Adaptation to climate change is largely envisioned as increments of adjustments that society has made or might make to reduce its vulnerability to existing climate change and variability intended to avoid disruptions of systems at their current locations (Kates, Travis et al. 2012). However, vulnerabilities and risks may require transformational adaptation rather than adjustments. Existing structures, institutions, attitudes and behaviors need to be critically evaluated in light of the risks that climate change poses or should pose in the future. There has been a growing interest in the scholarly community for integrating political and ecological processes in the theorization of transformative adaptation in socio-ecological systems. However, recent selected review on adaptation to climate change has demonstrated that only 3% of journal articles viewed adaptation as a process of transformation change (Bassett and Fogelman 2013). Most of the literature (70%) takes an "adjustment adaptation" approach, which views climate impacts as the main source of vulnerability. In contrast to this perspective in which individual decision makers adapt to natural hazards through a "satisficing" process, transformative adaptation relates to a social process in which political-economic dynamics and social relations determine individuals "adaptive capability" (Watts 1983). It emphasizes the importance of understanding the causal structures of vulnerability in different political-economic and environmental contexts as the basis of adaptation. Very few papers viewed adaptation as a transformational process that addresses the structural causes of vulnerability in different political-economic and environmental contexts, and the social processes through which evolving political-economic dynamics and social relations can increase individual adaptive capabilities.

The proposed session will advance understanding of transformation adaptation by highlighting the structural causes of vulnerability and transformational solutions. Our goal is to bring together various experts from the sustainability and climate change science including resilience and vulnerability thinkers and practitioners. The objective is to analyse different perspectives and experiences on transformational adaptation among coupled environmental and human systems. We aim to generate common and cutting edges reflexions on the politics, the praxis and the ethics of transformational adaptation. We also encourage presenters to analyse linkages, synergies and trade-offs between different research practices/communities toward a transformational adaptation of coupled environmental and human systems.

Case studies of adaptation processes will focus on rural livelihoods that rely on forests and trees. They will examine the different types of adaptation to climate change that are addressed by adaptation plans and initiatives. The objective is to analyse different experiences of transformational adaptation of social-ecological systems under different lenses of analysis. We aim also to generate common and cutting edges reflexions on the politics, the praxis and the ethics of transformational adaptation. Does science itself requires a transformational changes and a radical paradigm shifting?
Can experiences of forest co-management facilitate transformational adaptation in the face of global changes? A case study in Burkina Faso

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Transformational adaptation is defined as a change that is adopted on a large scale, one that transforms places, institutions and regions and shifts systems (Kates et al. 2011). However, little is known yet about the pre-conditions and factors that set the stage for transformational adaptation among socio-ecological systems.

In most regions of West Africa, livelihoods depend on goods and services from savannah ecosystems, in interplay with agricultural and livestock production systems. Economic, ecological, social and political changes represent challenges for the governance of the commons. Adaptive co-management appears as an emergent and promising strategy in complex and multi scale, overlapping, governance mechanisms among socio-ecological systems. In Burkina Faso, under state control, forest policies have been introduced since the 1980's that give more rights to communities to access and collectively manage previously protected areas through local Forest Management Groups (FMG). This is seen and celebrated as a significant shift in the environmental governance in Burkina Faso. The province of Ziro (Centre-West region) is one of the first regions where the co management of forest resources has been implemented. In this region professional groups of local actors gathered in Forest Management Groups (FMG) can exploit and sell firewood according to a forest management scheme. In two villages involved in this devolution process, we conducted vulnerability assessment surveys and focus group discussions.

This paper analyses how vulnerability and adaptive capacity of people, belonging to different social groups, using common resources, evolve under the implementation of a co management system. It also analyses how these established new norms shape people's collective action and adaptive capacity. We discuss the new system's pertinence to both incremental and transformational adaptation. The results show that in communities where more formal rights are granted through the forest co-management norms, disadvantaged groups encounter more challenges in accessing and using forest products than in communities where access is still regulated through customary regimes. The exclusive rights to manage forest product through the creation of professional woodcutter's organizations, raises the question of who defines institutional transformation for whom, and who benefit from it. If forest policies ignore the heterogeneous context of communities, as well as existing power relationships, co-management initiatives and actions aiming at granting more rights to people can produce pervert outcomes by decreasing the adaptive capacity of disadvantaged groups and their collective action to move on to a transformational adaptation. Our results show that co-management applied without reinforced rights and leadership of the most vulnerable, including a radical change in behavioural and institutional patterns, tends to maintain existing power relationships, renders powerless groups vulnerable and inhibits institutional adaptive transformation.
Assessing the resilience of agroforestry systems in Central America: what do we learn about the transformability of coffee plantations?

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Agroforestry systems provide ecosystem services, on which adaptation to climate change could increasingly rely. In Mesoamerica, under a tropical wet climate, coffee-based agroforestry can maintain supporting and regulating services such as drought resistance, soil formation and flood regulation, that help facing extreme rainfall events.

However, under conditions of global market fluctuations and weak policy support, coffee-based tropical agroforestry systems (AFS) are abandoned or imperiled by the extension of pasture and sugarcane areas. These land use changes also threaten biodiversity in biological corridors (BC) where protected areas are connected by AFS, as in the Costa Rican Central Volcanic – Talamanca BC.

In its Balalaica subcorridor delimited by two rivers and crossed by a mountainous spine, local stakeholders and a pluridisciplinary research team aim at understanding the dynamics of land use change affecting AFS and the mechanisms at work.

On the basis of the Resilience Assessment guide with emphasis on existing knowledge, either local or scientific, an historical profile and two threshold cascades were built in a two-step process: initial results obtained out of available literature, were then revised during working sessions with stakeholders and academic experts. Three scales were considered: the focal system Balalaica; its farms at the smaller scale; Costa Rica at the larger one.

The historical profile was constructed over a century, and specified for the last 30 years. It illustrates the combined effects that recurrent coffee crises and new national regulations have had at the farm level, where the creation and the bankruptcies of agricultural transformation units was determinant. Successive development phases could be identified that characterize the Balalaica subcorridor within the national context and correspond to different phases of several adaptive cycles.

The threshold cascades propose a conceptual model on how ecological or economic disturbances at the national scale affect the profitability of coffee plantation in the subcorridor, which lowers the economic importance of coffee for households and the cultural identity felt towards it, leading to land use changes and their ecological consequences, mainly soil degradation with pasture and connectivity loss with sugarcane. Bound this way, each phenomenon gets more irreversible.

Reconsidering the concept of adaptive cycle allows to complete the analysis of coffee agroforestry resilience and to question the transformability of this type of socio-ecological system at the farm and plot scale. Fluctuations in coffee and sugarcane areas are interpreted as resulting from two connected adaptive cycles; a same plot moving from one cycle to the other and back after some years. Such type of land use change has recently became a more irreversible conversion to sugarcane, and we found that alternative
practices in coffee plantations interact with this transformation. Doing so, we identified four alternative adaptation trajectories of coffee farms to exogenous disturbances.

This analysis highlights a possible progressive adaptation of coffee systems to an almost non-transformable state of abandoned coffee plantation, that is highly resilient. The result questions traditional views on agroforestry systems among researchers and prompts more reflection about potential traps induced by passive adaptation processes in perennial cropping systems.
Transition towards co-ownership in forest management: Bosland (Flanders, Belgium) as a frontrunner

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Intro and research questions

Forest management is evolving towards multifunctionality and sustainability. Thereby, co-owned forest managing models, where different owners collaborate and all forest users participate, are still exceptional. ‘Bosland’ (Flanders, Belgium) unites different stakeholders in a partnership and is an interesting pioneering example of drastic, systemic innovation in forest management. In that realm we aim to answer the following research questions:

● Can Bosland be categorized as a frontrunner case of systemically innovative forest management?
● In what ways does the Bosland management approach differ from the current forest management regime?

Methods

We used ‘lenses’ of transition management (TM)(Raven, 2005) and strategic niche management (SNM)(Rotmans et al, 2001) to analyse the Bosland-case by developing a learning history-like approach. We started off with a desktop study to list the mere ‘facts’ about the project, later on we conducted semi-structured interviews with ten key stakeholders involved in the origin of the Bosland partnership. In a third step we reviewed the processes on a transition theory background to assess which transition elements were in play in Bosland and whether more generic learnings could be derived as being instrumental for upscaled/accelerated forest management innovation.

Results

Analysis of the history of Bosland identified many typical characteristics of transition experiments as defined in SNM and TM. Our analysis shows that Bosland goes beyond traditional and more incremental innovation approaches. Furthermore, the case differs from the traditional forest management regime in the following specific features:

(i) A paradigm shift towards co-management; Bosland reflects a distinctive paradigm shift from management of isolated forest patches by different owners to collaborative management across various owners on a landscape scale. The traditional top down approach was abandoned and the involved parties are now collaborating as equals.

(ii) Connection of long term visions and short term actions; Bosland started off with the development of an overarching long term vision for the forest land assembling all forest fragments of the entire region. This vision is used as a basis for the shorter term management plans.

(iii) Focus on participation; The initiators of Bosland recognized that building legitimacy and empowering societal actors is essential in the transformation of forest management towards sustainability. Several participatory events took place and this involvement was later on anchored in ‘the Bosland parliament’, consisting of three equal ‘participative houses’.
(iv) Shared learning. The formation of Bosland describes a joint search and learning process for the variety of actors. Negotiation and debate co-created a common understanding and shared ownership.

Conclusions

Bosland can be considered as a frontrunner case in a system innovation towards sustainable forest management. Many features of Bosland align with transition experiments as defined in SNM and TM approaches even though the conception of Bosland was not explicitly based on these approaches, but rather emerged from the initiative of specific engaged actors. Our findings highlight that such ‘emergence' of novel (management) approaches offers fertile breeding ground to experiment with new forms of organization and coordination which create favourable conditions for transition guidance/steering.
Compromising ecological resilience for sustaining social resilience: Local regulation of spontaneous afforestation in the forest-savannah boundaries of Central Cameroon

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For social groups or communities that are dependent on ecological and environmental resources for their livelihoods, the generally admitted idea is that social resilience and ecological resilience are tightly interdependent and should be maintained concomitantly. The forest-savannah ecotone in the Mbam Province of Central Cameroon offers an interesting context where a group of forest dwellers are forced to jeopardize the natural dynamics of the ecotone in order to maintain the integrity of their social system.

The forest-savannah ecotone is a very dynamic ecosystem, which evolves naturally in the sense of a fast advance of forest onto savannah — or afforestation — while current human activities tend towards the opposite trend of forest regression. Most recent palaeoecological studies agree on the bioclimatic origin of these savannahs, induced by a drastic drought of the forest that occurred some 3,000 years ago. The forest-savannah transition areas throughout Africa are of prior interest to explore recent history of human interventions that may have shaped the margins of forest landscapes. They also offer ideal conditions to investigate the concept of ecological resilience since the ecotone is not borne to maintain itself in the absence of disturbance.

Almost three centuries ago, a group of cereal cultivators, the Tikar, moved further south from its northern savannahs in search of more forested and unoccupied lands. The Tikar offer an original case of migrants who have perpetuated their savannah ecological customs in their new forest environment. The knock-on effects of cultural choices and related agricultural practices on the landscape become easier to measure in such a dynamic ecological context, as the changes induced are perceptible within a time interval of just a few decades. However, evolution does not operate only on the biophysical side. During their warlike migration, the Tikar met with and subordinated forest dwellers like the Medjan Pygmies. Sustained by a political system that is based upon a sophisticated canvas of hierarchical chiefdoms, the Tikar performed a judicious combination between the political absorption of their new subordinates and the elaboration of an ethnically diverse identity. Such political predispositions have conclusively conditioned the adaptation of the Tikar to their new forest environment. In order to illustrate the complex relationships between the dynamic forest-savannah boundary and the Tikar life style, we propose to describe the Tikar perception of their constantly moving ecotone and to detail how their land-use system — still influenced by their savannah origins — subtly interacts with the social, cultural, political and ecological features of the locally absorbed forest dwellers to sketch out a strategy aiming at regulating the excessively rapid progression of the forest edge.

The social resilience of the Tikar communities is thus pending on their ability to counterbalance ecosystem dynamics that are, in essence, consubstantial of the ecological resilience of the ecotone, which consists of a continuous afforestation process.
Transformational Adaptation in rural and Indigenous communities

Claudia Comberti

When climate change impacts are particularly rapid or extreme, incremental adaptation may be insufficient (Kates et al. 2012). This is particularly relevant for indigenous and rural communities in developing countries, often the most environmentally exposed, vulnerable, marginalised and resource-dependent groups, on the front lines of environmental change (Gadgil et al. 1993; Smith et al. 2003; Nakashima et al. 2012). In such cases, a more radical adaptive response, transformational adaptation (TA) may be required (Kates et al. 2012). Transformational adaptation refers to fundamental changes to a social-ecological system in response to a shock or other stimuli (Walker et al. 2004; Folke et al. 2010), and whilst this concept has been developed for adaptive management of ecosystems (e.g. Chapin et al. 2009, Folke et al. 2005), factors necessary to support TA in indigenous and rural communities remains under-researched.

TA is conceived of in this instance as the radical end of a spectrum of adaptive responses, which start with ‘coping’ and end in longer-term, more fundamental ‘transformation’ (Thornton & Comberti 2013; Rickards & Howden 2012). This study builds upon the existing literature on requirements for transformational change (e.g. Chapin et al. 2009; Olsson et al. 2006), wider literature on social change (e.g. Reed et al. 2010), and dimensions of TA in indigenous communities (Thornton & Comberti 2013). Two case studies are presented to illustrate the concept and refine a framework for transformational adaptation: a case of responses to climate change in Himalayan communities in Humla, Nepal, is compared to a case of responses to biodiversity change in communities in the Western Ghats of India resulting from the invasive Lantana camara species.

In exploring cases where TA did and did not occur, this study enables a reflection on the differences between incremental and transformational adaptation and the determining factors in these responses. Understanding when and how to support adaptive transformation, in turn, can encourage positive responses to rapid and extreme environmental change in exposed and vulnerable communities – a situation that will become increasingly pertinent given future climate scenarios. This knowledge can be integrated into adaptation, mitigation and development planning, such that synergies between them can be better exploited (Thornton & Comberti 2013) and the resilience and adaptive capacity of marginalised communities increased.