Resilience of Smallholder Farms in the Brazilian Cerrado: An Interdisciplinary and Participatory Assessment Framework

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Abstract

In recent decades, the Cerrado biome in Brazil’s Center-West has become a center for industrial agriculture. Rapid expansion of soy, cotton, corn and sugar cane production threaten the Cerrado’s native grassland and forest ecosystems and lead to social displacement. At the same time, land reform social movements in this region, such as the MST (o Movimento dos Trabalhadores Sem Terra, or the Rural Landless Workers’ Movement), have been developing alternative food networks based on agroecology and food sovereignty frameworks since the mid-1990s. These alternative agriculture initiatives seek to achieve diverse goals in addition to crop production, such as increasing household income, improving human nutrition, increasing soil fertility, conserving biodiversity, and reducing social inequality by increasing smallholders’ access to political power, markets, credit, appropriately-scaled technology and educational and other knowledge resources. Evaluating socioecological outcomes and resilience of these initiatives thus requires robust, multidisciplinary tools that incorporate diverse variables within a single assessment. In addition, adoption of agroecological practices on farms in MST-organized land reform settlements is complex and variable, as families navigate trade-offs and synergies inherent in decisions around the multiple objectives of these production systems and the realities of the dominant industrial agriculture infrastructure. Understanding variability in agricultural management, and mechanisms for change, involves accounting for ecology, collective action, infrastructure, public policies and distributions of power. This interdisciplinary, community-based research measures socioecological outcomes of varying management systems in four land reform settlements in the state of Mato Grosso. We combine perspectives across disciplines, epistemologies, and levels of organization to assess farming system resilience. This work exemplifies an ‘engaged’ agroecology that seeks to understand the sociopolitical relations of food systems through analysis of data from a farmer survey, soil samples, qualitative interviews with farmers and members of institutions at multiple spatial scales, and secondary data analysis. This paper presents an interdisciplinary indicator framework developed using preliminary data from this empirical case of collective action in Brazilian alternative food networks. Research that spans disciplines and scales, and that is engaged with communities, can foster development of policies that support food system resilience.

Keywords: resilience assessment, socioecological systems, agriculture, land management, livelihood, equity, Brazil, indicator framework, participatory research

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