



An indicator framework for assessing livelihood resilience in the context of social–ecological dynamics



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ARTICLE INFO

Article history:

Received 31 March 2013

Received in revised form 13 June 2014

Accepted 16 June 2014

Available online

Keywords:

Livelihood resilience

Buffer capacity

Self-organisation

Learning

Adaptation

Vulnerability

ABSTRACT

Livelihood resilience draws attention to the factors and processes that keep livelihoods functioning despite change and thus enriches the livelihood approach which puts people, their differential capabilities to cope with shocks and how to reduce poverty and improve adaptive capacity at the centre of analysis. However, the few studies addressing resilience from a livelihood perspective take different approaches and focus only on some dimensions of livelihoods. This paper presents a framework that can be used for a comprehensive empirical analysis of livelihood resilience. We use a concept of resilience that considers agency as well as structure. A review of both theoretical and empirical literature related to livelihoods and resilience served as the basis to integrate the perspectives. The paper identifies the attributes and indicators of the three dimensions of resilience, namely, buffer capacity, self-organisation and capacity for learning. The framework has not yet been systematically tested; however, potentials and limitations of the components of the framework are explored and discussed by drawing on empirical examples from literature on farming systems. Besides providing a basis for applying the resilience concept in livelihood-oriented research, the framework offers a way to communicate with practitioners on identifying and improving the factors that build resilience. It can thus serve as a tool for monitoring the effectiveness of policies and practices aimed at building livelihood resilience.

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1. Introduction

Resilience is increasingly becoming a key concept in social science-oriented environmental research analysing human–nature interactions in social–ecological systems (SES) and exploring how to deal successfully with climatic, economic or social change. Although much has been written about ecosystem and social–ecological resilience (Holling, 1973; Carpenter et al., 2001; Folke et al., 2002; Berkes et al., 2003), the few studies addressing resilience from a livelihood perspective (e.g. Marschke and Berkes, 2006; Sallu et al., 2010; Obrist et al., 2010), do so from different perspectives. Capturing how much a livelihood practice maintains or increases an actor's capacity (agency) to affect societal structures and processes (structure) and maintain the actor's livelihood, especially during periods of crisis, needs to be made more operable by integrating these perspectives.

Resilience thinking is implicit in the Sustainable Livelihood (SL) approaches, for example, the SL approach of the United Kingdom Department for International Development (DFID), that focusses on how people's capabilities, assets and activities, as well as transforming structures and processes lead to positive outcomes like more income, increased wellbeing or improved food security (Obrist et al., 2010; op. cit. 286). Adger (2000) refers to livelihood stability as one aspect of social resilience, but operationalization and assessments of livelihood resilience are few (e.g. Marschke and Berkes, 2006). Obrist et al. (2010) also note that social resilience remains neglected especially from an actor or practice theory perspective. The authors define social resilience as “the capacity of actors to access [livelihood] capitals in order to – not only cope with and adjust to adverse conditions (i.e. reactive capacity) – but also search for and create options (i.e. proactive capacity), and thus develop increased competence (i.e. positive outcomes) in dealing with a threat” (Obrist et al., 2010, p. 289).

Linking livelihood approaches to resilience thinking can enhance understanding of livelihood dynamics, of how households maintain and enhance their livelihoods in the face of change, including stresses and shocks (Marschke and Berkes, 2006; Scoones, 2009; Sallu et al., 2010). Following Obrist et al. (2010),

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we specially consider that resilience means – at the same time – increasing the capabilities (agency) to respond to adverse external conditions and to develop collective action aimed at changing the part of external societal structures that constrain resilience-related agency. Another added value is that resilience can be used to characterise a livelihood system's ability to deal with change and recover from adverse consequences. Marschke and Berkes (2006) identified resilience-building strategies and used local perspectives of wellbeing as a surrogate of resilience. Sallu et al. (2010) used livelihood strategies and principal component analysis to determine households' resilience through time. Considering that a livelihood has various dimensions at the individual level in the form of capacities (livelihood assets and strategies) and at the structural level in the form of transforming structures and processes and the vulnerability context, these dimensions need to be considered when conceptually and empirically integrating livelihood and resilience. However, there is a lack of such a framework with which livelihoods can be assessed for resilience.

While a resilience assessment includes characterising and assessing the exposure to shocks and stresses (resilient of what to what?), the question of “what constitutes livelihood resilience” needs more conceptualisation (cf. Sallu et al., 2010; Bahadur et al., 2010). Answering the question, “How can livelihood resilience conceptually be defined and how can it be made more operable?” is thus the focus of this paper. In a first step we attempt to fill the research gap regarding the question of how to conceptually link resilience with the various livelihood dimensions. In a second step we develop an indicator framework and address how to make the framework operational by identifying attributes and indicators

that can be used to measure or assess resilience in livelihoods, and illustrating it with examples from empirical literature.

2. Resilience as a conceptual and analytical lens

Various fields use the concept of resilience, interpreting resilience in different ways and emphasising different dimensions (Table 1). Resilience is widely used in research on human–nature interactions particularly that which uses a social–ecological lens, encompassing the social, economic, cultural, political and environmental factors and their interactions, which together shape vulnerability, adaptive capacity, and development outcomes. The increasing multiplicity of global challenges of which climate change is one and the difficulties of finding lasting solutions to variable climatic challenges raise interest on adopting resilience as a concept in livelihoods research.

Resilience refers to the capacity of individuals, social groups or SES to accommodate stresses and disturbances, to self-organise, and to learn in order to maintain or improve essential basic structures and ways of functioning (cf. Berkes and Folke, 1998; Carpenter et al., 2001; Walker et al., 2002; Berkes et al., 2003; Folke, 2006; Adger, 2003, 2006; IPCC, 2007, 2012). This definition encompasses the system-oriented approaches characterising resilience as linked to human agency, as well as to social structures or systems (Bohle et al., 2009; Obrist et al., 2010).

The essence of the resilience concept is that it captures the factors that enable functioning under adverse conditions. Cumming (2011) argues that many disciplinary concepts and approaches are relevant in the study of resilience and certain

Table 1
Definitions and measures of resilience.

Disciplines and authors	Definitions	Measures of resilience
Ecological resilience (Holling, 1973: 14, 17)	“A measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables”.	Ex-ante and ex-post: “the overall area of the domain of attraction” and “the height of the lowest point of the basin of attraction above equilibrium”; “probabilities of extinction” (p. 20); “capacity to absorb and accommodate future events” (p. 21).
Holling, 1973; Carpenter et al., 2001; Gunderson and Holling, 2002; Walker et al., 2002	The magnitude of disturbance a system tolerates (can tolerate) before moving into a different state space and set of controls.	Capacities (a) to absorb disturbances (b) for self-organisation, and (c) to learn and adapt (Carpenter et al., 2001; Walker et al., 2002)
Population ecology; Resilience as an element of stability; as a central feature of population dynamics (Pimm, 1984, 1991: 3, 13)	Resilience is “how fast a variable that has been displaced from equilibrium returns to it. Population resilience is the rate at which populations recover their former densities”.	Ex-post: “The return time, the amount of time taken for the displacement to decay to some specified fraction of its initial value. Long return times mean low resilience, and vice versa.” Resilience as a rate of change.
Social resilience (Adger, 2000: 347; cf. Obrist et al., 2010: 289)	“Social resilience as the ability of groups or communities to cope with external stresses and disturbances as a result of social, political, and environmental change”.	Ex-ante and ex-post: Coping and adaptive capacity.
Economic value of resilience (Walker et al., 2010)	Resilience as distance to a threshold; this distance is a stock variable, where the level of the stock is equivalent to the systems resilience.	Ex-ante measure of current and future resilience. The bigger the distance from a critical threshold, the bigger the system's resilience.
Social–ecological resilience (Resilience Alliance, 2010: 34)	Resilience to a specific disturbance or event involves identifying a particular threshold effect such that the system will not recover its earlier pattern of behaviour if this threshold is crossed.	Ex-ante and ex-post: Identify important system variables and their thresholds; If threshold is crossed, system loses resilience.
Spatial resilience (Cumming, 2011: 13)	Resilience as maintaining identity over time: “maintenance of key components and relationships and the continuity of these through time”. “If resilience is low, identity may be lost and if identity is lost, resilience was low” (Cumming, 2011: 13; Cumming and Collier, 2005).	Ex-ante and ex-post: “Quantifying identity and assessing the potential for changes in identity”.
Social ecology of resilience; – psychology, social anthropology (Ungar, 2005)	Resilience reflected in “lives lived well despite adversity”. Under exposure to significant adversity, “resilience is both the capacity of individuals to navigate their way to the psychological, social, cultural, and physical resources that sustain their wellbeing, and their capacity individually and collectively to negotiate for these resources to be provided and experienced in culturally meaningful ways (Ungar, 2008: 225; Ungar, 2011).	Ex-ante and ex-post: Capacity, associated factors and processes.

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