

Federative Republic of Brazil
State of Tocantins
Secretariat of Production (SEPRO -TO)
Secretariat of Planning and Environment (SEPLAN -TO)

Japan International
Cooperation Agency
(JICA)

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EXISTENT PROGRAMS

ANEXO XI

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1. Agriculture

(1) Programa de Desenvolvimento Regional Integrado da Região do Bico do Papagaio (PDRI – Bico do Papagaio)

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

- viable of the transport intermodal
- implantation of basic infrastructure of overhead irrigation (380.000 there are approximately)

(1.1) Intermodal Transport

They exist two alternatives now goes the construction of an interligacao channel among the Tocantins and Araguaia river seeking the consolidation of the transport intermodal (hidrovia, highway and ferrovia).Fig. 11.1

- Alternative 1 (Canal de navegação interligando Xambioá a Estreito)

Although it is technically viable, there would be need of construction of several dams and dams turning this very onerous alternative and with to team relatively long to travel this passage. It dear cost and of 1,14 billion R\$.

- Alternative 2 (Canal de navegação interligando Araguatins a Vila Nova)

Although economically viable than the alternative 1, with cost of 608 million R\$, it had still needed lives detailed studies, mainly hydrologicos.

(1.2) Irregation System

The projects plows being elaborads in agreement with the accomplished studies, basing on three possibilities:

- direct derivation of the lake of UHE Sta Isabel;
- implantation of regularization dams (goes irrigation);
- direct aducao of the Araguaia and Tocantins river(bombeamento).

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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

The areas of the sub-projects and the main respective foreseen dams are presented in the tables 11.1 and 11.2.

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 (mainly the UHE Sta Isabel).

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 i 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. The project basically consists of implanting protection dikes forming the calls "polders". Four conjugated "polders" plows planned two to two: polder 1-TO and 1-B, polder 2-TO and 2-B.

Tabel 11.1: Estimation of Irrigable Areas

Sub-Project		Irrigable by Canal Sta Isabel (ha)	Irrigable only by Regulation Dams (ha)	Raw Total (ha)	TOTAL UA (ha)
CORDA River		14,000	82,000	96,000	67,200
PIRANHAS River		33,000	13,000	46,000	32,200
SAO MARTINHO River		27,000	14,000	41,000	28,700
BARREIRO River		15,000	28,000	43,000	30,100
BURITI SUL		37,000	-	37,000	25,900
BURITI NORTE		7,600	-	7,600	7,600
VERTENTE do TOCANTINS		-	40,000	40,000	28,000
SAMPAIO	Polder 1-A and 1-B	15,000	-	15,000	15,000
	Polder 1-B and 2-B	10,000	-	10,000	10,000
	Complementary Area without Polder	18,000	-	18,000	12,600
	Sub-Total SAMPAIO	43,000	-	43,000	36,600
SAO SEBASTIAO	Polder 3-A, 3-B, 4-A and 4-B	22,000	-	22,000	22,000
	Complementary Area without Polder	11,000	-	11,000	7,700
	Sub-Total S. SEBASTIAO	33,000	-	33,000	29,700
TOTAL		285,600	177,000	376,400	286,000

Note: UA=Useful Area

Table 11.2: Estimation of the Main Dams Characteristics

Dam	Basin (ha)	Lake Area (ha)	Dam Length (ha)	Volume (10 ⁶ m ³)	Q (m ³ /s)	Irrigation Area (ha/year)
CORDA River						
Corda 1	4,000	90	1,500	18.0	1.2	800
Corda 2	65,600	1,476	800	295.2	19.7	13,120
Corda 3	27,200	612	1,200	122.4	8.2	5,440
Corda 4	51,200	1,152	800	230.4	15.4	10,240
Corda 5	28,800	648	800	129.6	8.6	5,760
Corda 6	6,000	135	800	27.0	1.8	1,200
Corda 7	14,000	315	800	63.0	4.2	2,800
TOTAL CORDA	-	4,428	-	885.6	59.1	39,360
PIRANHAS River						
Piranhas 1	80,000	1,800	1,300	360.0	24.0	16,000
Piranhas 2	20,000	450	1,000	90.0	6.0	4,000
Piranhas 3	18,000	405	1,400	81.0	5.4	3,600
Piranhas 4	8,000	180	800	36.0	2.4	1,600
TOTAL PIRANHAS	-	2,835	-	567.0	37.8	25,200
SAO MARTINHO River						
Sao Martinho 1	92,000	2,070	2,000	414.0	27.6	18,400
Sao Martinho 2	20,000	450	800	90.0	6.0	4,000
TOTAL SAO MARTINHO	-	2,520	-	504.0	33.6	22,400
BARREIRO River						
Barreiro 1	23,000	518	2,000	103.5	6.9	4,600
Barreiro 2	9,000	203	800	40.5	2.7	1,800
Barreiro 3	5,000	113	700	22.5	1.5	1,000
TOTAL BARREIRO	-	834	-	166.5	11.1	7,400
SAMPAIO						
Grotao do Dez	19,200	432	900	86.4	5.8	3,840
Gorgulho	16,800	378	1,500	75.6	5.0	3,360
TOTAL SAMPAIO	-	810	-	162.0	10.8	7,200
VERTEENTE do ARAGUAIA						
Caixa de Fosforo	14,400	324	1,400	64.8	4.3	2,880
Tira Ressaca	3,200	72	1,200	14.4	1.0	640
Camarao	22,400	504	900	100.8	6.7	4,480
Axixa	16,800	378	2,300	75.6	5.0	3,360
Jatobel	4,000	90	700	18.0	1.2	800
Sao Pedro	17,600	396	1,200	79.2	5.3	3,520
VT 1	5,000	113	400	22.5	1.5	1,000
VT 2	7,000	158	400	31.5	2.1	1,400
VT 3	4,000	90	400	18.0	1.2	800
VT 4	14,000	315	500	63.0	4.2	2,800
VT 5	7,000	158	600	31.5	2.1	1,400
VT 6	11,000	248	1,000	49.5	3.3	2,200
VT 7	3,000	68	200	13.5	0.9	600
VT 8	6,000	135	600	27.0	1.8	1,200
TOTAL VERTEENTE do ARAGUAIA	-	3,049	-	609.3	40.6	27,080
GENERAL TOTAL	-	14,476	-	2,894	193	128,640

(2) Project of Irrigated Coconut

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

The project will be implanted in an area of degraded pasture, but with big percentile of it longs goes. The area will be divided in 16 portions of 3,125 there plows with 640 plants goes portion and demand of it longs goes of 28.000 liter/day in the stabilization of the production.

Item	Year						
	1	2	3	4	5	6	7
Production estimation (fruitt/plant/year)	-	-	20	60	80	100	150
Income estimation (1000 R\$)	-	-	41	123	164	205	307,5

(3) Nucleus of agricultural production of Araguatins (NPA III)

Located to east of the city of Araguatins (right margin of the river Taquari) the display the illustration. This nucleus had understood an area of 50 there plows of flooded rice and 2 there i of fish farming. This nucleus i part of the program of land reform of the State Government where each family had received 25 there i each with the objective of corn production, rice and fish.

(4) 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 (approximately 10 families association) producing mainly tomato goes it elaborates it of tomato in Araguaina.

(5) Other Nuclei 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.

(6) 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:

- a) Araguatins
- b) Axixá
- c) Buriti
- d) Filadélfia
- e) Itaguatins
- f) Nova Olinda
- g) Sítio Novo
- h) Tocantinópolis
- i) Wanderlândia
- j) 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 Tocantinópolis, Itaguatins, Besiege New, Philadelphia, New Olinda and Xambioa enter in operation.

(7) Private production of Banana

The group Yamada from Minas Gerais State produces 80.000 banana boxes approximately a year in Araguaína the display the illustration. The company have difficulties in irrigating its property the Government intends to build the reservoir goes supply of the it longs goes of irrigation.

(8) Other Agricultural Projects

In this study area, implantation plans still exist of it elaborates of tomato in Araguatins similar to the of Araguaína and the deprived production (1000 there plows) of banana in Aguiarnópolis to export to Europe. Still encontram-if in planning phase the Programs of Invigoration of the Family Agriculture and of Development of the Horticulture.

(9) Industry

The largest concentration of you elaborate in the Area of Study this in Araguaína where the District Agroindustrial exists. In this district they plows installed elaborate of tomato and manioc flour.

It elaborates her/it of tomato needs of 200 ha of tomato goes full funcionamento, but in the moment it

goes by difficulties due to the fall of his production in the area. To soften such situation, disponibilizar 49% of the ownership i intended of the it elaborates to private producers being the cooperative with 51%. Hereafter, there plows plans of using her elaborates goes the juice production and guava pulp sees that this product requests the same equipments used in the tomato. When this happens, the guava demand will be equivalent the production of 300 ha.

It elaborates it of manioc flour established through the financing of SUDAM possesses the production from 30 to 40 tones the day demanding an equivalent production approximately to 600 ha of annulled.

Agrolandia, producing of chicken and ration also this installed in Araguaia 10 years ago, being stable production.

Another elaborates poultry, AZA Alimentos SA, intends to install in Aguiarnopolis planning to reach the production of 200.000 birds the day in the year of 2004. To supply this big one it elaborates, one elaborates of ration this foreseen in Tocantinopolis where the demands corn initials will be brought of Pedro Afonso. This corn production will be gradativamente supplied with local productions.

In Xambioa it drifts her one Manufactures of Cement returned goes the building site. It intends to impel this section generating conditions goes investments in the area.

2. Infrastructure

(1) Energy

The main projects, presented in Fig. 11.3, they are the following ones:

- **a.1 - UHE Saws Broken:** Located in the Tocantins river, it possesses installed capacity of 1.328 MW. It possesses dam and this being concluded through the Plan Advances Brazil (I Federal Govern). The forecast and that 5% of the project plows concluded in 2003.
- **a.2-UHE Strait:** With capacity of 1.200 MW located in the river Tocantins. It possesses dam and also this being concluded by the Plan Advances Brazil. It foreseen that 5% of the project plows concluded in 2003.
- **a.3 - UHE Santa Isabel:** the capacity of 2.200 MW i Foreseen and located in the river Araguaia.
- **a.4 - UHE Lajes:** With foreseen capacity of 2,4 MW, located in Rib. of the Flagstones, already meets in operation.
- **A.5 - UHE CORUJAO:** With capacity of 0,64 MW, locates in the river Otter, and already meets in operation.
- **a.6 - 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.

- **a.7 - 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.

Table 11.3 Rural Electrification Program (PERTINS)

No	Municipality	Transmission Line (km)	No de Transformer
1	Ananas	22.10	5
2	Aragominas	24.64	12
3	Araguaina	221.23	149
4	Araguana	40.84	17
5	Babaculandia	44.61	34
6	Cachoeirinha	0.15	1
7	Filadelfia	0.56	1
8	Itaguatins	0.35	2
9	Muricilandia	78.24	36
10	Nova Olinda	4.15	4
11	Piraque	17.44	4
12	Santa Fe do Araguaia	89.95	32
13	Sao Bento do TO	3.62	2
14	Wanderlandia	4.57	8
15	Xambioa	50.34	12
TOTAL		602.79	319

(3) Transport

- **b.1 - 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 Itaquí and vice-versa.
- **b.2 - Hidrovia Araguaia-Tocantins:** it Intends to optimize the uses of the resources hidricos.
- **b.3 - 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.
- **b.4 - 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 is foreseen in the Plan Advances Brazil.

- **b.5 - 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.
- **b.6 - 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. Social Sector

- a) **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.
- b) **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.
- c) **Guaranteed of Fundamental the Teaching:** it Intends to enlarge the teaching facilities to assist the youths' of the first degree demand.
- d) **Guaranteed Universal of Access Greets her:** he/she Have the objective enlarges and to assure the service medicates hospitalar the population.
- e) **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.
- f) **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.
- g) **Community Activates:** Program of federal initiative that you/he/she 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.

4. Environment

a) 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 executive institutions of PGAI.

b) 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, ecotourism, solid residues and biodiversity.

c) Programs national of the environment 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 intuicoes can have an effective participation. The program and object of loan agreement between the Brazilian Government and the World Bank.

d) Plan of development ecotourism of the state of Tocantins:

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

5. Other Projects

a) Administration of the basins of Araguaia and Tocantins:

Objective the integrated administration of the basins of the rivers Araguaia and Tocantins making possible the multiple uses of their resources hidricos. Also programs included in the Plan it Advances Brazil.

b) Diagnosis of the resources hidricos of River Otter's basins and rope:

It foreseen the accomplishment of studies and inventories of the resources hidricos of the basins of the rivers Otter and Rope in the Area of Study to subsidize the elaboration of Resources Hidricos's master plan.

c) Formulation of hydrics resources politicizes of Tocantins state :

Project that has the objective the formulation of the it politicizes Sstate of resources Hydricos and implantation of an integrated system of administration of resources hydricos in the State.

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ANNEX XII
CLASSIFICATION OF LANDS THROUGH GIS

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1.	Classification of Lands through GIS.....	XII - 1
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1. Classification of lands through of GIS

(1) Existent data

The basic data existent used directly in the analysis of GIS are the following:

a) Potentiality of the land usage

The potentiality of land usage in this analysis was divided in 4 groups as presented in the Figure 12.1.1:

Intensive of usage	Potential areas to the intensive use in the agricultural and cattle production
Average Intensity	Areas with potential for pastures (semi-intensive livestock) or forestry
Low Intensity	Areas with potential for pastures (extensive livestock) or forestry
Critical areas	Areas with high erosion potential, with flood occurrence and other areas with high difficulty for the development or need of high investments and technology in the development

b) Slope

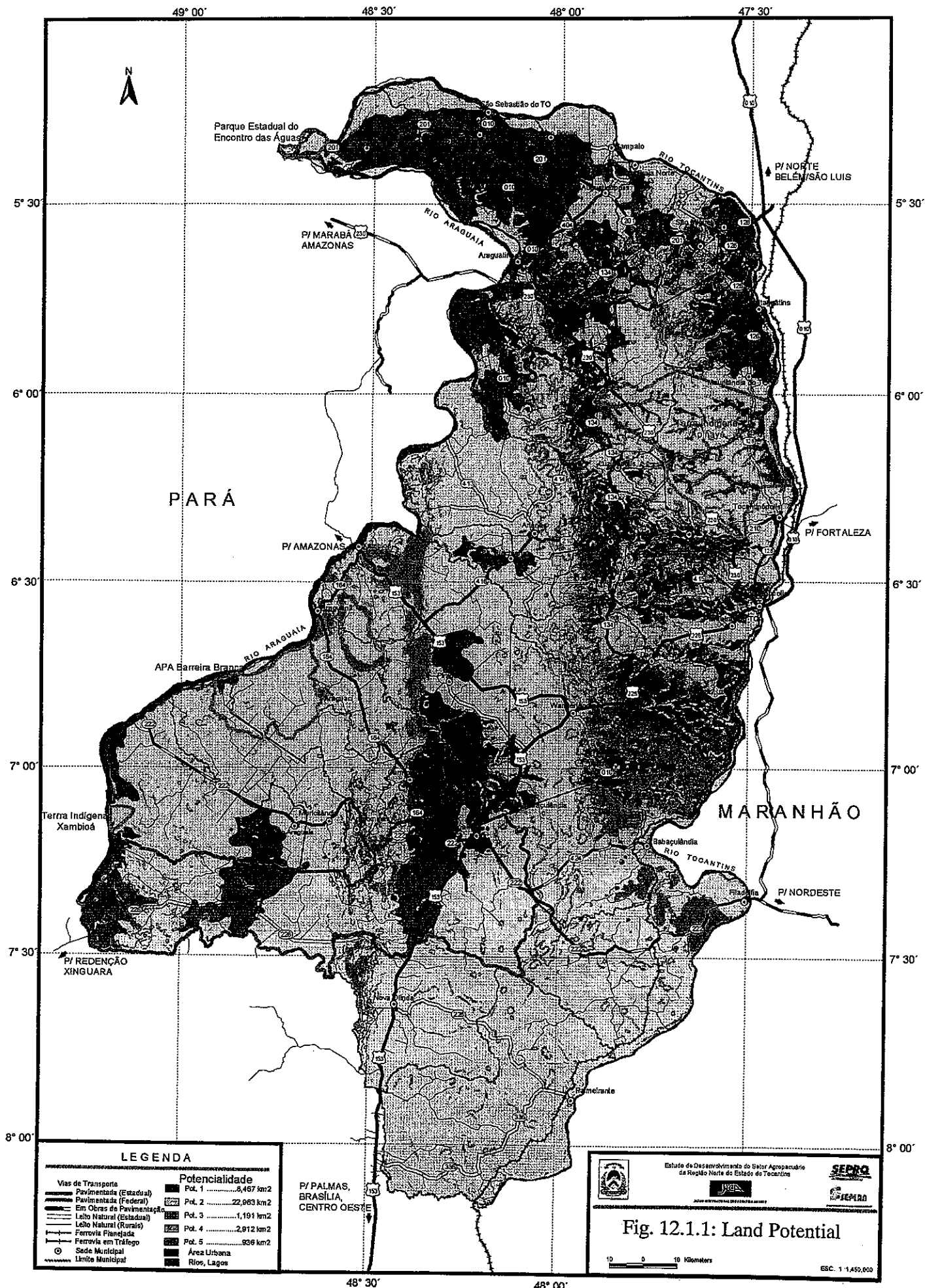
The slope is divided in 3 groups, as presented in the figure 12.1.2, with the main objective of knowing the possibility of mechanization of the lands:

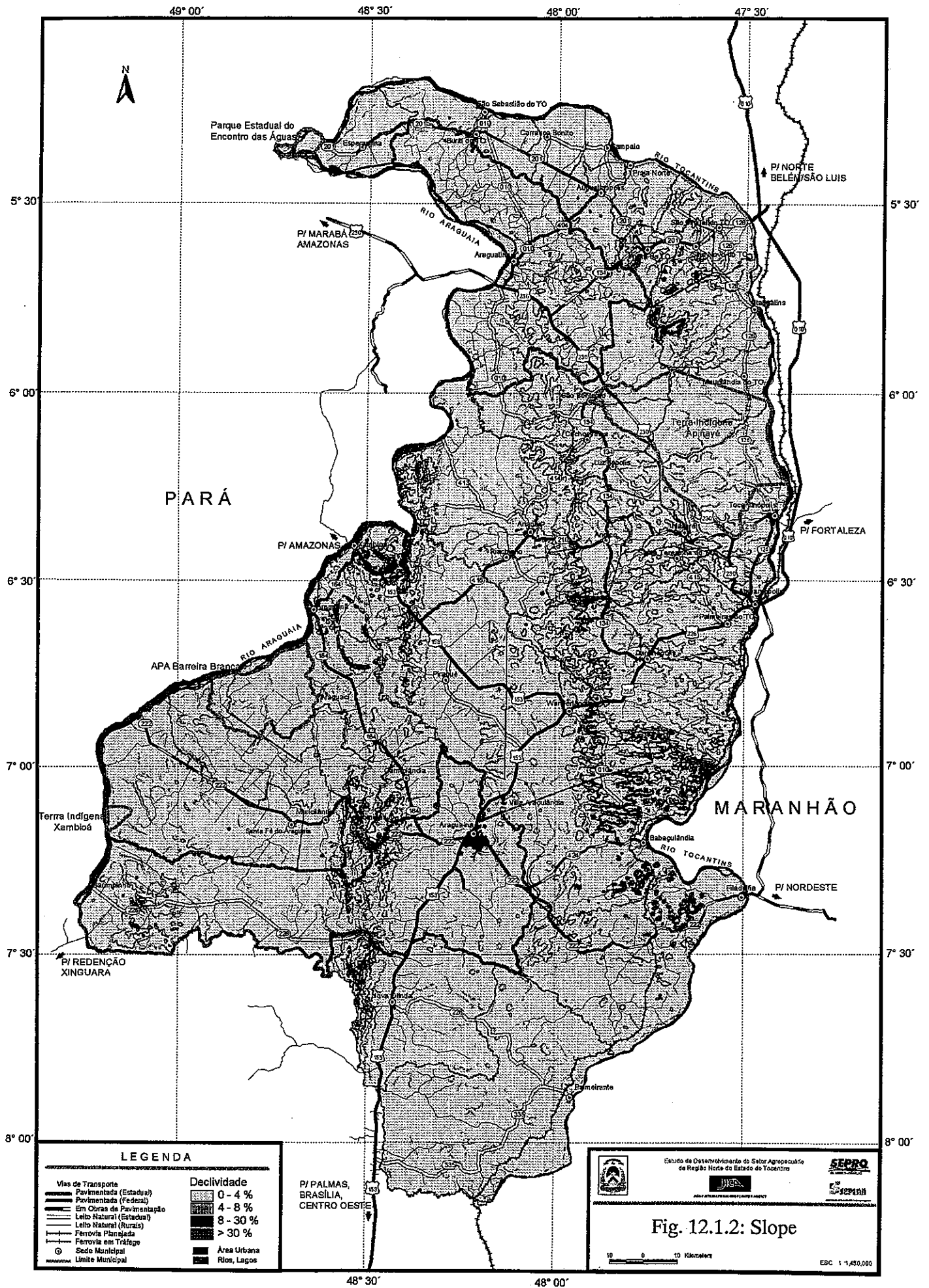
less than 15%	Most of the lands in this category can be mechanized
15% to 30%	Cultivation possibility just for simple machines in level or special machines
more than 30%	No appropriate to the mechanization

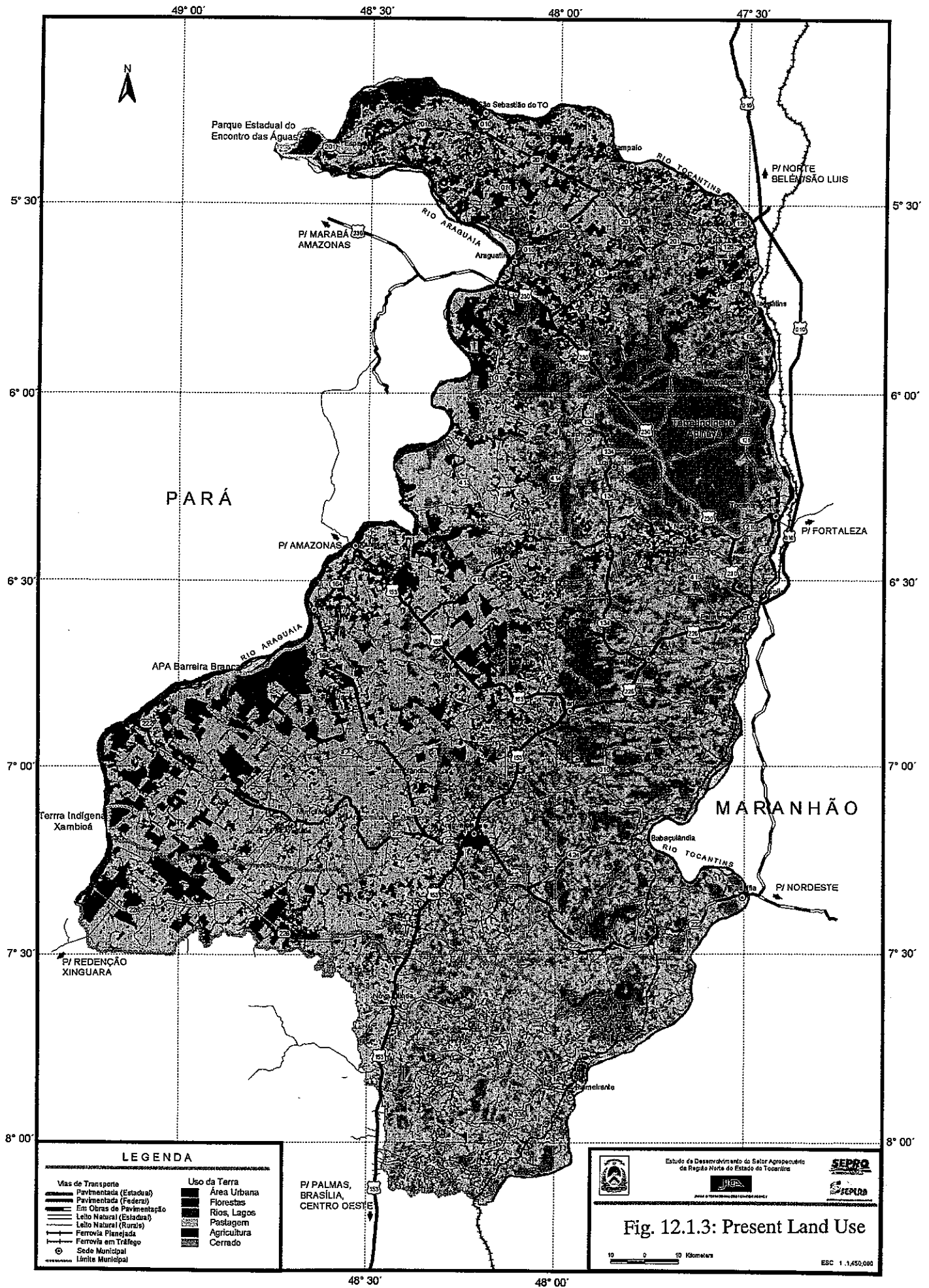
c) Present Land Use

The most recent data about the conditions of land use in this state were obtained through analysis of satellite images of 1996, as presented in figure 12.1.3. Information that can be obtained by this analysis:

Cultivated lands	Places with agricultural activities
Pasture	Places where presents pasture
Forests	Places where still forests exist
Savannah	Places where they still present savannah vegetation







2. Selection of areas for proposed activities through GIS analysis

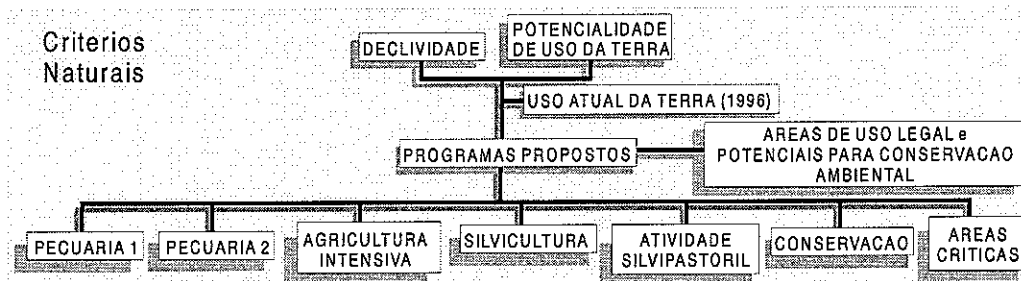
The GIS analysis of this study was accomplished in 2 stages:

- Analysis of the potential considering mainly natural criteria
- Analysis of the potential considering social and statistical criteria

The analysis of the potential considering natural criteria made possible to define potential areas for the following activities:

- Intensive agriculture
- Cattle
- Forestry
- Activity Silvopastoril
- Activity Agro-florestal
- Reforestation
- Conservation

This analysis was accomplished being used information of the potentiality of earth usage, steepness and current use of the earth. As display the flowchart of the analysis to proceed, was analyzed the steepness and the potentiality firstly. The result of these it was analyzed associating it to information of the current use. of the earth resulting in the proposal of the activities above mentioned.



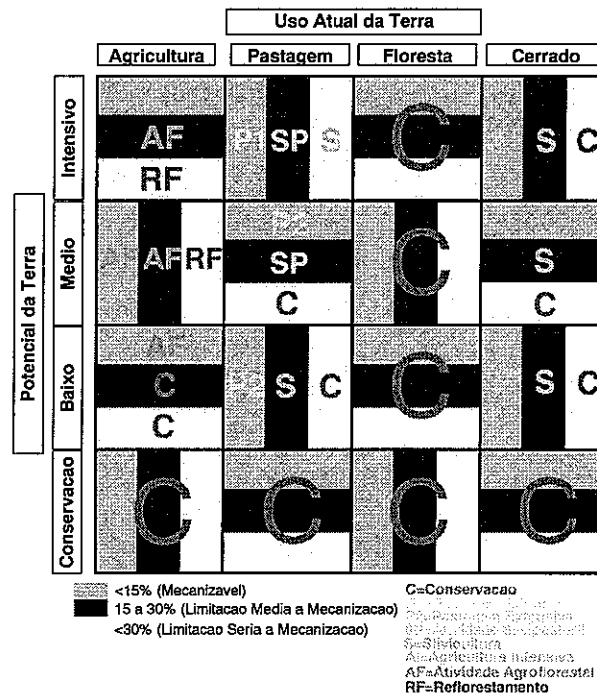
a) Potentiality of Land Use x Steepness

The main objective of this analysis was to verify the levels of mechanization possibility in each potentiality level in the use of the earth usage through the association of information of potentiality of the earth usage and steepness. We obtained like this the following results:

Land Potentiality	Mechanization Level
Intensive	Possible Mechanization
	Difficult Mechanization
	No Mechanization
Medium	Possible Mechanization
	Difficult Mechanization
	No Mechanization
Low	Possible Mechanization
	Difficult Mechanization
	No Mechanization
Critical areas	-

b) Item a) x Present Land Use

The intersection of the results of the item a) and the current land use, it was contained as it is followed to characterize the conditions of the proposed activities:



Like this, the study area was divided in potential areas for the following items being considered only the natural criteria:

Intensive agriculture	in areas you mechanized with potential of intensive use, that you/they are busy actualmente for agricultural actividades or savannah vegetation
Livestock (Intensive)	in areas you mechanized with potential of intensive use, that you/they are busy actualmente for pasture. They are areas for livestock but with possibility of agricultural actividades due to his/her potential for intensive use
Livestock 2 (Extensive)	in areas you mechanized of potential for medium use to I lower, that you/they are busy actualmente for pasture
Forestry	in areas with intensive potential, no mecanizável and that it possesses pasture actualmente. In areas with potential of intensive use of difficult mechanization with savannah vegetation. In areas with bass potential, difficult mechanization and with pasture actualmente. Also in areas of medium and potential bass, with savannah vegetation, being mecanizável or of difficult mechanization
Actividades Silvipastoril	in areas of difficult mechanization with potential for use intensive or medium and that actualmente are busy for pastures
Actividades Agroforestais	in areas with actividade agricultural actualmente, of difficult mechanization and intense potential. In areas you mechanized of medium to I lower potential and in areas of difficult mechanization with medium potential. No found in the study area for the scale 1:250.000
Reforestation	in areas you didn't mechanize with intense potential the medium and that you/they possess actividades agricultural actualmente. No found in the study area for the scale 1:250.000
Conservation	in areas that still possess forests and those recommended for the conservation. Also areas didn't mechanize that you/they possess savannah vegetation. In difficult areas

	and you didn't mechanize with potential bass and that you/they possess actividades agricultural actualmente. Last in areas that actualmente possesses pasture, with medium potential to bass that you/they can be automated
Critical areas	they are areas that possess difficulties in his/her use (flood periodic, high erodibilidad, etc.), that you/they need high investments and of high technology for they be developed. This item won't be handled in the present project

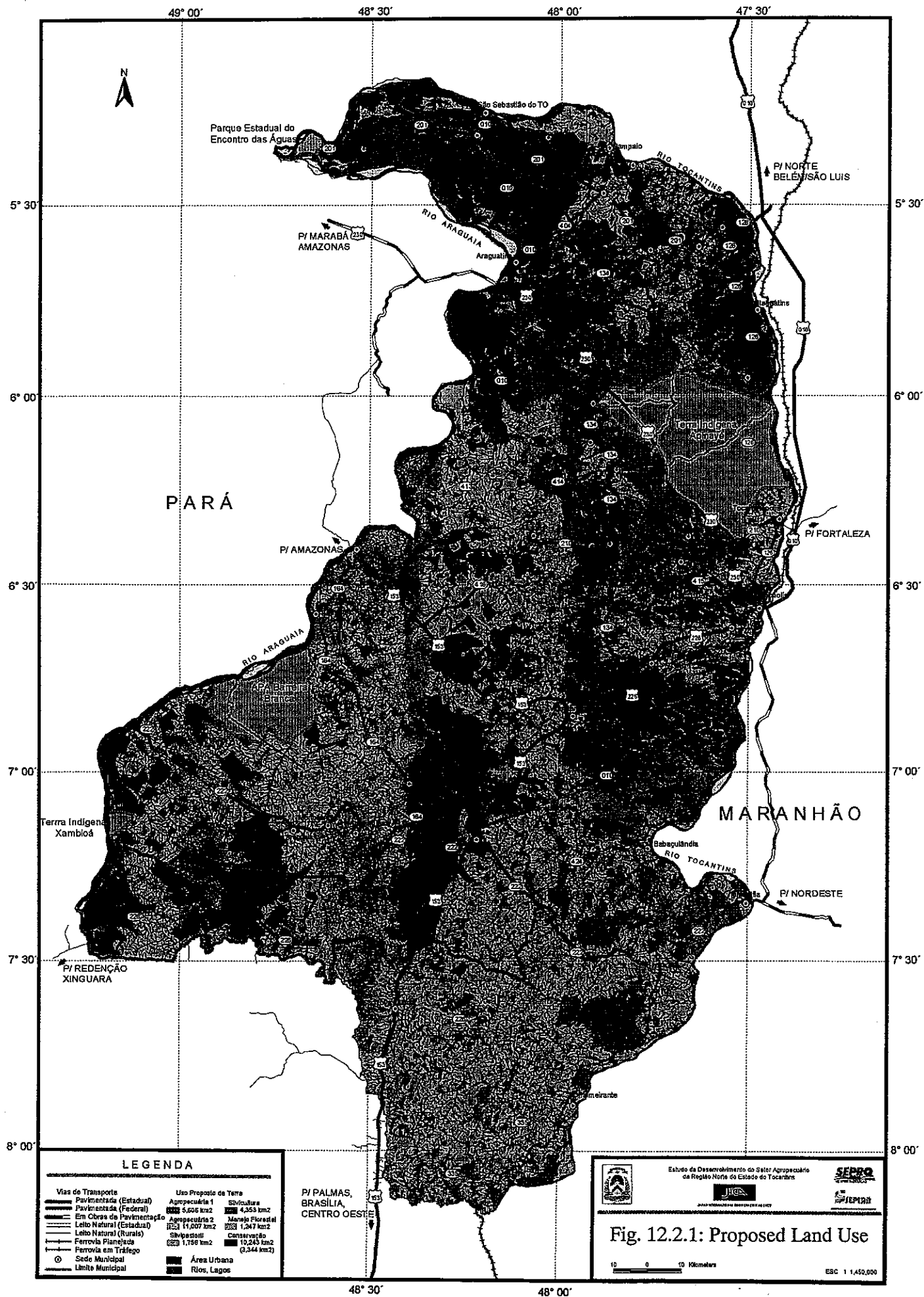
The extraction of areas presented above, as display the figure 12.2.1, will allow will typify it of the study area for the 4 proposed types, only considering the natural conditions.

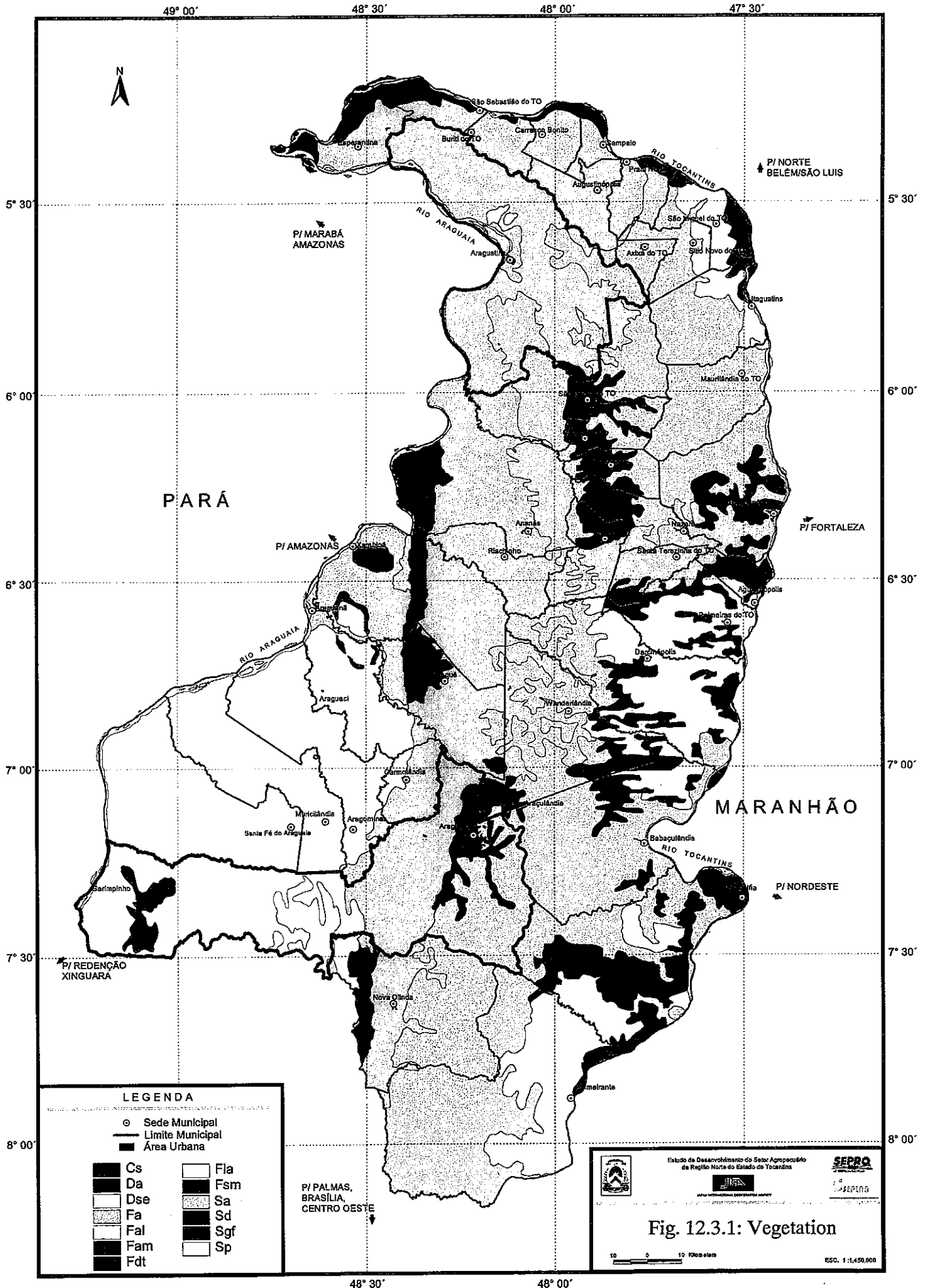
c) **Areas of legal use and areas with potential for the environmental conservation**

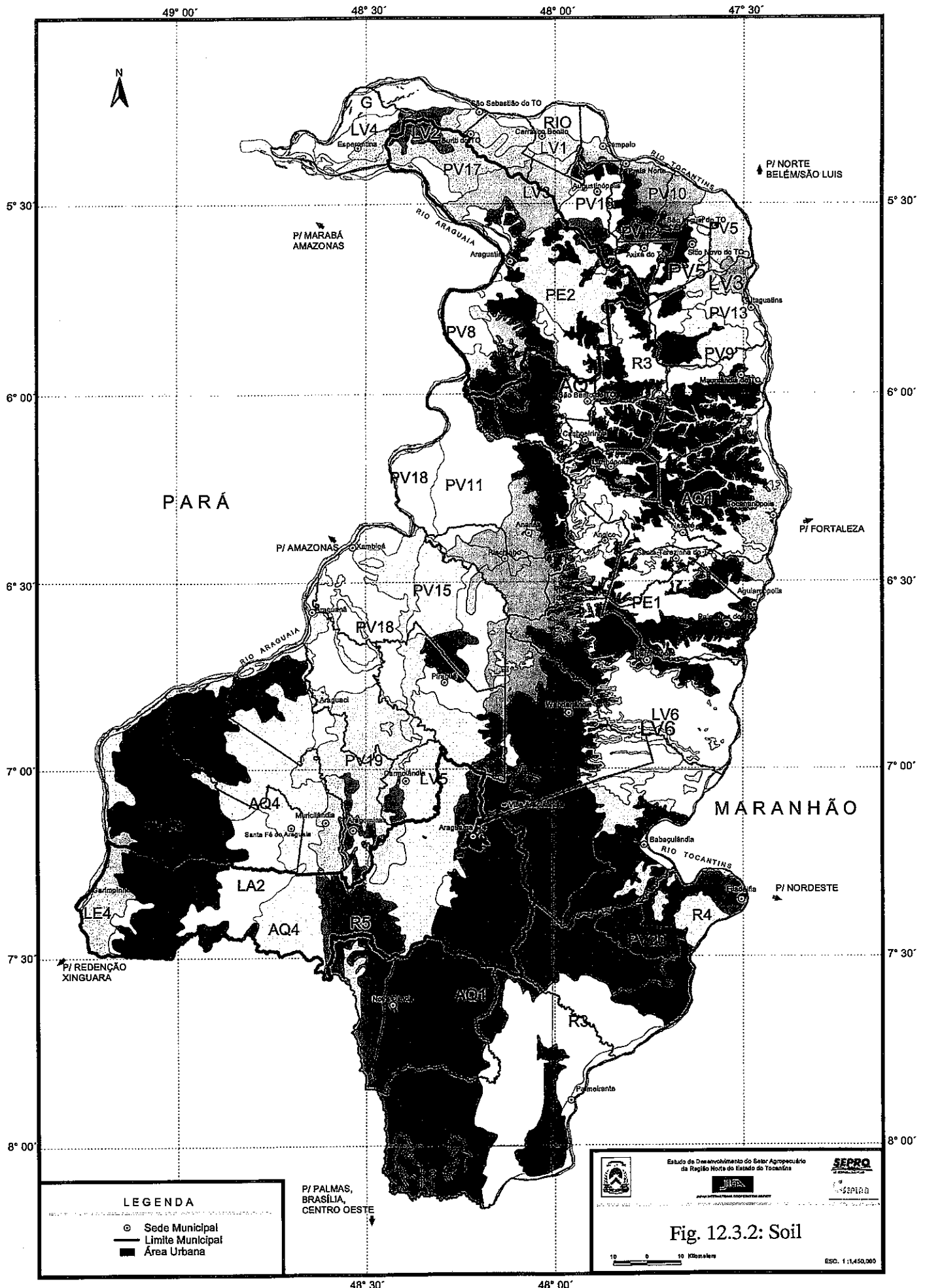
The indigenous areas (Areas of Legal Use) and areas with potential for the environmental conservation will be excluded of the analysis, because they possess special treatment in relation to use.

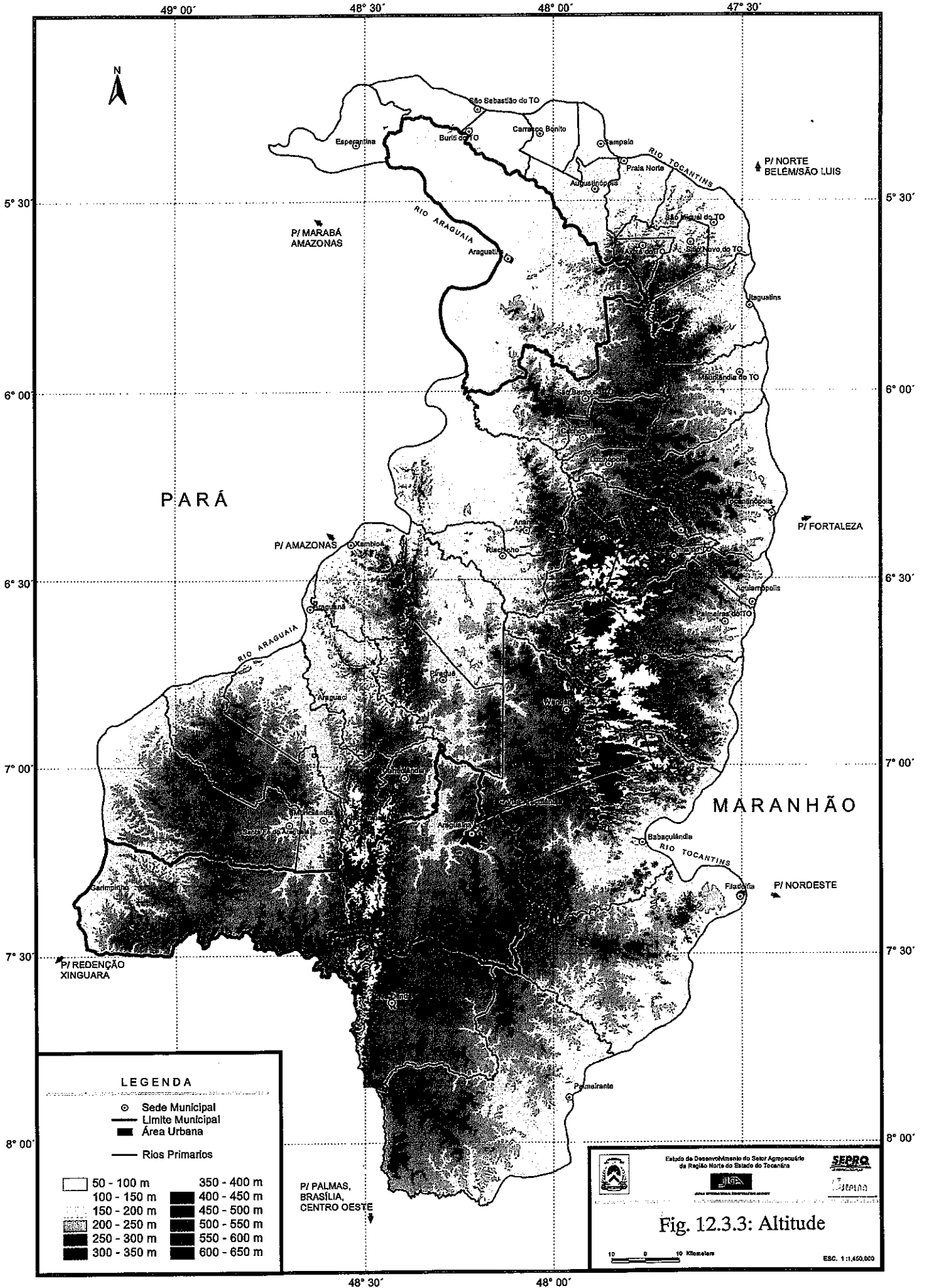
d) **Other Relevant Maps of the Entire Study Area**

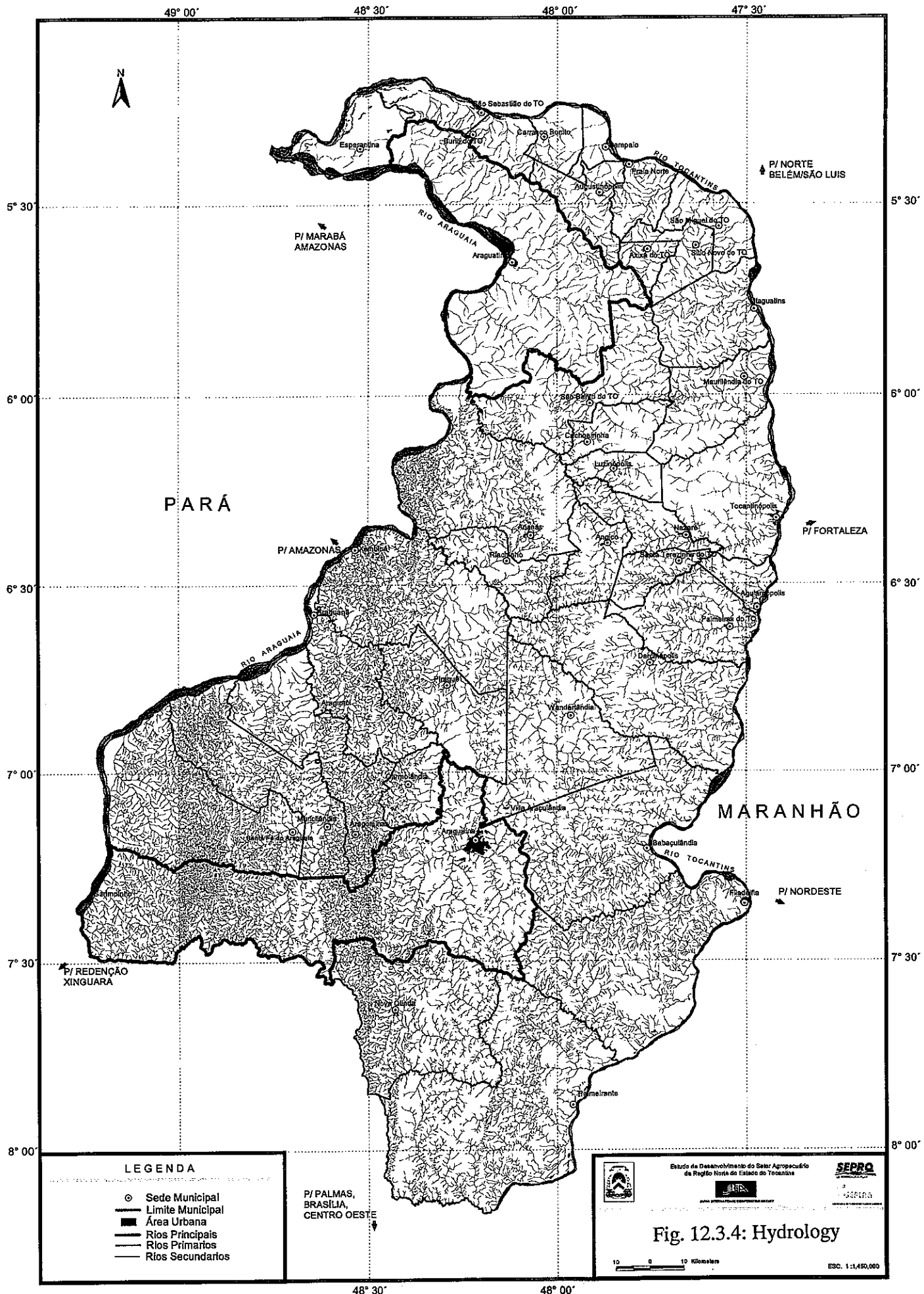
Other relevant maps of the entire study area are shown after the figure 12.3.1.











LEGENDA

- ⊙ Sede Municipal
- Limite Municipal
- Área Urbana
- Rios Principais
- Rios Primários
- Rios Secundários

P/ PALMAS,
BRASÍLIA,
CENTRO OESTE

Estudo de Desenvolvimento do Setor Agropecuario
de Região Norte do Estado do Tocantins



Fig. 12.3.4: Hydrology

10 0 10 Kilometros

ESC. 1:1.450.000

