CHAPTER

1

Introduction and basic propositions

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This book is about how landscape approaches can address the challenges of sustainable development. It explores the opportunities and challenges for developing countries to simultaneously achieve social, environmental and economic objectives at the landscape level through multifunctionality. It challenges the 'one-place-one-function' concept of specialization. Current interest in reducing the negative impacts of climate change, and slowing down its progression, leads logically to landscape-level interventions, but in interaction with many ongoing processes and learning opportunities. More specifically, the book aims to review conceptual understandings of landscapes and landscape approaches, as well as synthesize knowledge and experiences largely from across the developing world. Looking at landscapes within the context of climate change, this book provides a set of concepts, tools, incentives, past experiences and practices to further operationalize the concepts of integrated landscape approaches, and climate-smart landscapes in practice. Written for researchers, professionals and policymakers alike, it moves from theory to practice providing a toolkit for implementation of multifunctional landscapes.

This introductory chapter builds up an appreciation of what the landscape scale of analysis and action can do and how it can add value to understanding the relationships between individual livelihood options and strategies, and global change. Landscapes are usefully interpreted as dynamic socio-ecological systems. This supports the perspective that the actual landscape in its current configuration is one out of many possible configurations, and potentially a suboptimal one. Once the wider range of options and the various perspectives on 'optimality' are understood, the opportunity of a 'landscape approach' by proponents of change opens up: it is possible to influence the complex system operating at the landscape scale to manage the various tradeoffs between functions and stakeholders in different, and potentially better ways.

1. Why landscape approaches? What problems might they solve?

Landscape approaches have been born out of the need to address multiple objectives simultaneously. The primary reason for this need is the growing competition for land, with increasing global population and a non-expanding-sized planet earth. Interconnected socio-economic systems at the landscape scale are expected to deal with the 'wicked' challenge of sustainable development. The latter requires environmental conservation (avoiding further damage and recovering from inflicted damage) plus socio-economic development (achieving a considerable increase in quality of life for many people). Climate change has added to this challenge, increasing the sense of urgency.

Addressing climate change is one of many challenges within the environmental and natural resource management fields, termed, 'wicked problems' due to their complex, interwoven nature, often demanding intricate behavioural and policy changes from multiple actors to address them (Balint et al., 2011). Due to their complexity, these problems are often hard to explicitly define and arrive at a clear solution. It may also not be evident when the problem has been adequately addressed (Rittel & Webber 1973; 1984; Weber & Khademian, 2008). Within a landscape there are many different forces driving the change trajectories of the landscape's current and future states. While being able to identify a specific problem (e.g., deforestation), it might be much more complex and challenging to first, identify the specific drivers causing the problem and second, determine the best intervention to address the problem. For example, in the case of deforestation it has been recognized that there exists a number of both direct (proximate) and underlying (ultimate) drivers that are usually interconnected (Geist & Lambin, 2002; Hosonuma et al., 2012; Bernard et al., 2013). This can require a complex set of interventions ranging from land tenure fixes, land use choice changes, incentives schemes, intensification of agriculture at the forest margins, accompanying policies to limit the expansion of agriculture, and much more (Geist & Lambin, 2002; Palm et al., 2005).

Competition for a limited land base for food, fibre, fuel and other land uses has increased, as the world's population has grown. To feed a projected population of more than 9 billion by 2050, food production is expected to grow by more than 50% (FAO, 2009). This will require both expansion of agricultural land and intensification of agricultural practices. In order to meet this demand, it is estimated that agricultural land will increase by approximately 107 million hectares (ha) by 2050 (about 51 million ha in Africa and 49 million ha in Latin America), on top of its previous increase of 176 million ha between 1963 to 2007 (Alexandratos & Bruinsma, 2012). The projected agricultural growth likely implies loss of biodiversity and ecosystem services. Agricultural growth since the 1960s has already caused a decline by approximately 30% of biodiversity; the trend being the most extreme in the tropics with a decline of almost 60% (Global Biodiversity Outlook, 2010). Growing competition over fixed land resources implies often that economically attractive land uses triumph over those that are more valuable from a societal perspective, but less profitable for a private land user. Tropical and sub-tropical developing country landscapes are at the heart of this competition for land, partly because they also represent areas of the highest population growth as well as of projected agricultural land increases. As a result, planning of land use can no longer be the business of single interests, but needs to involve all interested parties. Hence, the increasing requirement for a landscape approach.

The growing competition for land has created mosaic landscapes that simultaneously emit greenhouse-gases, thereby accentuating climate change. This has given birth to a set of actions that aim to reconcile actions to address climate change mitigation (efforts to reduce greenhouse gases) and climate change adaptation as well as food production and food security in the context of the United Nations Framework Convention on Climate Change (UNFCCC). These approaches have been increasingly referred to as 'climate-smart' with multiple variants such as climate-smart agriculture, climate-smart landscapes and climate-smart development (Scherr et al., 2012; Harvey et al., 2013). In this context a landscape approach identifies opportunities to create sustainable landscape pathways

by capitalizing on synergies to facilitate multifunctionality while reducing tradeoffs. This book builds on this increasing body of experience with integrated landscape approaches.

These kinds of holistic approaches are not entirely new. They have been advocated for in international forums including the Convention on Biological Diversity (CBD), which promotes the ecosystems approach, the Bern Convention and the World Heritage Convention, which also recommend landscape actions (WWF, 2002). A growing community of professionals in the area is also emerging[1].

Multifunctionality is about seeking to achieve multiple objectives simultaneously. Multifunctional landscapes in this context then refers to landscapes that effectively provide, as best as possible (relative to their potential), ecosystem functions (i.e., supporting, provisioning, regulatory and cultural)[2] that underpin social and economic functioning.

Therefore in this book we draw from, and build on, current experiences providing knowledge, tools, methods and lessons learned to promote achieving multiple objectives relating to economic, social and environmental functions in practice, framed specifically around 'climate-smart' opportunities.

2. Landscapes and landscape approaches

2.1 Landscapes

From the emergence of the word landscape, derived in English from German and Dutch origins in the Middle Ages as "landschaft" and "landschap", it has been given several definitions and interpretations. In science, these are covered in many fields and disciplines including, but not limited to, geography, ecology, arts and anthropology (Meinig, 1979). Angelstam et al. (2013*a*) distinguishes four interpretations and aspects of landscapes: i) ecological - the interactions between biophysical components such as soil, water, biota and vegetation and resultant patterns and processes; ii) anthropogenic - landscapes as human phenomena with constructs such as infrastructure, land uses, electoral and political constituencies; iii) intangible - as cognitive representations of space, organization and systems; and iv) coupled socio-ecological systems with a combination of all three above and the interfaces between them.

In sum, landscapes are place-based systems that result from interactions between people, land, institutions (laws, rules and regulations) and values. These interactions shape the dimensions of peoples' lives and either produce the food, fuel, fibre they need, or generate the income to buy these from elsewhere. Landscapes shape ecological services and the social and economic relationships on which people depend (Frost et al., 2006). We distinguish three outstanding interactive aspects that define a landscape: functional interactions, negotiated spaces and multiple scales.

1. **Functional interactions:** Ecological, economic and social processes in a landscape interact. Landscapes can be seen as a mosaic of components, named land units by Zonneveld (1989), who defined these as ecologically homogenous areas of land with associated variation in land use. The management of the various land units is linked to multiple and different sectors of a national economy (including agriculture, forestry, water management, infrastructure, rural development), and also to actor interests and biophysical characteristics.

2. **Negotiated spaces:** Landscapes typically have a diverse set of stakeholders with different perspectives, interests, power and ambitions, which can often be conflicting. Hence, negotiations are needed for the different actors to accept and live within decisions shaping the landscape. Therefore, landscapes are negotiated spaces, differing in degree of achieving harmony.
3. **Multiple scales:** Landscapes often have households, farms and other institutions (e.g., community-based organizations or the private sector) as elements, potentially engaged in collective action. Landscapes are interacting with neighbouring landscapes and are nested in coarser-scale subnational units, watersheds/basins or eco-regions. A convenient landscape scale is one that is large enough to contain the heterogeneity of biophysical characteristics as well as social, economic, political and cultural dimensions, but small enough to be socially coherent.

The fact that landscapes have multiple dimensions suggest that iterative, complex processes and interactions take place within a given landscape unit (see Figures 1.1, 1.2 and 1.3). Such interactions are influenced or shaped by both internal and external factors.

Figure 1.2 puts the actual landscape and the individual livelihoods it supports at the centre of the graph. It suggests that the actual landscape is a subset of the set of feasible landscape configurations in a local context, constrained by national development policy and its implementation. Three key influences on the actual versus feasible landscape are the (sense of) identity of those living in and shaping the landscape, their knowledge and understanding of the current situation and its alternatives, and the continuously changing perspectives on opportunities to link in with the national economy - by people moving in and out of the landscape, by attracting public and private investment, by interacting with existing and emerging markets.

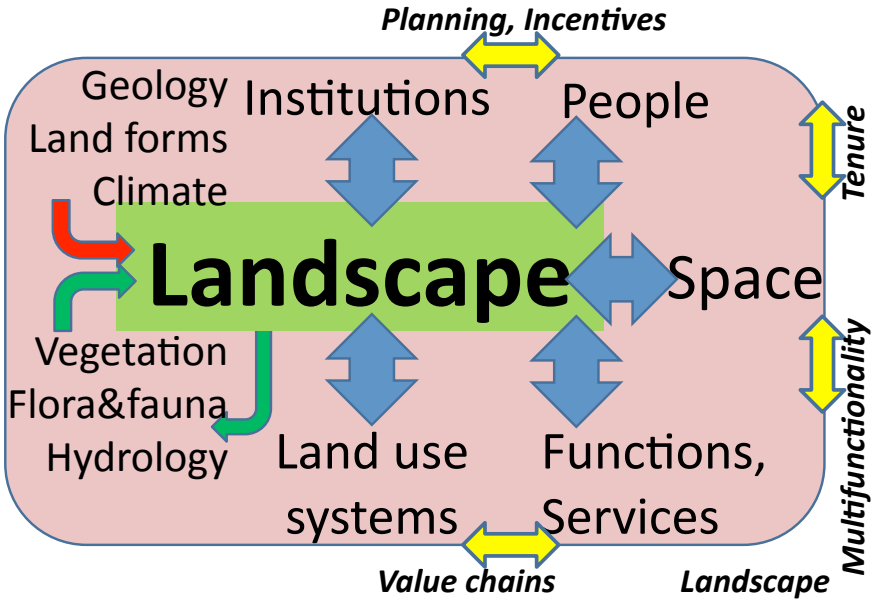

Figure 1.1 A landscape as the interaction between human actions, ecosystems and the abiotic factors that shape the physical environment.

Meanwhile the meso/macro-, micro- and pico[3]-economic dimensions of decision-making at the household level are influenced by the three basic instruments of public governance, shaping rights and rules, modifying incentives through taxes and subsidies, and influencing motivation (informally known as the 'sticks, carrots and sermons').

Figure 1.3 provides a wider context for the landscape of Figure 1.2, emphasizing that the national context interacts with a wider international set of global change dimensions that provide opportunities and constraints for national responses and development pathways.

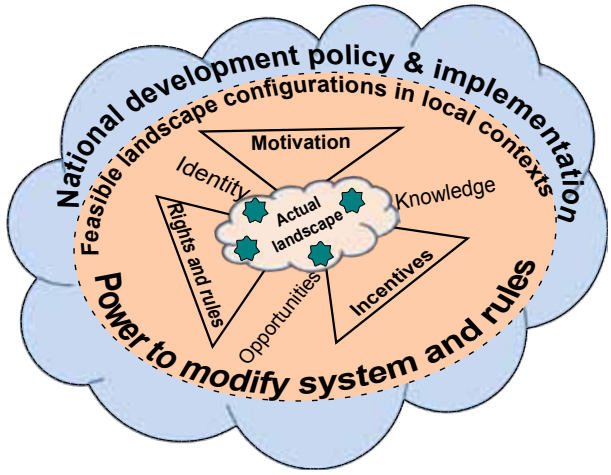

Figure 1.2 Visualization of an actual landscape as a member of a wider set of locally feasible landscape configurations, constrained by household decisions and national context.

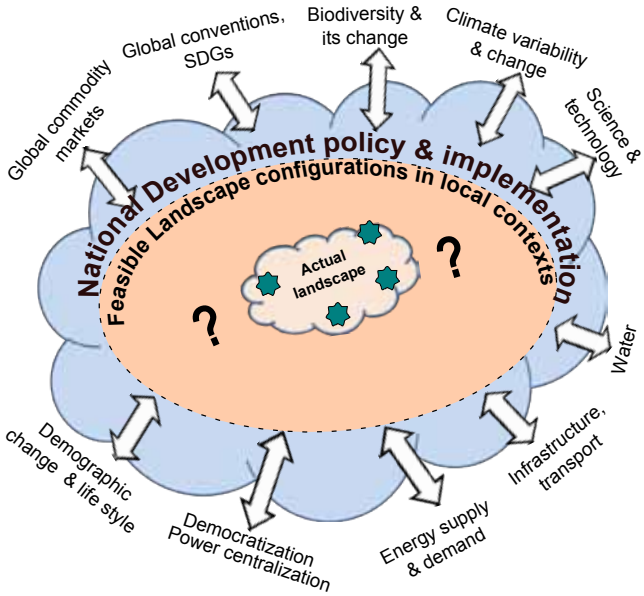

Figure 1.3 Visualization of climate change as part of the wider set of interacting global change influences and drivers of change at the landscape scale, modified by national development policy and its implementation.

Climate change is one of many such dimensions, and the current interest in the climate change community in 'landscape approaches' implies interactions, through the landscape system scale, with a wider agenda based on the sustainable development goals (SDGs), biodiversity, global trade, demographic change, global commodity markets, energy supply and demand, as well as water shortage due to increased demand, even without factoring in climate change.

2.2 The landscape approach

The term 'landscape approach' has been applied in many different contexts, often encompassing and representing different theories, ideas and processes. In this book, landscape approaches refer to a set of concepts, tools, methods and approaches deployed in landscapes in a bid to achieve multiple economic, social, environmental objectives (multifuntionality) through processes that recognize, reconcile and synergize interests, attitudes and actions of multiple actors. Therefore landscape approaches usually involve some form of multi-stakeholder processes.

As the approach may be defined by its process, rather than a well-defined end product, Sayer et al. (2013) has outlined a set of ten principles for landscape approaches adopted by the CBD. The ten principles include: continued learning and adaptation, common concern entry point, multiple scales, multifunctionality, multiple stakeholders, negotiated and transparent change logic, clarification of rights and responsibilities, participatory and user friendly monitoring, resilience, and strengthened stakeholder capacity. These principles are further discussed in many parts of the book.

In unpacking the term 'landscape approach' we may note that the term 'approach' suggests movement in the direction of, without necessarily getting there. For insiders, it may imply that the landscape is a target not yet reached, while for outsiders, who try to get closer to what is already a landscape, something that does not fully reflect their perception. In the way the term 'landscape approach' is often used, it indeed refers to a view from a given starting point (current state), benefitting from the distance that allows to see a bigger picture, and to consider alternative configurations of interests, goals and land use actions within a given space (the landscape), that might be better in achieving multiple bottom lines (i.e., a common desired multifunctional state). This distance demonstrates the benefits of using the landscape scale; it is where the local meets the global, accounting for both individual units within the landscape (both social and biophysical) and the emergent patterns and processes.

Still in taking a landscape approach there will usually need to be a set of enabling factors that will be partly context dependent. The concepts, incentives, methods and tools in a landscape approach will thus vary by context. Sayer et al. (2008) noted that in environments where institutions are strong, and where plenty of knowledge and ability to enforce agreements exist, a landscape approach to reconciling functions could rely on optimization algorithms used by experts who understand the agricultural production potential, conservation values and other needs. In developing countries where institutions are weak (e.g., where there is unclear or poorly enforced land tenure arrangements/laws) and relatively poor knowledge and weak enforcement capacity, a landscape approach will largely rely on "building constituencies, negotiating deals and muddling through" (Sayer et al., 2008). Sectoral and sometimes disparate objectives are encountered at the institutional level in landscapes. Land use sectors, such as agriculture, forestry, biofuel

(energy) and other interests are often seen to be competing and conflicting. Dealing with such 'wicked' challenges often requires an inter-sectoral perspective and moving beyond decision-support to negotiation-support approaches within landscapes. Therefore landscape approaches represent a continuum of application, which can include weak-to-strong combinations of institutions, knowledge and enforcement capacity. Most places in the world would fall at some point along a continuum rather than be black or white situations.

3. Multiple starting points to approach a common destination

3.1 Diverse starting points

Landscape approaches can be interpreted as a journey with a given starting point depending on where you are (the current state of a given place in terms of functions and diverse interactions) moving towards a desired state (common desired multifunctionality). While you might have diverse starting points, the destination of sustainable multifunctional landscapes is a common destination. Figure 1.4 describes multiple possible starting points for a landscape approach that may converge if the multiple objectives can be reconciled and operational modalities allow for synergy.

3.2 Multifunctionality: the common desired destination

Many other integrated initiatives (e.g., Integrated Conservation Development Programmes (ICDP), integrated watershed management, climate-smart agriculture), are often framed in terms of sustainable land management in which there are synergies between multiple social, economic and environmental objectives (Angelstam et al., 2013*a*; Sayer et al., 2013). Therefore, regardless of the starting point, integrated approaches are essentially about achieving optimal potential for social, economic and environmental functions (i.e., sustainable multifunctional landscapes). Yet the actual application of such approaches in practice, have overall remained a significant challenge.

The articulation of an essential set of multiple ecosystem functions by the Millennium Ecosystem Assessment (MEA, 2005) (regulating, supporting, provisioning and cultural) could represent one way of looking at multifunctionality. The number of functions or sustainable development objectives targeted and/or prioritized is likely to vary by context as deemed relevant by actors. In this process tradeoffs will have to be made among functions.

Verchot et al. (2007) use the term 'sustainagility', implying not only the 'persistence' and 'resilience' of current systems as in sustainability, but the ability of such landscapes and its actors to self-adapt to future changes (e.g., climate). Sustainagility (shorthand for sustaining agility) is directly linked to maintaining and enhancing the resource base for future change, complementing and facilitating human adaptive capacity. The process of promoting climate-smart multifunctional landscapes is then also part of a process of creating climate-resilient pathways by promoting sustainagility.

3.3 Why climate-smart landscapes as a starting point for this book?

While 'climate-smart agriculture' is a term that is starting to be more widely used, 'climate-smart landscapes' are still fairly new with limited literature focusing specifically on this concept. Climate-smart landscapes can be defined as landscape actions and processes

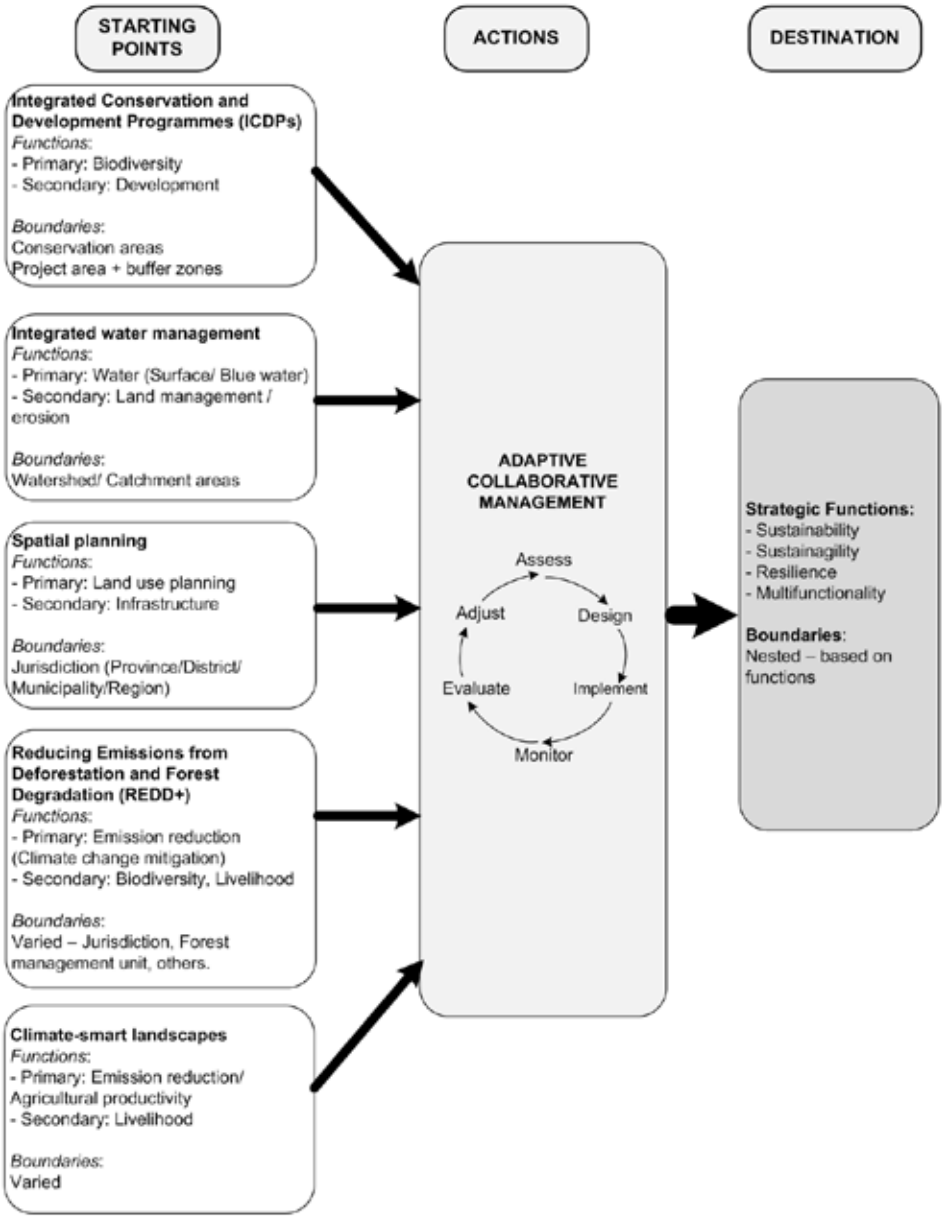

Figure 1.4 Examples of the multiple starting points for landscape approaches, that may have a common destination and all use an adaptive collaborative management learning loop approach.

that seek to integrate climate change mitigation and adaptation alongside multiple social, economic and environmental objectives (Harvey et al., 2013). Scherr et al. (2012) identify three features of climate-smart landscapes: 1) climate-smart practices at the field and farm scale, 2) diversity of land use across the landscape to provide resilience, and 3) management of land use interactions to achieve desired social, economic and ecological impacts.

Climate-smart landscapes were chosen as a starting point for this book for two main reasons. Firstly, that current climate change frameworks at the global level are providing unprecedented policy and financial support for landscape approaches, and secondly, that this support has provided a strong and growing portfolio of initiatives globally that urgently need support and guidance for implementation if they are to make a contribution to sustainability (DeFries & Rosenzweig, 2010; LPFN, 2012; Bernard et al., 2013).

Although the CBD has been most explicit in its support for ecosystems approaches, which have frequently been linked to or described as landscape approaches, its impact has been far less effective in triggering action compared to the UNFCCC. Reducing Emissions from Deforestation and forest Degradation (REDD+) and climate-smart agriculture are among growing initiatives that have emerged within the context of the UNFCCC. More than 70 countries worldwide are engaged in some form of REDD+ activity, with more than USD 7.2 billion pledged for REDD+ since 2008 (Creed & Nakooda, 2011). As integrated landscape approaches are needed for managing within complexity to address wicked problems, and climate change remains a significant wicked problem currently facing the world, application of climate-smart landscape approaches hold great potential to promote climate-resilient pathways, sustainagility and hence sustainable futures. This book therefore provides theories, tools, methods and lessons learned to assist in operationalizing climate-smart landscapes in practice, as an important dimension of multifunctional landscapes.

4. Guiding concepts for landscape approaches

This section briefly introduces a number of useful and recurrent underpinning concepts for landscape approaches that will be encountered throughout this book.

4.1 Systems thinking and positive and negative feedback loops

Landscapes can be fruitfully seen as coupled socio-ecological systems (Walker & Abel, 2002; Berkes & Folke, 2002). One example of a representation of socio-ecological systems is given by Ostrom (2009). She describes four core systems namely, resource systems (e.g., designated protected area with forests, wildlife and water systems), resource units (e.g., trees, shrubs, plants in forests, types of wildlife), users (e.g., individuals who use the park in multiple ways), and governance systems (e.g., institutions for management and rules). These four sub-systems are interacting with each other and are linked to political, social and economic settings as well as other related systems.

Feedback loops and non-linear dynamics are important pieces in the interactions between components and therefore can constitute important points for leveraging change in landscapes (Gunderson & Holling, 2002).

4.2 Leveraging, planning and emergence

A major dilemma in landscape approaches relates to how best to bring change needed to attain the desired state of a landscape. How much of a landscape can be fully designed, how much of landscape systems emerge from interactions and self-organization of system components and how much can be realistically expected from leveraging and strengthened feedback loops? Designing and re-designing landscapes comes from the planning perspective where sustainability and sustainagility, in a dynamic perspective of continued change, are the main objectives (Gallopin, 2002). While planning has a strong role to play, it is most helpful in places where governance, enforcement and implementation

are strong (Sayer et al., 2008; Rudel & Meyfroidt, 2014). However, the main thrust of planning processes should be to foster negotiations towards common agreed objectives and actions towards sustainability.

With landscape systems being dynamic, some have underscored the role of leveraging as an important part of systems management (Meadows, 1999). Leveraging landscape systems would involve identifying leverage points and taking action to impact on system functioning and performance. Leverage points represent places in a complex system wherein a small change can generate bigger changes in the entire system. The paradigm/mindset out of which a system is developed, power distribution, the rules of the system (e.g., incentives, punishments), and information and material flow nodes are given as examples of leverage points that could be targeted (Meadows, 1999). Understanding the drivers of change in the system, changes in system inputs and/or processes are important. In essence, therefore, some degree of leveraging alongside planning and emergence from interactions are needed as main ingredients for successful landscape approaches.

4.3 Buffering

Where exposure to external sources of variability, in terms of weather, pest and disease outbreaks, economic supply-demand cycles, political context and social pressures, system properties that reduce exposure by buffering are crucially important for human wellbeing (van Noordwijk et al., 2011). Buffering across these different aspects and disciplinary traditions can be defined on the basis of reduction of variance between the outside and inside of a buffer. Buffers tend to have a limited absorption capacity, and their functionality can breakdown upon overexposure, leading to a sudden increase in human vulnerability. A key aspect of a landscape approach is to identify which environmental and social subsystems provide buffering, how buffering functions can be enhanced, and how loss of buffering can be avoided (van Noordwijk et al., 2013). Global change tends to be associated with loss of 'inefficient' and 'redundant' buffering and diversity, at a time that actually an increase in buffering is needed.

4.4 Multi-stakeholder governance

In the socio/human sub-systems in the landscape, players or stakeholders are key elements of the system and therefore need to be fully involved with planning, decision-making and incentives. These players have different, and often divergent interests, un-equal power distribution, and uneven resources at their disposal and therefore will impact landscape inputs, processes and outcomes differently and vice versa. Landscape processes are therefore expected to be multi-stakeholder processes that take into account heterogeneity in perspectives and in functions. But these interests may also mean that all players have to be watched in terms of compliance as free-ridership is often a challenge at the individual level.

4.5 Collaborative learning and action

A key feature of landscape approaches is active learning. Active learning takes place through actors that manage and make decisions in adaptive management loops that interact dynamically (Clark et al., 2011). Adaptive management has been defined as a systematic approach for improving management by learning from management outcomes. It recognizes that resource management in landscapes is dynamic, uncertain and complex, hence continued learning, reflection and adjustments are essential elements for success.

The process typically involves, assessing the problems, considering alternatives, predicting outcomes based on current knowledge, implementing alternatives, gaining new knowledge and using the new knowledge to adjust objectives and options (Holling, 1978; Lee, 1999).

Wicked development challenges being dealt with in landscapes often demand multi-disciplinary and multi-sectoral actions. Hence, only a collaborative approach that enables the joint generation of knowledge, learning and renewal can enable proper analysis, planning, decision-making and/or negotiations and actions (Gunderson et al., 2002). Angelstam et al. (2013*b*) suggest seven steps for collaborative knowledge generation and learning including: identify the landscape; study landscape history; map stakeholders use and non-use values, products and land use; analyse institutions, policies and governance systems; measure ecological, economic, social and cultural sustainability; asses sustainability dimensions and governance; and lastly, comparisons and synthesis.

4.6 Tradeoffs and synergies

Every landscape approach will have multiple and conflicting objectives – for example, conservation versus competing agriculture, emission reductions, biofuel production and many more. It is therefore important to understand the tradeoffs in reconciling these objectives in landscape implementation processes. Understanding opportunity costs of various land use options, their ecological productivity thresholds and their overall impacts are good examples of tradeoff considerations needed for decision-making or negotiations.

Even more important is the need to deliberately consider opportunities for synergies between these objectives in order to enhance efficiencies. Synergies relate to efficiency from a value addition (i.e., additive synergy) and/or reduced costs perspectives (i.e., non-additive synergy) (von Eye et al., 1998). Super-additive synergy has the essence "the whole is greater than the sum of the parts" (Corning, 1998; von Eye et al., 1998). In sub-additive synergy, the combined individual effects of the intervention is less than the effect obtained when the interventions act together. This form of synergy is useful when the main purpose of seeking synergy is to reduce costs or risks to the system (Duguma et al., 2014) (i.e., the combined cost of the individual interventions is often less when they are implemented together) (Tanriverdi, 2006).

5. In this book

This book is focused on four central propositions on climate-smart landscape approaches:

A. Current landscapes are a suboptimal member of a set of locally feasible landscape configurations;
B. Actors and interactions can nudge landscapes towards better managed tradeoffs within the set of feasible configurations, through engagement, investment and interventions;
C. Climate is one of many boundary conditions for landscape functioning;
D. Theories of change must be built within theories of place for effective location-specific engagement.

We use the four propositions to structure the book into six main parts comprising 27 chapters, including: Introduction (Part 1); Understanding Landscapes (Part 2); From Concepts to Inducing Change (Part 3); Involving the Private Sector (Part 4); Contextualized Experience (Part 5); and Synthesis and Conclusions (Part 6).

Understanding Landscapes (Part 2)

This part deals with Proposition A ("landscapes are meaningful units of analysis and for catalyzing change"; "the actual landscape is likely to be sub-optimal") and makes a start with Proposition B ("landscape approaches can have effect"; "they interact with complex socio-ecological systems, with internal and external feedbacks"). It is about concepts and frameworks that deepen understanding of landscapes as interactive socio-ecological systems. It opens up with a chapter exploring general features of landscapes (Chapter 2). A set of five chapters follow reviewing a selected number of conceptual framework examples applied to landscapes in the past decades including, looking at multifunctionality in climate-smart landscapes (Chapter 3), the *gestion de terroirs* concept (Chapter 4), socio-ecological systems (Chapter 5), climate smart territories (Chapter 6), and integrated landscape initiatives (Chapter 7). The section closes with a futuristic and policy-based perspective on how landscapes approaches connect with global level agenda's such as the SDGs and Future Earth (Chapter 8).

From Concepts to Inducing Change (Part 3)

Part 3 of the book deals with Proposition B ("landscape approaches can have effect"; "they interact with complex socio-ecological systems, with internal & external feedbacks") and Proposition C ("climate is a boundary condition for landscape functioning"). It ushers in a set of tools, methods and practices for analysing and facilitating change in landscapes for improved effectiveness, efficiency and equity. It begins with a chapter on scale considerations in landscape approaches (Chapter 9) and is followed by Chapter 10 which addresses the use of leverage points and levers in landscape restoration. Chapters 11, 12, 13 and 14 focus on land-care strategies, landscape attributes for supporting sustainable intensification, water-focused landscapes, and a landscape approach based around charcoal production for implementing landscape multifunctionality, respectively. Another set of three chapters focus on tools for analysing and understanding very specific landscape dimensions including varied modelling tools for gender-specific visioning (Chapter 15), opportunity cost analysis in the context of emission reductions (Chapter 16), and negotiation support tools for reaching common desired sustainable multifunctional goals (Chapter 17). The last chapter in this section addresses institutional pathways for reaching sustainable landscape objectives (Chapter 18).

Involving the Private Sector (Part 4)

In this part, Propositions B and C are further enriched by considering the interactions between private and public sectors in landscapes from three broad angles: investment (Chapter 19), value-chains (Chapter 20), and motivation (Chapter 21). All three chapters provide rich examples of private sector engagement in landscapes highlighting an area where this is a lot of potential for growth.

Contextualized Experience (Part 5)

This section addresses Proposition D ("interacting theories of place and change in landscapes") by presenting specific examples of 'what works' and/or does not work in various locations. Case studies unravel multiple dimensions of the issues discussed in preceding book sections under different contexts. The stories come largely from around Africa and demonstrate evolving and diverse situations. Chapter 22 dwells on an experience of operationalizing climate-smart agriculture in a landscape in western Kenya. Chapters 23 and 24 relay two experiences from Cameroon on how community

forestry landscapes changed as a result of changes in institutional dynamics and how sustainable intensification can change cocoa dominated landscapes, respectively. And lastly in this section, Chapter 25 looks at potential of emission reduction programmes in the Democratic Republic of Congo.

Synthesis and Conclusions (Part 6)

In this final section, the first (Chapter 26) revisits the four propositions focusing especially the way theories of place and theories of change interact (Proposition D). The second, (Chapter 27) articulates a systems improvement and landscape democracy-based framework for enhancing effectiveness, efficiency and equity in landscape approaches with specific attention on the challenges ahead.

Endnotes

1 See Landscapes for People, Food and Nature (LPFN) initiative http://peoplefoodandnature.org/
2 According to the Millennium Ecosystem Assessment (2005), there are four main categories of ecosystem services: 1) provisioning (e.g., of resources and livelihood needs such as food, fuel and fibre), 2) regulating (e.g., basic ecological and natural processes such a climate), 3) cultural services (e.g., life fulfilling and development opportunities such as ecological-based education), and 4) supporting (e.g., regeneration of resources directly used).
3 Pico-economics or behavioural economics reflects the complement to micro-economic rationality in the way people make choices (van Noordwijk et al., 2012).

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