

Paraíba, Brazil Agricultural Sector Risk Assessment

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The present study is part of an effort by the World Bank and the State of Paraíba to assess agricultural sector risks as a contribution to the strategic economic development and poverty reduction agenda of the State Government. It is composed of two phases: 1) Agricultural Sector Risk Identification and Prioritization and 2) Risk Management Strategy and Action Plan. The study was conducted in close collaboration with the Cooperar Agency (which is currently preparing a World Bank–financed project) and the Secretary of Agriculture of Paraíba.

When compared to the total national agriculture gross domestic product (GDP), Paraíba's agricultural sector accounts for only 0.7 percent of total production. In relation to the Northeast, Paraíba accounts for 11 percent of total agriculture GDP. Nonetheless, agriculture remains an important source of employment for the majority of the rural population, and the rural population remains vulnerable to agricultural shocks, in that a shock will have greater proportional impacts on the welfare of a poor household than on a wealthier one.

The risks in Paraíba's agricultural sector are highly concentrated in a few crops that account for more than 80 percent of the total agricultural gross output value of the state and 84 percent of total estimated annual losses due to realized production risks. These crops include: sugar cane, pineapple, banana, coconut, cassava, maize, and beans. Livestock production is also a key livelihood activity for the rural population

since it is well suited to the semiarid conditions prevailing in rural Paraíba. Thus, based on the productive structure (reflecting the relative importance of both crops and production patterns) the priority value chains and sub-sectors chosen for the risk management analysis, were: sugar cane, commercial fruit production, family agriculture, and livestock production.

The risk assessment confirmed that there are no high-impact risks with a high probability of occurrence in Paraíba (a one-in-three-year occurrence is considered highly probable, and a one-in-five-year occurrence is considered probable). However, there are several probable and highly probable risks that cause moderate and high impacts when realized. It was observed that the important issues identified around these main risks require comprehensive measures to complement the existing federal policies and programs that in some way contribute to managing agricultural risks (*Garantia Safra*, price



Photo credit: World Bank

guarantees, livestock sanitary services, food safety, etc.) and to improve their implementation in Paraíba.

MAJOR RISKS

For the sugar cane value chain, the most important risks are: drought, irregular precipitation, possibility of contamination with the *ferrugem laranja* disease, and uncertainty about gasoline prices. The sugar cane industry is the most important agribusiness sector and main economic activity of Paraíba. As a result, any adverse impact on this supply chain also has important financial consequences to the State. For the fruticulture value chain, the four main risks are: irregular rainfall, pests and diseases, pesticide use without needed technical knowledge, and inter-annual price variations. For the livestock sector (mainly cattle, sheep, and goat), the three main risks are: drought, exotic diseases that affect the world beef trade, and zoonotic diseases.

Severe drought, irregular rainfall, and pests and diseases are the main risks affecting family farmers in Paraíba. When the risks are prioritized taking into account the relative importance of

family agriculture in the total number of farmers (there are 148,047 family farmers in Paraíba out of a total of 167,272 farmers), then those risks are the main risks in Paraíba. Accordingly, the solutions scenario presents strong actions directed towards improving risk mitigation among family farmers, such as adoption of innovative technology, improved agricultural practices and effective marketing mechanisms. The solutions scenario also contains suggestions for better agroclimatic information management, together with recommendations regarding other agricultural sub-sectors in Paraíba.

ADVERSE IMPACTS

The impacts of the aforementioned risks have greater consequences for human welfare among the individuals, communities, and regions of Paraíba that are the most vulnerable. The poorest areas of the state, as measured by earned income per capita, are not necessarily the areas that will be hardest hit by drought. State transfers for old age pensions and *Bolsa Família* serve to diversify the poor's portfolio and buffer the direct effects of drought.

Approximately R\$ 28 million (equivalent to US\$ 16 million), or 2.3 percent of the agricultural GDP, was estimated as the value of the average production loss annually in the agricultural sector as a result of unmanaged production risks. Drought was the main cause of these shocks, sometimes in combination with other events. The calculation involves all crops, but the losses are concentrated in the those whose gross output value accounts for over 80 percent of the total agricultural gross output value: sugar cane, beans, banana, pineapple, maize, papaya fruit, and cassava. Sugar cane and fruits, especially pineapple, are the greatest determinants of the agricultural losses, due to their large share in Paraíba's total agricultural production value. Paraíba is one of the largest pineapple-producing states in Brazil, currently ranked as the second-largest producer in the country.

Average figures tend to conceal the actual catastrophic impact that some shocks have at the time they occur. For instance, during the 2010 drought, losses amounted to R\$65 million (against the R\$28 million annual average), or 5.4 percent of the state's agricultural GDP. There were much higher losses in previous years: R\$108 million in 1998, R\$104 million in 1993, and R\$82 million in 1996. Not surprisingly, the first two years coincide with two very severe statewide droughts (1998 and 1992–93).

Losses in terms of the normal production value in 2010 were extreme for important smallholder crops like beans and maize, accounting for R\$ 16 million and R\$ 7 million losses, respectively. In the same year, the losses of sugar cane and banana reached R\$ 18 million and R\$ 13 million, respectively. In total these four crops accounted for 83 percent of total losses in 2010.

RISK MANAGEMENT SOLUTIONS

The first phase of the assessment identified the following four risk management intervention areas to address priority risks:

1. Strengthen State rural extension and technical assistance system, including both production and marketing aspects
2. Review and reinforce State animal and plant health sanitary system
3. Improve coordination within fruit supply chains
4. Develop an integrated agroclimatic information system.

After analyzing a number of programs and projects that are already addressing some of the identified risks along the above solution areas, the team examined the existing gaps and potential complementary actions. As a result, the following are the strategic lines identified during the second phase of the agricultural risk management assessment (ARM):

Agroclimatic risk information system (ACIS):

- Develop an Integrated Agroclimatic Database System in the state of Paraíba, including federal institutions and the Executive Agency of Water Management of Paraíba
- Strengthen of the Drought Management Committee, making actions more proactive and less reactive
- Train the extension workers associated with inspection procedures in the *Garantia Safra* project, in order to reduce moral hazard and technical issues.

Sanitary and phytosanitary system:

Sugarcane

- Expand the area of sugarcane under biological control
- Assess the impact of the possible introduction of the *ferrugem laranja* in Paraíba
- Set up a surveillance network for *ferrugem laranja* in Paraíba.

Fruticulture

- Assess the likelihood and impact of the possible introduction of the diseases *sigatoka negra* and *moko* (bananas), *cancro da videira* and *Huanglongbing* (citrus).

Family agriculture in the semi-arid zone

- Substitute the varieties of *palma forrageira* susceptible to the *cochonilha do carmim* for resistant ones.

Livestock production

- Reinforce the program for controlling and eradication of brucellosis and tuberculosis
- Coordinate the animal health and food safety programs
- Establish the actual status of classical swine fever and Newcastle disease virus in Paraíba
- Create the State Agency for Agricultural Health.

Supply chain coordination:

- Identify successful farm-to-market experiences in Paraíba and assess the viability of replication under a massive technical assistance program
- Develop market-oriented business development methodologies for training and providing technical assistance to associated small-scale farmers
- Assess different options to support market development for family agricultural products, including revision of the legal framework to channel public resources.

Agricultural innovation system (AIS):

- Improve the coordination of the Agricultural Innovation System for family agricultural risk management
 - » Strengthen the research sub-system
- Improve the efficiency of the Agricultural Innovation System for family agricultural risk management
 - » Strengthen the Technical Assistance and Rural Extension (ATER) network
 - » Enlarge successful programs and projects.

The proposed action plan reflects the strategic lines and includes basic details on who, when, and how much is required for implementation. The estimated cost of the ARM Action Plan totals US\$18,881,000 over five years, with a strong concentration of activities in the first two years.

Out of this total, US\$6,081,000 corresponds to studies, training, and pre-investment and US\$12,800,000 corresponds to program investments. The Paraíba state ATER staff cost is not part of the ARM Action Plan, but it is included as a complementary public policy, as suggested by State policy makers. Table 1 summarizes the cost break down by intervention category.

TABLE 1: Estimated Cost of the Proposed Risk Management Action Plan (\$US)

Intervention category	Field program implementation	Payments to ATER staff	Studies, training, and pre-investment	Total cost
Agro-climatic risk information system	0	0	3,211,000	3,211,000
Sanitary and phytosanitary system	5,000,000	0	1,120,000	6,120,000
Supply chain coordination	0	0	205,000	205,000
Agricultural innovation system	7,800,000	0	1,545,000	9,345,000
Total Action Plan	\$12,800,000	\$0	\$6,081,000	\$18,881,000

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