How to quantify changes in vulnerability and resilience of agroecosystems resulting from sustainable intensification?

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Abstract

Agriculture represents the predominant form of human-environment interaction by employing more people and consuming more natural resources than any other human activity. Agricultural intensification, particularly in the last 50 years, has been responsible for net gains in human well-being and economic development but at the cost of degradation of natural resources and human health. Sustainable intensification has been put forward as a key strategy for agricultural development and it is based on the notion that the resilience of agricultural production is a function of the effective conservation and use of natural resources. This session will consider transition states (environmental, agricultural, and human well-being) along agricultural intensification gradients in the tropics. Traditionally this gradient has implied a transfer of resilience functions from natural capital, to institutional capital often resulting in natural resource degradation and reduced long-term system resilience. We will explore how a greater focus on ecological processes accompanying technological innovations, as proposed by the sustainable intensification paradigm, can support a transformative agriculture that does not compromise natural capital and its contribution to system resilience and sustainability. We will identify and value different approaches to quantify changes in vulnerability and resilience, both social and ecological, in tropical agricultural systems. We will produce a position paper based on the discussion of the session and covering knowledge gaps for better quantification of resilience as a measure of change underpinning agricultural sustainability.

Keywords: agriculture, ecological processes, natural capital, resilience, sustainable intensification, vulnerability

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