Zentrum für Entwicklungsforschung
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Crop Science Bonn

Assessing multifunctional agroforestry systems applying the resilience/vulnerability and adaptability (RVA) approach

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Background

Recently, the sustainability paradigm has changed from *stability* to *disruption and change*.

Operationalization attempts pass by understanding the systems' patterns of change, to readdress them towards sustainable pathways.

The Resilience / Vulnerability and Adaptability (RVA) approach

The RVA approach, aims at doing so. By assessing social-ecological systems (SES) by stressing on "(...) *the dynamic interaction of its resilience and vulnerability, and overall adaptability, after/during the occurrence of a disturbing event/process in terms of its composition, structure and function.*" (Callo-Concha & Ewert 2011) (Figure 1).

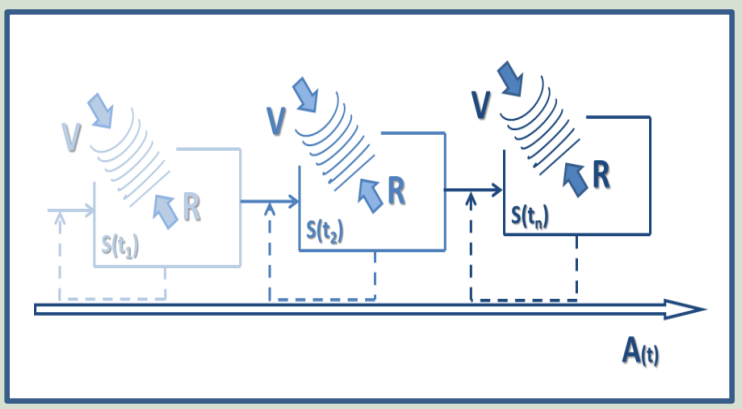

Figure 1. Ontology of the RVA approach. System's Resilience (R) and Vulnerability (V) interact and determine its adaptability (A) along time (t) and via successive feedbacks

Materials and methods

Under this approach, we have assessed the multifunctional performance of agroforestry systems in Tomé-Acú municipality, Pará, Brazil.

Firstly, the 'adaptive cycle' metaphor served to track loops of decision and change; later, participatory multicriteria and systems (Vester®) analyses were applied to identify the most sensitive ecological, productive and administrative variables; and determine its roles (critical, buffering, active and reactive) with respect to the resilience/vulnerability and adaptability of the system.

Results

Farmers' adaptive decision cycles (panarchy) were identified. These comprise structural, organizational and technical aspects; operate from small (farm) to large (global) scales; and tend to compromise larger stability periods with smaller-scale decisions (micro-management) (Figure 2).

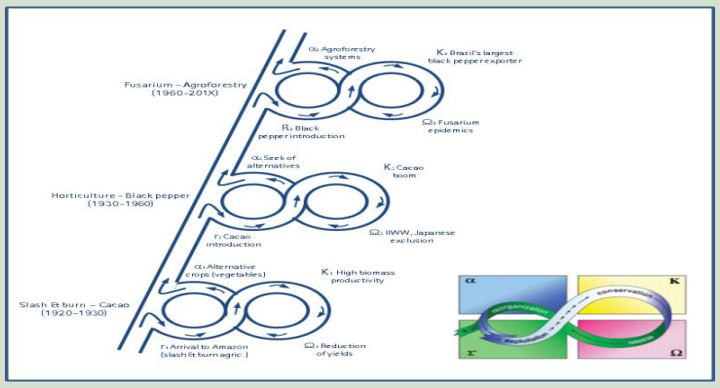

Figure 2. Main adaptive cycles of farmers of Tomé-Acú, Pará, Brazil along the last century

From the 31 identified variables, most -ecological and productive-, encourage resilience (lower left); none increase vulnerability (upper right). Few, administrative, are influential (upper left); and there are no influentiable ones (bottom right) (Figure 3).

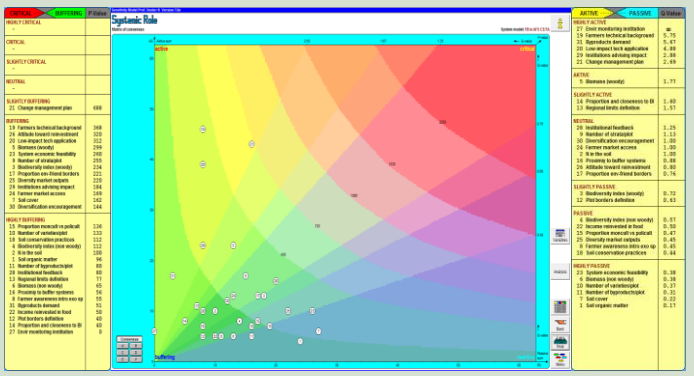

Figure 3. Systemic performance of relevant variables. Distributed in four critical regions: buffer, critical active and reactive, characterize the roles of each variable and the system as a whole

Conclusions

Results suggest a system highly resilient, little vulnerable, but not very maneuverable
(Adaptive) management focuses on retaining ecological and productive functions via minimum administrative actions. These are diverse, small-scale applied, but coordinated at medium-scale (farmers' organization level).

Contact

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