

ISSUES IDENTIFICATION AND MANAGEMENT WORKSHOP

Lisboa, June 1989

A WATER RESOURCES AGENDA FOR BRAZIL

by

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The Country

Before focusing on water resources issues in Brazil, it is appropriate to give to the participants of this Workshop some perspective of our economic and social structure.

The main feature of the Brazilian society is duality. On one hand, there is a modern industrial society, which is capable of producing the eighth GNP of the Western hemisphere. Professionals working in public or private companies, universities and research centers are on the average comparable to their counterparts acting in similar institutions in Europe or in the USA.

On the other hand, there is an extremely poor society living in the urban shantytowns or in the countryside with standards of living comparable to the most backward societies in the less nations.

Sixty five percent of the working force has a wage smaller than U\$ 100.00 per month. Less than 1.5% earns more than U\$ 600.00 per month. The 50% poorest share the same fraction of GNP as the 1% richest (corresponding to 13% of GNP). This means that the mean income of the richest is fifty fold the mean income of the poorest. This ratio grows exponentially if one considers lower and upper quantiles for defining respectively the poor and the rich. Misery affects mostly childhood. This can be observed in the sidewalks and streets of the large Brazilian cities, where there is an enormous quantity of children begging for help. Less than 10% of all Brazilian children have enough support to complete the eight years of elementary school.

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Indices of poverty are also easily perceived in water related topics. Consumption of electricity is about 1300 Kwh/year per capita. Consumption in the USA is roughly eight fold this figure. 30% of households do not have water supply and 50% are not served with sewage.

Brazilian population is estimation as 150 million, growing at an annual rate of 2% GNP is roughly U\$ 300 billion and the foreign debt U\$ 120 billion. Most of this money was loaned to Brazil while the country was run by a non-Democratic regime, that lasted from 1964 to 1982.

In recent years, Brazil has managed a trade surplus, mostly by restraining essential consumption from Brazilians. For example, in 1988 this surplus was U\$ 19 billion. However most of it was used just to pay interests. The economic impossibility of decreasing the debt's principal causes unrest in th Bazilian society. Many think that we are subjected to a neo-colonial relationship with the First World.

It is the belief of this writer that the building of a stable society in Brazil depends on the achievement of at least three goals:

- a) Re-distribution of the wealth, mostly through the support of an education program capable of braking the family chain of poverty and ignorance;
- b) Re-negotiation of the foreign debt in order to stop the flux of capital from Brazil to the First World; at least in the next 10 years;
- c) Sustainable growth, at a rate much higher than the population growth, without predatory use of natural resources.

The last goal "sets the stage" for the discussion on water resources issues. Indeed, U\$ 2000/year per capita is too low. We need to achieve a high rate of economic development and this gives the framework for dealing with topics such as the power production in the Amazon Basin, which has been a focal point of worldwide interest.

Issues

The water resources issues in Brazil may be grouped into six themes:

1) Creation of a Water Resources System

Since 1984 Brazil has been going through a political process called "transition towards democracy". It is expected that this process will conclude in March of 1990, when the first elected-President in a thirty years period will take office.

In 1988 a new Constitution was promulgated containing several items of interest related to natural resources development and preservation of the environment. In particular, it was established that a Water Resources System will be specified by ordinary legislation, in order to coordinate the activities of the several agencies, private or public, dealing with water. It is generally accepted that the Water Resources System will enhance the development of multiple objective and multiple purpose river projects.

Multiple objective projects will probably decrease the priority attributed in Brazil to hydro power, vis a vis other water uses, such as irrigation, navigation and flood control. Multiple purpose projects will democratically translate people's aspirations and concerns into purposes that go beyond the plain growth of GNP. This includes income distribution, local and regional development, and social and environmental impact evaluation of the project. Centralized versus decentralized management of water resources is also a key question for the shaping of a Water Resources System.

It is not particularly difficult to propose a conceptual Water Resources System to be applied to a generic country. The real challenge is how to create a political and educational strategy that will lead to a good System, starting from the institutional framework and human resources now available in Brazil.

2) Hydro Power

95% of the electricity produced in Brazil comes from hydro power. The installed capacity is roughly 50,000 MW. The best alternative for expanding the generation capacity, which is essential for the development of the Nations, is also hydropower because: a) the nuclear alternative is much more expensive and possibly more risky to the population; b) Brazilian oil production of 600,000 barrels/day is not enough to meet transportation and industrial heating needs and therefore can't be burned into electricity.

The best sites for hydropower development in the river basins located close to the big cities (load centers) in the Eastern Brazil have already been used. Now the attention turns mainly, but not entirely, to hydropower sites located in hinterland. This perspective has stirred worldwide controversy.

Much concern has been devoted to the Indian rights of the Indians and environment impacts. In fact these are very important questions and should be in several cases "hard constraints" to any kind of development. Less concern has been devoted to the Brazilian population (at large) right for a better standard of living. The Amazon Basin should not be occupied predatorily, nor be preserved untouched to last as the garden of humanity.

From the water resources engineer point of view, the most important questions in the development of power projects are: a) how the man made reservoir affects the water quality and quantity; b) what is the safety of the dams and hydraulic structures which are designed based on the hydrological data base which is unfortunately quite insufficient in the Amazon Basin.

3) Deforestation

The waste of rainforest because of the reservoirs that will be filled to produce electric energy is rather small, when compared to the drainage area of the basin. The significant loss of rainforest (7% of the Brazilian Amazon, in the last 30 years) is related to deforestation which is done for cattle ranching and/or crop raising. There are many questions regarding how appropriate this strategy is because some believe that at the end, the rain forest will be transformed into a desert. There is little scientific knowledge supporting any of the "parties" involved in the discussion. Most of the future scenarios are based on qualitative evaluation, rather than on quantitative extrapolations. It is urgently needed to increase the research on the hydrological processes occurring in the Amazon Basin, in order to evaluate the effect of different scales of deforestation upon the rainfall and runoff patterns.

4) Water Quality

Water quality problems in Brazil may be classified into two classes:

- a) Related to the urbanization and industrialization. These are similar to the problems found in the First World and need to be accordingly solved.

- b) Related to the primitive mineral industry, for example, the contamination of Amazon rivers notably with mercury by gold miners. The water resources specialist has little contribution to give for the solution of these problems. Usually it depends on the political will and on the economical capability of the government. The law to be enforced already exists.

5) Irrigation

Brazilian Government is giving several incentives for irrigation. The target is to irrigate 3 million hectares in the next five years. This is quite an ambitious goal, comparable to all the land irrigated in the West of the USA by the Bureau of Reclamation.

If only part of the 3 million goal will actually be implemented, it will cause a fierce competition for water. In particular in the San Francisco Basin (drainage area of 670,000 Km²). This basin is located in the Brazilian Northeast, a region severely affected by droughts. Its population of about 30 million people has the lowest mean income of the country. There are high hopes about the agriculture potential of the San Francisco valley, when irrigated. On the other hand, the installed capacity of a number of power plants in the river will be MW in 1995. The planning and operation of the water resources system of the San Francisco Basin will be one of the most demanding challenges for water resources specialists in the next decade.

6) Urban Floods

Water resources specialists have a role to play in the effort to decrease the effects of the large floods that almost yearly occur in some Brazilian cities. Modern techniques of flood forecasting are certainly useful. However the major problem is the lack of capacity of local governments to enforce building codes. Because of this, shacks are built on unstable hillslopes and on the flood zone. Solution depends, once again, on political will and economic capacity of the government for enforcement of the law. That is safer housing alternative should be offered to the population that live in the shantytowns ("favelas").