CHAPTER 3 PRESENT CONDITIONS OF THE STUDY AREA

3.1 Natural Conditions

3.1.1 Climate

The Study Area is quite uniform in regard to climatology presenting a humid climate with moderate water deficiency (B1wA'a') and humid sub-humid climate with small water deficiency (C2rA'a'). The annual precipitation of the Study Area varies between 1400 and 1800 mm, and the division between the dry and rainy seasons is quite clear. The rainy season encompasses the months of October to April, and more than 85% of the annual rainfall is concentrated in this period. The mean monthly rainfall of the main meteorological stations is presented as follows.

Mean Monthly Rainfall (mm/month)

Station	J	F	M	A	M	J	J	A	S	O	N	D	Total
Imperatriz	226.5	227.7	279.0	197.3	55.0	16.2	6.4	10.2	37.7	85.5	123.3	198.7	1463.5
Conceição do Araguaia	222.8	235.6	268.6	193.4	66.7	18.6	18.0	19.3	79.1	169	193.2	270.6	1754.9
Carolina	283.0	270.5	278.7	188.6	51.8	12.6	9.0	16.9	49.8	156.7	166.8	234.3	1718.7
Araguaína	287.9	282.2	291.2	212.0	90.5	27.3	9.4	22.7	62.1	134.6	198.4	226.6	1819.6

The temperature varies conversely and the humidity proportionally to the rainfall. That means that the higher temperature months are from July to October while the more humid months are from October to April. The mean values of temperature and humidity are presented as follows.

Mean Monthly Temperature (^{o}C)

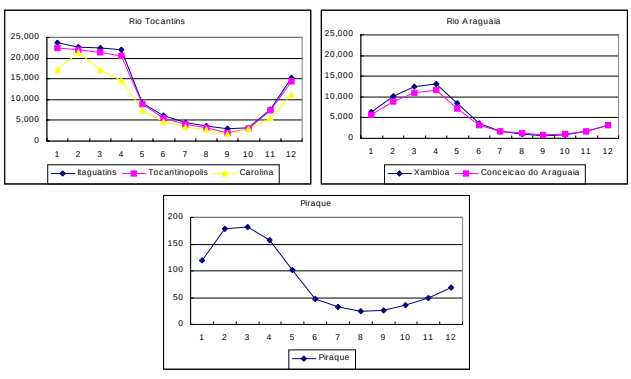
Station	J	F	M	A	M	J	J	A	S	O	N	D	Total
Imperatriz	26.0	25.9	26.0	26.2	26.6	26.2	26.4	27.0	27.0	27.3	26.9	26.4	26.4
Conceição do Araguaia	25.1	25.2	25.4	25.8	26.1	25.5	25.4	26.1	26.4	26.0	25.8	25.3	25.7
Carolina	25.2	25.3	25.4	25.9	26.2	26.1	26.4	27.5	27.8	26.6	25.9	25.4	26.1

Mean Monthly Humidity (%)

Station	J	F	M	A	M	J	J	A	S	O	N	D	Total
Imperatriz	83	84	84	83	78	72	64	61	65	70	75	80	74
Conceição do Araguaia	90	91	87	90	83	83	77	78	83	83	88	90	85
Carolina	84	85	85	81	73	61	55	50	57	74	80	83	72

3.1.2 Hydrology

The Study Area can be divided into two hydrographic basins: the Araguaia river (21,027.3 km^2) and the Tocantins river (16,118.2 km^2). The existing discharge data are presented as follows.



According to the above graph, the difference of discharge between the rainy and the dry seasons is high, and the months presenting the lowest discharges are from July to October.

The Figure 3.1.1 presents the hydrographic system of the Study Area. Taking into consideration the accuracy of the data on rivers in the present study, we can divide them into 3 types. The “Main” rivers are the Araguaia and the Tocantins rivers, the “Primary” rivers are those that directly run into the main rivers, and the “Secondary” rivers are those that run into the primary rivers.

Concerning to the potential of the hydrographic system, it can be said that the secondary rivers only have water during 4 months, drying the other 8 months. As a consequence, the irrigation practices would require the construction of water reservoirs for the utilization of the rivers smaller than the primary ones. In case of irrigation throughout the year, it is highly possible to need the utilization of the Araguaia or Tocantins rivers waters. A special attention shall be paid for the management of water resources in case of the utilization of irrigation practices. This is specially true in order to avoid the occurrence of a disordered utilization of the water resources.

However, there are also perennial rivers such as the Lontra river. Therefore, it is urgently necessary to carry out a study on the region’s water potential to give the conditions for the elaboration of utilization plans for the existing water potential.

3.1.3 Topography

The Figure 3.1.2 presents the altitude variation in the Study Area. As can be noticed, most of the area contains altitudes lower than 300 m though there are some points with more than 600 m. The stronger undulations in the topography can be observed between Nova Olinda – Xambioá and Babaçulândia – Sítio Novo. The data on altitudes utilized in the present study were obtained from existing maps in the scale 1:100,000, with contour lines each 50 m. The Study Area presents a very irregular topography although there are not high differences of altitude due to the large quantity of rivers.

One of the important items taken into consideration in this study is the agricultural mechanization. The cultivation in large areas requires the utilization of machines. Thus, one of the restraining factors for the mechanization is the land declivity. Therefore, a special attention was paid for the land declivity in the Study Area.

In the present study, a 3D model of the Study Area was elaborated utilizing contour lines. This model allowed the calculation of declivity. However, the accuracy degree of contour lines (each 50 m) generated a problem. For instance, a difference of 50m in altitude in 167m in horizontal would be the maximum distances in order to obtain 30% of declivity. These declivities would be seen in the map since the contour lines are located in each 50 m. On the other hand, an altitude of 5m in 17m in horizontal would also present a declivity of 30%. However, this last declivity could not be seen in the map since only contour lines each 50m are recorded. Therefore, the topography variation between the contour lines (50m) would not be recorded due to the data accuracy degree.

Usually, a land is considered prone to mechanization if its declivity is smaller than 30%. Within this interval, in a declivity until 15% mechanization would be possible, and between 15 and 30% it would be possible with certain restrictions. However, the present study has utilized more strict intervals due to the previously mentioned problem.

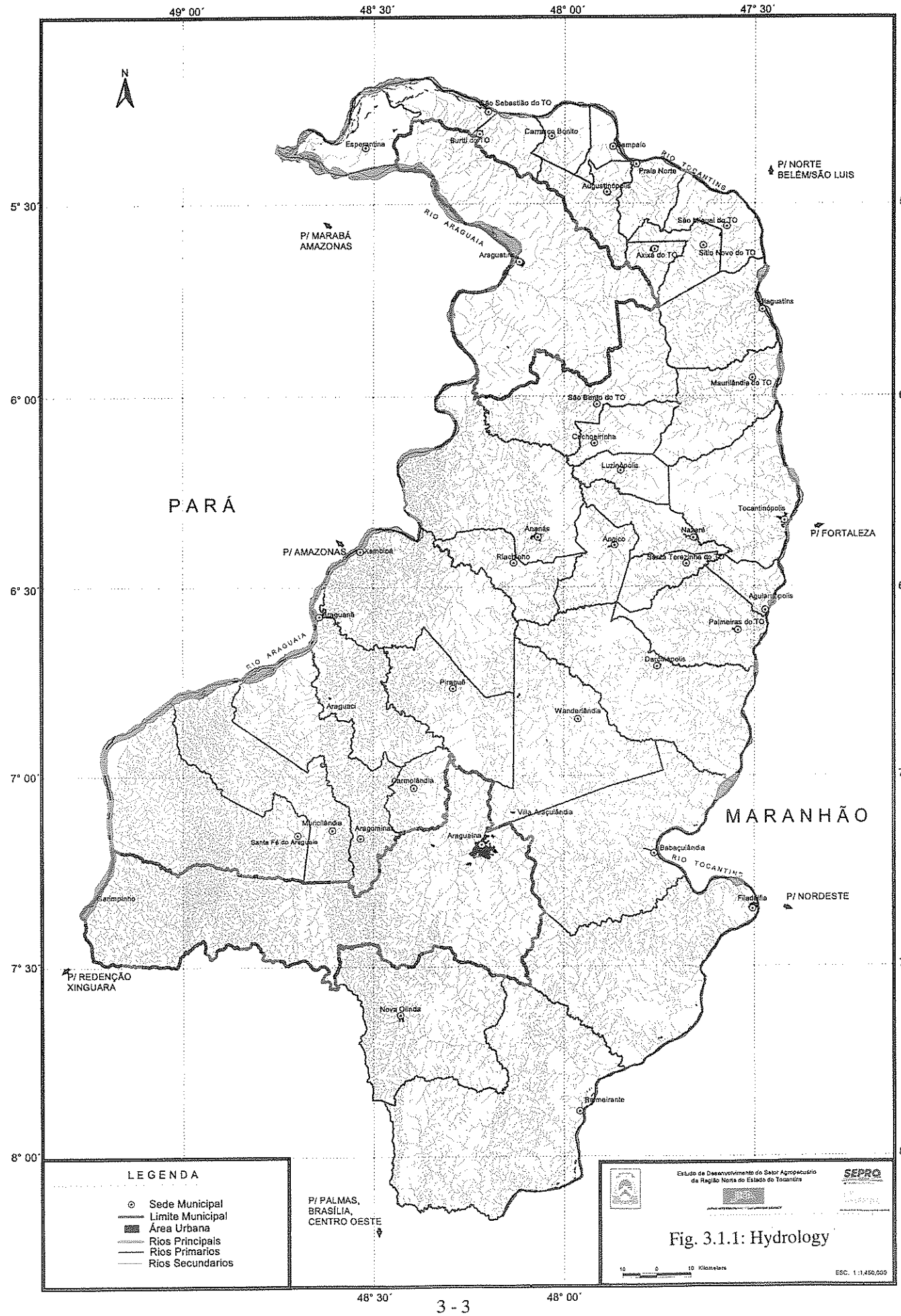


Fig. 3.1.1: Hydrology

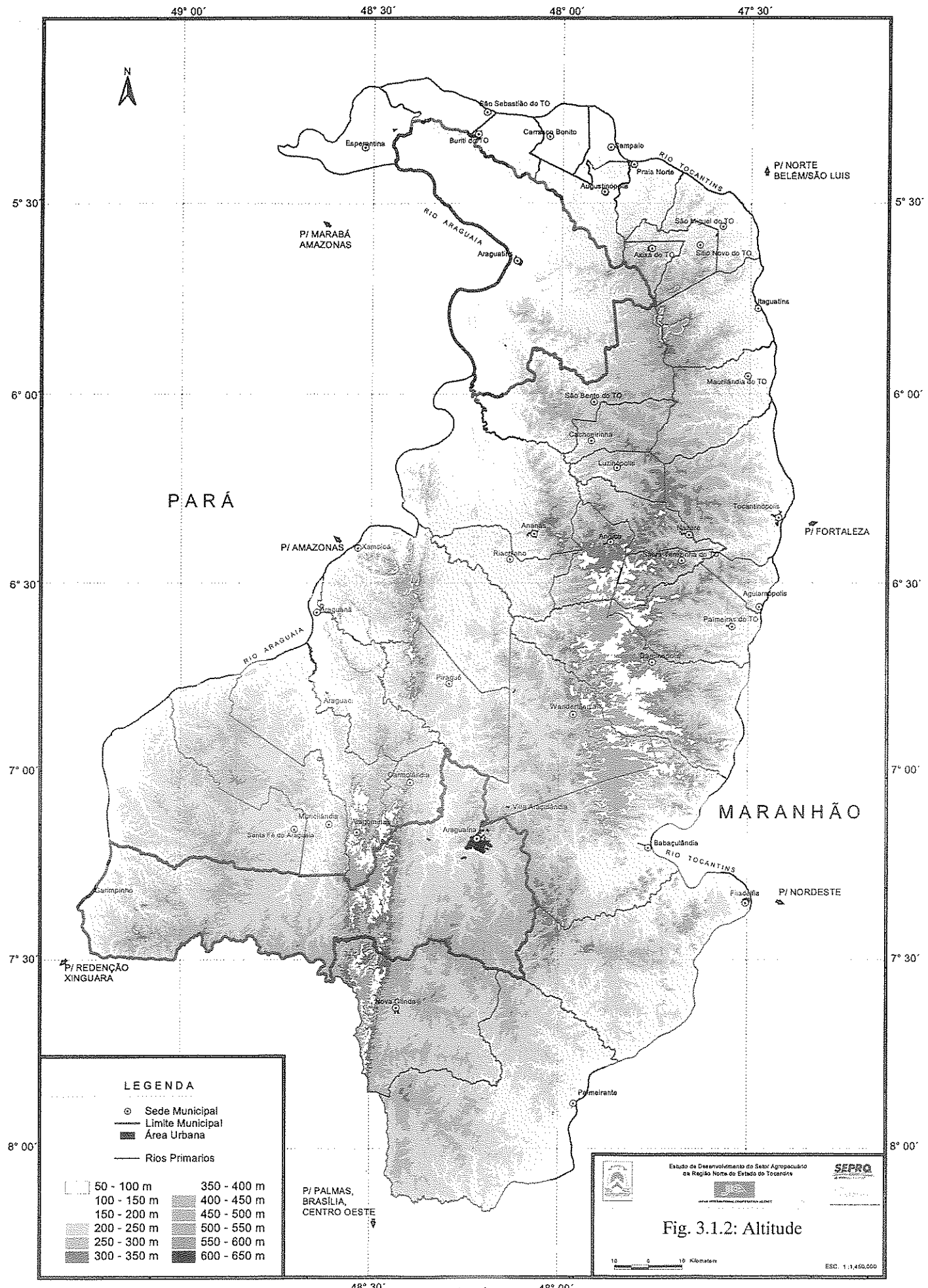


Fig. 3.1.2: Altitude

As a consequence, the declivity intervals utilized in the present study were the following ones.

Declivity	Mechanization Possibility
0 – 4%	Easy
4 – 8%	With Certain Restrictions
8 – 30%	Difficult
> 30%	Not Possible

This analysis' results are presented in the Figure 3.1.3. As observed, the declivities higher than 8% are concentrated in those formations between Nova Olinda – Xambioá and Babaçulândia – Sítio Novo, previously mentioned.

If we take Araguaína municipal district as an example, the areas with declivity higher than 4% are, besides the area between Nova Olinda and Xambioá, the locations close to primary rivers. Thus, observing Araguaína, it can be noticed that most of its area is easy for mechanization what in reality is not true. As observed in the altitudes' map, the Araguaína municipal district presents undulation although the differences in altitude are not high. The conclusion is that it is difficult to find large continuous areas with flat topography.

The declivities presented in this map are only trends in large scale. As a consequence, if a deeper detailing is necessary, information on contour lines with a smaller interval shall be necessary.

3.1.4 Soils

The Table 3.1.1 presents the soil types and the characteristics of each type within the Study Area.

Table 3.1.1: Soils Classification and Characteristics in the Study Area

Current Classification		Area Occupied	Soil Associations	Characteristics
Sandy Soils (Quartz Sands)	Areias Quartzosas	13,719.4 km^2 (36.9%)	Petroplinthic Soils, Dystrophic Litholic Soils, Dark-Red Oxisols, Hydromorphic Quartz Sands, Gley Soils	This soil belongs to Entisol which is strongly affected by the parent material and not affected by the environmental factors. This type of soil is formed on recent topographic conditions such as recent alluvial soils. It shows high erodibility on steep topography.
Hydromorphic and Alluvial Soils (Gley Soils)	Hidromórfico Gleizado	883.5 km^2 (2.4%)	Alluvial Soils, Organic Soils, Quartz Hydromorphic Sands	This soil is blackish in color and rich in organic matter and base contents including humic gley soils. This soil is basically suitable for crop production with some problems such as shortage of available water in dry season and less drainability in lowland.
Latosols (Yellow Oxisols, Red-Yellow Latosols, Reddish Brunizem)	Latossolo Roxo, Latossolo Vermelho-Amarelo, Latossolo Vermelho-Escuro	180.4 km^2 (0.5%) 9,874.1 km^2 (26.6%) 593.7 km^2 (1.6%)	Purple Oxisols, Red-Yellow Oxisols, Dark-Red Oxisols, Quartz Sand, Red-Yellow Podzolic, Dystrophic Litholic Soils, Gley Soils	This soil is a highly weathered tropical soil specifically distributed in the areas with dry and steady temperatures in summer. It is mainly utilized for shifting cultivation, extensive agriculture/animal production and cultivation of sugarcane, banana, pineapple and coffee. An appropriate soil management is needed due to poor fertility and water holding capacity.

Podzolic Soils (Red-Yellow PodzolicSoils)	Podzólico Vermelho-Amarelo, Podzólico Vermelho-Escuro	6,286.3 km^2 (16.9%) 2,063.7 km^2 (5.6%)	Dark-Red Podzolic, Quartz Sands, Red-Yellow Oxisols, Dark-Red Oxisols, Cambisols, Dystrophic Litholic Soils, Petroplinthic Soils	This soil has grey to brown colored surface layer and is usually formed under forest and grass land vegetation with the climate of hot/dry summer and clear dry and wet seasons. This soil is widely used for crop production and pasture land due to rather high fertility derived from cation accumulated layer (C layer).
Concretionary Soils (Petroplinthic Soils)	Solos Concrecionários	1,949.4 km^2 (5.2%)	Red-Yellow Oxisols, Yellow Oxisols, Red-Yellow Podzolic, Dark-Red Oxisol, Alluvial Soils, Dystrophic Litholic Soils	This soil is a part of latosol which has organic matter poor and Fe-rich concretionary layer within 1m from soil surface. This soil is formed under the repetition of dry and wet conditions.
Litholic Soils (Dystrophic Litholic Soils)	Solos Litólicos	1,595.0 km^2 (4.3%)	Red-Yellow Oxisols, Red-Yellow Podzolic, Dark-Red Oxisols, Yellow Oxisols	This soil is gravelly soils belongs to Entisol and the organic matter contents reduces in deeper layer. It shows high erodibility on steep topography similar to the case of Quartzose Sands.
Total		37,145.5 km^2 (100.0%)		

3.1.5 Vegetation

The division of vegetation in the Study Area carried out by SEPLAN/DZEE is presented in the following table.

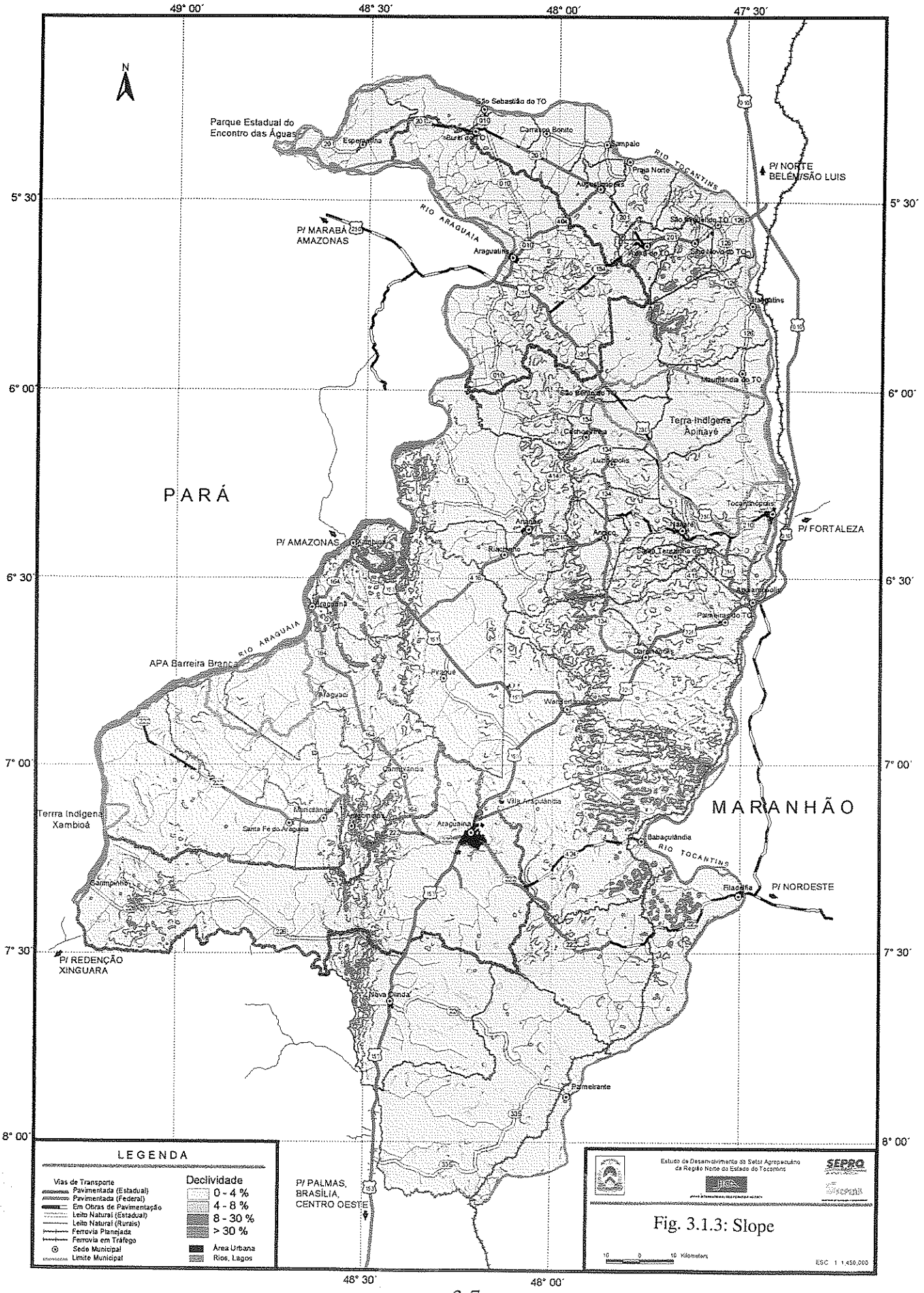
	Seasonal Forest		Rain Forest		Cerrado		
	Deciduous	S-Deciduous	Forests	Woods	Arboreous	Park	Grassy Woody
Total in the State	0.6%	1.9%	5.4%	4.3%	87.8%		
Study Area	1.7%	-	28.5%	20.0%	29.8%	11.8%	8.2%
Araguatins Region	0.0%	-	54.4%	6.0%	32.1%	6.9%	0.6%
Augustinópolis Region	16.9%	-	51.2%	6.0%	25.9%	0.0%	0.0%
Tocantinópolis Region	3.4%	-	16.2%	0.0%	37.4%	22.2%	20.8%
Xambioá Region	0.0%	-	62.1%	17.1%	9.0%	11.8%	0.0%
Araguanã Region	0.1%	-	12.8%	33.9%	33.2%	10.8%	9.2%

As for vegetation in the Study Area, the parts which are left with native forest are few, and most of the area is covered with a secondary vegetation. In the few remains of Cerrado we can find a natural vegetation although it has already undergone several fires. The main vegetation in the Study Area is the Arboreous Cerrado (Cerradão) covering 30%, followed by forests with 28%, and finally by woods. The Tropical Rain Forest areas are found at the margins of the Araguaia river, and the Cerrado at the margins of the Tocantins river.

The Tropical Rain Forest is classified into forests and woods according to the density of trees. The Vegetation classification is carried out in the same manner, standing out the fact that in the forests the predominance of trees such as the babaçu palms can be observed.

The tropical rain forests at the margins of the Araguaia river are found in larger areas at the south of the Study Area. Some decades ago, in this region it was still possible to find very useful trees. However, due to the uncontrollable deforestation occurred in the 70's, few native vegetation was left since most of it was cut in order to form pastures.

The regions with the occurrence of Cerrado were divided into the following classes: **Arboreous Cerrado** with a more dense vegetation; **Cerrado Prairie** in areas with few vegetation; and the **Cerrado Park**. The **Arboreous Cerrado** can be found in regions with fertile soils, with high trees. The **Cerrado Prairie** can be found in regions with poor soils, and the **Cerrado Park** in regions where the soils have low water runoff capacity.


49° 00´
48° 30´
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47° 30´
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N
Parque Estadual do Encontro das Águas
São Sebastião do TO
Esperantina
Buriti do TO
Carrasco Bonito
Sampaio
Praia Norte
Augustinópolis
RIO TOCANTINS
P/ NORTE BELÉM/SÃO LUIS
RIO ARAGUAIA
P/ MARABÁ AMAZONAS
Araguatins
São Miguel do TO
Xambioá
São Valério da Natividade
Nova Olinda do TO
São Miguel do TO
Augustinópolis
Tocantins
Maurilândia do TO
São Bento
Terra Indígena Apinayé
Cachoeirinha
Luzinópolis
PARÁ
Tocantinópolis
P/ FORTALEZA
P/ AMAZONAS
Ambrosina
Riachinho
Angico
Itaguatins
São Terezinha do TO
Ananás
Palmeiras do TO
APA Barreira Branca
RIO ARAGUAIA
Piraquê
Wanderlândia
Carmolândia
Terra Indígena Xambioá
Muricilândia
Santa Fé do Araguaia
Araguaína
Vila Araguaína
MARANHÃO
Babaçulândia
RIO TOCANTINS
Filadélfia
P/ NORDESTE
Campinaçu
P/ REDENÇÃO XINGUARA
Nova Olinda
Palmeirante
P/ PALMAS, BRASÍLIA, CENTRO OESTE
LEGENDA
Vias de Transporte
Pavimentada (Estadual)
Pavimentada (Federal)
Em Obras de Pavimentação
Leito Natural (Estadual)
Leito Natural (Rurais)
Ferrovia Planejada
Ferrovia em Tráfego
Sede Municipal
Limite Municipal
Declividade
0 - 4 %
4 - 8 %
8 - 30 %
> 30 %
Área Urbana
Rios, Lagos
Estudo de Desenvolvimento do Setor Agropecuário da Região Norte do Estado do Tocantins
SEPRO
Fig. 3.1.3: Slope
10 0 10 Kilometers
ESC 1:1.450.000

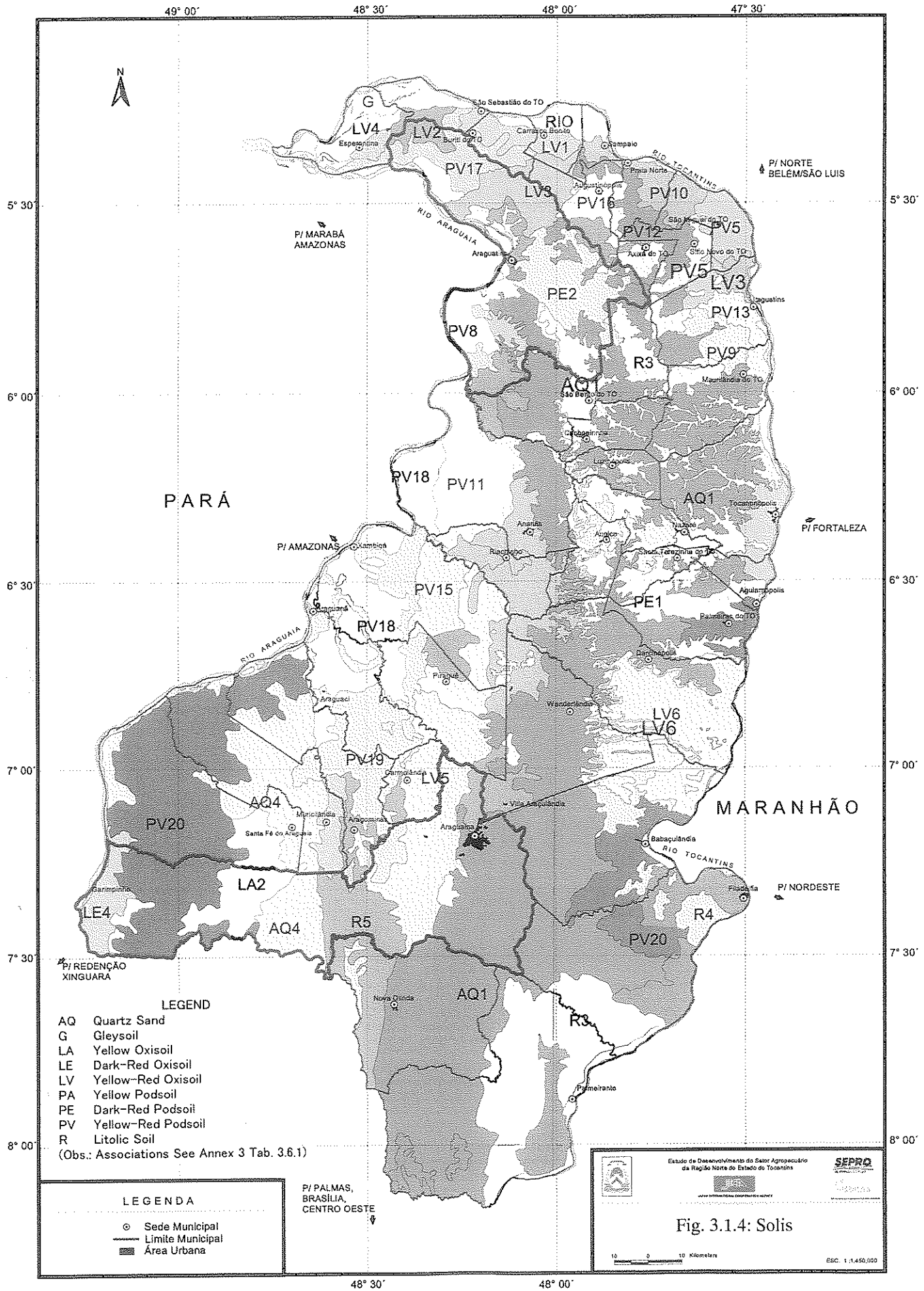


Fig. 3.1.4: Solis

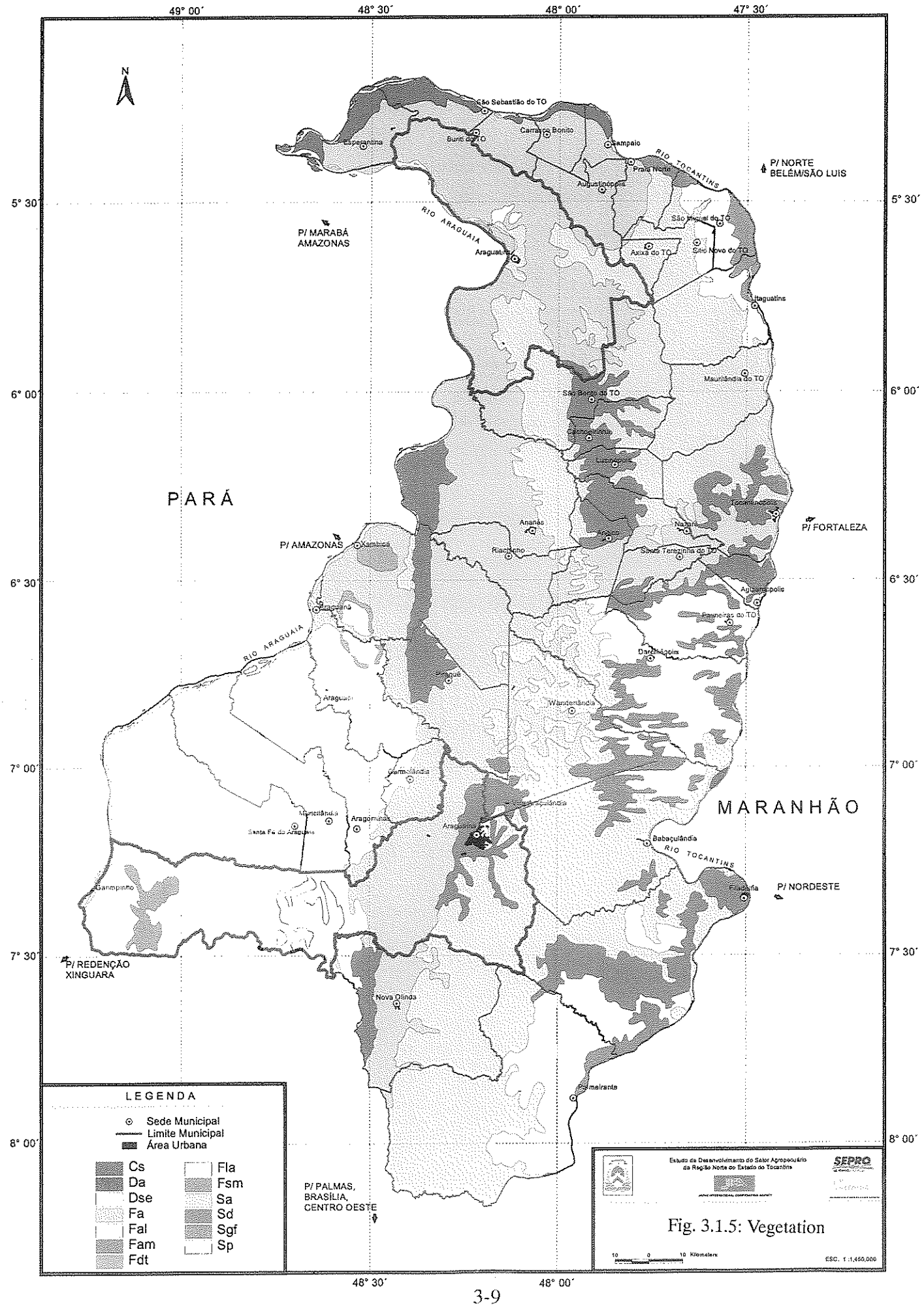


Fig. 3.1.5: Vegetation

3.2 Social Conditions

3.2.1 Population

The population in the Study Area is of 363,996 inhabitants, representing about 31.5% of the state population. On the other hand, the Study Area represents 13.8% of the state area.

Area	Pop. (1996)	Area (1996)	No.of family	Persons per family	Pop. Density (1996)	Man (1996)	Women (1996)	Pop. (2000)	Pop. Dens. (2000)
Area I	36.910	4.859,8	7.530	4,9	7,6	18.931	17.979	43.048	8,9
Area II	60.344	2.147,4	12.498	4,8	28,1	30.533	29.811	60.334	28,1
Area III	49.372	5.964,4	10.617	4,7	8,3	25.263	24.109	56.518	9,5
Area IV	29.233	5.519,6	6.229	4,6	5,3	15.133	14.100	32.836	5,9
Area V	156.439	17.760,7	35.482	4,5	8,8	78.469	77.970	171.260	9,6
Study Area	332.298	36.251,9	72.356	4,6	9,2	168.329	163.969	363.996	9,8
All State	1.048.642	262.268,7	237.789	4,4	4,0	537.118	511.524	1.155.913	4,4

Source: Institute of Geography and Statistic: 1999

3.2.2 Poverty Index

The highest values of poverty index are concentrated in the North Area. The classification according to the IDM–Index of Municipal Development is presented bellow:

Municipality	Index of Development Municipal - IDM	Classification in the State
Carrasco Bonito	0,000	139º
Campos Lindos	0,059	138º
Sampaio	0,062	137º
Lagoa do TO	0,078	136º
Barra do Ouro	0,079	135º
Recursolândia	0,082	134º
Itapiratins	0,094	133º
São Félix do TO	0,095	132º
Santa Terezinha do TO	0,095	131º
São Miguel do TO	0,095	130º

Source: SEPLAN/SETAS –TO - 1998

Among the ten municipal districts with high IDM of the State of Tocantins it attended for the recently instituted administrative areas focused in these analyses, just the municipal district of Araguaína that was classified in a fourth position.

The area presents abundant natural resouces, where they are under utilized by an extensive activity with low productivity. 90% of the population earns less than 3 minimum salary, and 58% earn less than 1 minimum salary.

Region	No income	< 1 MS	1 to 3 MS	3 to 10 MS	10 to 20 MS	>20 MS	Total
Study Area	2.541	32.157	18.468	5.040	985	534	59.725
Other Areas	4.113	60.960	46.272	14.966	2.732	1.527	130.570
State	6.654	93.117	64.740	20.006	3.717	2.061	190.295

Source: Renda 91 (MS=Minimum Salary)

Region	No income	< 1 MS	1 to 3 MS	3 to 10 MS	10 to 20 MS	>20 MS	Total
Study Area	4.3%	53.8%	30.9%	8.4%	1.6%	0.9%	100.0%
Other Areas	3.2%	46.7%	35.4%	11.5%	2.1%	1.2%	100.0%
State	3.5%	48.9%	34.0%	10.5%	2.0%	1.1%	100.0%

Source: Renda 91 (MS=Minimum Salary)

By the agricultural production point of view, only 16% of the land owner realizes agricultural activities. It represent only 23% of the area.

3.2.10 Degree of literacy

According with the Census of 1991, the people's literacy rate with more than 10 years of age, in the State of Tocantins, was of 69,25%: 56,50% in the rural area and 78,04% in the urban area. As for age groups, the literacy rate as much of men as of women above 40 years is inferior to 50%.

Tax of Literacy for age group

Age group	Total	Men	Women
10 to 19 years	77,83%	72,77%	83,05%
20 to 29 years	80,72%	77,77%	83,74%
30 to 39 years	72,46%	71,45%	73,49%
above 40 years	46,23%	49,36%	42,68%
Medium	69,25%	67,25%	70,74%

Source: Census 1991, IBGE

3.2.4 Education Services

(1) Basic Education

The total number of schools of basic education in the state is 2.118 public schools and 70 private schools, with a number of students of 307.414. The students' percentage that end the first four years of the course of first degree is of 62%. As for the last 4 years of the first degree, the students' percentage that concludes this stage it is of 63%.

There are in the State 152 public schools and 19 private schools for the medium level. The total number of students are 3.513. Five schools agrotécnicas of second degree exist in the state: 1 federal school in Araguatíns, 1 municipal school in Fátima, 1 school of the state, belonging to UNITINS, in Natividade, 1 state school in Pedro Afonso (SEDUC) and 1 school in Canuanã.

(2) Professional Education

Inside of PLANFOR, 103 courses were made in 53 municipal districts of the state of Tocantins and there was the 7.187 workers' participation. Basically, the training in the rural area is made by RURALTINS and SENAR (*Serviço Nacional de Aprendizagem Rural*) and sometimes by SEBRAE

(3) Faculty

Two established universities exist in the State: UNITINS and ULBRA. The UNITINS faculty related with the agricultural section is in Araguaína (Veterinary Medicine), in the north area, Gurupí (Agronomy), in the south area and Paraiso do Tocantins (Engineering of Victuals), in the central area. ULBRA has a course of agricultural engineering. The total number of students of this university is of 923.

3.2.5 Syndicalist Movement

1) Owners Unions

The owners unions join in the State to the Federation of the Farmers in the State of Tocantins–FAET and affiliated to the National Confederation of the Agriculture–CAN. There are 14 the cooperatives of existent producers in the State.

2) Rural Workers Syndicate

The rural workers syndicates join to the Federation of the Workers in the Agriculture of the State of Tocantins–FETAET (founded ten years ago) and this to the Confederation of Workers in the Agriculture–CONTAG. They are today 54 unions in the State, of the only two are not in operation.

3.2.6 Indios

The indigenous population of the State of Tocantins adds today 6,058 inhabitants approximately. There are the two present indigenous groups in the area, Xambioá and Apinajé add a population of only 1.230 inhabitants. They collect tubercles, roots and fruits like *jenipapo*, *cajú* and *mangaba* and they cultivate the sweet potato, cassava, *banana*, cotton, pepper, tobacco and medicinal plants.

3.2.7 Services of Health

(1) Physical Net

The administrative management of the politics of health is made through three regional offices: regional office of the north in Araguaína, regional office of the south in Gurupí and central regional office in Palmas. They are 11 regional hospitals supervised by the regional offices. In comparison with the data of the country and of the North area, the number of doctors in Tocantins is inferior the half of the rate of the country (13,04), but the difference with the North area is small (6,02).

(2) Diseases

The malaria is controlled in the State, happening some isolated cases among them people seatled in the establishments of INCRA. The people coming from Pará they bring the incubated malaria and they end up developing the disease in Tocantins. In the rural area, many cases of tuberculosis, hanseníase and hepatitis exist caused by the poverty, malnutrition and precarious sanitary conditions. Also cases of meningitis exist.

(3) Preventive medicine and health education

The control and the prevention of diseases at domestic level, it has been done by the General office of Health through the campaigns of health and of the Program of Community Agents of Health–PACS. Besides, programs of health are accomplished at the schools of first and second degrees with the volunteers' training among the own students.

(4) Other

As for the maternal-infantile health, the General office supposes that it still exists a high infant mortality tax although this statement is not based on data officials. The main causes are the malnutrition, diseases diarréicas, pneumonia and nati-died.

3.3 Conditions for Infrastructure

3.3.1 Transportation network

This study are used to locate geographically disadvantageous area. However, Carajas railway and Itaqui port in Maranão state are introduced to this area recently, then the disadvantage is almost solving. The main network includes road, railway and water transportation network.

(1) Road network

The Belem-Brasilia road is running to the center of Study Area and moreover, the trans Amazon highway intersects in Aguianopolis which is located in right end of Study Area. Pavement road connects with belem-Brasilia road which runs in the central part and connects with the main cities, towns and villages in Study Area.

Accomplishment of road network is progressing at the considerable speed in Araguaia, Xambioã, Aguanopolis, Araguatins, Axixa. And with these services, carrying-out to major market is becoming possible. In extreme northern part, transportation of reaching Pará state Maraba city is becoming easy from northeastern part and northern part to Imperatoris which is main wholesale site.

(2) Railway network

Introduction of railway network is progressing rapidly. With the combination of Carajas railway and north-south railway, the carriage to Maranhão state Itaqui harbor is becoming possible. North-south railway reaches to Estrait, Maranhão now. In the future, the railway through Tocantins river side and can contact with each cities in the center part of Brazil. There is a plan of carrying-out base to be constructed in Aguanópolis ,Tocantins.

As other plan, railway from Aguianopolis to Xiambioá is plan to construction. Possibleness with the service is judged higher because this railway is the part of the plan of the Araguaia river transportation plan which is main plan of the federal government.

With accomplishment of this traffic network, large capacity carriage would be possible. The big capacity of product is possible to carry out to the world major cities from Itaqui harbor which is the final destination of this system.

(3) Water transportation network

Water transportation network hasn’t accomplished yet but being serviced as the cereal carrying course from the mid-western area future is a highly possible. The service of these traffic networks is taken up as the federal government plan and Araguaina river is assumed to be utilized as the cereal conveyance passage from Mato Grosso state futurely.

(4) Aerial network

Airport already exists in Araguaina in the centre of this Study Area and can access main cities easily.

3.3.2 Other Infrastructure

(1) Storage facilities

This state has the storage facilities of about 1,600,000 tons and in the meantime, only about 10,000 tons exist in this Study Area. This is caused by that cereal growth and its circulation in this area weren't done. The main facilities in Study Area are in Araguaina and Tocantinópolis.

(2) Electrical system

As for electric infrastructure in this state, the main power distribution is managed by ELECTRONORTE and as for the power distribution in Study Area, CELTINS is managing. ELECTRONORTE manages the high-voltage line which runs through in the state.

3.4 Conditions of Land Use

3.4.1 Land Use

As for area of this Study Area (about 37,000 km2), the utilization as pasture is the great part. The following is utilization of this Study Area estimated from SEPLAN/ZEE GIS and IBGE data.

Utilization of area in Study Area (km^2)

	Water area	Pasture	Cerrado	Forest	Residential	Farm	Total
Area I- ARAGUATINS	149.9	1,892.9	1,345.1	1,401.4	6.2	65.5	4,861.00
Area II- AUGUSTINOPOLIS	45.5	1,224.3	241.9	577.0	9.1	51.2	2,149.00
Area III-TOCANTINOPOLIS	82.1	2,496.1	3,537.8	570.0	11.3	63.7	6,761.00
Area IV- XAMBIOA	82.4	3,620.6	445.0	1,331.5	4.2	36.3	5,520.00
Area V- ARAGUAINA	193	10,517.1	3,692.3	3,162.0	42.8	153.8	17,761.00
Study Area	552.9	19,751.0	9,262.1	7,042.0	73.6	370.4	37,052.00
Percentage of the area(%)	1.49%	53.31%	25.00%	19.01%	0.20%	1.00%	100.00%

(1) Utilization of agriculture farm

Mainly utilized for planting cassava then maize, upland rice. The area planted agriculture production becomes 0.63% of the producer possession area.

The planted acreage in Study Area, 1998(ha)

	Upland rice	maize	cassava	Feijão	Pineapple	sugarcane	total	Use area/land possession
Area I- ARAGUATINS	3,180	2,290	635	410	30	0	6,545	0.66%
Area II- AUGUSTINOPOLIS	1,820	1,745	855	700	0	0	5,120	0.61%
Area III-TOCANTINOPOLIS	3,450	1,690	675	515	4	35	6,369	0.69%
Area IV- XAMBIOA	1,390	1,700	325	165	48	0	3,628	0.62%
Area V- ARAGUAINA	4,985	8,560	1,105	550	168	9	15,377	0.60%
Study Area	14,825	15,985	3,595	2,340	250	44	37,039	0.63%

(2) Utilization of livestock farm

When analyzing stock raising subdivision based on the data in 2000, the producer in the area is about 10,000 and is raising cattle mainly.

The number of livestock in Study Area (2000)

	Producer (farm)	Cattle	Buffalo	Swine	Goat	Sheep	Equine	Chicken
Area I- ARAGUATINS	2,670	142,375	24	2,360	117	394	2,152	5,712
Area II- AUGUSTINOPOLIS	2,169	103,219	110	4,044	232	719	4,941	34,458
Area III-TOCANTINOPOLIS	1,970	142,201	208	3,375	494	564	3,262	24,339
Area IV- XAMBIOA	882	365,115	127	1,976	371	1,632	5,662	16,369
Area V- ARAGUAINA	4,069	692,632	409	8,770	1,296	5,050	33,444	183,117
Study Area	11,760	1,445,542	878	20,525	2,510	8,359	49,461	263,995

When seeing livestock farming situation of this Study Area from the number of farmhouses, the number of cattle and pasture area in this investigation area, the breeding number of cattle per producer is 123 and average pasture area becomes 168 hectares. Especially, in the XAIAMBIOA area, intensive livestock farming is popular.

3.4.2 Land possession foam

About 7,600 producer are living in this Study Area and in the meantime, the farmhouse who is judged to be a production farmhouse by the INCRA standard is 16.7% and the other farmhouse is put in the position as the petty or non-production farmhouse.

Land Possession Foam in Study Area (1998)

	Petty	Small scale		Middle scale		Large scale		No. of producer
		Pro.	Non-pro	Pro.	Non-pro	Pro.	Non-pro.	
Area I- ARAGUATINS	381	45	257	22	83	7	46	841
Area II- AUGUSTINOPOLIS	846	45	229	13	54	1	17	1,205
Area III-TOCANTINOPOLIS	729	104	401	31	163	8	72	1,508
Area IV- XAMBIOA	178	25	136	33	73	44	52	541
Area V- ARAGUAINA	981	498	875	260	479	138	333	3,564
Study Area	3,115	717	1,898	359	852	198	520	7,659
Rate of producer in Study Area	40.7%	9.4%	24.8%	4.7%	11.1%	2.6%	6.8%	100.0%
Other area	9,295	3,989	10,635	2,291	6,539	769	2,240	35,758
Whole state	12,410	4,706	12,533	2,650	7,391	967	2,760	43,417

In the aspect of area, the result is as following. 56% of individual possession area belongs to big scale non-production farmhouse. And moreover, non-production are a belongs to small scale producer is large.

Area by land possession foam in Study Area (1998)

	Petty	Small scale		Middle scale		Large scale		Total
		Pro.	Non-pro	Pro.	Non-pro	Pro.	Non-pro.	
Area I- ARAGUATINS	16,194	7,717	42,978	14,478	42,970	16,654	121,361	262,350.7
Area II- AUGUSTINOPOLIS	27,733	10,998	65,306	16,759	31,380	2,375	28,513	183,063
Area III-TOCANTINOPOLIS	29,742	17,397	65,222	16,447	94,510	95,882	233,005	552,205
Area IV- XAMBIOA	8,167	4,434	23,457	23,365	43,953	117,295	131,379	352,049
Area V- ARAGUAINA	42,262	83,066	154,495	151,796	277,068	492,320	2,111,244	3,312,250
Study Area	124,097	123,613	351,458	222,845	489,880	724,525	2,625,502	4,661,919
Rate of producer in the Study Area	2.7%	2.7%	7.5%	4.8%	10.5%	15.5%	56.3%	100.0%
Other area	453,190	648,274	1,804,585	1,363,655	4,016,093	2,141,484	6,578,082	17,005,362
Whole State	577,287	771,887	2,156,042	1,586,500	4,505,973	2,866,009	9,203,584	21,667,281

3.5 Present Situation of Agriculture

3.5.1 Agricultural Production

The area of land of the extreme northern region and the northern region of Tocantins State are 16,147 km^2 and 21,083 km^2, and the percentage of the area of each region for the area of the whole Tocantins State is 5.8% and 7.6%, respectively. The pasture and the cultivated field, in which agriculture and animal husbandry are being carried out, occupy about 45% of the area of the extreme northern region and about 65% of the area of the northern region. The percentage of pasture and cultivated field within the total land area of each municipality ranges between 4% and 81% in pasture, and between 0.3% and 5.7% in cultivated field in the extreme northern region. And the same in the northern region ranges between 47% and 76% in pasture, and between 0.2% and 2% in cultivated field, respectively.

The productions of main crops, such as rice, maize, pineapple, sugar cane, mandioca, feijão, are shown in the Table below. The production of feijão in the extreme northern region is higher than that of the other regions in the Tocantins State, and the region produces about 40% of the total production of feijão in Tocantins. On the other hand, the productions of other main crops in the extreme northern region and the northern region are very limited. It seems that sugarcane is cultivated for fodder and "Pinga (spirits)", because there is no sugar refinery in the region.

Agricultural Production in the Study Area (1999/2000)

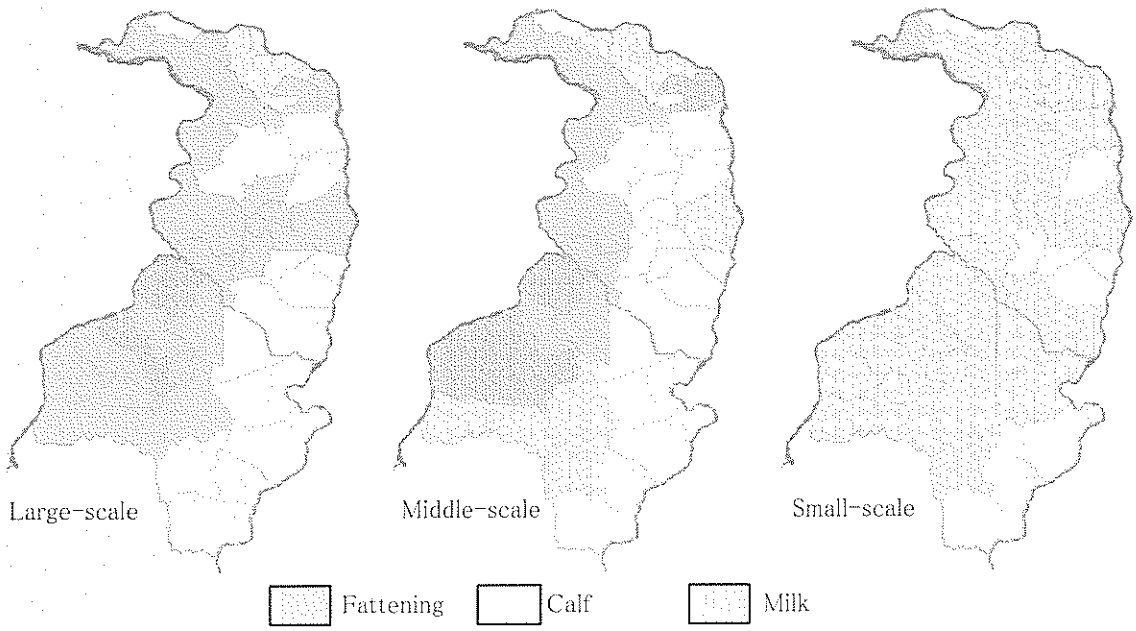
	Area of Crops				Amount of products				Yield			
Region	Ex.North		North		Ex.North		North		Ex.Nort	North	State	Brazil
Crops	ha	%	ha	%	ton	%	ton	%	ton/ha	ton/ha	ton/ha	ton/ha
Rice	9,150	5.7	5,675	3.5	10,780	2.5	6,689	1.6	1.18	1.18	2.67	3.08
Maize	6,365	11.2	9,620	16.9	7,440	6.2	12,073	10.1	1.17	1.15	2.10	2.54
Pineapple	39	2.9	211	15.9	556	1.1	4,611	9.0	14.26	21.85	38.76	47.24
Sugarcane	35	1.1	9	0.3	780	0.6	662	0.5	22.29	73.56	40.96	69.25
Mandioca	2,335	18.7	1,260	10.1	32,330	16.9	13,122	6.9	13.85	10.41	15.27	13.09
Feijao	1,685	40.1	655	15.6	624	44.6	205	14.6	0.37	0.31	0.33	0.67

Source: IBGE

In general, at reclamation of barren land to make pasture and renewal of existing pasture, crops for self-consumption are sowed with seed of pasture. After harvest of crops, the field becomes pasture. SEPRO has supplied seeds of vegetables and fertilizer with free of charge to the farmers of the registered associations, and has supplied seeds of cereals and fertilizer under condition of repayment with 10% of farmers' products. However, most of farmers have not used fertilizer. Furthermore, banks have put the pH control of soil and fertilization, based on the soil inspection, under an obligation in various credits, such as renewal of existing pasture, reclamation of barren land to make pasture, cultivation of forage crops for silage. But farmers apply fertilizer only once in the first year. If such a situation is continued, the increase of yield per unit area for cereals, vegetables and pasture can not be expected.

3.5.2 Current conditions of farm management

The main agricultural activity in the Study Area is animal husbandry in which the majority is beef meat production. When considering the animal husbandry into 3 categories that are fattening, calf production and milk production, different trend can be found for each municipality according to each condition of the location as shown below.



Large scale farmers basically perform their farm management through beef meat production. Fattening is the major activity of the area where good soils with high clay contents are distributed. Calf production, on the other hand, is major for the area of sandy soils. This is more remarkable in the northern region. Fattening farmers are distributed in the western part of route 153 where the soils are mainly latosol and podzol. Calf production farmers are distributed in the eastern part where the soils are mainly cerrado soils. In case of the extreme northern region, fattening farmers are mainly distributed in the area with better soil condition such as Nazare, Luzinopolis and Cachoerinha. In Augustinopolis and surrounding municipalities, however, dairy farming is rapidly expanding due mainly to the establishment of milk processing facility with the capacity of 100,000 liter/day 4 years ago. In this area, therefore, even large-scale fattening farmers are converting their farming into milk production.

Although some of the large-scale farmers are performing an appropriate pasture management, most of the pasture land is managed without proper fertilization and regeneration and those area is rapidly degraded through occurrence of Cigarringa and Babaçu as weed. The area along Estrondo mountain range is topographically erodible and this is accelerating the degradation of pasture. Although the development of breed is necessary, prominent improvement is not carried out yet. The price of beef meat is also low as 30R$/arroba and many large-scale farmers are feeling their limit on the farming depending only on beef meat production. Some of such farmers are now intending to start fruit production under the formation of group.

The major agricultural activities of middle-scale farmers are also animal husbandry same as large-scale farmers. But middle-scale farmers depend more on calf and milk production than fattening. Only some middle-scale farmers perform fattening in the area with good soil condition. As for milk production, dairy farming is rapidly expanding due to the establishment of milk processing facilities in Augustinopolis in extreme northern region and in Araguaina in northern region. Average production of milk is only 4–5 liter/day/head and the lactation period is about 5–6 months due mainly to the low quality of pasture. Although the price of milk is low as 0.2 R$/liter as farm gate price, many farmers convert from meat to milk production because of stable operation through daily income.

Most of middle-scale farmers are also performing cereal production for their own consumption. Main crops are rice, corn and feijão and usually such crops are cultivated on reclaimed land and such land is successively converted to pasture land. In other case, cereal crops are cultivated in a part of degraded pasture land similar to barreirão system for better management of pasture. In both cases, however, fertilizers are not applied for crop production. In this case, the effect of the integration of agriculture and animal husbandry is not satisfactorily expected.

Mini and small-scale farmers in the study area are carrying out combined agriculture of cereal production for self-consumption and small scale livestock raising. As for the crop production, rice, maize, feijão and cassava are cultivated in the area of few ha under family management. Since these crops are cultivated in slash-and-burn area without irrigation, fertilizer and agro-chemicals, the yield from unit area is very limited. Many farmers are also cultivating fruit crops in their home garden. As for the livestock raising, calf production is common in the outskirts and milk production is common in the suburbs. Small-scale farmers are keeping a few to 100 heads of animals according to their land area. Since the price of milk to the processing facility is extremely cheap, some farmers are directly selling their products to the consumers and some other farmers are producing cheese by themselves for sale.

There can be found several signs of the future agricultural development for small-scale farmers and immigrants here and there. Triggers for those signs are supporting program of national level for the association of small-scale farmers such as PRONAF and PRORURAL and other financing system of state level such as Bacia Leiteira by PRODIVINO. One of the associations in Araguatins, for example, is jointly utilizing the tractor and seeding equipment for their cereal production and there is a plan of joint operation for the facilities such as cassava milling and fruit processing. At Itaguatins, as a part of

Bacia Leiteira, a group of 35 members received 2 tractors, 1 track, and milk sterilization facility. In Araguaina, one of the associations is going to receive cheese and confectionery processing facilities from PRONAF through the association's active function and cooperation of municipal office. In Nazare and Filadelfia, group cultivation system is functioning. In this system, a group of small-scale farmers borrow a land for their cereal production by utilizing the distributed seeds and fertilizer then return the land after soil preparation for pasture to the landlord. This is the natural integration system of agriculture and animal husbandry and the number of landlord offering their land to this activity is increasing.

3.5.3 Conditions of Farm Economy

The following table shows the comparison of average figure on general information collected from different group in mini-workshop.

Group	Class	Farming Type	No of Family (pers.	Total land (ha)	Pasture land (ha)	No of animal (head)	Animal for meet (head)	animal for milk (head)	Agr. income (R$/mon)
Association, Araguatins	INCRA	Self	6.2	35.0	-	0.0	0.0	0.0	-
Association, Araguatins	small	Crop/milk	5.9	42.7	11.0	14.6	6.0	8.6	150
Association, Augustinopolis	small	Crop/milk	6.4	68.2	41.4	39.8	24.9	14.9	487
Association, Araguaina	mid/small	Crop/milk	4.2	108.8	72.5	54.8	10.9	43.9	625
Association, Itaguatins	mid/small	Crop/milk	5.3	183.3	71.9	119.1	92.3	26.8	541
Syndicate Rural, Araguatins	mid/small	Meet/milk	5.0	237.5	110.3	88.8	58.8	30.0	688
Group, Filadelfia	middle	Meet/milk	5.2	644.0	211.7	208.0	198.0	10.0	625
Syndiacate Rural, Xambioa	Lar/mid	Meet/milk	7.3	2437.5	1790.0	1575.0	1497.5	77.5	13,800

（Source ; The result from investigation at mini work shop）

Immigrants of INCRA have no cash income due to no production except self-sufficiency, but they earn about 300R$/month as a day laborer in the region. In case of small-scale farmers, income level is higher for animal husbandry farmers. In case of middle to small-scale farmers, the income level is relatively higher for milk production farmers than calf production farmers. Animal husbandry farmers generally obtain higher income than crop production farmers.

The economic feasibility of agricultural production was analyzed and the result revealed that the production cost exceed the gross income for major crops such as rice and maize as shown below. This means that most of the farmers are forced to carry out self-consumption agriculture due to extremely low yield.

Economic feasibility of each crop

Crop	Yield Kg/ha	Farm gate price R$/Kg	Gross income R$/ha	Production cost R$/ha	Net income R$/ha
Rice	1,180	0.28	330.40	354.60	(24.20)
Maize	1,170	0.17	198.90	282.60	(83.70)
Cassava	10,400	0.09	904.80	670.00	234.80
Pineapple	21,900	0.40	8,760.00	7,500.00	1,260.00

The agricultural production is being carried out in spite of the above situation. This is because of the self-consumption agriculture based on family labor.

3.6 Present Conditions of Livestock Husbandry

3.6.1 Conditions of Livestock Production

(1) Livestock Production

Analyzing the present land use condition of the Study Area, we observe that the agricultural area does not surpass 1% of the total area while 53% corresponds to pasture land, and that a large number of producers depend on the cattle husbandry activity (bovine cattle breeding).

According to the statistic data of ADAPEC-TO (Tocantins State Agriculture and Livestock Protection Agency), the livestock production in number of cattle and poultry heads raised in the Study Area can be seen in the following table.

Livestock Production in Number of Cattle and Poultry Heads in the Study Area (2000)

	Bovine	Bubaline	Swine	Goats	Ovine	Equine	Poultry
Extreme-north	541,519	342	10,703	888	2,303	12,053	74,291
(% in the State)	(9.28%)	(3.33%)	(7.14%)	(5.27%)	(5.20%)	(7.07%)	(7.61%)
North	927,991	536	(9,822)	1,622	6,056	37,408	193,704
(% in the State)	(15.91%)	(5.22%)	(6.55%)	(9.63%)	(13.68%)	(21.94%)	(19.84%)
Total of Study Area	1,469,510	878	20,525	2,510	8,359	49,461	267,995
(% in the State	(25.19%)	(8.55%)	(13.69%)	(14.89%)	(18.87%)	(29.01%)	(27.44%)
Total of the State	5,833,522	10,262	149,885	16,846	44,277	170,474	976,405
	(100.00%)	(100.00%)	(100.00%)	(100.00%)	(100.00%)	(100.00%)	(100.00%)

Source: ADAPEC-TO, 2000. The figures between parenthesis ( ) represent the participation rate within the State Total number.

The previous table shows that, as for the bovine cattle husbandry, the Study Area participates with approximately 25% of the State total production while as for poultry its participation corresponds to 27%, meaning that the Study Area is the larger bovine cattle and poultry producer in the State. At the same time, according to statistic data, there is also a large herd of small size ruminant animals.

Many of the bovine cattle raisers are engaged in fattening the meat cattle, most of them being represented by large-scale farmers that adopt the traditional extensive husbandry system. The small- and medium-scale producers located at the surroundings of the main urban centers are also engaged in the production of milking cattle. There are several categories of meat cattle breeders. There are those engaged in the production of reproducers for meat cattle, or those exclusively engaged in cattle fattening, or even those acting in an integrated manner, from the production of calves to their fattening. However, most of large-scale farmers purchase the male and female feeders in other regions, focusing their activities only in the final cattle fattening stage.

One can observe that there is a large difference in the animals' management method between large-scale producers and small- and medium-scale ones. Most of the large-scale farmers who reside in their properties have tractors and cultivate several types of forage in the cultivated pasture areas. Those who adopt the integrated production system produce their own matrices for renewal through artificial insemination and adopt modern methods of animal management utilizing silage. On the other hand, the small- and medium-scale producers are limited to the traditional extensive breeding system.

The predominant bovine meat cattle race is undoubtedly the Nelore race which animals are mostly non-castrated bulls. As for the milking cattle breeding, most of the herd is composed of mixed varieties resulting from the crossbreeding between Nelore females with males of the Holandesa, Giroland, Pardo-suiço, Jersey races. The male feeder is also utilized for fattening purposes.

After the final fattening process, the cattle is sent to several private slaughterhouses located in Araguaína where they are prepared to be commercialized in the South, North and Northeast regions of the Country as processed meat. Many of the meat cattle animals are transported to the Northeast region in the form of "gado em pé" (alive animal) although, in such a case, most of the business is carried out through middlemen.

The bovine meat cattle is commercialized in the form of "gado em pé", with 30-36 months of live when reaching around 400~500 kg, at prices varying around R$400~R$500 what corresponds to approximately R$2.00/kg of processed meat. The produced milk is collected by several different scales dairy products factories, located in several places of the region, and most of it is destined to cheese production. In Araguaína, there is a modern dairy products factory where milk *in natura*, processed milk and butter are produced, and commercialized even for markets outside the State. The demand of milk in the region is very high, thus the producers located in the surroundings of the consumer centers commercialize the milk *in natura* directly to the consumers.

The crossbred resulting from the Nelore female and a milking male produces around 4~8 liters of milk daily, but the production drops to 3~5 liters/day in the dry season. The milk price differs from region to region, although maintaining a price of around R$0.20~R$0.25 per liter. On the other hand, in the direct sale from the producer to the consumer the price is around R$0.50/liter.

(3) Bubaline

The buffaloes were introduced in the Araguaína region more than 30 years ago, in special in the surroundings of large-scale farms. However, due to the lack of control as the result of the absence of their owners who most of the times did not reside in their properties, those properties had their fences destroyed with the consequent runaway of most of the animals which returned to wild life. This generated several prejudices and misunderstandings against the bubaline cattle. In general, it is considered that the farms engaged in organized breeding of buffaloes are rare. However, according to the field survey carried out in several locations, we estimate that the figures on buffaloes' husbandry are higher than those shown by statistic data.

There was recently an increase of consumers' awareness on the fact that the buffalo meat presents advantages such as the low contents of cholesterol and calories. Besides, the mozzarella cheese produced with buffalo milk is being very much appreciated as a high quality product in the large urban centers. In general, the milk production volume of those buffaloes being raised at the rivers' margins is higher than the volume of bovine cattle milk production. Particularly in the Study Area, which is part of the Amazônia Legal region where there are legal restrictions as for the utilization of properties and without possibility of increasing new pasture land, the buffaloes present advantages in comparison with the bovine cattle since they can be raised with rough forage usually rejected by the bovine cattle. Furthermore, they do not require the increase of pasture land and are easily managed. These advantages were mentioned in the workshops carried out in several locations of the region and,

ever since, one can observe a gradual increase of interest in bubaline cattle raising by the producers.

The buffaloes milk production volume varies from 5~8 liters per day, occurring some isolated cases where the production surpasses 10 liters/day during the rainy season. It is worthy to call the attention on the calving rate: while for the bovine cattle it is around 60~70%, in the case of bubaline cattle it jumps to 90~95%. Besides, the buffalo economically useful life rate corresponds to more than the double than that of bovine cattle. Recently, a cheese factory started to pay 40% more for the buffaloes milk comparing to the price paid for the bovine cattle milk. This has increased the interest in buffaloes raising among the small- and medium-scale producers.

Most of the varieties raised are those living at the rivers' margins such as the Murrah, Jafarabadi, Mediterranean, and the buffalo meat is very appreciated in the northeast region of the Country. In the Study Area, we verified that the buffalo meat is not consumed as so, thus the sale price of the meat buffaloes producers is low. However, the buffalo meat is actually being commercialized at the same price of the bovine cattle meat in some retail meat processing plants and the consumers are consuming both without knowing the difference. In Tocantins State, the swamp type buffaloes are rarely being raised.

Comparison of Productivity between Bubaline and Bovine Cattle in the Study Area

	Bubaline	Bovine
Fecundation rate (first birth)	90%	75%
Pregnancy period in the first birth	34-36 months	36-40 months
Interval between births	12-14 months	14-18 months
Age for slaughter	24-26 months	30-36 months
Mortality among calves between 10-12 months	1-2%	5-10%
Mortality among feeders between 12-24 months	1-2%	1-3%
Mortality of the adult animal	0-1%	1-3%
Average weight for slaughter	400-450kg	350-450kg
Milk production by lactation period	Equal or over 2,500kg	Equal or over 1,500kg
Slaughter rate of meat cattle	27-30%	15-20%
Renewal rate of adult female	10%	15-30%
Economically useful life	15-20 years	8-10 years

Source: Results of interviews carried out with producers during the field survey.

(4) Swine Husbandry

In the Study Area, the swine husbandry is very developed in the municipal district of Araguaína, in the State northern region, that is close to the consumer market. It is also developed in the municipal districts of Araguatins and Augustinópolis, in the extreme-northern region, with possibilities of extending the commercialization towards the States of Maranhão and Pará. In the municipal district of Nova Olinda, in the northern region, the swine herd is also large. This is due to the fact that in the outskirts of this municipal district there is a cheese factory, making easy to obtain the cheese serum which is utilized as an important complement for swine feeding.

The predominant swine race for breeding is the local Piau variety which female is compatible with modern races such as the large scale Yorkshire, generating good lineage crossbreds. The swine meat commerce has been suffering from the supply deficit in the State. Considering that the demand for barbecue meat for rural festivities is quite high, the swine meat price use

to stabilize in relatively high levels, strongly stimulating the small- and medium-scale farmers to dedicate to the swine husbandry. The swine price does not depend on the animal weight nor age, keeping the level of R$1.70~R$2.50/kg of alive animal. As problems of the activity, we can mention the difficulty in the acquisition of good lineage modern races and the lack of knowledge on swine husbandry on the part of the livestock technicians of the State government. Besides these, we can also mention the lack of proper technical guidance and the lack of an exclusive slaughterhouse for the swine, among other problems.

(5) Poultry

Most of the small- and medium scale producers is traditionally engaged in the poultry production in the region although they do not surpass the limit of utilization for self-consumption or for regional consumption. So far, the organized and modern poultry husbandry (production of eggs, raising plants) in Tocantins State was restrained to urban regions. However, with the start of enterprises oriented to poultry integration, in the northern region, stimulated by the large-scale poultry producers coming from outside the State, it is noticeable that there is recently a larger opening for the participation of small- and medium-scale producers in this activity. In the extreme-north and central regions of the State, a strong trend in the creation of poultry integration enterprises with funds collected outside of the State is observed. The development of poultry integration activities, in the Study Area and surroundings, is justified by the following advantages;

1. Absence of natural disasters and low cost in the construction of chicken raising facilities due to the high temperature throughout the year in the State.
2. Increase of incentives for the cultivation of grains in the whole State and in the neighboring States, facilitating the procurement of inputs for animal feeding.
3. Progress in the construction works of the North-South Railway, located in a favorable location for the commercialization of products to the European and Far-Eastern markets.
4. The industries oriented to exportation receive a special treatment being exempted from the ICMS.
5. Absence of the occurrence of serious poultry diseases since this is a pioneer area in the industrial poultry production.
6. During the rainy season, the climate is relatively stable facilitating the planed production.
7. Low cost of land and labor force in comparison with other States.
8. Therefore, even in Brazil where the production cost is already considered low, it is possible to achieve an even larger reduction in this production cost.

These factors are indispensable not only for the production in poultry production plants but also in terms of stimulating the development of the livestock production. They also make clear the aptitude for livestock production in the whole State and in the Study Area.

(6) Other Animals

According to statistic data, the breeding of small size ruminants, such as goats and sheep, is mainly developed by small- and medium-scale farmers for meat production. However, due to the lack of a commercialization route, among other restrictions, this activity is not being conducted in an organized manner.

The horses are traditionally important participants in the bovine cattle breeding (extensive system) and their breeding is quite developed in several localities in the State.

(7) Conditions of Animal Health

Currently, there have been no occurrences of serious cases of animal disease in the Study Area. Since 1998, aiming at eradicating the FMD, the State government through ADAPEC is making efforts in the implementation of a strong vaccination campaign in the whole State, specially for bovine cattle together with the implementation of mobile units for the execution of tests in animals in bordering regions. As the result of these measures, the State of Tocantins has finally achieved, in January 2001, the long time expected title of being the only State in Brazilian Northern region "free from FMD". The next target of the State is to be considered a FMD free zone without preventive vaccination, not only regarding to bovine cattle but also to bubaline and swine cattle. Preventive measures shall also be elaborated for the eradication of the swine cholera. With these measures, there is a high expectation of opportunities to export meat for the southern States and for the foreign market in the future. Furthermore, it is also expected a higher awareness on the part of the producers as for the need of investment in the improvement of quality of the meat to be commercialized.

3.7 Current conditions of Agro-Industry and Transportation

3.7.1 Current Situations of Agro- Industry Activity

The transportation infrastructure constructed and the abundant natural resources are atracting big companies of agricultural processing industry to the State as the chicken integration firm. The chicken integration, the AGROLANDIA has being producing in a stable maner, chicken since 10 years ago. The AZA Food SA is preparing to produce 200,000 birds per day in 2004. The ration of the last one is going to be suplied by the ration industry in Aguiarnópolis, that will utilize raw material produced in Pedro Afonso. The raw material (corn) will be gradativelly substituted by the local production.

Factories of cassava flour and tomato process are in construction in the Araguaína Agricultural Industry District.

The tomato factory has the capacity for 12 ton, that is equivalent to 200 ha of tomato. There is not such production in the moment, being the factory inactive. In the future, the same equipment can be utilized to produce guava juice. Such factory will need 300 ha of guava.

Moreover, the cassava flour factory that is under construction is financed by SUDAM, and has a capacity of 30 to 40 ton per day. Such production will need 600 ha of cassava.

Also, in Xambioá, it is foreseen a cement factory, that can activate the regional economy.

RURALTINS promotes the construction of cassava flour factories, where 79% located in the north area of the state.

Location	In operation	Out of operation	Total
State of Tocantins	261 (84,2%)	49 (15,8%)	310
North area	188 (76,7%)	42 (23,3%)	245

Source: Ruraltins–Diagnosis of the "Casa da Farinha" of Tocantins, out.99

Another program in development, is the installation of fruit processing units in Augustinopolis and Itaguatins. Several other projects are planned as: Araguaina (horticulture), in Xambioá (banana), Aguiarnópolis (banana), Sampaio Project (rice and fruits), Tocantinópolis (coconut). Major part of those projects have the purpose to supply domestic

market .

The great part of the cattle are sold alive on the practices of trade called “ox in foot–boi em pé” to the Northeast markets and the remaining is soldo to the butchers in the region. In Araguaína we find Frinorte with capacity of 750 heads/day and Coopercarne of 300 heads/day. There also is a tannery in the region.

The State Government, as a form to elevate the profits of the primary sector, is developing actions to promote the agricultural industry. The “Programa Bacia Leiteira”, that besides offering infrastructure of the milk production, contemplates the state with 25 units of milk processing plants, which 9 are concluded (Buriti de Tocantins, Araguatins, Axixá do Tocantins, Sitio Novo do Tocantins, Tocantinopolis, New Olinda, Philadelphia, Itaguatins and Xambioá).

In Araguaina there is a babacu palm processing company with total production capacity of 8.000 case per month. In Tocantinopolis TOBASA–Tocantins Babacu S/A is one of the babacu processing plant in the region, with installed capacity of 4.000 tones of babacu/ month (actually only 20% of the capacity is used).

3.7.2 Marketing System

(1) Market

Only the beef and fruits produced in the region are sold out of the region. The remaining is for the regional consume.

Crop	Market
Soybean	Não produzido atualmente
Rice	Consumo próprio ou regional
Feijão Bean	Consumo próprio ou regional
Corn	Consumo próprio ou regional (suinocultura regional)
Cassava	Consumo próprio ou regional e outros estados (PA, PI, RO, MA, etc.)
Fruits: Pineapple Banana Water Melon Native Fruits	 Local / SP / RJ / DF Local (2%), Belém / S. Luís / RJ / BH / Brasília (98%) Local / Imperatriz Local / PA / MA / PI
Beef	Frigorífico Local (50%) Mercado Nordestino (S. Luis / Sobral / Fortaleza / Recife) – Boi em Pé (50%)
Milk	Fresh milk Longa Vida

(2) Transport Cost of Agricultural Product

The transportation cost is a item very important for a large country as Brazil, representing most of the production cost. The main products costs are presented bellow:

i) Soybean(Soja)

The soybean produced in Araguaína and Pedro Afonso is exported to Rotterdam (Holland).

Producing area: ARAGUAINA COST OF TRANSPORT

To export	Origin	Araguaína	P. Afonso	Estreito	São Luís
	Destine	Estreito	Estreito	São Luís	Rotterdam
Extension	km	124,95	390,73	740	
Transp. Road	R$/t.km	0,0548	0,0548		
	R$/t	6,85	21,41		
Transp. Rail	R$/t.km			0,0261	
	R$/t			19,33	
Port cost	R$/t				12,87
Freight marine	R$/t				29,70
Total cost of transport (besides marine)		Araguaína to Rotterdam (R$/t)			68,75
		P. Afonso to Rotterdam (R$/t)			83,31

ii) Rice

The rice production areas, besides Formoso de Araguaia and Lagoa da Confusão, are in six locations (Porto Nacional, Paraiso do Tocantins, Alvorada, Pedro Afonso, Gurupi and Marianópolis), and the production is consumed in the region. Major part of the transport is made by Road within the distances of transports of 135,9 Km, average freight of R$ 8,00/t which represents average costs of R$ 0,0589/t.Km.

iii) Pinapple

Analysing Araguatins as production area, the marketing will be realized through intermediaries that acts in Miracema (distance of 534,7 Km), by R$ 18,71/t, with medium unitary cost of transport of R$ 0,035/t.Km. From Miracema to main capitals of the Southeast and Center-west market are R$ 56,56/t (1.414 km), what produces a moment of transport of R$0,04/t.Km.

iv) Banana

Production is concentrated in the pole of Araguaina and Xambioa and destined to the other States market. The half of the regional production sold through CEASA of Belém and São Luís and the remaining quantity are sent to Rio de Janeiro, Belo Horizonte and Brasília market. Average travel distance–1.479 Km; Cost of Freight –R$ 71,00/t; Medium moment–R$ 0,058/t.Km

v) Coconut(Coco Anão)

Small production in the poles of Araguaina and Tocantinopolis. Marketed at the local markets and in Palmas, and outside of the state in Goiânia. Transport in bulk.. Average travel distance – 578 Km; Cost of Freight – R$ 22,15/t; Medium moment–R$ 0,0383/t.Km.

vi) Watermelon

Small production in Araguaina and marketed in Imperatriz (MA) with average transportation distance – 250 Km; Cost of freight–R$ 18,74; Midium moment–R$ 0,0751

vii) Beef and Frigorific Meat

The cattle meat production is the most important economical activities of Tocantins. It's marketing condition is one of the most important factor for the market promotion. The market is realized in two ways: alive and by frigorifics. The frigorifical one has as origin frigorifics

located in Araguaína e Colinas do Tocantins. The frozen and refrigerated meat has as main markets the northeast region, besides Rio de Janeiro and São Paulo.

	Distance Km	Freight medium R$/t	Medium moment R$/Km
Calf in foot	270	76,48	0,0283
Ox in foot (local)	275	45,78	0,3333
Ox in foot (northeast)	1236	329,50	0,2666

Markets: Local (Araguaina/Colinas), northeast (Fortaleza, Sobral, S. Luís, Recife and Belém)

The meat would originate from the slaughterhouses of Araguaina is destined to the Northeast (85%) and markets of S. Paulo and Rio de Janeiro (15%), transport in refrigerated trucks, traveling average extension of 1.868 Km.

Truck Type	Cap. cargo	Freight medium	Medium moment
Trucado	12 t	R$ 167,48/T	R$ 0,0896/T.KM
Refrigerated truck	24 t	R$ 134,64/T	R$ 0,0721/T.KM

3.7.2 Current situation of transportation

(1) Current Conditions of the Roads

The principal road is called Belém-Brasília (BR153), that it crosses the whole state from North-south, making it easy to build a transportation network throughout the state.

Road network	Km	%	Jurisdiction			
			Federal	%	State	%
Paved/ paving	2.259	24	927	41	1332	59
No paved	7.193	76				
Total	9.452	100				

	State of Tocantins	
	Over national net	Particip. Area territor.
Total Highway	3,6%	3,3%
Paved highways	1,2%	
Paving rate	23,9%	
Density *	5,35 km	

* Km of highway paved by 1000 Km2 of territorial area. 5,35 km represents 1/3 of the density of Brazilian average rate. Data of 1997. In December /99, the paved highways arose to 3.714 Km.

The presence of two rivers–Araguaia and Tocantins brings some difficulties for the development because for the Araguaia there is no bridge to cross the river, while, in the river Tocantins, the bridges are only three–on BR 226, Estreito (Maranhão); in Porto Nacional; on TO 280, Peixe (TO). In other important points for crossing the river Tocantins, ferryboat are used, what elevates the transport costs and time spended for the trip.

3.8 Conditions of Environmental Aspects

3.8.1 Current Situations of Environment Preservation Area in Study Area

This Study Area, half of the area in tropical rain wood vegetation and rest of it covered with cerrado vegetation. However, the great part of the area is influenced by indiscriminate

development in the 1970s. And there is few area where original vegetation is left.

According to current map of land utilization by SPALAN, this Study Area divide as river；1.4%, pasture；54.4%, cerrado；24.8%, forest；19.1%, residential；0.2%, farm；0.1%. In Carmolándia municipal, 8% of land is utilized as pasture. The table below shows the rate of pasture in the Study Area.

Repartition which is divided by pasture area rate in each municipal

Rate of pasture	No. of Municipal	Name of Municipal
70% over	3	Augustinópolis, Araguanã, Carmolándia
60%~70%	12	Palmeirante, Palmeiras do Tocantins, Xambioá, Santa Fé do Araguaia, Buriti do Tocantins, Ananás, Sítio Novo do Tocantins, Riachinho, Araguaína, Nova Olinda, Muricilándia, Piraquí
50%~60%	8	São Miguel do Tocantins, Aguiarnópolis, Praia Norte, Sampaio, Santa Terezinha do Tocantins, Carrasco Bonito, Axixá do Tocantins, Aragominas
40%~50%	9	Darcinópolis, Itaguatins, Nazaré, Esperantina, Wanderlándia, Araguatins, Filadélfia, Angico, Babaçulándia
25%~40%	3	São Bento do Tocantins, São Sebastião do Tocantins, Luzinópolis
Less than 25%	3	Maurilándia do Tocantins, Cachoeirinha, Tocantinápolis

When dividing each municipal from the rate of green area in this Study Area, green area is comparatively remained at northern part. There are 11 very low municipals at the rate of green area. The rate of green area of this Study Area is 19.1%.

Repartition which is divided by green area rate in each municipal

Percentage of green area	No. of Minicipal	Name of Municipal
50%over	1	São Sebastião do Tocantins
40%~50%	1	Esperantina
30%~40%	8	Carrasco Bonito, Aragominas, Sampaio, Araguatins, São Miguel do Tocantins, Santa Fé do Araguaia, Xambioá, Buriti do Tocantins
20%~30%	9	Muricilándia, Riachinho, Augustinópolis, Araguaína, Araguaná, Piraquí, Itaguatins, Carmolándia, Praia Norte
10%~20%	8	Santa Terezinha do Tocantins, Angico, Ananãs, Nazaré, Wanderlándia, Sítio Novo do Tocantins, Nova Olinda, Palmeirante
Less than 10%	11	São Bento do Tocantins, Axixá do Tocantins, Darcinópolis, Tocantinópolis, Filadelfia, Babaçulándia, Maurilándia do Tocantins, Cachoeirinha, Palmeiras do Tocantins, Aguiarnópolis, Luzinópolis

Vegetation of cerrado area which accounts about 1/4 of this Study Area, with the repeated burned off its field, the rate of the environment preservation becomes a low situation.

3.8.2 Environment reserve area

There are Indio reserve area and APA plan area in this Study Area as protection of environment resources. The present conditions of each area is as the following.

(1) Apinae Indio reserve area

This reserve area is located between Tocantins river and trans-Amazon road. It has about 140,000-hectare and 714 people are living at the 7 residence ward according to census in 1995. Vegetation in the reserve area divided as cerrado and consists of sand soil.

(2) Xamboia Indio reserve area

The Xamboiá Indio reserve area has 3.300 hectares located on the Araguaia river's right bank. According to the census in 1995, 1 colony exists and 176 people are living.

(3) APA plan area

As the APA plan area, the area crossing the Araguaia river and the Tocantins river, Aragominas and Muricilandia minicipal are planned. The vegetation in both planned areas are divided as tropical forest.

3.8.3 Extraction industry

The extraction activites in the study area are realized by women groups that pick-up the babaçu coconuts for the babaçu oil industry in Tocantinópolis and for the palmito factories. Other activities are the honey production and medicin plant collection.

3.8.4 Silviculture Condition

Only the "Teca" production, that was initiated actually, can be observed in the present. In Augustinópolis and Araguína, some farmers are changing the meet production for the milk production. The animals that produce milk need more shadow than the one for meet. So, the tree plantation is increasing in those areas.

1) "Teca" Plantation

The "Teca" (*Tectona grandis*) is known by it's hardness and resistance, being mainly used in the production of high class furniture, cabinets, interior design and sculpture. Also, the root and leeves are utilized to take an ocre ink and the seed are utilized to produce medicine. It was introduced in Brazil 7 years ago in Mato Grosso state, being now cultivated commercially. The seedlings are produced in Araguaína and 100,000 have being sold till the moment to Palmas, Miracema, Colinas and other areas. It is said that it can be produced, as an agroforestry activity, with coffee, papaya and cupuaçú, but there are no detailed information about it.

2) Silviculture in Pasture Areas

Some farmers have changed the meet production to the milk production. It has being increased the plantation of "Teca" with the existing trees as Ipê and Mogno around Araguaína as an agroforestry activity. Those trees have a high marketing potential and need to be planted in more areas for an efficient land use. The farmers realize plantation and conservation around rivers realizing an eficient soil conservation. So, this practice need to be promoted from the point of view of the environment.

3.9 Existent programs for development

3.9.1 Agriculture

(1) Program of Regional Integrated Development of the Area of the Beak of the Parrot (PDRI– Bico do Papagaio)

O PDRI – Bico do Papagaio have how main objective the rational uses of the resources hydricos, donate tend two main lines:

- viabilizacao of the transport intermodal
- implantation of basic infrastructure of overhead irrigation (380.000 ha)

The followings are 9 irrigation sub-projects.

- Sub-project Rio Corda
- Sub-project Rio Piranhas
- Sub-project São Martinho
- Sub-project Rio Barreiro
- Sub-project Buriti Sul
- Sub-project Buriti Norte
- Sub-project Vertente do TO
- Sub-project Sampaio
- Sub-project São Sebastião.

Of the sings to sleep sub-projects the one of Sampaio was prioritized due to reception possibility of it longs goes directly of the river Tocantins, without the need of waiting the complementation of the great infrastructure work foreseen . The sub-project Sampaio includes an area of 15.000 has been placing the margins of the river Tocantins, between Sampaio's cities and Saint Sebastião of TO. It is glide areas constituted by capable soils the production of grains (mainly irrigated rice). However they plows areas propitiate to periodic floods caused by the full of the river.

(2) Others

Project of Irrigated Coconut: The project of irrigation of small coconut goes microaspersao in 40 there in Wanderlandia. The production seeks the industrialization of it longs goes of coconut and in natura goes consumption in the State the well the export goes Brasilia and Goiaia.

Nucleus of agricultural production of Araguatins (NPA III): Located to east of the city of Araguatins this nucleus had understood an area of 50 there plows of flooded rice and 2 there is of fish farming. This nucleus is part of the program of land reform of the State Government where each family had received 25 there is each with the objective of corn production, rice and fish.

Nucleus of Agricultural Production of Araguaina (NPA I): Located to west of Araguaina, area of 20 ha with central pivot goes association of small producers producing mainly tomato goes it elaborates it of tomato in Araguaina.

Other Nucleus of Production: Similar to NPA I, farms Breaks Pot and Area Stream Otter they possess the headquarters pivot that irrigates 20 ha each goes associations of small producers. These also produce mainly tomato goes it elaborates it in Araguaina.

Program Bacia Leiteira: The program seeks to implant units of production of milk goes small producers in 25 municipal districts in the State. This program will be implanted in Study Area in the following municipal districts: Araguatins, Axixá, Buriti, Filadélfia, Itaguatins, Nova Olinda, Sítio Novo, Tocantinopolis, Wanderlândia, Xambioá. The program includes to supply to each unit (composed of 35 families each) 140 cows Girolanda, unit of pasteurizacao (2000 liter/day), the truck, two tractors, ceifadeira, forage colheitadeira, 0,5 have of suck-cane and 1000 semen doses. Haul of that, it intends to install the small one manufactures of cheese and sweet goes uses of the spare milk. It ties the end of June this foreseen that the units of Tocantinopolis, Itaguatins, Besiege New, Philadelphia, New Olinda and Xambioa enter in operation.

Private production of Banana: The Group Yamada produces 80.000 banana boxes approximately a year in Araguaina. The company have difficulties in irrigating its property the Government intends to build the reservoir goes supply of the it longs goes of irrigation.

Other Agricultural Projects: In this Study Area, implantation plans still exist of it elaborates of tomato in Araguatins similar to the of Araguaina and the deprived production of banana in Aguiarnopolis to export to Europe. Still encontran-if in planning phase the Programs of Invigoration of the Family Agriculture and of Development of the Horticulture.

3.9.2 Infrastructure

(1) Energy

The main electric source is the hydropower and the main stations are:

Hidropower	River	Capacity
Serra Quebrada*	Tocantins	1.328 MW
Estreito*	Tocantins	1.200 MW
Santa Isabel*	Araguaia	2.200 MW
Lajes	Lajes	2,400 MW
Corujão	Lontra	0,640 MW

Source: SEPLAN/TO (*Projected)

Besides that, the following projects are on going:

- Line of North-south Transmission II: I Project included also in the Plan Brazil that foresees 517 km of transmission lines in 500 kV with associated substations among Empress Move forward (MA) and Miracema (TO). The work this foreseen to be concluded in 2003.
- Program Rural of Electrification (PERTINS): disponibilizar electric power i Intended goes 18.000 producers in whole the State being built 36.000 km of distribution lines to promote the irrigated agriculture, modern livestock and agribusinesses.

(2) Transportion

- Platform Multimodal of Aguiarnopolis: Project foreseen in state PPA, where it had worked an improvement center, reception and distribution of products and goods. The change of coming loads of Hidrovia Araguaia-Tocantins will be accomplished, highways and of Ferrovia Norte-Sul, tends the destiny the port of Itaqui and vice-versa.
- Platform Multimodal of Aguiarnopolis: Project foreseen in state PPA, where it had worked an improvement center, reception and distribution of products and goods. The change of coming loads of Hidrovia Araguaia-Tocantins will be accomplished, highways and of Ferrovia Norte-Sul, tends the destiny the port of Itaqui and vice-versa.
- Hidrovia Araguaia-Tocantins: it Intends to optimize the uses of the resources hidricos.
- Paving and Restoration of State Highways: With the objective of endowing the State of an efficient road mesh, it intends to cream cake and to accomplish the maintenance of the highways of the State with financing of the World Bank and of

JBIC. In the Area of Study the highways will be meditated presented in the table.

- Transposition of the Rapids of Saint Isabel of Araguaia: one Plans the construction of the channel to avoid the rapids of the waterfall Santa Isabel, that will have an extension of 14 km and unevenness of 13 m. This work this foreseen in the Plan Advances Brazil.
- Construction of Ferrovia Norte-Sul: the construction of 1.466 km of ferrovia interligando Empress i Foreseen (MA) to Senator Canedo (GO) cutting the State of Tocantins in the sense North-south. This work also this included one in the Plan Advances Brazil.
- Rail Extension Xambioa of the I Narrow: through this connection (165 km) will possible interligar be the basins of the rivers Araguaia and Tocantins. Work also included in the Plan it Advances Brazil.

3.9.3 Social section

1) ABC of the Citizenship: it Intends to reduce the illiteracy of the largest population than 15 years of acts, which plows not included in the formal teaching.
2) Little Pioneers: With the objective of assisting children and adolescents from 7 to 14 enrolled years in the official net of teaching, oferecere partner-educational activities i intended, of leisure and feeding.
3) Guaranteed of Fundamental the Teaching: it Intends to enlarge the teaching facilities to assist the youths' of the first degree demand.
4) Guaranteed Universal of Access Greets : the objective enlarges and to assure the service medicates hospitalar the population.
5) to Enlarge e/ou to Implant Systems of Provisioning of Water: to Enlarge systems of provisioning of it longs goes existent that you/they don't accompany the population growth and to implant such system in places that still don't possess the system.
6) to Implant Systems of Collection and Treatment of Sewer: Sees that the State only possesses 3% of the urban population with services of collection of sanitary sewer, it intends to increase this covering of sewerage systems.
7) Community Activates: Program of federal initiative that it intends to promote the social development through the integrated and maintainable regional development, conjugating government's actions and accomplishing partnerships with the society. The municipal districts of Araguatins, North Beach and Sampaio plows the municipal districts included in the program in the Area of Study.

3.9.4 Environment

(1) Program of Gestão Ambiental Integrada (PGAI):

Programs that seeks to make possible the maintainable uses of natural resources tends the following components the:

- Accomplishment of the ecological-economical Zoning;
- Environmental monitoramento;
- Control and environmental fiscalization;
- Promotion of the maintainable handling of the natural resources;

- Structuring of the exective institutions of PGAI.

(2) Evaluation / Reformulation of Politicize of the State of Tocantins:

Have the avaliar/reformular objective politicizes state of environment and to formulate politicizes of environmental education, ecoturism, solid residues and biodiversity.

(3) Programs national of the enviroment II (PNMA II):

Project addressed to the improvement of the process of environmental administration, with the objective of obtaining effective results in the improvement of the environmental quality, also improving the quality of life of the population. The execution had suffered the decentralization of the government actions alone that the organized civil society, the private section and academic intituicoes can have an effective participation. The program and object of loan agreement between the Brazilian Government and the World Bank.

(4) Plan of development ecotourism of the state of Tocantins:

Seeks to foment the maintainable ecoturism and strengthen institutions publish and private component of "Trade state Turistico".

3.10 Relation with the Master Plan

3.10.1 Present Situation of the Master Plan and Necessary Items in the Present Study

The "Integrated Development Master Plan of Agriculture and Cattle Husbandry in the State of Tocantins" (herein on called M/P), elaborated between 97 and 98, made the following programs: Program of Environmental Conservation, Program of Agricultural Production Structure Improvement, Program of Sustainable Agriculture Promotion, Program of Regional Development, Program of Sectorial Development, and Programs Related to the Private Sector. The Tocantins State Government has being implementing it's enterprises considering this M/P.

Observing the present situation of these programs, the Program of Regional Development has the north region as priority area, which is also the target area for the present Study. Also, the Program of Agricultural Production Structure Improvement realized the re-structured the SAG, and with the Program of Animal and Vegetable Defense they had being increasing the number of staffs.

Related to the Promotion Program of a Sustainable Agriculture, it was realized in 2000 experimental cultivation of grains in the north region. It was successful and some farmers begun to produce it. Also, in the Sector Development Program, programs as water resources development and electification (as the Lajeado Hydroelectrical Unit construction) are under relization. On the other hand, one of the most important item related to the marketing infrastructure, the north-south railway, has it's bridge on Tocantins river under construction and the construction of it's structure in the State has begun. According to this fact, the private investment has increased in the State.

The necessary items for present Study are presented bellow, considering the projects of the M/P.

- Concerning to the Program of Agricultural Production Structure Improvement, the related organisms restructuring process and the animal and vegetal health protection program in progress, where the state was considered in January of 2001 as free of aftosa. However, this present study shall also include the themes related to the strengthening of the agricultural research and the development of human resources which are essential to these programs' management;

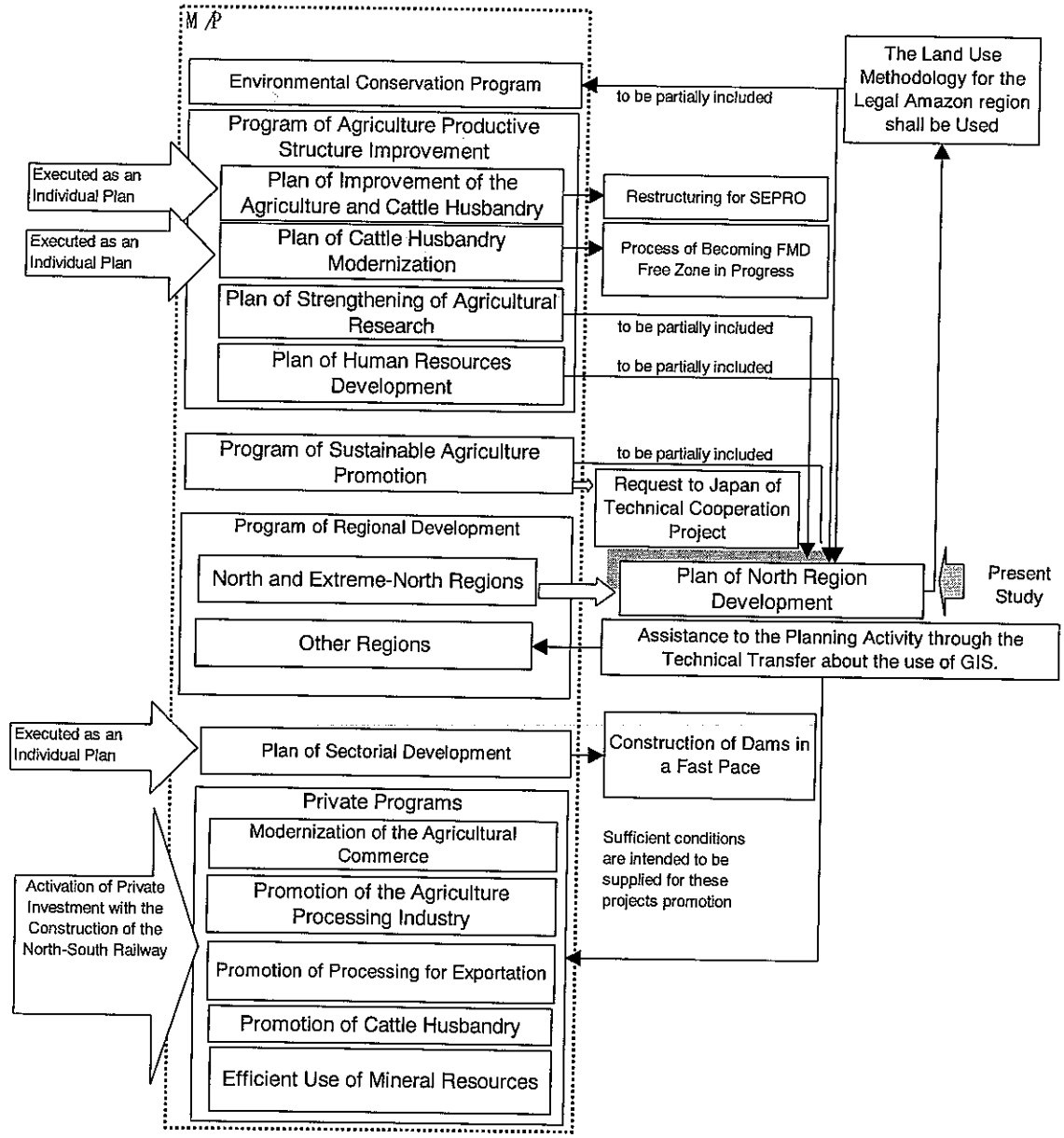
- Concerning to the Program of Sustainable Agriculture Promotion, the State Government has implemented experimental farms of soybean in 2000, and some farmers already begun to produce grain. Besides, technical cooperation was also requested to the Japanese Government. Consequently, the present study shall elaborate programs that can support the satisfactory progress of this process;

- Concerning to Regional Development, technological transfer shall be carried out to the Tocantins State in order to give it conditions to expand the programs to other regions. This can be said specially concerning to the utilization of the GIS;

- Sectorial Development is being carried out through other programs, therefore this theme shall not be approached in the present study;

- Concerning to the Programs related to the Private Sector, this sector investments were activated due to the construction of the north-south railway. Consequently, the present study shall not directly approach this program, although it shall indirectly assist for that this sector can develop without problems.

The following figure shows the relationship between the M/P and the present study.



3.10.2 Development Lines according to the Present Situation of the Study Area and the M/P Themes

(1) Present Situation of the Regional Economy

The area owned by each farmer is relatively large, in average 608.7 ha, and a minimum area of approximately 40 ha. Despite this, the main restraining reasons for the agricultural production are the lack of resources, low productivity, lack of market, and low prices of the products. Again observing the land use, it is remarkable that 53.3% of the land is used for cattle husbandry. The agriculture is only carried out in 1% of the area. As a consequence, the larger part of the area depends on the cattle husbandry.

(2) Cattle Husbandry

Let's take the cattle husbandry that is the main activity in the region. The average area of each farmer is 168 ha, who raise in average 123 cattle heads each that can be considered as a high quantity of heads per farmer. But, the regional economical activity is estagnated due to the low prices and productivity of the products. So, it will be difficult to activate the regional economy only by the husbandry sector. So, it shall be necessary to transform the present extensive production structure in a high productivity structure.

(3) Agricultural Production

The low productivity of the lands is a problem either for the husbandry sector, and it needs a improvement in the production conditions. The introduction of a high productivity agriculture should be a method to allow such an improvement, but the lack of resources, experience and technology does not make possible this to become true.

If we analyze the production of corn and rice (main products) in economic terms, we realize that the production cost surpasses the gross income. It is mainly due to the lack of resources and tecnology that impede the utilization of inputs and labours, resulting that most is realizing subsistance agriculture. The productivity must be increased utilizing variety of corn and rice that have high performance that already exist.

(4) Agricultural Credit (Assistance)

The agriculture and cattle husbandry improvement shall demand resources. The Federal Government established several credit lines for the agricultural sector with an easier access nowadays. In reality, the number of producers qualified to introduce such resources is limited. In reality, only 2.6% of the large scale farmers and, approximately, 14.3% of the small / medium scale ones utilize these credit lines. However, the value of credit for settlers is limited, not being sufficient for an active utilization of it.

The majority of farmers are not capable to offer guarantees and to elaborate projects in order to request for credit. As a consequence, they depend on the traditional agriculture that in turn hinders the efficient utilization of natural resources, downgrading the life standards. The income and life improvement depend on the improvement of the credit system.

(5) Present Land Use and Environmental Conservation

53,3% of the lands are covered by pasture in the present land use. It is more than the stipulated by the environment state law that indicates as conservation area 50% of the property. It means that the land under utilization must be decreased.

Out of the 38 analyzed municipalities, 23 have pastures that surpasses the 50% of the respective farms. Consequently, it is necessary to utilize more efficiently the land and to increase the conservation area. The future trend is to have more strict forestry laws, and the land development shall take into consideration this trend.

(6) Development Strategies

The present situation was resumed considering that there was no significant regional activation and that the agricultural sector doesn't change since the M/P. The M/P strategies

were the Diversification of the Agricultural Sector, the Intensive Agriculture and Introduction of Conservation Enterprises. There is still the necessity to promote the agricultural diversification, organize the farmers and transfer the extensive agriculture to an intensive way. In parallel, there is the necessity to adjust the present land use to make compatible with the environmental laws, returning to the conservation lands utilized in excess. So, a sustainable agricultural development may be reached. The enterprises must be developed according to the strategies not only to eliminate the poverty of the region, but to elevate the regional conditions by an eficient utilization of the natural resources.

3.10.3 Revision Considering the Residents Willingness in the Social Study

(1) Problems to be Solved and Items to be Evaluated

Making a summary of the problems identified by the region producers during the Workshops and through the Questionnaires, there is the lack of technique and resources by the farmers, where they identify the lack of technical and financial assistance by the government. Also was identified the lack in market information and irrigation water between others. The solution is to introduce adequate crops in adequate lands, technical and production assistance, agricultural credit system, etc.

According to the production scale, the large scale producers are having problems caused by the low productivity due to the degradation of pastures and high production costs. The mini and small producers indicated the lack in organization and the monoculture. So, it is planned to diversify the agriculture and promote the production nucleus.

Concerning to the environment, the problems caused by the reduction of the forests, not controled burning are well known. Considering that the study area is located within the Legal Amazon region, their inhabitants are aware about the environmental conservation. So, there is the necessity to solve those problems introducing enterprises of conservation that has the inhabitants participation.

(2) M/P Review

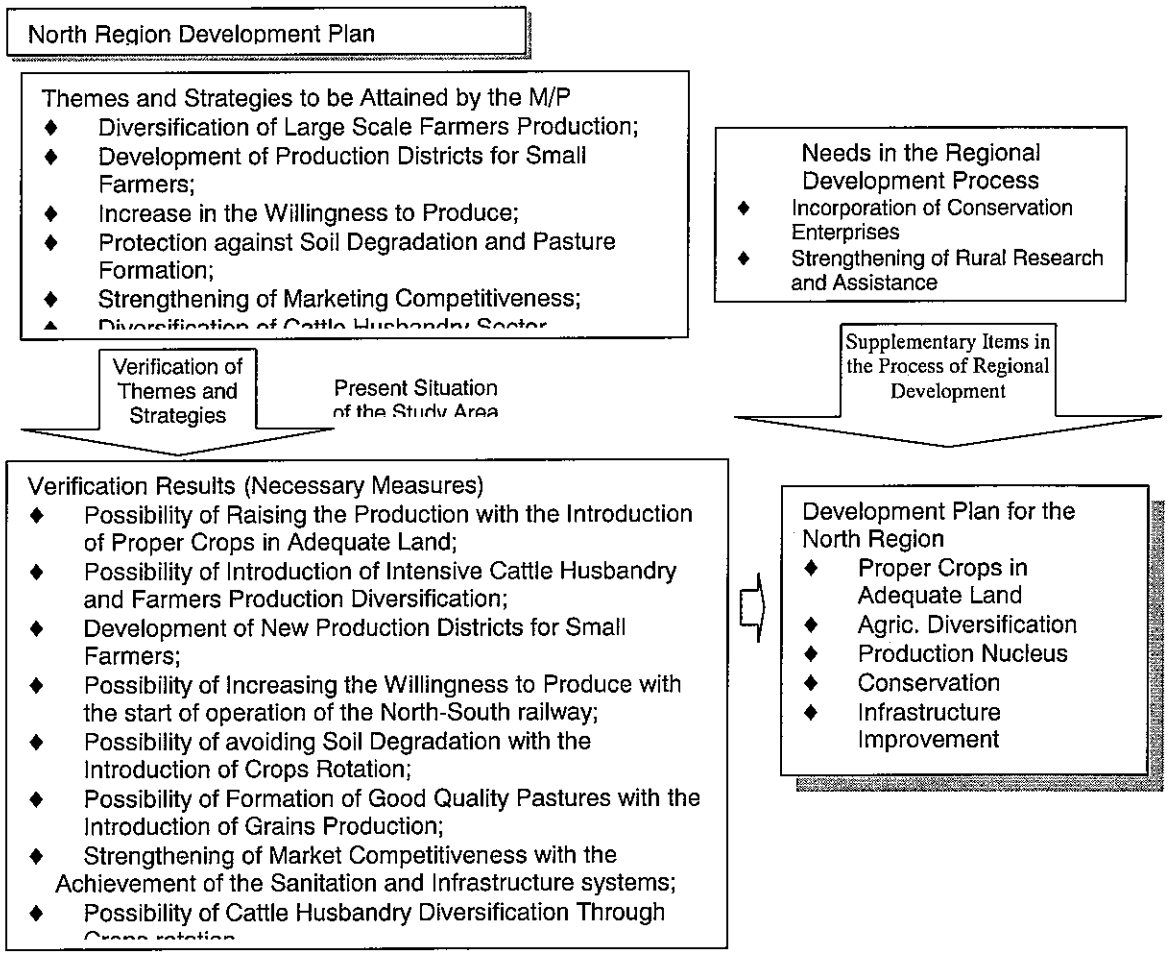
The themes and strategies elaborated in the M/P for the agriculture and livestock development are:

Agricultural Sector Themes	Strategies
Production diversification for large farmers	Introdution of grains with the method of crop rotation and diversification of the livestock;
Development of the production districts for small farmers	Introdution of grains, vegetable, fruits and medium animal;
Increase the wish for production	Improvement of the transport infrastructure; Propagation and information collection of the internal and external market; Assistance for agricultural inputs; Finance of production costs; Technical assistance, etc.
Soil Protection and formation of pasture	Introduction of crop rotation;
Strenghtning of the market competitivity	Elevate the products quality with the strenghtening of animal and vegetable defence; Reduction of transportation costs with the improvement of the transport infrastructure;
Diversification of the Livestock Sector	Promotion of dairy industry; Formation of the suine production.

The problems of all producers indicated by the rural society study and the items that must be evaluated were recumed above. The contents were similar to the M/P themes and strategies. So, the M/P strategy will be utilized in the present study.

3.10.4 Items to be Evaluated in the Elaboration of the Development Scenario

Through the re-evaluation of the M/P themes and strategies, we came to the conclusion that they are still valid. Considering that the region is situated in the Legal Amazon, it is inevitable that the development must be done in harmony with the environment. Also, the elevation of the rustic agricultural techniques of the region need activities of research and assistance. Consequently, the promotion of the regional development and rural research/assistance shall be included in the study.



Therefore, the following 5 items shall be evaluated for the elaboration of the north region projects.

- Appropriate crops in appropriate areas;
- Agricultural and Cattle Husbandry Diversification;
- Production Nucleuses;
- Promotion of Environmental Conservation;
- Strengthening of Rural Research and Extension;
- Improvement of Infrastructure

The Potentials and Restrains of those items are going to be evaluated by the point of view of the producers and colaborators, to male possible the elaboration of a realistc plan.

3.11 Potentials and Constraints

It was evaluated the introduction of crops and animal specimen from the point of view of soil resources, economy, market and producers technical level. Moreover, in parallel to the evaluation of the technique, socio-economy, inhabitants participation, resources supply and environmental impacts, it was realized an evaluation of the regional government participation that will be responsible for the enterprises assitance.

3.11.1 Potentials and Constraints of Introducing/Recommended Crops and Livestock

The analysis results of the introduction of new crops and livestock are as follows:

Item		Potential	Constraints
Natural Conditions	Agriculture	➢ Potential land area for the crop rotation: 15,913 km2 ➢ Potential land area for the intensive agriculture: above value + 1,334 km^2 ➢ Recommended area for Silvipastoril； 2.316 km^2 ➢ Recommended silviculture area；6,085 km^2 ➢ The area is suitable for cereal production by rainfed agriculture during rainy season	➢ There is a possibility of veranico. ➢ The area suitable for lage-scale mechanized agriculture is limited due to undulating topography.
	Livestock	➢ Although there is no hope for area expansion, the pasture improvement through crop rotation is expected. ➢ High potential due to the abundant rainfall;. ➢ Carrying capacity can be increased through quality and quantity improvement of pasture.	➢ Since more than 50% of the agricultural area is utilized as pasture land in the study area, there is no hope for future expansion.
Economic Feasibility of the Agriculture and Livestock	Fruit	➢ Income increase of small-scale farmers can be expected because of possible operation in the small area.	➢ Fruit culture needs high investment. ➢ High fluctuation of the price and consequent high risk.
	Cassava	➢ Although the yield fluctuates, relatively stable management is possible. ➢ This can be carried out as family operation.	➢ Man-power is needed and mechanization is difficult
	Corn	➢ Operation is possible under relatively low investment in case of high yield. ➢ Large-scale mechanized system can easily be introduced and there are suitable land	➢ High fluctuation of the yield and consequent high risk. ➢ High investment needed for mechanization.
	Rice	➢ Large-scale mechanized system can easily be introduced and there are suitable land ➢ Income increase can be expected through large-scale mechanized system.	➢ High investment needed for mechanization. ➢ Storage facilities are needed for processed rice.
	Soybean	➢ Large-scale mechanized system can easily be introduced and there are suitable land ➢ Income increase can be expected through large-scale mechanized system..	➢ High investment needed for mechanization ➢ There are exchange risks when exported.
	Milk	➢ Relatively stable management is possible due to constant market price	➢ Collection facilities are needed.
	Meet	➢ Relatively stable management is possible due to constant market price. ➢ The production cost is low due to less reqirement of man-power. ➢ Operation can be possible in the present condition in case the area is sufficient.	➢ Large area is needed and the yield per unit area is low. ➢ A great improvement in the management is not expected

	Buffalo	➢ The buffalo milk has higher prices; ➢ The buffalo does not need pasture in good conditions; ➢ The demand of meat and cheese is increasing specially at the large cities in the southern part of Brazil.	➢ There is a wrong idea for buffalo. ➢ The marketing flow for meat and milk is not established except for some areas. ➢ Research on buffalo is far behind compared to cattle.
	Suine	➢ There is a continuous demand for pig meat and their processed products with low production ➢ The treatment of excreta is easy due to large waste land. ➢ Initial investment is low and quick capital return is expected.	➢ Lack of disease control .. ➢ There are insufficient technical supporting system. ➢ Modernized system is not satisfactorily introduced like AI. ➢ The marketing system of pork meat is not established.
Future Marketing Conditions of the Crops and Livestock to be Introduced	Fruit	➢ North-south railway can be used as transportation means with minimum damages to the fresh fruits ➢ In case of the production for export, there is high production potential comparing to the other production areas.	➢ The marketing plan might depend on the operation plan of North-south Railway. ➢ The study area is located far away from the consumption center except the products for export.
	Mandioca	➢ Since there are milling and starch production facilities in the study area, the producers can supply their products to such facilities. ➢ The product can be utilized for suine criation	➢ The market will be restricted to certain processing facilities.
	Cereals	➢ Since there is a poultry integration plan in the study area, there is a high demand of the products. ➢ In case the world demand is increased in future, it is possible to produce cereals with high competitiveness. ➢ The area can offer an efficient transport with the asphalted highways. ➢ Due to Multimodal Programs of the Federal Government, the infrastructure of transport will be rapidly improved in the study area. ➢ The study area is adjacent to the northeastern area where is insufficient in cereal production.	➢ The local storage facilities will be needed.
	Milk	➢ The construction of dairy products processing facilities is going on within the study area.	➢ The amount of local consumption is limited and there is little expansion possibilities.
	Meat	➢ The study area is located adjacent to the northeastern area where self-sufficiency is not performed yet. ➢ When the exportation becomes possible in future, the study area can be a competitive production area for Europe and Asia. ➢ The study area became a free zone area in 2001	➢ Living cattle that is transported from Pará can bring risks of aftosa ➢ Lot of living cattle is tranported to avoid taxes.
Cultivation Technique and Experience on Introduced Crops	Fruit	➢ Fruits can be cultivated at the land conditions (sandy and slope area) where is not suitable for the cultivation of cereals and vegetables. ➢ A specialized company of banana production is already existing in the area and this company can support for the technology transfer and seedling distribution etc. ➢ It is possible to develop the combined management with agro-forestry and beekeeping.	➢ The local producers have less experience on the commercial production. ➢ Although the introduction of the irrigation system is needed for better quality ➢ The technical support is not satisfactorily carried out. ➢ There is insufficient information on marketing of the products and the marketing system is not satisfactorily functioned.

	Mandioca	➢ Majority of the producers have experiences of mandioca cultivation though it is small scale. ➢ The average yield of mandioca in the state is more than the national average and the average in the study area is also not less than the national average. ➢ Many milling facilities of mandioca is constructed by the associations. ➢ It is planned to construct the starch factory at the industrial complex in Araguaina and the technical transfer and the introduction of promising varieties are expected in addition to the increase of the demand. ➢ The by-products of mandioca can be used as animal feed.	➢ Since mandioca was cultivated for self-consumption so far, there are no activities on the introduction of the promising varieties and the improvement of quality. ➢ Considering the supply to the starch processing facilities, the products should be supplied to the facilities within 24 hours after harvest.
	Corn	➢ The producers have knowledge on the cultivation of corn in spite of being in small scales. ➢ Corn is the important rotation crops together with feijão and soybean and is also used as animal feed. ➢ Since the yield of this crop is greatly be affected by the cultivation technique, the high yield can be expected by an appropriate management. ➢ The production cost can be reduced by selecting an appropriate location for the cultivation.	➢ The yield of corn in the study area is lower than the national average and also than the average of the State. ➢ Since corn was cultivated for self-consumption so far, there are no activities on the introduction of the promising varieties and the improvement of quality. ➢ Corn is mainly produced for the domestic market and there is a high fluctuation in prices.
	Rice	➢ The producers have experiences on the cultivation of rice though it is in small scale. ➢ The existence of appropriate varieties for this area makes possible the high productivity.	➢ The yield of rice in the study area is lower than the national average and also than the average of the State. ➢ Since rice was cultivated for self-consumption so far, there are no activities on the introduction of the promising varieties and the improvement of quality. ➢ The growth of this crop is negatively affected by the high temperature during flowering. ➢ The damage by veranico is expected especially in the sandy soil condition.
	Soybean	➢ There are many candidate areas for crop rotation in order to improve the degraded pasture land. ➢ Concerning the selection of variety and cultivation method, various know-how already accumulated can be utilized effectively. ➢ It is possible to apply the research data of Embrapa in order to avoid the damage by veranico.	➢ The local producers have less experience on the cultivation of this crop especially large-scale mechanized cultivation. ➢ The damage by veranico is expected especially in the sandy soil though it is flat. ➢ The road condition of the area should be improved for the transportation of machineries, inputs and products. ➢ The storage and drying facilities are not available in the study area.
Raising technique of introduced livestock	Buffalo	➢ Temperature is always high and the water resources are abundant even in dry season in the study area. ➢ No special technique for buffalo raising is needed and readily available facilities can be utilized. ➢ The crude feed materials that cannot be utilized by cattle can be utilized by buffalo and therefore new land reclamation is not necessary. ➢ The facilities for water bathing are not necessary and only shading trees are needed. ➢ Buffalo has longer life than cattle and has higher reproductivity. ➢ Buffalo can be utilized as plowing animal for plowing and transport. ➢ Many farmers have intension to introduce the buffalo at the workshops	➢ Farmers, consumers and researcher have a wrong idea for buffalo. ➢ Buffalo doesn't have resistance against direct sun shine. ➢ The modern technologies are not yet introduced. ➢ There is no technical support system in the study area. ➢ The acquisition of the promising variety is not easy.

	Suinoculture	➢ The raising technique is rather simple and the local varieties are raised in many places. ➢ There are enough feed supply such as mandioca, rice bran, waste fruits and etc. ➢ Only small space is needed and aged people and children can be involved in the operation.	➢ The general recognition of suinoculture is rather low. ➢ There is no enough organization for technical services. ➢ The system for the prevention of diseases is not functioning. ➢ Slaughterhouse for swine is not enough in the study area. ➢ The acquisition of the promising variety is not easy.

Related to the existance of areas, it can be considered that the cultivated area can be amplified, considering the high natural conditions of the land use, making possible to enlarge the areas from 370km^2 to 17,000km^2. Considering the areas used for pastures that include more than 50% of the Area, it will be difficult the expansion of new areas.

In the relationships of conditions of the cultivation, it is difficult to obtaining a condign family income by the small producers producing grains for the amounts produced now. But it will be possible if there are an increase of the production in the same used areas. The fruit production can reach1 minimum salary in 1ha, but it won't be possible for the need of high investments for the production. In the livestock need at least an area of 50ha, being impossible the accomplishment for the small producers.

The future commercial conditions of the induced cultivations, were analizadas as bases the conditions and production estimate, it disputes of the national and international market, resulting as of short period, the planting of the soy that has conditions commercial exportativas, medium term the grains, being as main cultivation the rice and corn that it is increasing the national and international, and long term demand the livestock, animals in general that equally this increasing the commercial conditions. Considering these factors of commercial conditions, the Area of the Study and appropriate for the production of grains, livestock, and animals in general. The forecast and their advantages of the products in each area are in the following way:

- Production of grains destined for the Northeast (Rice, Corn, Bean);
- Cattle products for the Northeast;
- Production of exportation products (Short term: soybean, Medium term: soybean, corn, rice and fruits, Long term: products of medium term and cattle products);
- Raw material production to supply the regional industry (cassava and corn);
- Special products of the area (Buffaloes products, palm hearts)
- Wood

The region already has experiences of cultivation and production techniques for the proposed products, except for the fruit production. So, the introduction will not be problemathic, but the low utilized technology must be improved to elevate the productivity.

As in the Study Area they already possess production of buffalos and swine, it can be introduced without problems. But, the inhabitants have a distorted vision of the buffalos, and it will be necessary to change this scenary. For the suinocultura, it will be necessary to improve the criation techniques and control of diseases, which are delayed.

3.11.2 Analysis Results of the Alternatives Implementation Possibilities

It was evaluated the possibility of introduction of grain production in pastures and an intensive livestock by the medium/large producers, elevate the production through the intensive agriculture by the mini and small producers and plans of conservation for all the producers. The results were as follow.

Item		Potential	Constraints
Livestock Integration	Technical feasibility	➢ Intensive livestock raising will be possible through introduction of cereal production. ➢ Cereal cultivation and intensive fattening technologies are already available. ➢ The technical cooperation from EMBRAPA can be expected. ➢ There are various alternative cereals such as rice and corn in addition to soybean.	➢ Most of the land owners have no experience of large scale cereal production. ➢ The livestock farmers should depend on the other grain production farmers. ➢ There will be a need to introduce cereal production expert from the other area. ➢ There is a risk of veranico due to sandy characteristic of the soil with less water holding capacity. ➢ There are insufficient infrastructures for cereal production. ➢ The support services such as soil analysis, selection of variety and technical transfer are not satisfactorily functioned.
	Economic feasibility	➢ Improvement of farm economy through progress in productivity and quality of cattle ➢ Rapid expansion of farm income and effective use of land through cereal production ➢ High competitiveness of the local products due to low transportation cost	➢ There is a high risk for cereal production due to large investment.
	Creation of job opportunities	➢ The direct employment is expected through cereals production. ➢ Creation of job opportunity is expected through the activation of regional economy.	➢ There will be less job opportunities due to the application of mechanized agriculture.
	Intention of participants	➢ There are many livestock farmers who are interested in cereal production. ➢ Many producers are interested in cereal production due to recent investment to the poultry project.	➢ The producers are rather reluctant to be participated into new activities. ➢ The traditional livestock farmers are rather reluctant to be participated into new activities.
	Availability of fund	➢ The involvement of the private sector is expected due to comparative advantage in the transportation.	➢ It need rather high investment. ➢ The funding cost is high to get financial support from bank. ➢ There is no necessary security for getting financial support from bank.
	Environmental conservation	➢ The land that is not suitable for farming can be conserved due to planned utilization of land. ➢ The forest conservation law will be easily applied due to the economic improvement of producers. ➢ The afforestation activities will be activated due to the economic improvement of producers.	➢ Some farmers may not obey the forest conservation law at the places where the land potential is high. ➢ Some farmers may invade into the area where the land potential is low
Introduction of intensive	Technical feasibility	➢ Efficient technology transfer to the association members. ➢ Availability of RURALTINS/NATURATIN offices in the area.	➢ The local producers have less experience on the new type of agriculture. ➢ Necessary the interest of the producers.

	Economic feasibility	➢ Crops and livestock that can enjoy the regional advantage are available in the area. ➢ Specialized cultivation such as buffalo and banana is possible based on the regional advantage. ➢ The group production of special products such as buffalo milk cheese can be promoted. ➢ The local producers can supply the materials to the manufacturers established in the area. ➢ Minimization of production cost through collective purchasing. ➢ Maximization of selling price through collective marketing of the products. ➢ Minimization of production cost through collaborated use of land, machinery and facility. ➢ Stabilization of farm income through combined management (circulation of organic matter, effective utilization of natural resources)	➢ There is an investment risk because of new activity. ➢ This activity is highly influenced by the investment trend of the private sector.
	Creation of job opportunities	➢ At least can absorb the family manpower. ➢ High efficiency for the creation of direct job opportunity. ➢ The indirect creation of job opportunity can be expected through regional activation.	➢ The equal relation so far established can be changed into the relation of employer and employee.
	Intention of participants	➢ There is high participation wish.	➢ The leadership capacity might be needed for the mutual agreement.
	Availability of resources	➢ Association can apply for the various credit systems supported by the Government. ➢ It is possible to participate in the integration promoted by the private sector.	➢ There is no enough security for providing enough fund. ➢ It is sometimes difficult for producers to prepare report necessary for the financial support due to insufficient education.
	Environmental conservation	➢ It is possible to promote the collective environmental activities such as afforestation.	➢ There is a possibility not to follow the indications of proper land use plan.
Promotion of the Environment Conservation	Technological possibility	➢ Abundance of lands that can used for the present activity. ➢ Without needing high technology, anybody can participatie in this activity. ➢ Abundant resources, and the appropriate climates for the reforestation activities.	➢ Lack of research that assures the beginnings of the activities. ➢ Lack of basic information. ➢ Lack of agronomic technologies information. ➢ Lack of agroforestry activity information.
	Economical profitability	➢ A potential of current and future Market of wood exists. ➢ This activity can represent future savings. ➢ Possibility exists of turning an economical activity. ➢ As the environment activities, can reduce the social costs in the future.	➢ He/she requests investment initial high, with the recovery of the capital invested in the long period. ➢ The section publishes doesn't have enough capital to execute the activity.
	Effect of the Creations of Jobs	➢ It creates the direct jobs for the reforestation activities.	➢ After the planting and creations, it doesn't request work hand fixed, but temporary.
	Participations of the Producers	➢ High coincidence about the preservation of the environment.	➢ Due to the long time of recovery of the investment, interest them are very few.
	Possibilities of the Obtainings of the Financial Resources	➢ Less dificult to obtain international resources.. ➢ Possibility to request the participations of NGOs. ➢ Possibility of being negotiated as projects seeking the change of CO2.	➢ They request the times prolonged to recover the investments ➢ Lack of fiscal incentives. ➢ Requests high investments.
	Necessity form the Environmental conservation	➢ Great effects on improvement of the environment. ➢ Possibility to respect environmental codes.	➢ Possibility to become monoculture, that is not appropriate to the environment
Ince ntive of	Technological possibility	➢ Being a simple activity, it is possible the participation of anybody.	➢ It requests the capital to improve the activity.

	Economical profitability	➢ They can bring improvements of the family economy. ➢ Existence of one manufactures in Toccantinopolis, TOBASA. ➢ Possibility to bring income to the less privileged people, in the other activities.	➢ Being a cheap product, it cannot wait a lot in the improvement of the economy. ➢ Big companies can influence a lot this sector.. ➢ Big influences on the economy of great companies, as external factors.
	Effect of the Creations of Jobs	➢ They can be the source of income for women that doesn't have job opportunities in the rural area	➢ Being an activities of low income, if they have other activities better, the producers change the activities easily.
	Participations of the Producers	➢ The possibility of improvement of the family economy, it is of high interest for the rural residents'.	➢ As it is an activity realized in a collective form, takes a long time to the consensus of the opinions. ➢ The risk of interrupting the acting exists.
	Possibilities of the Obtainings of the Financial Resources	➢ Being an environmental activity, it is the possibility to receive to get resources of several types.	➢ Difficulty to arrive to the federal line of credit. ➢ Difficulties in the elaboration of the plans for obtaining of credits.
	Needs of the Environmental Measures	➢ Great effects in the improvements of the environment conservations. ➢ It contributes to the fixation of the family in the rural way.	➢ The benefits are exclusive of the associates

The possibility of an economical improvement by the introduction of the agricultural integration and diversification system is high, where naturally, it will occur a grain production increase, also increasing the productivity in the livestock sector. With this, the promotion of jobs can be expected by the increase of the use of the lands. On the other hand, as the producers don't possess experience in the cultivation of grains and, for it's introduction, is necessary that the cattle farmers ask the assistance of the grain producers, or attract experienced producers of other areas. It was also verified that and big the problem of the obtaining of resources, mainly for the new begginers.

Analysing by the point of view of the intensive production through the associativismo, it can be concluded that there are crops and animals that can be introduced in the study area, taking into account the regional superiority in this aspect. So, it can be introduced more economical models, with associative production, with good results in the promotion of work opportunities. On the other hand, the support of organizations is necessary due to little experience of the farmers and the innovation that will be introduced in the administrative field. The restrictions in the obtaining resources are also many, having the need of measures that compensate the lack of hypothecary goods of the mini and small producers.

Relating to the conservation enterprises, the silviculture can be relatively easy due to the abundant natural resources. So, there is the possibility of future increase on the wood demand. On the other hand, there are constraints as the long time to the profits initiation, high initial investment and lack of technology in the moment. The promotion of the extraction activity can introduce an eficient utilization of the natural resources in the region, originating focus of activity activation, but it is clear that the economical results are very small.

3.11.3 Items to be Considered in the Measures Elaboration

The items to be considered:

Diversification / Integration of the Agriculture	➢ Introduction of Intensive Agriculture utilizing the natural consitions.
	➢ It must be a cooperation between the cattle breeder and the experienced grain producers for the agricultural diversification, establishing production techniques of grais and planos of agricultural diversification.
	➢ Introduction of new crops with future perspectives: soybean (short term); corn, rice and soybean (medium term); medium term crops and livestock (long term). In parallel, the introduction of products that can be special of the region as buffalo and wood.
	➢ Utilization of local advantages for the grain production. Mainly for the products that has large areas, it must be demonstrated those advantages and the possible results for the introduction of those methods.
Intensive Agricultural Management in Association	➢ The number of mini and small producers dedicating for the livestock. Although, as the meet production is not appropriated for them, it must be researches on other forms of production that can substitute this one.
	➢ The grain production will need the introduction of methods for the production increase.
	➢ Intensive agriculture introduction that include the cassava, grains and livestock.
	➢ The dairy production must be introduced in the place of meet production, and the buffalo production must be introduced to increase the profits due to it's high potenctial value.
	➢ It must be stimulated the association formation, in the place of searching means of marketing.
	➢ It must be proper the subsistance producers participation in the economical development with the formation of associations or comunity farms. In parallel, it must be supported the extraction activities with objective of strenghtening the association in the projects.
	➢ The lack in technical knowledge and experience in production of new crops are constraints. It is necessary that the development of methods that improve the agriculture with objective of production increase.
	➢ The introduction of new animals (buffalo, suine and chicken) need an adaptation of the farmers that are not habituated with them. It was found that there is a delay in the animal health control for the suine criation, needing to be improved.
Conservation Activities	➢ It will need the introduction of methods adjusted for the future increase in the environmental laws severity.
	➢ The expansion of the livestock is difficult due to the fact that more than 50% of the region already is utilized for pasture, being in the future necessary to cinvert those areas from extensive use to intensive use. As an alternative, it must be introduced sustainable agriculture forms.
	➢ Analyse the Silvipastoril and Agroflorestal activities as alternatives for the sustainable activities.
	➢ Areas of risk conversion that are not appropriated for the cultivation in areas of environmental conservation.
	➢ Efective utilization of lands with appropriated crops in appropriated soils with the conservation of natural resources and introduction of reforestation activities. It has the objective of a project of a sustainable economical development for the future.

As a result of those analysis, it was confirmed the possibilities of strenghtening the regional economy through the efective use of the natural resources (lands). For that, it is necessary that the State Government supplies information refering to the efective use of lands, adopting a monitoring system to know and make quickly the resolution of any modification that can occur.