logproduzir (incentive to logistics operating companies), and
- Comexproduzir (incentive to foreign trade operations)

In addition to these incentive programs, Goiás also has funds from the Mid-West Constitutional Fund (FCO). FCO was created in 1988 with the objective of contributing for the economic and social development of the Brazilian Mid-West region. The permanent provision of resources of the Fund, by the Federal Government (29% for Goiás, 29% for Mato Grosso, 23% for Mato Grosso do Sul and 19% for the Federal District) allows long term financing for economic sectors, creating new perspectives of investment for the business community.

In 2010, FCO in Goiás financed investments of approximately R$ 1.583 million. Out of this, 44.6% were used in the business modality, and 55.4%, for rural activities financing.

3.7.4 State of Maranhão

In Maranhão, rural credit and tax incentives were identified as the main instruments of agricultural expansion and modernization, input of capital in the agricultural sector, addressing commodities with government support, as mentioned in Tocantins state (Bank of Brazil, BNDES, Bank of Amazon), and are favoring an increasing process of production restructuring under different aspects: land use (more or less intense), spatialization (preference for certain states, microregions or municipalities), production scale and specialization (meat production, milk production, mechanized agriculture).

In the State of Maranhão, the highlight is the Incentive Program to Industrial and Technological Activities in the State of Maranhão – PROMARANHÃO, implemented through Decree no. 26.689 as of June 30, 2010. This program has the objective of promoting the development of industrial and agroindustrial activities in the whole territory of Maranhão, through:

I – incentive to:

a) implementation of new industries and agroindustries; and

b) expansion, relocation and reactivation of industries and agroindustries;

II – incentive to the development of industry and agroindustry of small scale that do not choose the Simples Nacional taxation system, or those choosing such system, but forbidden to collect tax on operations regarding the circulation of goods, an on the provision of interstate and intermunicipal transports, and communications – ICMS, under the terms of Complementary Law no. 123, as of December 14, 2006, that have obtained, in each calendar-year, a gross revenue of up to R$ 2,400,000.00 (two million and four hundred thousand reals).

3.6 Agricultural Policy

3.6.1 Federal

Of the federal policies and programs, the most relevant ones are as follows: (i) Regional and local development; (ii) Territorial planning and management; and (iii) Social inclusion.

(1) Regional and local development

The *National Program of Rural Territories Development* (PRONAT)[2] is a program developed by the Territorial Development Secretariat – SDT of the Ministry of Agrarian Development – MDA. PRONAT is developed in 164 territories, and its areas of action are focused on 4 topics: (i) support to social management; (ii) strengthening of socio-production networks; (iii) economic dynamization of rural territories; (iv) public policies articulation.

The *Program of Citizenship Territories*[3] is a program developed from the PRONAT. It is a program of support and incentives to development processes organized on a territorial basis. The strategy has the objective to support and strengthen, in the territories, the social self-management capacities. It specifically aims to overcome poverty and social inequalities in the rural environment, including the gender, race and ethnical inequalities, through a strategy of sustainable territory development.

(2) Territorial planning and management

The federal policies and programs for territorial planning and management include from zoning and territorial organization initiatives, to efforts for the land ownership regularization.

The *Macro Ecological Economic Zoning of Legal Amazon (Macro ZEE)* has the purpose of providing a technical-scientific basis to subsidize regional development policies, discussions on the occupation of the territory and the creation of proposals of natural resources use. In the State of Tocantins, the ZEE has units composed of the Agro-ecological Zoning and Ecological-economic Zoning of north region (Bico do Papagaio), which were approved by the State Environmental Council, and the ZEE shall be executed for the whole state, at the scale of 1:250,000. The Agro-ecological Zoning of the State of Tocantins is a spatial reference landmark for the organization of territory under the perspective of sustainability.

The *GEF, Subproject Sustainable Cerrado of Tocantins*, donation done by the World Bank, in the amount of 3 million dollars, with actions to be executed in conservation units and their surroundings, comprising the formulation of policies, institutional strengthening, regularization of legal reserve and areas of permanent preservation, support to productive low impact projects, alternative to deforestation, and diffusion of conservationist practices.

(3) Social inclusion

The *Solidary Economy* theme[4] was incorporated to the set of actions that compose the 2029 Program – Regional, Territorial Sustainable Development and Solidary Economy of Pluri-annual Plan 2012/2015 of the Federal Government. Two factors contribute and enrich this approach. On one side, the fact that the Solidary Economy actions are adopting a territorial approach and appraising aspects and institutions present in the territories; and on the other side, the fact that the transversal topic can consolidate as part of a development conception, impregnating collegiate and territories.

Information from the National Secretariat of Solidary Economy SENAES (2007) shows the existence of approximately 9,402 productive groups exclusively composed of women or with predominance of women. Those groups are located in all the regions of the country, with higher concentration at North and Northeast regions.

The *National Policy of Sustainable Development of Traditional Peoples and Communities* – PNPCT (presidential decree no. 6040/07) and the National Plan of Promotion of Sociobiodiversity

[2] This material was elaborated from material found in the website http://www.mte.gov.br/ecosolidaria/prog_default.asp

[3] Parts of this document were extracted from the internal circulation document of SDT and elaborated in 2007.

[4] This material was elaborated from information contained in the website http://www.mte.gov.br/ecosolidaria/prog_default.asp

Products Chains (PNPSB) are also expressions of the challenge to conciliate development with social insertion and environmental conservation, highlighting the commitment of the State of assuming the diversity of the Brazilian social reality.

The *National Program of Family Agriculture Strengthening* (PRONAF) is a program of the Federal Government created in 1995, with the purpose of serve in a different way the mini and small rural producers. PRONAF finances individual or collective projects, which create income to family farmers and settlers of the agrarian reform. It covers harvest cost and agroindustrial activity actions, for the investment in machinery, equipment or production infrastructure and agricultural or non-agricultural services.

Law no. 11.947/2009 determines the utilization of, at least, 30% of funds transferred by the National Fund of Education Development - *FNDE* for school food, in the purchase of products from family agriculture and from the rural family enterprise or from their organizations, prioritizing agrarian reform settlements, traditional indigenous communities and Quilombo communities.

The main objective of the *Technical Assistance and Rural Extension (ATER)* services is to improve the income and life quality of rural families, through the improvement of production systems, mechanism of access to resources, services and income, in a sustainable manner. The Secretariat of Family Agriculture (SAF/MDA) coordinates ATER actions.

Single System of Attention to Agricultural Sanity – SUASA was regulated in 2006. It is a unified system coordinated by the Federal Government, with the participation of municipalities, states, through adhesion. Products inspected by any organization of SUASA System can be commercialized in the whole national territory. This new sanitary inspection system allows the legalization and implementation of new agroindustries, which facilitates the commercialization of industrialized products locally, in the formal market in the whole Brazilian territory.

The Family Agroindustry Program [5] has the general objective of supporting the agroindustrialization of the family farmers´ production, and its commercialization in order to add value, create income and job opportunities in the rural environment.

The State Systems of Commercialization of Family Agriculture and Solidary Economy Undertakings´ Products – SECAFES are components of a policy related to the MDA, operationalized through the SDT, but coordinated through a collegiate, with the Territorial Development Secretariat as the main lead.

The Food Acquisition Program (PAA)[6] is one of the actions from the guidelines of the Zero Hunger Program, which objective is to ensure food with necessary quantity, quality and regularity to people in situation of food and nutritional insecurity, and to promote the social inclusion in the country side through the strengthening of the family agriculture.

The interface of the Ministry of Agriculture, Livestock Husbandry and Supply – MAPA with the socioenvironmental aspects is mainly in its historic attributions related to the Vegetal and Animal Defense, and with proceedings for the registration of agrochemicals and seed varieties. It is also in initiatives more clearly related to the environment, microbasin preservation programs, soil and water conservation programs, much older than any environmental policy, and more recently, financing lines adapted to the implementation of production systems with low carbon emission (ABC) and for the revitalization of riparian forests and other Permanent Preservation (APP) or Legal reservation (RL) areas.

The Brazil Without Misery Plan / Green Bag and Water for everyone With the Brazil Without Misery Plan, the country assumes the challenge to end misery, responding to the targets of the millennium. The Brazil Without Misery Plan has as general objective: to promote social and productive inclusion of extremely poor people, turning residual the percentage of those living under

[5] This information was extracted from the official website of MDA http://www.mda.gov.br/saf

[6] This information was extracted from the official website of MDS and of the National Supply Company – CONAB, respectively http://www.mds.gov.br/programas/seguranca-alimentar-e-nutricional-san/programa-de-aquisicao-de-alimentos-paa and http://www.conab.gov.br/

the poverty line. The specific objectives are: to raise the per capita family income; to expand the access to public services, to citizenship and social welfare actions; to expand the access to opportunities of job and income through production inclusion actions in the rural and urban environments.

Within this scope, there are the Active Search Program (a set of actions to include families living outside the social protection and promotion network in the Single National Registry); Green Bag Program (income for families in situation of extreme poverty that promote the environmental conservation in the areas where they live and work); Family Scholarship Program; Water for Everyone Program (solutions ensuring the access of the whole extremely poor population to water).

Local Productive Arrangement – APL of family agriculture. For the definition of agro-gathering APLs in Tocantins, five "sectors" defined in the Participatory Mapping were considered: bee-keeping, handicraft, babaçu, cerrado fruits and artisanal fishing. In the State of Tocantins, the following APLs are suggested:

1) Bico do Papagaio: approximately fifty municipalities in the extreme north region, with an integrated combination of bee-keeping, babaçu, cerrado fruits and artisanal fishing.
2) Vale do Araguaia: The municipalities along Araguaia (or Javaés), with the integration of artisanal fishing, complemented by bee-keeping and cerrado fruits.
3) North: The municipalities of Belém-Brasília, from Araguaína, with the combination of cerrado fruits with bee-keeping and babaçu.
4) Northeast: Cerrado fruits complemented by bee-keeping.
5) Belém-Brasília: The municipalities to the south of the State located along BR-153, integrating bee-keeping with cerrado fruits.
6) Jalapão: The municipalities of the Administrative Region of Novo Acordo, with handicraft, bee-keeping and cerrado fruits.

3.6.2 State of Tocantins

The initial planned occupation milestone of the region was the Integrated Development Program of the Araguaia-Tocantins Basin - PRODIAT, at the late 1970s and early 1980s. This program was aimed to promote the occupation of the region included in the program such as wetlands potentially suitable for annual crops and buffalo livestock, in the lower areas, and lands potentially suitable for agriculture and forestry, in the higher areas. The Project Formoso, contemporary of PRODIAT, encompasses an expropriated area of 63,859 hectares. From the total area, 22,742 hectares are actually cultivated and protected by a system of polders, and supplied by dams located in the lower area. In the mid-1990s, the Project Javaés was aimed to replicate the Project Formoso in other basins of the region. The municipalities affected were: Araguaçu, Cristalândia, Dueré, Formoso do Araguaia, Paraíso do Tocantins, Pium, Lagoa da Confusão e Sandolândia.

Today, the ongoing development projects in the State are: Development Program of the Cerrado; Project Jalapão; Project Campos Lindos; Araguaia-Tocantins Waterway and Agribusiness Projects.

The *Development Program of the Cerrado* - *PRODECER III* - is a Japanese-Brazilian undertaking, which aims at increasing the production in the Brazilian cerrado. It is implemented in the region of Pedro Afonso. Its total project area covers 40,000 ha, hosting 40 parcels with an average area for planting of 485 ha. The main cultures grown are: soybean, corn (rainfed and irrigated), irrigated beans and cashew nut.

The *Project for Sustainable Development of the Region of Jalapão* aims to sort the territorial area of the Jalapão, promote sustainable production and improve the population's quality of life through the fruit farming and forestry, including carbon sequestration and ecotourism.

The *Project Campos Lindos* – is located near the municipality of Goiatins. The Project aims to support the implementation of high-tech agriculture, especially for grain and fruit. The Project Campos Lindos is implemented in an expropriated area of 105 hectares, divided into 43 parcels that will be used to grow grains and tropical fruit trees. The production center of Campos Lindos is capable of developing

an area of approximately 200 000 hectares.

The Program *Araguaia-Tocantins Waterway* - the operation of this intermodal transportation system will extend the agricultural frontier of the States of Mato Grosso, Pará, Tocantins and Maranhão. The transport availability is estimated in 120,000 tones / year, still far beyond the region capability of load generation. It signals the numerous opportunities for new river transport operators. In addition, the State Government has paved the road Xambioá-Araguaína, via Araguanã, and the Federal Government is committed to build a modern port in Xambioá. The private sector is committed to build a storage complex and several industrial undertakings.

There are two ongoing projects with external funding in the State: the Development Program for Sustainable Tourism in the State of Tocantins - PRODETUR Development Program in the Southwestern Region of Tocantins - PRODOESTE and the Regional Sustainable and Integrated Development Program - PDRIS. *PRODETUR* aims to develop tourism in a sustainable manner and to contribute to economic growth and to improve the quality of life through promotion of local clusters of tourism and local communities engagement in tourism centers of Cantão, Jalapão and Palmas, in the Jalapão State Park. The *Development program in the southwestern region of Tocantins - PRODOESTE* aims to (i) improve the quality of life through environmentally responsible planning and management of water resources (ii) increase the level of employment and income based on the crops and agro-industrialization of the region, thus reducing social inequalities; (iii) improve low-income access to the productive benefits of the Program; and (iv) increase the water storage and distribution structures to irrigate crops during dry season.

In addition to these Projects and Specific Development Programs, the Multi-Annual Program of the Government of the State of Tocantins - PPA for 2012-2015, establishes a set of macro objectives, guidelines and government programs, which goals are among others: (I) Design, implement, strengthen and integrate the public policies for economic development, together with public and private actors in line with the market; (ii) decentralize the development through regional hubs driven by supply and vocational chains; (iii) incorporate technology into the productive chains; (iv) strengthen economic activities with sustainability, (v) integrate public policy of protection, development and social advancement. The PPA manages 148 state programs, mobilizing resources of about $ 6.4 billion.

Table 3.6.1: Demonstration of agricultural sector programs and projects of the State of Tocantins.

Programs	Description
DEPARTMENT OF AGRICULTURE, LIVESTOCK AND AGRICULTURAL DESEVOLVIMENTO - SEAGRO	
Sustainable Agriculture, Trade and Supply	Implement public policies and support mechanisms for the generation and sharing of technologies and rural extension contributing to farming sustainability; Implement public policies and support mechanisms for the generation and sharing of technologies and rural extension contributing to agriculture sustainability; Encourage agricultural production increase, contributing to the socioeconomic and environmental sustainability of the State of Tocantins; Second activities supporting the plant production trade, by offering quality products, adding value and improving the socioeconomic status of the State's population
Aquaculture and Fisheries	Improve the knowledge diffusion of aquaculture and fisheries on an ongoing basis, with emphasis on environmental, social, associational, productive and economic sustainability among the actors involved in the production chain of the State; Promote the generation of employment and income, productive occupation, better quality of life and reduction of socioeconomic inequalities, through the development of aquaculture and fisheries, increasing the production and consumption of fish, food safety and associationism, with emphasis on sustainability Conduct and support the development of aquaculture parks and centers in the state's public waters.
Agribusiness	Providing the conditions for small farmers to process animal/plant production, adding value and generating income through implementation, revitalization, maintenance, inspection and monitoring of agro-industries in the State
Family Farming	Modernize and maintain the services of Technical Assistance and Rural Extension. Improve the quality of life for Family Farmers and differentiated populations, with actions that increase their incomes, stimulate socio-cultural organization, knowledge and environmental protection. Promote sustainable rural development and strengthening of family farming through initiatives involving agriculture and non agricultural, fishing, extractive and socio-biodiversity-related activities, providing farmers access to land, structured production facilities, and social and productive

Programs	Description
	organization.
Water Infrastructure for Irrigation and Multiple Uses	Regulate and implement the State Irrigation Plan. Stimulate agricultural production increase through irrigated agriculture; Promote sustainable regional development by means of projects and construction of water infrastructure, to contribute to the economic development of the State and to increase people's quality of life.
TOCANTINS LANDS INSTITUTE - ITERTINS	
Agrarian Regularization	Promote the legalization of legitimate possessions, through a set of actions that involve the establishment of partnerships with other agencies (covenants) in order to optimize the services delivered to the target audience, allowing the development of the state's productive sector by increasing the access to the credit intended to the agricultural sector.
INSTITUTE OF RURAL DEVELOPMENT OF THE STATE OF TOCANTINS - RURALTINS	
Family Farming	Modernize and maintain the services of Technical Assistance and Rural Extension; Improve the quality of life for Family Farmers and differentiated populations, with actions that increase their incomes, stimulate socio-cultural organization, knowledge and environmental protection.
AGRICULTURTAL DEFENSE AGENCY OF THE STATE OF TOCANTINS - ADAPEC	
Agricultural Protection	Promote the defense, inspection and animal health system, ensuring the supply of products within the standards of sanitation, and their trading within the quality needed for final consumption, preventing, controlling and/or eradicating contagious/infectious diseases, deficiencies and parasites in the cattle; Promote and maintain plant health and the quality of agricultural inputs; Promote Agricultural Health Education in search of effective prevention, control and eradication of diseases and pests in animals and plants; Promote the modernization, restructuring and maintenance of the entire system of Agricultural Protection Tocantins

Table 3.6.2: Demonstration of Federal Projects of the Agriculture and Agrarian Development Ministries.

Programs	Description
MINISTRY OF AGRICULTURE - ROADMAP	
National Healthy Bees Program (PNSAp)	The National Healthy Bees Program strengthens bees' productive chain, either for surveillance or health protection actions. Preventive measures include the control or eradication of bee diseases; health education; epidemiological studies; inspection and control of animal and beekeeping products transit; registration, inspection and health certification of the premises; as well as prompt intervention in cases of suspicion and occurrence of notifiable disease.
National Program for Rabies Control in Herbivores	The National Program for Rabies Control in Herbivores sets the guidelines to control of occurrence of this acute disease that attacks central nervous system, and can affect all mammals, including humans. The program is developed since 1966 and is run by the Department of Animal Health, linked to the Agricultural Protection Department of the Ministry of Agriculture.
Actions to prevent and control Transmissible Spongiform Encephalopathies (TSE)	Transmissible spongiform encephalopathies are neurodegenerative diseases that seriously affect the whole structure of the central nervous system (brain and other structures) of various species. So-called Mad Cow Disease is an example of such a disease that affects cattle, and which features are nervousness, overreaction to external stimuli and limited mobility.
National Poultry Health Program (PNSA)	The National Poultry Health Program, established in 1994 by the Animal Defense Department of the Ministry of Agriculture, considers the importance of poultry production in the domestic and foreign markets and the need for standardization of follow-up actions related to the health sector. Its activities are based on the implementation of inspection, prevention, control and eradication of diseases in birds such as influenza, Newcastle disease, salmonella and mycoplasms, among others.
National Sheep and Goat Health Program (PNSAp)	The National Sheep and Goat Health Program was created in 2004 and aims to strengthen these productive chains, through inspection and animal health protection. To prevent, control or eradicate diseases that may compromise the national livestock, the program promotes activities related to health education; inspection and control of animals transit; epidemiological studies; and intervention in case of suspicion or occurrence of notifiable diseases. The national coordination of the program is carried out by the Animal Health Department of the Ministry of Agriculture.
The National Swine Health Program (NFPs)	The National Swine Health Program (NFPs) was established by the Ministry of Agriculture in 2004 and includes the coordination, standardization and support for actions related to swine health protection. Efforts are concentrated on the eradication of major diseases affecting pigs, such as Classical Swine Fever (CSF); Aujeszky's disease (AD); the African Swine Fever (ASF); the Swine Vesicular Disease (SVD), the trichinellosis - the Porcine Reproductive and Respiratory Syndrome (PRRS), swine brucellosis, the Transmissible Gastroenteritis (TGE) and Vesicular Stomatitis (VS).
National Program for Control and Eradication of Brucellosis and Tuberculosis in Animals (PNCEBT)	The National Program for Control and Eradication of Brucellosis and Tuberculosis in Animals aims to minimize the negative impact of zoonoses (animal diseases transmissible to humans or those transmitted from man to animals) and promote the livestock competitiveness. Under the program, the vaccine against bovine and buffalo brucellosis was made mandatory across the national territory, and the certification strategy regarding monitored and non-monitored properties was defined, thus allowing a more accurate control diseases.
National Equine Health Program (PNSE)	Horse breeding can be strengthened by actions of inspection and animal health protection, one of the main purposes of the National Equine Health Program (PNSE) established by the Ministry of Agriculture in 2008. To prevent, control or eradicate diseases, the program promotes activities related to health education; inspection and control of animals' transit; epidemiological studies; and intervention in case of suspicion or occurrence of notifiable diseases. The national coordination of the program is carried out by the Animal Health Department of the Ministry of Agriculture.
National Plan for Prevention and Eradication of FMD (PNEFA)	The National Plan for Prevention and Eradication of FMD is the main strategy progressive implementation and maintenance of disease free zone, in accordance with the guidelines established by the World Organization for Animal Health (OIE). The implementation of PNEFA is shared between the different levels of hierarchy of the official veterinary service to private sector participation. The Federal Government coordinates and supervises the plan on a national basis, while developing strategies to combat the disease; control of international animals' transit; control the vaccine quality and laboratory diagnosis; and support health education activities.
Cattle Guardian Program	Cattle Guardian Program is a unique initiative of the Ministry of Agriculture to monitor via satellite cattle ranches in the Amazon biome, in order to reduce the deforestation caused by cattle ranching. The pilot project was launched in December 2009, in partnership with the Government of Pará, and the

Programs	Description
	support of the State Federation of Agriculture (FAEPA), supermarkets and meat processing plants. Initially, the program will monitor six municipalities in Pará - Marabá, Eldorado do Carajás, Água Azul do Norte, Ourilândia do Norte, Tucumã e São Félix do Xingu - where nearly four million cattle are raised. Under the Cattle Guardian Program, electronic permits for animal transit (GTA) will only be issued on the condition that cattle are raised in non-deforested areas. GTA permits include information on sanitation and are mandatory for the transport of animals between properties, municipalities, states, meat processing plants, or live export. The novelty is that in Para the GTA is now issued electronically in real time. Farms are georeferenced (location defined by the geographic coordinate system) and monitored by experts from the National Institute of Meteorology (Inmet) and Agriculture Defense Agency of the State of Pará (Adepará). The monitoring covers the entire state of Pará, beyond the cattle raised in Rondônia and in the Amazon biome of Mato Grosso.
National Program on Micro-watersheds and Soil Conservation in Agriculture	The National Program on Micro-watersheds and Soil Conservation in Agriculture aims to promote rural development, in an integrated and sustainable manner prioritizing two pillars: the micro-watershed as a planning unit, and the organization of farmers, as a strategy to promote better agriculture productivity and the use of environmentally, economically and socially adequate technologies.
Food & Beverage Safety and Quality	The Food & Beverage Safety and Quality Program seeks to improve the quality of food and beverage, by researching new processes and inspecting production plants. It promotes best practices regarding animal & plant products and food, considering their specificity before they reach consumers' hands. The purpose is to ensure agribusiness competitiveness in the domestic and foreign markets and to reduce Brazil's cost, tailoring products to international agricultural regulations, under the World Trade Organization (WTO). Another program's goal is to improve agriculture and livestock productivity, through the implementation of plant classification systems and the definition of supply and trade policies.
Sugarcane Funding Program	The program grants a subsidy on the price of sugarcane paid by industry. The official equalization benefit is granted to sugarcane growers of the states of Bahia and Rio de Janeiro, when their production is processed by plants located in the same region. To qualify for the program, it is mandatory that the properties are duly regulated in the National Register of Sugarcane Farms (CNPPC). The subsidy is paid to the accredited grower, individual or entity, by deposit made by the National Petroleum Agency (ANP), at the bank authorized by the Ministry of Agriculture. The criteria for calculating the subsidy are specified in the regulation issued by the agency. Information on the property production is of sugarcane growers' responsibility and is subject to technical conference at government level.
Low-Carbon Agriculture Program	The ABC program encourages the adoption by farmers of technological processes that neutralize or minimize the effects of greenhouse gases in the field, in the coming years. ABC program actions are part of the Agriculture and Livestock Plan 2010/2011 and provide $ 2 billion to finance technologies that ensure efficiency in the field, with a positive balance between sequestration and emission of carbon dioxide (CO2). The resources are guaranteed to farmers and cooperatives, with a funding limit of $ 1 million per beneficiary. The credit will be financed with an annual interest rate of 5.5% and 12-year repayment term.
MINISTRY OF AGRARIAN DEVELOPMENT – MDA	
Citizenship Territory	The Citizenship Territories aim to promote economic development programs and universalize basic citizenship programs through a strategy of sustainable territorial development. Social participation and integrated actions among the Federal Government, states and municipalities are fundamental to build this strategy.
Agribusiness	The program supports the inclusion of family farmers in the process of industrialization and trade of their produce in order to add value, generate income and employment opportunities in rural areas, ensuring the improvement of living conditions of the beneficiary populations.
Biodiesel	The Ministry of Agrarian Development (MDA) through the Family Agriculture Department (SAF) participates in the management of the National Biodiesel Production and Use (PNPB), through which, in addition to stimulating the production of new fuel, seeks to support participation of family farming in the production chain.
Legal Land	The purpose of the Legal Land Program is to regulate the legitimate land occupations, giving priority to small farmers and local communities to keep the land. Law 11.952/09 provides the disposition to prevent the legalization of illegally occupied areas. Another measure to prevent fraud is the disclosure of the applicants list and an online service to receive complaints, which can be accessed by any citizen,

Programs	Description
	even anonymously.

3.6.3 State of Goiás

The programs and projects in the agricultural sector of the state of Goiás are described in Table 3.

Table 3.6.3 : Summary of agricultural sector programs and projects of the State of Goiás.

Programs	Description
TECHNICAL ASSISTANCE, RURAL EXTENSION AND AGRICULTURE RESEARCH AGENCY OF THE STATE OF GOIÁS – EMATER	
State Program on Technical Assistance and Rural Extension	Make available to farmers and ranchers, the diffusion of technologies, products and services, and technical assistance and rural extension, to support sustainable development with a view to improving the quality of life in rural areas.
State Program on Agricultural Research	Carry out research, disseminate technologies, products and agricultural processes, contributing to the agricultural development of the State of Goiás through the generation, promotion and transfer of knowledge and competitive technologies, respecting the principles of sustainability to increase employment, income and quality of life.
SEAGRO - DEPARTMENT OF AGRICULTURE, LIVESTOCK AND IRRIGATION	
Agricultural Development Program	Promote and plan organically public policies on institutional development of agriculture, livestock, irrigation and supply, besides supporting the implementation of SEAGRO program across the State.
AGRICULTURE & AGRO DEFENSE AGENCY OF THE STATE OF GOIÁS	
Defense and agricultural surveillance program	Run defense measures, and animal and plant health surveillance.

3.6.4 State of Maranhão

The programs and projects in the agricultural sector of the state of Goiás are described in Table 3.6.4.

Table 3.6.4 : Summary of agricultural sector programs and projects of the State of Maranhão.

Programs	Description
SAGRIMA - STATE DEPARTMENT OF AGRICULTURE, LIVESTOCK AND FISHERIES	
Management Policy on Agriculture, Livestock and Fisheries	Coordinate the planning and formulation of sectoral policies and the evaluation and control of programs regarding agriculture, livestock and fisheries.
Agricultural Protection	Increase the level of food safety in animal and plant products and by-products, ensuring the supply of quality products and by-products and promoting public health and environmental preservation.
Maranhão More Productive	Contribute to increase the production, the productivity and the competitiveness of Maranhão's agriculture.
Productive Fisheries	Promote the increase of extractive fishing production in the State.
Productive Aquaculture	Promote the increase of aquaculture production in the State.

CHAPTER 4

CONTEXT OF COMMERCIALIZATION

4.1 Introduction

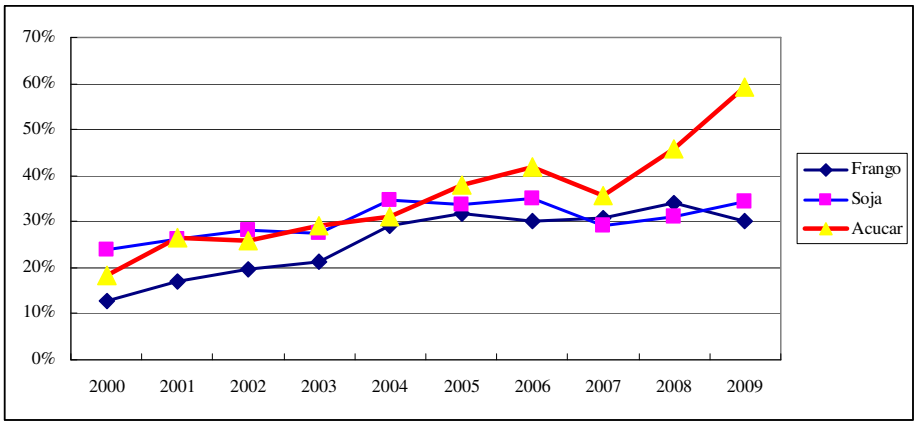
In the last years, the international trade of food products has been increasing on a fast rhythm. The products that are most traded internationally are:

Table 4.1.1 Evolution of the international trade imports (US$ 1,000)

	1990	2000	2009	Increase in Amount (2009-1990)	Increase (2009- 1990)
Pork meat	620,995	6,722,096	13,509,358	12,888,363	21.75
Palma oil	2,797,355	5,037,692	25,484,235	22,686,880	9.11
Non-alcoholic beverage	1,579,142	3,611,414	12,383,298	10,804,156	7.84
Soybeans	6,759,696	10,492,932	35,993,409	29,233,713	5.32
Pet Food	1,746,744	3,579,627	8,626,285	6,879,541	4.94
Colza	1,693,795	2,281,910	8,027,580	6,333,785	4.74
Soybean oil	1,850,448	2,995,038	8,444,831	6,594,383	4.56
Chicken meat	3,501,141	6,051,352	15,698,786	12,197,645	4.48
Chocolate products	4,286,349	6,672,830	17,286,689	13,000,340	4.03
Soybean bran	5,925,302	7,625,797	23,644,015	17,718,713	3.99

Source: FAOSTAT

Brazil has contributed to this rapid growth, especially regarding the trade of pork meat, chicken and beef as well as soybeans. The evolution of the Brazilian participation in the international trade of food products has been as follows:



Source: FAOSTAT

Fig 4.1.1 evolution of the Brazilian share in the international export of food products

Brazilian sugar represents close to 60% of the total amount traded in the international market. Chicken and soybean occupy approximately 30% of the international trade. Despite these facts, the region of the Study does not contribute much to this scenario. The Brazilian states that contributed the most for the expansion of these products' trade are:

Table 4.1.2 States that contributed the most for the expansion in the last 10 years.

Item	Four States that contributed the most
Chicken	• Paraná • São Paulo • Santa Catarina • Rio Grande do Sul
Soybean	• Mato Grosso • Paraná • Rio Grande do Sul • Goiás
Sugar	• São Paulo • Minas Gerais • Goiás • Mato Grosso do Sul

Source: JICA Study Team

The international trade of the studied States also shows a growth tendency. The following table indicates the value of export and import of three States.

Table 4.1.3 The State's trade balance (US$)

State	2009			2010		
	Exp.	Imp.	Balance	Exp.	Imp.	Balance
Maranhão	1,331,064	1,993,858	-662,79	2,133,592	3,816,926	-1,683,334
Tocantins	267.129	127,347	139,782	342,273	239,888	102,385
Goiás	2,402,148	2,864,231	-462,082	2,779,983	4,185,662	-1,405,68

Source: BRAZILIAN TRADE BALANCE PER MUNICIPALITY – 2010/2009/SECEX/Banco Central

The municipalities that export the most are:

Table 4.1.4 Amount of exports of main municipalities 2010

Maranhão		Tocantins		Goiás	
Municipality	US$ FOB	Municipality	US$ FOB	Municipality	US$ FOB
State	2,133,592,477	State	342,273,652	State	2,779,983,251
São Luís	1,450,030,396	Campos Lindos	91,402,267	High Horizonte	504,658,668
Balsas	226,037,480	Araguaína	64,312,779	Luziânia	356,133,809
Açailândia	187,731,576	Pedro Afonso	56,567,977	Itumbiara	214,210,499
Porto Franco	93,826,147	Guaraí	35,235,135	Palmeiras de Goiás	204,604,439
Tasso Fragoso	42,071,325	Porto Nacional	28,726,058	Mozarlândia	171,148,565
Bacabeira	27,560,842	Gurupi	28,284,636	Goiânia	169,837,304
São D. do Azeitão	26,062,024	Presidente Kennedy	20,524,387	Quirinópolis	152,394,375
Riachão	23,133,217	Fortaleza do Tabocão	15,547,645	Ouvidor	150,978,152
Godofredo Viana	15,651,920	Peixe	656,,020	Rio Verde	147,757,703
Anapurus	11,936,278	Miranorte	453,,012	Catalão	86,773,289
Pindaré-Mirim	10,426,214	Palmas	299,,888	Minaçu	77,901,023
Sambaíba	10,272,515	Nova Olinda	148,,900	Edéia	59,655,045
High Parnaíba	5,006,165	Ponte Alta do TO	52,,295	Goianésia	58,288,643

Source: BRAZILIAN TRADE BALANCE PER MUNICIPALITY – 2010/2009/SECEX/Banco Central

4.2 Context of the commercialization in the Study Region

4.2.1 Tocantins

First of all, a general evaluation of the trade general conditions in Tocantins is carried out, based on secondary data obtained from different institutions. Secondly, the trade conditions of various Tocantins agriculture/livestock products are analyzed, using information obtained from interviews with representatives of institutions and companies connected to trade.

(1) General Conditions

Most part of the Tocantins agriculture/livestock production is aimed to local and domestic markets. Only soybeans, fresh pineapple and pineapple juice, as well as meat, leather and other part of bovines are consistently exported to foreign markets. Table 4.2.1 shows the evolution of the state export in total amount and the participation of the products, in the period 2001-2011. As one can notice, the total amount exported increases continually during the period mentioned, showing that the State is taking advantage of the trade opportunity in the international level. This growth is sustained by the trade of soybeans and the combination of beef-leather-other parts of bovines. In this context, soybean participates the most during the mentioned period. The cattle products expanded its participation on a recent period due to works of sanitary control of FMD fever and other diseases.

Regarding the destination markets, Tocantins exports have reached, mainly, Spain, China, Holland and Russia that receives, respectively, 38,7%, 22,2%, 8,8% and 6,9% of the total exported by the State, according the 2011 data. It is important to emphasize that in 2011 the total exports represented US$ 486,316,321.00 (FOB). The exports to Japan represented 0,18% of this total. Table 4.1.2 presents the distribution of Tocantins exports in 2011, according the destination country. Fig. 4.2.1 illustrates the participation in percentage of Tocantins exports in that year.

The exports of the State are carried out, basically, by six companies that have concentrated around 90% of the total export, in 2011. In this context, the main companies and their respectively participation on the total are: Bunge Alimentos SA (39,0%); Minerva SA (19,5%); Cargill Agrícola SA (11,5%); ABC Industria e Comercio SA (10,7%); Los Grobo Brasil Central Negócios de Originação (8,5%); e ADM do Brasil Ltda. (1,7%).

Considering that the international trade is organized according bilateral relations, it is important to notice that Tocantins also imports supplies and products from countries that it exports. In 2011, the State total imports were US$ 162,306,023.00. Imports from Japan represented 0.38% of this total. Table 4.2.3 presents the Tocantins imports distribution in 2011, according the destination country. Fig. 4.1.2 illustrates the percentage participation of the 2011 imports.

Table 4.2.1: Exports of Tocantins Ag Products, 2001-2011, in percentage of the total exported by the State

Year Harvest	Amount (US$ FOB)	Soy (beans) %	Bovines (beef, leather/other parts) %	Pineapple (fresh and juice)%
2001	3,919,041	36.0	32.8	1.7
2002	16,208,440	89.2	10.6	0.1
2003	45,580,963	87.9	11.4	0.5
2004	116,465,953	86.7	10.0	2.4
2005	158,735,865	89.8	8.9	0.8
2006	203,886,580	70.4	28.8	0.9
2007	154,981,621	77.8	23.4	1.0
2008	297,684,013	82.0	17.7	0.3
2009	280,218,094	74.6	24.5	0.7
2010	343,991,671	74.9	24.8	0.1
2011	486,316,321	72.3	27.1	0.2

Source: IBGE.

Table 4.2.2: Exports of Tocantins state, according the destination country, 2011, in US$ FOB.

Country	US$ F.O.B.	Part%
01 SPAIN	188,398,943	38.74
02 CHINA	108,010,855	22.21
03 HOLAND	42,601,310	8.76
04 RUSSIA	33,653,089	6.92
05 IRA	19,063,600	3.92
06 HONG KONG	18,188,230	3.74
07 EGYPT	17,118,334	3.52
08 VENEZUELA	17,021,071	3.50
09 CHILE	8,656,431	1.78
10 GERMANY	7,051,587	1.45
11 LEBANONN	5,252,216	1.08
12 ARGELIA	5,057,690	1.04
13 SAUDI ARABIA	3,452,846	0.71
14 BELGIUM	2,820,635	0.58
15 IRAQUE	1,604,844	0.33
16 VIETNA	1,507,581	0.31
17 PORTUGAL	1,167,159	0.24
18 JAPAN	75,369	0.18
19 UCRANIA	680,84	0.14
20 TURKEY	680,843	0.14
21 ARAB EMIRATES	680,843	0.14
22 LEBANON	583,580	0.12
23 COVEITE	437,685	0.09
24 ARGENTINA	389,053	0.08
25 AFEGANISTAO	291,790	0.06
26 CATAR	291,790	0.06
27 JORDANIA	145,895	0.03
28 PUERTO RICO	97,263	0.02
29 DOMINICAN REPUBLIC	97,263	0.02
30 CAZAQUISTAO	97,263	0.02
31 OTHER COUNTRIES	340,421	0.07
TOTAL	486,316,321	100.00

Source: Secretaria do Comércio Exterior. / Foreign Trade Secretariat

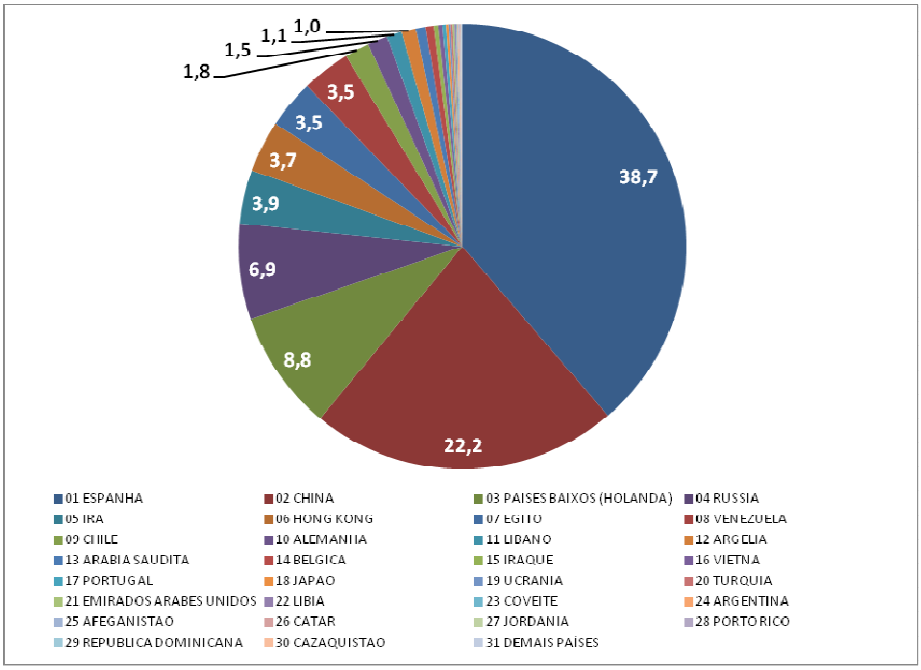


Fig. 4.2.1: Exports of Tocantins State, according the destination country.

Source: Secretaria do Comércio Exterior / Foreign Trade Secretariat

Table 4.2.3: Tocantins Imports, according the origin country, 2011, in US$ FOB.

Country	US$ F.O.B.	Part%
01 CHINA	43,866,669	27.03
02 ISRAEL	17,202,933	10.60
03 UNITED STATED	15,418,660	9.50
04 ITALY	14,463,465	8.91
05 INDONESIA	11,816,301	7.28
06 GERMANY	10,663,602	6.57
07 RUSSIA	10,439,107	6.43
08 BELARUS	10,255,322	6.32
09 EGIYPT	3,062,237	1.89
10 SPAIN	2,662,329	1.64
11 ARGENTINA	2,551,525	1.57
12 TURKEY	2,393,678	1.47
13 SOUTH KOREA	1,739,203	1.07
14 HONG KONG	1,664,015	1.03
15 PORTUGAL	1,620,118	1.00
16 CHILE	1,424,637	0.88
17 INDIA	1,365,935	0.84
18 MARROCOS	1,350,363	0.83
19 SOUTH AFRICA	1,174,423	0.72
20 SWEDEN	1,041,203	0.64
21 FRANCE	1,007,317	0.62
22 TAIWAN (FORMOSA)	830,302	0.51
23 NORTH KOREA	686,024	0.42
24 BELGIUM	639,651	0.39
25 JAPAN	619,861	0.38
26 EQUADOR	445,462	0.27
27 CANADA	283,345	0.17
28 NORWAY	252,599	0.16
29 PERU	149,849	0.09
30 HOLAND	136,613	0.08
31 OTHER COUNTRIES	1,079,275	0.66
TOTAL	162,306,023	100.00

Source: Secretaria do Comércio Exterior / Foreign Trade Secretariat

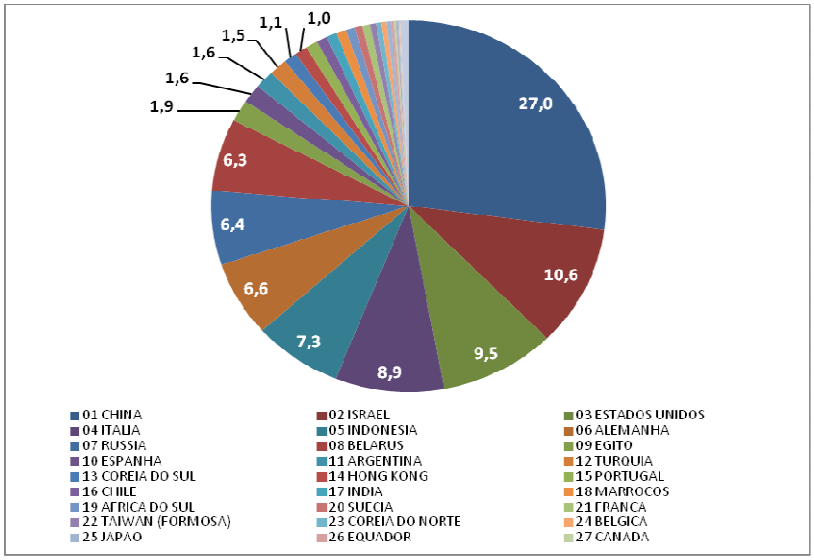


Fig. 4.2.1: Tocantins State imports, according the origin country, 2011.

Source: Secretaria do Comércio Exterior / Foreign Trade Secretariat

4.2.2 North of Goiás

(1) General Conditions

The North Region of Goiás is composed by three micro regions that border Tocantins: São Miguel do Araguaia, Porangatú and Chapada dos Veadeiros. In the analysis of the north part of Goiás, the micro region of Ceres was also considered, due to its influence on the others micro regions.

When the export trade environment of these micro regions is analyzed, we notice a great variety of products exported, including farm, industrialized and manufactured goods. In the specific case of the agribusiness, there is a natural concentration on types of sugar produced out of sugarcane and beetroot, and internal organs of cattle, as shown on Table 4.2.3 data, regarding Goianesia Municipality, which represents Ceres micro region, in 2011. It is important to notice that these products represent 98.8% of the total exported.

Table 4.2.3. Agribusiness products export, in US$ F.O.B., Goianésia (GO), 2011

Product	Amount	
	US$ F. O.B.	Part %
1 OTHER SUGARS FROM SUGARCANE, BEETROOT, .ACUCARES DE CANA, BETERRABA, SUCROSE QUIM., PURE, SOLUBLE	67724188	81.2
2 SUGAR FROM SUGARCANE, RAW	14,686,969	17.6
3 TRIPES OF BOVINES FRESH, COLD., FROZEN., SALTED., SMOKY	758,985	0.9
4 OTHER EATABLE ENTRAILS OF BOVINES, FROZEN	211,496	0.3
5 PAPER BOXES OR CARDBOARD, WAVY (ORRUGATED)	12,758	0.0
6 BAGS FOR PACKAGE, MADE OF POLYETHYLENE / POLYPROPHYLENE	1,203	0.0

TOTAL OF THE MAIN PRODUCTS EXPORTED	83,395,599	100

In terms of the export destinations, the analysis of Table 4.2.4 shows a great concentration to the United States, with around 22% and, a wide distribution of export to various countries of many continents. This represents an interesting asset, from the point of view of minimizing the risks of market losses and trade results. Figure 4.2.3 illustrates the distribution of the export destination of Goianésia Municipality products in 2011.

Table 4.2.4. Export of agribusiness products, in US$ F.O.B., according the country of destination, Goianésia (GO), 2011.

Destination Country	Amount	
	US$ F. O.B.	Part %
1 UNITED STATES	18,313,348	21.96
2 GERMANY	6,764,850	8.11
3 LIBIA	5,862,789	7.03
4 SYRIA	5,348,672	6.41
5 MONTENEGRO	5,062,270	6.07
6 NIGERIA	4,751,967	5.7
7 RUSSIA, FEDERATION OF	3,799,992	4.56
8 NETHERLANDS (HOLANDA)	3,679,161	4.41
9 LEBANON	3,484,943	4.18
10 ALBANIA	2,361,151	2.83
11 INDONESIA	2,286,878	2.74
12 SOUTH AFRICA	2,119,406	2.54
13 GUINE	1,999,063	2.4
14 BENIN	1,717,079	2.06
15 BANGLADESH	1,610,558	1.93
16 MIANMAR	1,408,999	1.69
17 CANADA	1,321,725	1.58
18 CROACIA	1,245,114	1.49
19 CAMEROON	1,222,414	1.47
20 UNITED ARAB EMIRATES	1,150,101	1.38
21 BELGICA	1,080,000	1.3
22 HONG KONG	955,138	1.15
23 ARABIA SAUDITA	869,364	1.04
24 PAQUISTAN	839,777	1.01
25 ANGOLA	789,816	0.95
26 IEMEN	740,679	0.89
27 MARROCO	419,148	0.5

28 MALASIA	416,338	0.5
29 BULGARY	395,179	0.47
30 MEXICO	317,060	0.38
31 OTHER COUNTRIES	1,062,620	1.27
TOTAL	83,395,599	100

Source: SECEX.

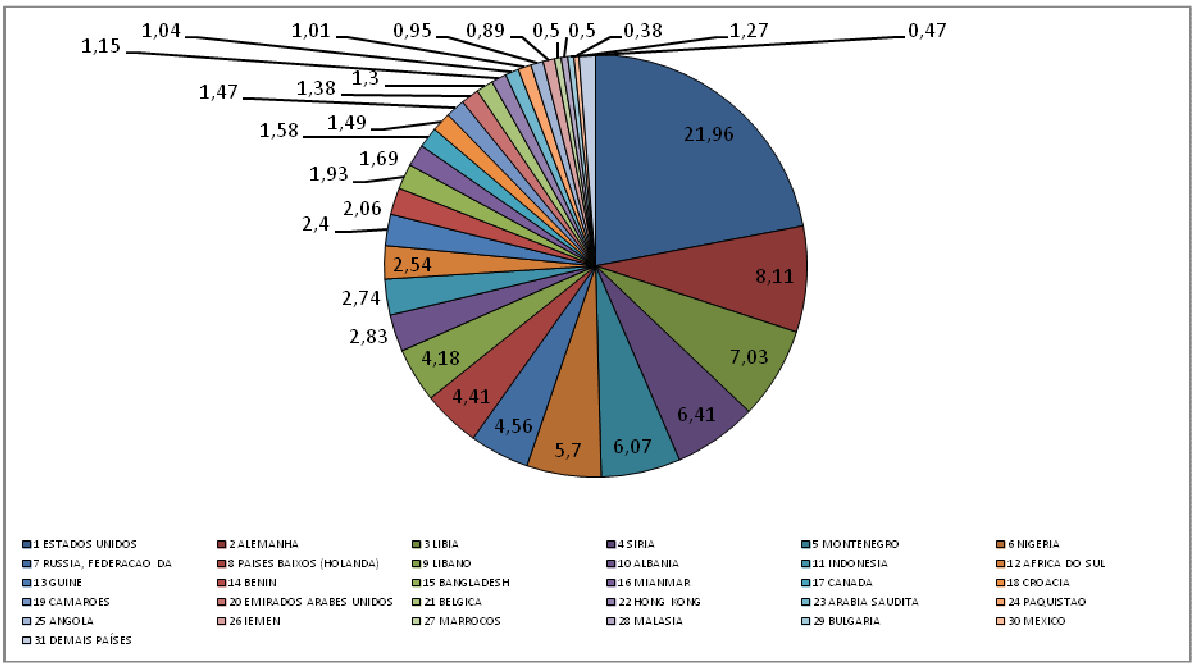


Figure 4.2.3. Distribution of the export destination of the goods produced in Goianésia Municipality (GO), in 2011. Source: SECEX.

4.2.3 South of Maranhão

(1) General Conditions

The South Region of Maranhão is composed of three micro regions that border directly with Tocantins: Imperatriz, Porto Franco and Gerais de Balsas. In these micro regions the production and the trade are intense and specially oriented to foreign markets.

Regarding the foreign trade, and taking Balsas Municipality as the Representative of the south part of Maranhão, it is noticed that the main products exported are based on soy production, as beans, bran or oil. Cotton is also present on the export agenda of that Municipality. The distribution of Balsas Municipality exports, according to the type of product, is shown in the following Table 4.2.5.

Table 4.2.5. Export of agribusiness products, in US$ F.O.B., Balsas (MA), 2011

Product	Amount	
	US$ F. O.B.	Part %
1. OTHER SOY BEANS, EVEN CRUSHED	370,006,737	95.9
2. COTTON SIMPLY THRESHED, NOT CARDED/COMBED	15,668,278	4.1
3. SOY OIL, RAW, EVEN DEGUMED	300,001	0.1
TOTAL	385,975,016	100.0

Source: SECEX.

As per the export destination, the analysis of the Table 4.2.6 shows that China, Spain, Holland, Saudi Arabia and Belgium are responsible for more than 90% of the total exported by Balsas, among 17 countries selected. The Figure3 presents a better view of the Municipality international trade situation:

Table 4.2.6. Export of Agribusiness Products, in US$ F.O.B., according the destination country, Balsas (MA), 2011

Destination Country	Amount	
	US$ F. O.B.	Part %
1 CHINA	202,457,568	52.45
2 SPAIN	92,626,748	24.00
3 HOLAND	45,822,618	11.87
4 SAUDI ARABIA	20,759,479	5.38
5 BELGIUM	14,590,029	3.78
6 SOUTH COREIA	4,061,730	1.05
7 VIETNAN	983,501	0.25
8 INDONESIA	977,510	0.25
9 TURKEY	843,125	0.22
10 MALÁSIA	782,470	0.20
11 ARAB EMIRATES	596,733	0.15
12 PAQUISTAN	484,939	0.13
13 THAYLAND	319,261	0.08
14 HONG KONG	300,001	0.08

15 ARGENTINA	140,834	0.04
16 BANGLADESH	121,650	0.03
17 JAPÃO	106,820	0.03
TOTAL	385,975,016	100.0

Source: SECEX.

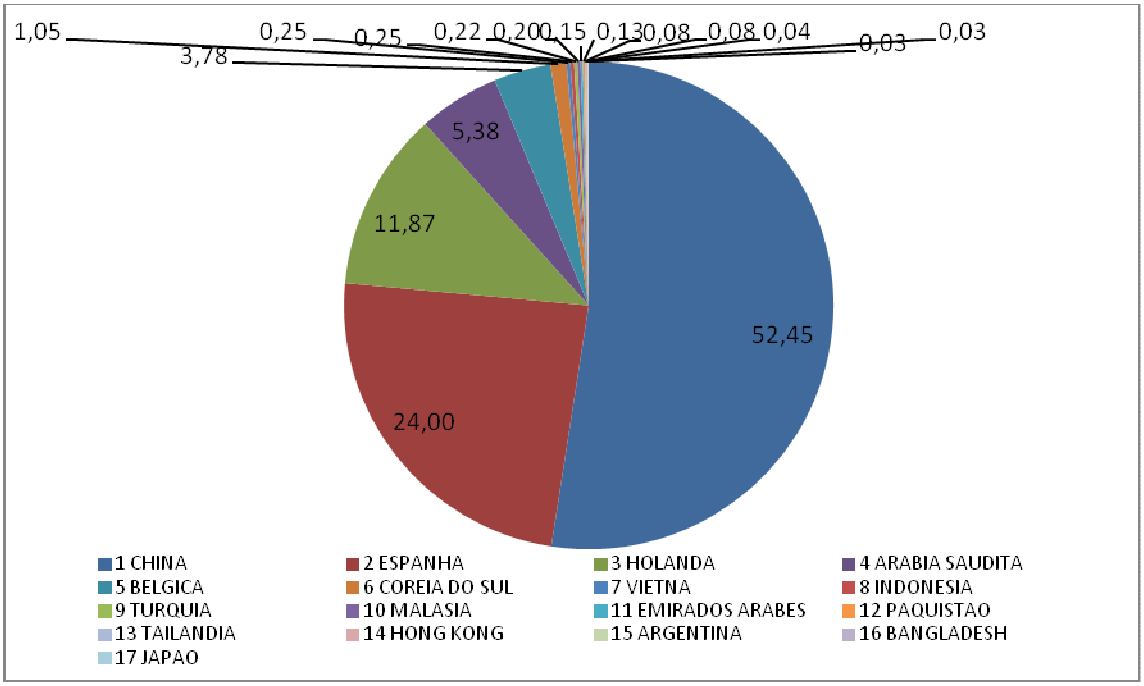


Figure 4.2.4. Distribution of the export destination of Products produced in Balsas Municipality (MA), in 2011.
Source: SECEX.

4.3 Perspectives of Undertakers

The potential and the productivity reality of the Cerrado northern region are a result of the particular productive condition of Tocantins, north part of Goiás and the south of Maranhão, In this context, it is important to do a prospective evaluation of the trade conditions of the agriculture and livestock products of these three locations. So, below it is presented the evaluation of Tocantins, the north part of Goiás and south of Maranhão.

4.3.1 Methodology

In order to collect the field impression, many interviews were made with representatives of institutions and companies that distribute various agriculture and livestock products, with the objective of evaluating the potential and the limits of the Tocantins trade competitiveness. In this context, four environments were considered: production, market, management and institutional. The aspects identified in each environment and its respective criteria of evaluation are presented on Table 4.3.1.

Table 4.3.1: Aspects of competitiveness evaluated according to the environment

ITEM / CONSIDERATION	Low (0-3)	Medium(4-7)	High(8-10)	Observations
PRODUCTION ENVIRONMENT				
. Production System Updating				
. Standardization of Process/Products				
. The use of Advance Practices				
. Access of New Technologies				
. The use of Technical Assistance				
. Control of Environment Impacts				
. Quality of the Product				
. Operational Efficiency				
. Production Capacity				
. Production Idleness				
. Storage Capacity				
. Storage Idleness				
. Conditions of the Transport Prod/Ins				
. Cost of Production Level				
. Cost of Distribution Level				
MARKET ENVIRONMENT				
. Availability of Suppliers				
. Definition of the Buyers				
. Existence of Trade Channels				
. Trade Easiness				
. Presence of Intermediaries				
. Qualified Competition				
. Competitiveness in Prices				
. Suitability of Prices used				
. Level of Informality				
. Expectations about the Markets				
MANAGEMENT ENVIRONMENT				
. Planning Preparation				
. Control of the Process Quality				
. Control of Expenses and Costs				
INSTITUTIONAL ENVIRONMENT				
. Level of Taxation				
. Credit Availability				
. Level of Supervision/Regulation				

(1) Field Impressions

The aspects of Tocantins agriculture and livestock trade can also be evaluated from the impressions of agents related to the product distribution.

(2) Field Results

The impressions on the competitiveness of the main products of the Tocantins' agribusiness, captured by producers and trade agents interviewed, are presented below:

Impressions of the Producers

The vision of the producers of soybeans, corn and bovine cattle interviewed, is that the environment of the market is favorable from the point of view of the supplier's availability, existence of channels and trade facility. However, there are medium difficulties in terms of competitiveness due to prices and informality in some cases. Even though, the expectations over the respective markets are high. In the case of soybeans is due to high international prices; in the case corn because of the poultry industry that is becoming a reality in the State; and in the case of beef is also due to the opportunity of the international trade. The worry lies on taxation that is different in each neighbor state of Tocantins, which

generates differences on costs. Table 4.3.2 brings a synthesis of opinions from the majority of producers of these three products.

Table 4.3.2: Synthesis of opinions over the market of soybeans, corn and cattle.

SOYBEAN/CORN/CATTLE MARKET	Low	Medium	High
. Availability of Suppliers			X
. Definition of Buyers			X
. Presence of Trade Channels			X
. Facility of Trade			X
. Presence of Intermediates	X		
. Qualified Competition	X		
. Price Competitiveness		X	
. Suitability of Prices Practiced		X	
. Level of Informality			X
. Expectations over Markets			X

Regarding the poultry business, the producers say that the expectations on the markets are highly favored by a production integrated system that guarantees the availability of suppliers, trade channels and buyers. The integration can also provide good conditions of competitiveness and prices, besides reducing the number of intermediaries and informal activities. A synthesis of the interviewers' opinion is presented next.

Table 4.3.3: Synthesis of the opinions on poultry market.

MERCADO AVÍCOLA	Low	Medium	High
. Availability of Suppliers			X
. Definition of Buyers			X
. Presence of Trade Channels			X
. Trade Facility			X
. Presence of Intermediates	X		
. Qualified Competition		X	
. Price Competitiveness		X	
. Suitability of Prices		X	
. Informality Level	X		
Expectations over Markets			X

In the fruits production cases, the statements show a distinct interpretation of producers.

The pineapple and melon interviewee declared that in his perception, the market environment for these fruits is favorable in terms of the suppliers, buyers, trade facility and channels. Even in the presence of a medium qualified competition that leads to losses on prices and competitiveness. Besides that the informality level is high, damaging the activity. Even though, the expectations regarding the pineapple market are high. The producers' impressions are synthesized bellow:

Table 4.3.4: Synthesis of the opinions on pineapple and melon market

PINEAPLE/MELON MARKET	Low	Medium	High
. Availability of Suppliers			X
. Definition of Buyers		X	
. Existence of Trade Channels		X	
. Trade Facility			X
. Presence of Intermediates			X
. Qualified Competition		X	
. Price Competitiveness		X	
. Suitability of Prices		X	
. Informality Level			X
. Expectations on the Market			X

The interview with the watermelon producer has shown that, under his point of view, the market conditions of the fruit trade are very favorable in all aspects. Even the nonexistence of informality is a positive fact, as we can notice in the next Table 4.3.5.

Table 4.3.5: Synthesis of opinions on the watermelon market.

WATERMELON MARKET	Low	Medium	High
. Availability of Suppliers			X
. Definition of Buyers			X
. Existence of Trade Channels			X
. Trade Facility			X
. Presence of Intermediates			X
. Qualified Competition		X	
. Price Competitiveness			X
. Suitability of Prices			
. Informality Level	X		
. Expectations on Markets			X

For the banana producer interviewed, the market of this fruit presents average trade conditions, as per suppliers, buyers, competitors, prices and competitiveness. Besides, it was emphasized the existence of a highly informal activity. Nevertheless, the expectation on the banana trade market is very high, as one can notice in the words of the producer presented next.

Table 4.3.6: Synthesis of opinions on the banana market.

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BANANA MARKET	Low	Medium	High
. Availability of Suppliers		X	
. Definition of Buyers		X	
. Existence of Trade Channels		X	
. Trade Facility		X	
. Presence of Intermediates		X	
. Qualified Competition		X	
. Price Competitiveness		X	
. Suitability of Prices	X		
. Informality Level			X
. Expectations on Markets			X

Impression of the Institutions / Companies-Industries

Cooperativa Agroindustrial do Tocantins – COAPA / Agroindustrial Cooperative of Tocantins
Municipality: Pedro Afonso (TO)
Activity: Cooperative of Production
Main Products: Soybean, Corn , Sorghum and Sugarcane

Impressions over Competitiveness

Until 2009, the main production of Pedro Afonso Region was grains. Since then, the implementation of an ethanol and sugar industry located in the heart of the grain production pole has been occupying more space, resulting in the reduction of the area planted with soybeans. The competition among the products derived from sugarcane (ethanol, sugar and co-generated energy) has represented a strong competitor to soybean. Even though, the tendency is the recovery of the soybean production, in the middle term, due to the beginning of such production in Centenário, Recursolânida, Santa Maria e Rio Sono municipalities. The biggest difficulty to expand the soybean area is the amount of investment requires for the

opening of new fields. It is important to notice that the soybean area planted by the cooperators of COAPA had reached 33,500 hectares, but nowadays this number fell to 14 thousand hectares. From the 327 COAPA cooperators, only 85 produce soybean, the others work on family agriculture.

As per the technology of grain production, the chain is already established, and the soybean production uses cutting edges practices. The acquisition of supplies is also facilitated, In this regard the biggest difficulty has been the availability of qualified hand labor.

Concerning soybean production costs and profit, the implementation of high technology is favorable due to good perspectives of market prices, indicated by Chicago stock exchange prices. Even thought, COAPA tries to orientate the reduction of costs through partnership with research institutes. Because of that, the typical soybean production cost is around R$ 1,300.00 per hectare. Among the soybean producers there is an interest in standardize their products, because the technology used by one producer to make 100 hectares of soybean is the same for a producer to make 2,000 hectares. They use the same plant variety, machinery and inputs. The standardization promotes the market.

In the last two years the logistics has become well defined regarding transportation. Before, the soybean was taken to Porto Franco in the border between Tocantins and Maranhão and from there the cargo would be taken by train until São Luis port. With the arrival of the North South Railway, the soybean is now taken to a modal yard in Palmeirante city, near Colinas do Tocantins, reducing the distance in 250km and the transportation cost.

As for credit, Banco do Brasil and Banco da Amazônia offers funds for current expenditures until the harvest. However, due to bureaucracy, COOAPA intervenes in order to obtain advance credit from input suppliers, based on the sales of the soybean that will be planted.

Regarding the taxation level, there is a 2,3% rural tax over soybean (corn for human consumption has ICMS; and for animal feed there is not). Soybean does not result in market competition between producers. If the production is high or low, the price is the same stated by the international market. The only competitor to the Brazilian soybean market is its neighbor country, Argentina, because there, soybean is produced with a cost much smaller than Brazil, for they use less fertilizers and harvest more products. In the case of corn, among many difficulties, there is the necessity to use a high amount of own resources to develop the production. However, those who plant corn have a good productivity and excellent trade conditions, especially if the product is distributed in the Northeast region.

COAPA has a modern storage where grains are classified, impurities and humidity are measured, dried and storage. The aspect that impacts the most the grains quality in Tocantins is the period of the harvest, during the rainy month of March. The storage capacity

of soybean in the Cooperative warehouse is 60 thousand tons. For the cooperators it is enough, and it can also serve a part of the region producers who are not associated. There is a qualified technical team, two agronomists and three agriculture technicians to answer demands of cooperators, and a zoo technician and a vet to take care of the livestock production. Regarding the environment impacts control, some actions are taken to minimize it, such as direct planting and the acceptance of pesticides' package.

BUNGE Açúcar e Bioenergia S.A / Sugar and Bioenergy
Municipality: Pedro Afonso (TO)
Activity: Agri-industry
Main Products:Sugarcane

Impressions on Competitiveness

Sugarcane is a new culture in Tocantins State, implemented in the Pedro Afonso Region only four years ago. And that makes it difficult to find technical assistance, spare parts for the equipments and qualified hand labor for the work. The present qualified hand labor was brought by companies outside Tocantins, such as São Paulo and Goiás.

The sugarcane area planted by Bunge is around 30 thousand hectares, between rented and private land, and approximately 4 thousand hectares are irrigated.

Bunge works with a scheduled capacity of around two million tons of crushing a year. The total storage capacity is 74 thousand cubic meters, 60 thousand cubic meters in the plant, 4 thousand cubic meters at the trans-shipping of Tupirama municipality by the Railroad and 10 thousand cubic meters are kept in São Luiz.

Regarding fees and taxes charged by the State, Bunge receives the benefit of the *Pró-industria* government program, which represents a good fiscal advantage for the activity. Although the tax on ethanol is 25%, the fiscal incentive of the *Pro-industria* makes the investment attractive.

As per the production flow, the company does not find any difficulty, because it uses trucks of companies that buy the production. And also uses wagons of the North-South Railroad. The ethanol produced by Bunge is distributed in the states of Tocantins, Pará, Maranhão, Piauí e Amazonas.

The production costs, when compared to regions where the sugarcane is already well established, are very high, because it depends on production facts external to the State. The expectation is that in the next 5 years, the Bunge of Pedro Afonso will reach the national level. For that, the industry considers a strategic planning for 3, 5 and 10 year periods. In this context, it is important to emphasize that the industry has a long term plan to expand the production and crushing units. The next phase is to double the capacity of the present unit to five million tons.

In terms of credit, the industry has been contributing with the supplier’s production expenditures. However, the expectation is that the producer has an official credit line with the Bank of Amazônia and Bank of Brasil. Nowadays, there is a lack of official credits to cultivate sugarcane in the State, because the banks have not noticed yet the business

opportunity.

The environment impact controls follow the present legislation. There are 25 environmental plans that were agreed, so that the industry could be implemented, and they have been followed up by the industry own environmental sector and competent organizations.

- Cooperativa dos Produtores de Carnes de Gurupi/TO – COOPERFRIGU / Cooperative of the Meat Producers of Gurupi / TO

Municipality: Gurupi (TO)
Activity: Cooperative of Production
Main Products: Bovine meat (beef)

Impressions on Competitiveness

According COOPERFRIGU's vice-president, Aelton Camargo, the industry has nowadays 460 direct employees and a slaughter production of approximately 700 head/day. And around 2,500 pieces of deboning/day are processed. The raw-material comes from the states of Tocantins, Pará and Maranhão and it is supplied by 1,700 cattle producers, among cooperators and non cooperators. They all receive permanent technical assistance from the Cooperative.

COOPERFRIGU is located in Gurupi by the margins of BR 153 and that makes the transport of the products easier, however, it is costly. With the implementation of North-South Railway, the expectation is that the logistic is less costly for the transport of the production, enabling a cost reduction.

The meat production is aimed to the domestic market (50%) and to foreign markets (50%). The Cooperative is able to export to 73 countries, and the biggest client is Russia, followed by China.

Nowadays the biggest difficulty to expand business is the raw-material availability that can standardize the supply. Some producers have associated to each other and are producing through confinement, regulating, thus, the production.

According the interviewee, COOPERFRIGU has set its goals and targets always focused in the socio-environmental responsibility, since its establishment.

- Minerva S/A

Municípality: Araguaína (TO)
Activity: Agro-industry – Slaughterhouse

Main Products:

Table 4.3.7: Main Products.

Product	Destination Location Purpose*	
Bovine meat (beef)	Foreign market (70%) and domestic market (30%)	Trade
Meat and leather derivatives		Trade
Olive Oil (In Araguaína only resale)		Trade
Maquem Potato (In Araguaína only resale)		Trade
Fish (In Araguaína only resale)		Trade

Impressions on Competitiveness

In the technological aspect, the quality and capacity of the production conditions were well evaluated. However, it was emphasized that the raw material becomes rare in the offseason period. So, the industry decided to establish a confinement in Araguaína

municipality and keeps high updating level of technological, research and development of new products and processes.

As per the chain of inputs, supplies and suppliers, the industry difficulties are concentrated in the offseason periods due to the shortage of cattle and the package acquisition, which is produced outside the state (São Paulo). Besides that, it is difficult to obtain hand labor, especially for the deboning process. The industry invests in training for all employees aiming the guarantee of the products quality.

About the internal management, the interviewee mentioned the implementation of a strategic planning. An action plan of the industry is done and a monthly review is carried out in all sector. That helps to increase the operational efficiency and to reduce production costs. He has indicated as high, the value of the electric energy and the freights due to the roads conditions from the rural producer until the consumer.

The interviewee said that, as per the institutional environment, most part f the credits come from outside, through partnerships with private initiatives. About duties, taxes and production fees he considers them costly, and noticed that during the offseason, there is no raw material in the state, and it is necessary to obtain them in other states where taxes are higher, leading to the increase on the production cost.

As for the presence and action of regulation organizations and representative institutions, the supervision is frequent and carried out by various public agencies.

About the competition, in the domestic market there are products from not clear origin that competes with the industry products. In the foreign market the challenge is to balance the price-demand relation, especially in new markets. It is also important to notice that there are few suppliers and many buyers and the contracts present a high level of security.

- JBS S/A

Municipality: Gurupi (TO)
Activity: Processing
Main Products: Leather.

Impressions on Competitiveness

The leather processing unit of JBS, located in Gurupi, receives the leather from slaughterhouses of the South and Southeast part of Tocantins state.

The interviewee stressed that JBS is the largest processing industry of animal protein of Brazil, working in areas of food, leather, biodiesel, collagen and cans. In Gurupi, the unit processes only leather and its byproducts.

In the productive environment the interviewee has declared that Gurupi unit operates at a high technological level, including the use rate of the installed capacity. Difficulties on the access of new technologies and technical assistance were also emphasized as difficulties.

As per the market environment, it was mentioned weaknesses related to the quality of competition and prices due to informal activities. Even tough, the expectation over markets is high. So, the industry operates and considers highly important the planning of activities.

About the institutional environment, the interviewee noticed the existence of government fiscal incentives and a wider necessity of credit, supervision and market regulation.

JBS is located in all continents, with production units and offices, in Brazil, Argentina, Italy, Australia, USA, Uruguay, Paraguay, Mexico, China, Russia among other

countries.

- Cooperativa Agropecuária Tocantinense (COOPERNORTE) – Tocantins Agriculture and Livestock Cooperative

Municipality: Paraíso do Tocantins (TO)
Activity: Cooperative of production
Main Products: Milk and derivatives, ration and mineral supplements

Impressions on Competitiveness

Regarding the productive environment, the interviewee has declared that despite the high quality of the product, the production system developed is of an average quality in terms of technological updating, standardization, practices, efficiency and operational controls. This means that one has to work with a high idleness capacity in the production, storage and consequently with high production costs.

Such average environment in the production results on an average condition in the markets, especially in terms of competition and competitiveness capacity. Besides that, the production is vulnerable to the large existence of different players and the informal production.

The fragile situation of the market is aggravated by the low use of planning and control of processes, expenses and costs.

The institutional environment is also complicated by the low availability of credit and high inspection and taxation.

- Vitafruta

Municipality: Pedro Afonso
Activity: Agro-industry
Main Product: Sugarcane

Impressions on Competitiveness

VITAFRUTA produces pineapple and sells it at CEASA located in the South Industrial Sector of Palmas / TO.

VITAFRUTA industry has a total of 3,000,000 plants of pineapple cultivated in a total area of 130 hectares. The farms are located in Porto Nacional and Pium, 60 hectares planted in Porto Nacional / TO, 45 hectares in the São João Irrigated Fruit Cultivation Project, 30km distant from Palmas, in Porto Nacional Municipality/TO and 25 hectares in Pium Municipality / TO.

Pineapple is a culture that takes 15 to 17 months to be harvest and the destination of the whole production is the domestic market, for up to this moment, the industry does not export. Until now, the venture has facing difficulties on selling the pineapple in the capital, Palmas. The production is sent to wholesalers of other states and the prices vary from R$ 0.40 to R$ 3.00 per fruit.

VITAFRUTA also buys fruits outside the state and sells locally, fruits from producers of various states, such as: Bahia, Minas Gerais, Rio de Janeiro, Paraíba and Goiás.

- Nova Agri – Armazenagem e Escoamento Agrícola / Agriculture Storage and Flow/Transport

Municipality: Santa Rosa do Tocantins (TO)
Activity: Intermediate
Main Product: Grain storage.

Impressions on Competitiveness

Nova Agri is a company of storage and transport of agriculture products. The area between the farm and the port is structured to offer all kinds of logistic services such as: silos for grains, storehouse for bags and bales, road-railway transhipment, and a terminal of containers.

Nova Agri is essentially a service provider company, that does not buy or sell, only receives, standardize, processes, keeps and sometimes transports the production. According the interviewee, the company is not a trading, because it does not have a harbor/port structure for embarkation. However the company is already working on that.

The company works following planned steps of a logistic flow: product, freight, storage, port terminal and retro port terminal. It also offers integrated logistic consulting, performing the transport flow in all steps: storage, standardization, transhipment, integrated logistics, financing services.

- Meridional – Revenda John Deere – Resale John Deere

Municipality: Santa Rosa do Tocantins (TO)
Activity: Supply of inputs
Main Products: Machinery and e implements

Impressions on Competitiveness

The company working area is the whole Tocantins state. Its activity started in the State in 2006 with one store and now it has 6 units.

The sales of trucks are distributed as follows: 60% of machinery with a power higher than 110HP, used mostly in the livestock business, and 40% aimed mostly to agriculture (over 110HP) that demands a more advanced technology. The company offers technical assistance with its own team, besides developing training for the buyers.

The regions, target of the Study, are supplied by the stores of Porto Nacional (Southeast of the state) and Lagoa da Confusão (Southeast Region). In the market, the level of competition is high, considering that similar businesses have the same number of stores in the State. According to the interviewee, 580 tractors, 35 combine harvesters and 40 planting machines were sold in 2011, representing a 20% increase a year of the sector.

The sales of the machinery are made, mostly, around 95%, with BNDES banking financing, through Bradesco, responsible for the financing transaction. The other 5% are transactions done with cash. In these cases, the financing agent requests the environmental license of the rural properties.

As for taxation, it is difficult to compete with prices of Goiás state, which are 5% less expensive.

- Agroquima Productos Agropecuários LTDA / Agroquímica Agriculutre/Livestock Products LTDA

Municipality: Araguaína (TO)
Activity: Input Supplier

Main Products:

Table 4.3.8: Main Products of Agroquima.

Product / Inputs Agroquima Araguaína	Destination Location Purpose*	
Seeds agriculture and pastures	Tocantins	Grains and Pastures
Herbicide	Tocantins	Pastures and crops
Fungicide	Tocantins	Pastures and crops
Mineral supplements	Tocantins	Bovine culture
Endectocides	Tocantins	Grains and pasture
Vaccines	Tocantins	Prevention of diseases
Machinery and implements	Tocantins	Pastures and agriculture
Insecticide	Tocantins	Pastures and agriculture

Impressions on Competitiveness

Regarding the quality and capacity of the productive conditions, the interviewee believes that the productive condition still has a lot to improve due to the little application of new technologies in the rural area. He also claims that it is easy to absorb new technologies in the company. In this case, in terms of research and development of new products and processes, the information is spread quickly and that enables the inclusion of new products launched in the market.

The interviewee has stated that the access to supplies is easy, due to the existence of a large chain of suppliers that provides a good level of services. The biggest difficulty is qualified manpower, which is not much available.

The company's management considers and follows its strategic planning. And a review on the company's action plan is carried out monthly. They work to improve the operation and achieve targets indicated by the planning, in order to reduce costs.

In the institutional environment, financing is considered suitable for the company, but it is believed that for the rural producers the access to financing is lower (medium level). Tributes, taxes and fees charged over the production/sales are costly, increasing the product prices. The inspection of the regulation agencies happens frequently (ADAPEC, MAPA, PROCON, CREIA, CRMV, Bomb, Labor Ministry, Rural Unions ASBRAN, Secretariat of Finance, Environment Regulation Agencies).

The competition in the market relations is high. There are few suppliers and many buyers and the contracts offer an average security level.

(3) Final Considerations

Generally speaking, the availability of suppliers, buyers and trade channels is high, and that facilitates the production and transport of the Tocantins agriculture and livestock production. In this regard, it is an advantage that the local road transport matrix spreads transversely from the Highway BR 153, Belém-Brasília, reaching all the State productive regions. With the arrival of the North-South Railway, this advantage is multiplied. If the Araguaia-Tocantins waterway is finally implemented, the scale achievements would be more significant, due to the possibility of a better modal composition.

The operational advantage provided by the market environment is also appropriated in terms of commercial results. The general observation is that competition is considered medium and the price competitiveness is medium-high, fostering the obtainment of good finance results. It is important to notice that the producers and workers interviewed are concerned with the present informality level on the products trade. Another mentioned aspect

is the possibility of competition due to the production that comes from South Maranhão and North Goiás Regions.

The analysis of trade aspects, on the institutional context and the producers and companies interviewed reveals favorable expectations on the commercial activity related to products from the productive matrix of Tocantins State. This understanding was emphasized by producers and traders of agriculture and livestock products. This can be considered a sign of trust on the state capacity to expand and improve the trade and productive environment of Tocantins agribusiness.

4.3.2 North of Goiás

(1) General Conditions

The North Region of Goiás is composed by three micro regions that border Tocantins: São Miguel do Araguaia, Porangatú and Chapada dos Veadeiros. In the analysis of the north part of Goiás, the micro region of Ceres was also considered, due to its influence on the others.

(2) Field Results

In order to know the commercialization conditions of the North part of Goiás, interviews were carried out with institutions/companies and agriculture/livestock producers working in that area. The results are as follows:

- COOPERMAF / Goiás

Municipality: Luiz Alves/São Miguel do Araguaia (GO)
Activity: Cooperative of production.
Main Products: Rice, soybeans, watermelon, and cabotia pumpkin

Impressions on Competitiveness

In the interviewee view, the productive environment developed in the region is, in general, considered of a high technical capacity, due to its updating and standardization of processes and products, and because the access to new technologies, including partnerships with EMBRAPA. The environmental impacts control is also technically high. However, problems with transport and/or storage increase the production costs, resulting on the competitiveness decrease.

About the market environment, the statement is that the conditions and the expectations are average, when considering the presence of suppliers, buyers and trade channels. The existence of the intermediate of cooperatives has contributed to keep informality on a low level and preserves the quality of market and competitiveness in terms of prices.

The favorable perception over the cooperative production is sustained by the good practice of planning and cost and quality control. On the institutional scope, the availability of credit, inspection and behavior regulation provided by the public sector are seen as positive aspects. The high taxation level, on the other hand, is considered a negative aspect.

- BRASMILHO S.A.

Municipality: Goianésia (GO)
Activity: Intermediate of Seeds

Main Products: Corn and sorghum

Impressions on Competitiveness

The interviewee considers good, the conditions of trade and competitiveness of the corn and sorghum seed production in the Region.

As for the productive environment, there are concerns related to idleness in the production and the costs of production and distribution. The market is very favorable to the seed producers in all aspects.

Due to the necessity of a specialization in the seed production, the management aspects are highly considered. In the institutional level, credit, inspection and taxation are high.

- JBS/AS

Municipality: Mozarlândia (GO)
Activity: Agroindústria Frigorífica – Slaughte house agro-industry
Main Products: Fresh meat

Impressions on Competitiveness

The interviewee states that the productive aspects of the production environment involving system, standardization, technical assistance and product quality are very suitable.

However, the market environment is considered average, when focusing suppliers, trading channels, price competitiveness and, expectations. The interviewee emphasizes that the low quality of the competition is a market gap.

In terms of management and institutional aspects, the evaluation is also good when analyzing planning and cost and processes controls and the credit availability. The taxation and inspection on the activity are considered high.

- Fazenda Vale do Sonho - Waldemar Rodrigues Silva / Vale do Sonho Farm

Municipality: São Miguel do Araguaia (GO)
Activity: Cattle
Principal Product: Cattle for Beef

Impressions on Competitiveness

The region where the rural property is located – Vale do Sonho farm is considered a Region of livestock, but it is starting to grow cultures such as soybean, leasing land by an American group. There is also near the region, the Irrigation project Luiz Alves with soybeans, watermelon and beans.

The producer says that he develops a high technological level of the extensive livestock production of bovines in pasture. He also raises and re-raise animals with the supplementation of sorghum silage during the dry season. The producer considers the production cost high, however he emphasizes that it is cheaper than Tocantins production, because of the 4% tax difference.

The veterinarian and agriculture supplies, as well as technical assistance are obtained in São Miguel do Araguaia, at a rural products store. The payment of the products is

calculated according the cattle price.

The obtainment of financing resources for expenses and investment is facilitated because the financing agents have a good disposition to release funds.

Nowadays, there is no slaughterhouse operating in São Miguel do Araguaia, so the trade is done through intermediate brokers (offices that buys and sells cattle) that represents Friboi industry, located around 200km distance, in Morzalândia-GO. So, the producer emphasizes that there are difficulties to trade his animals, due to the lack of competition to sell, because there are no slaughterhouses in the region. The informal trade of animals is low in the region and the risk for the producers is high.

According to Mr. Silva, the producers of the Region expects that the export of meat expands, improving the commercialization.

The management of the property is done by the producer himself, who controls activities such as animal husbandry, rent and reform of pastures, acquisition of inputs, buying and selling of animals, among others. The producer has an accountant to control the property financing activities.

4.3.3 South of Maranhão

(1) General Conditions

The South Region of Maranhão is composed by three micro regions that border Tocantins: Imperatriz, Porto Franco and Gerais de Balsas.

(2) Field Results

In order to know the trade condition of South Maranhão, some interviews were carried out with producers and agriculture/livestock industries that works in that area. The results are as follows:

- BUNGE Food/ Fertilizers

Municipality: Balsas (MA)
Activity: Input supplier
Main Products: Fertilizers and soybean

Impressions on Competitiveness

Bunge in Balsas does not produce nor industrializes products. It only trades grains and fertilizers.

As per the productive environment, the industry considers high the updating and standardization of the production system and the use and search of advanced practices, with the technical assistance support. This results in high quality products and operational efficiency. However, the environmental control is average.

The market environment is well considered, regarding suppliers, buyers, trade facility and price adjustments. However, it is noticed a strong presence of competitors and informal trade. These observations results in an average expectation in terms of sale's market.

It is not noticeable difficulties in the management and institutional environments, except for the taxation that is considered high.

- .Fazenda Santa Marta Fam

Municipality: Açailândia (MA)
Activity: Producer

Main Products: Eucalyptus tree.

Impressions on Competitiveness.

The farm located in Açailândia Municipality, around 30km from downtown, city hall, belongs to the Group Queiroz Galvão and is dedicated to silviculture with eucalyptus reforestation.

South of Maranhão has today, more than 100,000 hectares of eucalyptus planted, and the group has 42,000 hectares planted in various farms located in many Municipalities of Maranhão.

According to the interviewee, Engineer Bitencourt, in 2012 another 58,000 hectares will be planted in Maranhão. This significant growth is due to the fact that besides the steel makers of iron pig, the paper and cellulose industry, in Imperatriz, will also consume eucalyptus, boosting the market in the Region. The industry Suzano Papel and Celulose has around 16,000 hectares planted and in 2012 it intends to plant another 23,000 hectares.

The plantation can be done during the whole year using techniques (gel) to retain humidity in the area. The average productivity in the region is 300 m³ of Wood/hectare/7 years and the average cost of production is estimated at R$ 3,500.00/ha.

Another relevant aspect is that there is no trade market defined for wood. Those who produce wood do it for their own use. There are only around 1% of private people that plant trees with commerce objective. According the interviewee the present situation of the large producers is described on Chapter 4.3.9.

Table 4.3.9: Situation of the large producers of South of Maranhão.

Group of producers	Planted area (ha)	Area to be planted/year (ha)
Suzano Papel Celulose (MA)	16,000	23,000
Grupo Queiroz Galvão (MA)	42,000	4,500
Viena Siderúrgica (MA)	39,000	3,000
Grupo Ferroeste (MA)	1,500	26,000
Sc Agroflorestal (Ma)	1,500	100

- Fazenda Cajueiro Agropecuária LTDA - Farm

Municipality: Balsas (MA)
Activity: Inputs supplier, producer and wholesalers
Main Products: soybeans, corn, bean, fruits, fresh water fish farm

Impressions on Competitiveness

The interviewee considers that all productive aspects show a high competitive capacity, except by some idleness in the production and storage.

In terms of market the considerations are also good, especially on trade channels issue. The understanding about prices is that the distribution is average, but satisfactory. However, the expectation over the markets is as high as possible.

Due to favorable expectations, it is imperious to keep the management in high concern and have the institutional aspects on ones side, despite the elevate taxation indicated.

The Industry is creating a quality model searching for the improvement of the administrative organization, developing programs of hand labor qualification, measurement of operational losses, management of the seed quality, satisfaction of client and respect to the environment. Aspects that reaches high indexes of quality: 0% of re-buying, 0% of discharge, 0% returns and low number of complaints.

- CEAGRO

Municipality: Balsas (MA)
Activity: Input supplier, producer and wholesaler, trading
Main Products: soybean, corn, millet e sorghum

Impressions on Competitiveness

The company has started its activity in 1995 in Balsas city, Maranhão State,. By offering innovative alternatives of negotiation, it has expanded its activities to the neighbor states of Tocantins and Piauí. This area of intervention of Ceagro became known as MAPITO. In 2010 it started its business in the States of Goiás, Mato Grosso and Bahia.

It works on the distribution of supplies, production of inactivated soybeans in grains and soybeans in bran, production of soybean seeds, services of grain storage standardization, road transport of cargo, commercialization of soybean and corn and in the grain production and export.

CEAGRO has a capacity of production, buying and storage of more than 200 thousand tons of grains, and has 18 units spread in all MAPITO territory (administrative units, grains storage unit and transhipment unit, among others).

According to the interviewee, CEAGRO has competitive advantages because it is a Brazilian agribusiness platform acting integrated, with a wide geographic diversification reaching the main productive region of agriculture commodities.

The company has a wide portfolio of activities, covering many segments of the agribusiness value chain such as trade of supplies, agriculture production, commercialization of its own production and of others, industrial processing, and operation of domestic logistic.

The geographic diversity of performance minimizes the potential regional climatic risks and allows the diversity of cultures, what leads to a flexibility in the definition of strategy with cultures' management, increase of the productivity, consistent profitability, as well as the increase of income and operational margin. In face of that the expectation over the market results are high.

4.3.4 Strategic Evaluation of the Field Results

The results of the interviews carried out with producers, industries and institution in the Northern Region of Cerrado also enable a strategic approach under the selected environment of competitiveness. This way of interpreting data has the advantage of offering to the reader a perception of the gaps and potentialities mentioned by the interviewees in their area of work and business. So next, it is identified and briefly discussed the main aspects of competitiveness, according the Cerrado productive regions, according the available data.

(1) Productive Capacity

The statements of the interviewees in Tocantins emphasized that the conditions of the main grains production (rice, corn and soybeans), meat (bovine and poultry), fruits (pineapple, watermelon and banana), sugar-cane and caw milk, represent a high potential. This understanding took into account the updating of the productive system, the process standardization, the use of advanced practices and the access to new technologies. And that leads to an efficient production with an elevated control of processes and of environmental impacts, resulting on high quality products.

Nevertheless, the interviewees have expressed some worries over the production costs, considered average-high, due to the high level of idleness in the production and in the storage. Besides that, the average condition of the transport in the obtainment of inputs and products' flow were mentioned as significant gaps, contributing to cost increase. The strengthening of the transport multimodality, combined with the highway BR 153 (Belém-Brasília), North-South Railroad, Tocantins waterway and airports of Araguaína and Palmas are seen as essential by the interviewees

An additional aspect emphasized by the interviewees in Tocantins was the competition of the production coming from the productive regions of north of Goiás and south of Maranhão. The interviewees in these regions have stated similar opinions about the situation.

The visible differences stressed by the interviewees were the low production and storage idleness of products, especially soybeans, and the local conditions of transportation, due particular situations in the North of Goiás and South of Maranhão. This favors the productive capacity in these Tocantins neighbor regions.

(2) Competitive Capacity

Generally speaking, the competitive capacity of Tocantins for the main agriculture/livestock activities was considered high by the interviewees, who were optimistic in relation to market results. This view has considered, besides the productive aspects mentioned before, marketing, organizational and institutional aspects. In this context, the evaluation was highly positive, regarding the availability of trade channels and facilities. The availability of credit was considered positive, as well.

For some few activities it was emphasized the existence of informality as one of the market's fragility with negative competitive consequences.

Another aspect of concern was the high level of taxation in the productivity and commerce activities, increasing costs and reducing the competitive capacity of local products.

Regarding the North of Goiás and South of Maranhão regions, the respective local interviewees have indicated an average competitive capacity. Such situation is a result of the high level of direct or indirect taxation of the agriculture/livestock production.

In face of the gathered information from interviewed people it is possible to say that the analyzed Northen Region of the Cerrado has significant productive and competitive potential, especially in the production of grains, meat, fruits, sugar-cane and milk, despite the operational and logistic differences among the micro regions that composes the region. However, the region presents good expectations on production and market, being attractive to those interested in investing, especially in irrigated areas, in various places.

4.4 Zone of Processing for Exportation - ZPE

The Export Processing Zone (ZPE) is a free trade area with foreign markets, aimed to the installation of industries that produces goods to be sold abroad. It is considered a primary zone for customs control purposes. (MDIC, 2009)

The main purpose of a ZPE is to attract foreign investments. And the expectation is to increase the competitiveness of Brazilian exports and the strengthening of the payment balance. Regarding the domestic market the idea is to contribute for the creation of jobs, technological diffusion, reduction of regional unbalances and social and economical development of the country.

The ZPE operation is based on the concession of different types of incentives. In the fiscal scope, they are aimed to the acquisition of goods and services in the domestic and foreign markets. The incentives reach specially the IPI, COFINS and the PIS/PASEP. As per the exchange rate, the industries established in the ZPE are free from following the limits fixed by the National Finance Council regarding the maintenance of foreign currency obtained from exports. So, the industries are not obliged to change to Reals, the foreign currency received for exports. Besides that, the industries can also ask for administrative incentives that allow them to operate without license or authorization from federal agencies, except the controls such as sanitation, national security interest issues, and environment protection. Finally, the legislation facilitates the industries to obtain processes, equipments and researches that can increase their competitiveness.

To create a ZPE, the State or the Municipality has to provide the infrastructure and services of public utility needed to the demand created by the activity developed in the ZPE, such as transport, electric energy and public security. The administrator must bear the costs of the installation and equipments needed to the control activities, inspection and local customs management. It is important to remember that products produced in ZPEs do not represent a negative impact to the national industry.

In the case of industries that want to participate at the ZPE, they must notice that due to its imminent export character, the businesses installed in a ZPE must guarantee and keep, for a calendar-year, a gross income from export to the foreign market of at least 80% (eighty percent) of its total gross income of sales of goods and services. That means, the trade in the domestic market can only represent 20% (twenty per cent) of the industry gross income. It is also important to remember that the sales for the domestic market will be the base for the incidence of all the other due taxes, and the industry will not be able to build a branch industry or be part of another industry outside the ZPE area, even if it is to obtain tax legislation incentives.

In face of the operational and institutional context, it is important to evaluate the advantages and disadvantages of participating on a ZPE. The advantage are all kinds of incentives, the simplification of operations and the flexibility of procedures to import machinery, devices, tools and equipments, including used ones. Also, comparing to other regimes, the level of trust is higher for investors, once they are not subjected to revocation or changes, and the minimum term is 20 years. The disadvantages are the restriction to obtain other incentives, besides the specific one allowed to ZPE, and to operate in the domestic market.

The MDIC indicates that the ZPE success will depend on the integration between the established infrastructures, the simplification of administrative procedure and of juridical security, and productive and social strategic actions of the regions where they are installed.

4.4.1 ZPE in Tocantins

The ZPE in Tocantins was created by the Decree N° 98.123 of 6/9/1989 and is located in the Araguaína Municipality with a total area of 300 hectares, by the margin of the highway BR-153. However, the infrastructure was never effectively out into operation.

Recently in the tentative to activate the ZPE a partnership was signed between the Federation of the Tocantins State Industries (FIETO), the State Government, and the Brazilian Association of the Export Processing Zones (ABRAZPE).

In the scope of the partnership FIETO will be responsible for the mobilization of businessmen regarding the advantages of the reactivation of the Tocantins ZPE. The

ABRAZPE understands that the area gives juridical security to national and foreign investments and stimulates the export of industrialized products and, for that, it offers a package of incentives, fiscal, exchange rate and simplified administrative procedures, valid for 20 years and expandable for other equal periods. The State Government sees ZPE as an opportunity to place Tocantins products at the reach, specifically, of Asian markets and to integrate the market through the North-South Railroad and waterways platforms.

Generally speaking, the Tocantins ZPE, especially in Araguaína, represents a significant competitive advantage for the State. First due to its institutional conditions and, secondly due to its location favored by the multimodal road junction composed by the highway BR 153, the North-South Railway, local Airport and, whenever available, the Tocantins waterway. Another positive aspect is the shorter distance and facility to reach the ports Itaqui in Maranhão, and Vila do Conde in Pará.

CHAPTER 5 REGULATORY FRAMEWORK

5.1 Environment

5.1.1 Mechanism

In the Brazil legislation, environment is “the set of conditions, laws, influences and interaction of physical, chemical and biological nature, which allows, shelters and governs life in all of its forms” (Federal Law 6938, as of August 31, 1981, art 3, I).

The environmental management of agribusiness activities shall ensure, in addition to those actions intended to the prevention and mitigation of the impacts of the activities, the conduction and compliance with all the conditions set forth by environmental agencies to obtain previous license (LP), Installation license (LI), Authorization for the Suppression of Vegetation (ASV) and Operation license (LO).

To obtain the environmental licenses of activities using environmental resources or which can potentially cause environmental degradation, environmental studies are required. Law 6.938/81 set forth the National Environmental Policy and has one of the environmental licensing instruments detailed by Decree no. 99.274/90 in a logical sequence of licenses issuing.

CONAMA Resolution no. 237/97 set important definitions such as “environmental studies” “every and all studies related to environmental aspects related to the location, installation, operation and expansion of an activity or undertaking”, also defining the competences for the conduction of the licensing process. The basic guidance for the elaboration of the EIA/RIMA is provided by CONAMA Resolution no. 01/86.

There is also the requirement for the conduction of public hearings in the environmental licensing process, after the elaboration of the EIA/RIMA, as the phase of evaluation of environmental impacts, aiming to the participation of the community in the decisions about the process.

5.1.2 Federal Environmental Licensing

The environmental licensing is a legal obligation prior to the installation of any undertaking or activity potentially polluter or degrader of the environment, and in the federal level it is conducted by the Brazilian Institute of Environment and Renewable Natural Resources – IBAMA.

This obligation is shared by State Environmental Agencies and by IBAMA, as members of the SISNAMA (National Environment System). IBANA mainly performs the licensing of major infrastructure projects that involve impacts in more than one state.

The Ministry of Environment has recently issued the Opinion Report no. 312 about the state and federal competence for licensing, having the impact coverage as basis.

5.1.3 Environmental Licensing in the State of Tocantins

The execution of public policies to address the preservation and conservation of natural resources is one of the competences of the Nature of Tocantins Institute (Naturatins). As the environment inspecting body of the state government, it issues environmental licenses, for the prevention, control and monitoring of environmental damages.

The state Regulatory Framework was formed with the promulgation of Law no. 261, as of February 20, 1991, that stipulates the Environmental Policy of Tocantins State and creates the State Environmental Policy Council, called State Council of Environment of Tocantins – COEMA/TO, according to Law 791, as of November 22, 1995. COEMA/TO Resolution no. 07, as of August 09, 2005: "Provides for the Integrated System of Environmental Control of Tocantins State." – SICAM, instituted within the scope of Nature of Tocantins Institute scope – NATURATINS.

SICAM defines management mechanisms to address the control of natural resources use, in compliance with public Environment policies (Brown Agenda), Forest policies (Green Agenda) and Water Resources policies (Blue Agenda). SICAM has the objective to define and integrate procedures and routines of control to rule and instruct the reception of applications, according to the legislation.

Through the registration of service provider, obligatory for technical responsibility of the elaboration of studies and projects, as well as the environmental monitoring and execution, Naturatins has 365 registered technicians and companies (2010 data).

In the State of Tocantins, COEMA/TO Resolution no. 07/2005 creates a system to integrate procedures of environmental licensing and regularization of activities, where the classification of the undertaking per size and area is done.

The Nature of Tocantins Institute – Naturatins provides the Terms of Reference for the elaboration of environmental studies for the licensing of highway paving works in its website, highlighting the compliance with CONAMA Resolution no. 01/86, also highlighting the following general guidelines:

- Elaboration of environmental diagnosis considering the physical, biotic and socioeconomic environments;
- Inclusion of technological and location alternatives of the project;
- Indication of governmental plans and programs;
- Definition of direct and indirect influence area of the project;
- Identification and appraisal of environmental impacts generated at the implementation and operation stages;
- Definition of mitigating and compensatory measures;
- Proposal of environmental follow-up and monitoring programs.

The classification of activities related to agribusiness, to meet the requirements and to fill out the forms to start the proceedings, are as follows:

- Group 02 - Industry
- Group 03 – Agriculture and Livestock Husbandry
- Group 04 - Irrigation
- Group 05 – Aquiculture
- Group 13 – Forestry

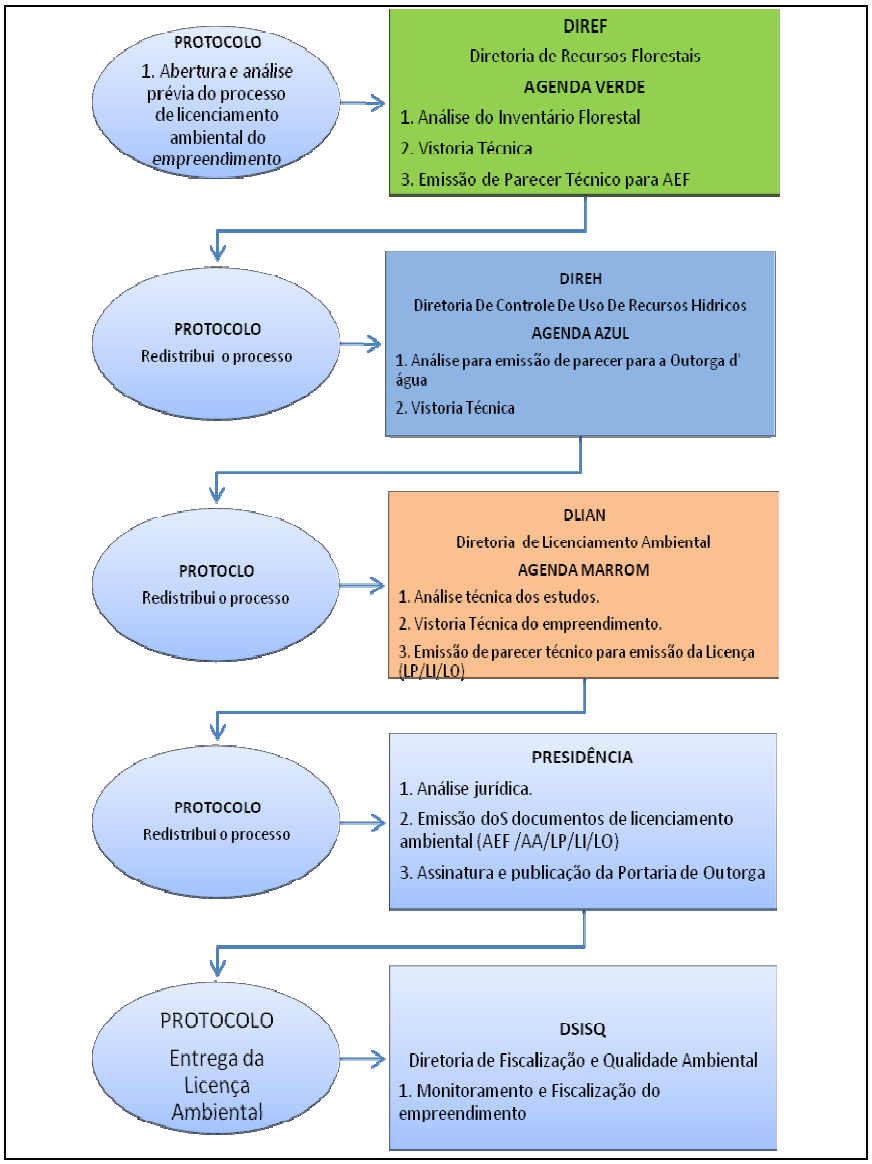


Figure 5.1.1: Flowchart of environmental licensing procedures in Tocantins. Source: Survey

The legal guidance regarding the socio-environmental development of Tocantins is also based on decrees, resolutions of councils and normative instructions. As an example, the following bodies were created: State Council of Water Resources (Decree 637/1998) and the Environmental Education Commission (Decree 866/1999), in addition to the institution of the Integrated System of Environmental Control of the State (Sicam) through Coema resolution no. 07/2005 of the State Environmental Council (Coema), among other measures regarded as important.

The State Council of Water Resources, a consultative and deliberative body, connected to the State Secretariat of Planning and Modernization of the Public Management – SEPLAN, which has the aim of promoting the articulation of water resources planning with regional, municipal planning and users; to arbitrate in the last administrative level the conflicts existing among Water Basin Committees, among others.

The action of Tocantins State Prosecution Office – MPE, through the Environment Prosecution Office, essential body for the inspection and defense of diffuse and collective interests, through its specialized sections, and the activities of Tocantins State Environmental Police – CIPAMA, connected to the Military Police of Tocantins State, are also highlights.

5.1.4 Environmental Licensing in the State of Goiás

The Secretariat of Environment and Water resources – SEMARH, instituted by law no. 12.603/95, with amendments introduced by law no. 13.456/99, and then by law no. 14.383/02, is responsible for formulating, coordinating, articulating and executing the state policy of environmental resources management and protection and the management of water resources.

Any economic activity using Natural Resources shall render accounts to the Environmental Agency of Goiás, connected to SEMARH. According to Law 16.272/2008, the Environmental Agency was extinct and its services were incorporated by the Secretariat of Environment and Water Resources (SEMARH), which started to be responsible for the formulation and execution of the state environment policy, protection of ecosystems, of water and mineral resources, of flora and fauna, and for the performance of the police power on the activities causing environmental impact (text updated by Law no. 17.257, as of January 25, 2011).

The State Water Resources Plan is also the responsibility of SEMAHR, as well as the administration of the supply and grant of use right, for all purposes, of water resources (superficial waters and groundwater) under the domain of Goiás State.

The State of Goiás has the State environment Council – CEMAM, created by Law no. 12.612/1995, which has the purpose of deliberating about regulatory rules and techniques, standards and other measures of operational measure for the preservation and conservation of the environment and of environmental resources. It also has the State Water Resources Council – CERHI, created by Law no. 11.414/1991, regulated by decree no. 3.608/1991, and reinvigorated through Decree no. 6.999 of 23-09-2009.

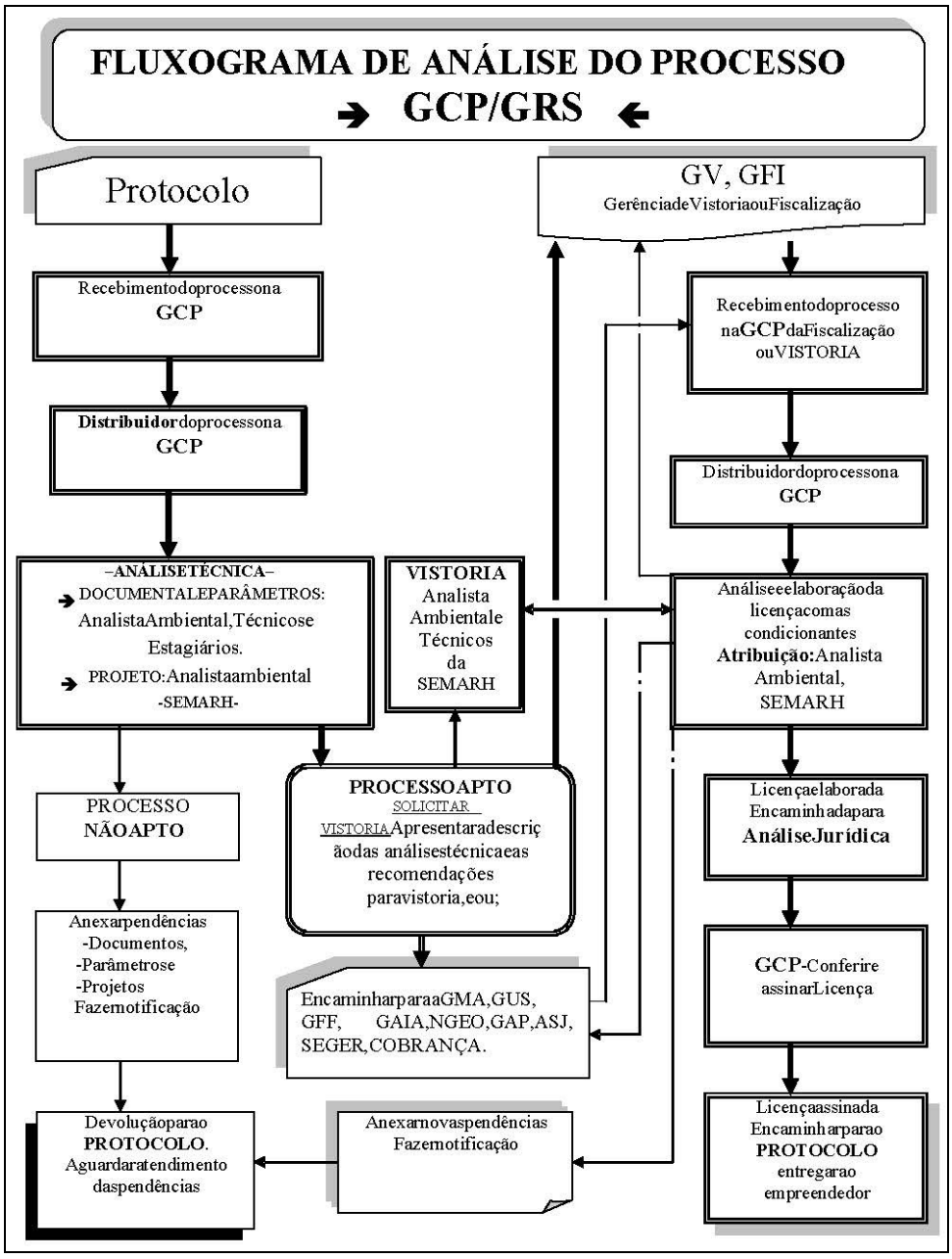


Figure 5.1.2: Flowchart of environmental licensing procedures in Goiás.

5.1.5 Environmental Licensing in the State of Maranhão

The importance of the environmental licensing is highlighted in specific legislation in Maranhão, in addition to the Federal Constitution, in federal law no. 6.938/81 – National Policy of Environment, and also in State Law no. 5.905/92 – Environmental Code of Maranhão State. There are other equally important legislations:

- Decree no. 13.494 – November 1993 – regulates the Code of Environment Protection of Maranhão State.
- Law no. 5.405 – April 1992 – Code of Environment Protection of Maranhão State.
- Law no. 8.528 – December 2006 – Provides for the Forestal Policy and the Protection to Biodiversity in Maranhão State.

- State Law no. 8.149/2004, defines rules for the use of water resources.

The State Council of Water resources – CONERH was regulated by decree 27.319, as of April 14, 2011, and is the upper, collegiate, deliberative and normative body of the State System of Water Resources Management in Maranhão.

5.1.6 Water – Mechanism, Code of Waters

Irrigation of agricultural crops is the economic activity that most consumes water due to the high losses caused by evapotranspiration. In worldwide terms, agriculture uses 69% of the water available, while industry consumes 23% and the residences, 8%. In developing countries, the use of water by agriculture already reaches 80% [World Bank (1994)].

Therefore, the management of water resources, through the hydrographic basin has a key role in the environmental management, because there is the assumption that water is an indicator used for modeling simulations. It is possible to reproduce the hydraulic and environmental functioning from a technical basis: information on the appropriation (use and pollution) of water, and physiographic characteristics of the basin and the water body itself.

In Brazil, the first experience of water resources management started in the 30´s, and was connected to the agricultural issue: in 1933, the Directorate of Waters was created, afterwards renamed as the Service of Waters, in the Ministry of Agriculture. Then, in 1934, this service was transferred to the structure of the National Department of Mineral Research (DNPM). Through this transference, the Code of Waters was published, and is in force to date.

The Code of Waters was established by Decree no. 24.643, of 10/07/34, and like other legal instruments that rule the activities of the sector, result from a water management model guided by types of use.

From the promulgation of the 1988 Constitution, various new aspects regarding water management were introduced, and in relation to the Code of Waters, the new Constitution modified it a little, and the most important alterations was the extinction of the private domain of water, in some cases provided for in the code. The new Constitution attributed a special condition to the water resources: in its art. 20, §1, it determines:

> *"It is ensured, under the terms of the Law, to the States, Federal District and Municipalities, as well as to Direct Administration Bodies of the Federal Government, the participation in the result of the exploitation of petroleum or natural gas, of water resources for purposes of electric energy generation, and of other mineral resources in the respective territory, continental platform, territorial sea or exclusive economic zone, or financial compensation for such exploitation."*

Another important determination of the Constitution was the determination of the Federal Government competence to institute a national water resources management system and to define criteria for granting water use rights (art. 21, item XIX). It also defines that the competence to legislate on water is exclusive of the Federal Government, although the Federal government, states, municipalities and the Federal District have common competence to record, follow up and inspect the concessions of water resources use rights.

In January 1997, Law 9.433 was finally sanctioned. It establishes the National Policy of Water Resources, which incorporates principles, rules and standards of water management, based on the main aspects of the systemic model of participatory integration, which requires specific legal instruments for its implementation. At this stage, it is not possible to leave aside the instrument of water use granting, mechanism through which the federal and state

governments, in which domains waters are found, are willing to promote their proper use from the viewpoint of the society in general.

With the law, the use of water has to be authorized through a grant. Currently, it is still difficult to implement the system of penalties or restrictions for sanitation companies, industries or rural properties that discharge their wastes into water bodies. The big users are those who practice the indiscriminate use, along with waste.

The instruments that Law 9.433 has defined as necessary for the good management of water use are as follows:

- National Plan of Water Resources – consolidates all the master plans of water resources of each hydrograph basin, and its elaboration is the responsibility of the Secretariat of Water Resources (SRH), of the Ministry of Environment.
- Grant of Water Resources Use Right – instrument through which the user receives an authorization, concession or permission, according to the case, to make use of the water. The grant constitutes the central element of control for the rational use of water resources. When the grant is on the right of using waters under the domain of the Federal Government, its concession is given by SRH.
- Charging for the use of water – instrument necessary to balance supply and demand.
- Classification of water bodies into classes of use – mechanism necessary for the maintenance of a system of vigilance on the quality of water. The classification is done based on the environmental legislation.
- National System of Information on Water Resources – it comprises the collection, organization, critique and diffusion of a database regarding water resources, its uses and the water balance in each basin, to provide users and managers with information for planning and management purposes. The information of this system is centralized at the SRH.

To manage the structure there are the National Council of Water Resources (CNRH) and its equivalent bodies in the states and the Federal District, the Hydrograph Basins Committees and the Agencies of Water.

The following articles of the Code of Waters present the most relevant topics for the use in agriculture:

TITLE II – Use of public waters – CHAPTER IV - DERIVATION

Art. 43. Public waters cannot be derived for applications in agriculture, industry and hygiene, without the existence of administrative concession, in case of public interest, and without the later, of administrative authorization, which will though be dismissed in case of insignificant derivations.

§ 1 - The authorization do not grant, in any case whatsoever, delegation of public authority to its holder.

§ 2 – Every concession or authorization will be given for a fixed period of time, and will never exceed thirty years, with determination of a reasonable time, not only for them to start but also to be concluded, under penalty of caducity of works proposed by the requestor.

§ 3 – The concession will have no effect if, during three consecutive years, the private use of waters is not carried out.

TITLE III – Use of common and private waters – CHAPTER II – COMMON WATERS

Art. 71. The owners or possessor of buildings crossed or bathed by streams can use them in benefit of such buildings, and with application both for agriculture and for industry, provided that the reflow of such waters does not result in harm to the buildings located upstream, and that the exit point of remaining waters located downstream is not changed, nor the provision of the last part of the sole paragraph of the article is violated. 69.

§ 1 – The exit point is understood as the point where one of the margins of the channel is no longer part of the building.

§ 2 – The expression remaining waters is not understood as drainage waters.

§ 3 – The use of waters for the first needs of life will also have preference on any other uses.

TITLE VI – NOXIOUS WATERS – SOLE CHAPTER

Art. 111. If relevant interests of agriculture or industry so demand, and through express administrative authorization, waters can be polluted, but farmers or manufacturers shall arrange for their purification, through any process, or for them to follow their natural sewage.

Art. 112. Farmers or manufacturer shall compensate the Federal Government, States, Municipalities, corporations or individuals who, because of the favor granted in the case of the previous article, are harmed.

TITLE VII – Legal right of passage of the aqueduct – SINGLE CHAPTER

Art. 117. Everyone is allowed to channelize through the building of another the waters they have the right to, through prior compensation to the owner of this building:

a) for the first needs of life;

b) for agriculture or industry services;

Common documents to all kinds of grant

- Request form filled out (as the provided model);
- Specific registry information (as the provided model);
- Title of property ownership (update certificate of ownership, with at most two years from the issuance, in name of the requestor, or leasing contract);
- Copy of the requestor´s identification documents (ID and CPF or CNPJ – individual or corporate taxpayer registration);
- Analysis and inspection fee receipt;
- Documents of the person responsible for the request (CPF and ID or professional ID);
- Sketch of the access to the undertaking;
- In case of rural property, submission of evidence of legal annotation of the property legal reserve (CERHI Resolution no. 10).

Catchment of superficial waters

- Measurement of the spring discharge, with description of the methodology used, draft of the calculation and indication of the stretch (with geographic coordinates) where measurement was done;
- Statement of the responsible technician stating that he/she does not have employment relations with the State of Goiás (according to provided model);
- Annotation of Technical Responsibility (ART) before CREA (Regional Council of Engineering and Architecture) of the service of spring discharge management;
- Map with the delimitation of the hydrograph basin.

5.1.7 Forestal Code

Federal law no. 4.771/1965 instituted the Brazilian Forestal Code that gathers a set of rules on environmental preservation in rural properties, with the specification and regulation of

Permanent Protection Area (APP), Legal Reserve (RL), Small Rural Property (PPR), in addition of providing other specific determinations for the environmental preservation.

Among the alterations under discussion, it is noteworthy that the new Forestal Code was approved at the Federal Congress providing for that the RL (native forest area which shall be preserved inside the property) in the Legal Amazon should be 80% of the property. It is noteworthy that Tocantins is located inside the Legal Amazon. In states/regions of the cerrado, this percentage is 35%, and in other regions of the Country, 20%. Senators maintained these percentages, but the text approved by them allows the reduction of the reserve to 50% in states with more than 65% of its territory in environmental reserves, provided that the reduction is authorized by the National Council of Environment.

As for APPs, the Code in force allows producers to recompose 30 meters of riparian forest for rivers up to 10 meter wide. The new text, elaborated in the Federal Congress, provides for the reduction to 15 meters of riparian forest recuperation for rivers up to 10 meters wide. At the Senate, the obligation to owners of up to four fiscal modules (the module varies in the states from 20 to 440 hectares) to not exceed the recuperation in 20% of the property area became effective.

It is also noteworthy that rural producers with properties of up to 4 fiscal modules, who were fined until July 2008, can convert their fines into reforestation, according to the text approved by the Congress. With the new text, in the Senate, such benefits become also effective for big rural owners who have deforested until the same period.

The proposal of changes in the Code is considered controversial, since those that agree with such changes, representatives of agribusiness and other representatives of the productive sector, defend that the current law ties up the production. Under such perspective, the text for the new code should accept that there are areas that, even protected, are practically consolidated as productive areas. On the other side, those against the new code approval (environmentalists, for instance), affirm that the project pardons deforestation, and require more time for discussion before voting in the plenary of congressmen.

Course of Approval

The New Forestal Code was approved by federal congressmen, and sent to the Senate, where – in December 2011, it was approved by 59 votes against 7. The text has undergone alterations and, under such circumstances, the matter has returned to the Federal Congress for appreciation by congressmen. When voted, if approved, it will be sent to the presiden of the Republic, Dilma Rousseff, for sanction or veto.

5.2 Land Ownership Issue

5.2.1 Land Ownership Legislation

Law no. 601/1850, Law of Lands, regulated that from that date on land could only be occupied upon purchase or sale, or with the authorization from the King. Everyone already on the land, received the title of owner, but they have to reside and produce on the land. It has also defined that land still not occupied would become property of the State, and could only be acquired through purchase in auctions by means of payment in cash, and no longer through possession, and that the already occupied land could be regulated as private property.

With the 1930 Revolution, the Law of Lands is changed to authorize the land condemnation for public interest, and that the property should be compensated. In 1946, with the new constitution, regarded as democratic, a new attribution was given to land: it should

fulfill its social function.

In 1964, the Military took over the government, via coup d´etat, and elaborated and approved the Statute of Land, still in force. There are various concepts described there, with important repercussions for the countryside life, as well as the relation of the land owner with his/her property. Among them:

- Agrarian reform – it is the set of measures aiming to promote a better distribution of land, through modifications in the possession and use system, in order to meet the principles of social justice, and the increase of productivity.
- Rural module – it consists, in general lines, of the smallest land unit where a family can sustain or, as defined in the law: use all its manpower, ensuring the subsistence or social and economic progress – and which dimensions, variable according to various aspects (location, type of soil, topography, etc.), are determined by official bodies. Through these criteria, a half an hectare area of dale can configure, theoretically, a rural module – while 10 hectares of Caatinga cannot attain that.
- Mini-rural property – A property of land which dimensions do not have the minimum size to configure a rural module (in the previous examples, 0.2 ha of dale…)
- Large rural property – properties exceeding 600 rural modules, or regardless of this value, that are intended to non-productive purposes (such as speculation).

It is noteworthy that the whole initiative of the agrarian reform, although ensured in the Statute of Land, was inhibited by force of the Civil Code (1916), revoked in 2002, which was more conservative and hindered the land condemnations for agrarian reform purposes.

Still from the time of military government, there is Law no. 6.383, as of December 7, 1976, that provides for the discriminatory process of land without owners (*terras devolutas*) thus owned by the Federal Government, still in force.

In article 29, of Law no. 6.383, as of December 7, 1976, it is highlighted that the occupant of public lands, who has made them productive with his/her work and with his/her family work, will be entitled to the possession of the continuous area up to 100 (hundred) hectares, provided that he/she complies with the following requirements:

> I – not being an owner of rural property;
>
> II – evidencing the permanent home and effective crop, for at least 1 (one) year.
>
> § 1 – The regulation of occupation provided for in this article will consist in the provision of an Occupation License, for at least another four years, at the end of which the occupant will have preference to acquire the land plot, for the minimum value established in the price reference spreadsheet, to be periodically updated by INCRA, using criteria regarding the antiquity of the occupation, the diversifications of regions in which the respective occupation is located, and the dimension of the area. (Text provided by Provisional Presidential Ordinance no. 458, of 2009)
>
> § 2 – The holders of Occupation Licenses, granted according to the previous legislation, will have the preference to acquire the area up to 100 (hundred) hectares, under the conditions of the previous paragraph, and the remaining land for the current value of the bare land.
>
> § 3 – The Occupation License shall be not transferable inter vivos and not negotiable, and cannot be the object of levy of execution and provisional attachment.
>
> Art. 30 – The Occupation License will give access to financing granted by financing institutions member of the National Rural Credit System.
>
> § 1 – The obligations assumed by the holder of the Occupation License will be ensured by the National Institute of Colonization and Agrarian Reform – INCRA.

§ 2 – With the default of the beneficiary, the National Institute of Colonization and Agrarian Reform – INCRA will cancel the Occupation License, and will arrange for the property alienation, under the terms of the law, in order to be compensated for what it has ensured.

Art. 31 – The Federal Government can, for public need or interest, at any time in which it needs the property, cancel the Occupation License and assume its possession, immediately promoting its clearance within 180 (one hundred and eighty) days.

§ 1 – The existing improvements will be compensated by a value fixed through the appraisal done by the National Institute of Colonization and Agrarian Reform – INCRA, considering the values stated for registration purposes.

§ 2 – If the interested party refuses to receive the defined value, it shall be deposited in court.

§ 3 – The holder of the Occupation License, in the event provided for in this article, will be entitled, if so he/she wishes, to the installation in another glebe of the Federal Government, with ensured compensation, addressed in § 1 of this article, and upon calculation of the times of customary residence and effective crop of the former occupation.

This policy has lasted until the 1988 Constitution, which finally legitimated the land condemnation for purposes of agrarian reform, and which was regulated by Law no. 8.629, as of February 25, 1993.

Article 2 of Law no. 8.629/1993 states that the rural property that does not fulfill its social function is subject to land condemnation, under the terms of this law, respecting the constitutional provisions, according to the following requirements:

I. Rational and adequate use (use attaining degrees of land utilization and exploitation efficiency);

II. Proper utilization of available natural resources (when the exploitation is done respecting the natural vocation of the land, in order to keep the productive potential of the property) and the environment preservation (the maintenance of the own features of the natural environment and the quality of environmental resources, in the appropriate manner to the maintenance of the ecological balance of the property, and of the health and life quality of neighboring communities);

III. Compliance with the provisions regulating employment relations; exploitation that favors the wellbeing of owners and workers (implicating both the respect to labor laws and the collective labor agreements, as well as the provisions that rule leasing contracts and rural partnerships).

The following are defined in article 4:

I – Rural Property – rustic construction in continuous area, whatever is its location, intended or that could be intended to agricultural exploitation, livestock husbandry, vegetal gathering, forestal or agro-industrial purpose;

II – Small Property – the rural property:

a) of area comprised between 1 (one) and 4 (four) fiscal modules;

III - Medium Property – the rural property:

a) the area bigger than 4 (four) and up to 15 (fifteen) fiscal modules;

Sole paragraph. Small and medium rural properties are not subject to land condemnation for purposes of agrarian reform, provided that their owners do not have another rural property.

Article 6 of Law no. 8.629 considers as productive property the one that, economically and rationally exploited, can simultaneously attain degrees of land utilization and exploitation efficiency, according to rates defined by the competent federal body. Where:

§ 1 – The degree of land utilization, for effect of the caption of this article, shall be equal or above 80% (eighty per cent), calculated by the relation between the area effectively used and the usable total area of the property.

§ 2 – The degree of efficiency of the land exploitation shall be equal or above 100% (one hundred per cent), and shall be obtained according to the following system:

I – for vegetal products, the harvested amount of each product is divided by the respective yield rates defined by the competent body of the Executive Authority, for each Homogeneous Microregion;

II – for cattle husbandry exploitation, the total number of Animal Units (UA) of the herd is divided by the occupation rate defined by the competent body of the Executive Authority, for each Homogeneous Microregion;

III – the sum of the results obtained as defined in items I and II of this article, divided by the effectively used area and multiplied by 100 (one hundred), determines the degree of exploitation efficiency.

§ 3 – The following are regarded as effectively used:

I – areas cultivated with vegetal products;

II – areas of native or cultivated pastures, observing the occupation rate per livestock husbandry zone, determined by the Public Authority;

III – areas of vegetal or forestal gathering exploitation, observing the yield rates defined by the competent body of the Public Authority, for each Homogeneous Microregion, and by the environmental legislation;

IV – areas of exploitation of native forests, according to the exploitation plan and under the conditions defined by the competent federal body;

V – areas under technical proceeding of formation or recuperation of pasture or other permanent crops, technically conducted and duly evidenced, through documentation and Technical Responsibility Annotation.

§ 4 – In case of consortium or intercalation of crops, the total area of the consortium or intercalation is considered as effectively used.

§ 5 – In case of more than one crop a year, with one or more products, in the same space, the biggest area used in the considered year is regarded as effectively used.

§ 6 – For products with no yield rates determined, the area utilized with such crops will be adopted, with the calculation result provided for in item I of §2 of this article.

§ 7 – The property that, for Force Majeure reasons, fortuitous event or renewal of pastures technically conducted and duly evidenced by the competent body, does not present, in the respective year, the degrees of exploitation efficiency required for the species will not lose the qualification of productive property.

§8 – Tax incentives regarding the Rural Territorial Tax related to the degrees of utilization and exploitation efficiency, as provided for in art. 49 of Law no. 4.504, as of November 30, 1964, will be ensured.

Art. 7 – The property that evidences to be object of technical project implementation, fulfilling the following requirements, will not be subject to land condemnation for agrarian reform purposes;

I – be elaborated by a legally qualified identified professional;

II – be in compliance with the originally defined physical-financial schedule, not admitted extension of terms;

III – stipulates that, at least, 80% (eighty per cent) of the total usable area of the property is effectively used, within at most 3 (three) years, for annual crops and, within 5 (five) years, for permanent crops;

IV – has been approved by the competent federal body, as defined in regulation, at least six months before the communication provided for in §§ 2 and 3 of art. 2.

Sole paragraph. The terms provided for in item III of this article might be extended in up to 50% (fifty per cent), provided that the project receives, annually, the approval of the competent inspection body, and has its implementation started within 6 (six) months from its approval.

Art. 8 – The rural property use will be considered as rational and adequate when officially intended to the execution of research and experimentation activities that has as objective the technological progress of agriculture.

Sole paragraph. For the purposes of this article, only the properties that have intended to research activities at least 80% (eighty per cent) of the total usable area of the property will be considered, and such activities shall comprise project:

I – adopted by the Public Authority, either of direct or indirect public administration, or by state owned company;

II – approved by the Public Authority, if the property is private.

Art. 10. For the effect of this law provisions, non-usable land are those:

I – areas occupied by constructions and facilities, except for those intended for production purposes, such as greenhouses, seedlings and seeds production facilities, tanks for reproduction and breeding of fishes, and other similar facilities;

II – areas evidenced as useless for any type of agricultural, cattle husbandry, forestal or vegetal gathering exploitation;

III – areas under effective mineral exploitation;

IV – areas of effective permanent preservation and other areas protected by law regarding the conservation of natural resources and the preservation of the environment.

Art. 11. The parameters, rates and indicators that inform the concept of productivity will be adjusted, periodically, in order to take into consideration the scientific and technological progress of agriculture, and the regional development, by the State Ministers of Agrarian Development and Agriculture and Supply, upon hearing the National Council of Agricultural Policy.

In complementation, the Law provides for in its article 13 that: Rural land under the domain of the Federal Government, States and Municipalities are preferably intended to the execution of agrarian reform plans.

Sole paragraph. Except for indigenous reserves and parks, the existence of rural properties owned by the government, with objectives different from those provided for in this article, will only be admitted if the public authority explores them directly or indirectly for research, experimentation, demonstration or fostering of activities related to the development of agriculture, livestock husbandry, ecological preservation, security areas, military training, all kinds of education, social adjustment and national defense.

For effects of ownership title, article 18 stipulates that the distribution of rural properties by the agrarian reform will be done through titles of domain or concession of use, non-negotiable for 10 (ten) years.

It is noteworthy that in article 23, of Law no. 8629, the foreigner resident in the Country and the legal entity authorized to operate in Brazil can only lease rural property under the terms of Law no. 5.709, as of October 7, 1971.

§ 1 – All the limits, restrictions and conditions applicable to the acquisition of rural properties by foreigner, included in the law mentioned in the caption of this article, are applicable to the lease.

§ 2 – The National Congress is responsible for authorizing the acquisition or lease beyond the limits of the area and percentage defined in Law no. 5.709, as of October 7, 1971, as well as acquisition or lease, by foreign legal entity, of area bigger than 100 (one hundred) modules of undefined exploitation.

Law no. 5.709, as of October 7 of 1971, regulates the Acquisition of Rural Property by

Foreigner Resident in the Country or by Foreign Legal Entity authorized to operate in Brazil, and stipulates other provisions. Its article 1 determines that the foreigner resident in the Country and the foreign legal entity authorized to operate in Brazil can only acquire rural property as provided for in this Law.

Article 3 of Law no. 5.709 stipulates that the acquisition of rural property by foreign natural person cannot exceed 50 (fifty) modules of undefined exploitation, in continuous or discontinuous area.

§ 1 – In case of property with area not exceeding 3 (three) modules, the acquisition is free, regardless of any authorization or license, except for the general requirements stipulated in law.

§ 2 – The Public Authority will issue rules for the acquisition of area between 3 (three) and 50 (fifty) modules of undefined exploitation.

§ 3 – The President of the Republic, upon hearing the National Security Council, can increase the limit fixed in this article.

Article 5 states that foreign legal entities mentioned in art. 1 of this Law can only acquire rural properties intended to the implementation of agricultural, livestock husbandry, industrial or colonization projects, related to their business objectives.

§ 1 – The projects referred to in this article shall be approved by the Ministry of Agriculture, upon hearing the competent federal body of regional development in the respective area.

§ 2 – Regarding industrial nature projects, the Ministry of Industry and Commerce shall be heard.

Proceeding with article 6: The shares of the following corporations shall obligatorily adopt the nominative form:

I – those dedicating to rural land development;

II – those directly exploiting rural areas; and

III – those owners of rural properties not related to their business objectives.

Art. 7 – The acquisition of property located in area regarded as indispensable for national security by a foreign natural person or legal entity depends on the prior authorization from the General-Secretariat of the National Security Council.

Art. 8 – In the acquisition of a rural property by foreign natural person or legal entity, the deed shall necessarily be done.

Art. 9 – In the deed regarding the acquisition of rural area by foreign natural persons, the following shall be obligatorily included:

I – mention of the purchaser´s ID;

II – evidence of residence in national territory; and

III – as applicable, authorization from the competent body or prior authorization from the General-Secretariat of the National Security Council.

Sole paragraph. In case of foreign legal entity, the deed shall include the transcription of the act authorizing the acquisition of the rural area, as well as the documents evidencing its incorporation and the license to operate in Brazil.

Art. 10 – The Property Registration Offices shall keep a special registry, in an ancillary book, of acquisitions of rural land by foreign natural persons or legal entities, in which the following shall be included:

I – mention of the ID of the contracting parties or of the respective incorporation documents, if legal entities;

II – description of the property, with area, characteristics, limits and border; and

III – transcription of the authorization from the competent body, when applicable.

Art. 11 – Each three months, the Property Registration Offices shall send, under penalty of losing the office, to the Disciplinary Board of Justice of the States to which they are subordinate and to the Ministry of Agriculture, the list of rural areas acquisitions done by foreign persons, including the information listed in the previous article.

Sole paragraph. In case of property located in area indispensable for national security, the relation mentioned in this article shall also be sent to the General-Secretariat of National Security Council.

Art. 12 – The sum of rural properties belonging to foreign natural persons or legal entities shall not exceed one fourth of the surface of the Municipalities where they are located, evidenced by a certificate from the Properties Registry Office, based on the ancillary book mentioned in art. 10.

§ 1 – Persons of the same nationality cannot be owners, in each Municipality, of more than 40% (forty per cent) of the limit fixed in this article.

§ 2 – The following acquisitions of rural areas are excluded from the restrictions of this article:

I – smaller than 3 (three) modules;

II – that were object of purchase and sale, of purchase and sale commitment, of cession or promise of cession, through deed or private instrument duly filed at the competent Registry, and that have been registered before INCRA in the name of the promisor-purchaser, before March 10, 1969;

III – when the purchaser has a Brazilian child or is married to a Brazilian person under the community property system.

§ 3 – The President of the Republic, through a decree, can authorize the acquisition beyond the limits defined in this article, in case of rural property related to projects regarded as priority in view of the development plans of the Country.

Art. 13 – Art. 60 of Law no. 4.504, as of November 30, 1964, becomes effective with the following text:

"Art. 60. For the effects of this Law, natural persons, national or foreign, resident or domiciled in Brazil, or legal entities, constituted and headquartered in the Country, that have the purpose of executing the area value enhancement or land distribution program are considered private colonization companies".

Art. 14 – Except for the cases provided for in the legislation of colonial centers, where farmers, foreign immigrants are settled on rural lots, it is forbidden, at any title, to donate lands from the Federal Government or from States to foreign natural persons or legal entities.

Art. 15 – The acquisition of rural property, that violates the provisions of this Law, is null by operation of the law. The notary who issues the deed and the official registration transcribing it shall civilly respond for the damages he/she might cause to the contracting parties, with no prejudice of criminal responsibility for nonfeasance or misrepresentation. The transferor is obliged to reimburse the property price to the purchaser.

Art. 16 – Corporations, comprised in any of the item of art. 6 caption, which were already incorporated at the date of this Law enforcement, shall communicate, within 6 (six) months, to the Ministry of Agriculture the list of rural areas of its property or under its exploitation.

§ 1 – The corporations, indicated in this article, which do not convert its bearer shares into nominative shares, within 1 (one) year from the this Law effective date, shall be regarded as irregular, becoming subject to dissolution, in the form of the law, by initiative of the Prosecution Office.

§ 2 – In case of utilities companies, which have rural properties not related to the purposes of their services, the conversion period for the shares shall be of 3 (three) years.

§ 3 – The utilities companies are not obliged to convert bearer shares into nominative shares, if within the period of 3 (three) years, from the Law effective date, they alienate rural properties not

related to the purposes of their services.

5.2.2 State of Tocantins

Tocantins has an area of 27,762,091.4000 ha (twenty seven million, seven hundred and two thousand, ninety one point four hectares), and until December of 2010, 18,208.276.8457 ha (eighteen million, two hundred and eight thousand, two hundred and seventy six point eight four hundred and fifty seven hectares) were already regularized. Data are from the Institute of Land of Tocantins (Itertins), the state agency created by Law no. 87/1989 with the mission of promoting the execution of land policy in the State.

The state and federal governments, considering that many of the areas lacking regularization are the responsibility of the Federal Government, still have the challenge to promote the land ownership regularization in Tocantins. The situation involving properties without ownership title in rural zones, and the inaccurate situation at the borders of the State with Piauí, Goiás and Bahia, are some of the main problems.

Thus, Itertins is responsible for executing all the activities concerning the organization of the land ownership structure, with the deliberation about public land and land without clear ownership (*terras devoluta*), the recognition of legitimate possessions, the alienation of its domain lands, the exercise of various forms of land acquisition, the promotion of discriminatory process, among others.

Points of improvement

One of the difficulties to regularize the land is, according to Itertins, the diversity of measurement systems used in Brazil, almost all accepted by official registers of land. The absence of a legal registry and the non-obligatoriness of the property plan registration, are also pointed out as difficulties.

Thus, it should be added that discriminatory proceedings in progress in the Justice system area also considered as contributors for the lack of speed in the regularization proceedings. With no figures, the state body highlights that most of the proceedings is in progress in the Justice system, pending judgment, and many of those already judged depend on demarcation of land.

Initiatives

Itertins is negotiating with the federal government, through the Ministry of Agrarian Development (MDA), with the aim of promoting, with the support from the federal government, the land ownership regularization of areas diagnosed and identified as possible of legalization. The example of this proactive relationship of Itertins is the regularization of areas in the municipality of Paranã, 304 km from Palmas, to the southeast of the State.

A diagnosis of such municipality was concluded in 2010, when the existence of rural properties of approximately 640 thousand ha with no documentation or registration in the property registration office was observed.

The investments

According to data from the Transparency Portal of the state government, in 2011, R$ 3.9 million were paid in Tocantins in actions of the State Land Ownership Regularization Program. The amount paid is bigger than that of the previous year, 2010, when payments within this program were approximately R$ 1.5 million[1].

[1] Consultation conducted on February 08, 2012, at 11h38min am at the website: www.transparencia.to.gov.br

5.2.3 State of Goiás

The State Constitution of Goiás, of 1989, in Title III, Chapter IV, Section I – General Provisions, determines that to reduce land ownership conflicts, the Court of Justice will propose the creation of specialized courts, with exclusive competence for agrarian issues.

The State of Goiás, in Title VI, Chapter I, Section II – Agricultural and Land Policy, in article 137, will adopt the integrated policy of enhancement and incentive to the agricultural production, under the terms of art. 187 of the Republic Constitution, through technological assistance and rural credit, organizing the supply of food, above all aiming to serve the domestic market. In article 138, it is determined that the State will destine its lands and constructions therein with priority to social promotion or ecological utilization projects, intended to the community health and the environment protection, as defined in law.

5.2.4 State of Maranhão

In the Constitution of Maranhão State, the Land Policy, according to chapter IV, aims to settle down the man in the rural zone, and to ensure effective conditions of improvement of his/her life quality, observing the rules of the Law and of the Federal Constitution. It also determines that the State cannot dispose of *terras devolutas* without prior discrimination, nor alienate them without previous demarcation. However, except for cases of public interest, state lands shall be used for: areas of ecological reserve and environment protection; rural settlements; popular urban and rural land developments; industrial districts; and agricultural and industrial projects. The contracts for providing public land owned by Maranhão State with domain title or concession of actual land use, for rural settlements and urban popular land developments, shall contain clause prohibiting the alienation or cession for the period of ten years. It shall also include that the domain title or the concession of use shall be granted to the man or woman, or both, regardless of marital status, under the terms and conditions of the law. It is noteworthy that the operations of transference of properties for the purpose of rural workers settlement in development programs conducted by the state Authority are exempt from state taxes.

The Law defines that the Public Authority can alienate or grant public lands until the limit of two thousand and five hundred hectares. Article 195 defines that floodable fields of public land and *terras devolutas* under the domain of the State cannot be alienated, and their use shall be ruled by law, which will ensure the communal ways of their utilization and the preservation of the environment. It is noteworthy that babaçu fields shall be used according to the law, under conditions that ensure the natural and environment preservation, and as source of income for the rural workers, and in public land and *terras devolutas* of the State, the exploitation of babaçu fields shall be ensured in the system of family or community economy.

5.2.5 Restriction for the acquisition and/or leasing of land by international companies

The National Institute of Colonization and Agrarian Reform (INCRA), a federal government agency, is responsible for the control of acquisition and leasing of land by foreigners in Brazil. According to INCRA, foreign natural persons or legal entities require the authorization from the agency.

According from information of the Institute (2010), 4 million ha of land, distributed in nearly 3.7 thousand municipalities, belong to foreigners. This corresponds to 0.47% of the national territory, which equals the territory of River Grande do Norte state.

According to information from the Agência Câmara, official news body of the National Congress, based on information from INCRA, Japanese have 23% of properties registered in the Country. The second place is of Italians, with 7%. Americans, Argentines and Chinese, thought of a new investors, have, each one, only 1% of registered properties.

Among the 26 Brazilian states, all of them have some land as property of foreigners. With 13.48%, São Paulo is the state with bigger percent distribution of land to foreigners. The next are the states of Mato Grosso do Sul, with 11.7%, and Bahia, with 9.41%.

In turn, Sergipe, in the Northeast region of Brazil, is the state with the smallest percent: 0.08%. Tocantins has 2.59%, according to INCRA survey.

Yet, according to Agência Câmara information, the federal government estimates that those figures are underestimated because of lack of notification. INCRA plans to map the lands owned by foreigners until the end of the first half of 2012. The National System of Land Acquisition by Foreigners (Sinat) is still in phase of tests.

Rules for acquisition

The acquisition of land in Brazil by foreigners is ruled by law 5.709/71 that, among other specifications, determines that only foreign individuals officially residing in Brazil can acquire properties. The rule is valid both for natural persons as well as for legal entities.

In addition, only rural properties intended to the implementation of agricultural, livestock husbandry, industrial or colonization projects might be acquired. According to such law, the Ministry of Industry and Commerce shall be heard regarding industrial nature projects.

The acquired land shall have a productive use, and the sum of properties owned by foreigners, in the same municipality, cannot exceed 25% of its total area.

On December 9, 2011, INCRA published in the Official Federal Gazette (DOU), the normative instruction no. 70, which regulates the purchase of rural properties by foreign persons residing in the country, and by foreign companies authorized to operate in Brazil.

Changes are already in force and highlight that, for the acquisition of land, the foreigner needs to have permanent residence and be enrolled with the National Foreigner Registration (RNE) in such condition. The legal entity needs to have authorization to operate in Brazil. In case of a property located in the frontier stripe, according to the instruction, it is necessary to get the approval from the Executive-Secretariat of National Defense Council.

Also in accordance with the Normative Instruction, foreigners can only acquire properties with more than 50 fiscal modules by means of authorization from the National Congress. Congressmen shall also approve the purchase of properties bigger than 100 fiscal modules by a foreign legal entity.

Brazilian individuals married to foreign individuals shall also follow the new rules, according to INCRA.

Debates in the Congress

According to information from the National Congress, in 2010, there were six bills of laws and a proposal of amendment to the Constitution under appraisal to expand the restriction of the purchase of Brazilian land by foreigners. There is another document, elaborated by congressman Nilson Mourão (PT-AC) and by the former congressman José Dirceu, which has its appreciation more advanced. The Bill of Law (PL) of the Congress 302/09 (former PL 4440/01) is under appreciation in the Senate, and focus the limitation of the acquisition of land

in the Legal Amazon, where Tocantins is included.

According to PL 302/09, the foreigner´s rural property can have up to 15 fiscal modules. Also according to the Congress, the fiscal module in Amazon varies from 50 to 100 ha, the measurement that is used as parameter for the land classification of the rural property as its dimension. A large property, according to these criteria, has an area larger than 15 fiscal modules.

Currently, the foreigner can only acquire land at the frontier with other countries upon consent from the National Defense Council. With this project, the possession of property or of any right on a rural property in the whole frontier stripe is forbidden. Tocantins, for being in the Mid-Northern region of the Country, has no frontier with other countries, thus it would not be affected by this rule if the project is approved.

Despite the restrictions, the bill of law stipulates that foreigners with land can expand those areas, after ten years of residence or domicile, provided that the original property is fulfilling its social function, according to opinion report to be issued by INCRA.

A subcommision at the National Congress analyzes the rules for the purchase of land by foreigners. The activities of the subcommission were extended until March 23, 2012.

5.3 Regularization of the operation of companies

In Brazil, the foreign company is a corporation incorporated and organized according to the legislation of the origin country, where its management is located. These companies are subject to authorization from the Federal Government to operate.

The foreign company interested in operating in Brazil shall request it to the Ministry of Industry, Commerce and Tourism, specifically to the DNRC, National Department of Commerce Registration, via protocol. The company shall never operate before getting the authorization from the Federal Government.

5.3.1 Regularization procedures

The foreign company shall elaborate a request to DNRC with documents evidencing the act deliberating about the installation in Brazil, with the activities the company intends to perform, and the highlight of the stock capital in Brazilian currency – i; the articles of incorporation with certified translation – ii; the list of partners or shareholders, duly qualified, when allowed in the legislation of the origin country – iii; evidence of the incorporation done in compliance with the law of the origin country – iv; appointment of a representative in Brazil and document of acceptance by the representative of the conditions of installation and operation – v; last balance sheet vi; receipt of the service price.

After authorized to operate, it shall file the above mentioned documents at the Commercial Registry of the respective State of installation, along with the document of authorization from the Federal Government, and the powers of attorney for the representative, with the respective certified translations.

5.3.2 Requirements

The foreign company has the main requirement to comply with Brazilian laws and with the laws of its origin country, regarding the publicity of its acts in Brazil, via official gazette of the Federal Government, and of the State or States in which it operates, as well as in the municipal gazette and/or in a major newspaper. It shall also keep permanently in Brazil a Brazilian or foreign representative, the later with permanent visa, with full powers to accept the

conditions under which the authorization is given, almost with powers to be summoned on behalf of the corporation.

5.3.3 Legal restrictions for the establishment of international companies

The foreigner company under any kind of operation restriction in the country of origin shall not be authorized to operate in Brazil. Every foreign capital that might become part of the company in Brazil shall be duly registered at the Central Bank of Brazil, to which a certificate shall be issued for use to justify the remittances of profits abroad, with the application of a 15% tax, and for the repatriation of the necessary capital. Assets shall follow the requirements of Siscomex – RFB.

Foreign companies cannot operate the following activities in Brazil. Health care; navigation and cabotage; journalism and radio-diffusion; cable TV; mining and hydraulic energy; highway cargo transportation; national air lines; be established in the frontier stripe; rural colonization and land developments; and mail and telegraphs.

In addition to that, foreign companies authorized to operate have the same treatment as national companies, because the provision on Brazilian company with national capital was revoked, without any kind of discrimination. Being equal to national companies, the business activities of foreign companies are subject to the same criteria and additional registrations. In this case, it is recommendable to conduct a prior specific study of the activity field by a regularization professional qualified in Brazil, engineers and/or architect, lawyers and accountants, among others.

5.3.3 Regulations for work

The worker under administrative and industrial conditions, even if in rural zone, is subject to the Brazilian labor laws system. The rural work is regulated by Law no. 5.889/73, detailed by Decree no. 73.626/74, and in article 7 of the 1988 Federal Constitution. The rural worker has ensured the payment of the minimum wage, observing the minimum wage of the union category to which the employee belongs.

(a) Rural Employer

Rural employer is the natural person or legal entity, which exploits agro-economic activity, permanently or temporarily, directly or through representatives and with the help of employees. The industrial exploitation in agricultural establishment is also included in this case.

The activities comprising the first treatment of natural agricultural products without transforming their nature are considered as industrial exploitation in agricultural establishment.

(b) Working Hours

Working hours are 44 hours per week and 220 hours per month. Between two working days, there shall be at least 11 (eleven) consecutive hours for rest. Workers are entitled to remunerated weekly rest, preferably on Saturdays and Sundays. Evening working hours vary from urban ones, because they start and end an hour earlier, from 9:00 pm to 4:00 am.

(c) Legalities and Transport

The work of minors is not allowed at all. Transport shall be ensured to workers who do not reside in the property or in the surroundings. Residence and goods intended to the production for their subsistence shall not be included in the wage amount.

(d) Temporary worker during the harvest (*Safrista*)

Safreiro or *safrista* is the worker providing services on a contract basis per harvest.

(e) Rights on the income

The rural worker is entitled to the right of deposit of FGTS (8%), Vacations (1/12 +1/3 of the wage), of INSS (8 to 11%) and of 13th wage (1/12 of the total annual revenue). The rural worker is entitled, in December of each year, to a Christmas bonus corresponding to 1/12 (one twelfths) of the remuneration due in December per month of service of the corresponding year. He/she is also entitled to prior notice before dismissal, unemployment insurance and primary school, safety and hygiene at work, and family-wage.

(f) Union Contribution

The rural worker shall contribute only once, every year, an amount corresponding to the remuneration of one day of work, as determined by item I of art. 580 of the Consolidation of Labor Laws (CLT).

(g) Profit share

It is at the discretion of the employer.

CHAPTER 6 GOOD AGRIBUSINESS PRACTICES

6.1 Introduction

Two concepts are involved in the topic of good agribusiness practices: the intrinsic quality of products and the set of extrinsic qualities increasingly demanded from them in the international markets – sanitary quality, environmental quality, social quality.

Concerning the accomplishment of good sanitary, environmental and social practices, Brazil is evolving very fast, creating and inspecting a very demanding legislation regarding the rules of nature preservation, utilization and application of agrochemicals and genetically modified products, agricultural soil conservation and correct utilization of water, traceability along the production system, fair treatment of the human being in labor relations. Likewise, the development of agricultural technology addressing the sustainability of the production system is also very fast, such as the massive adoption of direct planting, which preserves and enriches the fragile tropical soils, and the most recent development of a production system, in initial adoption phase, based on the agriculture-livestock husbandry rotation, which will increase the environmental and economic sustainability of the Brazilian agribusiness.

In the Study region, the following good practices are observed:

- Production of soybean seeds
- Production of grains
- Production of sugarcane
- Introduction of intensive milk production

6.2 Good practices in the production of grains

6.2.1 Production of seeds

In the study region, there is a center of soybean seeds production, in the region covered by Formoso River and its tributaries, with a key role in the supply of this input for the production of soybean in the states of Bahia, Tocantins, Piauí, and in part of Mato Grosso. This seeds production center is located in very flat dales, which in the summer – a very rainy season - are occupied with flood irrigated rice, and in winter – very dry season, produce high quality soybean seeds, in crops irrigated through the elevation of the groundwater. Those seeds, for being produced in a period of time close to the summer harvest cultivation, have an excellent quality without demanding cooled conservation, which provides them with competitiveness in the regional market.

It is also noteworthy that the producers of the study region financially support the FAPCEN – Foundation of Support to North Corridor Research, an institution that, through an agreement with EMBRAPA and private companies, develops researches for the adaptation of varieties and adjustment of agricultural technology to the regional conditions.

6.2.2 Commodities

a) Rice – Rice production, within the study region, is concentrated at

Formoso River basin, in which approximately 80,000 ha are cultivated, in areas irrigated by inundation, and that are currently attaining productivities between 6,000 and 8,000 kg/ha of good culinary quality rice. The Tocantins State Secretariat of Agriculture intends to implement in the region an agronomic experimentation to appraise the possibility of producing rice varieties intended to oriental cuisine.

Source: JICA Study Team

Fig. 6.2.1 Rice Cultivation

b) Corn – The best technology for corn production within the study region is in Southern Maranhão, where there are producers attaining productivities of approximately 10,000 to 11,000 kg/ha, during the summer harvest. In the whole region, it is possible to find producers producing more than 7,000 kg/ha in the second harvest (winter harvest), after soybean production, at very low costs, since part of the production is obtained from the presence of soybean fertilization wastes, as well as from the use of nitrogen fixed by soybean to the soil through the symbiosis with nitrifying bacteria.

Source: JICA Study Team

Fig. 6.2.2 Corn Cultivation

c) Soybean – In the whole study region, soybean production is attaining an increasing stability, through the adoption of varieties more adapted to the climate, and more efficient cultivation practices. The predominant system is the direct planting (with no soil disturbance), which ensures the preservation of the soil, which organic matter contents increase along the years. The cultivation, in the second harvest, of plants exclusively intended to the production of straw for soil protection, especially millet, is also very frequent.

Source: Jica Study Team

Fig. 6.2.3 Soybean Cultivation

In the whole region, there is a expressive number of producers attaining an average productivity of approximately 3,000 to 3,500 kg of soybean per hectare.

d) Use of agrochemicals – In regional agriculture, the concepts of Integrated Plagues and Diseases Management are generally used, through which producers use, for the control of such problems, a comprehensive approach, which implies the use of resistant varieties, pesticides with specific effect against the target plague, avoiding to affect beneficial organisms, and application only after the statistic survey to appraise the actual need of application.

6.3 Good practices in the production of sugarcane

In the study coverage area, there are four sugar and ethanol plants in operation. Three of them, middle size ones, are located in southern Maranhão, in the regions of Imperatriz and Balsas, and the fourth one, of big size, jointly owned by Bunge and Itochu companies that have most of the shares, is located in the municipality of Pedro Afonso, in Tocantins. This plant has currently cultivated approximately 30,000 ha of sugarcane, with the goal of having 60,000 ha of sugarcane, to be attained in the next years. The company is obtaining good results, from the viewpoint of agricultural productivity, and intends to improve them through the intensification of irrigation. For such purpose, it has already implemented, among other equipment units, the biggest set of central pivot irrigation in the world, with an area of 530 ha.

Source: JICA Study Team

Fig. 6.2.4 Sugarcane Cultivation

For harvest, the company does not use prior burning of sugarcane straw, which can cause environmental damages, using all the industrial production wastes as fertilizers in its own sugarcane plantations.

6.4 Dairy products

In the surroundings of the study region, a company named Leitíssimo is in operation, which industry is established at the city of Mambaí, state of Goiás, and which agricultural unit of milk production is located in the Western region of Bahia. This New Zealand company is attaining the biggest productivity of milk per hectare already reported in the whole world: 35,000 liters/ha/year, obtaining from animals exclusively fed with pasture, with no use of grains. This technology, if massively adopted, will allow Brazil, which now has 30 million ha dedicated to milk cattle breeding, to produce the same volume of milk it now produces in less than 1 million ha, thus releasing approximately 29 million ha for other productive activities.

Source: Leitissimo

Fig. 6.2.5 View of Leitissimo´s Pasture

6.5 Logistics

6.5.1. Road transportation

The study region is crossed, from south to north, by BR-153 Highway, also known as Belém-Brasília Highway, one of the main road axes of the country.

The states of Goiás and Tocantins also have good state road systems, which allow producers to have good transportation ways for their products until reception points.

6.5.2 Railway transportation

The region is crossed, throughout its whole length, by North-South Railway, through which the agricultural products can be transported to the ports of Maranhão, as well as to the ports of the Southeast region. The West-East Railway is in the phase of implementation, with conclusion expected for 2013, and which will initially connect the port of Ilhéus, in Bahia, to the state of Tocantins, at the city of Figueirópolis, where there will be a connection with North-South Railway, which can receive the production of grains coming from western Bahia, and send it to the above mentioned ports. In the future, this railway shall continue West bound, to transport the production of part of Mato Grosso state, the biggest producer of grains in the Country.

6.5.3 Waterway transportation

The great Araguaia-Tocantins Waterway is in phase of gradual implementation, with conclusion expected for 2025, which using the beds of these two major rivers will allow the transportation of grains from most of the northern region of the country to the north region ports. This waterway is 2,800 km long in total, allowing the flow, at low cost, of products coming from part of Mato Grosso, part of Pará, southern Maranhão, the whole state of Tocantins, and part of Goiás.

CHAPTER 7 IDENTIFICATION OF BOTTLENECKS FOR AGRIBUSINESS DEVELOPMENT IN THE REGION

7.1 Technical aspects

7.1.1 Agricultural production

The main bottleneck related to agricultural production in the region under study is related to the quality of its soils, which can provide unsuitable relief for mechanized agriculture, presence of stoniness, poor internal drainage or very low clay content. Areas showing this kind of problem should be for Legal Reserve, reforestation or use with extensive grazing.

In the south of Maranhão there are large contiguous areas with good agricultural characteristics, a fact that allows the existence of large projects by exploring areas that can even overcome ten thousand and up to twenty thousand hectares (at the time, all the plots with these characteristics are already occupied). In Tocantins, areas with these characteristics are very rare, which will make undertakings having smaller size, or those great undertakers exploiting discontinuous areas.

In the north of Goiás, there is a much smaller area with good characteristics for mechanized agriculture. There are, however, throughout the study area covering about 35 million hectares approximately 8 to 10 million hectares with good features for the practice of mechanized agriculture, much of it unexplored.

A second important bottleneck is related to the extreme seasonality of rainfall and the occurrence of "short summer drought" (*veranico*) (a dry and hot period of 15 to 20 days that can occur during the rainy season). The region has, in general, six months with good accumulated quantities of rain on the order of 1000 mm to 2000 mm per season and six months on the total amount of precipitation in general that does not exceed 300 mm per season. The occurrence of "veranicos" (which mainly occur in the years of "El Niño" phenomenon dominance), depending on the phase of the farming in which they occur, can cause substantial reduction in agricultural productivity. These region characteristics indicate therefore, be appropriate to the practice of irrigated agriculture, particularly as the luminosity and the temperature remained favorable throughout the year, allowing, for irrigated agriculture in the case of grains, the production of up to three harvests per year and in the case of perennial crops such as fruits, cocoa, black pepper, or *Robusta* coffee aiming at obtaining higher productivity to that obtained in the regions of highest latitude.

A third bottleneck that occurs in the region is the issue of land titling and registration. As a consequence of an obsolete system and in the past sometimes involving malpractice by the bureaucracy, there are problems throughout Brazil regarding the titling of land, especially dubious about the actual boundaries of each property and in some cases by double ownership referring to the same area, which may even lead to conflicts over land ownership. In the study area, these problems are more frequent in the south of Maranhão and Tocantins in the north, the area known as *Bico de Papagaio*, no conflicts were reported on the remaining area of the state of Tocantins. It is therefore necessary that investors, before accepting to be committed to purchase a particular property, hire local legal advice to scrutinize this issue. It is important to note that INCRA - National Institute for Colonization and Agrarian Reform - a few years ago, is being making efforts to gradually regularize this situation by regulation that requires the georeferencing all farms in the country.

7.1.2 Marketing system

A visible bottleneck to agricultural exporting products is related to logistics. The poor transport between the production areas for export represents enormous damage. The improvement of roads and the railroad and the better use of water transport are essential and pressing beyond the improvement of productivity of ports and warehouses. Prices in the international market show an increasing trend. The following table indicates the average price of sugar exported from Sao Paulo.

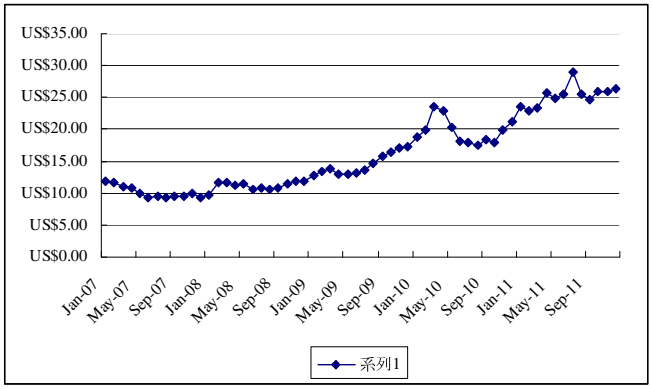


Fig. 7.1.1 Average Prices of VHP Exported Sugar (US$/50Kg bag) - SÃO PAULO

The producer prices also show a favorable environment. The price indexes of main products are as follows:

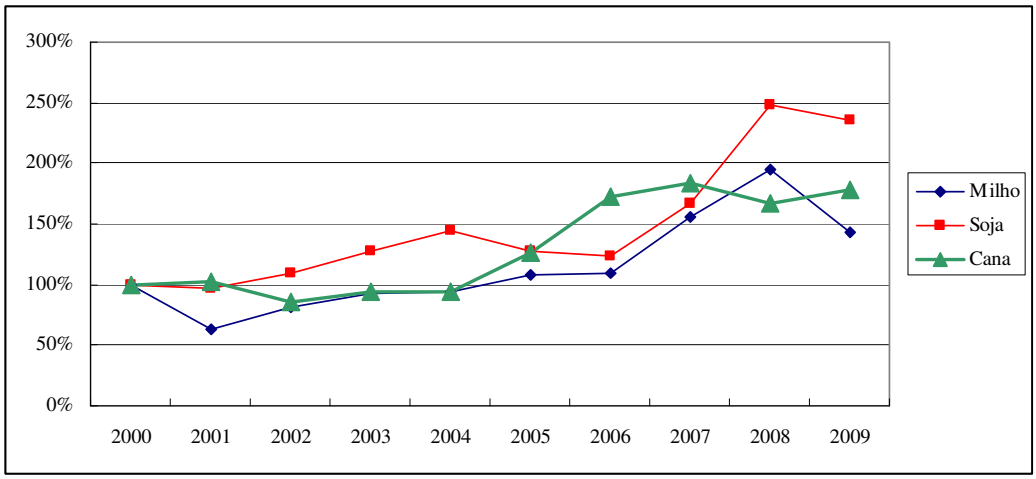


Fig 7.1.2 Evolution of prices for major crops

Nevertheless, with the region being located at a great distance from points of embarkation, there is a loss of competitiveness: the product leaves the farm gate with low prices and reach destination with high costs as a result of logistical problems. The movement of main ports is as follows:

Table 7.1.1 Ports with a higher cargo handling

Ports	Participation (%)
Paranaguá	31.92
Santos	31.71
Rio Grande	11.27
Tubarão	9.45
São Francisco do Sul	5.13
Itacoatiara	5.07
São Luis	4.07

Ports	Participation (%)
SUBTOTAL	98.63

Source: SECEX (2007)

The region of study is dependent on the Port of Itaqui in São Luís (MA). The segments of roads considered as essential for the study region are listed in the following tables:

Table 7.1.2 Distance in sections (Goiânia-Belém)

BR	Segment	Extent
010	Estreito(MA)-Div.MA/PA (Itinga)	251
010	Div.MA/PA (Itinga)-Entr.BR-316/010 (PA)	348
010	Entr.BR-316/010-(PA) - Belém (PA)	118
153	Goiânia (GO) - Div. GO/TO	481
153	Div. GO/TO - Araguaína (TO)	664
153	Araguaína (TO) – Estreito (MA)	122
Total		1, 984

Table 7.1.3 Distance in sections (Goiânia-São Luís)

BR	Segment	Extent
153	Goiânia (GO) - Div. GO/TO	481
153	Div. GO/TO - Araguaína (TO)	664
153	Araguaína (TO) - Estreito (MA)	122
010	Estreito- Açailandia	92
222	Açailandia- São Luis	576
Total		

As for transport logistics, in terms of roads, the main bottlenecks are in the southern state of Maranhão. In this region, there are serious difficulties about it, since much of the grain production is served only by dirt roads in poor condition, which causes the cost of freight only between farm and point of reception can cost up to about 10% of the product, in the case of soybeans and up to about 20% of the product in case of corn. Tocantins and Goiás have less important problems in this regard.

In analyzing the issue of logistics of a broader point of view, the transport of large volumes up to their destinations in Brazil and abroad, it is evident that the region has favorable geographical location to the flow of production and being indeed an axis of integration with the rest of the country. With the completion of Luiz Eduardo Magalhães Hydroelectric Plant, a new navigable segment arises in the Tocantins River which will enable the soybeans production flow to the extreme north of the state, and from that point, it will be transported by Carajás and North-South railroads still under construction to its final destination at the Port of Itaqui, Maranhão, which will entail a reduction in the cost of freight and other costs when compared with the current logistics.

Currently transport depends directly on the road system, which causes high cost of transportation. The cost of transport by road system (2005) was estimated at approximately $ 0.08/km/ton. Correcting this value by the IPCA index (3354/2435), this value would be at a level of R$ 0.11 / km / ton, which indicates the need to minimize this cost through better use of transport systems, including rail and waterway.

On the other hand, soybean prices at the Port of Paraná / Paranaguá were as follows:

Table 7.1.4 Evolution of Export Price at Paraná/Paranaguá Port

	60 kg		
	R$/69 kg	US$/60 kg	US$/t
1997	19.3	17.6	293.0
1998	14.8	12.7	212.1
1999	18.1	10.0	166.1
2000	19.1	10.4	174.2
2001	23.8	10.0	167.3
2002	33.3	11.1	185.8
2003	40.7	13.3	222.2
2004	42.3	14.4	240.4
2005	31.4	12.9	215.1
2006	28.3	13.0	216.8
2007	34.7	18.0	299.4
2008	46.2	25.8	429.4
2009	47.0	23.8	396.3
2010	40.0	22.8	380.3
2011	46.5	27.8	464.0

Although soybean prices show upward trend in recent years for the region of study, soybean cultivation, which requires shipping in volume, would have greatly expanded its viability if logistics and transport systems were strengthened and if storage capacity on farms was increased, which would reduce post-harvest losses;

- PPPs development (Public Private Partnerships);
- Set up a network of intermodal terminals, mainly taking advantage of the possibilities of combining rail with river navigation;
- Opening of local roads;
- Rail system revitalization;
- Building a strategic garners' network

7.2 Potentialities and bottlenecks for agribusiness development in the region

7.2.1 Potentialities

The following potentialities can be cited:

Table 7.2.1 Potentialities

Area	Potentialities
Wide-scale	• High potential, production of grains (rice, corn and soybeans), meat (beef and poultry), fruits (pineapple, watermelon and banana), cane sugar and milk cattle. • Availability of commercial channels and ease marketing.
Political Support	• State Government interest to move forward with the project. • Set the region reflects good expectations about production and markets, proving to be attractive to those interested in investments, especially those supported by irrigation in different localities.
Technology	• Current production system, standardization of processes, use of advanced practices and access to new technologies.

Area	Potentialities
	• Provide an efficient production with high process control and environmental impacts, resulting in high product quality.
Land	• Wide-scale property that allows cultivation of cereals. • Pressures on search for land is low
Soil Resources	• Availability of suitable areas for crops. • Availability of space for construction of irrigation systems
Water resources	• Availability of water resources in the vicinity.
Infrastructure	• Strengthening of multimodal transport, combining BR 153 (*Belém-Brasília*) Road, the North-South Railway, the Tocantins Waterway and Araguaína and Palmas airports is seen as to be essential.
Incentives	• Credit availability by financial systems

7.2.2 Bottlenecks

The identified bottlenecks are:

Table 7.2.2 Bottlenecks

Area	Bottlenecks
Wide-scale	• High level of taxation on productive and commercial activities. • High level of directly or indirectly taxation on agriculture production.
Environmental Restriction	• Requirements for lengthy studies (as for all, in Brazil)
Soil Resources	• Soil correction
Water resources	• Existence of dry period that requires irrigation for not rainy period.
Infrastructure	• Production costs considered as to be medium-high due to high rates of inactivity in production and storage. • Average transportation conditions in obtaining supplies and flowing of the products were marked as significant bottlenecks contributing to rising costs. Low product storage capacity, especially soybeans and
Incentives	• High financial cost

7.2.3 Required measures

Required measures are:

Table 7.2.3 Required measures

Area	Required measures
Political Support	• Environment to bring investors to farming and cattle husbandry exploitation
Technology	• Research continuity
Environmental Restriction	• Complement in regulations
Water resources	• Construction of water infrastructure Introduction of irrigation systems
Infrastructure	• Construction of flowing roads Strengthening of storage systems Structuring the drainage system

CHAPTER 8 SELECTION OF PRIORITY AREAS

8.1 Criteria for selection of priority areas

The election of a particular area within the region under study for implementation of agricultural development projects should be the result of examination of various aspects that can lead these enterprises to success or failure. For such, criteria should be established for each of these aspects in such a way that the option for an area or project is a consequence to be found as the best set of favorable characteristics.

8.1.2 State Policies

(1) Criterion for selection

At the governmental level, it is desirable to have development projects underway or under implementation, which could mean attaining critical mass for all the entrepreneurs that are installed or come to be installed and by attracting the interest of both suppliers of goods and of technical assistance as buyers of their production, as well as receiving government support under the aspect of production and dissemination of agricultural technology.

(2) Selection

The State of Tocantins, due the existence of structuring programs for agricultural development and specifically PRODOESTE and PROPERTINS, and due to the strong interest demonstrated by its government aiming at in implementing sustainable development projects is the most suitable area for these actions, in this aspect.

8.1.3 Environmental policies

(1) Criterion for selection

The rules governing environmental issues should not, within the selected region, be more rigid than those which are established within the country as a whole, under penalty of excessively charging the entrepreneurs which could eventually cripple its activities.

(2) Selection

In this respect, the three states, Maranhão, Tocantins and Goiás, have similar procedures, based on federal policy, with no special features that favor or prejudice any of them.

8.1.4 Land policies

(1) Criteria for selection

Also regional policies dealing with land issues should not be more restrictive than federal laws and must be, in the selected region, a transparent system of documentation and registration of farms, by avoiding any litigation concerning the land ownership.

(2) Selection

As mentioned in section 7.1.2, the southern regions of Maranhão and of far north Tocantins present problems regarding titling and land registration. For this reason, in this respect, actions in south-central Goiás and Tocantins should be prioritized.

8.1.5 Soil resources

(1) Criteria for selection

The soils of areas selected for development programs should have a smooth flat terrain, wavy, good depth, low incidence of stoniness. In general, these attributes are found in this region, in the soils classified as Red-Yellow Oxisol and Yellow-Oxisol. Also of great interest, the floodplain soils, which can be used for flood irrigated agriculture and raising the water table. Most of these soils are classified as Plinthosols.

(2) Selection

The soils of southern Maranhão and northern Goiás suitable for mechanized agriculture are predominantly Oxisols; in Tocantins, in addition to the Oxisols, there is a large area of lowland soils. Across the region under study, there is discontinuity between suitable and unsuitable areas for intensive agriculture. In this respect, the three sub-regions have relatively similar characteristics, except for the area under paddy fields of Tocantins, where suitable areas are continuous.

8.1.6 Water resources

(1) Criteria for selection

As the region presents a major bottleneck as prolonged drought and the occurrence of "short summer droughts" (*veranicos*), it is convenient to select inside areas where there is good flow of rivers, reservoirs or rivers already established that, when barred, may supply water areas of interest for irrigated agriculture.

(2) Selection

The three regions under study have abundant water resources, enabling the use of large volumes of water for irrigation. However, the best combination of the presence of water resources with soils and topography are appropriate in the state of Tocantins, especially in its southern portion.

8.1.7 Existing infrastructure

(1) Criteria for selection

So that agricultural development projects can achieve their goals, it is necessary that the selected region presents inside it transport infrastructure, energy supply, supply of inputs and equipment for agriculture and also urban centers able to offer care in health and education aiming that entrepreneurs and their employees could maintain an adequate standard of living.

(2) Selection

The states of Tocantins and Goiás cater well to this question, which does not occur to the south of Maranhão, which does not have good roads, have major shortcomings as to the distribution of electricity and the main urban center of grain producing region, the city of Balsas, presents problems for good quality of life of its inhabitants. In this regard, the state of Tocantins is the one with better features for installation of agricultural development projects, mainly because, having all of its territory disclosed, from north extreme to south extreme, both in the Belém-Brasilia North-South Highway and the future-Araguaia-Tocantins Waterway and, moreover, is also served by East-West Railway, under construction, will become the main logistic axis of northern savannah region.

8.1.8 Incentives

(1) Criteria for selection

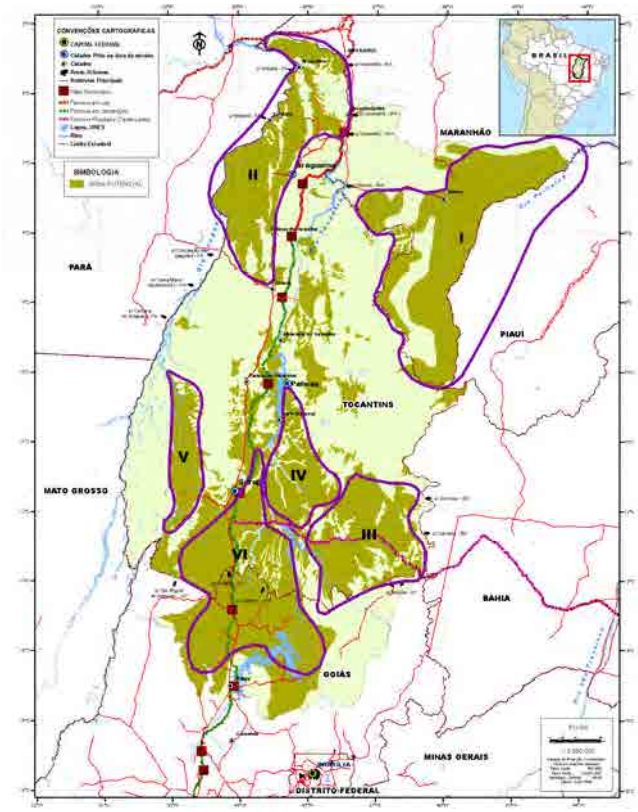
Once that in Brazil there may be great difference between the various states regarding tax policy, which could result in significant advantages or disadvantages for entrepreneurs, those states offering good tax incentives should be selected for evaluation of investment opportunities.

(2) Selection

The three states under study have tax incentives policies that do not greatly differ from each other, although they are very different from those that are effective in the southeastern and southern Brazil. All three offer interesting advantages for entrepreneurs who are established there or come here to settle.

8.2 Selection of Proposed Areas

Except for those protected areas, the available areas have been grouped as follows:



Source: JICA Study Team

Fig.8.2.1 Areas considered for selection

Area I; *Balsas* Region

Area II; *Araguaína* Region

Area III; PROPERTINS

Area IV; Middle Tocantins

Area V; PRODOESTE

Area VI; Gurupi and North of Goias

The *Balsas* region (Area I) is the soybeans production area especially in the *Chapada Mangabeiras*, where large-scale agriculture is practiced with intensive use of mechanization and technology. In this region around 400 acres of soybeans are planted. There is also possibility of area expansion but the lack of drainage infrastructure is immense.

The *Araguaina* region (Area II) is a livestock and subsistence farming producer area. The producers are small scale and there are pressures from movements that require land distribution. There are several INCRA settlements in the region and region limits with the State of Pará, where there is a large number of settlements made by INCRA.

The PROPERTINS area (Area III) is a totally underutilized area, estimated to have less than 100 000 hectares under cultivation. There are large areas available for farming. In terms of human settlement, the region is considered low density.

The Middle Tocantins Area (Area IV) is also an underutilized area. The main activity is livestock farming. Locating next to the Tocantins River whose availability of water resources is enormous; there exists great potential for irrigated agriculture.

The SOUTHWEST Area (Area V) is a highly developed rice culture area. In this region there are the *Formoso* Project, the *Javaé* river and *Confusão* Lagoon much favored by the special soil conditions, which allow production at lower costs.

The *Gurupi* Area region and northern Goiás are mainly used for livestock and large farms predominate.

Table 8.2.1 Evaluation of Potential Areas

	Political Support	Environmental Restrictions	Land Issue	Soil Resources	Water Resources	Existing Infrastructure	Political Incentives	Synergistic Factor	Existence of Structuring Projects	Joint Evaluation
Area I	C	B	A	A	C	E	C	C	C	C
Area II	B	D	D	B	C	A	C	C	C	C
Area III	A	A	A	B	B	B	C	A	A	A
Area IV	B	A	A	A	A	B	C	A	C	B
Area V	A	C	A	A	A	B	B	A	A	A
Area VI	B	A	A	A	C	A	B	A	C	B

Grades: A – Very Good; B –Good; C – Regular; D - Defective ; E - Improper

The following are selected as the most viable areas:

- Area III: PROPERTINS
- Area IV: Middle Tocantins
- Area V: PRODOESTE

CHAPTER 9 PROPOSAL FOR THE DEVELOPMENT OF AGRIBUSINESS IN THE REGION

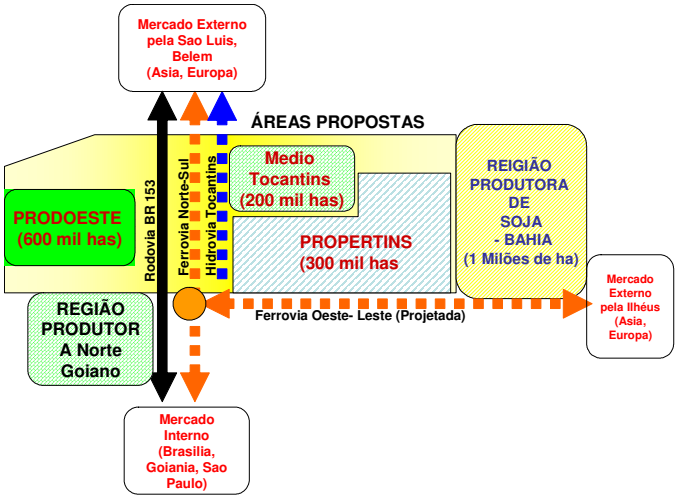
9.1 Introduction

In a scenario of the world economic growth resumption, the role of territories where it is possible to open new agricultural frontiers is increasing. . In the study region, the opportunities for agribusiness are also increasing, especially for exports, such as soybean, sugar and In the study region, currently approximately 800 thousand ha of soybean, 170 thousand ha of corn, 170 thousand ha of rice and 40 thousand ha of feijão beans are cultivated. The total area of the study region is 412 thousand km², that is, 41.2 million ha. The short cycle crops thus occupy less than 3% of the total area.

Among those potential areas, the areas where the proposed programs are more mature or where there are bottlenecks to resolve were selected as priority areas. Those areas are:

- PRODOESTE (600 thousand ha)
- PROPERTINS (300 thousand ha)
- Middle Tocantins (200 thousand ha)
- Improvement of the logistics sector

Those regions have a great potential, because of their geographic position and the abundance of natural resources, especially water resources, with possibility of becoming strategic in the development policy of the Country. In addition to the progress of agricultural activities and mining exploitation, the use of the great hydroelectric energy generation potential to supply the national market, and the possibility of railway transportation development, to channel the regional agricultural production for export purposes towards the ports of the north (São Luís and Belém), represent opportunities of investment.



Source: JICA Study Team

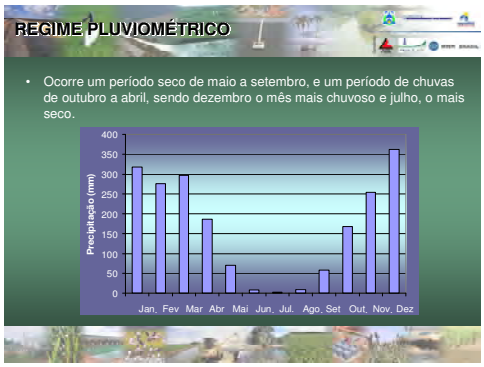
Fig. 9.1.1 Overview of the Proposal

It is noteworthy that this region, which is at the center of an area containing producing regions of the southern Maranhão, western Bahia, northern Goiás and eastern Mato Grosso, and also of Tocantins, will become the Logistics Center of this whole huge producing region, and thus the new Center of international production of food.

9.2 PRODOESTE (PROGRAM OF DEVELOPMENT OF TOCANTINS SOUTHEAST REGION)

9.2.1 Program Conception

The State of Tocantins is crossed from north to south by Araguaia and Tocantins rivers. Along the banks of those rivers, there are approximately 3.4 million ha of dales, called "Varjões", out of which 2 million ha are natural reserves, and the rest is regarded as usable in farms. Varjões are areas that allow irrigation through inundation during the rainy season.

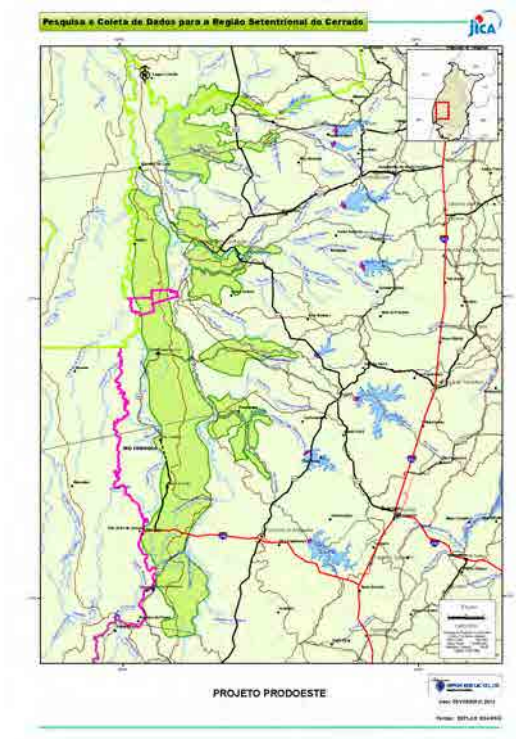


Source: PRODOESTE

Fig. 9.2.1 Rainfall Regimen

The climate is well defined, with a rainy season from October to April. Soils are flat and fertile, with abundant water. However, today, those soils are used only during the rainy season, staying idle during the dry season (May to September). This situation results in significant variations in the demand for work and services associated to agricultural activities and alike.

In order to promote a more intensive utilization of soil and water resources, the State has presented a Plan of Action for the Hydro-agricultural Development of Tocantins. The Plan was based on detailed studies on soils and water resources of the State. The above studies allow determining that in the Southwest of the State short term actions are justified, which conducted to the formulation of the Program of Tocantins Southeast Region Development – PRODOESTE. The selected region contains approximately 300,000 ha of dales, which can be irrigated in dry periods, utilizing the sub-irrigation technique.



Source: JICA Study Team

Fig 9.2.2 Location of PRODOESTE

This technique operates through the maintenance of water in channels and drainage systems, elevating the groundwater and allowing it raising by capillarity to the area where the radicular system of plants is. Irrigation during the dry season eliminates the seasonality of the production and of employment, and will allow the industrialization process of the region.

The total area affected by PRODOESTE has approximately 2 million ha, and the area to be irrigated can reach 600,000 ha.

The strategic objectives defined by the government for PRODOESTE are:

- to promote the sustainable, stable and environmentally sustainable economic growth,
- to reduce poverty, promoting social inclusion and more social and regional equality,
- to support the strengthening of democracy and institutional promotion of the private sector participation. The proposed project is coherent with

those purposes.

The specific objective is the intensification of economic activities and the expansion of productive opportunities in the southwest region of Tocantins, contributing for the sustainable development of the State and to increase the life quality of people. Those objectives are attained through the extension of the production infrastructure (specifically of irrigation and drainage), and infrastructure and services of support to agricultural production and to agribusiness.

- Accumulation/Distribution of water for irrigation, allowing 2 (and up to 3) annual agricultural harvests.
- Multiple use of reservoirs (irrigation, energy, fishery, human supply, animal thirst quenching, tourism, leisure, etc.).
- Intensive production of food to meet the current worldwide crisis.
- To meet the strong demands of local communities (water for irrigation).
- Creation of an intensive center of food to trigger the agro-industrialization process.
- Consolidation of a new regional and state development center.
- Promotion of the regional development – expansion of irrigated agriculture;
- To increase the water supply in the region – implementation of reservoirs in strategic sites, increasing regularized discharges in a manner compatible with the availability of soils proper for irrigation;
- Provision of water infrastructure (canals, water intakes, etc.) necessary to convey regularized discharges until rural properties;
- To avoid losses of agricultural harvests because of lack of water for irrigation, during annual dry periods;
- Provision of an ensured supply of agricultural products – two annual harvests, favoring the installation of agroindustries;
- To increase the supply of jobs, the income of the region, and the wellbeing of people;
- To improve the infrastructure in general of the region; and
- To allow the sustainable economic development, safeguarding and protection the environment, minimizing environmental impacts.

Source: PRODOESTE

Fig. 9.2.3 Project of sub-basins of Pium and Riozinho rivers

PRODOESTE will be conducted in stages, the first one corresponding to the sub-basins of Pium and Riozinho rivers, with a 35,000 ha area, with funds from the Inter-American Development Bank (IDB).

The project areas are currently occupied with livestock husbandry, and approximately 10,000 ha with rice at the rainy season. The project will allow the change the occupation pattern to more profitable crops, such as rice at rainy season and soybean for seeds, corn, sunflower, feijão beans or fruits, such as watermelon, at the dry season.

Through this Program, the following objectives can be attained:

- Regularization and guarantee of water for irrigation (water infrastructure of collective use – dams).
- Enhancement of favorable soil conditions, which allow the sub-irrigation practice.

- Maintenance of the existing land ownership structure.
- Rural producers are responsible for the catchment and application at the properties.
- Reduction of the State investment (less than half of the price for the irrigated hectare).
- Organization of water uses for irrigation through the organization of producers, water tariff, grant and individual licensing of properties.
- Bigger participation of the private sector (public-private partnerships), with enhancement of agribusiness connected to irrigation.
- Organization of irrigation farmers (associations, cooperatives, etc.) to assume the management of systems operation and maintenance.
- To meet the strong demands of local communities (water for irrigation).
- Enhancement of the entrepreneurial spirit of organized rural producers.

The components of the project are as follows:

Infrastructure to allow water for production: to be implemented at the sub-basins of Xavantes, Formoso and Dueré rivers, aiming at the transportation, storage and distribution of water needed to meet the needs of agriculture during the whole year, on a surface of 50,000 ha.

9.2.2 Current Situation

(1) Existing infrastructure

The project is located in the region with favorable infrastructure from the geographic and transportation viewpoints (near North – South railway), which allows the fast shipment of the production to consumption areas and ports. Main structures can be observed in the map on the side.

Main existing infrastructures are as follows:

- Asphalted Road (TO-242, TO-245)
- Well distributed electrical grid
- North-South Railway and Railway Platform (Gurupi)
- Javaé Project
- Formoso River Project (27,787 ha)

Source: JICA Study Team

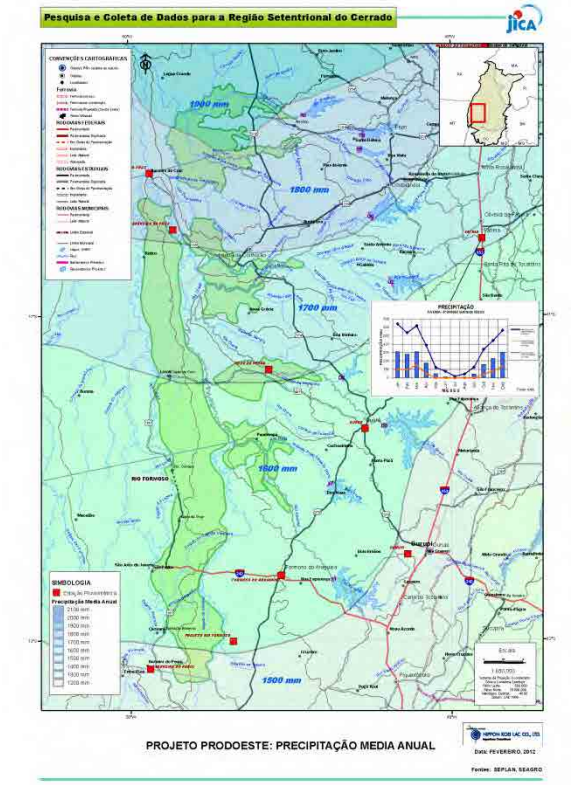
Fig. 9.2.4 Existing Infrastructure

(2) Natural Resources (Rainfall and Vegetal Coverage)

The region also has a 30-year experience with a similar irrigation project (Formoso

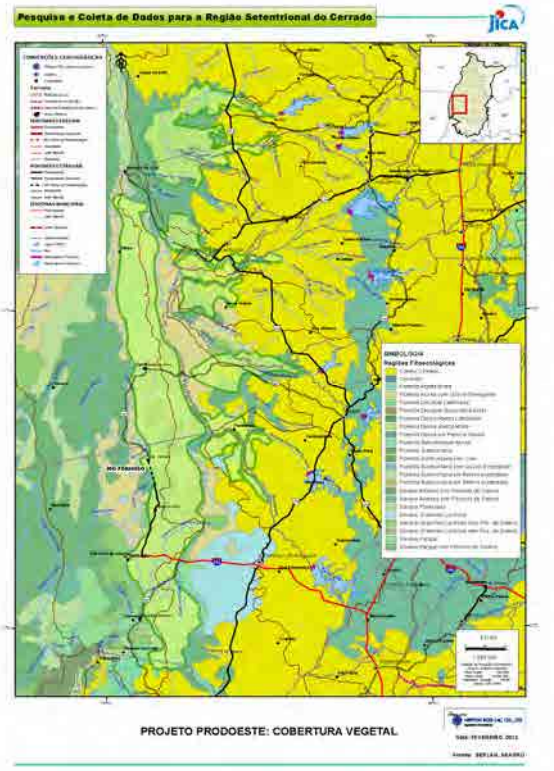
River Project), which irrigates 27,700 ha cultivated with rice, soybean and watermelon, where valuable lessons were learnt about the irrigation technology for the formulation of this project. The region covered by the Program has a great sustainable potential, due to the characteristics of soils, which favor the practice of sub-irrigation or sub-superficial irrigation, very diffused in the region, in addition to irrigation through inundation, with low on farm cost.

However, despite this great potential of soils in the region, irrigation is jeopardized by the lack of rainfall between May and September. Sites with no irrigation system, such as the dales in the region, are only productive in rainy seasons, remaining unproductive in the rest of the year. The following figures show the annual average rainfalls and the vegetal coverage of the project area.



Source: JICA Study Team

Fig. 9.2.5 Rainfall Distribution



Source: JICA Study Team

Fig. 9.2.6 Vegetal Coverage

(3) Protection Areas

In the PRODOESTE coverage area, which is located near Bananal Island, there are the following conservation units and indigenous lands, which shall be taken into consideration:

- National Park of Araguaia
- State Park of Cantão
- Bananal Island/Cantão APA
- Indigenous Land of Araguaia (Utaria Wyhyna/Iròdu Iràna, Krahô-Kanela, Canoanã, Araguaia Park)

Respective locations are shown in the map.

(4) Existing Studies ("Studies and Projects Related to Actions at the Basins of Pium and Riozinho Rivers, at the Southwest Region of Tocantins State – 1st Stage of PRODOESTE")

The Program is divided into 04 components of structuring actions: Component 1 – Water Productive Infrastructure; Component 2 – Complementary Infrastructure; Component 3 – Promotion and Support to Regional Development; Component 4 – Environmental Management; Component 5 – Studies and Projects; Component 6 - Institutional Strengthening; and Component 7 – Supervision and Inspection. Project details are shown as follows;

Table 9.2. Detail of Components of Pium and Riozinho Rivers Basins

Component	Activities
Component 1 – Productive Water Infrastructure	• Implementation of regularization/accumulation dams at high locations at the basins (US$ 84.961 million) • Implementation of level elevation dams at the low valley of water courses (US$ 22.129 million) • Collective distribution systems – Irrigation canals
Component 2 – Complementary Infrastructure	• Improvement and expansion of the road system to channel the production (US$ 3.900 million) • Improvement of existing housing centers (US$ 2.200 million) • Implementation of research scholarships
Component 3 – Promotion and Support to Regional Development	• Promotion and attraction of investments • Structuring of business and investment plans to organize and strengthen productive chains • Information and support for the implementation of companies • Organization of producers • Support to research applied to the natural conditions of dales
Component 4 – Environmental Management	• Water Resources Monitoring System • Plan of Water Resources of Hydrograph Basins and Recuperation of Degraded Areas • Environmental Programs of EIA •
Component 5 – Studies and Projects	• Update and adjustment of State Laws • Implementation of water users registry at the Program intervention areas, • As well as granting and charging systems; • Elaboration of operation and maintenance plans for water infrastructure at the Program intervention areas; • Preparation of environmental studies for areas of interventions; • Elaboration of safety plans for dams; • Execution of social work with the beneficiary community, fostering its participation in the conception of projects; and • Elaboration of social work plan to be implemented during the execution of works.
Component 6 - Institutional Strengthening	• Provision of Management Instruments to the State Administration; • Adjustment and Harmonization of Public Policies; • Support to the state administration in the creation and implementation of its environmental laws detailing, and of the services economic regulation.
Component 7 – Supervision and Inspection	• Administration, management, supervision and inspection • Monitoring and evaluation of the Program • Audit of the Program

Source: Studies and Projects Related to Actions at the Basins of Pium and Riozinho Rivers, at the Southwest Region of Tocantins State – 1st Stage of PRODOESTE

Source: Studies and Projects Related to Actions at the Basins of Pium and

Riozinho Rivers, at the Southwest Region of Tocantins State

Fig. 9.2.7 General Arrangement of the sub-basins System of Pium and Riozinho rivers

Agricultural plots, 100 ha each, belong to the owners already settled in the region.

According to the field works, it is assumed that the existence of water will expand the agricultural activity, since the lack of water is the main, if not the only, limiting factor for that.

The general arrangement of the irrigation system is shown in the figure to the side.

9.2.3 Requirements for PRODOESTE

To complement the concept of PRODOESTE, the following requirements are required:

Table

Topics	Details
Infrastructures	・ Construction of 10 elevation dams in Formoso, Xavantes and Dueré rivers. ・ Construction of collective distribution canals: main canals and secondary canals in Formoso, Xavante and Riozinho Rivers. ・ Construction of drainage systems in Xavante, Formoso and Dueré rivers. ・ Complementary infrastructure: Including: ・ Improvement and expansion of the roads system to channel the production. (In this case, local roads for the flow of products will be considered, giving priority to the support to the production commercialization).
Equipment and support services	・ Contemplated activities are the construction of storage infrastructure. Alternatives of incentive will be studied to attract the private participation in this component.
Necessary preparatory studies	・ Technical Aspects: The technical feasibility of the Program is based on the possibility of using sub-irrigation, which depends on the characteristics of soils in the region, ・ Environmental issues: PRODOESTE will be conducted in a transition zone between Cerrado and the Amazon, which will demand the implementation of relevant environmental studies, and the incorporation of respective reduction measures, ・ Management Capacity: In a multi-sectoral intervention, the participation of various entities and the conception of proper coordination mechanisms are necessary, ・ Financial Sustainability: The level of irrigation tariffs shall be enough to cover the system costs without unduly affecting the willingness of producers to take part in it. This requires the combination of an efficient management system, and the provision of technical assistance to producers.

Source: JICA Study Team

9.3 PROPERTINS (Program of Water and Environmental Management of the Rural Development Project in the Southeast Region of Tocantins State)

9.3.1 Program Conception

Since 1988, when Tocantins became independent from Goiás, the economy has grown steadily, thanks to some favorable natural and topographic conditions. However, an adverse physical condition that inhibits a greater socioeconomic development is the unequal rainfall distribution throughout the year, causing a period of annual drought. To mitigate the disadvantage of lack of water in the State, the government launched, in 1999, a policy called "PROPERTINS", which meaning is "Program of Perennation of Tocantins Water Supply" to allow water supply along the year through the rational use of water resources.

The Southeast region of Tocantins is the region causing more concerns among all the regions of the state regarding the guarantee of water resources for the following reasons:

- Lack of water caused by the inconstant flow of rivers;
- Lack of technology and infrastructure for the utilization of water resources
- Lack of infrastructure for the management of water resources
- Deficiency of the institutional framework for the development of the Rural Sector
- Limited availability of investments for Agribusiness activities

The deterioration of soils and lack of biodiversity result in serious environmental problems for the State, because they contribute for the loss of forestal coverage.

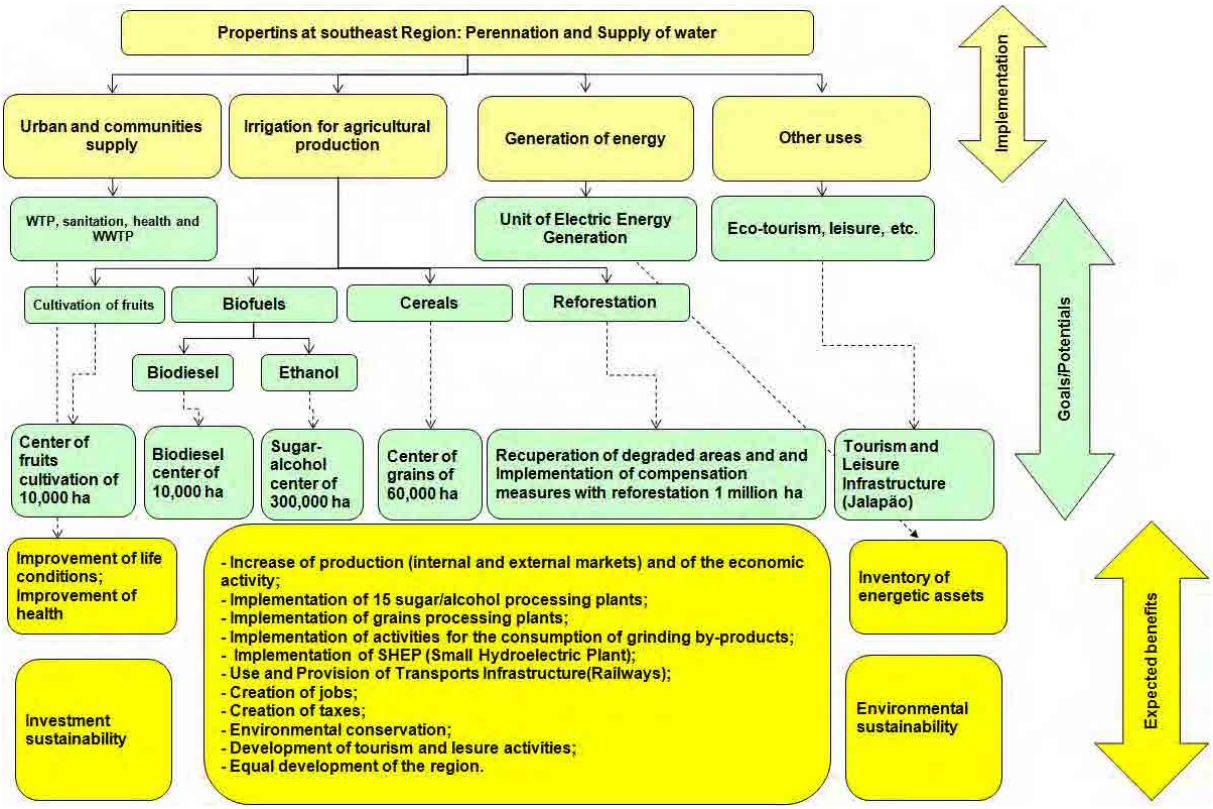
Those complicating factors directly and indirectly affect agriculture and the agribusiness activities in the Southeast region, which is taking the socioeconomic situation to levels of poverty. Consequently, the government of Tocantins State has given high priority to the development of water resources, in combination with the increase of production and environmental protection, ensuring the perennial supply of water through the rational use of water in a sustainable manner. PROPERTINS policy is that the development occurs in a balanced way in the whole state, and that the development of the Southeast region targets the reduction of poverty and the improvement of life quality of people.

The development mechanisms address initiatives of partnership between the State and the Private Sector in order to create collaborative business models that result in the generation of job opportunities and sustainable development in the large extensions of unoccupied land.

(1) Projects Proposed by PROPERTINS

The project is composed of the following three components:

- Construction of 25 (twenty five) water reservoirs and related infrastructure for the development of an irrigated area of 250,000 ha;
- Extensive production of biofuel by the private initiative in agricultural undertakings of approximately 300,000 ha, at the southern half of the project area, which will be allowed through the perennation of waters, which in turn will be regulated by 25 reservoirs;
- Environmental conservation, particularly in the Jalapão region, at the northern half of the project area.



Source: JICA Study Team

Fig. 9.3.1 Overview of PROPERTINS Implementation

The total project cost is approximately between 4 and 5 billion dollars, including private investments.

The development project conceived for the Southeast region is called "Water and Environmental Management of the Rural Development Project of the Southeast Region of Tocantins State, Brazil – PROPERTINS SOUTHEAST". This project, under PROPERTINS policy, is to provide water resources and infrastructure of irrigation to the Southeast region through the development and effective utilization of superficial water and groundwater, always taking into consideration the environmental conservation. The project has the following targets:

- Enhance the life standard of low income farmers at the area;
- Speed up regional economy, especially through the production of bioenergy;
- Environmental conservation as well as Sustainable Development

The Program proposes the following irrigation systems:

Table 9.3.1 Points Indentified for the irrigation systems

POINT OF IDENTIFICATION	WATER COURSE	Contributing Area	GEOMETRIC CHARACTERISTICS		
			Length	Height	RESERVOIR
		(KM2)	(M)	(M)	(KM2)
1	M Alves River	7,400	1300	25	408
2	Peixe River	1,100	200	30	140
3	M Alves River	1,600	700	35	19
4	M Alves River	3,600	1300	14	53
5	Itaboca River	1,270	650	10	20
6	M Alves River	670	1200	45	117
7	Itaboca River	680	1000	14	21

POINT OF IDENTIFICATION	WATER COURSE	Contributing Area (KM2)	GEOMETRIC CHARACTERISTICS Length (M)	Height (M)	RESERVOIR (KM2)
8	Palmeiras River	1,140	500	50	12
9	Inferno River	1,160	200	50	38
10	Palma River	11,200	1300	35	153
11	São Domingos River	800	700	30	12
12	Arraias River	825	1500	30	22
13	São Domingos River	225	600	15	10
14	Santa Izabel River	248	450	25	9
15	Custódio River	360	500	80	7
16	Arraias River	77.5	800	60	4.1
17	Tiúba water stream	60	500	20	2
18	Peixe water stream	48.8	350	80	3.8
19	Palma River	203.1	300	50	10.5
20	Sobrado River	440.6	200	30	12.5
21	Abreu Water Stream	188.3	400	20	3.4
22	Abreu Water Stream	122.4	400	50	4.4
23	Conceição River	108.5	300	40	2.5
24	Grande River	152.3	400	50	3
25	Ponte Alta River	202.2	600	50	8.9

Source: JICA Study Team

It is noteworthy that the Manuel Alves system (Axes 3) was already built.

9.3.2 Current situation (infrastructure, natural resources, manpower)

(1) Program Area

At the Southeast region of Tocantins, twenty five dams/reservoirs were identified, and the expectation is that those reservoirs supply constant water for local irrigation, and for the municipalities during the year. One of them, Manuel Alves River dam, was already built, and is operating since March 2008. The Master Plan study foresees a long term plan for irrigated agriculture in more than 380,000 ha of land, plus the water supply for the municipalities and villages of the Southeast region. The focus is not only on development of crops for food, but also on providing basic infrastructure for the production of biofuel and sugarcane ethanol (to which the investment from the private initiative is expected).

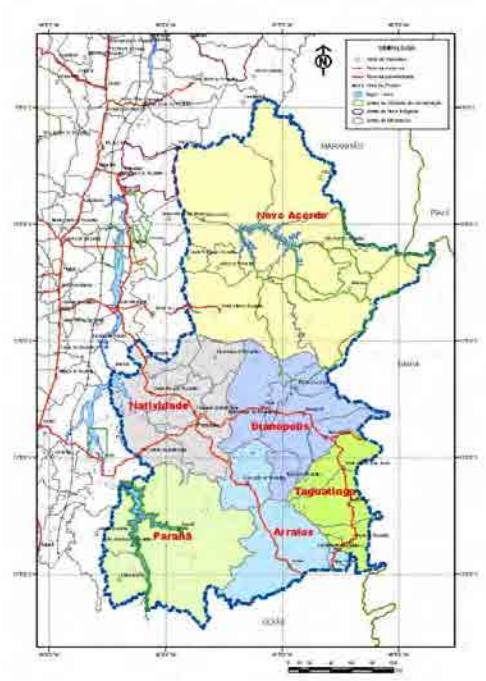
The Southeast region is influenced by the upland climate, and has a relatively smaller rainfall, varying from 1,200 mm to 1,500 mm. Anyway, the rainfall concentrates in a period of only four months, with the remaining eight months of dry climate. As a worsening factor, the rainy period and the rainfall volume vary every year. Such aspect is an underlying critical factor for the low agricultural productivity in Tocantins state. At more critical areas of Southeast region of Tocantins, it is common that most of the rivers dry up in the dry season. These natural circumstances restrict the livestock husbandry and irrigation in agriculture as economic base of the state. Therefore, the cities of the region suffer from the poor social and economic conditions.

Most of the rural communities in these areas are constantly lacking good quality water. Shallow wells are built in dry riverbeds, or in other areas called *cacimbas*. Shallow well water is usually muddy and brackish, being inadequate for drinking and for cattle husbandry. Serious health problems are found, mainly among children.

The northern area of the project, called Jalapão, is a Cerrado area with low utilization of natural resources by its people, being considered a transition area to Caatinga region (“white forest” or “white vegetation”), with an extremely fragile environment. Its landscapes area characterized by dynamic natural processes, due to the ecological instability of its natural resources. The dynamics of the processes of scenery modifications in the region

results in a natural environment degradation, which can be observed through the formation of dunes, eroded rocks, as well as loss of soils and biodiversity.

The project area is located in the Southeast region, at the right bank of Tocantins River, with focus on six development regions: Region XII Novo Acordo, region XII Natividade, region XV Dianópolis, region XVI Paraná, region XVII Arraias, region XVIII Taguatinga. Thirty nine municipalities are involved in the project area. Their areas totalize approximately 90,000 km². The project area covers the Southeast region, at the right bank of Tocantins River, with focus on six development regions:



Source: JICA Study Team

Fig. 9.3.2 PROPERTINS Coverage Area

i. Region XII Novo Acordo

ii. Region XII Natividade

iii. Region XV Dianópolis

iv. Region XVI Paraná

v. Region XVII Arraias

vi. Region XVIII Taguatinga

Thirty nine municipalities are involved in the project area.

(2) Existing infrastructure at the coverage area

Main existing infrastructures are as follows:

Table 9.3.2 Existing infrastructure in the coverage area of PROPERTINS

Project	Contents
Manuel Alves Project	• The Manuel Alves Irrigation Project is located in the Municipality of Dianópolis, southeast region of Tocantins. The Project started in 2001, and comprises the implementation of irrigation infrastructure for the pilot area of 5,000 ha for the cultivation of fruits, grains, among others. • The project works consist of dam, to perennate Manuel Alves River, and the water catchment, distribution and drainage system. Currently, civil works are 100% concluded, and the undertaking is at the phase of initial operation and management transfer to the local community. • Also, a step-down substation of electric energy is being installed, which will allow the local high voltage electrical grid to feed the project, meeting the entire demand. The sub-station is 75% concluded, with final conclusion planned to January 2012. • The pilot area of the project shall be subdivided into 16 business plots and 224 small producers´ plots. For this management phase, funds of R$ 5,989,000.00 are expected, which shall ensure the continuity of the works of management transfer until the end of 2014. • The undertaking will directly benefit the population of Dianópolis, which has a total population of 34,700 inhabitants, and indirectly the communities of neighboring municipalities: Almas and Porto Alegre do Tocantins. • In the economic and social sphere, the project pursues conditions to eliminate poverty in the region, dynamizing the economy with the increase of regional income and of public revenues, thus allowing the access of people to better life conditions. Source: Ministry of National Integration
Roads	• Federal Highway (BR 010) • State Highways (TO 040, 050)
Electrification	• Well distributed energy grid
Railway to be built	• West-East Railway (Figueirópolis ~ Ilhéus)

Source: JICA Study Team

The situation of existing infrastructure is as follows: served by two state highways and comprehensive electrical grid. The West-East Railway project is in this region. After the construction of this railway, the region of PROPERTINS will become a much more privileged region for the channeling of production and flow of inputs.

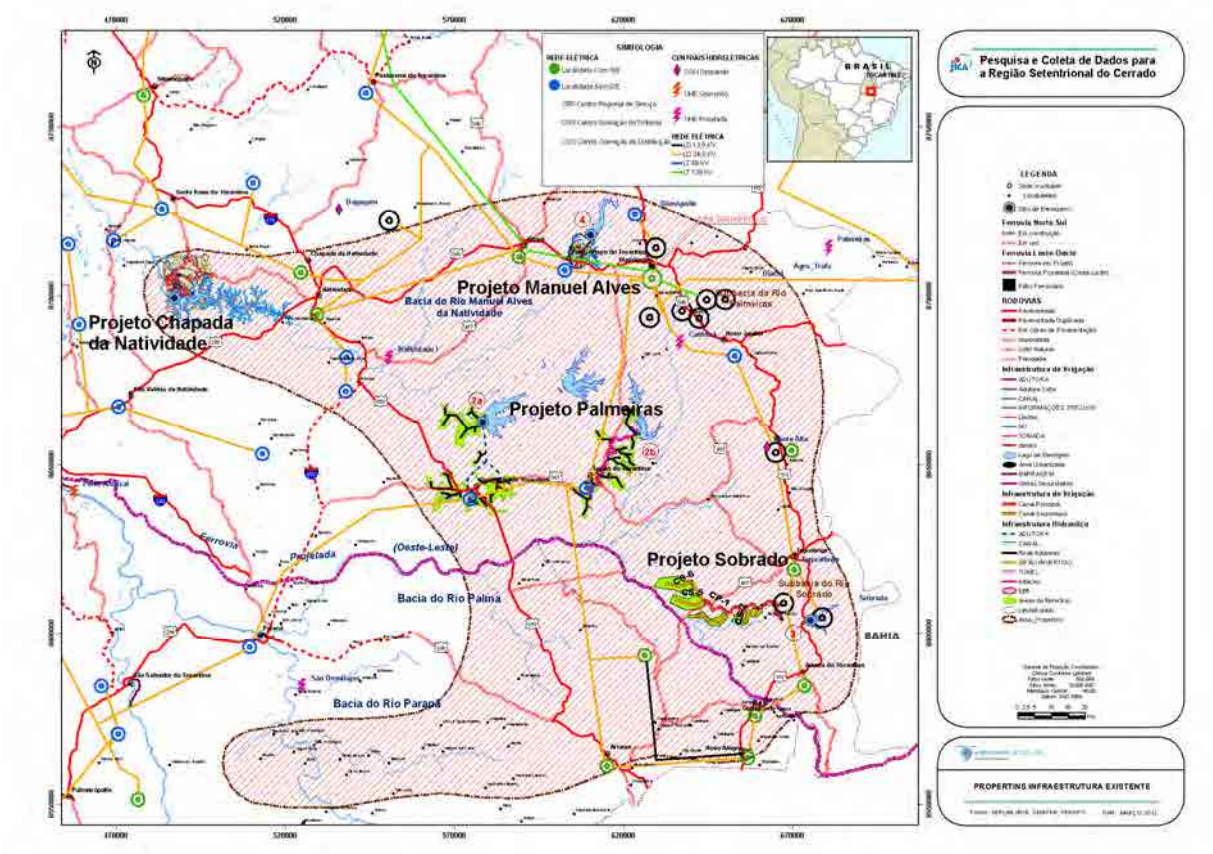


Fig. 9.3.4 Infrastructure Plan in the Region of PROPERTINS

(3) Natural Resources (Rainfall and Vegetal Coverage)

Rainfalls are characterized by the seasonal distribution defined in two periods, dry from May to September (5 months), and rainy season from October to April, with December being the most rainy one, and July, the driest month, according to monthly average rainfall histograms shown in Figure 8.

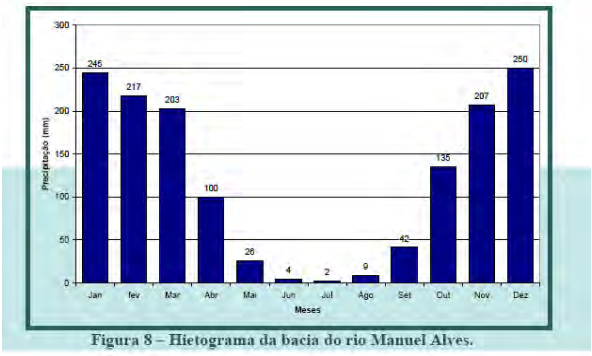


Figura 8 – Hietograma da bacia do rio Manuel Alves.

Source: JICA Study Team

Fig. 9.3.5 Rainfall Regimen

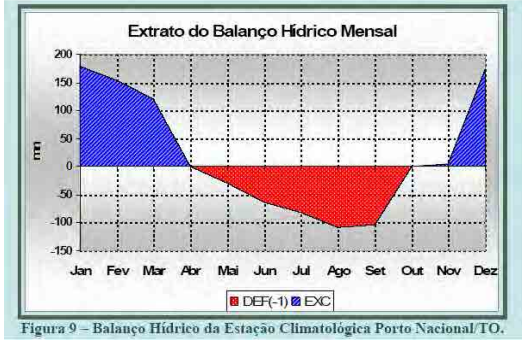


Figura 9 – Balanço Hídrico da Estação Climatológica Porto Nacional/TO.

Source: JICA Study Team

Fig. 9.3.6 Water Balance

Water balance is the determination of all water gains and losses verified in a terrain with vegetation, in order to define the quantity of water available to plants in a given interval

of time. Water balance consists of making the water accountancy of the soil, until the depth explored by roots, systematically quantifying all water deficits and surpluses. Such flows result from the exchanges with the atmosphere (precipitation, condensation, evaporation and transpiration) and from the superficial (runoff) and underground (percolation) movement of water.

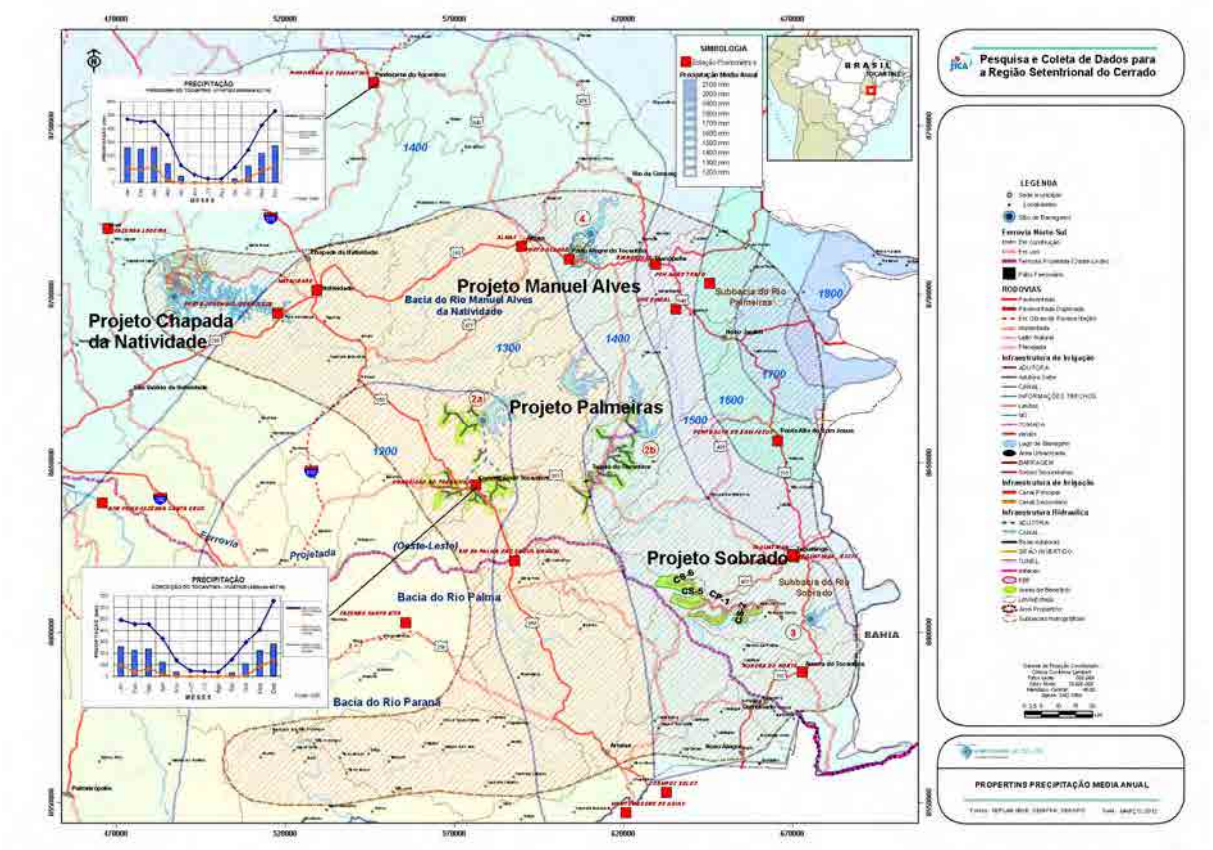


Fig. 9.3.7 Annual Rainfall Regimen

(4) Existing Studies

The proposed project is a large scale one, indispensable for the socioeconomic development of Tocantins. This project will demand most of the technical and managerial capacity of the State considering its complex nature, involving multiple engineering components, environmental issues, various stakeholders, including private business groups and governmental agencies. In addition, the project will be implemented step by step for a long period, with a large amount of investments.

Considering the above assumption, the government of Tocantins State is little by little developing actions in each site for the due implementation of irrigation projects. Within PROPERTINS, there are the following Hydrograph Basin Plan and Economic Feasibility Studies for dams already elaborated:

Table 9.3.3 Already Existing Plans and Studies

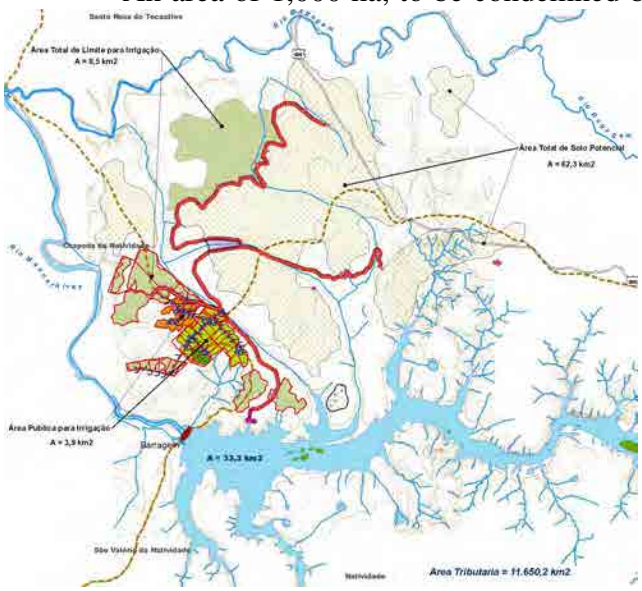
Plan and Study	Details
Plan of Water Resources of Hydrograph Basins	• Manuel Alves River • Palmas River • Balsas River/São Valério
Study of Economic Feasibility	• Chapada da Natividade Irrigation Project • Palmeira River Dam • Sobrado River Dam

Source: JICA Study Team

1) Chapada da Natividade Irrigation Project

The Chapada da Natividade Irrigation Project, conceived within the scope of the Tocantins Waters Perennation Program – PROPERTINS, plans the implementation of 15,000 ha in the municipalities of Chapada da Natividade, Natividade and São Valério da Natividade. The Project presents peculiarities both regarding the legal form of land acquisition and the spatial and temporal distribution of occupation of agricultural lots:

An area of 1,000 ha, to be condemned by the State of Tocantins, referred to as Pilot Project which includes 500 ha divided into 5 lots of 100 ha each, for entrepreneurs, and 500 ha, divided into 50 lots of 10 ha each, for small producers. In such area, that comprises the public perimeter of the enterprise, the cultivation of high commercial value fruits is expected, in order to justify the high investment amounts in the irrigation system.



Source: JICA Study Team

Fig. 9.3.5 General Arrangement of the Chapada da Natividade System

A 4,000 ha area, in which only the water supply infrastructure will be constructed, using the existing land ownership structure, with the aim of allowing the owners to enhance the technology used in the cultivation and to replace traditional soybean plantations by sugarcane, thus following the national trend of producing biofuels, and at the same time creating a revenue that makes this cultivation economically feasible.

The Water required by the Project will be supplied from the Dam reservoir referred to as Axis 1 to be built at the Manuel Alves river. The Project takes advantage of the water availability of Manuel Alves River through irrigated agriculture, in a 4,936 ha area (UAS), including the construction of an accumulation dam. There are the following infrastructures:

- Axis 1 Dam (Height Above Foundations: 30.0 m; Total Height Above the Natural Ground: 25.0 m; Inundation Area (270.0 m): 33.35 km²; Dead Volume: 15,600,000 m³; Useful Volume: 173,000,000 m³)
- Approximation Canal (Length: 100.0 m; Discharge: 5.00 m³/s)
- Main Pumping Station - EB 01 (Total discharge: 5.00 m^3/s; Manometric Height: 40.0 m)
- Pressure Water Main (Length: 400 m)
- Main Substation – 69/34.5 kV (Power: 10 MVA) and Secondary – 34.5/13.8 kV
- Main Canal CP-1 (Length: 22.85 Km; Discharge: 4.94 to 2.04 m³/s)
- Secondary Canals, Distribution Network, Parcel Irrigation System
- Boosting Station EP 01,
- Roads System, Electric Energy Distribution Grid, Electric Energy Transmission Line
- Hydroelectric Power Plant

The implementation of the Chapada da Natividade project was subdivided into stages, and the first one refers to the implementation of an Irrigation Project with 4,936 ha of Useful

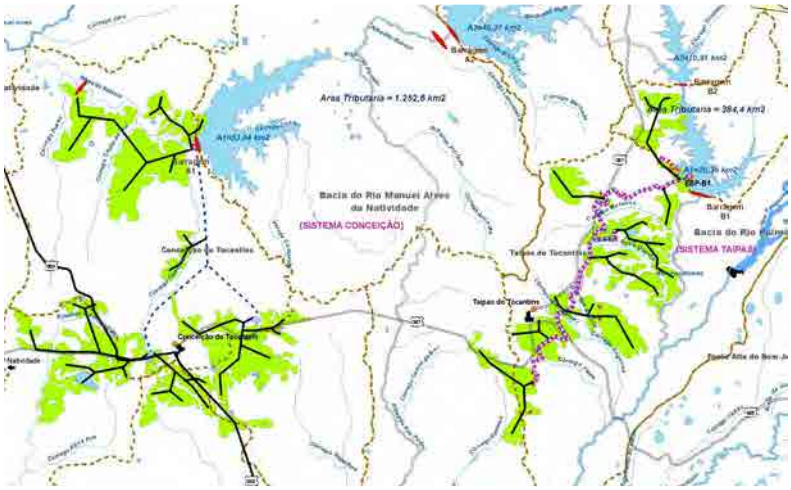
Agricultural Surface (UAS) located in the lands of the municipality of Chapada da Natividade. The other stages refer to the implementation of irrigable blocks totalizing 10,000 ha, amounting to a total UAS of 14,936 ha.

The Project, in its 4,936 ha stage, has peculiarities both regarding the legal form of land acquisition and the spatial and temporal distribution of occupation of agricultural lots:

- A 936 ha area, to be condemned by the State of Tocantins, including 446 ha divided into 5 lots with an average area of 89.2 ha each for entrepreneurs, and 490 ha divided into 48 lots with an average area of 10.21 ha each for small producers. In such area, that comprises the public perimeter of the enterprise, the cultivation of high commercial value fruits is expected, in order to justify the high investment amounts in the irrigation system;
- A 4,000 ha area, in which only the water supply infrastructure will be constructed, using the existing land ownership structure, with the aim of allowing the owners to enhance the technology used in the cultivation and to replace traditional soybean plantations by sugarcane, thus following the national trend of producing biofuels, and at the same time creating a revenue that makes this cultivation economically feasible.

2) Palmeira River Irrigation Project

The Feasibility Study of Palmeira Project "Report of Preliminary Feasibility of Water Infrastructure Undertakings – Volume 1 – Texts" was elaborated by the Consortium formed by the companies DPL Engenharia and Magna Engenharia Ltda. The Palmeira Project System proposed in the report is shown in the following figure:



Source: JICA Study Team

Fig. 9.3.6 General Arrangement of Palmeira River System

The result of the preliminary feasibility Study proposes the following systems:

- Ribeirão Mombó Dam (B1 Dam, with water level at elevation 390 m, and approximately 20 m high; and B2 Dam, with water level at elevation 405 m, and approximately 15 m high)
- Ribeirão Itaboca Dam (A1 Dam with a drainage basin of approximately 1,360 km², and its accumulation basin is entirely inside the municipality of Conceição do Tocantins; and A2 Dam located at the border between the municipalities of Conceição, Taipas and Dianópolis, having a drainage area of 447 km², with its lake located in the municipalities of Taipas and Dianópolis).
- Conceição System (EBP-A with capacity for 3.40 m³/s, geometric difference in level of 85 m, and AMT of 128.9 m; water main with two 1200 mm DN pipes, and 21,960 m long; two accumulation reservoirs, both with approximate capacity of 200 thousand m², enough to operate the system dudring the day; five Pumping Stations distributed as follows: EP-A1 near the dam, EP-A2 "booster" type at the intermediary portion of the water main; EP-A3 and EP-A4 near reservoir R1, and EP-A5 near reservoir R2; and five PVC and cast iron pressurized water mains, and the respective control and measurement systems)
- Taipas System (EBP-B with capacity for 5.07 m³/s, geometric difference in level of 25 m, and AMT of 26.4 m; water main with two 1500 mm DN pipes 690 m long; a main earth distribution canal, recovered with LDPE sheet (or similar) protected with concrete plates, 36.50 km long and capacity varying from 0.25 m³/s to 6.25 m³/s; eight pumping stations along the main canal and respective PVC and cast iron pressurized water mains, with their control and measurement systems.)

3) Sobrado River Dam

Source: JICA Study Team

Fig. 9.3.7 General Arrangement of Sobrado River System

The Technical-Economic Feasibility Study of Sobrado Project was conducted by ECOPLAN Engenharia, in 2007 (November, 2007). The Palmeira Project System proposed in the report is shown in the following figure:

The dam was considered an enterprise for employment in irrigation and power generation, by using the hydrical and agricultural potential of the region.

The irrigated area for the studied dam will have conditions to produce approximately 5,000 hectares of fruit or grain, and fruit growing presents more attractive market prices for the financial and economic feasibility of the project. The electric power generation of the enterprise, on the other hand, was estimated at 27,648 MWh/year. The result of the preliminary feasibility Study proposes the following systems:

- Dam (Type: Massif of compacted soils, originated from mandatory excavations and borrow pits, settled on natural granular soil, with side berm at the downstream slope; Massif length: 166.60 m; Cc = Crowning elevation: 453.00 m; Crowning width: 8.00 m; Maximum height above the foundations: 46.80 m; Maximum width of the base: 289.04 m)
- Ancillary Works of Cofferdam and River Diversion
- Canals and Dissipation Basin of the Spillway System
- Water Intake for Hydroelectric General, Ecological Discharge and Irrigation
- Retaining Wall
- Secondary Damming
- Irrigation Canals

9.4 Proposal of Agribusiness Models

9.4.1 Production of grains

(1) Chapada de Natividade

At the region of Chapada da Natividade, to the southwest of Tocantins state, in an area covered by Propertins, a center of irrigated production of grains will be implemented, through the catchment of Manuel Alves river water, and conveyance through a network of pipes, with no need to construct a dam in the river, since the grantable discharge is way bigger than the need of water to irrigate the areas to be served.

In this region, considering the most favorable features, a total area of 20,000 (twenty thousand) hectares will be selected, of which, deducting the areas of Permanent Preservation and Legal Reserve, 50% will be effectively used for the implementation of grains production, i.e. approximately 10,000 (ten thousand) hectares.

The predominant soils in these areas are classified as Red Yellow Latosols, qualified for short cycle and long cycle crops, provided that their fertility is properly corrected. The predominant relief is of the slightly undulated type, proper for mechanized agriculture; small inclusions of rough topography that occur in the region will be intended for the Permanent Preservation and/or Legal Reservation areas.

The climate and the soil of this region are qualified for the cultivation of grains, provided that technically conducted irrigation is carried out. The comparative advantages that the region offers for that are as follows:

- During the whole year, temperatures and sun radiation rates are always high, allowing the cultivation of grains throughout all the seasons; the combination of this factor with an adequate management of crops rotation will allow the maximum utilization of irrigated land, as well the optimization of the use of agricultural machinery and of the system of grains reception and storage, a condition that can only be repeated in few regions of Brazil and of the whole world.
- The exceptional logistic conditions - easy access to the North South road-railway system and to the West-East Railway – will allow irrigation farmers to obtain very good prices, which, allied to the high productivity obtained in irrigation crops, will allow these undertakers to ensure the return of their investments, with no risk of problems resulting from climatic irregularity frequently occurring in most of the regions producing grains, especially in the second harvest.
- As an alternative which feasibility is being shown by pioneer cattle raisers in various regions of Brazil, there is also the possibility of introducing forage plants irrigated for pastures, with high productivity of meat per hectare and reduction of the meat cattle production cycle, allowing to obtain early young bulls, more appraised by the marketplace. The agriculture-cattle raising rotation also provides additional advantages, since the powerful radicular system of tropical forage grasses promotes the recuperation of the physical qualities of the soil, and also allows a longer cycle of rotation with soybean, favoring the broad reduction of pathogens of grains cultivation in the agroecological environment.

Execution

The production of grains under irrigation will be provided to agribusiness farmers, who shall assume the costs of investments inside the agricultural properties in which they implement their businesses.

The implementation of the system of grains reception and storage will be allowed through the articulation between companies providing agricultural inputs (fertilizers and agrochemicals) and Japanese companies established in the international trade of grains, thus creating a commercial chain of reliable flow from the production to the international marketplaces.

The Government of Tocantins State will take part of the undertaking through counterparts related to the implementation of necessary infrastructure, such as paving 35 km of the road crossing the region, connecting the city of Santa Rosa do Tocantins to the point of installation of the pumping system, at the banks of Manuel Alves River, including the necessary works compatible with the degree of their utilization, the improvement and perennation of local roads that cover the region, the implementation of the main water pipeline network and the electric energy grid to serve the irrigation farmers, and will also provide support through legal means available, procurement and/or provision of land necessary to the undertaking, possibly through leasing, receiving the financial support from the Japan International Cooperation Agency – JICA for that.

(2) Formoso River Region

The Formoso River basin has, since the second half of the XX century, a consolidated center of irrigated agriculture, comprised of approximately 80,000 (eighty thousand) hectares, which is already producing an expressive volume of rice, irrigated by inundation, in the main harvest, and feijão beans, watermelon and soybean for seeds, irrigated by elevation of the groundwater, in the second harvest. There are also producers who, through the planned management of crops rotation, manage to obtain the production of three harvests per year.

The producers established in the region intend to expand their cultivation area, but at the moment there is not enough water available for that in the existing reservoirs. As a result, the Government of Tocantins State intends to incorporate to the agriculture of the region another 200,000 (two hundred thousand) hectares, constructing new reservoirs for accumulation and regularization of the discharge of the Formoso, Xavante, Dueré, Pium and Riozinho rivers, small reservoirs along these rivers, for the installation of catchment equipment in the riverside properties, and also canalization and drainage systems.

1) Pium and Riozinho Rivers

The Prodoeste Project implementation will be done in stages. The first of them, as part of the financing articulated between the Government of Tocantins State and the Inter-American Development Bank - IDB, will cover the basins of Pium and Riozinho rivers.

The production process already consolidated in this region is successfully producing rice, feijão bean, watermelon and soybean for seeds. There is also the intention of diversifying the production, through the introduction of rice and soybean varieties indicated for oriental cuisine and adapted to the regional climate. There are already varieties with those characteristics developed by private companies and Brazilian research institutions, only requiring the implementation of local tests to verify the feasibility of a profitable production.

Execution

The production of grains and fruits under irrigation will be provided to agribusiness farmers already established in the region, who shall assume the costs of investments inside the agricultural properties in which they implement their businesses.

The provision to the marketplace of special grains intended to the oriental cuisine, if the production feasibility is confirmed, will be done through the articulation with Japanese companies established in the international trade business.

The Government of Tocantins State will take part in the undertaking through

counterparts related to the implementation of the infrastructure necessary for the undertaking success, such as the construction of reservoir at Pium and Riozinho rivers, the implementation of electric and hydraulic networks to supply irrigation farmers, the construction of small dams to allow water catchment by riverside irrigation farmers, the perennation of local roads that cross the irrigated perimeter. The Government sill support the implementation of local tests to verify the feasibility of a profitable production of special grains intended to the oriental cuisine, and will also support the creation of a committee comprised of the producers of the region aiming at the implementation of key organized actions for the phytosanitary defense of the fruits pole, and if applicable, for the center of special grains production, as well as for the marketing efforts in benefit of the produces, receiving the support of Japanese financing for these actions, complementary to those already negotiated with the IDB, through the Japan International Cooperation Agency – JICA.

2) Formoso, Dueré and Xavante Rivers

For its complete implementation, the Prodoeste project requires large scale works and, as a result, it will take some time until its results can be enjoyed by all the producers of the involved macrobasin. For this reason, the State Government will implement, in the short run, 10 (ten) small dams along the three rivers of this water basin – Formoso, Dueré and Xavante, thus allowing the acceleration of the incorporation of a significant part of the interest area – approximately 20,000 (twenty thousand) hectares – into the productive process. It is noteworthy that these small dams will be part of the Prodoeste Project, when the later is entirely concluded.

The characteristics of the climate, soil and logistics of these irrigated centers are the same as above described for the irrigated centers located in the basins of Pium and Riozinho rivers, very close to them, and the undertakings in this region will have the same nature and format as described for the above mentioned basins.

Execution

The execution of these production centers of grains, fruits and seeds will also be done according to the same model of the centers located in the basins of Pium and Riozinho rivers.

9.4.2 Production of fruits

(1) Chapada de Natividade

In the region of Chapada da Natividade, considering the most favorable features, a total area of 10,000 (ten thousand) hectares will be selected, of which, deducting the areas of Permanent Preservation and Legal Reserve, 50% will be effectively used for the implementation of fruits production, i.e. approximately 5,000 (five thousand) hectares.

The climate and the soil of this region are qualified for the cultivation of tropical fruits, provided that technically conducted irrigation is carried out. However, the long distance to the big consumer centers of Brazil turns the industrialization of the production more interesting, and fresh fruits would only be sent to the markets when “market windows” make this operation commercially advantageous. In principle, the most interesting species to couple with agroindustry are banana, pineapple, mango, guava and passion fruit. The comparative advantages that the region offers for that are as follows:

- High temperatures and low solar radiation rates almost the whole year, allowing growth throughout all the seasons. The combination of this factor with the correct adoption of cultural practices will allow industrial

plants to fully operate throughout the whole year.

- The optimal logistic conditions - easy access to the North-South road-railway system and to the West-East Railway – will allow manufacturers established in the region to destine their products both to the Brazilian market as well as to exportation.
- As an alternative which feasibility is being shown by pioneer producers in some regions of the northeastern semi-arid region, the south of Bahia state and the north of Espírito Santo state, there is also the possibility of introducing irrigated cacao cultivation, fully under the sun (no shading) and with a productivity per area dramatically higher than that obtained in traditional regions of Brazil, Africa and Asia. This produce has high unit value, admitting freights to longer distances to chocolate factories already installed in Brazil, especially in the region of Ilhéus, which is being connected to the south of Tocantins by the West-East Railway. After the consolidation of the cocoa production center, it will also be possible to attract industries for the region for the local processing of cocoa produced there (see annex "Opportunity of investment in cocoa production in São Francisco River and Parnaíba River valley", Codevast, 2009).

Execution

The production of fruits under irrigation, with a total area of approximately 5,000 (five thousand) hectares, will be made available to anchor companies, which will have their own production areas and will install industrial plants, and to small and middle scale farmers, who will produce fruits under contract, to supply the agroindustries installed in the region, as well as to send their fresh produces to the market, when advantageous.

The Government of Tocantins State will take part in the undertaking through counterparts related to the implementation of the necessary infrastructure, such as the construction of a water supply system from a catchment in Manoel Alves river, in the municipality of Chapada da Natividade, the hydraulic and electric networks necessary for the implementation of the irrigated perimeter, the already mentioned paving of a road connecting this catchment point to the city of Santa Rosa do Tocantins. The government will support the creation of a committee comprised of producers of the region aiming at the implementation of key organized actions for the phytosanitary defense of the fruits production center and for the marketing efforts in benefit of the produces, and will also support, through the legal means available, the acquisition and/or provision, possibly through lease, of land necessary for the undertaking, receiving the support of Japanese financing for those actions through the Japan International Cooperation Agency – JICA.

(2) Formoso River Basin

The region of Formoso River already has an important volume of watermelon production, produced as second harvest crop, in irrigable dales, through the elevation of the groundwater. This crop will be benefited by the above described project, in item 8.2.1.2 Formoso River Region.

9.4.3 Production of crops for energy generation

At the region of Middle Tocantins, a center for the production of irrigated sugarcane will be implemented, based on a catchment directly done at Tocantins River, and on the conveyance of water done through pipelines that will cross the area. This region comprises approximately 400,000 (four hundred thousand) hectares. Inside it, considering the most favorable features, a total area of 60,000 (sixty thousand) hectares will be selected, of which, deducting the areas of Permanent Preservation and Legal Reserve, 50% will be effectively used for the implementation of agricultural projects, i.e. approximately 30,000 (thirty thousand) hectares.

These areas are located at the right bank of Tocantins River, in the municipalities of Santa Rosa do Tocantins, São Valério da Natividade and Peixe, between the 11th and 12th

South Latitudes. This region is bathed, throughout 150 km, by Tocantins River, which average discharge in this stretch is 2,500 m3/s, which will allow the analysis of various alternatives for the location of the pumping stations, and the analysis of various alternatives in terms of soil quality and topography adequacy. The combination of these factors will determine the selection of sites for the implementation of irrigated agriculture projects.

The predominant soils in these areas are classified as Red Yellow Latosols, qualified for short cycle and long cycle crops, provided that their fertility is properly corrected. The predominant relief is of the slightly undulated type, proper for mechanized agriculture; small inclusions of rough topography that occur in the region will be intended for the Permanent Preservation and/or Legal Reservation areas.

The Government of Tocantins State is highly interested in the creation of development centers in this region, which economic evolution is slower than in other parts of the state, mainly as the result of having a smaller rainfall. However, on the other side, as it is bathed by Tocantins River, with a huge discharge, and considering the privileged location in terms of logistics, the irrigation will allow to speed up its growth process, to levels that respond to the aspirations of the Government and of its population.

The climate and the soil of this region are qualified for sugar cane cultivation, provided that technically conducted irrigation is carried out. The comparative advantages that the region offers for that are as follows:

- High temperatures and low solar radiation rates almost the whole year, allowing growth throughout all the seasons. The combination of this factor with the correct adoption of sugar cane varieties and with an adequate management of the planned restriction of water supply will allow the control of sugar cane maturation, allowing harvest and utilization of the industrial plant for a period longer than what is possible in other regions.
- The compulsory use of irrigation if, on one side, implies a highest initial cost of implementation, on the other side, allows the most efficient use of fertilizers, through fertirrigation, and a longer live for sugar cane plantations, everything resulting in a lower production cost per ton of sugar or ethanol produced, since it is possible to expect an average productivity equal or above 120 ton of sugar cane per hectare/year and an average cycle of sugar cane plantation reformation equal or above ten years.
- The production of big biomass volumes per hectare, as the result of the climate and of fertirrigation management, will allow obtaining a second generation of ethanol in a very efficient fashion in the future, extracted from sugar cane cellulose, based on technology developed in Japan.
- The generation of electric energy from sugarcane bagasse allows autonomy and low cost to meet, wholly or partially, the energetic needs of the industrial plant and of the undertaking irrigation system.
- The logistic conditions are exceptionally favorable, especially aiming at the international market: the region is immediately connected to the future Tocantins-Araguaia Water Way, is connected to asphalted roads close to the Belém-Brasília highway axe and to the North-South Railway, it is crossed by the West-East Railway route, now under implementation and that will connect Southern Tocantins to the port of Ilhéus, Bahia State, and through the railway junction of Figueirópolis, it is connected to the North and South of the country.

Execution

The undertaking to be implemented will be the result of the association between Brazilian business groups, traditionally related to the sugar cane industry, and Japanese business groups, related to the big international trade, thus optimizing the agroindustrial activity and the trade of the obtained production as well.

The Government of Tocantins State will take part of the undertaking through

counterparts related to the implementation of necessary infrastructure, such as the implementation of a road connecting the undertaking region to the existing roads system, including the necessary works compatible with the degree of their utilization, the improvement and perennation of local roads that cover the region, and will also provide support through legal means available, procurement of land necessary to the undertaking, receiving the financial support from the Japan International Cooperation Agency – JICA for that.

9.4.4 Establishment of a reliable flow of grains acquisition

The model proposed to obtain a reliable flow of acquisition of great volumes of grains in Tocantins is based on the association between the government of Tocantins State, companies suppliers of inputs to agriculture, especially seeds, fertilizers and agrochemicals, and companies of the field of international grains trade (trading companies). This association offers the following advantages:

- Companies suppliers of inputs maintain, throughout the whole harvest and through their distributors, a close relation with agricultural producers, who are frequently visited by their Technical Sales Representatives, thus being perfectly informed about the crop development, the financial status of producers, such as respect of deadlines and punctuality in the fulfillment of commitments.
- The companies suppliers of inputs are, in general, big multinational companies, which are highly operationally efficient and economically and financially stable, ensuring the reliability in the flow of products from the agricultural production to the international traders.
- The companies operating in the foreign trade of agricultural commodities are also large scale multinational companies, also operating with efficiency in the distribution of such products to global markets.

At this point of the beginning of the expansion of Tocantins grains production, there is still not an expressive network of inputs distributors, with the supply to producers done through representatives of the companies from other regions. There is also a network of grains reception points, which purchase is done by agents of companies located outside the region.

To make a good use of this business opportunity, at first, five establishments intended to shelter inputs distributors and grains reception storages will be built, in strategically selected sites to cover the main producing regions of the state.

The Government of Tocantins State will be responsible for the implementation of the infrastructure necessary to provide soybean of Tocantins with competitiveness: roads, electric energy, construction of silos, storehouses for inputs, technical assistance office, platform for embarkation of grains at the railway, works of art, for those actions, receiving the Japanese financial support through the *Japan International Cooperation Agency* – JICA.

It is interesting to mention that the current system in Brazil for the provision of inputs to farmers is the exchange of such inputs by the future delivery of soybean in the physical market (“green soybean”), which frequently results in risk of default among producers. This requires the permanent presence in the producing region, to rapidly take legal actions to avoid the evasion of the production, to be delivered to the inputs supplier through a contract.

Using the above mentioned system, the supplier sells inputs to farmers, closing contracts based on a certain volume of grains to be delivered at the moment of the harvest, and upon contracting, it does the hedging of the volume contracted at the Chicago Stock Exchange, and undertakes through the contract to transfer to the trading company all the grains thus acquired by the later.
Thus, the trading company is ensured to receive not only a reliable flow of grains to allow it

to develop its international business, but also the repayment of the loan received, thus exempting the trading company from establishing its own agricultural products reception network, and from the risks this operation implies.

The proposed project has the special merit of creating a “critical mass” regarding the provision of inputs to farmers and the acquisition of grains intended to the international market, facilitating and enhancing the volume of businesses, and thus anticipating the role of central axis of the production and of the logistics of the whole Northern Cerrado region that Tocantins will certainly assume in a near future.