

CHAPTER 2. DESCRIPTION OF THE STUDY AREA

Characteristics of natural and social condition in the Study Area are described below.

2.1 Natural Condition

The Orinoco River rises in the Parima mountains, 1,100 m height, at the Brazilian and Venezuelan border and discharges into Atlantic Ocean. The total catchment area of the Orinoco River Basin is 1,015,000 km² (see Fig. S-2-1), third largest catchment area in south America, the total length of the river is 2,063 km. The river has a fairly uniform profile with a mean slope of about 1/22,000 (4.5 cm/km). Average annual flow discharge and sediment discharge are 36,000 m³/s and 150 million ton/year respectively.

The Orinoco Delta in the Orinoco River basin can be defined as the area downstream of Ciudad Guayana along its main course. The total area of the Delta is approximately 66,000 km². The Study Area of the delta is 22,000 km² and located below 100 meters above mean sea level, surrounded by Rio Grande and Manamo Channel. The annual average temperature is higher than 26 °C and annual average rainfall is about 1000 mm to 2000 mm. Rainy season is from May to October and dry season is from November to April.

In the west and north part of the Orinoco river basin, there are active mountain formation from sediment clastic of Andes mountains and in the southern part, there is Guyana plateau which is stable since of the Precambrian age. These two geological units in the north and south form a basement for a Venezuelan sedimentary basin where thick secession of sediments is mainly supplied from Andes mountains. The turbidite sediment deposition covers all of the basin area and thickness of the sediment at the eastern edge of the study area (where it is deepest) amounts to over 10,000 m.

The mineral soils represent approximately 75 % of the surface of the delta and according to the origin of the material, they can be classified into two principal types: the ones derived from the fluvial sedimentation and the ones developed over a marine sub-stratum. Organic soils represent the other 25%.

The upper delta has high agricultural potential because fluvial sedimentation has been predominant, although mineral soils prevail. The intermediate and lower delta plains are generally of marine origin with high contents of pyrite. This means that these soils are potentially sulfate acidic. The problem is aggravated as this strata reaches the surface and if the areas are drained in order to make a more intensive use of the soil, sulfate acidic soils may be formed. The lack of drainage and textures are two factors that also contribute to worsen the acidic problem. The organic soils have low agricultural potential due to the low pH (acidic) of the peat, strong problems of drainage and/or high contents of

pyrite. Most of the Orinoco Delta is covered with savanna (pasture), semi-deciduous forest and evergreen forest whereas front of the outer edge of the Delta covers mangrove forest.

2.2 Socioeconomic Conditions

2.2.1 Social Conditions

The recession caused by the decline of the international oil price since 1980 has aggravated the plight of the middle class while the economic policy dependent on oil has impoverished rural areas, resulting in a massive migration of the rural population to urban areas. This in turn causes deterioration in living environment, law and order. Population: 28,560,000 (1998); population growth rate: 2%; GNP per Capita: US\$ 3,450 (1998)

The average life expectancy is 73 years (1996) and the infant mortality rate is 22 in 1,000, i.e. 2.2%. The provision of medical facilities is rather low as the number of hospital beds per 1,000 people is only 0.3.

The literacy rate is 91.0%. While the school enrollment rate for basic education (primary, secondary and higher) was 68% in 1994, the completion (graduation) rate was extremely low. The education budget of the government is low (3.8% of the GDP), causing concern in regard to the poor quality of education.

The social security system is inefficient as it covers only 32% of the employed population, making review of the system and other related matters pending tasks for the future.

2.2.2 Conditions of National Economy

The sluggish oil price which became highly noticeable in the second half of 1997 caused a major recession and the national economy recorded negative GDP growth of 0.7% in 1998. The first half of 1999 recorded negative growth of 9.4% and substantial negative growth of 5 - 6% is expected for the year despite the recovery in the second half due to the upturn of the international oil market.

Venezuela is endowed with rich mineral resources and its long-term growth prospects as an exporting country of mineral resources are promising. It is, therefore, necessary to reform its economic and fiscal structures to achieve sustainable economic growth which will not be seriously affected by fluctuations of the oil price.

Government finance recorded a surplus of 693 billion bolivars (US\$ 1.1 billion, 1.6% of the GDP) in 1997 but recorded a deficit of 2,164 billion bolivars (US\$ 3.4 billion, 4.2% of the GDP) in 1998 due to the poor tax collection performance reflecting the decline of the oil price and the economic recession. At the end of 1998, the official external debt stood at US\$ 23.17 billion.

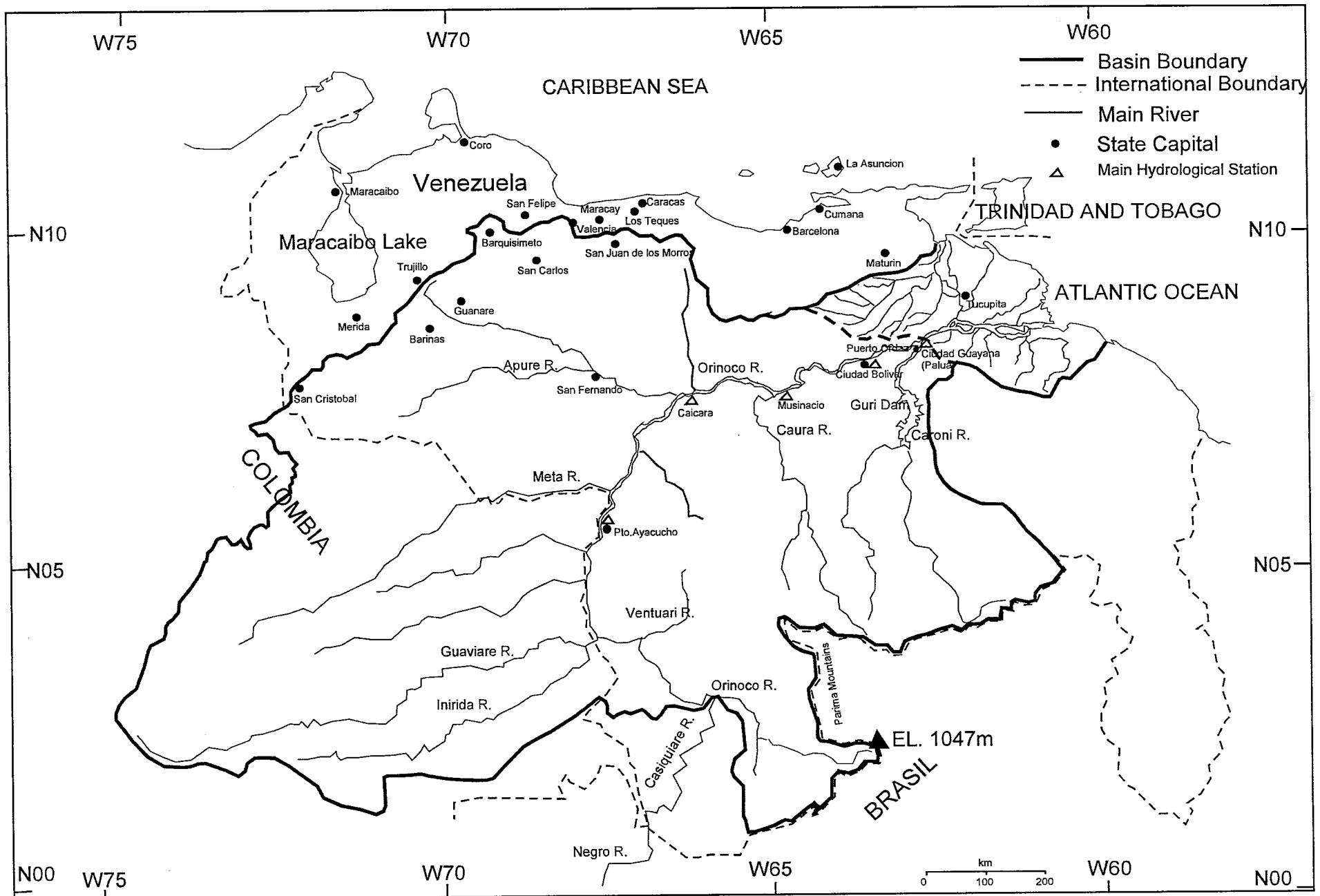


Fig.S-2-1 Location of the Orinoco River Basin

The external trade balance, which had recorded a surplus of US\$ 17,817 million in 1997, recorded a reduced surplus of US\$ 14,849 million in 1998. This declining trend is expected to continue in 1999 but is likely to be reversed in 2000 and thereafter due to the expected upturn of the international oil market.

The GDP in 1997 was US\$ 78.5 billion. In 1998, it recorded negative growth of 0.7%, including negative growth of 1.0% for the oil sector and negative growth of 0.8% for the non-oil sector.

The inflation rate, which hit its highest level ever of 103.2% in 1996 subsequently stabilized to 37.6% in 1997 and 29.9% in 1998. The government target for 1999 is 20 - 24%. The minimum wage for workers in 1998 was 100,000 bolivars (US\$ 159) and the new administration implemented a wage hike of 20% in May, 1999.

The working population at the end of 1998 was 9.91 million, of which 8.82 million were employed, resulting in an unemployment rate of 11.0%. However, the informal sector accounted for 49.8% of the employed, indicating the vulnerability of employment.

2.2.3 Conditions of Regional Economy

(1) General

Delta Amacuro : Delta Amacuro is located in the northwestern corner of the country along the left bank of the rivermouth area of the Orinoco. It has an area of 45,000 km². In general, it is formed by a lowland swampy delta and is a less developed area from an economic point of view. It is also an original habitation area of the indigenous Warao tribe.

Bolivar : Bolivar occupies a vast area of 218,997 km², extending on the right bank of the Orinoco from the rivermouth to the middle reaches. Only the area immediately along the bank of the Orinoco forms belt-like flat land and a mountainous area extends to the south. The famous Guyana Plateau is partly located in this province.

Monagas : Monagas is located to the west of Delta Amacuro and on the opposite side of the Manamo Channel to Bolivar. It has an area of 28,900 km². Apart from a hilly area in the north, some 90% of the province consists of flat land. The area along the Manamo Channel is swampy. It has development potential for agriculture, stock raising and forestry.

(2) Local Society and Economy/Population Changes

Delta Amacuro : Population: 133,022 (1998); average annual growth rate: 3.7%

Bolivar : Population: 1,273,586 (1998); average annual growth rate: 2.7%

Monagas : Population: 591,449 (1998); average annual growth rate: 1.5%

The discrepancy between the average annual growth rates is judged to be attributable to the different degree of social mobility determined by the geographical as well as transport conditions.

(3) Industrial Activities

Delta Amacuro : The only industrial production features the food processing, mainly for self-supply, showing an undeveloped economic situation.

Bolivar : As industrial production is mainly based on local mineral resources, industrial activities center on refining, steel making, aluminum smelting and machining. The metal industry in particular accounts for more than 90% of the local industrial production.

Monagas : At present, agriculture and stock raising are the main industries. Food processing and timber/furniture industries are also present. The province is characterized by the production of oil-related underground resources and Orinoco heavy oil (Orimulsion), the development of which is recently in progress. It is hoped that this oil production will improve the economic structure of the province in the coming years.

2.2.4 Regional Development Plans

(1) General

The new Chavez administration announced the First National Plan for Territorial Development in December, 1998, followed by the announcement of the Economic Transition Programme 1999-2000 in January, 1999 for the purpose of introducing new economic policies designed to improve the macroeconomic environment characterized by stagnant economic growth since 1997.

(2) First National Plan for Territorial Development

The basic policies of the First National Plan for Territorial Development are listed below.

- Strengthening of the linkage with the international economy through the maintenance of a liberal economic regime
- Promotion of sustainable economic development through the creation of resources, taking environmental conservation into consideration

- Consolidation of education to raise public awareness of the country and to ensure regional health and the right to an affluent life
- Promotion of decentralization to achieve efficient economic activities, expansion of the administrative function and social fairness and the creation of local employment opportunities through the reorganization of centralized functions in urban areas
- Expansion of employment fields through development of available resources

(3) Economic Transition Programme 1999-2000

This programme mainly features urgently required stabilization measures for the macro economy and measures designed to promote and vitalize the non-oil sector which has long been pointed out as a structural shortcoming of Venezuela's economy. This programme is outlined below.

< Policy Objectives >

- Establishment of policies to reduce the fiscal deficit
- Downward guidance of bank interest rates
- Stabilization measures for the foreign exchange rate
- Review of the redemption method for external debt
- Introduction of a government body to facilitate investment by the private sector at home and abroad
- Export promotion measures for non-oil products
- Creation of new employment opportunities through public investment
- Implementation of small business promotion measures
- Promotion of the selective privatization of state enterprises

The following types of concrete measures are indicated to achieve the above policy objectives.

- Government finance reconstruction measures
- Financial and foreign exchange stabilization measures
- Sector-specific development measures

The programme sets the following investment targets for public works for 1999 and 2000.

- 1999: 1,716 billion bolivars (US\$ 2.7 billion)
- 2000: 2,227 billion bolivars (US\$ 3.5 billion)

The other main targets included in the programme are as follows.

- Target inflation rate: 1999 - 22% maximum
 2000 - 17% maximum
- Foreign reserves: US\$ 14 billion minimum (at the end of 1999 and 2000)

(4) Regional Development Plan (Orinoco-Apure Axis Development Plan)

This plan aims at stimulating socioeconomic development in the vast Orinoco-Apure Basin (300,000 km²) by generating increased employment opportunities. At the same time, it intends to reform the Venezuela's general economic structure.

The following areas have been designated for the development of priority industries.

- Agriculture: Uribante, Aragua, Caparo, Apure Modules, Guanare Masparro, Biruaca Aohaguas, Sul de Giarico, Orinoco Vegas, La Paragua and El Cristo Delta
- Forestry: Monagas, Anzonategui, Cinaruco and Capanaparo
- Mining: San Cristobal, Guayana and Anzonategui

For the mass transportation of 40 million tons of products resulting from this plan, the key requirement is believed to be the development and securing of shipping on Orinoco and Apure Rivers.

2.3 Waterway Transportation System in Orinoco Delta

Navigable spans in Venezuela consists on three, Orinoco, Apure and Portuguesa and these lengths are 1204 km, 665 km and 249 km respectively.

The development of the Orinoco river has been historically linked with the development of the Venezuelan mining industry in this basin. Two mining companies, Iron Mines Co. and Orinoco Mining Co. were founded in 1933 and 1949 respectively to export iron ore to their main factory in North America. The Orinoco river was the natural way to take the product out, but transit of large vessels was not possible due to inadequate navigable depth.

The Iron Mines Co. transported the mineral through the Macareo channel by barges till Peninsula of Paria port in the Caribbean Sea, and then transferred to larger vessels crossing to North America.

The Orinoco Mining Co. constructed the railroad from mining site, Cerro Bolivar to Puerto Ordaz located in the estuary, and the export port too. Channeling works were undertaken in the Orinoco and Caroni rivers to allow the entrance of large vessels.

Due to the increased volume of export, strong meander along Macareo channel and vast maintenance dredging, a new channel through Rio Grande was opened. In 1988, a transfer vessel station was installed at Boca de Serpiente, with a storage capacity of 220,000dwt and a water access depth of 50ft. This station is served by cargo capacity of 65,000 dwt class two shuttle vessels to transfer iron ore to the station. The capacity of Boca Grande waterway, Atlantic entrance to the Rio Grande, has been increased to receive 65,000 dwt vessels with 42-feet draft.