

11 A Human Actor Model as a Conceptual Orientation in Interdisciplinary Research for Sustainable Development

Urs Wiesmann¹, Cordula Ott², Chinwe Ifejika Speranza³, Boniface P. Kiteme⁴, Ulrike Müller-Böker⁵, Peter Messerli⁶, and Jakob Zinsstag⁷

Abstract

Pursuing the normative goal of sustainable development is necessarily bound to the values held by the actors involved, and to these actors as agents of change. The outcomes of development efforts and interventions depend on actors' actions and reactions, which are largely determined by these actors' agency. The questions of how actors are conceptualised in development-oriented research and to what extent the resulting concept is shared beyond the social science community are thus of fundamental importance. Current livelihood models in development-oriented research fail to address agency; strategies of action and, consequently, change and innovation in action largely remain black boxes. In this article we propose a general human actor model that can serve as a tool for communication, reflection, and orientation in development-oriented research. It explicitly builds on existing theoretical foundations and ontologies and comprises four nested components: (1) *action* as the dynamic interplay between activity, means, and meaning, (2) *strategy of action* as a combination of actions, (3) *dynamic conditions of action*, to which activities and means are exposed, and (4) *institutions*, in which meanings of action are embedded. Application of the proposed model in interdisciplinary research for sustainable development has shown that the model can be concretised for specific actor categories, and therefore has a high heuristic potential regarding concrete inter- and transdisciplinary research questions. The model can trigger theoretical innovation and, most importantly, it can be used to promote reflexivity and unravel and share ethical positions in development-oriented research.

Keywords: Development-oriented research; livelihoods perspective; human actors; agents of change; agency; institutions; action theory; interdisciplinarity; transdisciplinarity; sustainable development.

11.1 A need and a challenge: understanding ‘actors’ in development-oriented research

Decades of development aid and cooperation have nurtured controversy over the question of where best to look for leverage points. Positions often clash in times of intensifying globalisation and social and ecological degradation processes. We perceive an ongoing crisis in development policy and practice that gives evidence of a crisis of understanding, with regard to both the aims and the dynamics of development (Wiesmann 1998, 2008a; Clarke and Carney 2008). In this situation, the normative concept of sustainable development provides orientation and guidance. Research for sustainable development requires inter- and transdisciplinary approaches that build on the foundations of a broad set of scientific disciplines (Wiesmann et al 2011, in this volume). These approaches acknowledge that pursuing the normative goal of sustainable development is necessarily bound to the values held by the actors involved in that development, and to these actors as agents of change. At the same time, the outcomes of development efforts and interventions depend on actors’ actions and reactions, which are largely determined by these actors’ agency. Human agency, according to McLaughlin and Dietz (2008, p 105), refers “to the capacity of individual and corporate actors, with the diverse cultural meanings that they espouse, to play an independent causal role in history”. In light of these considerations, the questions of how actors are conceptualised in research for sustainable development and to what extent the resulting concept is shared beyond the participating specialists in social science are of fundamental importance.

This poses a dilemma. For development-oriented research, adopting a livelihoods perspective that integrates actors is a practical and ethical necessity, but developing a perspective that does this in a sensitive, respectful, and meaningful way still remains a great challenge. It is obvious that our understanding of human behaviour, rationales, and agency will remain limited, as cognitive systems, thinking, and acting are largely based on unconscious processes (Gigerenzer and Brighton 2009). To come as close as possible to an understanding, we must adopt an ethical attitude based on self-consciousness and respect – or as Göran Hermerén, President of the European Group on Ethics (EGE), puts it: “Ethics is the result of our pursuit to systematically reflect on, analyse, and question the norms and values that guide human action” (AGE 2008, p 3; for the original Swedish quote see Hermerén 1989, p 37). Consequently, for the researcher, analysis from an actor-oriented perspective always requires a double effort: (1) reflection on and integration

of underlying theories and epistemological assumptions, or the researchers' conceptual background, and (2) close and respectful observation and understanding of activities and options open to individual actors and categories of actors in their sociocultural contexts. This attitude is a precondition for a conceptualisation of actors as *agents of change* and for the formulation of *meaningful* livelihoods approaches.

Already from the 1980s, livelihoods approaches (Chambers and Conway 1991; Hoon et al 1997) called our attention to human beings as the real agents of change – with broad implications for development policy and practice and related research. Numerous livelihoods concepts have been developed that can be used as analytical frameworks and/or as project guidelines (see Ashley and Carney 1999; Carney et al 1999; Carney 2002; Hussein 2002). The Rural Livelihood System (RLS) (Baumgartner and Högger 2004) and Sustainable Regional Development (SRD) (Wiesmann 1998) are two Swiss examples of integrative livelihoods approaches. Over the last decade, however, discourses and research practices related to marginalised rural actors have been largely dominated by the Sustainable Livelihoods Approach (SLA) and Sustainable Livelihoods Framework (SLF) proposed by the British Department for International Development (DFID 1999–2001). Due to its potential for structuring empirical work, this framework is very attractive for applied research and to development agencies, and has triggered a wealth of contextualised studies worldwide (see Carney 2002; Hussein 2002; Ellis and Freeman 2004; Clarke and Carney 2008). At least in theory, a vivid debate has brought livelihoods approaches far beyond well-criticised input–output model thinking and use in local contexts. Core principles such as *people-centred; responsive and participatory; multi-level; conducted in partnership; sustainable; and dynamic* (Scoones 2009) have indeed prepared the ground for SLA and connected it to approaches framed under transdisciplinarity and sustainability science (Hirsch Hadorn et al 2006; Clark 2007; Wiesmann et al 2008; Jäger 2009).

Nevertheless, and although the design of the approach itself is far from reductionist, practice has shown that widespread mechanistic application of the SLF falls short of taking adequate account of the agency and rationales of local actors (see section 11.2). We argue that greater reflexivity regarding the conceptual foundations of livelihoods approaches is crucial in devising an adequate concept of actors (section 11.3). Building on theories and concepts of existing livelihoods approaches, we present an actor model that emphasises actors' agency and rationales of action, as well as their influ-

ence on the production and reproduction of social structures. This model is intended as a conceptual orientation for inter- and transdisciplinary research for development, as well as a tool for reflection and communication with a view to contributing to a problem-oriented understanding of development dynamics (section 11.4). Translated into practice, the structural model allows for better identification of leverage points for inter- and transdisciplinary development-oriented research (section 11.5).

11.2 The quest for agents of change in the Sustainable Livelihoods Approach and Framework

Advocates of livelihoods approaches aim to achieve a better understanding of needs and conditions at the local level and to address challenges posed by the ‘real’, ‘complex’ world more appropriately than this is normally possible in singular top-down interventions. This aim is pursued by adequately integrating actors into development research. In simple terms, a livelihood comprises the capabilities, assets, and activities required for gaining a living (Chambers 1995; DFID 1999–2001). Livelihoods approaches are usually goal-oriented, focusing on livelihood security (Chambers and Conway 1991) and/or livelihood sustainability (Hoon et al 1997; DFID 1999–2001). Their explicit – and even more so, implicit – aim is to operationalise underpinning social theories in the context of development-oriented research. Indeed, a tradition of cross-disciplinary approaches intended to be people-centred and systemic stretches back many decades, although many of them were not labelled livelihoods approaches. Comparative assessments of livelihoods approaches soon emerged (Hussein 2002; Clarke and Carney 2008).

Within this broad array of approaches, the Sustainable Livelihoods Approach (SLA) proposed by DFID (1999–2001) has by far received the most attention and been most frequently applied. The reason for this success lies in its graphic representation, the Sustainable Livelihoods Framework (SLF). As an easy-to-use instrument, it structures the components influencing livelihoods as well as their interactions. The first component, the *vulnerability context*, depicts the external environment within which actors have access to certain assets (Sen 1981, 1987; Chambers 1987). The second component, *livelihood assets*, comprises human, social, natural, physical, and financial capital; political and information capital have been proposed in addition (Baumann and Subir 2001). The third, crucial component, *transformation structures and processes*, is portrayed as the prevailing social, cul-

tural, institutional, and organisational environment, including policies and legislation. This component largely determines access to assets, the terms of exchange between different types of capital, and the returns on any given livelihood strategy (Shankland 2000; Keeley 2001; Keeley and Scoones 2003). This component also constitutes the main entry point for development interventions. Based on the three key components, people pursue *livelihood strategies* to achieve *livelihood outcomes*, which in turn have a feedback effect on the assets.

Notwithstanding the strength and popularity of the SLA and SLF (see section 11.3), advocates complain that it does not live up to its potential (Scoones 2009). This has been the subject of broad discussion, especially concerning the predominantly economic interpretation of the SLF (and other frameworks), which leads to linear or mechanistic application of the framework in development practice as a ‘predictive’ model based on supply–demand, input–output, or pressure–response relations (Ellis 2000; De Haan and Zoomers 2005; Scoones 2009; Geiser et al 2011, in this volume). The benefits and drawbacks of the SLA and SLF have been broadly debated and do not have to be repeated here. But reflection on how framework users perceive and conceive of actors is disillusioning. While livelihoods approaches favour co-production of knowledge (Knutsson 2006) with local actors as knowledgeable and capable partners, we have found that widespread linear application of the SLA usually falls short of ascribing rural actors an active role. We argue that the ready applicability of the SLF has partly hindered the discourse on underpinning theoretical and meta-theoretical concepts as well as related ontological and epistemological positions in livelihoods approaches. More specifically, the graphic representation of the SLF has encouraged a restricted form of implementation of livelihoods approaches, thus inadvertently counteracting the original intention to focus on actors, their rationales, and their agency.

In particular, it is the graphic representation of the “asset pentagon” and the use of the term “capital” to describe these assets that lure framework users into economic analysis. Not surprisingly, this component has attracted the most attention and has largely guided practice, a fact that Scoones (2009, p 178) deplors as “an unfortunate diversion”. Despite much debate and further elaboration, the asset pentagon has remained in the territory of economic analysis. Yet, as economic theories aim to be universal, they neglect the specific cultural backgrounds of human agency (Etzrodt 2003). One-sided economic application of the SLF has thus restricted its use for in-depth anal-

ysis of actors' cultural backgrounds or life-worlds (Habermas 1987, 1994). First of all, the SLF provides few indications of how to address actors' freedom of choice or room for manoeuvre. In particular, it does not guide theoretical reflection on how, why, and when actors change their actions or how changes in action emerge. Nor is it explicit about the form of livelihood strategies. This implies that the SLF places more emphasis on structure than on agency or actors' rationales for action. Consequently, actors appear to be passive and incapable of influencing and changing the "transformation structures and processes" or the "vulnerability context". Secondly, this context remains vague and static, not allowing for consideration of the dynamics of change and development, such as globalisation processes, power structures and struggles, shifts in rural economies, and long-term social or ecological changes. And thirdly, the SLF keeps the conceptual backgrounds of framework users in the dark. Taken together, these shortcomings of the SLF have profoundly undermined the power of livelihoods approaches.

Treating actors' agency and rationales and the context as black boxes means blocking out what constitutes and perpetuates society: actors, power relations, meanings, and institutions. Social and ecological diversity is only partially captured, and a dynamic relationship between the context and the actor is not considered; the view remains static, neither offering a sophisticated model of change and development nor providing a basis for formulating adequate research hypotheses or development scenarios in the quest for sustainability. A major question thus remains unanswered: How can we put the actor back in the picture? This question puts us in search of a practical conceptual model that promotes a clear positioning in terms of its theoretical background.

11.3 Theoretical foundations of an actor-oriented perspective

Social theories provide support in focusing on the meanings and intentions underpinning human action, the social systems enabling and constraining agency, and the production and reproduction of social structures (rules, norms, traditions, and values) by actors. In addition, the SLA has triggered inter- and transdisciplinary discourse on supplementary concepts in livelihoods research (see Wiesmann 1998, 2008a; Baumgartner and Högger 2004; De Haan and Zoomers 2005; Eyhorn 2006; Rist et al 2007a; Rist et al 2007b; Thieme 2008). This concerns in particular the concepts of vulnerability,

adaptation, and resilience, where agency is more evident (Hussein 2002; Füssel 2007; Obrist et al 2007; Plummer and Armitage 2007; McLaughlin and Dietz 2008; Nguyen Viet et al 2009). Moreover, integrative approaches, critical and innovative interpretations of the SLF, and other livelihoods approaches continually evolved in parallel, even if they always remained at the margins of discussion and, even more so, of implementation (Scoones 2009). With a view to conceptualising actors as *agents of change*, we refer in particular to two complementary theoretical discourses that both discuss the relation between structure and the actor, that is, the questions of how structure influences actors and actors influence structure: one stemming from Bourdieu's *theory of practice* (Bourdieu 1977, 1984, 1997; Bourdieu and Wacquant 1992), and one triggered by Giddens's (1984) *structuration theory* and the subsequent discourse of the post-structuration schools.

Bourdieu's *theory of practice* provides key concepts – *habitus*, *practice*, *capital*, and *field* – that make it possible to interpret actions and strategies from the perspective of the actor and of social structure (Dörfler et al 2003). Bourdieu departs from the concept that actors are shaped by society and accounts for the patterned character of social practices by postulating that practice is shaped by *habitus* – a system of acquired, learned, and lasting dispositions to perceive, think, and act in certain ways (Parker 2000) – therefore leading to an *urgency of practice* (Bourdieu 1990, p 112). Closely related to *habitus* is the concept of *capital*. Four main types of capital – economic, cultural, symbolic, and social – are used by actors to meet their needs and improve their social position. While economic capital comprises the material basis, cultural capital refers to cultural possessions and identities and tends to legitimate social hierarchies (Bourdieu 1984), its study thus enabling insights into underlying factors of social injustices and inequalities and their reproduction. Symbolic capital refers to status and recognition based on which actors gain advantages, and is related to the concept of reciprocity (Nowak 2006). Social capital, finally, refers to social networks as patterns of relationships and is linked to the increasingly important concept of multi-locality (Thieme 2008). The distribution of the key forms of capital, their interrelations, and their interconvertibility shape power relations and lead to Bourdieu's concept of *field* as a set of social relations and a system of social positions in which actors strategise and compete over desirable resources. This offers an approach to analysing power relations between actors, their competition to achieve or improve their positions in their social field, how their internalised dispositions influence their actions, and how societal structures constrain or support them in achieving their goals.

Bourdieu's theory puts more emphasis on the influences of social structure on actors than on the actors' influence on social structure, thereby basically narrowing the framework for interpreting the rationale of actors to the pressure to adhere to rules, norms, and values. Giddens's structuration theory provides a complementary interpretative framework, starting from an actor who is knowledgeable and can significantly influence social structure. Structuration refers to the ways in which social systems are produced and reproduced in social interaction (Giddens 1984, pp 25–26). Actors are characterised as being “conscious of the limited possibilities of action and having to make choices commensurate to the constrained situation” (Giddens 1997, p 365). On this basis, an actor may also choose not to act. The basic assumption is that human beings are intentional actors who have reasons for their actions and are capable of discursively explaining their actions. Structuration theory thus provides an interpretative approach that focuses on the rationale of actors.

Despite their critics (Parker 2000; Dörfler et al 2003), Bourdieu and Giddens provide complementary interpretative theories of human social action and interaction, and many livelihoods approaches and concepts have at least partially adopted these theories. Referring to and building on this discussion, in what follows we develop a structural model that puts more emphasis on agency and contextuality by promoting critical reflection on livelihoods approaches against the background of these underlying social theories.

11.4 A human actor model as a conceptual orientation in inter- and transdisciplinary research for development

Based on the discussion above, the impetus to propose an actor model as a conceptual orientation in inter- and transdisciplinary research for development is informed by three arguments:

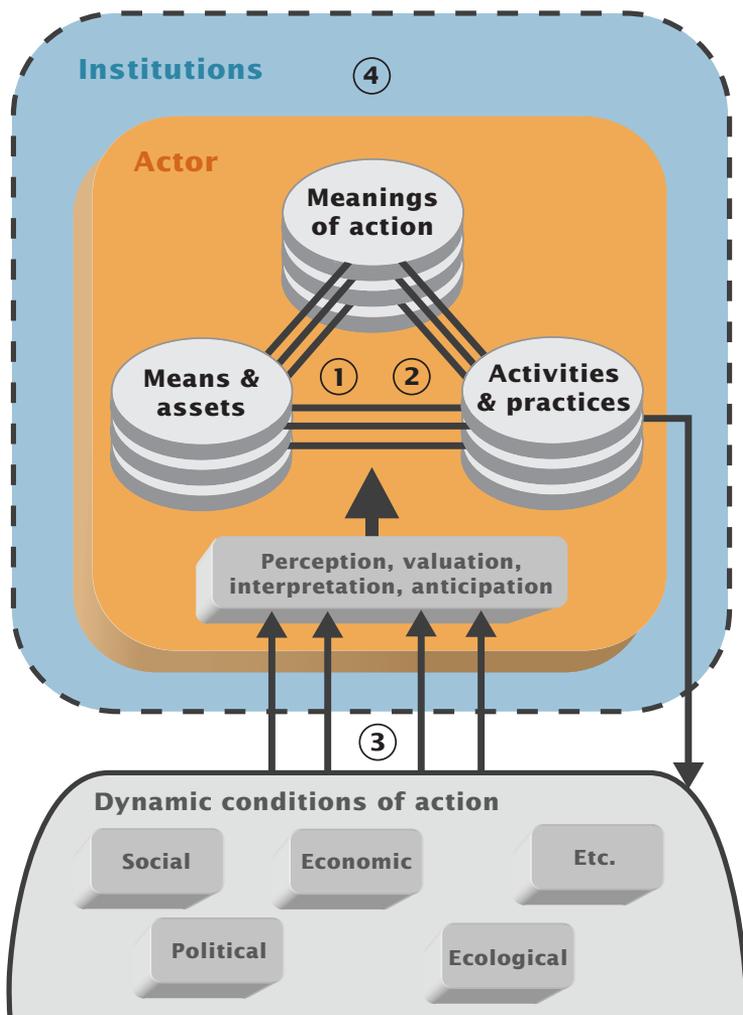
1. The outcomes of basically all development efforts and interventions depend on actors' actions and reactions. The way in which actors are conceptualised in research for development is therefore not only practically relevant, but also influences research findings and conclusions. This implies that the conceptualisation of actors should be shared beyond the participating specialists.

2. Livelihood models and tools that are currently widespread in development-oriented research have their merits; but they do not put enough emphasis on agency, implying that strategies of action and, consequently, change and innovation in action largely remain black boxes.
3. Underpinning theoretical foundations and ontologies should be referred to explicitly, as they form the basis for critical reflection and self-reflection in interdisciplinary research teams and, even more so, in transdisciplinary science–society interactions.

The model presented here does not claim to represent a comprehensive and consistent synthesis of the relevant theories and concepts mentioned in section 11.3. It is intended as a tool for communication, reflection, and orientation in concrete inter- and transdisciplinary research for development, which takes into account basic theoretical and practical considerations.

The model is formulated at a meta level. This offers the possibility of adapting and concretising it for any specific actor category and/or context discussed in interdisciplinary discourses, and enables integration of specialised theories and concepts – for example peasant theories (Wiesmann 2008a) – without losing sight of its basic theoretical foundations. The model builds around an understanding of ‘action’ that puts much emphasis on agency and actor strategies, thereby supporting the fundamental conception that actors creatively balance and evolve their strategies, actions, and practices. This actor-oriented perspective demands an attitude of due respect towards actors of those engaged in research for development.

We have chosen to provide a graphic representation of the model, as experience shows that such representations have a great potential for triggering interdisciplinary discourses and can prevent a division between specialists in the conceptualisation of actors and researchers from other disciplines. The graphic representation highlights *four nested and interlinked components*, each representing a core conceptual element (Figure 1). A detailed description of these components is given in the following sections.



- ① **Action as the dynamic interplay between activity, meaning, and means:** a continuous process of mutual adaptation as a result of differences and tensions between the aim and the – inherently delayed – outcome of action.
- ② **Strategy of action as a combination of actions:** dynamic interplay between the allocation of means, the network of activities, and the structure of meanings. *Rationale of action:* underpinning principles of optimisation processes within strategies of action.
- ③ **Exposure of activities and means to dynamic conditions of action:** The multitude of social, political, economic, and ecological conditions become relevant in actions and strategies of action when perceived, valued, interpreted, and anticipated by actors.
- ④ **Embeddedness of meanings of action in institutions:** Institutions determine social standards (values, norms, rules, etc.) for the evaluation of particular actions, strategies of action, and outcomes of actions by actors. However, individual actors are only bound to these standards to a certain, contextually varying degree.

Fig. 1
A human actor model as a conceptual orientation in interdisciplinary and transdisciplinary research for sustainable development.

11.4.1 Action as the dynamic interplay between activity, meaning, and means

The term *action* is at the core of the model and forms its smallest conceptual unit. It refers to the dynamic interplay between the *activity* of an actor, the *meaning* assigned to this activity, and the *means* used to perform the activity. The term “activity” is understood in a broad sense and also includes practices as well as passivity. The term “meaning” refers to a broad notion of ‘making sense’ from the actor’s perspective and includes, but also goes beyond, rationalised intentionality – be it ex-ante or ex-post (Giddens 2009). The term “means”, finally, refers to material and non-material assets, resources, and capitals in the sense of DFID (1999–2001) or, more so, Bourdieu (1990). This concept of action does not postulate monocausal relations between its three components, but rather a continuous process of mutual adaptation as a result of differences and tensions between the aim and the – inherently delayed – outcome of action. Action is therefore dynamic in all its three components.

In concrete interdisciplinary development-oriented research, this basic concept of action calls for discussion and operationalisation of the following issues, among others:

- Activity – and, to some extent, means – can be observed; but action encompasses more than that, and in order to understand its status and change we have to be able to interpret the rationale behind it.
- Non-activity or persisting activities in a certain field often make much sense when they are understood as an action including all three components of activity, meaning, and means.
- In light of this concept of action, development approaches that concentrate one-sidedly on means or assets – for example through information transfer – bear a high chance of failure.

11.4.2 Strategy of action as a combination of actions

Every actor continuously performs a range of actions. The activity components of these actions share the total material and non-material means or assets available to the actor and form a *network of activities* within which the actor subjectively optimises use of these means. At the same time, the combined aims or intentions driving the different actions constitute a *structure of meanings* within which the actor positions and balances different needs, wishes, and visions. The network of activities with its inbuilt process

of allocation of means results in a range of outcomes, which are inherently delayed. The actor measures these outcomes against the structure of meanings. Discrepancies between outcomes and the meanings assigned to the respective activities may be reflected in changed activity components – for example, to increase certain means – but may also provoke modifications in the structure of meanings itself. This dynamic interplay between the network of activities and the structure of meanings can be referred to as the actor's *strategy of action*. The fundamental rules or principles under which optimisation processes in these strategies take place can be termed *rationale of action*.

These considerations regarding strategies of action based on the theoretical foundations outlined in section 11.3 can stimulate and guide inter- and transdisciplinary research for development in several ways:

- The basic assumption of rationale in strategies of action promotes reflexivity, increases respect within interdisciplinary research teams for actors and stakeholders involved in the development issue under study, and prevents premature conclusions and prejudice.
- The recognition that not only activities and means, but also the structures of meanings in strategies of action may be subject to change opens interpretative perspectives and lays the foundation for mutual learning processes (Rist et al 2007a, 2007b) in transdisciplinary endeavours.
- The greatest practical relevance of this concept of strategy of action for development-oriented research and related development initiatives pertains, however, to the recognition that single actions or sectoral activities – for example in crop production – cannot be understood and influenced meaningfully without taking account of how they are embedded in the relevant actors' strategy of action. From this perspective, it is not surprising that so many sectoral approaches to development have failed and still continue to fail based on overly narrow actor concepts.

11.4.3 Exposure of activities and means to *dynamic conditions of action*

Ecological, economic, political, and social conditions in an actor's life-world are generally *dynamic* and influence the outcome of activities and the actor's stock of means. However, they only become *dynamic conditions of action* in the sense of being relevant to and influencing the actor's strategy of action when they are perceived and interpreted by the actor. In this respect, it is crucial to note that the dynamic conditions of action are perceived as structures, weighted in relation to each other, and interpreted as potentials or limitations for the realisation of activities. In combination with the structure of meanings (see above) they set the framework for decision-making by the actor. However, an actor can only anticipate the influence of the conditions of action on the outcome of activities to a limited degree when contemplating activities. Therefore, perception, valuation, interpretation, and methods of coping with the uncertainty of activity outcomes are at the core of the actor's strategy of action. In the strategy of action, the actor has to strike a balance between adaptation of activities to the dynamic conditions of action and modification of activities to stabilise or improve the conditions of action. This individual and social quest can be seen as a creative process of adaptation and innovation.

These considerations with regard to dynamic conditions of action have decisive implications for inter- and transdisciplinary research for development:

- The creative process of balancing adaptation to and modification of the dynamic conditions of action forms the basis of endogenous development potentials. Priority should be given to assessing these potentials before exploring external support options.
- The proposed concept of dynamic conditions of action prevents research from perceiving these conditions – for example ecological aspects – as unalterably given. Moreover, it entails the perspective that their relevance for action is a function of patterns of perception, valuation, and interpretation by actors. This adds a focus on the effects of dynamic conditions on action to the scientifically dominant focus on their causes.
- Further, it is of utmost practical relevance that the positive or negative impacts of one specific dynamic condition cannot be meaningfully assessed without gaining insights into the importance that actors attribute

to it compared to all other conditions they are exposed to, and without taking account of the strategies of action that determine how actors cope with changing limitations and opportunities.

11.4.4 Embeddedness of meanings of action in *institutions*

The meaning component of action is not a purely individual construct of the actor's. It is co-influenced by social values and norms that provide a frame of reference and rules for evaluating the meaningfulness of actions. This frame of reference is captured in the term *institutions*. The societal context in which the actor is embedded shapes not only the actor's patterns of perception, valuation, and interpretation of the dynamic conditions of action, but also the actions themselves. Institutions determine social standards for the evaluation of particular actions, strategies of action, and outcomes of actions; however, individual actors are only bound to these standards to a certain degree. The resulting interplay between individual and institutional notions of the meaning of action – combined with the analogous interplay involved in the valuation and interpretation of the dynamic conditions of action – lays the foundation for processes of innovation regarding both the activity component and the meaning component of action. The fundamental link between meanings of action and institutions raises the question of how values and norms are constituted, mediated, and enforced. Factors such as social networks, social control, and social hierarchies play a crucial role in shaping action, changes in action, and innovation processes. A focus on innovations is therefore essential for an actor-oriented research perspective.

These considerations regarding the embeddedness of meanings of action in institutions can influence discourses and empirical operationalisation in inter- and transdisciplinary research endeavours:

- Acknowledging that meanings of action are socially and societally contextualised and embedded in institutions promotes self-reflection in research teams regarding their own institutional embeddedness and paves the way for deconstructing prejudice and developing a respectful understanding of actors and societies concerned by the issues under study.
- Focusing on institutions is not only crucial to gaining a better understanding of action and, on this basis, of development; it is also fundamentally important in shaping the science–society interface in transdis-

ciplinary approaches and in understanding and giving appropriate weight to endogenous knowledge and values in this interface.

- Research for development strives for change, at least implicitly if not explicitly. The understanding of innovative action as a result of the tensions between the dynamic conditions of action, outcomes of action, individual meanings of action, and societal values and norms as represented in institutions, opens up avenues to better conceptualising innovation and change in research for development.

11.4.5 The human actor model in a nutshell

Overall, the proposed meta model of human actors stipulates that actions and strategies of action depend on dynamic conditions of action and on social values and norms as represented in institutions, but that the actors themselves do not only react to these influences. Rather, it is their embeddedness in social contexts and their exposure to dynamic conditions of action that defines the degree of freedom with which they continuously balance and try to optimise their specific strategies of action. This process of optimisation can be understood as a creative act which is concretised by the interplay between action and reaction, and concerns all three components – activity, means, and meaning – of action. This basic conceptualisation of actors and action opens up opportunities to promote discourse and operationalisation in inter- and transdisciplinary endeavours that are not confined to the social science representatives in the research teams. In the following section we illustrate this potential based on experiences gained within the framework of the Swiss National Centre of Competence in Research (NCCR) North-South, an inter- and transdisciplinary programme concerned with global change research for sustainable development.

11.5 Application of the human actor model within the NCCR North-South: review and outlook

The NCCR North-South international research programme aims to contribute to more sustainable development (Hurni et al 2011, in this volume). Based on conceptual considerations regarding sustainability, such a contribution necessarily has to be inter- and transdisciplinary, and must generate systems knowledge, target knowledge, and transformation knowledge. In view of the normative dimension of sustainability, emphasis must be placed

on the power of definition of the populations concerned by the issues under study (Wiesmann et al 2011, in this volume). Consequently, sociopolitically contextualised sustainability values, adequate science–society interfaces, and actor-driven transformation potentials are of paramount importance. All this implied from the beginning of the NCCR North-South that the actors and stakeholders involved in the development issues under study must take a central position in the programme’s research approaches and selection of research topics. For this reason, the scientific and ontological conceptualisation of actors is highly relevant to this programme.

From the outset, the NCCR North-South deliberately strove for conceptual and methodological pluralism regarding actor-oriented approaches, with a view to promoting critical exchange and mutual learning among the programme’s different research groups. In 2006 a major effort was made by representatives of these groups – in particular the authors of this article – to identify and conceptualise common grounds, finally resulting in the human actor model presented above. In addition, the process also increased cohesion within the programme and added value to the different conceptual strands of the participating research groups. The model itself has proven to be useful in guiding and informing inter- and transdisciplinary research for development. Its application has shown to be particularly valuable at the following three levels: 1) its concretisation for specific actor categories, 2) its use as a heuristic tool for formulating research questions and meaningful hypotheses, and 3) its use as an underpinning theoretical framework for more specialised and innovative theoretical and conceptual development. In the following paragraphs we briefly outline some past and planned applications at these three levels.

11.5.1 Concretisation for specific actor categories

Small-scale farmers – or peasants – are a key actor category when it comes to rural development in the global South. The actor model was therefore concretised for peasant actors by assessing specificities for each of the four model components based on the vast existing literature on this actor category. The resulting peasant actor model (Wiesmann 1998, 2008a) reveals that peasants perceive most dynamic conditions of action – ecological, economic, and sociopolitical – as uncertainties and risks rather than opportunities. Combined with limited assets, this leads to complex and multifaceted strategies of action that cover a broad range of spheres of action, including, among other things, multi-variety crop production, mixed livestock husbandry, a

range of off-farm activities, social networking within and beyond contexts, and sometimes also multi-locality. These multifaceted strategies are primarily developed to balance and reduce the risks associated with high uncertainty of dynamic conditions, and to selectively seize opportunities that are compatible with the basic multi-strategies. The rationale of balancing risks by diversifying and selectively building on opportunities aims at optimising utility in terms of sustainable livelihoods, social position, as well as inter-generational preservation of social and material resources. As a result, the fall into poverty or the achievement of greater wealth are primarily reflected in weight shifts within the multi-strategies and the corresponding rationales. The institutional embeddedness of peasants is typically twofold, within the context of a peasant society on the one hand and a globalising national society on the other. This produces tensions and conflicts within livelihood strategies and rationales, but at the same time acts as an important driver shaping action, change in action, and processes of innovation, given their compatibility with the basic multi-strategies. Among others, this peasant actor model, which builds on the actor model presented here, was successfully applied by Ifejika Speranza (2006) and Ifejika Speranza and co-authors (2009) in relation to vulnerability to climate risks, by Eyhorn (2006) in relation to organic farming and cotton production, and by Gallati and co-authors (2006) in system modelling of water allocation among smallholders. Its basic elements partly also found their way into the global assessment of agricultural knowledge, science, and technology (IAASTD 2009; Hurni et al 2009).

11.5.2 Heuristic potential in research for development

In concrete and contextualised inter- and transdisciplinary research, the actor model has proven to be an important heuristic tool to stimulate structuring of research questions and formulation of hypotheses in interdisciplinary discourse. This can be illustrated by the debate on climate change, as the questions of climate change mitigation and, even more so, adaptation to climate change, as well as the related questions of food security tend to dominate the development discourse at the global level.

Considering the question of adaptation to climate change by rural smallholders against the background of the actor model and its concretisation in the peasant model reveals that the assumption of a direct link between changing climate and changing agricultural practices does not hold. Climate change is just one of the many hardly predictable dynamic conditions of action faced

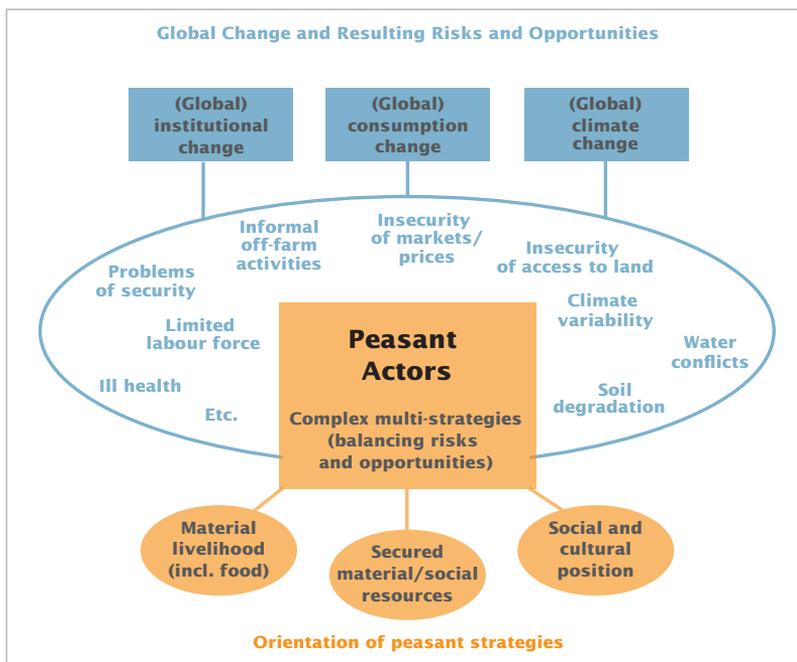


Fig. 2
Application of the human actor model to the question of smallholders' adaptation to climate change.

by smallholders (see Figure 2), and in their perception the amplitude of climate change tends to be overridden by that of climate variability, which they perceive as being high already. This is reflected and taken account of in smallholders' complex multi-strategies of action. We can therefore hypothesise that for the time being, climate change will not lead to major adaptation of smallholder practices. Adaptation processes will begin at the point where the perceived amplitude of climate change will exceed that of climate variability and will thus be seen as an additional risk; however, they will be reflected in weight shifts between the components of smallholders' multi-strategies rather than in modified agricultural practices. In addition, we can hypothesise that over the next decades, changes in global consumption patterns and related changes in global agricultural markets – including resulting international land investments – will change the dynamic conditions of action to a higher degree than climate change itself. As a consequence, promoting adaptation to climate change and rural innovation highly depend on whether and how uncertainties in the dynamic conditions of action faced by smallholders can be reduced. In addition, new forms of local multi-stakeholder organisations could be promoted to reduce tension arising from the

twofold institutional embeddedness of peasants at the local and national levels, which could open up avenues for innovation and adaptation processes, as Kiteme and Gikonyo (2002) have shown in their transdisciplinary work with water users' associations in the Mount Kenya region.

All these considerations have not yet been consolidated in scientific publications, but the questions and hypotheses were derived from applying the actor model to the concrete issue of smallholders' adaptation to climate change. They illustrate the considerable heuristic potential of the human actor model when applied in an interdisciplinary setting concerned with typical questions of development-oriented research.

11.5.3 Potential for theoretical innovation

The human actor model, together with its theoretical and ontological foundations, can form a basis for innovative and more specialised theoretical and conceptual contributions. Several such contributions have been made or are in progress within the NCCR North-South. One of the most innovative and widely recognised contributions by the NCCR North-South is the refinement of the concept of social resilience (see also Adger 2000) proposed by Obrist et al (2007). Although this conceptual framework does not directly build on the actor model presented here but was developed in parallel, the two are compatible and an expression of the stimulating discourse within the overall NCCR North-South. Efforts are being made to broaden the single-actor perspective of the present actor model to create a multi-actor model by systematically addressing the interplay between different actors in all four components of the model. It also appears important to further extend this multi-actor perspective and explore the ramifications of including gender issues explicitly in the model; this will be undertaken in the near future. Further, the actor model has triggered theoretical development regarding the spatial dimension of development, as its translation into space leads to complex overlaps of spaces of action, spaces of concrete manifestations of dynamic conditions of action, and institutional spaces, which have implications for the conceptualisation of regional development (Wiesmann 2008a, 2008b; Messerli and Wiesmann, submitted). Last but not least, the actor model has also informed conceptual considerations regarding sustainable development, as its normative dimension is closely linked to the model component of meanings of action being embedded in institutions (Wiesmann and Messerli 2007; Wiesmann et al 2011, in this volume).

11.5.4 The actor model as a trigger of inter- and transdisciplinary dialogues

The previous three sections refer to concrete and potential outputs from applying the human actor model. Experiences from the NCCR North-South show that in addition to the high practical utility of the model as such, discussing conceptions of actor-orientation in an attempt to find common ground strongly shapes inter- and transdisciplinary research collaboration. In particular, such processes promote reflexivity in intercultural research teams and settings, and help to unravel ethical positions in research for sustainable development. Debates on concepts of action as opposed to simple behaviouristic conceptions of activity, or discussions on concepts of multi-strategies as opposed to simplistic cause-and-effect models have proven to be important in this respect. At the same time, the acknowledgement of meaning in values, norms, and respective institutions, as well as of the plurality of dynamic conditions, which in most development contexts offer few opportunities and pose many risks, is crucial. In research for sustainable development such an acknowledgement promotes the necessary respect towards “knowledgeable and capable” local actors (Giddens 1984), humility in view of the complexity of development settings, as well as scepticism towards the many simplifying solutions offered in development practice. The human actor model presented here is intended to encourage this spirit and to inspire in-depth reflection on and interaction with agents of change, their agency, and their contextuality.

Endnotes

Full citation for this article:

Wiesmann U, Ott C, Ifejika Speranza C, Kiteme BP, Müller-Böker U, Messerli P, Zinsstag J. 2011. A human actor model as a conceptual orientation in interdisciplinary research for sustainable development. In: Wiesmann U, Hurni H, editors; with an international group of co-editors. *Research for Sustainable Development: Foundations, Experiences, and Perspectives*. Perspectives of the Swiss National Centre of Competence in Research (NCCR) North-South, University of Bern, Vol. 6. Bern, Switzerland: Geographica Bernensia, pp 231–256.

Acknowledgements:

The authors acknowledge support from the Swiss National Centre of Competence in Research (NCCR) North-South: Research Partnerships for Mitigating Syndromes of Global Change, co-funded by the Swiss National Science Foundation (SNSF), the Swiss Agency for Development and Cooperation (SDC), and the participating institutions.

¹ Urs Wiesmann is Professor of Geography and Sustainable Regional Development at the Institute of Geography, University of Bern, Switzerland, and Chair of the Institute's Department of Integrative Geography. He is Member of the Board of the Centre for Development and Environment (CDE), University of Bern, and Director of the Swiss National Centre of Competence in Research (NCCR) North-South. He coordinates a number of integrative research projects dealing with contextualised sustainable development in East Africa, Central Asia, Southeast Asia, and the Swiss Alps.

E-mail: urs.wiesmann@cde.unibe.ch

² Cordula Ott is a social anthropologist and holds a position as a senior researcher at the Centre for Development and Environment (CDE), University of Bern. For the past 20 years she has been providing concepts, strategies, instruments, and advice regarding natural resource use and sustainable development in the context of CDE's environmental mandates from the Swiss Agency for Development and Cooperation. Within the Swiss National Centre of Competence in Research (NCCR) North-South she has been supporting coordination of the Transversal Package and of the synthesis process. She is currently writing her PhD thesis on scientific and social challenges in global governance of natural resources.

E-mail: cordula.ott@cde.unibe.ch

³ Chinwe Ifejika Speranza holds a PhD in Geography and works as a senior researcher at the Centre for Development and Environment (CDE) of the University of Bern, Switzerland, and at the German Development Institute in Bonn, Germany. Her research and teaching focus on the interactions between the environment, human actors, and livelihoods, as well as on resilience and adaptation to climate change, natural resources management and environmental governance, and the impacts of development interventions. Her regional focus is East Africa and Nigeria.

E-mail: chinwe.ifejika.speranza@cde.unibe.ch

⁴ Boniface P. Kiteme is Director of and Researcher at the Centre for Training and Integrated Research in Arid and Semi Arid Lands Development (CETRAD) in Kenya. His research interests are natural resources management, integrated water resources management, resource use conflict management, participatory planning, rural livelihoods, and food security.

E-mail: b.kiteme@africaonline.co.ke, b.kiteme@cetrad.org

⁵ Ulrike Müller-Böker is Professor of Human Geography, University of Zurich, Switzerland. She is co-head of the programme component “Livelihoods, Institutions, Conflicts” of the Swiss National Centre of Competence in Research (NCCR) North-South and in charge of NCCR North-South research in South Asia. Her research concentrates on the analysis of institutional dimensions of livelihood strategies, the impact of globalisation processes, local resource use conflicts, labour migration patterns, nature conservation, and development and participation processes, all with a regional focus on South Asia, Central Asia, and Switzerland.

E-mail: ulrike.mueller-boeker@geo.uzh.ch

⁶ Peter Messerli is a human geographer and Director of the Centre for Development and Environment (CDE) of the University of Bern, Switzerland. His research interests lie in the sustainable development of human–environment systems in Africa and Asia, focusing on globalised and distant driving forces of rural transformation processes and their spatial manifestations. Peter Messerli holds a PhD in Geography, for which he specialised in strategies towards sustainable land management in shifting cultivation on the Eastern Escarpment of Madagascar.

E-mail: peter.messerli@cde.unibe.ch

⁷ Jakob Zinsstag, veterinarian, is Professor of Epidemiology at the University of Basel and Head of the Human and Animal Health Unit at the Swiss Tropical and Public Health Institute (Swiss TPH) in Basel, Switzerland. He is also Co-head of Thematic Node 2 of the Swiss National Centre of Competence in Research (NCCR) North-South.

E-mail: jakob.zinsstag@unibas.ch

References

Publications elaborated within the framework of NCCR North-South research are indicated by an asterisk (*).

- Adger WN. 2000. Social and ecological resilience: Are they related? *Progress in Human Geography* 24(3):347–364. doi:10.1191/030913200701540465.
- AGE [The European Older People's Platform]. 2008. *Older People and Information and Communication Technologies: An Ethical Approach*. Brussels, Belgium: AGE. Also available at: http://ec.europa.eu/information_society/activities/einclusion/docs/workshop_ethics_09/age.pdf; accessed on 31 January 2011.
- Ashley C, Carney D. 1999. *Sustainable Livelihoods: Lessons from Early Experience*. London, UK: Department for International Development (DFID).
- Baumann P, Subir S. 2001. *Linking Development with Democratic Processes in India: Political Capital and Sustainable Livelihoods Analysis*. Natural Resource Perspectives 68. London, UK: Overseas Development Institute (ODI).
- Baumgartner R, Högger R, editors. 2004. *In Search of Sustainable Livelihood Systems: Managing Resources and Change*. New Delhi, India: Sage.
- Bourdieu P. 1977. *Outline of a Theory of Practice*. English translation [1972']. Cambridge, UK: Cambridge University Press.
- Bourdieu P. 1984. *Distinction: A Social Critique of the Judgement of Taste*. English translation [1979']. Cambridge, MA: Harvard University Press.
- Bourdieu P. 1990. *In Other Words: Essays Towards a Reflexive Sociology*. Palo Alto, CA: Stanford University Press.
- Bourdieu P. 1997. The forms of capital. In: Halsey AH, Lauder H, Brown P, Wells AS, editors. *Education: Culture, Economy, Society*. Oxford, UK: Oxford University Press, pp 46–58.
- Bourdieu P, Wacquant L. 1992. *Invitation to Reflexive Sociology*. Chicago, IL: University of Chicago Press.
- Carney D. 2002. *Sustainable Livelihoods Approaches: Progress and Possibilities for Change*. London, UK: Department for International Development (DFID).
- Carney D, Drinkwater M, Rusinow T, Neeffjes K, Wanmali S, Singh N. 1999. *Livelihoods Approaches Compared: A Brief Comparison of the Livelihoods Approaches of the UK Department for International Development (DFID), CARE, Oxfam and the United Nations Development Programme (UNDP)*. London, UK: Department for International Development (DFID).
- Chambers R. 1987. *Sustainable Rural Livelihoods: A Strategy for People, Environment and Development*. An overview paper for Only One Earth: Conference on Sustainable Development, London, UK, 28–30 April 1987. London, UK: International Institute for Environment and Development (IIED).
- Chambers R. 1995. *Poverty and Livelihoods: Whose Reality Counts?* IDS Discussion Papers 347. Brighton, UK: Institute of Development Studies (IDS).
- Chambers R, Conway GR. 1991. *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*. IDS Discussion Papers 296. Brighton, UK: Institute of Development Studies (IDS).
- Clark WC. 2007. Sustainability science: A room of its own. *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* 104(6):1737–1738.
- Clarke J, Carney D. 2008. *Sustainable Livelihoods Approaches: What Have We Learnt?* Background paper presented at the ESRC Livelihoods Seminar, Brighton, UK, 13 October 2008. Available at: <http://www.eldis.org/go/topics/dossiers/livelihoods-connect/livelihoods-in-dfid&id=41798&type=Document>; accessed on 30 October 2011.
- De Haan L, Zoomers A. 2005. Exploring the frontier of livelihoods research. *Development and Change* 36(1):27–47.
- DFID [Department for International Development]. 1999–2001. *Sustainable Livelihoods Guidance Sheets*. London, UK: Department for International Development (DFID). Also available at: <http://www.eldis.org/go/topics/dossiers/livelihoods-connect/what-are-livelihoods-approaches/training-and-learning-materials>; accessed on 30 October 2011.

- Dörfler T, Graefe O, Müller-Mahn D. 2003. Habitus und Feld – Anregungen für eine neue Orientierung der geographischen Entwicklungsforschung auf der Grundlage von Bourdieus 'Theorie der Praxis'. *Geographica Helvetica* 58(1):1–23.
- Ellis F. 2000. *Rural Livelihoods and Diversity in Developing Countries*. Oxford, UK: Oxford University Press.
- Ellis F, Freeman HA. 2004. Rural livelihoods and poverty reduction strategies in four African countries. *Journal of Development Studies* 40(4):1–30.
- Etzrodt C. 2003. *Sozialwissenschaftliche Handlungstheorien: Eine Einführung*. Constance, Germany: UVK Verlagsgesellschaft.
- Eyhorn F. 2006. *Assessing the Potential for Organic Farming for Sustainable Livelihoods in Developing Countries: The Case of Cotton in India* [PhD dissertation]. Bern, Switzerland: University of Bern. Also available at: http://www.rfpp.ethz.ch/fellowships/concluded_fellowships/organiccotton/dissertation; accessed on 17 November 2011.
- Füssel HM. 2007. Vulnerability: A generally applicable conceptual framework for climate change research. *Global Environmental Change* 17(2):155–167.
- * Gallati J, Askaraliev B, Niederer P, Maselli D. 2006. *Towards a System Dynamics Framework for Understanding Interactions of Head- and Tail-Users in Irrigation Systems in Kyrgyzstan*. Paper presented at the 24th International Conference of the System Dynamics Society, Nijmegen, The Netherlands, 23–27 July 2006. Available at: <http://www.systemdynamics.org/conferences/2006/proceed/papers/GALLA276.pdf>; accessed on 30 October 2011.
- * Geiser U, Müller-Böcker U, Shahbaz B, Steimann B, Thieme S. 2011. Towards an analytical livelihoods perspective in critical development research. In: Wiesmann U, Hurni H, editors; with an international group of co-editors. *Research for Sustainable Development: Foundations, Experiences, and Perspectives*. Perspectives of the Swiss National Centre of Competence in Research (NCCR) North-South, University of Bern, Vol. 6. Bern, Switzerland: Geographica Bernensia, pp 257–271.
- Giddens A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*. Cambridge, UK: Polity Press.
- Giddens A. 1997. *Sociology*. 3rd edition [1989¹]. Cambridge, UK: Polity Press.
- Giddens A. 2009. *Sociology*. 6th edition [1989¹]. Cambridge, UK: Polity Press.
- Gigerenzer G, Brighton H. 2009. Homo heuristicus: Why biased minds make better inferences. *Topics in Cognitive Science* 1(1):107–143.
- Habermas J. 1987. *The Theory of Communicative Action. Vol. 2: Lifeworld and System: A Critique of Functionalist Reason*. English translation [1981¹]. Cambridge, UK: Polity.
- Habermas J. 1994. *The Theory of Communicative Action. Vol. 1: Reason and the Rationalization of Society*. English translation [1981¹]. Boston, MA: Beacon Press.
- Hermerén G. 1989. *Det goda företaget: Om etik och moral i företag*. Stockholm, Sweden: Svenska arbetsgivareföreningen.
- * Hirsch Hadorn G, Bradley D, Pohl C, Rist S, Wiesmann U. 2006. Implications of transdisciplinarity for sustainability research. *Ecological Economics* 60(1):119–128.
- Hoon P, Singh N, Wanmali S. 1997. *Sustainable Livelihoods: Concepts, Principles and Approaches to Indicator Development*. A Draft Discussion Paper prepared for the Workshop on Sustainable Livelihoods Indicators, United Nations Development Programme (UNDP), New York, 21 August 1997. Available at: <http://www.sustainable-livelihoods.com/pdf/sustainablelivelihoodsc-1.pdf>; accessed on 30 October 2011.
- Hurni H, Osman-Elasha B; with an international group of authors. 2009. Context, conceptual framework and sustainability indicators. In: IAASTD [International Assessment of Agricultural Knowledge, Science and Technology for Development]. 2009. *Agriculture at a Crossroads: Global Report*. Washington, D.C.: Island Press, pp 1–56. Also available at: http://www.agassessment.org/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Report%20%28English%29.pdf; accessed on 27 October 2011.

- * Hurni H, Wiesmann U; with an international group of co-authors. 2011. Global change research for sustainable development. In: Wiesmann U, Hurni H, editors; with an international group of co-editors. *Research for Sustainable Development: Foundations, Experiences, and Perspectives*. Perspectives of the Swiss National Centre of Competence in Research (NCCR) North-South, University of Bern, Vol. 6. Bern, Switzerland: Geographica Bernensia, pp 15–42.
- Hussein K. 2002. *Livelihoods Approaches Compared: A Multi-agency Review of Current Practice*. London, UK: Department for International Development (DFID) and Overseas Development Institute (ODI). Also available at: <http://www.eldis.org/go/topics/dossiers/livelihoods-connect&id=40301&type=Document>; accessed on 30 October 2011.
- IAASTD [International Assessment of Agricultural Knowledge, Science and Technology for Development]. 2009. *Agriculture at a Crossroads: Global Report*. Washington, D.C.: Island Press. Also available at: http://www.agassessment.org/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Report%20%28English%29.pdf; accessed on 30 October 2011.
- * Ifejika Speranza C. 2006. Gender-based analysis of vulnerability to drought among agro-pastoral households in semi-arid Makueni District, Kenya. In: Premchander S, Müller C, editors. 2006. *Gender and Sustainable Development: Case Studies from NCCR North-South*. Perspectives of the Swiss National Centre of Competence in Research (NCCR) North-South, University of Bern, Vol. 2. Bern, Switzerland: Geographica Bernensia, pp 119–146.
- * Ifejika Speranza C, Kiteme B, Ambenje P, Wiesmann U, Makali S. 2009. Indigenous knowledge related to climate variability and change: Insights from droughts in semi-arid areas of former Makueni District, Kenya. *Climatic Change* 100(2):295–315. doi:10.1007/s10584-009-9713-0.
- Jäger J. 2009. The governance of science for sustainability. In: Adger WN, Jordan A, editors. *Governing Sustainability*. Cambridge, UK: Cambridge University Press, pp 142–158.
- Keeley JE. 2001. *Influencing Policy Processes for Sustainable Livelihoods: Strategies for Change*. Lessons for Change in Policy and Organisations No. 2. Brighton, UK: Institute of Development Studies (IDS).
- Keeley JE, Scoones I. 2003. *Understanding Environmental Policy Processes: Cases from Africa*. London, UK: Earthscan.
- * Kiteme BP, Gikonyo J. 2002. Preventing and resolving water use conflicts in the Mount Kenya highland–lowland system through water users' associations. *Mountain Research and Development* 22(4):332–337.
- Knutsson P. 2006. The Sustainable Livelihoods Approach: A framework for knowledge integration assessment. *Human Ecology Review* 13(1):90–99.
- McLaughlin P, Dietz T. 2008. Structure, agency and environment: Toward an integrated perspective on vulnerability. *Global Environmental Change* 18(1):99–111.
- * Messerli P, Wiesmann U. Submitted. The 'sustainability context': A conceptual tool for improving scientific knowledge contributions to sustainable development. Available from Peter Messerli.
- * Nguyen Viet H, Zinsstag J, Schertenleib R, Zurbrügg C, Obrist B, Montangero A, Surinkul N, Koné D, Morel A, Cissé G, Koottatep T, Bonfoh B, Tanner M. 2009. Improving environmental sanitation, health and well-being: A conceptual framework for integral interventions. *EcoHealth* 6(2):180–191. doi:10.1007/s10393-009-0249-6.
- Nowak MA. 2006. Five rules for the evolution of cooperation. *Science* 314(5805):1560–1563. doi:10.1126/science.1133755.
- * Obrist B, Iteba N, Lengeler C, Makemba A, Mshana C, Nathan R, Alba S, Dillip A, Hetzel MW, Mayumana I, Schulze A, Mshinda H. 2007. Access to health care in contexts of livelihood insecurity: A framework for analysis and action. *PLoS Medicine* 4(10):1584–1588. doi:10.1371/journal.pmed.0040308.
- Parker J. 2000. *Structuration*. Buckingham, UK: Open University Press.
- Plummer R, Armitage D. 2007. A resilience-based framework for evaluating adaptive co-management: Linking ecology, economics and society in a complex world. *Ecological Economics* 61(1):62–74.

- * Rist S, Chidambaranathan M, Escobar C, Wiesmann U, Zimmermann A. 2007a. Moving from sustainable management to sustainable governance of natural resources: The role of social learning processes in rural India, Bolivia and Mali. *Journal of Rural Studies* 23(1):23–37.
- * Rist S, Delgado F, Wiesmann U. 2007b. Social learning processes and sustainable development: The emergence and transformation of an indigenous land use system in the Andes of Bolivia. In: Wals A, editor. *Social Learning Towards a Sustainable World*. Wageningen, The Netherlands: Wageningen Academic Publishers, pp 229–244.
- Scoones I. 2009. Livelihoods perspectives and rural development. *Journal of Peasant Studies* 36(1):171–196. doi:10.1080/03066150902820503.
- Sen A. 1981. *Poverty and Famines: An Essay on Entitlement and Deprivation*. Oxford, UK: Oxford University Press.
- Sen A. 1987. *Hunger and Entitlements*. WIDER Research for Action. Helsinki, Finland: World Institute for Development Economics Research (WIDER), United Nations University (UNU). Also available at: http://www.wider.unu.edu/publications/working-papers/previous/en_GB/rfa-1/; accessed on 31 October 2011.
- Shankland A. 2000. *Analysing Policy for Sustainable Livelihoods*. IDS Research Reports 49. Brighton, UK: Institute of Development Studies (IDS).
- * Thieme S. 2008. Sustaining livelihoods in multi-local settings: Possible theoretical linkages between transnational migration and livelihood studies. *Mobilities* 3(1):51–71. doi:10.1080/17450100701797315.
- Wiesmann U. 1998. *Sustainable Regional Development in Rural Africa: Conceptual Framework and Case Studies from Kenya*. African Studies 14. Bern, Switzerland: Geographica Bernensia.
- * Wiesmann U. 2008a. *Sustainable Regional Development in Rural Africa. Part I: An Actor-Oriented Perspective on Regional Development in African Smallholder Areas*. Revised edition [1998']. Bern, Switzerland: Centre for Development and Environment and NCCR North-South. Available at: <http://www.north-south.unibe.ch/content.php/publication/id/2646>; accessed on 17 November 2011.
- * Wiesmann U. 2008b. *Sustainable Regional Development in Rural Africa. Part II: Peasant Strategies and Ecological Adaptation in the Semi-arid Laikipia District, Kenya*. Revised edition [1998']. Bern, Switzerland: Centre for Development and Environment and NCCR North-South. Available at: <http://www.north-south.unibe.ch/content.php/publication/id/2647>; accessed on 17 November 2011.
- * Wiesmann U, Biber-Klemm S, Grossenbacher-Mansuy W, Hirsch Hadorn G, Hoffmann-Riem H, Joye D, Pohl C, Zemp E. 2008. Enhancing transdisciplinary research: A synthesis in fifteen propositions. In: Hirsch Hadorn G, Hoffmann-Riem H, Biber-Klemm S, Grossenbacher-Mansuy W, Joye D, Pohl C, Wiesmann U, Zemp E, editors. *Handbook of Transdisciplinary Research*. Berlin, Germany: Springer, pp 433–441.
- * Wiesmann U, Hurni H, Ott C, Zingerli C. 2011. Combining the concepts of transdisciplinarity and partnership in research for sustainable development. In: Wiesmann U, Hurni H, editors; with an international group of co-editors. *Research for Sustainable Development: Foundations, Experiences, and Perspectives*. Perspectives of the Swiss National Centre of Competence in Research (NCCR) North-South, University of Bern, Vol. 6. Bern, Switzerland: Geographica Bernensia, pp 43–70.
- * Wiesmann U, Messerli P. 2007. Wege aus den konzeptionellen Fallen der Nachhaltigkeit: Beiträge der Geographie. In: Kaufmann R, Burger P, Stoffel M, editors. *Nachhaltigkeitsforschung – Perspektiven der Sozial- und Geisteswissenschaften*. Bern, Switzerland: Schweizerische Akademie der Geistes- und Sozialwissenschaften, pp 123–142. Also available at: <http://www.sagw.ch/sagw/oeffentlichkeitsarbeit/publikationen/publis-schwerpunkte/publis-ne.html>; accessed on 17 November 2011.