CHAPTER 7 FEASIBILITY STUDY ON THE ARAGUAÍNA MUNICIPALITY

7.1 Present Conditions of the Study Area

(1) Natural Conditions

a. Climate

According to the Ecological-Economic Zoning of Tocantins (SEPLAN, 1999), adopting the Thornthwaite method, the Araguaína municipal district is classified as follows; humid climate with moderate water deficiency (B1wA'a'), potential evapotranspiration with an annual average variation between 1,400 and 1,700 mm, and during Summer this variation is around 390 and 480 mm along three consecutive months with the highest temperatures.

According to the data of the main climatological station of Araguaína, during the period from 1988 to 2000, the annual average rainfall was of 1,800.9 mm. This rainfall is concentrated in the period from November to April (81% of the annual average rainfalls), with a higher concentration from January to March (45% of the annual average rainfalls). The following table presents the monthly average rainfall in Araguaína.

Monthly Average Rainfall in Araguaína – 1995 to 1997 (mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
270.5	249.7	287.0	231.2	104.5	20.7	9.7	15.3	57.7	122.0	218.6	214.0	1,800.9

Source: Main Climatological Station of Araguaína

The annual average temperature is around 25°C, according to the data of the main climatological station of Araguaína, for the period from 1988 to 2000. The data on monthly average temperature is presented in the following table.

Monthly Average Temperature in Araguaína – 1995 to 1997 (°C)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
24.9	25.0	25.0	25.3	24.9	24.1	23.9	24.9	25.7	25.3	25.1	24.9	24.9

Source: Main Climatological Station of Araguaína

b. Hydrology

The Araguaína municipal district is effectively composed of 5 basins. Among these, the following basins stand up due to their coverage area; Lontra river basin (A14) that encompasses the center of the municipal district, and the basins of the Araguaia river (A1) and of the Muricizal river (A13). These three basins cover around 92% of the municipal district area, with a larger participation of the Lontra river as presented as follows.

Hydrographic Basins of Araguaína

Lontra River (A14)		**Araguaia River (A1)**		**Muricizal River (A13)**		**Tocantins River (T1) e Jenipapo River (A12)**		**Others**		**Total Area**
Area (km^2)	%	Area (km^2)	%	Area (km^2)	%	Area (km^2)	%	Area (km^2)	%	(km^2)
1,619.3	41.31	1,038.2	26.48	973.8	24.84	285.5	7.28	3.2	0.08	3,920.0

Source: SEPLAN (1999) e JICA Mission calculations (2000)

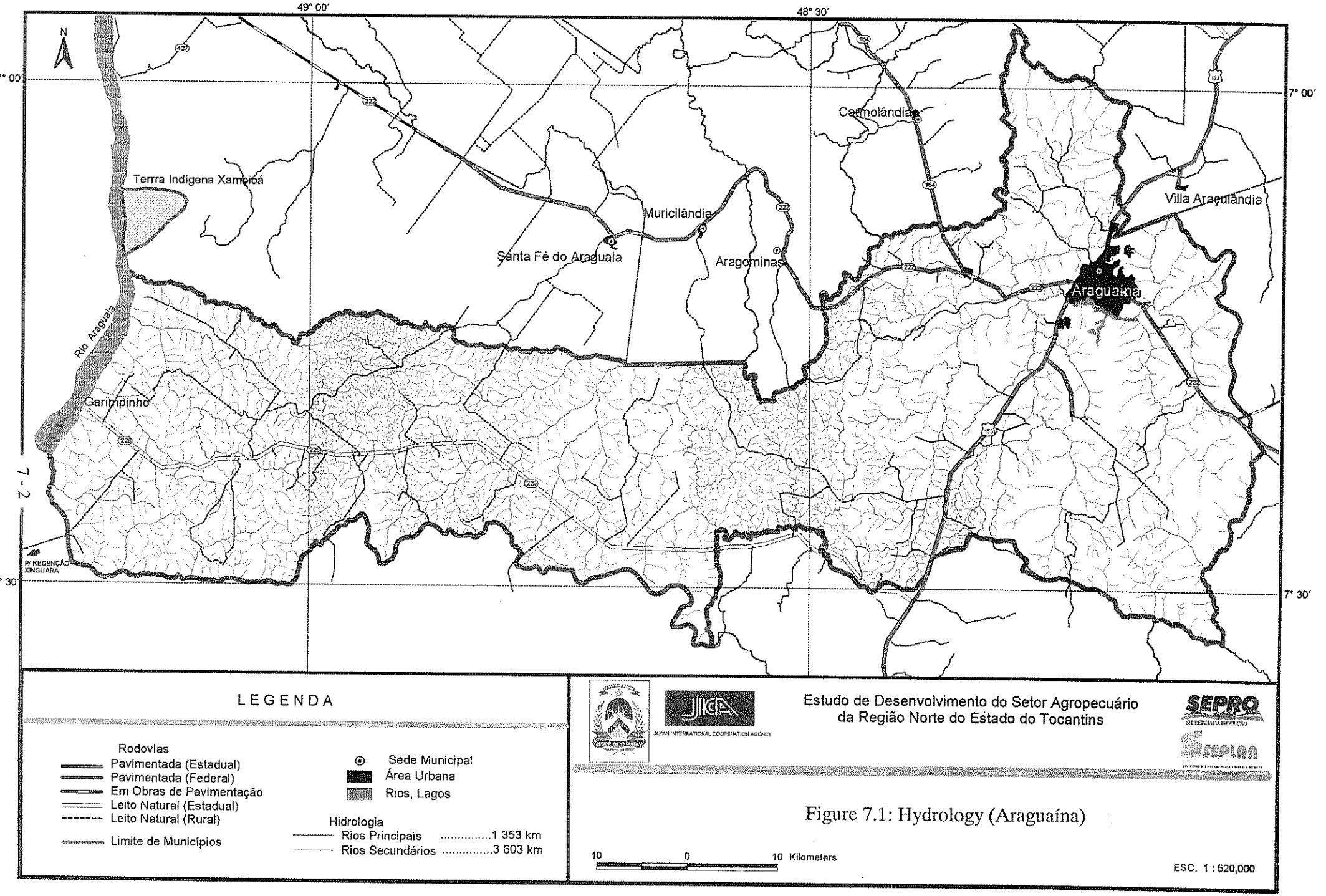


Figure 7.1: Hydrology (Araguaína)

c. Geomorphology

The Araguaína municipal district (3,920 km^2) é characterized by relief derived from Plainness of Bare Degraded Pedi-plain (1,901.7 km^2) and from homogeneous Dissection with Top Convex Features (1,414 km^2), with topography is determined by the geological structure of origin.

The first is concentrated at the Eastern position, in direction to the West until the surroundings of the N-S axis, while the second occupy almost all the Eastern position. They are intercepted only by other origin relief in the N-S direction, the Plainness of Bare Retouched Pedi-plain (509,6 km^2). Still in the domain strip of this last one, there are points with relief derived from Structural or Differential Dissection (6 km^2).

At the Center-West position, there are relieves deriving from Homogenous Dissection with Acute Top Features (29.2 km^2), and the margin of the Araguaia river, at the extreme West of the municipal district, there are relieves resulting from the Plains Fluvial Accumulation (40.9 km^2).

Relieves which shapes are the consequence of other actions, and that are spread all over the municipal district, represent around 16.6 km^2.

d. Soils

In Araguaína, as well as in Araguatins, the existing soil classes are predominantly Quartzose sand, Oxisols and Podzolic soils, respectively in decreasing proportions. The occurrence of Litholic, Gley and Plinthic soils is also observed. The following table presents the percentages of predominant classes of soils in the municipal district of Araguaína.

Predominant Classes of Soils in Araguaína

Predominant Classes of Soils	**Coverage Area (km^2)**	**% of the Area**
Quartzose sand – AQ	1,271.0	32.42
Oxisols (red and yellow oxisol – LV, yellow oxisol – LA and dark red oxisol – LE)	1,251.8	31.93
Podzolic soils (red and yellow podzolic – PV and dark red podzolic – PE)	916.6	23.38
Litholic soils – R	456.7	11.65
Others (rivers, lakes, urban area, indigenous area)	24.1	0.62
TOTAL	3,920.2	100.00

Source: SEPLAN data, JICA Mission calculation (2000)

According to the soils analysis carried out for the Preliminary Study of Environmental Impact for the Agricultural Development Plan of the Northern Region (Araguaína and Araguatins), the Araguaína municipal district's soils present low contents of Phosphorus, slightly to strongly acid pH, medium to very high Aluminum saturation, low organic matter contents, low Potassium contents in sandy texture, and medium to high Potassium contents in medium and sandy texture, low contents of Calcium, and medium contents of Magnesium.

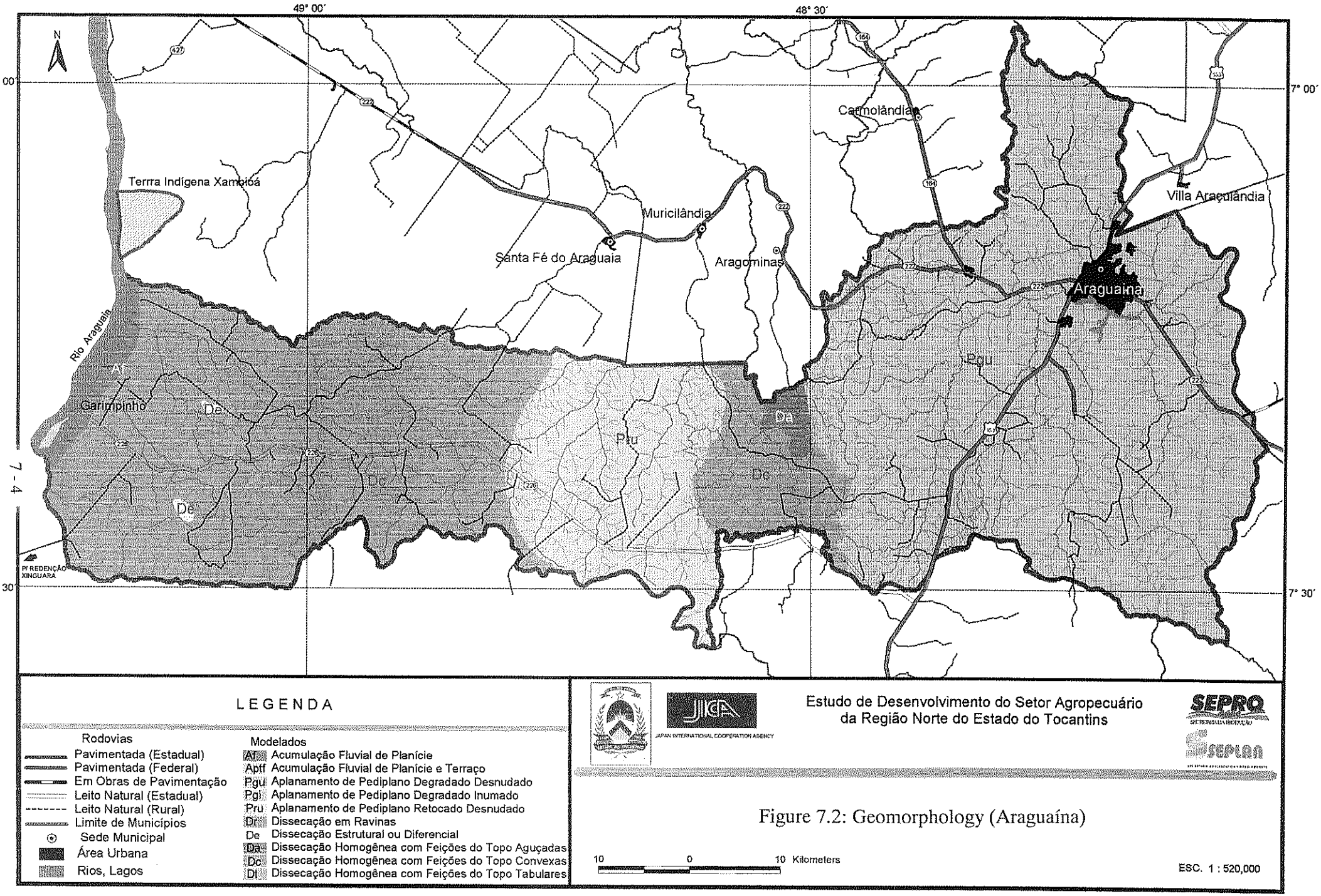
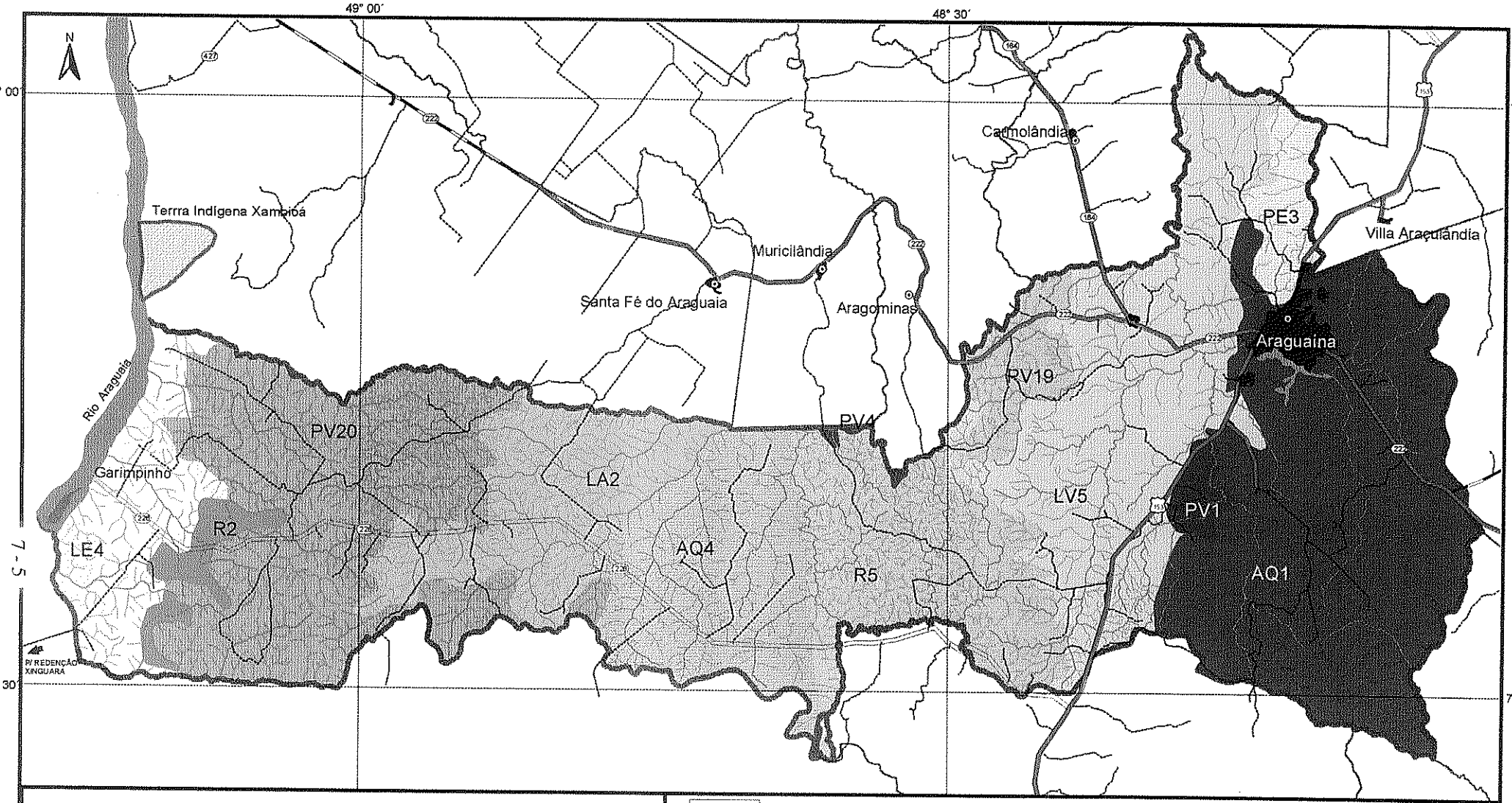


Figure 7.2: Geomorphology (Araguaína)



LEGENDA

Rodovias
- Pavimentada (Estadual)
- Pavimentada (Federal)
- Em Obras de Pavimentação
- Leito Natural (Estadual)
- Leito Natural (Rural)
- Limite de Municípios

AQ Quartz Sand
G Gleysoil
LA Yellow Oxisoil
LE Dark-Red Oxisoil
LV Yellow-Red Oxisoil
PA Yellow Podsoil
PE Dark-Red Podsoil
PV Yellow-Red Podsoil
R Litolic Soil
(Obs.: Associations See Annex 3 Tab. 3.6.1)

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY

Estudo de Desenvolvimento do Setor Agropecuário
da Região Norte do Estado do Tocantins

SEPRO

SEPLAN

10 0 10 Kilometers

ESC. 1 : 520,000

Figure 7.3: Soils (Araguaína)

e. Erosion Hazard

The soils erosion hazard study was carried out taking into consideration the hazards conditioned to soils mechanics, according to SEPLAN data (1999). The erosion hazard was evaluated taking into consideration basic documents about soils, geology, and altimetry. According to this study, the potential erosion classes of the Araguaína municipal district's soils are presented in the following table.

Erosion Potential of Araguaína's Soils

Erosion Potential Classes	Characteristics	Area (km^2)	% of the Total Area
Slight	Soils varying from well to strong drained, deep and with predominance of 3 to 8% gradient.	1,854.8	47.32
Very Strong	Shallow and very shallow soils. The predominant relief varies from hilly to very inclined, with gradient higher or equal to 45%.	765.7	19.53
Moderate	Soils varying from deep to slightly deep, and usually with undulate topography, with a gradient from 8 to 20%.	512.1	13.06
Strong	Slightly deep soils, with moderate drainage. Usually present in strongly undulated relief, with predominant gradient between 20 and 45%.	483.7	12.34
Slight to very Slight	-	280.7	7.16
Special	-	0.0	0.00
Others	-	22.9	0.58
TOTAL		3,920.0	100.00

Source: SEPLAN Data and JICA Mission calculation (2000)

f. Vegetal Coverage

Cerrado vegetation is predominant in Araguaína, and is the characteristic of soils where the water and nutrients availability is small, and to which the riverside forests are associated. In another portion, the Open Rain Forest that is the characteristic of the Amazon domain is observed.

The cerrado features vary from not dense, typical, to "cerradão" (not dense forest combined with cerrado flora). Many of them are already strongly modified by the men actions, considering that this type of vegetation is strongly sensitive to environmental changes. Despite the large area of available land, most of it was already explored in the past, drastically reducing the primary vegetation.

At the west portion of Araguaína, where a dominance of rain forest covering deeper soils with higher fertility is observed, there are individuals of large-scale such as Ipê (*Tabebuia serratifolia*), Mogno (*Swietenia macrophylla*), Aroeira (*Myracroduon urundeuva*), Sucupira-preta (*Bowdichia virgiloides*). However, the selective cutting of trees is also carried out, considerably reducing the number of individuals with high commercial value. In this region, the presence of palm trees with the predominance of Macaúba (*Acromia aculeata*) and of Inajá (*Attalea maripa*) is also observed, and this last one is a colonizing species and occupies the void left by the deforestation.

g. Analysis of Present Conditions through GIS

The present conditions of the Study Area were analyzed through the GIS. Some analyzed themes are presented as follows;

i. Slope

In a first observation, the region can be considered flat and thus present little declivity. However, due to the existence of large number of rivers and small brooks, the large extension flat land is limited. This type of topography is characteristic of the bordering region to the municipal district of Aragominas.

The areas classification according to the declivity is presented in the following Table 7.1.

Declivity	Area (km²)
< 4 %: apt for mechanization	3,355.1
4 to 8 %: mechanization with restrictions	365.3
8 to 30 %: difficult mechanization	171.5
More than 30 %: improper for mechanization	3.3
Others	24.8
Total	3,920.0

ii. Land Potential

According to the type of soil (physical-chemical characteristics) and to the declivity, we can define the land potentiality as described as follows. The areas with high agricultural potential in the region are divided into 3 blocks; eastern, central and western regions of the municipal district. The areas with less aptitude for agriculture according to the mechanization possibility are located in the bordering region with the municipal district of Aragominas. The areas with potential 4 are scattered at the eastern region. The areas with potential 5 are concentrated at the western region. The conservation areas are few.

The areas classification according to the Land Potential is presented in the following Table 7.2.

Potential	Description	Area (km^2)
1	Soils with capacity for intensive use and possible for mechanization	1,253
2	Soils reasonably fertile with possibility for mechanization	2,360
3	Soils with capacity for intensive to medium use, but difficult for mechanization	153
4	Land for silviculture, silvi-pastoral, agro-forestry and reforestation activities	67
5	Land for conservation	62
Others		25.2
Total		3,920

iii. Proposed Land Use

The proposed land use is presented in Table 7.3. The area for Agriculture and Livestock I is scattered all over the region. The areas for Agriculture and Livestock I and II represent the majority of the municipal district areas and are mingled. The existence of a large number of rivers and brooks gives an indication that there are several water source protection areas.

Proposed Use	Description	Area (km^2)
Agriculture and Livestock I	Area with potential for intensive use	817.2
Agriculture and Livestock II	Area with potential for medium use	1,344.3
Silviculture (S)	Area for Silviculture activities	192.9
Silvi-pastoral (SP)	Area for Silvi-pastoral activities	136.0
Forest Management (MF)	Area for Forest Management activities	14.6
Conservation (C)	Areas for Conservation	1,360
Others		55.8
Total		3,920

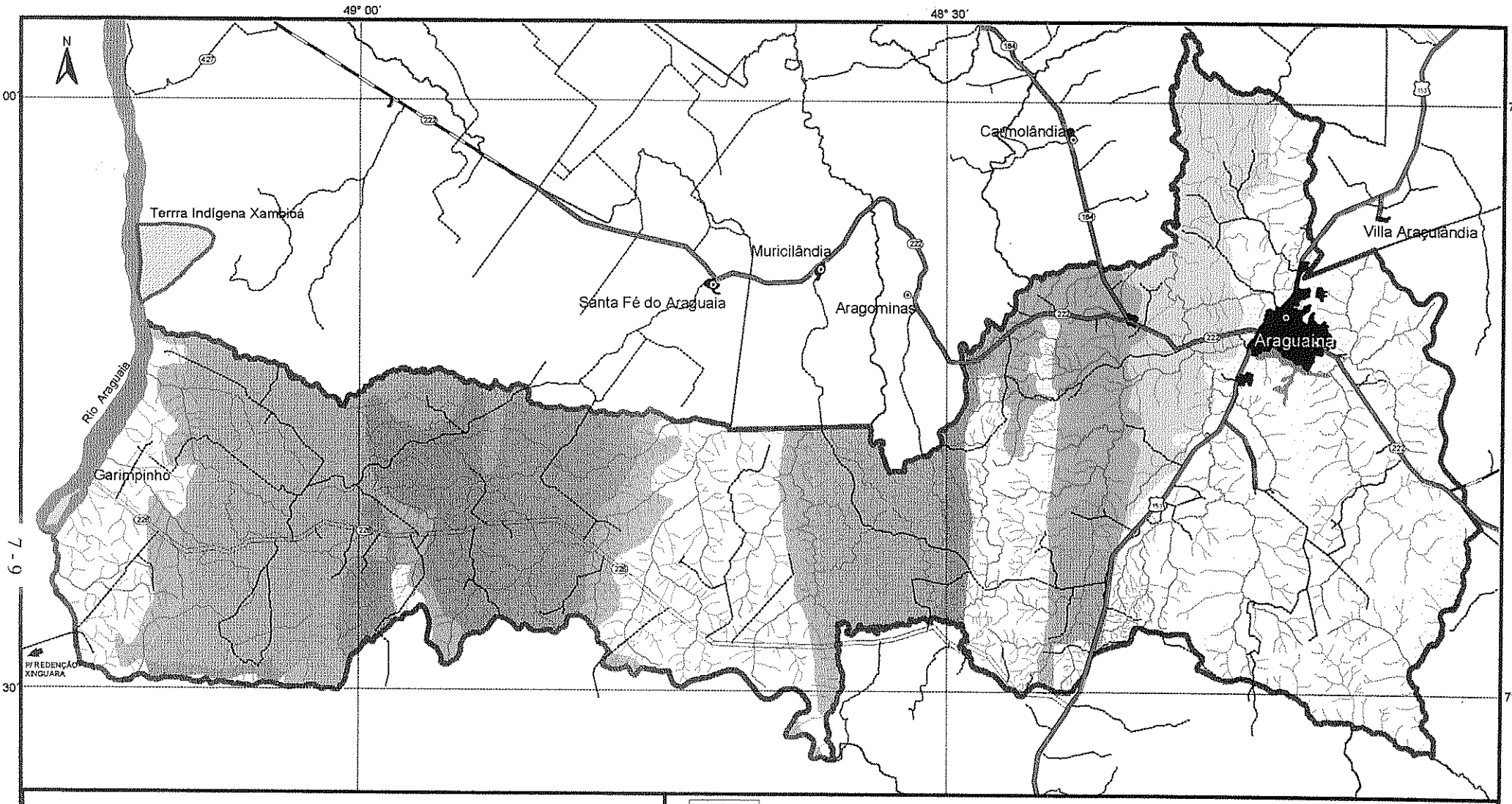


Figure 7.4: Erosion Hazard (Araguaína)

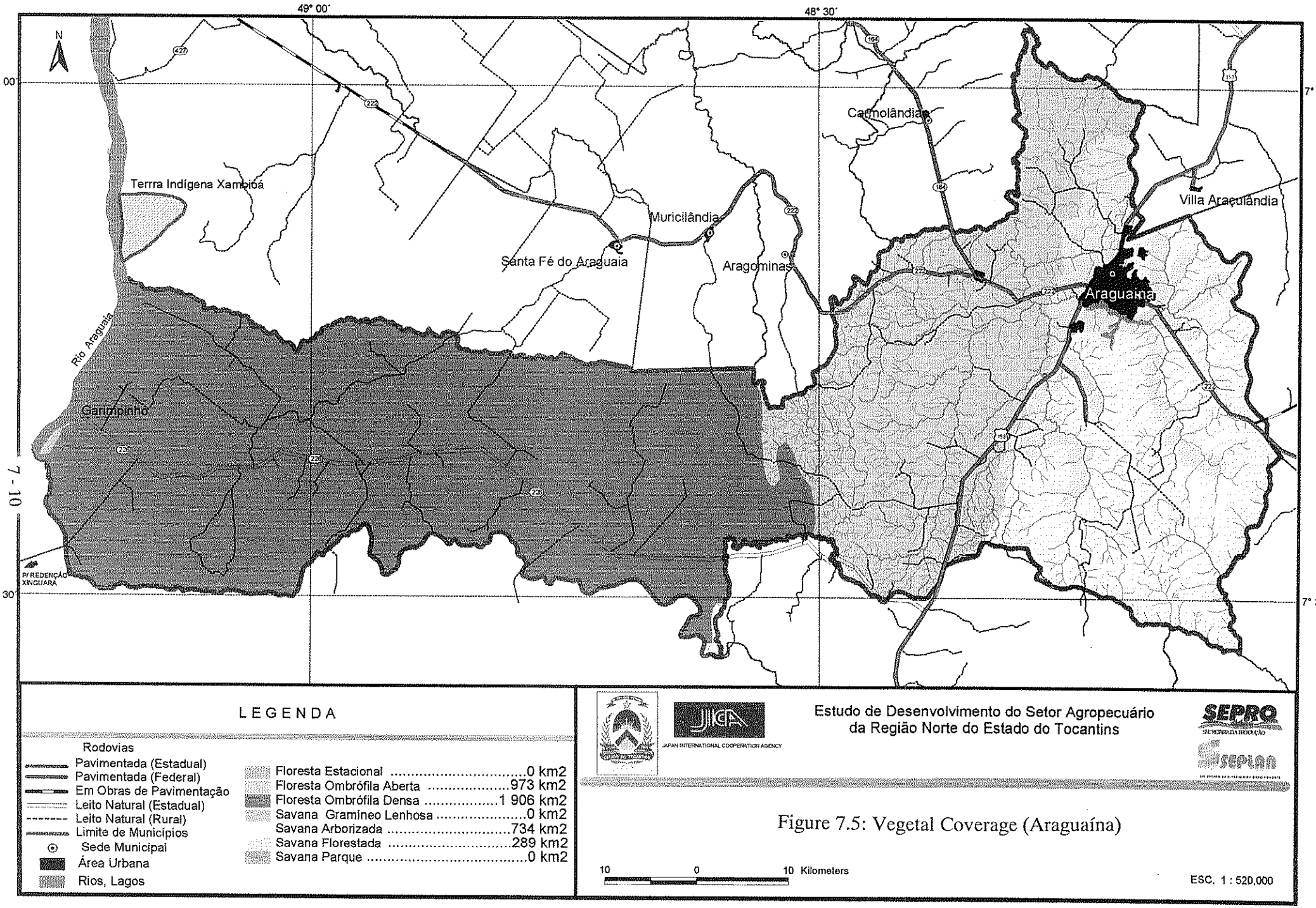


Figure 7.5: Vegetal Coverage (Araguaína)

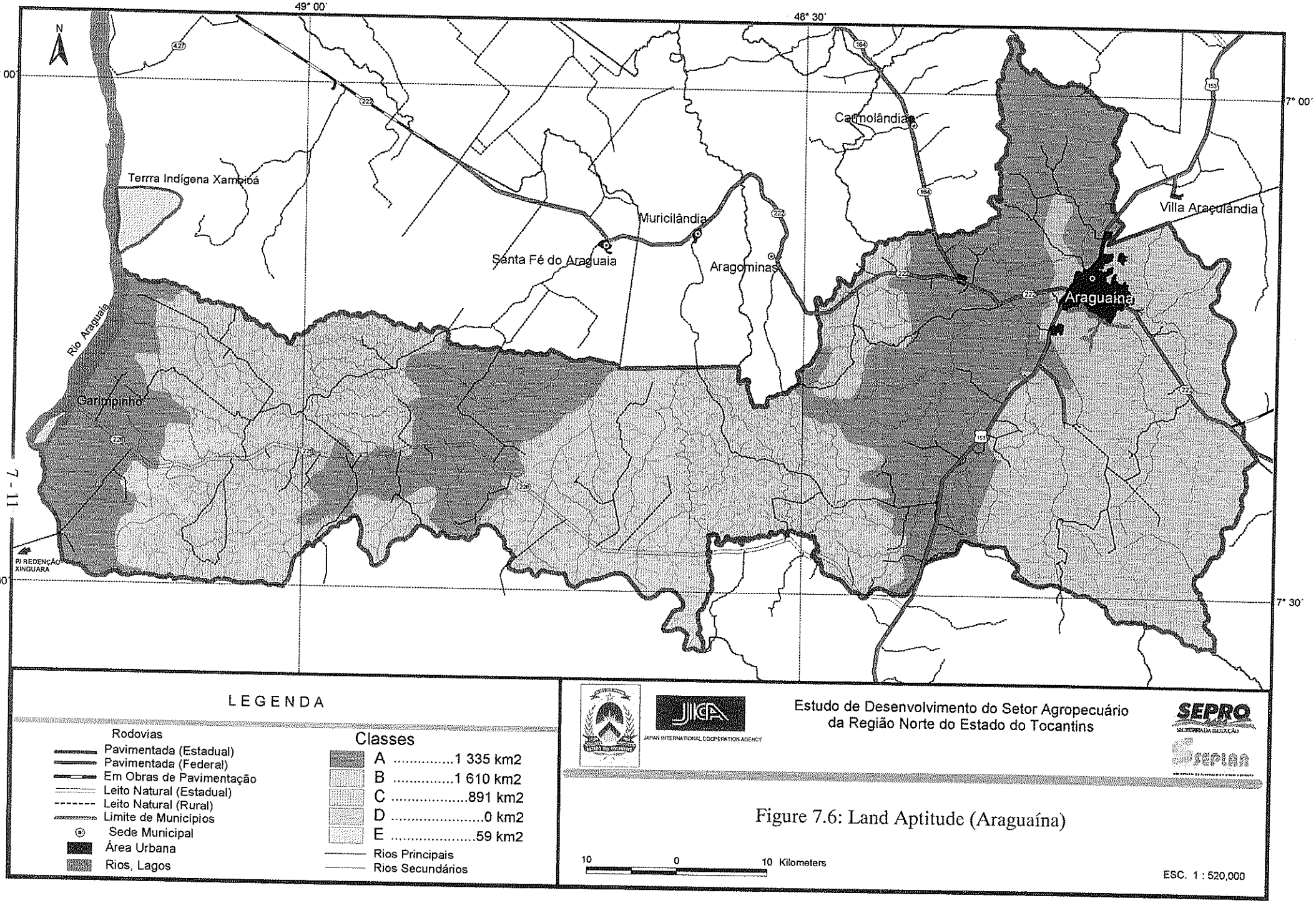


Figure 7.6: Land Aptitude (Araguaína)

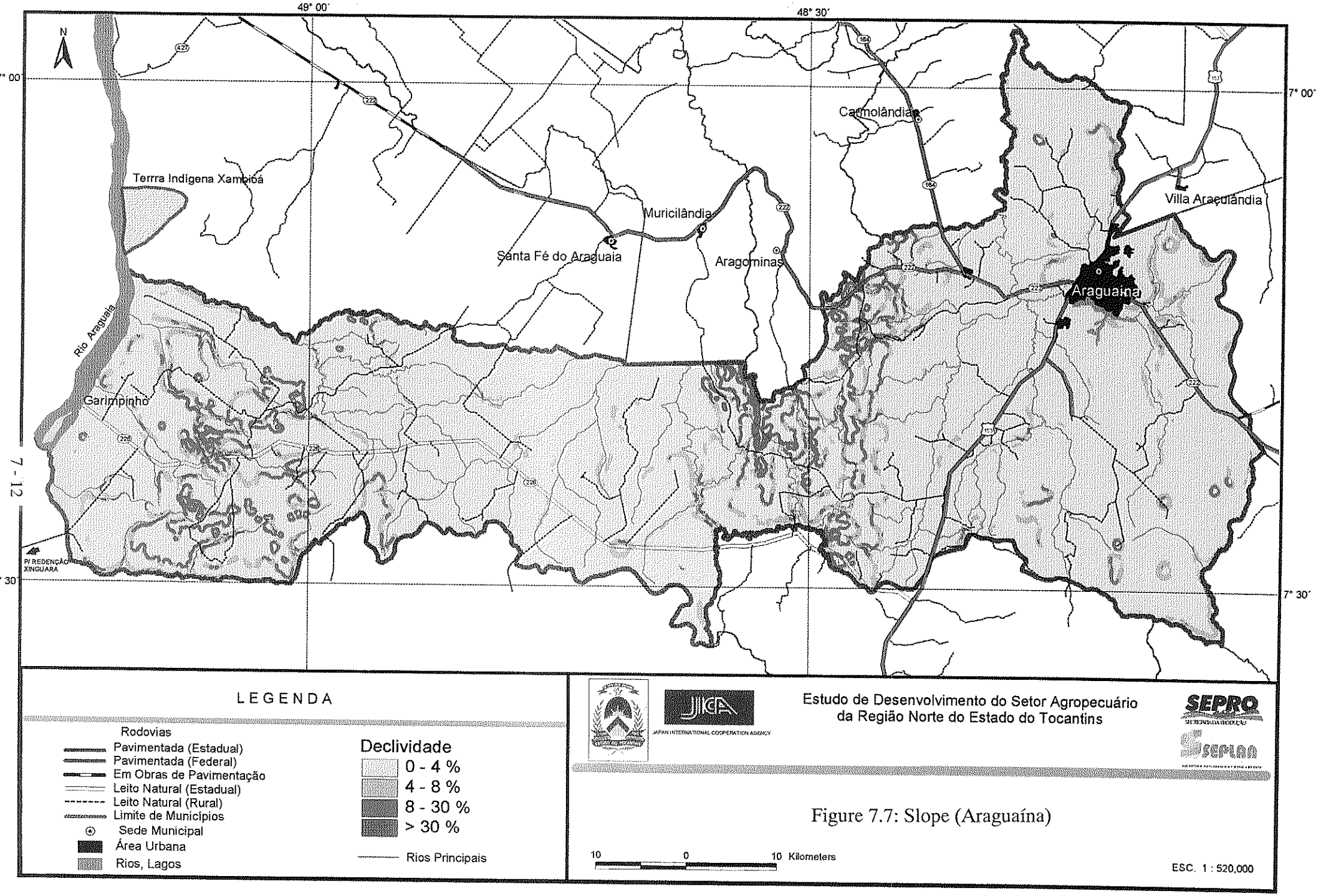


Figure 7.7: Slope (Araguaína)

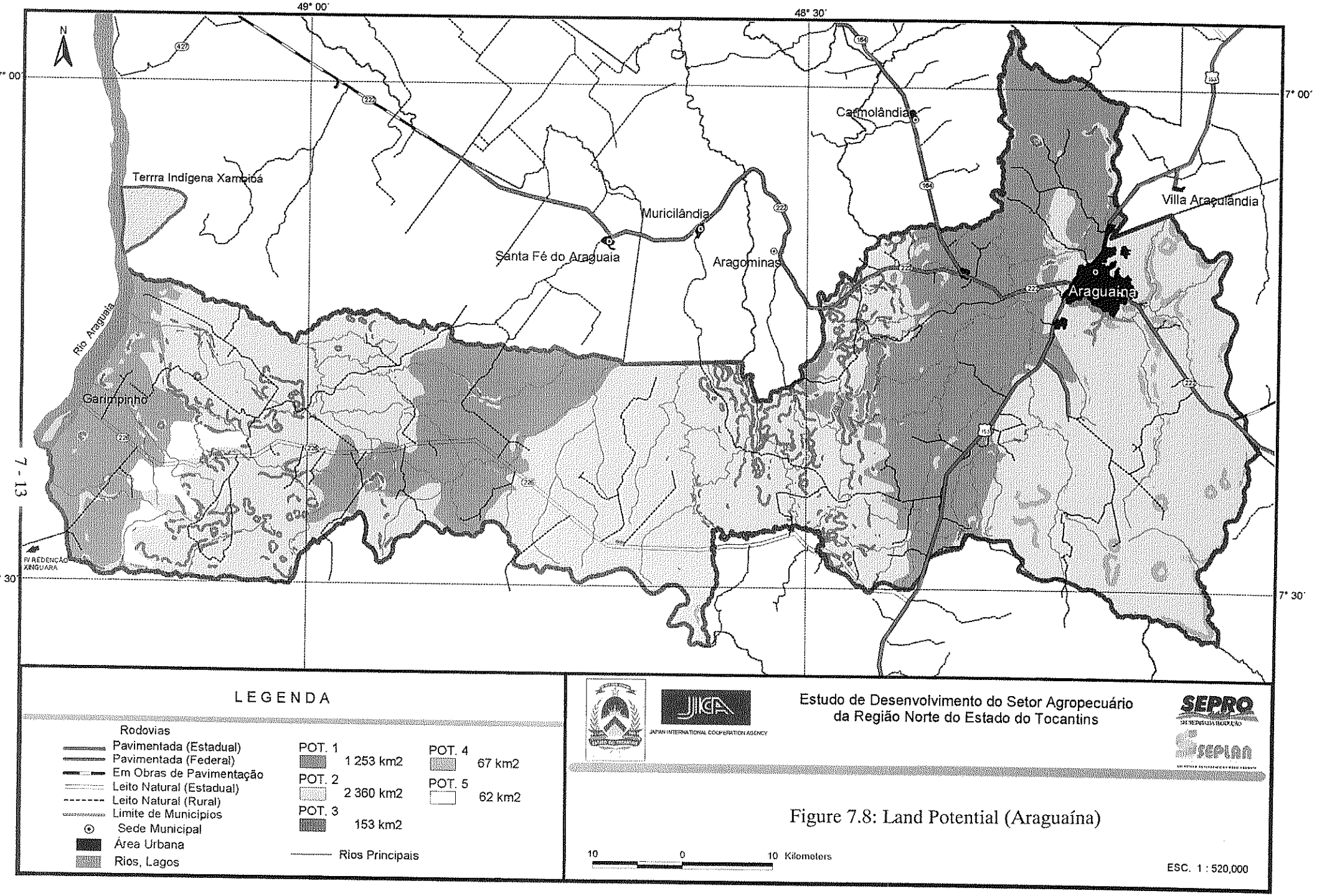


Figure 7.8: Land Potential (Araguaína)

(2) Social Conditions

a. Introduction

The Araguaína municipal district area is of 3,920 km^2 and represents 1.4% of the Tocantins State total area. The main thrust for the implementation of Araguaína was the construction of the highways Belém-Brasília and Transamazônica in the 60's. The municipal economy is being developed mainly based on the primary sector. Considering that the main strength of the Araguaína primary sector is mainly focused on the meat cattle husbandry that depends on large extensions of land and on the small use of manpower, the large scale farm is not necessarily an answer for the improvement of social conditions in Araguaína. There is also a significant number of small- and medium-scale properties whose dwellers depend on the sale of their manpower to assure the survival in the countryside.

In a context such as the Araguaína one in which the economic activity does not make significant use of manpower and depends mainly on management technologies, the population genesis, the migratory currents, and the chaotic urbanization processes have been influencing the formation of the predominant socio-economic scenario. This scenario is characterized by the presence in the same region of both development conditions and relative or almost absolute stagnation conditions.

b. Population Structure

According to the 2000 census preliminary data, the Araguaína population has gone through an annual growth of about 1.79%, from 105,019 in 1996 to 112,762 in 2000. As for gender, the proportion is of 48.81% for men and 51.19% for women.

The vegetative growth and migration rates are still not available for calculation since the IBGE has only published the 2000 year data concerning to total population, residence location and gender.

The population growth of Araguaína according to IBGE in the last decade was as follows: 103,396 (1990 – Census), 105,019 (1996 – Counting) and 112,762 (2000 Census).

Despite the fact that during the last ten years the municipal district has lost part of its territory due to the independence of old districts into new municipal districts, the population growth was maintained, confirming the influence of Araguaína over the region's population. In 1996, the recorded migratory current was of 13.30% as shown in the following table.

Origin of the Migrant Population according to Gender (01/Sep/91 a 01/Dec/96)

	Total Population	**Total of Migrants**	**Other States***	**Same State (Tocantins)**
Araguaína	**105,019**	**13,753**	**9,294**	**4,419**
Men	51,136	6,740	4,555	2,168
Women	52,260	7,013	4,739	2,251
Percentile migration over the total population of 1996 (%)				
Araguaína		13.30	67.67	32.13

Source: Instituto Brasileiro de Geografia e Estatística (IBGE) / Contagem Populacional, 1996
Note: * foreigners are included

The migration of people coming from other states was higher than the internal migration (within Tocantins), with a relative balance of gender probably due to the migration of families.

The migration phenomenon to Tocantins is probably due to the proximity of other States such as Pará, Maranhão and Piauí. Besides, Araguaína has the role of services' exchange and execution location for part of these States and nearby municipal districts' populations.

Population according to Domicile Location (1990-2000)

	TOTAL		URBAN				RURAL			
	1990	2000	1990		2000		1990		2000	
	Abs.	Abs.	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Araguaína	103,396	112,762	84,697	81.9	105,701	93.7	18,699	18.1	7,061	6.3
Tocantins	960,116	1,155,251	530,795	55.3	858,388	74.3	429,321	44.7	296,863	25.7

Source: Instituto Brasileiro de Geografia e Estatística - IBGE, 2000

The Araguaína urbanization rate increased from 81.9% in 1990 to 93.7% in 2000. Despite the high urbanization rate, this does not mean that the population is essentially urban since the residence and the work location not always coincide. Several rural workers' families reside in urban areas where collective public services are easily accessible.

c. Health Services

The health services structure of Araguaína fulfills the demand of the local population besides the demand of neighboring municipal districts populations of Tocantins state and other states such as Pará and Maranhão. Considering this demand, the structure is small as shown in the following table.

Basic Health Services Structure – No. of Professionals and Hospitals

Item	**Quantity**	**Relation per Inhabitant**
Infrastructure		*Inhabitants / Item*
Hospitals	4	28,191
Beds	615	183
Ambulatory Units	40	2,819
Professionals		*Inhabitants / professional*
Physicians	96	1,175
Nurses	27	4,176
Technician in nursery	156	723
Assistant in nursery	175	644
Dentists	29	3,888

Source: State Secretariat of Health, 2000.

d. Educational System

According to the Educational Census (2000) carried out by the Tocantins State Secretariat of Education, there are in Araguaína 125 fundamental and medium levels educational establishments, with a total of 37,117 enrolled students (29,607 – fundamental, 7,510 – medium). The services are carried out by the State, municipal and private educational systems.

Students Enrolled in the Educational System (2000)

ARAGUAINA								
Establishment	Pre-school	Alphabetization Classes	Fundamental Level		Medium (High School) Level	Especial Education	Education for Young People and Adults (Short Term Course)	Education for Young People and Adults (Fundamental)
			1st to 4th Series	5th to 8th Series				
State	405	0	7,612	13,690	6,821	126	423	327
Municipal	1,257	0	6,121	0	0	10	1,404	1,404
Private	896	249	1,192	992	689	0	1,821	315
Total	2,558	249	14,925	14,682	7,510	136	3,648	2,046

Source: Educational Census 2000

According to IBGE (1996), the number of persons with no education or with less than 1 year of study corresponds to 22.38%.

e. Land Reform

In Araguaína, there are 4 land reform settlement projects with the capacity for 343 families of rural producers.

Settlement Projects in Araguaína

Settlement	Capacity of Families	Phase*	Area (ha)	Year of Foundation	Area per Family
Alegre	49	4	1,681.0	1987	34.3
Andorinha	70	2	3,976.3	1992	56.8
Araguaminas	34	2	1,816.6	1995	53.4
Rio Preto	190	3	9,681.0	1991	51.0
Total dos 4 projetos	343		17,154.9		50.0

*The settlements stages are as follows; 2 –Implementation; 3 – Consolidation; 4 – Emancipation
Source: INCRA - 2000

(3) Infrastructure Conditions

As for transports infrastructure, Araguaína is accessible through the roads presented in the following table.

Actual Condition of the Road Net in Araguaína

Type	Existing (km)	Asphalt (km)	Density (km/km^2)
Federal	50.7	50.7	0.013
State	166.2	62.4	0.042
Municipal	578.5	7.3	0.146
Total	795.4	120.4	0.201

Source: GIS Data

Besides, there is also an airport in Araguaína connecting the region to the main capitals of the Country.

As for electric energy, the municipal district is served by CELTINS – Electric Energy Company of Tocantins State.

(4) Present Land Use

The present land use in Araguaína (Figure 7.9) is presented in the following table.

Forests		Pasture		Agriculture		Cerrado		Others		Total Area
Area (km^2)	%	Area (km^2)	%	Area (km^2)	%	Area (km^2)	%	Area (km^2)	%	(km^2)
957.3	24.42	2,619.5	66.82	0.4	0.01	284.3	7.25	58.5	1.49	3,920.0

Source: SEPLAN data, JICA Mission calculation (2000)

It is worthy to mention that agriculture is still incipient, with a low representativeness in the present land use of about 0.01% of the total area.

The following table shows the distribution of rural properties by area. The large scale land owners (12%) occupy 58% of the total area; the non productive land owners with large areas (32%) occupy 37% of the total area. This is a sign of the stagnation of the agricultural activity.

Distribution of Properties by Area in the Study Area

	Petty Farmers	Small scale		Medium scale		Large scale		Total
		Productive	Non productive	Productive	Non productive	Productive	Non productive	
No. of rural properties	311	147	173	147	118	82	38	1,016
Area of the properties (ha)	12,440	25,578	30,621	92,022	67,968	218,038	102,820	549,495
Average area of properties (ha)	40	174	177	626	576	2,659	2,706	541

Source: INCRA data

(5) Agricultural Conditions

a. Agricultural Production

Araguaína's territory corresponds to 3,920 km^2. Among these, 67% is pasture land, with a predominance of bovine cattle husbandry. The total bovine herd in 1999 was 236,563 heads, representing 25.5% of the State Northern Region herd and 16.4% of the Study Area herd.

In Araguaína, the irrigated agricultural production is insignificant. Traditionally, the municipal district primary sector is oriented towards cattle husbandry, as seen in the previous paragraph, and the production of grains and fruits is being recently introduced. However, the most important crop is cassava, of which Araguaína is the main producer in the region, and maize and pineapple, recently introduced as already mentioned. The following table presents the agricultural production in Araguaína.

Agricultural Production in Araguaína (harvest 1999/2000)

Crop	Cultivated Area (ha)				Production (t)				Yield (t/ha)			
	Araguaína	(%)	Study Area	(%)	Araguaína	(%)	Study Area	(%)	Araguaína	Study Area	Tocantins	Brasil
Rice	500	0.3	5,675	3.5	605	0.1	6,689	1.6	1.10	1.18	2.67	3.08
Maize	4,500	7.9	9,620	16.9	6,300	5.2	12,073	10.1	1.40	1.15	2.10	2.54
Pineapple	160	11.9	211	15.9	3,680	7.3	4,611	9.0	23.00	21.85	38.76	47.24
Sugar cane	-	0.0	9	0.3	-	0.0	662	0.5	-	73.56	40.96	69.25
Cassava	420	3.3	1,260	10.1	4,620	2.4	13,122	6.9	11.00	10.41	15.27	13.09
Feijão bean	100	2.3	655	15.6	12	0.9	205	14.6	0.12	0.31	0.33	0.67

Source: IBGE (2000)

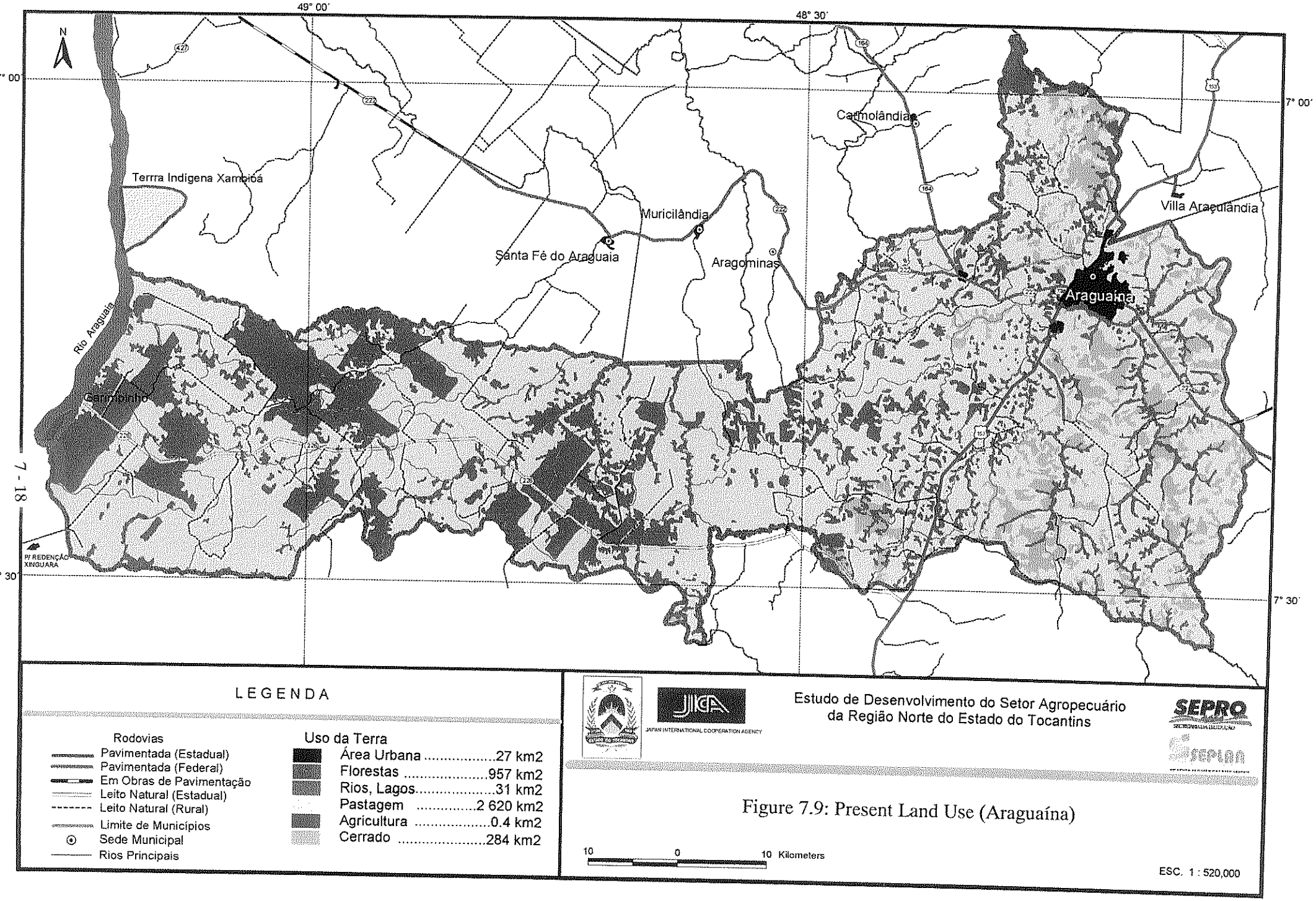


Figure 7.9: Present Land Use (Araguaína)

Within a 10 km radius around the city, there are 12 greenery producers producing lettuce, green onion, cole, among other vegetables for the supply of Araguaína. Among these producers, there are some adopting the hydroponics technique attaining lower production costs. Despite these innovative producers, if the consumption does not increase the integration of new producers in the productive process will be difficult.

b. Present Conditions of Agricultural Management

The large-scale producers that represent approximately 15% of the total number of producers are involved mainly in the meat cattle husbandry and some in the production of calves. The medium-scale producers that represent around 25% are involved in milk production and commercialization of calves, and only few of them are involved in meat cattle husbandry. The small-scale producers who represent the remaining 60% cultivate grains for self-consumption and, some of them carry out milking cattle husbandry.

One of the main agricultural management problems in Araguaína is the advanced land degradation stage caused by the outbreak of "cigarrinhas" and by forest fires. Therefore, the introduction of the grains-pasture rotation system is necessary for the regeneration of land and pastures. The State government, from 1999 on, has been making many efforts in order to implement model activities aiming at the implementation of this system in the region. As of 2000, the cultivation of 600 ha of soybean is expected to be carried out by the local producers.

c. Existing Associations

According to SEPRO data, there are in Araguaína 13 registered associations of rural producers, with a total of 413 members, what corresponds to an average of 32 members per association.

(6) Livestock Husbandry Conditions

The municipal district of Araguaína is a typical livestock husbandry region, mainly oriented for meat cattle husbandry. The total cattle herd of Araguaína, known as the "meat cattle city", corresponds to 17% of the State total herd, outstanding as the major bovine cattle producer of Tocantins.

Comparison of the Bovine Cattle Herd in Araguaína and other municipal districts of Tocantins

Region	Total number of cattle heads	%
Araguatins	471,525	8.3
Araguaína	974,017	17.1
Colinas	870,113	15.3
Pedro Afonso	177,452	3.1
Paraíso	771,741	13.5
Palmas	141,497	2.5
Porto Nacional	487,824	8.6
Formoso	646,071	11.3
Gurupi	761,540	13.4
Taguatinga	399,188	7.0
TOTAL	5,700,968	100.0

Source: ADAPEC-TO, 2000

In this region, there are several slaughterhouses authorized by the federal government, several places for cattle auctions, as well as large scale dairy products factories for the production of milk and cheese, besides the veterinary school of UNITINS. Recently, several large scale integration companies for broiler production from outside the State are coming to the region with capital to invest in broiler processing units, and roughage processing factories. These companies have just started operation, showing signs of modernization in the livestock husbandry sector.

The municipal district of Araguaína is the main livestock husbandry center in Tocantins state, and also is the main center in the Northern region, where the swine husbandry is also large. However, the region lacks slaughterhouses exclusive for swine cattle. The produced variety is the mixed of local varieties ("mestiça"), and there is no systematic raising structure in the region.

Most of the large scale cattle producers are engaged in meat cattle production through the extensive system. For the meat cattle production, funds are necessary for the acquisition of calves. On the other hand, the production cost is low, as well as the maintenance is relatively easy, and thus this activity is traditionally carried out by large scale farmers.

Most of the large scale land owners does not live in their properties, and thus the employees become responsible for the cattle husbandry. This hinders the adoption of new raising methods. However, some few advanced farmers are adopting the agriculture-livestock integration system, including some experiences of confinement and semi-confinement. There are already good male reproducers of the Nelore race in the region. However, there is a great discrepancy as for the pasture control system and facilities (installation of fence, corral, maintenance equipment) between the large scale farmers and the medium and small scale ones.

Most of the meat cattle raisers are oriented exclusively for the fattening activity. In order to supply these producers, middlemen buy calves from several regions of the state and commercialize them in auctions. Some cattle raisers also produce calves until their fattening and slaughter, but this production does not correspond to their total production, and thus the complementation of calves purchased in auctions is necessary. The meat cattle commercialization scheme in the Araguaína region and in Tocantins state is represented in Figure 7.10 (Meat Cattle Commercialization Canal).

Most of the meat cattle produced in the region is from the Nelore variety and its cross-breds, including some milking calves, with the predominance of non castrated cattle. The young cow is not commercialized for herd renewal. The buffaloes are rarely auctioned.

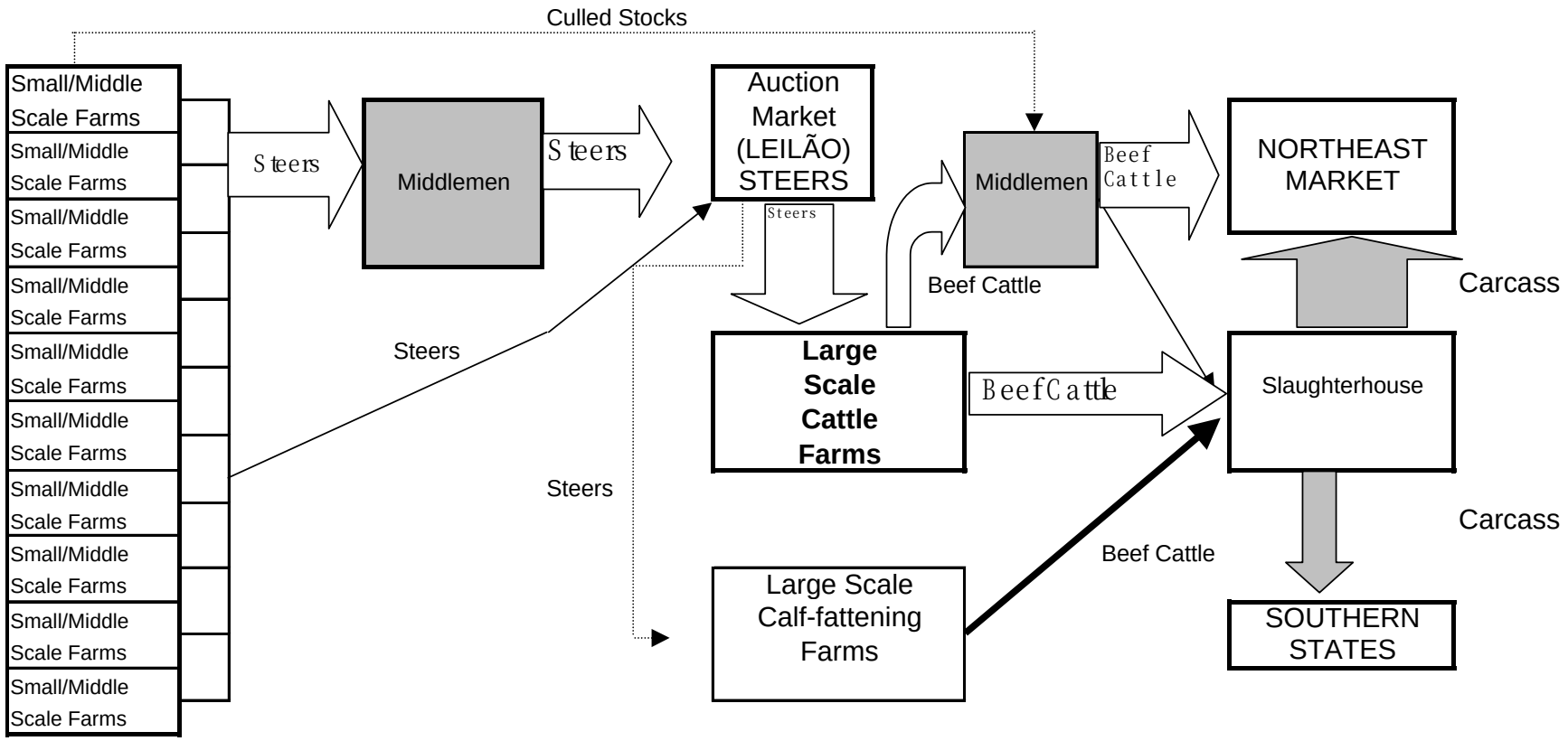


Figure 7.10: Meat Cattle Commercialization Canal

The production of milk and dairy products is carried out by small and medium scale producers that utilized mixed varieties of Tabapuã, Nelore, Holandesa leiteira (Holstein), Pardo Suíço, Jersey, which milk productivity is sharply reduced during the dry season.

Approximately 70~80% of the pasture area in the region is composed of cultivated pasture. The climate is clearly divided into dry and rainy seasons. During the dry season, there is pasture shortage, while in the rainy season, there is grass surplus. This phenomenon is repeated cyclically, and can be represented in rough through the Figure 7.11.

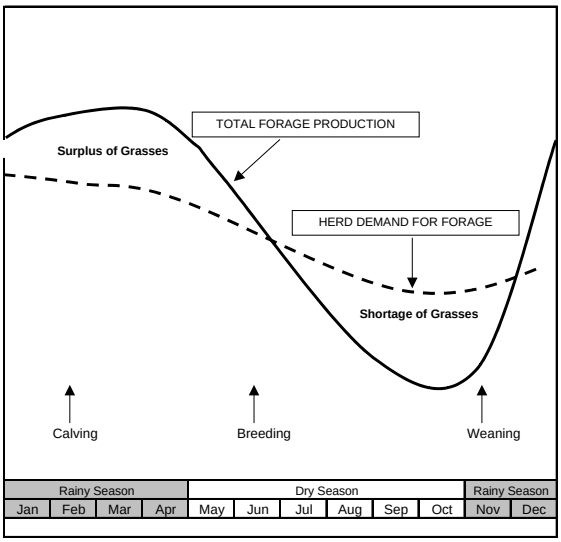


Fig. 7.11: Seasonal Conditions of Pastures in the Study Area

The main pastures varieties utilized in Araguaína and Araguatins are presented in the following table. The increasing tendency of utilization of new varieties with higher productivity, such as Mombaça and Tanzania, is remarkable.

Main Types of Grass utilized in the Study Area

Local Name	Common Name	Scientific Name	Note
Andropogon		**Andropogon gayanus**	Most popular, but very coarse when dried.
Braquiarão		*Brachiaria brizantha*	Most common grass
Braquiaria	Signal grass	*Brachiaria decumbens*	-do-
Capim Colonião	Guinea grass	*Panicum maximum*	Good for fertile land
Elefante	Napier grass	*Penisetum purpureum*	Fodder grass
Estrela Africana	African star	*Cynodon plectostachyus*	Drier area
Jaraguá	Jaraguá	*Hyparrhenia rufa*	Coarse fodder
Mombaça		*Panicum maximum var. monbaca*	New variety, high yield
Quicuio		*Brachiaria humidicola*	Quicuio da Amazônia
Tanzânia		*Panicum maximum var. tanzania*	

Source: Field survey carried out by JICA Mission, 2000.

As for poultry production, there is a small production of free range chicken eggs being carried out. However, this production is mostly for self-consumption or consumed at the local market.

(7) Producers' Intention Research – Workshop in Araguaína

The results of the producers' intention research as for several agricultural activities were collected from the workshop carried out in this municipal district. Representative associations' leaders, technicians and producers of the region were invited to take part in this workshop.

(a) Participants of the Workshop and Results of Questionnaires applied to the Producers

The total number of participants were 37, 13 mini- and small- scale producers and 7 medium- and large- scale producers.

As for the life conditions, most of the participant producers live in masonry houses, with concrete floor, bathroom inside the house and electricity. On the other hand, half of the producers use firewood ovens, thus without kitchen gas.

In the agricultural activity, 70% of the participants use their own land for cultivation. They make use of little cultivation technology, and few of them use manure for fertilization. Most of them possess some kind of agricultural equipment/machine.

In livestock husbandry, almost all of them supplement the cattle feeding with mineral salt and other supplements, besides pasture during the dry season. They vaccinate their cattle periodically.

As for commercialization, half of the farmers sell their production to local traders or directly to the final consumers, and 25% of them to regional wholesalers. Half of the producers declare not being able to pay for the production costs.

One third of the producers do not receive any type of technical assistance.

(b) Results of the Discussions about the Themes

The *Agriculture and Livestock Husbandry Integration* was the preferred theme by most of the participant producers. Besides this theme, the necessity of diversification in the current livestock husbandry activity was also very much discussed (this is already practiced by some of the participants).

The lack of funds for mechanization and the lack of market information were the important mentioned problems.

Due to the low profitability, thus due to the lack of funds providing from the currently developed cattle husbandry together with the lack of knowledge on the part of the region's producers, the system of agriculture and livestock husbandry integration becomes difficult according to the opinion of most of the participants in the discussion. As alternative, the arrival of outside producers for the development of such activity was discussed. However, for that to occur incentives from the State government were considered necessary.

As for the theme *Production Nucleus* for the development of intensive production, everybody agreed about the need of formation of producers associations. The participants in the discussion of this theme pointed out the main problems: lack of technical assistance, deficient infrastructure (access roads), lack or deficiency of funds, and difficult access to bank financing for the agricultural activities.

As for cattle husbandry, the market problems and the need of fostering agroindustry were pointed out as the main hindrances.

As for *Environmental Conservation*, the pasture degradation/ forest fires/ deterioration of water quality/ necessity of more resources for institutions such as IBAMA and NATURATINS, besides the lack of incentives for the natural resources exploitation activities, were pointed out as the main problems.

(c) Opinion of the Associations' Leaders

As for the *Associations*, the general opinion is that in most of the cases the main objective of forming an association is to solve the lack of funds problem, i.e. to search for bank financing. Most of the associations were formed spontaneously, without direct incentives from the government.

The main necessary investment items pointed out during the workshop for the present associations were: agricultural machinery, processing machine, grinding machines. At present, these associations are performing as main activities the cultivation of rice and maize, and poultry breeding, followed by swine and meat cattle breeding, and fruits cultivation. For the future, there are some producers interested in the production of greenery.

The strengthening of associations has as main objective, according to most of the participant associations' leaders, to allow the procurement of financing thus becoming a way to obtain funds for production.

(8) Commercialization and Agro-industrialization Conditions

a. Agricultural Products

Due to the small agricultural activity in the region, few products are commercialized in the market. These are the surplus of the self-consumption production in the case of grains, fruits and vegetables, mostly sold to small local traders in the region.

Araguaína – Products and Markets

Products	Market	Price
Lettuce	Local market	R$ 1.00/5 units
Hydroponic lettuce	Local market	R$ 0.80/2 units
Watermelon	Local market/Imperatriz	R$ 0.15/kg
Acerola	Local industry	R$0.70/kg
Coconut	Local market/Goiânia/Palmas	R$ 0.30/unit
Passion fruit	Local industry/Local market	R$ 0.55/kg
Banana	Local market	R$ 0.10/kg

The livestock products, meat and milk, poultry products, agroindustrial products are presented as follows.

b. Meat Cattle

The low utilization of the installed processing capacity is due to the commercialization of alive animals, locally known as "gado em pé", what represents around 50% of the total commercialization amount. The existing slaughter structure is presented in the following table.

Existing Slaughter Structure

Type	Name	Location	Installed Capacity (heads / day)
SIF 4001 (Inspected)	FRINORTE ALIMENTO S/A	Av. Rio Maravilha s/n – Daiara – Araguaína - TO	700
SIF 0723 (Inspected)	COOPERATIVA DE PRODUTORES DE BOVINOS, CARNE E DERIVADOS	Estrada da Muricilândia, km 1,5 – Bairro JK – Araguaína - TO	500
State Owned Slaughterhouse	ASSOCARNE	Araguaína	100

The cattle processing products are as follows: meat with bones, meat without bones, leather, plucks, and bones and blood flour. The meat is packed in plastic and placed in standardized boxes and inspected by SIF. The transportation is carried out in refrigerated trucks with 12 to 24 ton of capacity. The following tables present the destination of sub-products and the types and costs of bovine products transportation.

Destination of Processing Sub-products

Sub-product	Destination
Meat with and without bones	Recife – 65% Fortaleza and Natal – 20% Rio de Janeiro and São Paulo – 15%
Plucks	Exporting (Continental China and Hong Kong)
Leather	Redenção (PA) Wanderlândia (TO)
Bones Flour	Araguaína – 30% Brazilian Northeastern market – 70%

Types and Costs of Transportation

Product	Type	Capacity	Cost
Alive Cattle	Truck proper for animals	6 t	R$ 0.60 to R$ 1.00 / km
Processed Meat	Refrigerated truck	12 t 24 t	R$ 170.00 / ton R$ 135.00 / ton

c. Milk

The milking cattle husbandry was stirred up by the Program “Bacias Leiteiras” financed by the State Government through the PRODIVINO. The predominant race is the Girolanda.

In Araguaína there are 2 dairy products factories. The milk is collected at the properties in 50 liters plastic containers and transported to these factories in 4 ton trucks. Once processed, the products are sold in Arapoema, Colinas and Guaraí. The milk of the long life type is transported in trucks with capacity of 12 to 14 ton, and is distributed in the Northeastern markets, besides Rio de Janeiro and São Paulo.

The following table presents the capacity and the products produced by the two dairy products factories in Araguaína.

Capacity and Dairy Products produced in Araguaína

Factories	Capacity (liters / day)		Products
	Installed	In operation	
ASA – Agroindústria de Alimentos	20,000	18,000 (90.0%)	In Natura Milk / Long Life Milk / Cheese
BIANA	350,000	50,000 (14.3%)	In Natura Milk / Long Life Milk / Cheese

d. Poultry Production

The poultry production is carried out by one only integration firm, "Agrolândia", established in the industrial sector of Araguaína. This firm has its origin in Castanhal (Pará State) where part of its infrastructure and the consumption market are located. The following table presents the characteristics of this integration firm.

Characteristics of the Poultry Integration

Item	Capacity		Unit
	Installed	In operation	
Number of producers	18	-	
Hatchery	100,000	70,000 (70.0%)	young chicken
Roughage factory	120	80 (66.7%)	ton / month
Slaughterhouse	8,000	5,500 (68.7%)	heads / day
Other inputs	-	-	

e. Agro-industry

The three main processing industries of agricultural products in the municipal district of Araguaína are presented in the following table.

Agricultural Processing Industries in Araguaína

Industry	Capacity		Remarks
	Installed	In operation	
CPV - Tomato pulp factory	12 ton/h	0%	Industrial sector – Daiara
AGROMASSA – starch	200 ton/day	0%	Installation stage. Start in 2002
CATO - fruits	30 ton/month	15%	Homemade manufacture

CPV (Vegetal Production Cooperative) although being a production cooperative also has a tomato pulp factory. However, due to the lack of funds for production and operation this already installed factory is still out of operation.