

Climate Variability in Semi-arid Brazil: Food Insecurity, Agricultural Production and Adjustment to Perceived Changes¹

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Climate change and variability are among the main threats to socio-ecological sustainability in many semi-arid regions. High levels of social vulnerability in the northeast of Brazil make this region one of the most susceptible to the impacts of climate change in the country. Within the region, the state of Ceará is one of the most vulnerable to the foreseen climatic impacts (PBMC, 2013). The year 2012 was marked by a long and severe drought that affected millions of people, primarily due to the significant decrease in agricultural production yields and the death of cattle.

Among the 184 municipalities of the state of Ceará, 174 were declared to be in state of emergency, with government interventions such as water supply trucks provided by the army, and other compensatory measures. Below we provide a brief analysis of the local vulnerability status during this period and policy implications related to our findings. Interviews were conducted with 233 family farmers in four municipalities of Ceará (Altaneira, Mauriti, Missão Velha and Salitre) in January 2013.

Food insecurity

According to the Brazilian Food Insecurity Scale (*Escala Brasileira de Insegurança Alimentar*—EBIA) (Segall-Correa et al., 2003), 103 households (44.21 per cent) reported food insecurity. Several socio-economic variables, such as education, are related to the productive capacity, food security and social vulnerability of households. Many of the interviewed family heads were illiterate (N=60), and only 30 per cent (N=70) had an education beyond the fourth grade.

Production

Almost 100 per cent of participants (N=229) reported agriculture as the main productive activity. The main staples cultivated were found to be beans (N=218), maize (N=197) and cassava (N=70), followed by other products on a smaller scale of production. The interviewees mostly depend on a small diversity of rain-fed cultivated items, which could be a major concern for the food and nutritional security of family farmers in this area. Only 25 per cent of households reported using some sort of fertiliser (organic = 37; inorganic = 13), while 82 per cent reported the use of industrial pesticides. Increased knowledge about traditional and alternative ways to tackle crop problems could drive changes towards more sustainable techniques that would be less damaging to farmers, local food security and ecosystem health. Institutional demand for organic products (e.g. *Programa de Aquisição de Alimentos* – PAA – Food Acquisition Programme), in conjunction with increased technical assistance to demonstrate sustainable production practices more adapted to the drought-prone environment, could lead to an increased use of sustainable techniques.

Climate change perception

Most of the participants (N=194) perceive the climate to be worse now than when they were 20 years old, while 11 stated that it had improved. Additionally, 219 (94 per cent) believe that temperatures have indeed changed (N=207, warmer), while

12 did not report any difference. The majority (N=208) consider that changes in temperatures have had a negative effect on household agricultural production.

Productive adjustments

One third (36 per cent) of the households (N=85) confirmed changing the planting schedule in previous years, while 138 (59 per cent) did not report any changes. Modifications in the timing of farm activities have been suggested as an important tool in the face of unpredictable weather (Smit and Skinner, 2002). Some 58 per cent (N=134) confirmed having experienced crop failure due to changes in climate, pests and other challenges. Only 12.6 per cent (N=17) reported adopting a new crop in the same period. Abandoning crops without replacing them with new varieties can lead to a decrease in food diversity, and a reduced level of food and nutritional security if households are mainly subsistence farmers.

Recommendation

The results indicate that farmers in this area can be characterised as being reliant on a limited diversity of crops, with limited use of fertiliser and few adjustments in production in response to climate variability. Despite the high perception of changes in climate, few farmers appear to be taking proactive measures to replace crops that were abandoned in the past due to environmental and economic reasons. Therefore, additional research is needed to better understand the rationale for the apparent inaction when presented with such changes, to more specifically adjust programmes and policies to the local context. The failure to adopt ex ante adaptation measures could be related to the lack of trust in climate forecasts and other traditional beliefs that are ingrained in the culture, lack of education, weak technical assistance and the historical reliance on emergency aid and programmes. We believe that programmes dealing with rural development and social protection (including those directed towards food security) must urgently tackle the foreseen challenges related to climate variability and change, and make use of geographical as well as social targeting.

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Notes:

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