Assessing vulnerability of agri-food systems to climate and policy changes: proposal of an integrated framework

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Abstract

Agri-food systems, defined as a set of activities ranging from production through to consumption, can be conceptualized as integration and processes of interaction between humans and the agro-environment, i.e. social-ecological system (hereafter SES) (Erickson, 2008). Agri-food systems are especially vulnerable to environmental and socioeconomic changes that lead to system’s modifications (desirable or not). Conceptualizing agri-food systems as SES and assessing their future vulnerability to global change requires a new integrated approach. According to the focus used for the assessment of agri-food systems, scholars distinguish between official and alternative frames of research. The official frame tends to analyse agri-food systems mainly from natural sciences, separating the social and ecological components to study the system, and focusing in developing blueprint approaches to assessment and design policies mainly oriented to economic growth and sectorial interventions.

The alternative frame of research tends to combine natural, social and political sciences to study agri-food systems as a SES, analyzing power structures and diverse strategies for supporting the design of polices linked to alternative development pathways from a human rights perspective. Policies for food security are specially linked to official frames, while for alternative frames food sovereignty is the main concern. Here we propose an integrated framework (Figure 1) applied to a case-study research in Andean Ecuadorian region for assessing the vulnerability of agri-food systems to policy changes, using the alternative frame.

To achieve our objective we integrate the general conceptual and methodological SES framework proposed by Ostrom (2007; last revision in 2013) with the framework of vulnerability proposed by Adger (2006) and operationalized by Fraser (2007). Conceptually, the SES framework provides a common conceptual language and a logical linguistic structure for classifying those factors deemed to be important influences on the types of SES from a system oriented approach. The vulnerability framework takes into account context-specific characteristics of sensitivity and capacity to adapt (at individual and collective level) generated and influenced by multiple factors and process and includes the perception of actors about vulnerability for whom, at which scale and to what. Methodologically, the SES framework allows us identifying the boundary and components of SES, moving across spatial levels (e.g. between governance arrangements) to analyse how their interaction may produce certain outcomes, such as impacts on food production and self-sufficiency, affected by internal feedbacks and external forces/stresses. The integration between the system-oriented and the actor-oriented frameworks allows us analyzing the relationships between vulnerability, resilience and adaptive capacity as properties of the SES, moving towards the food sovereignty focus. The establishment of this link is essential in the sustainable research of agri-food systems to global change.

Keywords: Agri-food system, social-ecological system, vulnerability, food sovereignty, sustainability, Ecuadorian Andes.

* SES Resilience is here considered as flipside of vulnerability (Fraser, 2007). It can be related to adaptive capacity in the interaction phase. Thus, vulnerability decreasing can lead to resilience increasing in outcomes phase of the system.

Figure 1. Integrated framework to evaluate the vulnerability to global change of the agri-food system, conceptualized as SES (the SES graphic is adapted from McGinnis, 2013).

References


