

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

Japan International
Cooperation Agency
(JICA)

ANNEX III

NATURAL CONDITIONS

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1. Conditions of Climate

(1) Climate Observation Network

The existent climate observation station in the Study Area just measure the precipitation. The Calculation of water demand were realized, using 30 years data (1961 to 1990) of stations as Imperatriz, Conceição de Araguaia and Calorina that contain the records of the atmospheric pressure, temperature, evaporation, relative humidity, sunshine and cloudiness. The other existent stations in the Study Area are shown in Fig. 3.1.1.

(2) Climate

Study Area and plenty uniform in relation to climatologic (Fig. 3.1.2) presenting humid climate with moderate deficiency hidrica (B1wA'a') and climate humid subumid with small deficiency hidrica (C2rA'a').

(3) Rainfall

The annual precipitation of the Area of Study varies among 1400 to 1800 mm, as shown in the Fig. 3.1.3.

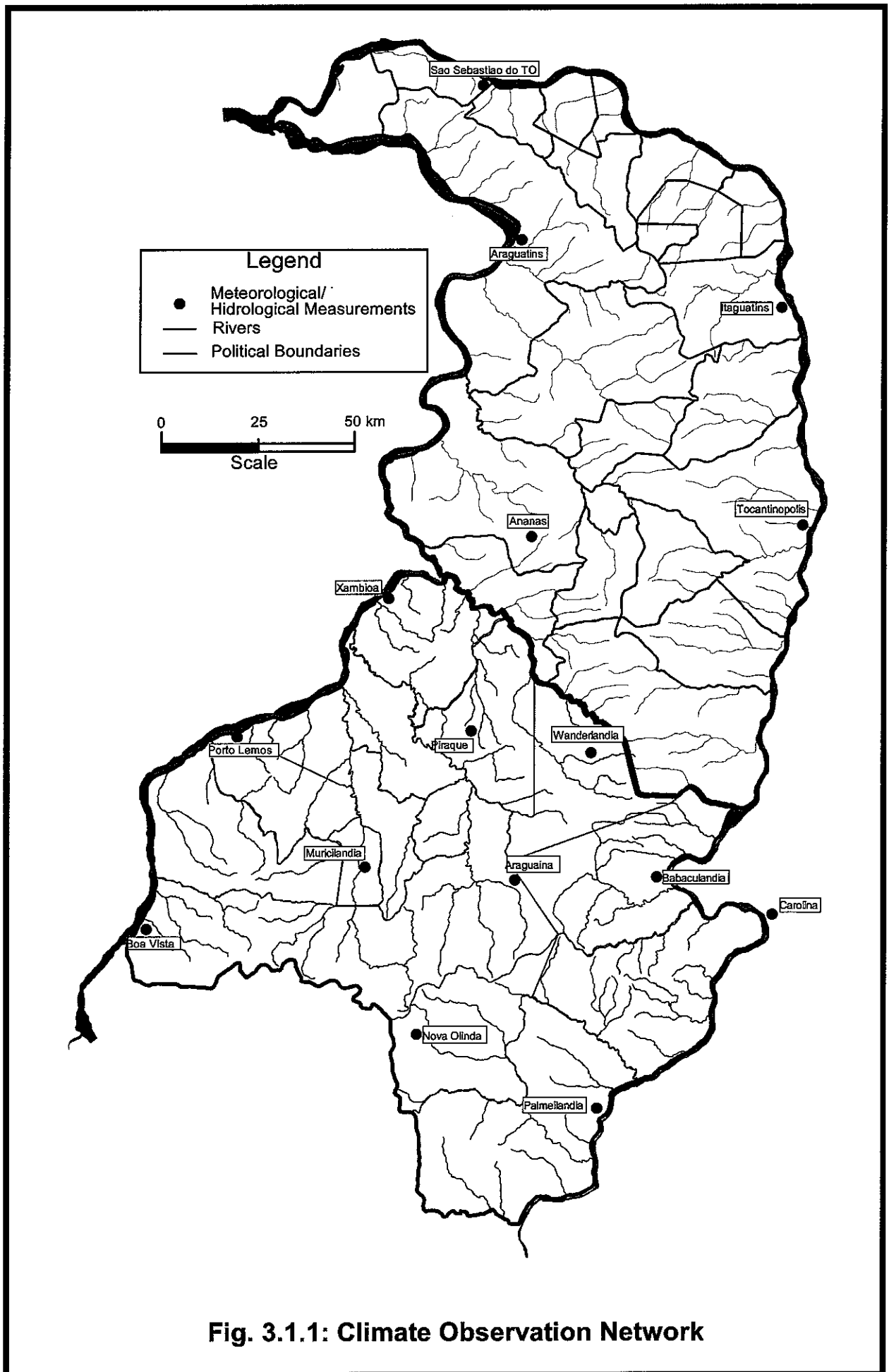
The division of the dry and rainy season is clear. Being considered the rainy period as of October to April, with the precipitation concentrated more than 85% of the annual rain.

Mean Monthly Precipitation (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

(4) Temperature

The mean annual temperature in the Study Area varies a little as shown in Fig. 4.1.4, showing the variation of mean annual 27 to 28 degree C.. The only variation were obserbed around Aragominas where exist higher areas with the elevation of more than 400 m. But in a general way, the temperature is high during the season from July and September, and the low from December to February.



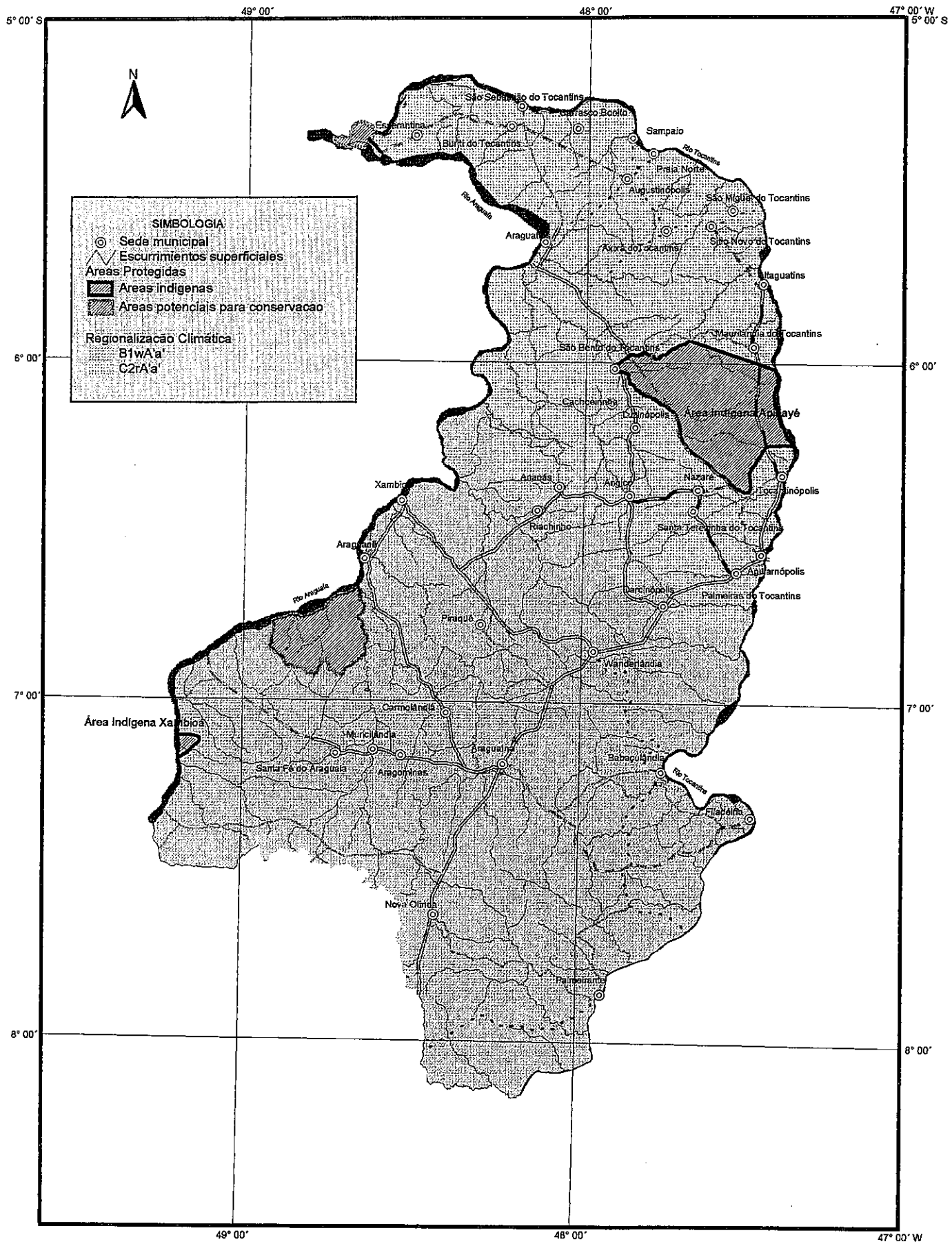


Fig. 3.1.2: Climatology

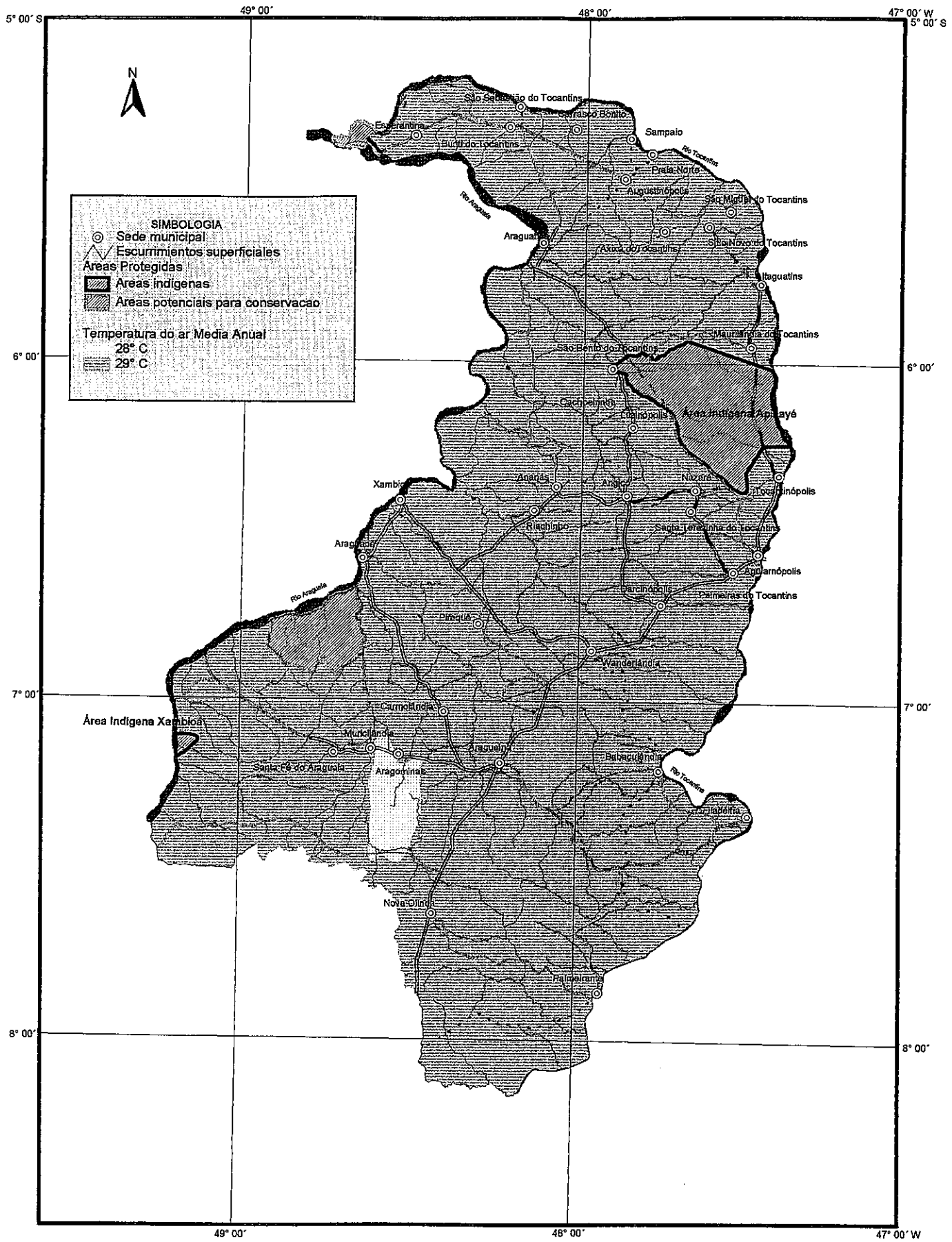


Fig. 3.1.4: Temperature

(5) Veranico

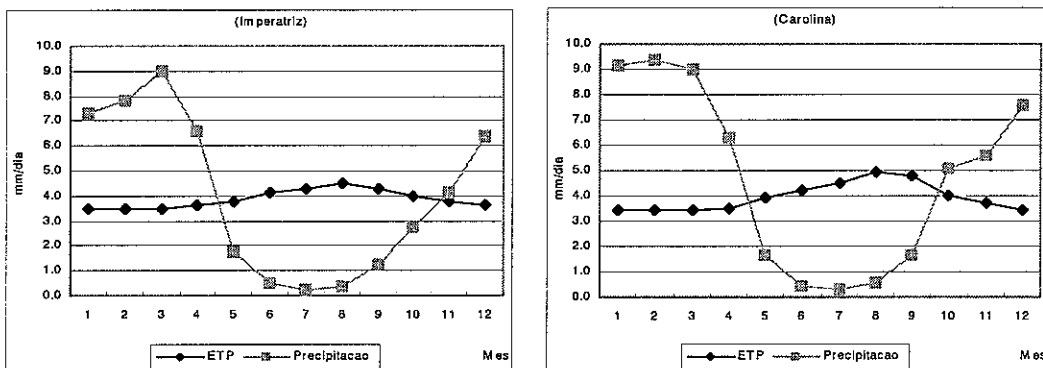
The following table show probability of the veranicos damage occurrence with duration of 5, 10, 20 and 30 days for Xambioa and Itaguatins.

XAMBIOÁ		ITAGUATINS	
Duration (days)	Probability of no exceedency (%)	Duration (days)	Probability of no exceedency (%)
30	0.1	30	0.7
20	1.6	20	5.0
10	28.6	10	40.0
5	84.7	5	87.0

(6) Evapotranspiration

The variation of the evapotranspiration in the Study Area are shown in the followings, showing the largest values happen between June and September.

As it can see, in the rainy period (October to April) the precipitation exceeds the evapotranspiration



value. It is noticed the great aptitude then for the cultivations in sequeiro of the area.

2. Hidrology

(1) Hydrologic Observation Station

The hydrological observation station in Study Area are as follows; :

Rio Tocantins	Itaguatins, Tocantinopolis, Carolina
Rio Araguaia	Xambioá, Conceição do Araguaia
Rio Lontra	Piraque

(2) Basin

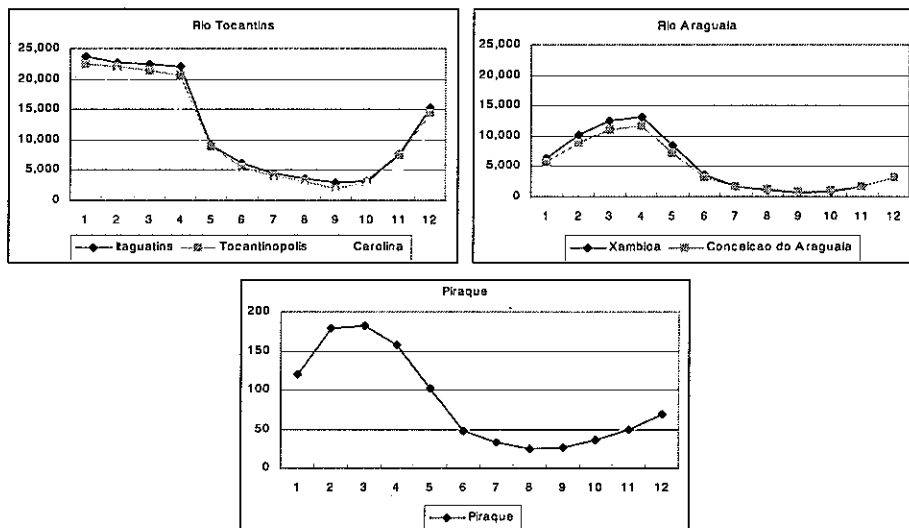
This Study Area can be divided mainly in two basins, the one is Araguaia and another one is Tocantins (fig. 3.2.1). The basin of the Araguaia river can be subdivided in 6 sub-basins. The area of each basin and presented to proceed:

- Basin of Araguaia Basin (21.027,3 km²)
 - Basin of Rio Araguaia (8.125,7 km²)
 - Basin of Rio Jenipapo (87,9 km²)

- Basin of Rio Muricizal (3.274,9 km²)
 - Basin of Rio Lontra (3.944,6 km²)
 - Basin of Ribeirão Corda (3.528,4 km²)
 - Basin of Rio Piranhas (2.065,9 km²)
- Basin of Tocantins (16.118,2 km²)

(3) Discharge

The existent discharge data are presented in the graphs below.



(4) Potential of water resources

The potential water resources of this Study Area are extremely high, mainly in what it refers to the Tocantins and Araguaia river. Although it still doesn't happen a rational use of this big potential, some exist projects of use of resources water resources as presented below:

Basin	Existents Projects	Capacity
Rio Tocantins	• UH Serra Quebrada	1,328 MW
	• UH Estreito	1,200 MW
	• UH Tupirante	1.000 MW
Rio Araguaia	• UH Santa Isabel	2,200 MW
Ribeirão Corda	• UH Lajes	2.4 MW
Rio Lontra	• UH Corujão	0.6 MW

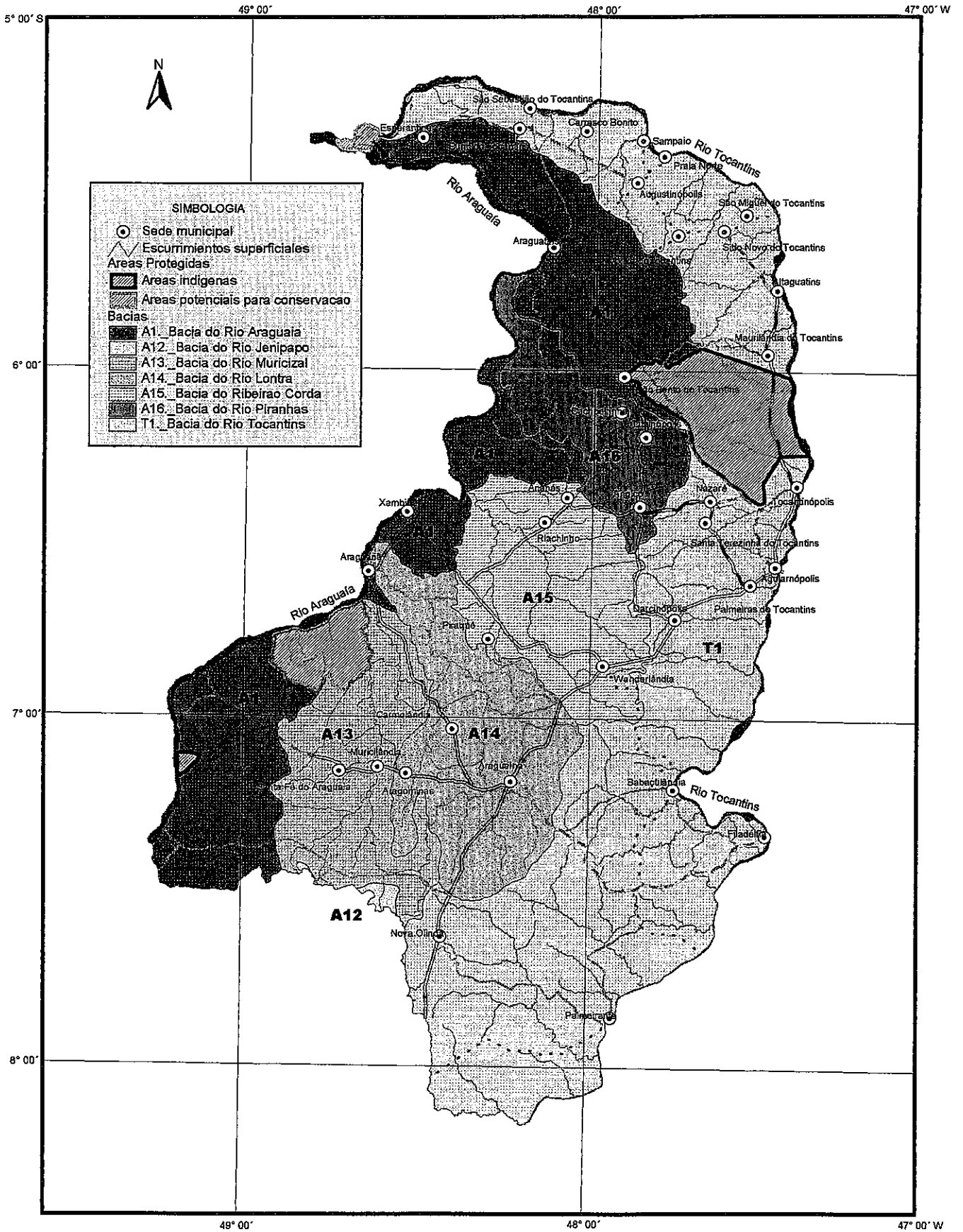


Fig. 3.2.1: Hydrology