Drought conditions and management strategies in Brazil

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Background

Droughts in Brazil affect in particular, but not exclusively, the semi-arid Northeast, a large área of about 800,000 sq km covering all 8 of the nine states plus the North of Minas Gerais. It is not that precipitation is very low – between 400 and 800 mm in average years, but because evapotranspiration is very high – between 2,000 and 3,000 mm per year. In addition to that, rainfall is concentrated in four Months, usually January to April in the northern part of the Northeast, and intra-annual and interanual variability is high. Being a region that lives on the brink of climate sustainability, any small variations in quantity or in distribution of rainfall causes large impacts.

Droughts have Always been a problem in the Northeast, in particular after the increase in population density. For three hundreds years, the Northeast was the main economic region in Brazil, based on sugarcane production in the coastal forest zone and the cattle civilization in the backlands or "sertão", the Brazilian name for that semi-arid region. The most famous drought, because of its devastating impacts, was a three year drought from 1877 to 1879. This drought triggered the beginning of organized policy responses in order to reduce impacts and provide relief for the population. In 1877, it is said that 500,000 people died of hunger and thirst, and the cattle activity was practically decimated.

In this XXI century, there were droughts in 2002, 2003, 2010, 2012 and 2013. The impacts of droughts continue to be high. In 2012 and 2013, practically all rainfed agriculture was destroyed, and a large part of the cattle stock died, was transfered to other places or sold for a lower price. Water resources are majorly impacted as many rural communities and even cities lose their water sources.

Brazil has a long experience of drought policies traditionally aimed at providing emergency relief, but also the so-called permanent policies that have contributed to reduce, but not eliminate, social and economic vulnerability. In particular, a large water infrastructure was created through the construction of thousands of big, medium and small dams, together with transport and urban infrastructure. More recently, social protection policies have been effective in providing income for the poor population.

Drought monitoring and early warning systems

There is a long tradition in regard to the production and collection of data on rainfall in Brazil. There is a network of meteorological stations which provide reliable information on precipitation. More recently, institutions like the INMET – Brazilian Institute of Meteorology, ANA – Brazilian National Water Agency, CPTEC/INPE – Center for

Weather Prediction and Climatic Studies at the National Institute of Space Research, CENAD – National Center for Managing Disaster Risk, CEMADEN – National Center for Monitoring and Early Warning of Natural Disasters, and Funceme – Foundation of Meteorology of the State of Ceará are involved in initiatives to enhance and improve drought monitoring and early warning systems.

For the last 20 years, there has been progress in regard to understanding the regional climate and to applying the new knowledge to predict climate and probability of a drought in the next season, with an anticipation of three Months. In fact, for the last 15 years Funceme, INMET and INPE/CPTEC have been organizing every year fora for climate prediction in the Northeast. This is one region where there are good conditions for climate prediction, in seasonal terms, for the rainy season between January and May, in view of the Intertropical Convergence Zone – ITCZ, and its relationship with the sea surface temperatures (SST) of the tropical Atlantic e and the action of the El Niño Souther Oscilation – ENSO.

States like Ceará have pionneered in using climate information to inform agricultural and water policies.

There is a need to strengthen coordination among the various institutions involved, at federal and state levels, and also to strengthen the network of data collection on climate and weather variables, vegetation índices, water resources.

Vulnerability assessment

The Northeast of Brazil is a region that is highly vulnerable to droughts. Being a climatic marginal region, it is highly impacted by any reduction in rainfall. And reductions in rainfall are frequent, with an estimated 5 years of precipitation below normal in each 10 years. Agricultural activities developed by small family farmers in the semi-arid area are the most vulnerable. In droughts like the recent ones, in 2012 and 2013, most small farmers lost between 90 and 95% of their production of beans, maize, and manioc, which are the main subsistance staples. As a consequence, there is a fall in agricultural output from subsistance farmers. Social vulnerability is also high, as these farmers and rural workers who depend on their agricultural activities lose their source of income during severe drought periods. These are also the most poor, and hence the most vulnerable to drought crises. Besides economic and social vulnerability, there i salso high environmental vulnerability. Droughts, together with unsustainable land use, affect land, water and biodiversity resources and lead to land degradation and desertification in several sub-areas in the Semi-arid Northeast.

Emergency relief and drought response

There is a long tradition in Brazil in regard to emergency relief and drought response. There is a system of National Defense under the Ministry of Integration and in coordination with the states. This system is prepared to coordinate response in case of droughts. The initiative to declare an emergency situation starts in the local level – the municipality – and at the state level, and is finally confirmed at the national level. This allows for emergency action to be taken. Throughout more than a hundred years, emergency actions have been linked to (1) provide water supply to affected populations, (2) create ways to provide and income for the rural poor, and (3) create alternatives for animal feeding. In the recent 2012-2013 drought, the federal and state governments have distributed water to rural dispersed populations, using more than 8,000 water trucks. This year – 2013, also some cities have depended on emergencial solutions for the lack of water due to the drought. In regard to income creation, the traditional way was to create work fronts, including the construction and cleaning of roads and comunal infrastructute, and employ the affected population in such work fronts. Since 2010, however, the work fronts have been substituted by social protection programs that provide a cash transfer to each poor Family, the so called "bolsa família" program. Together with the system of rural retirement which benefits rural workers and small farmers, these have eliminated the need for work fronts. In regard to animal feeding, the government has also organized a system to transport maize from the large producing region of Brazil, the Center West, to the Northeast, and sell it at subsidezed prices to the farmers. This has reduced animal mortality in the Northeast.

Practices to alleviate drought impacts

After the big drought of 1877, it became clear that it was necessary to start accumulating water in reservoirs in the Semi-arid. The first dam, or "açude", which is the name in Portuguese, was built in Ceará, the Cedro dam. In 1909, the government created an institution devoted to reduce drought impacts, the National Department Agains Droughts (DNOCS), at it was later renamed. DNOCS build a large number of dams in all the states. This, together with transport infrastructure and improvement in accessibility, has reduced vulnerability in regard to water supply and has allowed the increase in population densities in the Semi-arid. After 1960, other institutions like SUDENE, BNB and the increasing participation of the state governments have contributed to reduce vulnerability through (a) reducing dependency on rainfed agriculture, (b) enhancing infrastructure and accessibility, (c) increasing employment opportunities, (d) exploring new agricultural developments such as promoting irrigation and agroindustries, and (e) promoting regional development which increases opportunities.

The need for knowledge and skills on drought management

If, on the one hand, Brazil has made much progress in regard to emergency and long term responses to droughts, on the other hand there is still need for much action in regard to strengthening of the institutional framework, improvement of coordination among the federal institutions and between federal and state institutions, involvement of the local municipal governments and community organizations. Brazil does not have a consolidated drought policy, though there are many components of such a policy that are in place and need improvement. There is a crucial need to improve and consolidate a system of monitoring and early warning. Though there is a number of researchers involved in vulnerability and impact studies, this is an área where there is a need for better coordination and strengthening. Based on existing experience and on interchange of knowledge and information with national and international institutions and experts, there is presently an opportunity for Brazil to consolidate its drought policy and to improve drought management.

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