Livelihood resilience and adaptive capacity: A critical conceptual review

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The concepts resilience and adaptive capacity have gained currency in ecology, climate change, disaster risk reduction and related development discourse; yet there has been almost an absence of clarity in the understanding, substance, definition as well as applicability of these concepts in livelihoods theory and practice – where they can potentially contribute far-reaching insights vis-à-vis long-term response to livelihoods adversity in different communities. Drawing upon literature from several disciplines utilising these concepts, this article traces the roots and evolvement of the resilience and adaptive capacity concepts and suggests indicators and pillar processes towards their integration into livelihoods thinking. This article therefore mainly contributes towards the conceptualisation and understanding of a focused 'resilience and adaptive capacity' construct in livelihoods analysis.

Introduction

This article aims to review the concepts of resilience and adaptive capacity as they apply to livelihoods. The key focus and major objective is to add not only to the clarity and practical relevance of these concepts but also to their methodological application with respect to understanding and assessing livelihoods and livelihoods adversity in different communities. Whilst there has been a steady increase in the use of the concepts in a number of recent livelihood discussions, the major challenge has been and remains their translation from ambiguous concepts to meaningful integration into livelihoods theory and practice in different communities. Discussions in mainstream literature have mainly focused on the utility of the concepts in either disaster risk management (e.g. Buckle 1998; Tobin 1999; Paton & Johnston 2001; Twigg 2004; Manyena 2006) or in climate change and variability (e.g. IPCC 2001; Tompkins & Adger 2004; Adger *et al*. 2005; Nelson, Adger & Brown 2007). There has also been wide usage of the concepts within (what some scholars have termed) a social-ecological perspective, which endeavours to recognise the coupled nature of social and ecological systems (e.g. Berkes, Colding & Folke 2003; Olsson, Folke & Hahn 2004; Carpenter *et al*. 2005; Folke 2006). Livelihood resilience and adaptive capacity analysis ordinarily had to fit within this perspective given the supposed (human and environmental) coupled nature of the approach. As Schulter and Pahl-Wostl (2007) rightly point out, however, and notwithstanding significant contributions made by ideas emanating from this perspective, few studies and discussions taking the social–ecological perspective have so far explicitly explored the coupled system and how the dynamic nature of the linkages between the ecological and social systems affect resilience and adaptive capacity. In fact, most of the studies and literature utilising the perspective have largely retained a focus on the ecological angle and paid scant attention to the social perspective in analysis, thus failing to adequately capture livelihood dynamics.

Whilst the conceptualisation of resilience and adaptive capacity in the three dimensions (i.e. disaster risk management, climate change and variability and the social-ecological perspective) is quite informative vis-à-vis the integration of the concepts in different scholarly domains, and has been central in the formulation of ideas advanced in this article, these perspectives are qualitatively different from a focused livelihood resilience and adaptive capacity perspective which is more encompassing in approach, as, for example, the ultimate success of both disaster risk reduction and a viable response to climate change and variability will almost always have to rely on resilient and adaptive livelihoods. Very few scholars (e.g. Marschke & Berkes 2006; Oparinde & Hodge 2011) have endeavoured to undertake an analysis and utilisation of 'livelihood resilience and adaptive capacity' as a stand-alone construct – a construct which can potentially contribute significantly to re-energising livelihood (and other development) approaches towards understanding current dynamic environments characterised, for example, by a multiplicity of interrelated and increasingly reinforcing vulnerabilities in many communities. This article therefore seeks to contribute towards filling this gap. The article is organised into four main sections. The first outlines the methodology used in conducting this analysis. The second focuses on the analytical approach guiding the conceptualisation of issues in the article. The third section

traces the origins of the resilience and adaptive capacity concepts and their current use in livelihoods and related development literature and the last focuses on the conjoined concept of 'livelihood resilience and adaptive capacity' and includes discussions on the indicators and pillar processes in the effective utilisation of this construct.

Methodology

This article was mainly prepared on the basis of a thorough review of literature (books, journal articles, manuscripts, occasional papers and theses) about the development as well as the evolving and current usage of the resilience and adaptive capacity concepts in various fields and areas related to livelihoods (e.g. environment, ecology, disaster management, climate change, community development). A main strategy was to find out what has been written on resilience and adaptive capacity in relation to livelihoods from a broader perspective, before concentrating on relevant aspects and ideas that could be of assistance in coming up with a focused 'livelihood resilience and adaptive capacity' construct. This therefore involved casting the net as wide as possible, particularly during internet search with free text searches on a number of databases such as *Academic Search Premier* and *Google Scholar*, using such terms as 'resilience', 'livelihood resilience', 'adaptive capacity', 'adaptive livelihoods' and 'household and community resilience' and then systematically scanning the various articles emerging towards understanding and coming up with a clear conceptualisation of 'livelihood resilience and adaptive capacity'. Ideas in the article were, however, also significantly informed by (the author's PhD study) fieldwork experiences involving an assessment and analysis of long-term responses to livelihood adversity in rural communities of the Mid-Zambezi Valley in Northern Zimbabwe.

Submerged in the sustainable livelihoods approach

Analysis in this article is rooted in the sustainable livelihoods approach (SLA). A livelihood is about assets (both material and social) and activities for a means of living (Scoones 1998). It becomes sustainable when it can respond to and recover from stresses and shocks (including enhancing assets and capabilities both now and in the future) without undermining the natural resource base (Chambers & Conway 1992; Scoones 1998). A sustainable livelihoods approach thus encompasses analysis of the context in which people live (i.e. their socio-economic, technological, demographic, agro-ecological and political context); their access to natural, human, social, physical and financial assets (and their ability to put these to productive use); the institutions, policies and organisations that determine people's access to these assets and the returns they can achieve; the priorities that people identify in confronting the problems they face as well as the different strategies they adopt in the pursuit of these priorities (Ashley & Carney 1999). The building blocks of the sustainable livelihoods approach strongly relate to ideas underlying livelihood resilience and adaptive capacity since both standpoints are concerned with the integrity of livelihoods, and particularly livelihoods analysis in the face of challenges and constraints.

Though influenced and guided by the SLA, analysis in this article also essentially seeks to contribute towards refocusing the same (sustainable livelihoods) approach to adequately understanding livelihoods dynamics in different communities. Criticism has been voiced, for example, on such issues as the clarification of the 'sustainability' aspect in the SLA (e.g. Morris *et al*. 2002; Longley & Maxwell 2003); difficulties in establishing networks, linkages, connections, flows and chains across scales (e.g. Singh & Gilman 1999; Scoones 2009); and overly concentrating on coping and short-term adaptation analysis as opposed to examining systemic transformations because of long-run secular changes (Scoones 2009). The livelihood resilience and adaptive capacity construct, as will be shown, seeks to address some of these shortcomings.

Origins andevolvement of the resilience and adaptive capacity concepts

Resilience

The definition of the concept of resilience may be traced to the Latin word *resilio* which means 'to jump back' (Manyena 2006). In scholarly discourses, some have posited that it originated from physics and engineering, where it was used to capture the ability of materials to bounce back after shocks and resume their original condition (Mohaupt 2008). Others note that the study of resilience evolved from psychology and psychiatry in the 1940s where the interest was on analysing the risks and negative effects of adverse life events (such as divorce and war) on children (Manyena 2006). Walker *et al.* (2002) have argued that the term resilience has its roots in Holling's (1973) ecological research. In his seminal paper ('Resilience and stability of ecological systems') he endeavoured to distinguish between ecological systems that persist in a state of equilibrium or stability and how dynamic systems behave when stressed and moved from this state of equilibrium. For the purposes of this discussion it will be helpful to highlight two schools of thought (i.e. engineering and ecological resilience) as developed by Holling (1996) in his analysis of resilience in ecological literature, where the concept has been elaborately developed, and then derive points of direction to apply to the conceptualisation of livelihood resilience and adaptive capacity in this analysis.

Resilience theory: Engineering versus ecological resilience

The main point regarding the difference between engineering resilience and ecological resilience is to emphasise different aspects of stability, where stability is characterised as the persistence of a system near or close to a state of equilibrium state, thereby drawing attention to the distinction between efficiency and persistence, constancy and change, and predictability and unpredictability (Gunderson 2000).

Engineering resilience

The focus in engineering resilience is on efficiency, control and predictability. This school of thought is concerned with the time required for a system to return to equilibrium or a steady state after a perturbation or disturbance (Gunderson 2000). Resilience in this case is thus measured by resistance to disturbances, how far the system has moved from equilibrium and the speed of its return to that state of equilibrium. For engineering resilience, the motive is to design systems with a single operating objective which accommodates the engineer's goal to develop optimal designs. As Holling (1996:34) posits, there is an implicit assumption of global stability within engineering resilience that only one equilibrium steady state exists, or if other operating states exist, they should be avoided by applying safeguards'. This conceptualisation of resilience is common in such disciplines as physics, control system design and material engineering.

Ecological resilience

Unlike engineering resilience, ecological resilience presumes the existence of multiple stability domains and the tolerance of the system to perturbations that facilitate transitions amongst stable states (Gunderson 2000). This line of thinking focuses on persistence, adaptiveness, variability and unpredictability and it emphasises conditions far from any equilibrium steady state, where 'instabilities can flip a system into another regime of behaviours or stability domain' (Gunderson & Holling 2002:426). Here ecological resilience relates to the 'width' or limit of a stability domain and it is measured mainly by the magnitude of disturbance that can be absorbed before the system changes its structure by changing the variables and processes that control behaviour (Gunderson 2000). In its current state then, ecological resilience theory is an expanding body of ideas that attempts to provide an explanation of the role of change in adaptive systems, particularly the kinds of change that are transforming (Redman & Kinzig 2003). It aims to understand three fundamental themes, namely resilience and adaptive change from one state to another in systems with multiple stable states; cross-scale interactions (panarchy) and lastly reorganisation and renewal after perturbations and disturbances using the heuristic models or metaphors of adaptive cycles linked across spatial and temporal scales (Allison & Hobbs 2004).

Adaptive capacity

The concept of adaptive capacity has gained prominence in current debates as it has been largely used in the climate change field, where it denotes 'the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities or to cope with consequences' (IPCC 2001:6). The concept, however, has its roots in biology where it was used to indicate the ability of species or organisms to become adapted to (or to be able to live and reproduce in) a certain range of environmental contingencies (Gallopin 2006). In human-environmental or social-ecological systems the term has been defined in different but related ways by various scholars over the years. They raise more or less similar points, as shown in the definitions in Table 1.

Critical points relating to this concept can be highlighted from the definitions outlined in Table 1. Firstly, there is the allusion that this term points to the ability of a given system to better manage or adjust to some changing condition, disturbance or challenge(s). In livelihood systems, these changing conditions, disturbances or challenges might be stresses (defined as pressures which are typically continuous and cumulative and therefore to some extent predictable) such as declining rainfall, HIV, AIDS and general economic hardships, or shocks (defined as impacts which are typically sudden, unpredictable and traumatic) such as floods, political violence and droughts (Krantz 2001). Secondly, the implication in these definitions is that adaptive capacity is largely a function of resources or assets inherent in and accessible to a given system. In livelihood systems, these would be natural, physical, human, financial and social capital. Lastly, (and this is seen especially in the definitions of Nelson *et al*. and Walker *et al*.), this capacity or ability has diverse elements and reflects in a number of ways (i.e. it is multidimensional). The goal of adaptive capacity, therefore, is to adequately respond to and reduce the conditions of vulnerability that a system faces.

Understanding 'livelihood resilience and adaptive capacity'

The terms 'adaptive capacity' and 'resilience' are often used together in livelihoods and related development literature, and there is arguably a thin line dividing their conceptualisation. Some scholars have posited that these

TABLE 1: Definitions of adaptive capacity.

Source	Definitions
Walker *et al.* (2002)	It is an aspect of resilience that reflects learning, flexibility to experiment and adopt novel solutions, and development of generalized responses to broad classes of challenges.
Luers *et al*. (2003	It is the extent to which a system can modify its circumstances to move to a less vulnerable condition.
UN/ISDR (2004)	It is the combination of all the strengths and resources available within an entity (household, community, society) that can reduce the level of risk (or the effects of a disaster).
Adger and Vincent (2005)	It is a vector of resources and assets that represent the asset base from which adaptation actions can be made.
Gallopin (2006)	It is the capacity of any human system from the individual to humankind to increase (or at least maintain) the quality of life of its individual members in a given environment or range of environments.
Nelson *et al.* (2007)	It is a way to describe the precondition necessary for a system to be able to adapt to disturbances and it is represented by the set of available resources and the ability of a system to respond to disturbances, including the capacity to design and implement effective adaptation strategies.
Moser (2008)	It more often refers to the ability to make various changes, sometimes deep and structural, to help systems better align to long-term changes in their social and environmental spheres.

concepts together represent antonyms of vulnerability (e.g. Adger 2000; Glavovic, Scheyvens & Overton 2002) whilst others, such as Folke, Colding and Berkes (2003), have tended to view resilience as only a precondition for adaptive capacity. The general thread (also advanced in this analysis), however, points to the conceptualisation of adaptive capacity as a significant aspect or component of a system's ability to create and maintain resilience (cf. Walker *et al*. 2002; Norris *et al*. 2008). The implication then is that a resilient livelihood system should have high adaptive capacity. A loss of adaptive capacity and therefore resilience would mean loss of opportunity and constrained options during and after periods of stresses and shocks.

The conceptualisation of the 'livelihood resilience and adaptive capacity' construct in this discussion borrows heavily from the concept of ecological resilience. The rigidly linear and single equilibrium ideas postulated within engineering resilience thinking may not be applicable to livelihood systems as there may not be a single equilibrium state to return to in livelihood systems because of the dynamic and continuously changing nature of economic demands, access to resources, social relationships and even the stresses and shocks that livelihood systems are subject to. Livelihood systems therefore operate far from any (single) equilibrium state, as do ecosystems, whilst a non-linear model of (livelihood) resilience and adaptive capacity analysis helps to explain how the elements that constitute a livelihood system change over time (Hoon, Singh & Wamali 1997).

The aspect of cross-scale connectivity is also essential in the conceptualisation of livelihood resilience and adaptive capacity. This involves an analysis of the transfer and flow of resources between and amongst different entities around the livelihood system, disturbances arising externally and opportunities created externally (Abel, Cumming & Anderies 2006). It is therefore constructive to think of 'livelihood resilience and adaptive capacity' as a concept which is layered both spatially and temporally; spatially as it reflects panarchy thinking, that is, the interplay at individual, household and community to national levels, and temporally as it reflects its dynamic nature – changing over time and reflecting the integrity of the livelihood system and the strategies that are feasible 'in particular locations and at particular junctions in history' (Glavovic *et al.* 2002:3). Despite these parallels, it should be noted that livelihood systems are distinctly different from ecological systems given the information-processing capabilities of the human actors and their ability to engage in purposeful action and reflexive learning (Schluter & Pahl-Wostl 2007).

In essence, livelihood resilience and adaptive capacity may be defined as a *process* linking the capacities of households and communities to respond to, recover and learn from changes and disturbances, and to reinstate, renew and reinvigorate their earnings and livelihood patterns disturbed or compromised by changes and challenges in the social and/or physical environment. The construct is consciously equated to 'process', thereby differentiating it from 'outcome', so as to capture its dynamic attributes. Livelihood systems with high adaptive capacity and resilience are, for example, able to reconfigure without significant declines in crucial functions in relation to primary productivity, natural resource-base sustainability, social relations and well-being during and after stresses and shocks. In addition, in resilient and adaptive livelihood systems, disturbances and challenges have the potential to create an opportunity for doing new things, for innovation and for development (Folke 2006).

Indicators and pillar processes to livelihood resilience and adaptive capacity analysis

When applied to livelihoods, 'resilience' and 'adaptive capacity' are fundamentally metaphors (after Norris *et al.* 2008) which may best be explained and conceptualised through indicators and 'pillar processes'. The indicators of livelihood resilience and adaptive capacity are somewhat difficult to discern and it is not possible to provide a list of 'off-the-shelf' indicators (Brooks & Adger 2005) as they vary from entity to entity, even in the same locality. Carpenter *et al.* (2005) use the term 'surrogates' instead of indicators, thereby acknowledging that important aspects of resilience and adaptive capacity in social systems such as livelihood systems may not be directly observable, but may have to be inferred indirectly. Surrogates are also forward-looking, rather than being measures only of the current and/or past states and processes (Berkes & Seixas 2005). This article advances two main factors in the consideration of the surrogates of resilience and adaptive capacity in livelihood systems analysis. The first factor is the careful selection and taking on board of useful insights from a myriad of angles advanced in relevant literature on these concepts, and the second is the consideration of defined local notions and priorities regarding what people in a particular area would ordinarily equate to 'livelihood resilience and adaptive capacity'. Ideas around 'well-being' and 'contextual sustainability' have stood out as informative surrogates in the capturing of locally appropriate notions of livelihood resilience and adaptive capacity (as people in most communities around the world have no specific definition of these terms in their local languages). A look at the work of Folke *et al.* (2003) and Berkes (2007), where a number of probable resilience and adaptive capacity surrogates have been elaborately discussed, elicits three main surrogates which (together with ideas regarding 'well-being' and 'contextual sustainability') may provide appropriate and insightful measures for the livelihood resilience and adaptive capacity construct. These five surrogates and their sub-components are briefly described below:

1. *Learning to live with change and uncertainty*: This involves looking for issues regarding livelihood diversification (in its broader conceptualisation), learning from crises and building rapid feedback mechanisms to various livelihood adversities.
2. *The nurturing of processes of learning and adapting*: This involves inquiring about processes related to tapping into social memory, rectifying mistakes from past experiences and enhancing viable livelihood strategies created during periods of crisis.

3. *Self-organisation* (*versus lack of organisation*) *which could be via individual agency, collective networks or external institutions*: This involves inquiring about issues regarding the creation, presence and/or strengthening of community-based resource management structures as well as cross-scale management systems (for example between local and national development players) in so far as livelihood activities in an area are concerned.
4. *Well-being*: This term is understood in many parts of the world and it enables people in different localities to give their own meanings to the idea of 'a good life' or a viable livelihood and/or 'a bad life' or ill-being (cf. Narayan *et al*. 2000; Marschke & Berkes 2006). As already noted, utilising this aspect in livelihood resilience inquiries allows for an incorporation and exploration of locally and culturally appropriate surrogates for livelihood resilience and adaptive capacity within a people's life-world; not less because there are actually no words or terms for resilience and/or adaptive capacity in most localities. The 'well-being' aspect also allows for an assessment of (locally-determined) thresholds of livelihood resilience and adaptive capacity within a particular area.
5. *Contextual sustainability*: An outcome of resilience and adaptive capacity analysis should be an understanding of 'sustainable' livelihood processes since, as earlier discussed, a livelihood is said to be sustainable when it can respond to and recover from stresses and shocks without undermining the natural resource base (Scoones 1998).

Embracing as it does the integrity of both livelihoods and natural resources, this (sustainability) definition of livelihood resilience and adaptive capacity may; however, be problematic and controversial, particularly in most rural areas, especially in developing communities, because viable and multiple livelihood interests there may for example entail continually extending the agricultural frontier at the expense of the environment (Morris *et al*. 2002). The aspect of contextuality is therefore added so that the researcher can be alert to those processes where local people balance meaning and trade-offs with respect to the appropriate, necessary and beneficial mining of their natural resource base, even when it may appear as undermining from an outsider's perspective. In this way a balanced analysis is made possible. This avoids pejorative descriptions of processes and activities which may actually be at the forefront of 'locally sustainable' responses to livelihood strain in given localities.

The 'pillar processes' alluded to in the title of this sub-section refer to the overall outcomes, which should reveal a successful interplay between the surrogates of livelihood resilience and adaptive capacity discussed above. These pillar processes should, in practice, essentially feed back to the surrogates, thereby strengthening and/or sufficiently transforming them according to the dynamics in the larger environment (see Figure 1). They include (1) *anticipating* livelihood challenges (e.g. through forecasting the nature and intensity of and planning for future livelihood challenges), (2) *reducing* the effects of past and present vulnerabilities, (3) *recovering* from the effects of past and present vulnerabilities, and (4) *thriving* even in the context of a difficult livelihood environment. As Gwimbi (2009) notes, resilience (and adaptive capacity) literature affirms that the concepts should also encompass 'thriving' and deriving benefits from the livelihood challenges experienced. A diagrammatic projection of the discussed ideas in the analysis of livelihood resilience and adaptive capacity is to be found in Figure 1.

The five surrogates, therefore, create 'layers of resilience and adaptive capacity' leading to the four pillar processes in response to 'waves of adversity' in a given locality. In essence then, livelihood resilience and adaptive capacity alludes to all institutional, physical, social and economic means and opportunities at a people's disposal that may lead to the activation and realisation of the four 'pillar processes' and feeding back to the surrogates in a continuously cyclical manner. From discussions in this and the previous sections, characteristics of resilient and adaptive livelihood systems can be summarised as the aspects highlighted in Box 1 above:

Conclusion

The inclusion of the resilience and adaptive capacity concepts in livelihoods and related development discourse is relatively new (cf. Manyena 2009). Whilst great strides have been made in understanding and analysing the utility of these concepts in disaster risk management as well as in response to climate change and variability, integrating resilience and adaptive capacity thinking into focused livelihoods analyses remains in its infancy; it is a 'work in progress' (Scoones 2009). This article contributes to this 'work in progress' by bringing together, analysing and proffering ideas and suggestions towards a more lucid definition and conceptualisation of livelihood resilience and adaptive capacity. There are no straightforward routes to the integration of resilience and adaptive capacity concepts into livelihoods analyses given the multidimensional,

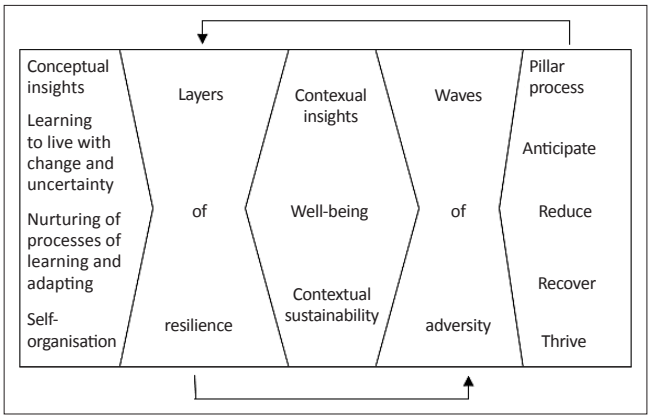

FIGURE 1: Indicators to and pillars of livelihood resilience and adaptive capacity analysis.

BOX 1: A summary of characteristics of resilient and adaptive livelihood systems.

On-going collaborative planning and participatory decision-making in social and other livelihood service, including natural and physical resource management in relevant vertical and horizontal institutional levels within a locality vis-à-vis livelihood challenges experienced and/or anticipated.
Strong networks for independent and interdependent segments of society (at and across both the household and the community levels).
Increased well-being (mostly as according to local and contextual interpretations) for the majority of people in a locality.
Viable and positive trade-offs between natural resource use and given livelihood activities within a locality.

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multifaceted nature and the multidisciplinary basis of these concepts. Whilst these (multidimensionality, multifaceted nature and multidisciplinary basis) have sometimes evidently led to abstraction, ambiguity and the use of these terms in an extremely broad sense in most of the studies, literature and discussions involving livelihoods, it is apparent that if carefully thought and thoroughly laid out, the conjoined concept of 'livelihood resilience and adaptive capacity' can become an insightful tool and effective lens with and through which the analysis of long-term perspectives in response to livelihood adversity in communities around the world may be undertaken. This is because, apart from its futuristic dimensions and awareness to multiple vulnerabilities and opportunities, it brings together issues relating to poverty reduction, natural resource management, productivity (agricultural and otherwise) and the advancement of policy understandings in different livelihood environments.

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