The Emergence of Resilience in Disaster Research

Daniel F. Lorenz

Beitrag zur Ad-Hoc-Gruppe »Armut und Resilienz in soziologischer Perspektive« – organisiert von Lars Meier Markus Promberger, Peter Ester und Heike Solga

In recent years resilience has become an ever more prominent topic in a number of disciplines. In addition to the established paradigms in psychology and ecology, differing concepts were developed in areas such as geography, city planning, or in the social sciences. Being characterised as a »boundary object« (Brand, Jax 2007), the concept of resilience has seen yet additional development in interdisciplinary contexts, whereby the connections often take on a solely metaphorical character (Norris, Stevens 2007; Bürkner 2010). The topic likewise was discussed in the context of disasters (Manyena 2006)[1] and also found its way into political discussions within the context of global disaster risk reduction (see UN »Hyogo Framework for Action 2005-2015«as well as the recent »Sendai Framework for Disaster Risk Reduction 2015-2030«).

The proceeding article studies the origins of the resilience concept as well as its use and development within social scientific disaster research, the topic of resilience found its way into disaster research through various other disciplines. As such, one can essentially identify three interconnected threads which sum up resilience's current thematisation in disaster research: this includes the especially prevalent ecological (and coupled social-ecological) approaches, developmental and social psychological approaches, as well as the use of the resilience concept in risk and hazard management (Wildavsky 1988).

Resilience in Ecology

Notwithstanding of the term's etymological origin in the latin word *resilire* which stretches as far back as Roman antiquity (Alexander 2013), or without speaking of the concept's development in field of psychology in the 1950s (found prominently in Werner 1971) which would later find a renewed popularity in the 1980s (Flach 1988), the contemporary topic of resilience draws first and foremost upon the ecological research of Crawford Stanley Holling. By viewing the interac-

1 A first mention with a reference to disasters can be found in the context of the Shimoda Earthquake 1854.

tions of populations, Holling (1973) investigated why some systems collapse in the face of changing environmental conditions, whereas others persist in spite of constellations having changed dramatically. In contrast to previous classical formulations based upon a notion of stability, Holling developed the concept within the framework of population ecology.[2] His research culminated with the idea that non-linear influencing factors of ecosystems dynamically interact and produce a multi-stable system which does not have merely one equilibrium state, but rather has a multitude of equilibrium states or a so-called *steady state equilibrium*. For Holling (1973: 17) »[r]esilience determines the persistence of relationships within a system and is a measure of the ability of these systems to absorb changes of state variables, driving variables, and parameters and still persist«. In this perspective, a resilient system can be conceived as being of limited stability and subjected to permanent change (Handmer, Dovers 1996): therefore, resilience is not to be understood as a system characteristic which acts as a baseline for the fluctuations beyond the equilibrium, rather, it serves to preserve the system in the case of disturbances.[3]

Resilience in Social-Ecological Systems

The original empirical and allegedly quantitative/descriptive concept transformed into a qualitative/normative concept without sufficient reflexive consideration accompanying it in the process. Even Holling's paper from 1973 begins with the search for perspectives »for theory and practice« (1973: 2) and ends – albeit in a reserved fashion – with the first considerations regarding the »application« of the resilience notion in active resource management and therewith the related idea to utilise the concept in approaches aiming to control and manage. In this aforementioned move, the concept is inherently stretched beyond its original application in ecosystems. This expansion of the resilience concept into social-ecological systems, which Holling also contributed significantly to, is only possible thanks to the axiom which heuristically describes ecosystems in the same manner as social-ecological systems: namely, as *adaptive cycles*, or accordingly, in the paradigm of *complex adaptive systems* (Westley et al. 2002; Walker, Cooper 2011). As already implied in the foundational theory of general systems which serves as basis for resilience's description (Lindseth 2011), this took a particularly argumentative detour through social-ecological systems until it could then be finally explicitly postulated for social systems.

Current ecologically oriented research directs its attention to the systemic interaction of social and ecological systems with non-linear feedback loops because this research firstly assumes a coevolution and interaction of the systems (Norgaard 1994; Zimmerer 1994; Gunderson et al. 1997; Levin et al. 1998; Berkes, Folke 2002; Berkes 2007). This, when combined with the complexity of existing and future environmental problems has, according to the authors, led to the

2 Regarding the cultural background of the concept, see Kirchhoff et al. 2010

3 Because the resilience concept takes the survival or the persistence of a system or reference unit into consideration, it is – at least in the original conception – independent of whether the system is desirable or worthwhile for any other reason (Levin et. al 1998; Voss 2010; Gallopin 2006; Walker et al. 2004; Christmann et al. 2011; Brand, Jax 2007). In the context of disasters such a positive notion of resilience is hardly ever contested.

situation in which these problems can no longer by resolved within disciplinary confines (Berkes et al. 2003; Holling et al. 1998; Young et al. 2006). The interaction of social and ecological systems is dealt with upon the basis of such terms as *socio-ecological systems* (Gallopín 2006) or *social-ecological systems (SES)* (Berkes et al. 2003) in which the focus should be directed at the *entire* system which itself arises through interactions (Berkes 2007). In general, the research initiatives into SES focus most of all on ecological systems and their management. Furthermore, they seemingly manage to get by although they lack a specific social systems theory or a societal theoretical approach (Bürkner 2010). Resource utilisation and the maintenance of the relationships between social and ecological systems stand at the centre of this research into SES. Subsequently, disasters play at best a subordinate role, alongside other less considered factors such as socio-economic structures, inequality, power distribution, and poverty.

The Detour through Vulnerability Research

Regardless whether one sees resilience as an entirely new paradigm of disaster research as McEntire et al. (2002) view it, or even if one assumes that it occupies a complementary relationship to the concept of vulnerability (Mayana 2006; Voss 2010), one cannot completely comprehend resilience without connecting it to the hitherto existing research into vulnerability.[4]
Vulnerability research, which is often seen as an attempt to take the naturalness out of so-called *natural* disasters (O´Keefe et al. 1976), stretches back into the 1970s and has its roots in the research into poverty and hunger, as well as in *human ecology* (Sen 1982; Chambers, Conway 1991; Hewitt 1983; Adger 2006). »[V]ulnerability expresses the multi-dimensionality of disasters by focusing attention on the totality of relationships in a given social situation which constitute a condition that [...] produces a disaster« (Oliver-Smith 2004: 11). In this sense, vulnerability research investigates the social production of inequality as a condition of the uneven distribution of damages inflicted by disasters. In this perspective disasters are not caused by nature, but rather social processes that can be influenced and mitigated.

The *Risk-Hazard-Approach* (Burton et al. 1978; 1993) was one of the first approaches that described vulnerability but nonetheless remained trapped in the previous naturalising paradigm; so much so that it is extremely difficult to draw a dividing line between the two from our present point of view. In this approach vulnerability is primarily described as the exposition of a reference unit vis-à-vis predominantly rarely occurring, stationary, and identified hazards. These hazards then form the primary focus of the investigation. As such, political economy, socio-economic conditions, as well as human behaviour are comparatively granted marginal attention at best and, in the event that social resilience comes to be mentioned, it is done without reference and without conceptual foundation. Instead forms of coping are denoted in the sense of adaptation or adjustment and, as before, social structures, power relations, etc. are granted altogether little attention.

4 The connection is perhaps made for the first time by Timmerman (1981).

In comparison, the *Pressure and Release* model from Blaikie et al. (1994 and Wisner et al. 2003) regards disasters as the result of the interaction between a broadly-termed and non-specific stressor and the vulnerability of social groups. The model identifies so-called *roots causes* as the societal base conditions for vulnerability, whose economic, demographics, and political processes which are spatially and temporally detached from the manifested risk: these root causes are then accordingly given great significance in the model. *Root causes* are translated into concrete *unsafe conditions* through *dynamic pressures* which, together with a hazard, can result in a disaster. The authors curiously define vulnerability as the devaluation of coping: i.e. that vulnerability means »the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard« (Wisner et al. 2003: 11).[5] In a similar manner, Wisner (2004: 189) sees vulnerability as »the blockage, erosion or devaluation of local knowledge and coping practices«. The nine years between the first and second printing act as evidence of a traceable a change in resilience's attributed significance during that time. So although the word »resilience« was already used in the first edition in 1994, it nonetheless developed further until 2003 where it seemingly approached the conceptually similar idea of »livelihood and community resilience« which was just being established at that time. This newer conceptualisation emphasised the ability to withstand shocks and to put adaptation into execution.

The understanding of resilience in social scientific disaster research was likewise pivotally influenced by the investigations of Turner et al. (2003) into *Coupled Human-Environmental Systems*, which, in a certain sense, combines ecological resilience with vulnerability against the background of global environmental change. The *Framework for Vulnerability Analysis in Sustainability Science* should, as the name hints at, serve for the analysis of vulnerability. To be specific, the authors of this framework refer to the *Risk-Hazard-Approach* and the *Pressure and Release* model. Building upon both of these approaches, Turner at al. (2003: 8074) define: »Vulnerability is the degree to which a system, subsystem, or system component is likely to experience harm due to exposure to a hazard, either a perturbation or stress/stressor«. The authors here do not remain entrenched in the idea of the violability of the system (its ability to be damaged), rather they complement the framework of resilience by declaring it to be the ability of a system to deal with disturbances as they occur. In doing this the authors explicitly hark back to the research into coupled social-ecological systems:

> »resilience enters vulnerability analysis from ecology, where it has evolved in meaning through extended debate and application. The concept has been used to characterize a system's ability to bounce back to a reference state after a disturbance and the capacity of a system to maintain certain structures and functions despite disturbance [...]. Resilience and related concepts influence a variety of interdisciplinary research focused on coupled human–environment systems [...], especially through the key component of 'adaptive capacity', the flexibility of ecosystems, and the ability of social systems to learn in response to disturbances«. (Turner et al. 2003: 875)

Although the framework does indeed conceptualise resilience as its own independent value, it nonetheless forms but one part of the system's vulnerability (Birkmann 2008).

---

5 The so-called release part of the model could be interpreted as resilience in terms of macro-social transformations.

Social Resilience

Similarly influenced by research into SES and vulnerability, Neil W. Adger (2000) investigated genuine social resilience and its connection to ecological resilience. By using Adger's work one can illustrate the attempt to formulate social resilience as a distinct property. This idea of social resilience also finds footing in Adger's work as he sees a prevailing synergistic and co-evolutionary relationship between social and ecological systems. According to Adger, the transfer of the ecological resilience concept onto social systems ostensibly assumes that there are no essential differences in the behaviour and structures of institutions and ecological systems. While this may be a contested idea in the social sciences, parallels are insinuated in various other disciplines (human geography, social ecology, and ecological economics) that there are in fact other existing interdependencies. From this Adger then further explicates as to how these interdependencies are changed by social interventions in ecosystems, which in turn have an influence on the social system based upon the extent to which social resilience is dependent upon ecological resilience. Social resilience represents a »loose antonym of vulnerability« for Adger (2000: 348), in which institutions, households, and communities are named as reference units.[6] He concludes with a definition of social resilience as »the ability of communities to withstand extern shocks to their social infrastructure« (Adger 2000: 361). One way social resilience is able to be assessed for example is by ascertaining the extent to which these shocks are internalised though migration or by changes in livelihood, or by looking at how they retroactively affect the ecosystem in a mediated fashion.

Social Resilience in Disaster Research

In social resilience, three constituent components have been given a specific and pronounced attention: adaptive capacity, coping capacity, and (more recently) participative capacity (Voss 2008). The research into social resilience, including the research into coupled social-ecological systems, focuses first and foremost on adaptive capacity. As a result, participative capacity and coping capacity have long been neglected in this area.

Adaption

The relationship between *adaptive capacity* and resilience is so contested in the academic debate due to the multitude of prevailing differing concepts: some authors identify resilience with

6 What is remarkable here Adger's work is how he turns away from the systems concept and focuses instead on communities as local manifestations of resilience: an idea which would later be found in the conception of community resilience among many authors even though they frequently did not make an explicit reference to his work (Norris et al. 2008; Murphy 2007; Boon et al. 2012, Cutter et al. 2008; Brown, Kulig 1996; Norris, Stevens 2007; Zautra 2008; Berkes, Ross 2013; Aldrich 2012). Nevertheless, limiting the focus purely to communities is not an uncontroversial move. In doing so, one could lose sight of other social systems which have other sources of social resilience (Berkes, Folke 1998; Westley et al. 2002; Bankoff 2003).

adaptive capacity (Smit, Wandel 2006), and others define the robustness of a system vis-a-vis change as adaptive capacity (Gunderson 2000). On the other hand, others view adaptive capacity as an element of resilience which can both reflect learning processes brought about by change and be made use of in the future (Carpenter et al. 2001). Given the context at hand, one should understand adaptive capacity in the way Walker et al. (2004) described it: as the ability to establish new structural relationships which should then be able to ensure the persistence of the system in case of radical environmental changes, or in the case of emerging of incompatible structures in the system itself (Gallopín 2006). These adaption efforts encompass the short-term reactive interventions implemented in dealing with disasters, as well as the those long-term structural changes which aim to prevent future disasters or, at the very least, those long-term structural changes focus on coping with disaster (Brown, Kulig 1996). Folke (2006) refers to both of these versions of adaptive capacity with the terms *adaptability* and *transformability*: the former in the case of short-term reactive measures, and the later as the establishment of entirely new system structures.[7] Within adaptability one can differentiate between mitigation – active disaster coping – and recovery[8] – those reconstruction measures after the disaster. Adaptations can be implemented in a goal-oriented and reflexive manner by taking advantage of the available body of knowledge and collected experience (Gunderson 2003; Westley et al. 2002; Gunderson et al. 2002; Young et al. 2006). Nonetheless it has been shown that structural adaptations are not always carried out in this manner and instead often prove to be exercises of trial-and-error (Bohle 2008, Voss 2009).

Psychosocial Coping

Coping is understood as the cultural and social »dealing« that makes collective stress bearable (Voss 2009). Coping capacity therefore provides the system's handling of failed expectations with a continuity of expectations which emerged through the system (Voss 2008, Norris et al. 2008). As a result, coping especially comes to bear in the midst of, or after a disaster. By ascribing meaning to catastrophic by means of socially, culturally, or religiously anchored interpretive patterns, it then becomes possible to produce a connection to the interpretive pattern found everyday life.[9] The existence of entirely different cultural meanings is illustrated by Elísio Macamo (2003), through the example of the flooding in Mozambique in 2000, and Martin Voss (2008), who both demonstrate that culture interpretative patterns can frame disasters, deaths and losses in ways in resoundingly different ways. Beyond meaning creation via cosmologies, every culture harbours within itself forms of dealing with the loss and the collapse of collective order

7 Walker et al. (2006) warn however that high degrees of adaptability could also mean the loss of resilience if the focus is directed wholly on singular spaces, hazards, or solutions.

8 One can draw a connection to terrorism (see Coaffee et al. 2009) in a similar fashion one by taking advantage of city-oriented approaches as found by Bürkner (2010). Recently there has been an identifiably surge of examinations into reconstruction efforts after disasters (recovery) in connection with resilience: such approaches (for example Aldrich 2012; Vale, Campanella 2005) often appear to use the city as their referential object.

9 According to Wolf R. Dombrowsky (1987) the significance of a disaster can be measured by how much »labour« must necessarily be expended in the construction of meaning whilst overcoming it.

creation which can be entirely different from those of other cultures (Bankoff 2007b). (Social-)psychological research amongst others has come to learn of numerous social meaning creation practice (Eyre 2006; Erikson 1976).

Power Relations and Participation

The concept of *participative capacity* (Voss 2008) enters the picture for the first in the discussion of social resilience. Self-organisation likewise plays a decisive role in the discussion concerning ecological adaptation in how to deal with environmental change (Carpenter et al. 2001; Folke et al. 2003; Holling 2001; Berkes 2007). The origins of the SES discussion as found in resource management and the related ecological economy essentially grants free range for institutional arrangement and organisation. Notably, this inherently ascribes great significance to the political sphere as well as the system of law. Other authors (Dow et al. 2006) argue for a political system based upon the constitution of a Rawlsian theory of justice. Nonetheless, the implications on the social sphere have only been insufficiently reflected on. Even in democratic systems which lawfully ensure the rights of freedom and participation, there is nonetheless an uneven distribution of interpretive power and hazards between groups due to social factors, as well as occasional serious constrictions on the ability of groups to self-organise. The uneven distribution of resources (Adger 2000), the differing strength and breadth of available networks (Blaikie et al. 1994; Aldrich 2012), expert cultures (Clausen 1992; 2003), mechanisms of exclusion and inclusion (Cutter et al. 2003), mobility (Adger 2000), gender identity and status (Fordham 2008; Krishnaraj 1997), language, as well as property laws (Berkes, Folke 1998) and education (Brauner, Dombrowsky 1996) interfere and culminate in the unequal distribution of power and the participative ability to affect change to the conditions of life. All of these aforementioned intervening factors could be combined under the domain of Pierre Bourdieu's expanded concept of »capital« (Bourdieu, Wacquant 1992). The concepts of social capital (Scheffer et al. 2002; Bankoff 2007; Murphy 2007; Aldrich 2012) and cultural capital (Berkes, Folke 1992) are already being used in the discussion surrounding social resilience and questions of adaptation. Nevertheless, the power dimension, which is inherent in Bourdieu's idea of symbolic capital and is likewise found in participative capacity itself, has been largely neglected in the discussion of social resilience till now. The idea of participative capacity attempts to direct attention to the interpretive power and influential prospects of the reference units regarding those local, regional, and global processes which affect them (Voss 2008). The contraction of participative capacity limits the various potentials to affect the conditions of life as well as the possibilities to deal and work with social change and adversity. In this sense, one could say, participative capacity reflects the vulnerability perspective as found within the resilience approach. As opposed to the *Pressure and Release* model in which the root causes manifest themselves as foundational causes for vulnerability on the local level, this model stresses the local self-organisational efforts which attempt to alter circumstances and become an integral component of social resilience. Hence authors such as Bohle (2008) or Voss (2008, 2010) view the concepts of vulnerability and resilience as being inescapably embedded in deliberative-participative, or transdisciplinary evaluation processes, that might counter social inequalities and power distributions.

Conclusion

To understand the theming of resilience in the social scientific research into disasters one must first view it as a culmination of a theoretical tradition. The term resilience appears in various publications concerning the topic of vulnerability – but it has yet to be brought up in a conceptual sense. As it is conveyed in the research into coupled systems, resilience has begun to be taken up as a conceptual element within vulnerability research. It is even increasingly brought up and contextualised as its own research approach, an approach which has some authors (McEntire et al. 2002) have labelled as a paradigm shift within disaster research. An approach based on social resilience has emerged in disaster research which does not make a direct reference to ecological systems. In place of a direct focus on the damages of disaster, attention is instead directed toward the non-disastrous everyday change and those factors which prevent disasters, those which deal with disasters, or those which make disasters bearable. Social resilience can be described in this sense with three capacities: adaptive capacity, coping capacity, and participative capacity. While adaptive capacity encompasses the adaption processes for preventing future disasters, for dealing with them, and for rebuilding in their wake, coping capacity encompasses the cultural and social interpretative patterns as well as psycho-social sphere. The final element participative capacity can be understood as an inversion of the vulnerability notion which attempts to comprehend local potential to participatively affect, shape, and create the conditions of life. In light of the significant nature of these potentials, the question is therefore posed whether a reference unit is subjected to change, or whether it can shape this change itself. Given the neoliberal take over and appropriation of the resilience concept (Walker, Cooper 2011; Joseph 2013), this inheritance from the vulnerability perspective seems to be necessary and imperative. In not considering these perspectives, the social conditions of vulnerability and the causal origins of disaster would receded into the background renaturalizing disasters as all efforts of unmasking disasters as genuine social processes never happened (Cannon, Müller-Mahn 2010).

Bibliography

Adger, N.W. 2000: Social and Ecological Resilience: Are they related? Progress in Human Geography, 24. Jg., 347–364.

Adger, N.W. 2006: Vulnerability. Global Environmental Change, 16. Jg., Heft 3, 268–281.

Aldrich, D.P. 2012: Building Resilience. Social Capital in Post-Disaster Recovery. Chicago: The University of Chicago Press.

Alexander, D. 2013: Resilience and Disaster Risk Reduction: An Etymological Journey. Natural Hazards and Earth System Sciences, 13. Jg., 1257–1284.

Bankoff, G. 2003: Cultures of Disaster. Society and Natural Hazards in the Philippines. London: Routledge.

Bankoff, G. 2007: Dangers to Going it Alone. Social Capital and the Origins of Community Resilience in the Philippines. Continuity and Change, 22. Jg., Heft 2, 327–355.

Bankoff, G. 2007b: Living with Risk; Coping with Disasters. Hazard as a Frequent Life Experience in the Philippines. Education about Asia, 12. Jg., Heft 2, 26–29.

Berkes, F. 2007: Understanding Uncertainty and Reducing Vulnerability: Lessons from Resilience Thinking. Natural Hazards, 41. Jg., Heft 2, 283–295.

Berkes, F., Folke, C. 1992: A Systems Perspective on the Interrelations between Natural, Human-Made and Cultural Capital. Ecological Economics, 5. Jg., Heft 1, 1–8.

Berkes, F., Folke, C. 1998: Linking Social and Ecological Systems for Resilience and Sustainability. In F. Berkes, C. Folke (Hg.), Linking Social and Ecological Systems. Management Practices and Social Mechanisms for Building Resilience. Cambridge: Cambridge University Press, 1–25.

Berkes, F., Folke, C. 2002: Back to the Future: Ecosystem Dynamics and Local Knowledge. In L.H. Gunderson, C.S. Holling (Hg.), Panarchy. Understanding Transformations in Human and Natural Systems. Washington: Island Press, 121–146.

Berkes, F., Colding, J., Folke, C. 2003: Introduction. In F. Berkes, J. Colding, C. Folke (Hg.), Navigating Social-Ecological Systems. Building Resilience for Complexity and Change. Cambridge: Cambridge University Press, 1–29.

Berkes, F., Ross, H. 2013: Community Resilience: Toward an Integrated Approach. Society & Natural Resources: An International Journal, 26. Jg., Heft 1, 5–20.

Birkmann, J. 2008: Globaler Umweltwandel, Naturgefahren, Vulnerabilität und Katastrophenresilienz. Notwendigkeit der Perspektivenerweiterung in der Raumplanung. Raumforschung und Raumordnung, 66. Jg., Heft 1, 5–22.

Blaikie, P.M., Cannon, T., Davis, I., Wisner, B. 1994: At Risk. Natural hazards, People's Vulnerability and Disasters. London: Routledge.

Bohle, H.G. 2008: Förderung von Resilience als Herausforderung für die Risikowelten von morgen. In C. Felgentreff, T. Glade (Hg.), Naturrisiken und Sozialkatastrophen. Berlin: Springer Spektrum, 435–441.

Boon, H.J., Cottrell, A., King, D., Stevenson, R.B., Millar, J. 2012: Bronfenbrenner's Bioecological Theory for Modelling Community Resilience to Natural Disasters. Natural Hazards, 60. Jg., Heft 2, 381–408.

Bourdieu, P., Wacquant, L.J.D. 1992: An Invitation to Reflexive Sociology. Chicago: University of Chicago Press.

Brand, F.S., Jax, K. 2007: Focusing the Meanings of Resilience: Resilience as a Descriptive Concept and a Boundary Object. Ecology and Society, 12. Jg., Heft 1.

Brauner, C., Dombrowsky, W.R. 1996: Defizite der Katastrophenvorsorge in Industriegesellschaften am Beispiel Deutschlands. Untersuchungen und Empfehlungen zu methodischen und inhaltlichen Grundsatzfragen. Gutachten im Auftrag des Deutschen IDNDR-Komitees für Katastrophenvorbeugung e.V. Langfassung. Bonn : Deutsches IDNDR-Komitee.

Brown, D., Kulig, J.C. 1996: The Concept of Resiliency. Theoretical Lessons from Community Research. Health and Canadian Society, 4. Jg., 29–52.

Bürkner, H.-J. 2010: Vulnerabilität und Resilienz. Forschungsstand und sozialwissenschaftliche Untersuchungsperspektiven, IRS Working-Paper 43. Erkner: IRS.

Burton, I., Kates, R.W., White, G.F. 1978: The Environment as Hazard. New York: Guildford Press.

B Burton, I., Kates, R.W., White, G.F. 1993: The Environment as Hazard. New York: Guildford Press.

Cannon, T., Müller-Mahn D. 2010: Vulnerability, Resilience and Development Discourses in the Context of Climate Change. Natural Hazards, 55. Jg., Heft 3, 621–635.

Carpenter, S., Walker, B., Anderies, J.M., Abel, N. 2001: From Metaphor to Measurement: Resilience of What to What? Ecosystems, 4. Jg., 765–781.

Chambers, R., Conway, G.R. 1991: Sustainable Rural Livelihoods: Practical Concepts for the 21st Century. IDS Discussion Paper 296. Brighton: Institute of Development Studies.

Christmann, G., Ibert, O., Kilper, H., Moss, T. 2011: Vulnerabilität und Resilienz in sozio-räumlicher Perspektive. Begriffliche Klärungen und theoretischer Rahmen. IRS Working-Paper 44. Erkner: IRS.

Clausen, L. 1992: Social Differentiation and the Long-Term Origin of Disasters. Natural Hazards, 6. Jg., Heft 2, 181–190.

Clausen, L. 2003: Reale Gefahren und katastrophensoziologische Theorie: Soziologischer Rat bei FAKKEL-Licht. In L. Clausen, E.M. Geenen, E. Macamo (Hg.), Entsetzliche soziale Prozesse. Theorie und Empirie der Katastrophen. Münster: LIT, 51–76.

Coaffee, J.; Wood, D.M.; Rogers, P. 2009: The Everyday Resilience of the City. How Cities Respond to Terrorism and Disaster. Basingstoke: Palgrave Macmillan.

Cutter, S.L., Boruff, B.J., Shirley, W.L. 2003: Social Vulnerability to Environmental Hazards. Social Science Quarterly, 84. Jg., Heft 2, 242–261.

Cutter, S.L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., Webb, J. 2008: A Place-Based Model for Understanding Community Resilience to Natural Disasters. Global Environmental Change, 18. Jg., Heft 4, 598–606.

Dombrowsky, W.R. 1987: Das Tschernobyl-Syndrom. Katastrophen als verhaltensändernde Ereignisse. In J. Friedrichs (Hg.), 23. Deutscher Soziologentag 1986. Opladen: Westdeutscher Verlag, 806.

Dow, K., Kasperson, R.E., Bohn, M. 2006: Exploring the Social Justice Implications of Adaptation and Vulnerability. In N.W. Adger, J. Paavola, S. Huq, M.J. Mace (Hg.), Fairness in Adaptation to Climate Change. Cambridge: MIT Press, 79–96.

Erikson, K.T. 1976: Everyting in its Path. Destruction of Community in the Buffalo Creek Flood. New York: Simon and Schuster.

Eyre, A. 2006: Remembering. Community commemoration after Disaster. In H. Rodríguez, E.L. Quarantelli, R. Dynes (Hg.), Handbook of Disaster research. New York: Springer, 441–455.

Flach, F.F. 1988: Resilience – Discovering a New Strength in Times of Stress. NewYork: Fawcett Books.

Folke, C., Colding, .J, Berkes, F., 2003: Synthesis. Building Resilience and Adaptive Capacity in Social-Ecological Systems. In F. Berkes, J. Colding, C. Folke (Hg.), Navigating Social-Ecological Systems. Building Resilience for Complexity and Change. Cambridge: Cambridge University Press, 352–387.

Folke, C. 2006: Resilience. The Emergence of a Perspective for Social-Ecological Systems Analyses. Global Environmental Change, 16. Jg., Heft 3, 253–267.

Fordham, M. 2008: The Intersection of Gender and Social Class in Disaster: Balancing Resilience and Vulnerability. In B.D. Philips, B.H. Morrow (Hg.), Women and Disasters: From Theory to Practice. Philadelphia: Xlibris, 75–98.

Gallopín, G.C. 2006: Linkages between Vulnerability, Resilience, and Adaptive Capacity. Global Environmental Change, 16. Jg., Heft 3, 293–303.

Gunderson, L.H., Holling C.S., Pritchard, L., Peterson, G.D. 1997: Resilience in Ecosystems, Institutions and Societies. Discussion Paper 95. Stockholm: Beijer International Institute of Ecological Economics.

Gunderson, L.H. 2000: Ecological Resilience – In Theory and Application. Annual Review of Ecology and Systematics, 31. Jg., 425–439.

Gunderson, L.H., Holling, C.S., Peterson, G.D. 2002: Surprises and Sustainability: Cycles of Renewal in the Everglades. In L.H. Gunderson, C.S. Holling (Hg.), Panarchy. Understanding Transformations in Human and Natural Systems. Washington: Island Press, 315–332.

Gunderson, L.H. 2003: Adaptive Dancing. Interactions between Social Resilience and Ecological Crises. In F. Berkes, J. Colding, C. Folke (Hg.), Navigating Social-Ecological Systems. Building Resilience for Complexity and Change. Cambridge: Cambridge University Press, 33–52.

Handmer, J.W., Dovers, S.R. 1996: A Typology of Resilience. Rethinking Institutions for Sustainable Sevelopment. Industrial & Environmental Crisis Quarterly, 9. Jg., Heft 4, 482–511.

Hewitt, K. 1983: The Idea of Calamity in a Technocratic Age. In K. Hewitt (Hg.), Interpretation of Calamity: From the Viewpoint of Human Ecology. Boston: Allen, 3–32.

Holling, C.S. 1973: Resilience and Stability of Ecological Systems. Annual Review of Ecology and Systematics, 4. Jg., 1–23.

Holling, C.S., Berkes, F., Folke, C. 1998: Science, Sustainability and Resource Management. In F. Berkes, C. Folke (Hg.), Linking Social and Ecological Systems. Management Practices and Social Mechanisms for Building Resilience. Cambridge: Cambridge University Press, 342–362.

Holling, C.S. 2001: Understanding the Complexity of Economic, Ecological, and Social Systems. Ecosystems, 4. Jg., Heft 5, 390–405.

Joseph, J. 2013: Resilience as Embedded Neoliberalism: A Governmentality Approach. Resilience: International Policies, Practices and Discourses, 1. Jg., Heft 1, 38–52.

Kirchhoff, T., Brand, F.S., Hoheisel, D., Grimm, V. 2010: The One-Sidedness and Cultural Bias of the Resilience Approach. GAIA, 19. Jg., Heft 1, 25–32.

Krishnaraj, M. 1997: Gender Issues in Disaster management: The Latur earthquake. Gender, Technology and Development, 1. Jg., Heft 3, 395–411.

Levin, S., Barrett, S., Aniyar, S., Baumol, W., Bliss, C., Bolin, B., Dasgupta, P., Ehrlich, P., Folke, C., Gren, I.M., Holling, C.S., Jansson, A.M., Jansson, B.O., Mäler, K.G., Martin, D., Perrings, C., Sheshinski, E. 1998: Resilience in Natural and Socio-Economic Systems. In Environment and Development Economics, 3 Jg., Heft 2, 222–235.

Macamo, E. 2003: Nach der Katastrophe ist die Katastrophe. Die 2000er Überschwemmung in der dörflichen Wahrnehmung in Mosambik. In L. Clausen, E.M. Geenen, E. Macamo (Hg.), Entsetzliche soziale Prozesse. Theorie und Empirie der Katastrophen. Münster: LIT, 167–184.

Manyena, S.B. 2006: The Concept of Resilience Revisited. In Disasters, 30. Jg., Heft 4, 433−450.

McEntire, D., Fuller, C., Johnsten, C.W., Weber, R. 2002: A Comparison of Disaster Paradigms: The Search for a Holistic Policy Guide. Public Administration Review, 62. Jg., Heft 3, 267–281.

Murphy, B.L. 2007: Locating Social Capital in Resilient Community-Level Emergency Management. Natural Hazards, 41. Jg., Heft 2, 297–315.

Norgaard, R.B. 1994: Development Betrayed: The End of Progress and a Coevolutionary Revisioning of the Future. London: Routledge.

Norris, F.H., Stevens, S.P. 2007: Community Resilience and the Principles of Mass Trauma Intervention. Psychiatry: Interpersonal and Biological Processes, 70. Jg., Heft 4, 320–328.

Norris, F.H., Stevens, S.P., Pfefferbaum, B.; Wyche, K.F., Pfefferbaum, R.L. 2008: Community Resilience as a Metaphor, Theory, Set of Capabilities, and Strategy for Disaster Readiness. American Journal of Community Psychology, 41. Jg., 127–150.

O´Keefe, P., Westgate, K., Wisner, B. 1976: Taking the Naturalness out of Natural Disasters. Nature, 260. Jg., 566–567.

Oliver-Smith, A. 2004: Theorizing Vulnerability in a Globalized World. A Political Ecological Perspective. In G. Bankoff, G. Frerks, D. Hilhorst (Hg.), Mapping Vulnerability. Disasters, Development, and People. London: Earthscan Publications, 10–24.

Scheffer, M., Westley, F., Brock, W.A., Holmgren, M. 2002: Dynamic Interaction of Societies and Ecosystems – Linking Theories form Ecology, Economy, and Sociology. In L.H. Gunderson, C.S. Holling (Hg.), Panarchy. Understanding Transformations in Human and Natural Systems. Washington: Island Press, 195–240.

Sen, A. 1982: Poverty and Famines. An Essay on Entitlement and Deprivation. Oxford: Clarendon Press.

Smit, B., Wandel, J. 2006: Adaptation, Adaptive Capacity and Vulnerability. Global Environmental Change, 16. Jg., Heft 3, 282–292.

Timmerman, P. 1981: Vulnerability, Resilience and the Collapse of Society: A Review of Models and Possible Climatic Applications. Environmental Monograph No. 1. Toronto: Institute for Environmental Studies, University of Toronto.

Turner, B.L., Kasperson, R.E., Matsone, P.A., McCarthy, J.J., Corell, R.W., Christensen, L., Eckley, N., Kasperson, J.X., Luers, A., Martello, M.L., Polsky, C., Pulsipher, A., Schiller, A. 2003: A Framework for Vulnerability Analysis in Sustainability Science. Proceedings of the National Academy of Sciences of the United States of America, 100. Jg., Heft 14, 8074–8079.

Vale, L.J., Campanella, T.J. 2005: The Resilient city. How Modern Cities Recover from Disaster. New York: Oxford University Press.

Voss, M. 2008: The Vulnerable Can't Speak. An Integrative Vulnerability Approach to Disaster and Climate Change Research. Behemoth. A Journal on Civilisation, 1. Jg., Heft 3, 39–56.

Voss, M. 2009: Vulnerabilität. In C. Hammerl, T. Kolnberger (Hg.), NaturKatastrophen. Rezeption – Bewältigung – Verarbeitung. Wien: Studien-Verlag, 103–121.

Voss, M. 2010: Resilienz, Vulnerabilität und transdisziplinäre Katastrophenforschung. In A. Siedschlag (Hg), Jahrbuch für europäische Sicherheitspolitik 2009/2010. Baden-Baden: Nomos, 67–84.

Walker, J., Cooper, M. 2011: Genealogies of Resilience. From Systems Ecology to the Political Economy of Crisis Adaptation. Security Dialogue, 42. Jg., Heft 2, 143–160.

Walker, B., Holling, C.S., Carpenter, S.R., Kinzig, A. 2004: Resilience, Adaptability and Transformability in Social-Ecological Systems. Ecology and Society, 9. Jg., Heft 2, o.S.

Walker, B., Gunderson, L.H., Kinzig, A.P., Folke, C., Carpenter, S.R., Schultz, L. 2006: A Handful of Heuristics and Some Propositions for Understanding Resilience in Social-Ecological Systems. Ecology and Society, 11. Jg., Heft 1, o.S.

Werner, E. 1971: The Children of Kauai. A Longitudinal Study from the Prenatal Period to age Ten. Honolulu: University of Hawaii Press.

Westley, F., Carpenter, S.R., Brock, W.A., Holling, C.S., Gunderson, L.H. 2002: Why Systems of people and nature are not just Social and Ecological Systems. In L.H. Gunderson, C.S. Holling (Hg.), Panarchy. Understanding Transformations in Human and Natural Systems. Washington: Island Press, 103–120.

Wildavsky, A.B. 1988: Searching for Safety. New Brunswick: Transaction Books,

Wisner, B., Blaikie, P., Cannon, T., Davis, I. 2003: At Risk: Natural Hazards, People's Vulnerability and Disasters. London: Routledge.

Wisner, B. 2004: Assessment of Capability and Vulnerabilty. In G. Bankoff, G. Frerks, D. Hilhorst (Hg.), Mapping Vulnerability. Disasters, Development, and People. London: Earthscan Publications, 183–193.

Young, O.R., Berkhout, F., Gallopin, G.C., Janssen, M.A., Ostrom, E., van der Leeuw, S. 2006: The Globalization of Socio-Ecological Systems. An Agenda for Scientific Research. Global Environmental Change, 16. Jg., Heft 3, 304–316.

Zimmerer, K.S. 1994: Human Geography and the »New Ecology«: The Prospect and Promise of Integration. In Annals of the Association of American Geographers, 84. Jg., Heft 1, 108–125.

Zautra, A., Hall, J., Murray, K. 2008: Community Development and Community Resilience: An Integrative Approach. Community Development, 39. Jg., Heft 3, 130–147.