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Water Resources Policy for the Brazilian Semiarid Region

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Introduction

The expression semiarid normally is used to describe the climate and regions where median annual precipitation is between 250 and 500 mm and the vegetation is primarily composed of bushes which lose their leaves in the driest months or pastures that become dry during droughts. The northeast Region of Brazil, which is about 1,219,000 km2, is approximately equivalent to a fifth of the entirety of Brazil (Cirilo, et al. 2003). The population in this region is 22.6 million, 38% of them are in the rural zone. The area officially classified as semiarid is 969,589.4 km² (INSA, 2016).

Water Policies for the Brazilian Semiarid Region

The Brazilian semiarid region is poor in surface drainage due to the temporal variability of rainfall and the dominant geological characteristics with predominantly a shallow soil on top of crystalline rocks. As a consequence there is poor penetratoin of water into the subsoil which result in fast run-off and a dence network of temporary rivers The major exception is the São Francisco River.Historically, the semiarid region of Brazil has been plagued by catastrophic events of severe droughts, while the general shortage of water has been one of the major obstacles to development in the region. Developmental models have been largely based on “combating drought”, leaving aside the search for alternative models that might have enabled people to cope with this phenomenon by focusing directly on water management solutions more suitable to the current reality (Dias et al, 2016). This discourse largely remained until the 21st century. From this time on, the discussions focused on development policies based on the concept of “coexistence with the semiarid climate. Medeiros et al. (2011) showed, that these discussions finally brought more attention to the major water challenges facing the semiarid regions and their most important aspects: access to water by a diffuse rural populations; efficient use of water resources in production processes; the inclusion of new social stakeholders with local knowledge in the decision making process; managing conflicts and ensuring the operation of existing infrastructure as the critical means by which the desired results can be achieved.

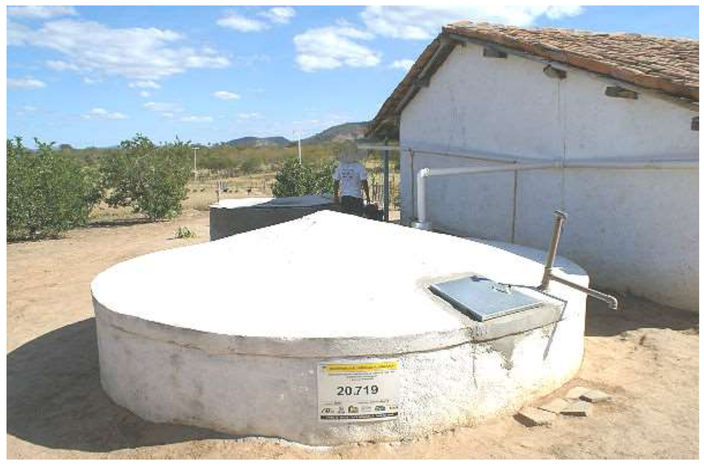
1. Water Accumulation in Dams

The policy of accumulating water in dams, typical of the Brazilian semiarid, has been carried out in two ways. In large reservoirs with the capacity for multiannual regularization in large scale river basins, and in small reservoirs with the capacity in the order of a few thousand cubic meters. High evaporation levels, in the order of 2,500 mm per year, present a serious policy challenge, especially for small dams, which are not able to withstand the effects of prolonged drought.

2.Rural Wells

In the northeast of Brazil it is estimated that there have been drilled nearly 100 thousand wells. As the greater part of the semiarid region of the northeast consists of crystalline formations, the drilling of wells to supply the different needs is subject to the following limitations: low flow, in the majority of cases up to 2 m³/h; in a significant part of the wells, salt contents, above recommendations for human consumption; and a large number of dry wells due to geological peculiarities.

3. Rural Cisterns



Various initiatives of the states, municipalities and governmental entities have multiplied the number of cisterns in the northeast of Brazil. The cisterns, with a normal capacity of 7 to 15 cubic meters, provides a daily supply of 50 liters during 140 to 300 days. They are filled by the end of the rainy season and not refilled during the rest of the year. Doing the necessary cleaning of the roof, the cistern, the gutters and pipes is a basic solution for satisfying the most essential needs of the diffuse rural population.

4. Subsurface Dams

In the middle of the 1990s successful experiments in the construction and management of small subsurface dams were implemented by Caatinga, an NGO, providing support for family agriculture in the region. Nearly 500 reservoirs were constructed underground, the results of which need to be evaluated and monitored. Parallel to technical activities, preparatory work among the affected communities is also necessary in order to make the best use of the available water.

5. Water Desalination

Due to the bad quality of the water in existing wells, in recent years many reverse osmosis desalination plants have been installed in Brazilian semiarid regions. The Sweet Water Program (*Programa Água Doce - PAD*) is one of the Federal Government programs coordinated by the Ministry of the Environment, through the Secretary of Water Resources and Urban Environment, in partnership with federal, state, municipal and civil society institutions.

6. Reuse of Sewage Water

In general, sewage continues to be discharged into water bodies. In the case of low or lack of treatment, the consequences are pollution, destruction of the biodiversity and reduction of potable water to supply populations and productive processes. In the northeast, the reuse of water for industrial activities has surged in sectors such as clothing production. It is still very limited, practically to pilot projects, with regard to the reuse of sewage, treated or not, for agricultural activities.

7. Transporting Water a Great Distance

In recent years major works for water transportation have been concluded. Others are in construction or are projected to supply cities of semiarid regions and give support to productive activities. Another option being explored is to transport water from the São Francisco River to the states of Ceará, Rio Grande do Norte, Paraíba and Pernambuco. According to the Minister of National Integration (2016), the final stage of the project will have a continuing water withdrawal of 26.4 m³/s.

The National Institute for the Semiarid Region (*Instituto Nacional do Semiárido – INSA*) aims at promoting scientific and technological development of the Brazilian semiarid region, as well as conduct and disseminate research and studies to strengthen the sustainable development of this region (INSA, 2017).

INSA
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Conclusions

The Brazilian semiarid regions present more difficult conditions to overcome, than other semiarid regions of the world: for most part, the soil here is very shallow, with rocks that are almost protruding, this reduces the number of aquifers and their recharge and quality; high temperatures lead to high rates of evaporation; few perennial rivers; and the highest population concentration among the semiarid regions of the world which generates excessive pressure on water resources. When water is as scarce as in the semiarid region of north-eastern Brazil water must be managed in a proactive manner. Water management decisions should be based on an assessment of future water use, including the long-term effects of current activities and policies, in order to achieve a sustainable development of the region.

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