



# Bahia, 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 Bahia 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 Regional Development and Action Company of Bahia (CAR) and the Secretariat of Agriculture of Bahia (SEAGRI). In the immediate term the study provides practical elements for the implementation of the Bahia Sustainable Rural Development Project — named Bahia Produtiva, which is currently implemented by CAR and is financed by a World Bank loan (8415-BR).

## MAJOR RISKS

Bahia is the largest economy in Brazil's Northeast region and the eighth largest economy in the country. The agricultural and livestock sectors represent 7.4 percent of the State's economy and present an opportunity for both decreasing poverty and increasing economic growth and development. Risks in Bahia's agricultural sector are highly concentrated in soybean, maize, cotton, cacao, fruits, vegetables and beans, as well as livestock production. The aggregated gross output value of these crops, which are important both for household food security and for the sustainability of commercial farming, accounts for 84 percent of total gross output value of state agriculture and 82 percent of the total estimated annual losses. The following productive systems aggregate the above crops

and are targeted under the Risk Management Strategy: agro-industrial commercial agriculture in the Western region of the State (Cerrado), commercial fruit subsector, commercial horticulture subsector, family agriculture, and livestock production chains.

There are a number of relatively frequent (one-in-three, one-in-five, and one-in-10 year occurrence probability) risks that have moderate expected impact. These risks are climate (drought), pest and diseases, and price volatility. The realization of those risks has no high or critical impact because of the many government interventions that are in place to produce innovations, cope with drought and support crop prices, although their management can be greatly improved. But there are a few risks with occasional-occurrence likelihood (one in



10 years) that could cause high/catastrophic damage, as already occurred in the past (fruit and cacao diseases, severe drought, and exotic livestock diseases), and therefore require strong mitigation and coping preparation efforts.

For the agro-industrial supply chains in the West of Bahia the most important risks are extreme dry climatic conditions and resistant pests and weeds due to intensive use of chemical products. The commercial fruit subsector's greatest risks are exotic diseases and the severe droughts. The horticulture supply chain in turn faces high price volatility and is exposed to some aggressive pests and diseases. For family agriculture the main risks are severe drought, irregular precipitation, and price volatility of some crops like cassava. The livestock value chain is always subject to outbreak of exotic diseases in addition to other diseases, and is highly exposed to severe droughts.

## ADVERSE IMPACTS

As a result of unmanaged production risks, the estimated value of the annual production loss of Bahia's agricultural sector over the last 20 years was approximately R\$186 million (US\$105 million at 2010 exchange rate), on average, or 1.9 percent of the State's agricultural GDP.

Average figures tend to conceal the actual

catastrophic impact that some shocks have at the time that they occur. For instance, during the 2002 and 2003 droughts, the worst in the 1990–2010 time period for Bahia's agricultural sector, losses amounted to R\$398 million and R\$390 million respectively, more than double the annual average. More recently, in 2006 and 2009, the estimated production losses amounted to R\$238 million and R\$263 million, respectively.

Further, the losses with respect to average agricultural production values tend to concentrate in specific crops and specific actors along the supply chain. The risk exposure is to a great extent a function of the supply chain governance and the stakeholders' capability and opportunities for risk management. In the period 1999–2003 the losses were highly concentrated in cacao: 48, 62, 46, 44, and 20 percent of the total losses, respectively. During the very bad years of 2002, 2003, 2006, and 2009, losses were particularly significant in soybean: 29, 36, 35 and 29 percent of total losses, respectively. Whereas other years drought conditions affected fruit and vegetable production more seriously, like in the period 1996–2000, where losses of papaya fruit alone accounted for 18–22 percent of total production losses in Bahia. As regards the subsistence crops of family agriculture, particularly beans, the years of 1995–1996, 2001–2004 and 2010 were particularly bad. In 2004 losses in beans were estimated to be R\$66 million or 38 percent of total agricultural production losses in the state. On occasion, the realized risks derive from longer-term processes of production downturns (cacao) or recurrent production drops (cassava) or periods of production depression.

Although livestock production is greatly exposed to sanitary risks, Bahia has not suffered catastrophic animal health events in recent years. The outbreak of an exotic disease (e.g., foot and mouth disease [FMD] or bovine spongiform encephalopathy) would trigger the elimination of animals, quarantine and disinfection, the loss

of external markets, etc. This occurred during the 2005 FMD outbreak in Mato Grosso do Sul and Paraná. The outbreak had great impact on exports and prices of beef, poultry, and pork, which only recovered after Russia (the main importing country) lifted import bans 28 months later.

## RISK PRIORITIZATION

Looking at risks from the combined perspective of their impact potential (moderate to critical) and management possibility (none to very high), severe drought and moniliase disease in cacao appear as the risks with the most critical potential impact and minimum risk management. Therefore, they require medium- to long-term investment and strong preparation to cope. Other diseases such as sigatoka negra (banana) and cochonilha rosada (grapes and mangoes) also have minimum risk management capacity but have a lower damage potential. Weeds resistant to herbicides (for crops like cotton, maize, soybean) present a potential high impact in the West of Bahia, and require an integrated pest management approach.

Considering output value as a measure of aggregated impact of risks in Bahia as a whole, the greatest challenges are drought, and aggressive pests, diseases, and weeds resistant to herbicides in Western Bahia (taking into account the proportionally large economic size of that region). If focusing on family agriculture, which has a small contribution to State agricultural output value but is significant in social terms, irregular rainfall and drought appear as the only major risk. In effect, most family farmers live in the Sertão (semi-arid) region where a destructive recurrent drought scenario dominates. Family farmers do not consider phytosanitary risks important in comparison to the great weather-related risks. Market risks are also minor because of family farmers' relatively low participation in commercialization of agriculture products and because of federal procurement and price support programs.

## RISK MANAGEMENT SOLUTIONS

Based on the above analysis and other considerations, the first phase of the assessment identified the following 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; and
3. 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 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 Information System

- Develop an Integrated Weather System Database for the State of Bahia;
- Strengthen the State Drought Committee in order to make actions more proactive and less reactive;
- Train extension workers that participate in the claim adjustment in the Garantia Safra in order to reduce moral hazard and technical issues.

### Sanitary and Phytosanitary System

- Implement a wide-area integrated pest management plan for the Cerrado of Western Bahia.
- Take action to delay or avoid the introduction of exotic pests.
- Enhance and expand *Rede de Multiplicação e Transferência de Manivas-semente de Mandioca com qualidade Genética e Fitossanitária*, a network of multiplication and transfer of propagating materials of cassava with genetic and phytosanitary quality program.

- Evaluate and improve animal health programs.

## Supply Chain Coordination

- Identify, support, and expand actual farm to market experiences and business opportunities for family farmers in Bahia.
- Build capacity in business development among associated small-scale farmers.

## Agricultural Innovation System

- Improve the coordination of the Agriculture Innovation System for agriculture risk management of family farmers.
- Improve efficiency of the Agricultural Innovation System for family agriculture risk management:
  - » Strengthen the research sub-system.
  - » Strengthen the Technical Assistance and Rural Extension (*Assistência Técnica e Extensão Rural*) sub-system for family farmers.
- Improve efficiency of the Agricultural Innovation System for family agricultural risk management.
- Scale-up successful programs and projects for family farmers.

The proposed action plan reflects the strategic lines and includes some basic details on who, when, and how much is required for the implementation of the actions proposed. The

cost of the entire ARM action plan has been estimated at a total of US\$129,522,000 over five years, with a strong concentration of activities within the first two years. Out of this total, US\$5,622,000 would correspond to studies, training and pre-investment, US\$38,900,000 to program investments, and US\$85,000,000 to cover staff costs associated with the Agriculture Development Company of Bahia (EBDA) reform. Table 1 shows the summary break down.

Finally, the following are some short-term actions that can be undertaken by CAR/Bahia Produtiva:

- Expand the citrus seedling production program, financing individual cages environments.
- Strengthening family farmer farm-to-market relations through greater farmer organization to facilitate technical assistance, marketing services, and increased participation in institutional markets like the National Program for Acquisition of Food from Family Farmers and the National School Feeding Program, having Bahia Produtiva as a focal point to develop supply chain coordination and supply/demand planning.
- Conduct a survey on potential technical assistance providers in the State, as well as explore other non-public technical assistance modalities.
- Conduct a survey to gather information regarding rural households organized in Community Associations.

**TABLE 1: Estimated cost of the proposed Agriculture Risk Management Action Plan (\$US)**

<i>Intervention category</i>	<i>Field program implementation</i>	<i>Payments to EBDA staff</i>	<i>Studies, training, and pre-investment</i>	<i>Total cost</i>
<i>Weather information system</i>	0	0	3,581,000	3,581,000
<i>Sanitary and phytosanitary system</i>	0	0	746,000	746,000
<i>Supply chain coordination</i>	0	0	230,000	230,000
<i>Agricultural innovation system</i>	38,900,000	85,000,000	1,065,000	124,965,000
<b>Total Action Plan</b>	<b>\$38,900,000</b>	<b>\$85,000,000</b>	<b>\$5,622,000</b>	<b>\$29,522,000</b>

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