

Sustainable livelihood approach from the lens of the state-and-transition model: an integrated model for social-ecological research and management

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Dealing with complex challenges worldwide regarding sustainable rural development requires applied frameworks to understand and manage change in complex social-ecological systems. The sustainable livelihood approach is a framework for thinking and communicating about factors that impact on the livelihoods of rural families from a multidimensional perspective, including wellbeing, health, income, social networks and the local environment. It is designed to assist in identifying changes or transformations that can be performed to institutions, assets or strategies of rural families in order to promote adaptive capacities and resilience to local communities. However, operative tools in order to implement these concepts in a systematic way are still challenging. In this regard, we argue that the State-and-Transition Model provides a useful perspective, and a conceptual basis for theory and disciplinary integration that could provide a dynamic perspective not only for rangeland management but also to manage changes and transformations on rural livelihoods. The aim of this paper is to provide a conceptual model for social-ecological research and sustainable management in agro-ecosystems. We suggest adapting the state-and-transition model by including structural and functional features of social-ecological systems, by taking into consideration the livelihood approach. The proposed conceptual model explicitly recognizes that structure and functions are strongly interlinked and must be assessed integrally. Both attributes are analyzed in five types of capital that typically comprise social-ecological systems: natural, human, manufactured, social and financial (Fig. 1).

Social-Ecological System – Household level

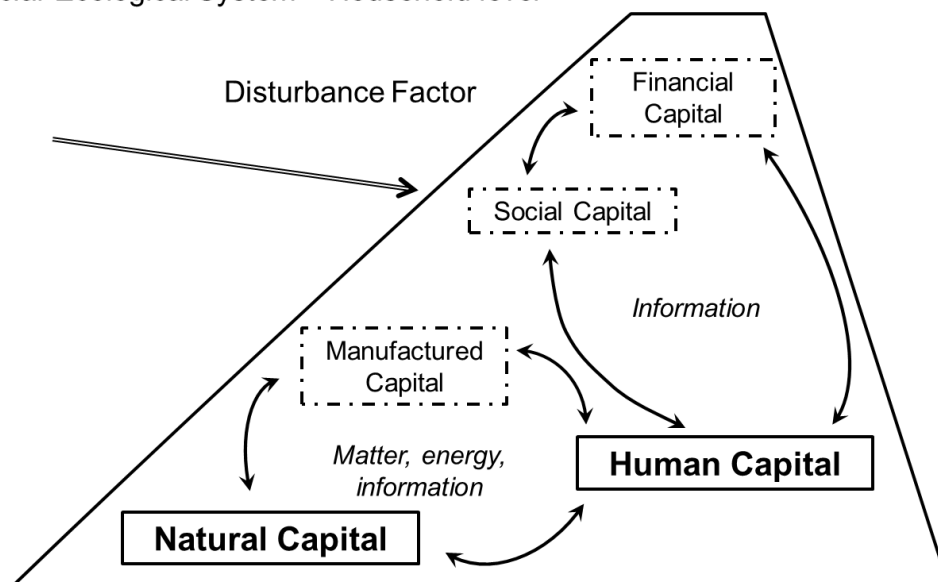


Figure 1. Schematic representation of a farming system at a household level. A pyramidal-hierarchy and direct relationships among natural, human, manufacture, social and financial capitals that constitute a social-ecological system. Arrows indicates main processes and/or flows regarding matter, energy and/or information.

We propose to perform the analysis at a household level, by identifying structural and functional features for each capital as separate sub-systems, to better evaluate the impact and interaction with different disturbance factors, and the interrelations among them at a system level. The framework provides an integral perspective to explore system properties such as resilience and resistance, in relation to different kind of disturbance factors and key thresholds, which are used as references to support differentiated management and to orient interventions in rural contexts (Fig. 2). The proposed conceptual model is encouraging as a step towards two main challenges: i) the provision of applied frameworks for social-ecological management, and ii) an attempt to bring closer science and decision making.

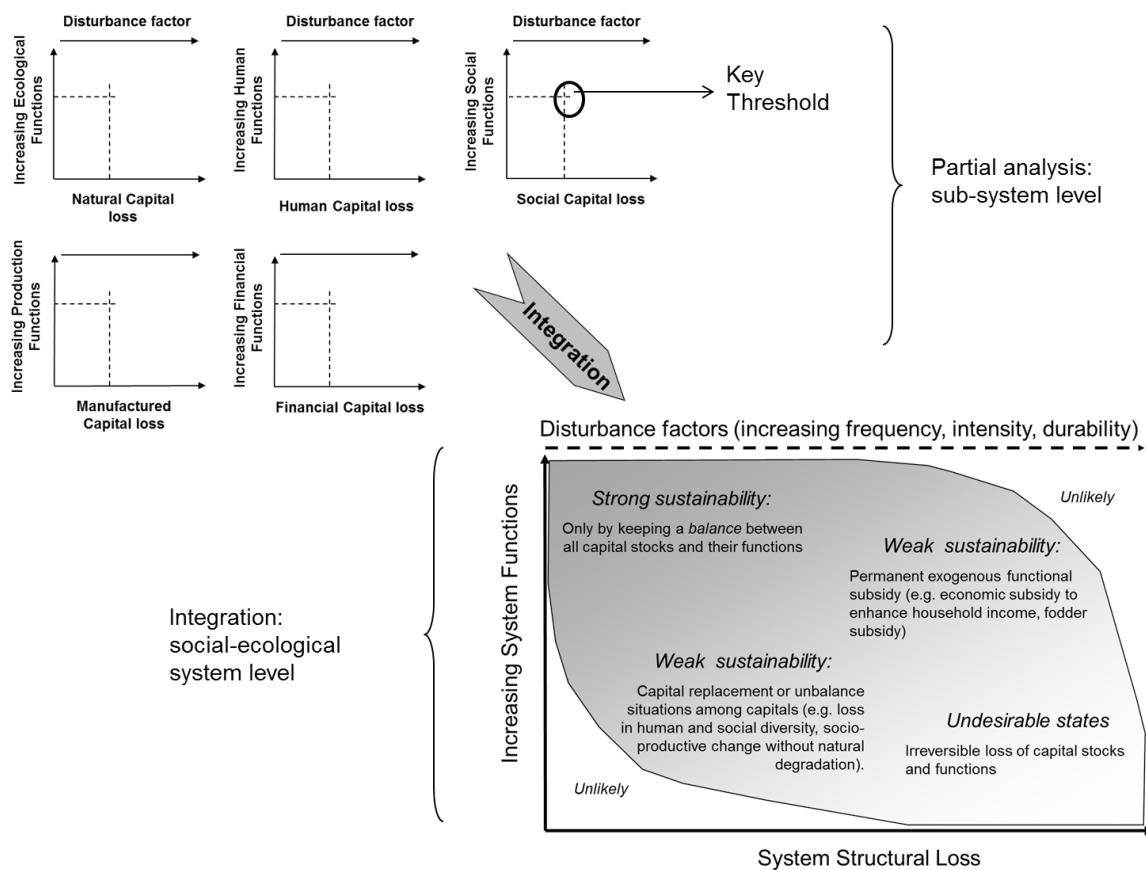


Figure 2. Conceptual framework of the Structural-Functional State and Transition Model for social-ecological analysis in agro-ecosystems. Two levels of analysis are represented: i) sub-systems level to assess structural-functional attributes in natural, human, social, manufactured and financial capitals when facing disturbances, and ii) integration of information at a social-ecological system level to assess sustainability pathways. The x axis represents social-ecological system structural loss (capital stock) and the y axis represents social-ecological system functions (processes and services). Different structural-functional configurations are associated with strong and weak sustainability, and undesirable states.