This section describes the boundaries and the main physical and socio-economic characteristics of the region in order to define the area considered in the regional GIWA assessment and to provide sufficient background information to establish the context within which the assessment was conducted.

**Boundaries of the Amazon region**

The Amazon Basin is the largest drainage basin on the planet. It is situated completely within the tropics, between 5° N and 17° S, and occupies more than one third of the South American continent. Seven countries, Brazil, Bolivia, Peru, Colombia, Ecuador, Venezuela and Guyana share this basin. The Orinoco and Paraná rivers represent other important South American basins, located to the north and south of the Amazon Basin, respectively (Figure 1).

The headwaters of the Amazon River are located in the Andes Mountains which are shared among Bolivia, Peru, Ecuador and Colombia, while the origin of several important tributaries are found in the Brazilian and Guyana shields, an ancient Precambrian crystalline basement situated along the northern and southern border of the Basin (Figure 2). The headwaters of rivers situated in the northern Amazon Basin are shared by Venezuela, Guyana and Brazil, while the headwaters of rivers in the south are located in Brazil. The central, the lower and the mouth of the Amazon River fall within the Brazilian territory (Figure 3). The Amazon discharges into the North Brazil Shelf Large Marine Ecosystem (LME 17).

The Brazilian Government excludes the Tocantins River from the Amazon Basin’s drainage area (COBRAPHI 1984). The mouths of these rivers are partially separated by several islands located at their confluence, and it may represent a division of the basins. The Marajó Island is the largest and it separates the mouth of the Amazon to the north from Marajó Bay and Pará River, which are considered the mouth of the Tocantins River and several other smaller rivers located to the south (Barthem & Schwassmann 1994). The discharge of the Amazon and Tocantins rivers creates a large area along the northeastern coast of South America where fresh and saltwater mix and sustains a 2 700 km stretch of low-lying, muddy mangrove forests. This environment extends from the Orinoco Delta in Venezuela into the Brazilian State of Maranhão and is inhabited by several endemic species, genera and sub-families of fishes (Myers...
1960). The volume of water discharged from both these rivers supply around 15% of the total fluvial water into the world’s oceans (Milliman & Meade 1983, Goulding et al. 2003). However, despite the geographical separation of the mouths of the Amazon and Tocantins rivers, the water from both mixes prior to reaching the ocean and therefore has similar physical and chemical properties which gives rise to similar freshwater fauna on both sides of the archipelago (Barthem 1985, SANYO Techno Marine Inc. 1998, Smith 2002). As a consequence, there are no ecological or geographical reasons to consider these basins separately.

The boundary of the GIWA Amazon region was considered the limits of the drainage area of the Amazon and Tocantins Basins. Due to the extension of the Amazon mouth and the influence of the freshwater discharge on coastal waters close to its mouth, it was necessary to define the eastern limits of the region. Although the distance from the mouth that freshwater is discharged from the Amazon varies more than 100 km between seasons, the influence of the freshwater is very small beyond 50 m depth (Barthem & Schwassmann 1994, SANYO Techno Marine Inc. 1998). Therefore, the eastern limit of the Amazon Basin region was designated as the 50 m depth contour and included the Guamá and Araguari rivers as well as other small basins (Figure 3).

### Physical characteristics

The area of the Amazon Basin is estimated to 6 869 000 km² (Table 1). Although 69% of the Amazon Basin is situated in Brazil; Bolivia and Peru can also be considered as Amazon countries, because 66% and 60% of the area of these countries respectively is located in the Amazon Basin (Goulding et al. 2003) (Table 2). The catchment area of the Basin extends from 79°W (Chamaya River, Peru) to 46°W (Palma River, Brazil), from 5°N (Cotingo River, Brazil) to 17°S (headwater Araguaia River, Brazil) and incorporates some of the greatest drainage basins of the world (Goulding et al. 2003). Table 1 shows the areas of the most important catchments within the Amazon Basin and identifies those that are considered international and drain an area shared by more than one country, and those that are considered national and drain an area larger than a state. The largest catchment within the Amazon Basin in terms of drainage area and discharges of water and sediment is the Madeira River, which drains an area that covers parts of Brazil, Bolivia and Peru. The Tocantins River is the second largest catchment in terms of drainage area and is entirely Brazilian. The Negro River, in the northern Amazon Basin, is the most important tributary in relation to discharge of water and drainage area, which drains parts of four countries: Brazil, Colombia,
The origin of the Amazon lies approximately 100 km from the Pacific Ocean in the oriental slopes of the Andes Mountains and reaches the sedimentary lands of low declivity in Peru before crossing the frontier between Colombia and Brazil. The total length of the Amazon is debated because it is difficult to measure the distance along its meandering course and also because it is not known exactly where the origin is located. However it is estimated to be between 6 400 and 6 800 km (Goulding et al. 2003). Approximately 15 tributaries and the Tocantins River have lengths greater than 1 000 km and three of them extend more than 3 000 km (Barbosa 1962, Goulding et al. 2003).

The Amazon River discharges approximately 220 800 m$^3$ of water per second which represents about 15% of the total discharge of all the rivers in the world (Goulding et al. 2003). It transports approximately 1.2 billion tonnes of sediments per year, less than Yangtze in China and Ganges-Brahmaputra in India and Bangladesh (Meade et al. 1979).

Most of the Amazon Basin does not exceed an altitude of 250 m, and the main humid zones are located below a height of 100 m (Salati & Vose 1984). The ports located in Iquitos, in the Amazon River (Peru), and Porto Velho city, in the Madeira River (Brazil), receive ships that travel more than 3 500 km along the rivers. Otherwise, not all the rivers of the Amazon Basin are navigable by commercial ships, although, it is estimated that more than 40 000 km of waterways within the Basin are navigated by various types of craft.

**Climate**

Despite its enormous size, the temperature range over the entire Amazon Basin is relatively small with annual mean temperature varying from 24 to 26°C. In the mountainous areas, the annual average is below 24°C, while along the Lower and Middle Amazon the mean temperature exceeds 26°C (Sioli 1975). The homogeneity of temperature is probably due to the relatively uniform topography of the Basin, the abundance of tropical rainforest, and its location in the north and centre of South America.
Other climatic parameters however, exhibit important temporal and spatial variations over the area of the Basin. The area, according to the climatic classification of Köppen, is characterised by several climate types: Type Afi is defined by relatively abundant rains throughout the year, with the total precipitation in the driest month always exceeding 60 mm; Type Ami is defined as a relatively dry season, with elevated total annual pluviometric rate; and Type AwI has a relatively elevated annual pluviometric index, but also exhibits a clearly defined dry season (Day & Davies 1986).

Mean annual rainfall exhibits great spatial variations throughout the Amazon Basin, generally oscillating between 1 000 mm and 3 600 mm, but exceeding 8 000 mm in the Andean coastal region (Day & Davies 1986, Goulding et al. 2003). At the mouth of the Amazon River, the total annual rainfall exceeds 3 000 mm, while in the less rainy corridor, from Roraima through Middle Amazon to the State of Goiás in Brazil, the total annual rainfall varies between 1 500 and 1 700 mm (Capobianco et al. 2001).

The pattern of rainfall throughout the year varies across the Basin. In the west, rains are relatively evenly distributed, while the northern Basin receives its greatest rainfall in the middle of the year and in regions south of Ecuador, maximum precipitation occurs at the end of the year (Simpson & Haffer 1978, Salati 1985). Because more than half of the total precipitation is recycled by evapotranspiration, the Amazon rainforests maintain the rainfall patterns and the hydrological cycles in the region (Salati et al. 1978, Salati & Vose 1984). Medium annual evapotranspiration ranges from almost 1 000 mm per year in the proximities of the Juruá and Purus rivers to more than 2 600 mm per year close to the mouth of the Amazon River.

Classification of Amazonian rivers

The great environmental heterogeneity of the Amazon Basin can be illustrated by categorising the different biotopes, considering the different sub-basins that comprise the Amazon Basin, the landscapes defined by the geological past and the different types of floodplain areas. The main geological units of the Amazon Basin include high mountains (Andes), old shields (Brazilian Shield and Guyana Shield) and the extensive lowlands (Central Amazonian Lowlands) (Figure 2). These three geological structures are of fundamental importance for the chemical quality of water as well as the composition and production of fish in the Amazon rivers. The types of water in the Amazon are classified as white, clear or black according to their colour, which is determined by the geological structures where the waters originate (Sioli & Klinge 1965, Sioli 1967, Sioli 1975).

The highly turbid rivers that carry a great amount of material in suspension, such as the Amazon, Napo, Marañón, Tiger, Juruá, Purus and Madeira rivers, are called white-water rivers and originate in the Andean slopes. The conductivity of waters in these rivers is elevated (\( > 60 \mu S/cm \)) and the pH is close to neutral (6.5-7) (Meade et al. 1979, Schmidt 1982, Guerra et al. 1990).

Clear-water rivers are, as the name suggests, generally transparent and originate in the crystalline Guyana and Brazilian shields where the processes of erosion yield few particles that are transported in suspension. As a result, these waters are chemically pure, with low conductivity (6-5 \( \mu S/cm \)) and almost neutral pH (5-6) (Sioli 1967). The visibility within the Tapajós, Xingu and Trombetas rivers is almost 5 m.

A great amount of humic acid in colloidal form is a characteristic of black-water rivers, such as the Negro and Urubu. The chemical properties of these waters is determined by the sandy soils and a type of vegetation known as Campina and Campinarana that grows in these soils. Campina and Campinarana habitats are dispersed throughout the sedimentary basin in which the upper reaches of these black-water rivers are located. Organic matter, leaves and logs, deposited on the soil are not completely decomposed and the porosity of the soils allows humic acid colloids to percolate into the rivers, thus reducing the pH of the water to between 4 and 5.5 and generating the characteristic dark colouration of these rivers. Despite the elevated concentration of organic matter, the water in black-water rivers is chemically more pure than those of white-water rivers, with conductivity up to 8 \( \mu S/cm \) (Junk 1997).

Rivers of the Andes

Ucayali and Marañón rivers. The Inca Empire was the most famous civilization of the Ucayali River. Its capital, Cuzco, was established on the Apurimac River, in the Basin’s headwaters. The mountains have a long history of human alteration extending thousands of years, but the valley and the lowlands are well preserved. Fishing is an important economic activity in the lowlands, mainly around the cities of Pucallpa and Iquitos. The Marañón River was the principal connection between the Peruvian Amazon and the Pacific in the recent past, and now it is the main pipeline route for the export of oil. In addition to oil extraction, numerous copper, zinc, iron, mercury, antimony and gold mines occur in the headwaters of these rivers (Goulding et al. 2003).

Madeira River. The Madeira River, composed of Mamoré, Beni and Madre de Dios rivers, is the main source of sediments of the Amazon Basin. The foothills of the Andes exhibit a sequence of habitats that change from snowfall streams to the large rivers at the base of the mountains. Although the biodiversity increases downstream, the chemical processes...
and species endemic to the high altitude reaches of these rivers make them an important area for the Basin. The confluences of the Andean rivers and the rivers of the Brazilian Shield is observed along a succession of rapids and falls located above the city of Porto Velho. Below this point, the River is calm and navigable. The largest floodplain areas are located in Bolivia, in the flooded savannahs. These areas are inundated with the floods of the rivers and by local rainwater (Goulding et al. 2003). One of the largest alluvial gold mines within the Amazon Basin is located along the Madre de Dios River (Núñez-Barriga & Castañeda-Hurtado 1999). Putumayo-Içá and Caquetá-Japurá. Although, these Andean rivers may have the most preserved catchments in the entire Amazon Basin, the foothill region has been altered in areas where communities, primarily of indigenous people, have expanded along the road and cocoa production has increased. Fishing is an important activity in the lower river, mainly in the Caquetá River and gold exploitation occurs along the Colombian and Brazilian border (Fernández 1991, Goulding et al. 2003).

Purus and Juruá rivers. The Purus and Juruá rivers are different from other white-water rivers in the Andean region because their headwaters are situated below 500 m altitude, although, in the past, they were connected with the Andes. As a result of geological changes these rivers now drain a desiccated landscape formed by an older alluvium deposit and carry large quantities of suspended solids (Clapperton 1993). These rivers have one of the largest floodplain areas of the Amazon Basin, which is explored by professional fishermen from Manaus (Batista 1998, Petrere 1978). In the headwaters, inhabited by Indians and small communities, several areas have been designated for ethnic groups and are protected from extractive activities (Goulding et al. 2003).

Rivers of the Old Shields

Guyana Shield

The Guyana Shield is located in the north of the Amazon Basin and is shared by Brazil, Venezuela, Guyana, Suriname and French Guiana.

Trombetas, Jari, Araguari and other rivers. Most of the drainage area of these rivers is located in the Guyana Shield, which is characterised by the falls and headwaters of small streams. Large industrial operations, such as the extraction of bauxite in the Trombetas River, the extraction of kaolin and paper production in the Jari River and the extraction of manganese in the Araguari River occur in these basins (Barthem 2001).

Negro River. The Negro River is the largest tributary of the Amazon River located in the Guyana Shield. Several floodplains in the catchment that are flooded by overflow from the Negro River are important, such as the Anavilhanas archipelago in the Negro River and the unnamed archipelago, between Paduara/Demini and Branco rivers (Goulding et al. 1988). In addition, forests in the catchment are periodically flooded by the rain and, as a consequence, creates another type of flooded environment that covers large contiguous areas close to the margins of the Negro and Branco rivers as well as in the headwaters of its tributaries. In the Branco River, the savannah that is periodically flooded by rain is an environment that favours cattle and rice cultivation and, moreover, it is an area prone to fires during dry periods. The falls and headwaters of the rivers are areas subjected to more severe environmental impacts, such as mining. Conservation depends on the enforcement of an environmental law, which is hindered by the expansion of mining activities in this area (Barthem 2001).

Brazilian Shield

The Brazilian Shield is located in the southern Amazon Basin and is located entirely within Brazil.

Tocantins River. The catchment of the Tocantins River is one of the most altered areas of the Amazon Basin. This region possesses two large hydroelectric dams, one at Tucurui in the lower Tocantins River, and the other at Lageado, in the upper Tocantins River, and the construction of 25 more is predicted (Leite & Bittencourt 1991). Moreover, its headwaters are altered by agricultural activities to the south of Pará and north of Tocantins, as well as by present and past mining activities.

Xingu River. The ichthyofauna of the Xingu River above the waterfall at Altamira is completely different from that of the lower sections of the River. The fauna and the ecology of this system are not sufficiently known and the main impacts are related to mining and agricultural activities in its headwaters.

Tapajós River. Of the rivers that drain the Brazilian Shield, the Tapajós River is the most altered by mining activities in its headwaters and also by dredging. Unfortunately, knowledge of the ichthyofauna and ecology of this drainage system is still insufficient to evaluate the dimension of the impact of this activity (Barthem 2001).

The tributaries of Madeira River. The headwaters of the Madeira River are located in the Andean slopes, but its tributaries drain the Brazilian Shield. The main impacts in this area are caused by mining, construction of Samuel’s Hydroelectric Dam on the Jamari River, and intense agricultural activity in its headwaters. Information on the fauna and ecology of these tributaries is lacking. The Madeira River area and regions close to its tributaries have been studied more often. However, mercury contamination is known in the area and the disturbances of the mining dredges on the migration of the great catfishes have been mentioned by local fishermen.
Forests

The limits of the Amazon Tropical Forest extend far from the area of the Amazon Basin and covers a great part of Suriname and French Guiana to the north. The Amazon Tropical Forest is composed of complex types of vegetation such as the highland forest, the cerrado, the flooded savannah and the flooded forest (Sioli 1975, Ayres 1993) (Figure 4). Beyond the limits of the Amazon forest, the Amazon Basin is covered by an extensive area of savannah and cerrado in the headwaters of the Brazilian and Guyana shields. The cloud forest is a special type of vegetation that grows between 1 500 and 3 000 m on the slopes of the Andes and is exposed to constant moisture-laden winds. The vegetation changes abruptly at altitudes above 3 000 m. The climate becomes dry and cold and a vegetation type known as Puna, which is composed mainly of grasses and bushes, dominates (Goulding et al. 2003).

The floodplains (várzea and igapó) represent the most important environment for diversity and aquatic productivity (Goulding 1980, Goulding et al. 1988, Forsberg et al. 1993, Araújo-Lima et al. 1986, Forsberg et al. 1983, Junk 1989 and 1997). These areas extend along the rivers and appear almost entirely flooded during the rainy season. Although it is difficult to determine accurately the areas that are periodically flooded because of the complexity of the flooding system which can be influenced by local rains, river overflow and the action of tides (Goulding et al. 2003), it is estimated that within Brazil, there is between 70 000 to 100 000 km² of floodplains and more than 100 000 km² of lakes and swamps (Goulding et al. 2003). In Bolivia, flooded areas occupy between 100 000 and 150 000 km² of the country (Barthem et al. 1995).

The areas of várzea of the white-water rivers are relatively well conserved in the area upstream of the confluence of the Purus and Amazon rivers, in Brazil, without great deforestation caused by cattle or agriculture. On the other hand, the várzea of the Solimões-Amazon rivers are altered downstream of the Purus River mainly in the area around Santarém, in the State of Pará, Brazil. In the area between where the Tapajós and Xingu rivers join the lower Amazon, there is a different type of várzea, that is influenced by flooding and river overflow (Barthem 2001).

In Brazil, the várzea of tides are observed along the area between the confluence of the Xingu and Amazon rivers, and the mangroves. This vegetation type has been intensely exploited by logging companies and small-scale farmers (Anderson et al. 1999, Barros & Uhl 1999). However, in spite of this, the condition of habitats in the area of the channels of Breves as well as in the area of the inner delta of Amazon River (Gurupá, Mexiana, Caviana and other islands) is relatively good, as there are no large agricultural enterprises (Barthem 2001).

Fish diversity

The number of fish species in Amazon remains unknown but estimates of the number of fish species in South America vary between 3 000 and 8 000, most of them in the Amazon Basin (Menezes 1996, Vari & Malabarba 1998).

Socio-economic characteristics

Low human population density is a factor that helps preservation of the Amazon Basin. Unfortunately however, this also tends to lead to a failure to prioritise the collection and maintenance of data describing basic demographic parameters, such as rates of rural migration, sanitary conditions and the exploitation of timber and fisheries resources, among regional administrations. As a consequence, data presented here is often old or does not always cover the entire Amazon Basin.

Demographic structure

The population density in the Amazon Basin is low and concentrated in urban centres (Figure 3). In Brazil, where the Amazon Basin is most
inhabited, the average population density is 3.3 inhabitants per km², which is considerably lower than the average density of 20 inhabitants per km² in the remainder of Brazil.

The Amazon Basin supports five cities that have more than 1 million inhabitants and an additional three that have more than 300,000 inhabitants. These major population centres are generally located along the larger rivers, such as Amazon and Madeira rivers. The main cities are Manaus, Iquitos and Pucallpa along the Amazon River, Belém, in the Amazon estuary and Porto Velho on the Madeira River. Other important cities, La Paz, La Santa Cruz, Sierra and Cusco, are located in the headwaters in the Andean Mountains (Goulding et al. 2003) (Figure 3).

**Socio-cultural aspects**

The Amazon Basin, with its enormous biodiversity, is also characterised by a great socio-cultural diversity, composed of countless indigenous tribes and traditional populations of riverine, rubber tappers and small farmers (Neves 1995). The indigenous populations, with more than 100 different languages, are generally located in reserves that currently occupy more than 15% of the entire Amazonian territory (Diegues 1989). Until the 1960s, the economy was based on the extraction of natural resources, particularly rubber or cocoa and fish. Afterwards, mining of iron, bauxite and gold became important economic activities and people began to migrate from settlements located along the rivers and várzeas to areas nearby these new industries (Cardoso & Muller 1978, Diegues 1989).

Human settlement in the Amazon, initially by the indigenous tribes and later on by European and other immigrants, occurred mainly in the várzea due to the resources offered by the rivers and streams as well as the high fertility of alluvial soils that were productive for agriculture and cattle grazing. A mixture of Europeans, African slaves and indigenous peoples traditionally inhabited the várzea and cultivated corn, rice, beans and bananas. Hunting, fishing, growing and harvesting rubber, Brazilian Nuts and açai, complemented those activities (Neves 1995).

Private and governmental planning investments occurred at the end of the 19th century with the construction of a railway that aimed to connect the upper Madeira River with the navigated stretch below the rapids and falls between Guajará-Mirim and Porto Velho and facilitate the transport and export of rubber, which was the main product of the Amazon Basin during that period. The Madeira-Mamoré railway was completed in the 1930s but, the inauguration of the railway coincided with the economic decline of rubber rendering it economically unfeasible to operate.

In the 1960s, the construction of highways irreversibly modified the social structure of the region. The road between Belém and Brasilia connected the Amazon to other areas of Brazil. The opening of the large highways parallel to the rivers changed the pattern of occupation of the Brazilian Amazon. As a consequence, deforestation increased along the rivers and in the Terra-Firme (upper-land) along the recently open highways (Fearnside 1995). In addition, the logging industry constructed roads deep into forests away from the rivers, which enabled the extraction and export of timber but also lead to the establishment of settlement in previously uninhabited areas of the Terra-Firme.

Hunting for subsistence and sale of skins was concentrated mainly on animals such as the capybara (*Hydrochaeris hydrochaeris*) and the alligator (*Caiman sp.*). The turtle (*Podocnemis expansa*) and the freshwater manatee (*Trichechus inunguis*) were easy to capture and, as a consequence of overexploitation, many of these animals practically disappeared in some areas (Neves 1995). In addition, the growing presence of commercial fishermen in the area has generated conflicts with the local subsistence fishermen, who try to protect the lakes that still contain healthy stocks from the fishing methods used by commercial fishermen in the várzea and industrial fishermen in the estuary (Barthem 1995).

Extraction of plant resources is another practice that is widespread in the Amazon. The main products are rubber, Brazilian Nuts and açai. In addition, a plethora of medicinal and aromatic plants are harvested for the production of pharmaceuticals and cosmetics. Unfortunately however, due to indiscriminate collection, some species are threatened to the point of extinction. Timber extraction, primarily for the export market, is practiced but in an exploratory and disorganised fashion. The exploration covers large areas of várzea, where the infrastructure to extract and transport the timber exists. The main exploited species are: Cedro (*Cedrela sp.*), Jacareuba (*Calophyllum brasiliensis*), Mogno (*Schwietenia macrophylla*), Andiroba (*Carapa guianensis*), Loura (*Aniba sp.*), Ucuuba (*Virola surinamensis*) and Copaiba (* Copaifera vinifera*), among others (Fearnside 1995). The highways facilitate the access in the areas of Terra-Firme, being the areas more explored than those with a more extensive net of highways (Verissimo et al. 2001).

In recent years, mining has seriously compromised the environment and the people that live in it. Gold extraction represents an activity that most affect the ecosystem.

**Socio-economic aspects**

The presentation of the socio-economic aspects of Amazon Basin is plagued by a chronic shortage of statistics. However, the quality of life
of the resident population and the relationships between production and the activities conducted within the area will be summarised on the basis of the available information.

The occupation of Amazon was intense at the beginning of the 18th century. Although the Portuguese paid little attention to the Amazon during their occupation, great international interest in this area was generated mainly by the English due to their marine and commerce tradition. In the 19th century, during the colonial period, the ephemeral “agricultural cycle” was progressively replaced by more permanent production of coffee, cotton, sugar cane and cacao. Later, American interests were stimulated by the increasing usefulness and demand for rubber which promoted several private incentives and government investments in the area. For example, beyond the railway Madeira-Mamoré, the North American entrepreneur, Henry Ford, invested in the plantation of Hevea along the banks of the Tapajós River, Brazil. The urban nucleus known as Fordland was built to extract, process and export the latex obtained from the plantation. Rubber became the main product of the Amazon Basin until the beginning of the 20th century when the low competitiveness of the extractive process and a fungal plague in the plantation caused the decline of rubber production around 1950. Afterwards, the world centre for rubber exploitation was transferred to Southeast Asia, where more productive areas existed and fungal infections were able to be controlled (Ribeiro 1990).

In the latter half of the 19th and the beginning of the 20th century, the migration of people assumed a pivotal role in the expansion and establishment of new urban centres. Initially, migration and colonisation occurred along navigable waterways but, with the construction of federal roads during the 1960s, a new route for migration and economic expansion was established. In Brazil, the most inhabited and impacted area is observed in the regions under the influence of highways constructed between Belém and Brasília and between Cuiaba-Porto and Velho-Rio Branco, where several consolidated urban nuclei have been established. However, in the remainder of the Amazon Basin, population centres are generally poorly connected. Transport and communication is only between those cities that are located along the main channel of the Amazon River (IBGE 1991).

In 1996, the Brazilian population in the Amazon River Basin was 6,706,154 inhabitants and had increased 9.4% since 1991 (IBGE 1996). This increase correspond with trends reported from the North and Middle-West regions of Brazil, which exhibited the most significant growth rates in the country (2.44% and 2.22%, respectively), while the growth rate of the entire country was 1.38% per year during the same period. The urbanisation rate in the Basin increased from 60.8%, in 1991, to 70.7%, in 1996, overcoming that reported for the Brazilian North region (IBGE 1996).

The quality of life of the population in the Amazon River Basin, based on indicators such as basic sanitation (provisioning of water, sanitary exhaustion and garbage collection) and incomes, is characterised by accentuated lack of infrastructure and social investments. These factors make the North region in Brazil less favoured than the average situation of the other regions in South America.

The contribution of the Amazon River Basin to the Brazilian economy is relatively modest, considering that the North region was responsible for less than 3.5% of the GDP, in 1990, despite occupying more than 45% of the national territory (IBGE 1991). The GDP of the North and Middle-West regions of Brazil increased approximately 18 fold between 1970 and 1990, while the national GDP increased only 11.4 times. The growth in per capita income in the Brazilian North region was of the order of 7.5 times during the same period, from 197 to 1,509 USD (Kasznar 1996).

In the region, the supply of electric energy to some specific areas is generally generated by isolated hydroelectric systems (dams of Balbina, Samuel, Curua-Unu and Coaracy-Nunes) and complemented by fuel-burning thermo-electrical centres. The connection of part of the State of Para to the System Electric Interlinked North-northeast, through Tucurui Hydroelectric Dam, with a transmission line (1,000 MW) between Venezuela and Balbina Hydroelectric Dam is predicted for the future.