

Trajectories of Adaptation: A Retrospectus for Future Dynamics

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Abstract

Humans modify their relationships with the environment through climate adaptations. Calls for sustainable adaptation recognize that changes in relationships need to be assessed beyond the present time and location, to include the way that adaptations influence future response options and affect other populations. We argue that an analysis of the dynamics of past changes critically informs this approach. Adaptation research often focuses on particular actions, technologies, or institutions that may positively influence these relationships in order to build resilience, reduce vulnerability, or both. But relationships are complex and often behave in unexpected ways. There is not a simple cause and effect, but rather actions are modified and transmitted through a web of linkages and feedbacks that are both physical and social. This complexity challenges our ability to predict the outcome of particular actions. Forecasting and scenario building are an important component of adaptive capacities, yet there remain gaps in the understanding of system interactions, that would permit a more accurate assessment of future development trajectories. The work presented here is an analysis of change in the climate vulnerability of dryland farmers in Northeast Brazil during a span of four decades. The analytical framework, which links biophysical characteristics with a socio-economic context and indicators, permits an analysis that captures the dynamic relationship of adaptive capacities and consequent changes in vulnerability. The analysis of trajectories grounds future assumptions about human behavior and the relationship with the environment. The research combines a broad analysis of secondary data with detailed ethnographic data in order to quantify and to explain trajectories of adaptation.

Keywords: Drought index; adaptive capacity; dryland farming; scenarios; rainfall variability; governance