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GOVERNING FOR ECOSYSTEM HEALTH AND HUMAN WELLBEING

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Introduction

Governance mediates the relationships between ecosystem services and human wellbeing, shaping the degree to which those services alleviate or exacerbate poverty (Suich et al., 2015). Indeed, the term ecosystem 'service' implies service to or for someone, involving potential trade-offs regarding which services, at whose cost or benefit, at what scale, from global (e.g. climate regulation) to local (e.g. food security) and for which social groups (McDermott et al., 2013). The decision-making processes that allocate access to ecosystems and ecosystem services are thus inherently political.

The terms 'ecosystem governance' and 'governance of ecosystem services' highlight the diversity of services that may be derived from an ecosystem in a way that the more common sectoral perspective (e.g. forest governance or fisheries governance) may not. This diversity of services, however, may lead to trade-offs being experienced between different uses and stakeholders, with ecosystem governance being concerned with the resolution of trade-offs (Sikor et al., 2014). One key area of trade-offs explicit in literature is between conservation and livelihood objectives and outcomes. We use this recognition of trade-offs as an organising framework for the chapter, considering first ecosystem-focused approaches, then rights-based approaches and lastly, participatory approaches to governance. We then turn to two overarching areas of concern within the literature, on the relevance of scale and multiple administrative levels (multi-level governance) and the importance of informal, or socially embedded, institutions.

For the purpose of this chapter, we consider natural resource governance to be

> . . . the norms, institutions, and processes that determine how power and responsibilities over natural resources are exercised, how decisions are taken

> and how citizens – including women, men, youth, indigenous peoples and local communities – secure access to, participate in, and are impacted by the management of natural resources.
>
> Campese (2016: 7)

The chapter is informed by a systematic mapping of literature related to governance of ecosystem services and renewable natural resources for improved wellbeing and poverty alleviation. Themes emerging from the coding of 872 papers included: institutions, instruments, power and participation/community-based governance. We further draw on interviews with 23 projects funded by the Ecosystem Services for Poverty Alleviation (ESPA) programme, and a workshop with partners from government and non-government actors across a range of sectors from both North and South. Our aim is to explore what is known about the nature and performance of governance arrangements, systems and processes at multiple levels for ecosystem health and poverty alleviation.

Ecosystem-focused approaches: regulatory vs market-based approaches to governing access and use

Some ecosystem governance approaches focus primarily on protecting or conserving ecosystem health. Aimed at reducing the environmental impacts of natural resource use and/or land-cover change, these are often divided into two main categories based on whether they focus on 'carrots' (market-based incentives for desired behaviour) or 'sticks' (regulatory approaches: command-and-control policies, rules and regulations) or some combination of the two (Börner et al., 2015). The regulatory approach includes legal frameworks, land-use or environmental policies that control use (e.g. restrictions on the species and size of trees that can be logged, controls on fishing gear used or seasonal bans for particular species) and enforcement of these rules and regulations. Protected areas, which restrict natural resource use, are a regulatory approach applied across the globe. While protected areas can have benefits for biodiversity and ecosystem services, they have variable implications for poverty and wellbeing (see Coulthard et al., this volume). Weaknesses in protected area effectiveness are often linked to their failures to account for human wellbeing and dependence on ecosystem services from the protected area. The very poor are often disproportionately affected by restrictions over access to natural resources, through protected area status or other measures (Bidaud et al., 2017; Bluwstein et al., 2016; Dawson and Martin, 2015). This exposes them to fines and sanctions if caught collecting products illegally, which they can ill-afford. For conservation to succeed, governance structures must support local participation in conservation initiatives, as seen in the case of Great Apes species conservation (Sandbrook and Roe, 2012).

Market-based governance initiatives, designed to incentivise sustainability through the provision of market rewards, have generated considerable debate in

the literature. Although they provide financial incentives for sustainable use, they focus primarily on environmental outcomes and the effects on wellbeing are often not central considerations in their design. Of particular importance, from a poverty perspective, is the critique that market-based instruments, such as certification or Payment for Ecosystem Services (PES) schemes, are neo-liberal tools which further entrench the existing inequalities of a global capitalist system (see also Menton and Bennett, this volume). They have widespread implications for power dynamics, access and equitable participation in governance processes. For example, a review of the evidence on four certification schemes focused on forests, fair trade and carbon found that without deliberative efforts to support local access and benefit-sharing, these schemes tend to favour large-scale and/or high-capacity producers and reinforce existing market inequalities (McDermott, 2013). Similar effects were found in a case study of biodiversity offsets in Madagascar, governed by the Business and Biodiversity Offsets Programme and associated international standards (Bidaud et al., 2017). Such challenges are also associated with PES, particularly when reliant on monetisation or marketisation of ecosystem services (Kovacs et al., 2016; Muradian et al., 2013). With regard to REDD+, researchers have highlighted how an excessive focus on 'technical' issues related to carbon measurement and accounting – which lies at the core of performance-based payments for emissions reductions – obscures power imbalances and favours the interests of external actors and investors over local communities (Patenaude and Lewis, 2014; Sikor, 2013a). These findings demonstrate that although market-based type instruments may deliver on efficiency, they do not necessarily delivery on equity and poverty alleviation (see also Box 10.1).

To inform the development of an approach that may deliver more equitable outcomes, Sikor (2013b) argues that three 'design elements' are critical for shaping social justice: scale of implementation, methodology to measure ecosystem services and the nature of benefits. He finds that 'safeguards', such as those associated with REDD+, are remedial and inadequate to address systemic design issues, for example that favour external control, commodification of ecosystem services and monetary benefits over local actors, knowledge and values. Local participation in the design of such schemes is generally seen as important, as is the need to design schemes explicitly to generate local benefit (Hejnowicz et al., 2015; Locatelli et al., 2014).

Equity, justice and rights-based approaches

There is growing interest in rights-based approaches to governance where well-being, equity and rights are central considerations in the design and implementation of interventions. Research on justice and equity suggests that whatever institutional approach is pursued for the governance of land and resources, it is critical that it be situated in a broader understanding of the distribution of power and resources across multiple social scales (McDermott et al., 2013; Sikor, 2013a; see also Dawson et al., this volume).

Equity and justice framings can be helpful for both researchers and practitioners to conceptualise social challenges such as poverty alleviation much more broadly, by recognising that what is 'fair' and 'just' is socially contested, that poverty is relative and its causes and manifestations highly diverse, and that resource conservation and poverty alleviation require trade-offs. For example, McDermott et al. (2013) distinguish between procedural equity, which refers to equity in decision-making processes; distributive equity, as in equity in the distribution of costs and benefits; and contextual equity, as in the equity of the overall environmental and socio-political context. A conservation intervention may invest heavily in procedural equity by bringing a wide group of stakeholders to the negotiating table, but if stakeholders vary in their relative capacities and freedoms to defend their interests and values, this could lead to highly unequal material and non-material outcomes. Many efforts to alleviate poverty do not explicitly address such trade-offs. Likewise, much research on the impacts of conservation interventions does not disaggregate social data adequately to identify precisely who benefits and loses (Daw et al., 2011). For example, a given governance strategy may raise average incomes (e.g. Liu et al., 2010), but these gains may serve to make the relatively well-off richer while excluding the poorest and most vulnerable (e.g. Kovacs et al., 2016; Muradian et al., 2013).

The emergence of 'rights-based' governance has grown from such conceptual foundations. While such an approach cannot eliminate all trade-offs, it does attempt to ensure that all interventions identify and respect the rights of all affected actors. In the case of Indigenous people, for example, the process of Free, Prior and Informed Consent (FPIC) is supposed to protect their land and resource rights. However, there remains lack of clarity about ownership by Indigenous people of sub-surface minerals and stored forest carbon, and the FPIC process is applied variably in different sectors (Mahanty and McDermott, 2013).

Participatory and decentralised approaches are widespread but imperfect

Participatory approaches to natural resource governance encompass a wide range of strategies aimed at improving the effectiveness and/or equity of ecosystem conservation. Such arrangements include community-based natural resource management, community-based forest management and community-based conservation, and collaborative arrangements, with communities working with other actors, such as government departments or the private sector. The participation of communities in community-based approaches to natural resource management, however, has been interpreted and approached differently within initiatives, sometimes involving no more than communication with local communities without meaningful devolution of power (Shackleton et al., 2010). Many community-based approaches are introduced through top-down initiative, while others are rooted in customary norms and practices. In addition to encouraging the participation of resource users

BOX 10.1 COMBINING REGULATORY AND MARKET-BASED APPROACHES TO CONSERVE BIODIVERSITY: AT WHAT COST TO WELLBEING?

The Corridor Ankeniheny-Zahamena (CAZ) protected area in Madagascar exemplifies the trend towards combining regulatory and market-based governance instruments, and highlights the challenge of linking improvements in ecosystem services with improved local wellbeing. Recognising that conserving biodiversity for global benefit may impose costs on local people, the World Bank prescribes a safeguarding process. Contrary to expectations, Poudyal et al. (2016) find that the best predictor for people to be identified as being eligible for safeguard payments is not their likely dependence on the forest but rather their socio-political power, with membership of the community forest association committee being the highest predictor. Compared with other ways of providing livelihood benefits to park-adjacent populations, MacKinnon et al. (2017) find safeguards to be the most expensive option delivering the least funds to the community but, unlike other approaches, benefiting individual households. Benefits linked to conservation agreements provide the greatest proportion of funds to the community level (ibid.). Using hypothetical scenarios, Rakotonarivo et al. (2017) find that a household's experience of the reality of the impacts of forest protection affects their willingness to accept any kind of compensatory activity in exchange for giving up their rights to clear forest for agriculture. These studies highlight the need to consider who benefits and who loses from the establishment of a protected area, and how best to deliver compensatory activities. They also illustrate the interlinked nature of community-, national- and international-level governance, as the funds available to support communities around CAZ are dependent on the level of income the government can obtain through REDD+ agreements, in turn based on calculations of by how much CAZ will reduce shifting cultivation and hence carbon emissions.

in governance, many countries have devolved power and responsibilities from central to local government. However, a lack of power and resources received by lower levels of government often constrains their ability to undertake their governance functions (Larson and Soto, 2008).

There is mixed evidence regarding whether community-based governance arrangements have a positive effect on ecosystem and poverty alleviation outcomes. Focusing on forest areas in East Africa and South Asia, Persha et al. (2011) find that only 27% of 84 cases studied have positive outcomes for both biodiversity and livelihoods, and that these win-win situations are more likely when local forest

BOX 10.2 COMPARING NATURAL RESOURCE GOVERNANCE SYSTEMS IN TANZANIA

Patenaude and Lewis (2014) compared the impacts on ecosystem services and on poverty alleviation of four prominent resource governance systems in Tanzania: Community Based Forest Management (CBFM), Joint Forest Management, Wildlife Management Areas and *ngitili* enclosures, a traditional land husbandry technique practised by some Sukuma pastoralists. In comparing these approaches, they conclude that *ngitili* and CBFM are the most successful in terms of outcomes for ecosystem health and poverty alleviation, and attribute this to decisions being made at the local level, with perceptions of equitable benefit-sharing among community members. Where decisions are made at other levels a lack of ownership or understanding may contribute to non-compliance or perhaps inappropriate or ineffective decisions. The authors stress the benefits of flexibility in institutional arrangements, so that systems reflect the local context and preferences. They conclude by making four recommendations for REDD+ in Tanzania, which have resonance for governance of ecosystem services for poverty alleviation more broadly:

1 A decentralised approach to governance should be adopted that aims to promote democratisation rather than tasked with reducing government expenditure.
2 There must be a commitment for fair benefit distribution.
3 Cooperation between agencies is essential, across programmes (horizontal) and between actors and administrative levels (vertical).
4 Governance structures should build on existing traditional systems, which would support buy-in by communities and simplify the operation of the governance system.

users participate in forest rulemaking. Reviewing 165 protected areas around the world, Oldekop et al. (2016) also find that a win-win relationship between socio-economic and biodiversity outcomes is more likely where protected areas adopt co-management and empower local people. In Tanzania, community-based forest management approaches offer the greatest potential to deliver on both ecosystem health and poverty alleviation (see Box 10.2).

A lack of baseline information and the challenges of finding counterfactuals make it very difficult to determine the precise impact of community forest management on either forest status or livelihoods. In Madagascar, where 15% of natural forest is managed in community forests, Rasolofoson et al. (2015) used a matching approach to show that community forest management overall has no apparent impact on deforestation; however, a reduction in deforestation was found in those

community forest sites which do not allow commercial use of forest products. In terms of household livelihoods, the team found that community forest management had neither negative nor positive impacts on household livelihoods; however, households closer to the forest and with higher education levels do obtain significant benefits (Rasolofoson et al., 2017).

Such findings chime with earlier work by McDermott and Schreckenberg (2009), which emphasises the need to understand who within communities benefits from community forestry, finding that it is more likely to generate positive change at community level rather than directly benefiting poor and marginalised households. Understanding who benefits is not just important in contexts of decentralisation. For example, interventions to reduce the use of illegal fishing gear on the Kenyan coast may improve the number of large expensive fish but have a negative impact on the wellbeing of women who are reliant on selling smaller fish (Abunge et al., 2013). Although women may have very different expectations of the outcomes of governance interventions than men (Keane et al., 2016), their perspectives are often not considered (see Brown and Fortnam, this volume).

The importance of community-level benefits is highlighted in many studies. In Tanzania, Gross-Camp (2017) finds that although households in villages participating in community forestry do not experience significant changes in wellbeing, they are nevertheless very supportive of the community forestry process, valuing it as a means of securing the land for the community and protecting it from use by outsiders. A similar focus on collective goals of securing resources for the future and aesthetic benefits is an important motivating factor for community participation in marine protected areas in the Philippines (Chaigneau and Brown, 2016).

One of the challenges of participatory approaches is that governments may be unwilling to devolve power to communities in a meaningful way, as was found in a study of Wildlife Management Areas (WMAs) in Tanzania (Bluwstein et al., 2016). Although ostensibly community-owned, WMAs give limited space for popular participation in rule-making (Bluwstein et al., 2016). This centralised control of power and resources is seen in the maintenance of the conservation narrative, with no alternative land uses being considered over time. This is manifested in 'territorialization', the setting of territories and marking of boundaries, where 'decades of consecutive conservation projects have continuously territorialized the landscape despite failures in the processes of demarcating, controlling, and managing conservation interventions' (Bluwstein and Lund, 2018: 2). The governance framework and purpose therefore go unchallenged over time.

Centralised control and power are also evident in the lack of downward accountability of formal structures to communities. This means that local communities often lack full knowledge and understanding of, and engagement with, what is going on (Bluwstein et al., 2016; Moyo et al., 2016). In the case of WMAs, Bluwstein et al. (2016) argue that although villagers can elect and remove representatives to the inter-village community-based organisation formed to manage the WMA, the establishment of this body above the level of village government means that villagers' power is undermined. This lack of knowledge and engagement

encourages resource users to utilise informal institutions rather than, or in combination with, formal structures and systems.

Governance at scale: multi-level and multi-actor

All of the above approaches occur within a context of governance at multiple scales, involving multiple actors with different, at times conflicting, interests. A multi-level governance perspective recognises interactions among a complex network of actors and institutions that go beyond a state-centric interpretation of governance. Such a perspective recognises the challenge of scale in natural resource governance, referring in particular to spatial scale, but also to temporal scale and the range of analysis (Gibson et al., 2000). Scale is challenging because ecosystems may cross administrative boundaries, provide multiple services (governed by multiple sectors) and are affected by decisions and actions at multiple administrative levels, from local to international. This multiplicity of actors, policies, rules and levels suggests that interactions between actors within and across levels are essential for effective governance, yet such interactions tend to be piecemeal, often project or activity-driven and are rarely at a level for sustained and effective integrated governance. Given this complexity, multi-level governance systems may lack legitimacy in the eyes of resource users and struggle to deliver on accountability and transparency of decision making (Termeer et al., 2010).

A multi-scale perspective is ever more critical in the context of globalisation, where the 'local' is increasingly embedded in external flows of materials, capital (e.g. in the form of remittances), investments and the larger-scale dynamics of international governance and trade. However, as Zoomers and Otsuki (2017) argue, too many resource governance interventions have focused their environmental and social strategies and assessments exclusively at the project or very local level, thereby missing many of the core drivers of poverty and its long-term alleviation.

Ecosystems tend to be governed through separate natural resource sectors (forestry, fisheries, environment and water, for example). These often operate in 'silos', with only limited cooperation and coordination (Reed et al., 2016). Sectors have their own cultures, ways of doing things, budgets, objectives and plans. The requirements of, and constraints on, sectors limit willingness and capacity to coordinate and cooperate with other sectors and actors. One of the challenges at the local level is the creation of multiple user groups or committees, sometimes associated with specific donor-funded projects, calling into question the long-term sustainability and effectiveness of such structures.

Landscape approaches are a specific type of multi-level governance. Ranging from Integrated Conservation and Development Projects to Integrated Water Resources Management and Eco-agriculture, landscape approaches seek to overcome disciplinary boundaries and reconcile social and environmental agendas (Reed et al., 2016). In a systematic review of landscape approaches, Reed et al. (2016) argue that the approach differs from preceding attempts to tackle issues such as poverty alleviation and biodiversity loss by explicitly acknowledging that it is not possible

to always satisfy all stakeholders. They identify five elements of effective landscape approaches: evaluating progress, establishing good governance, evolving away from panacea solutions, engaging multiple stakeholders and embracing dynamic processes (Reed et al., 2016: 2544).

International processes, such as the Convention on Biological Diversity or REDD+ under the UNFCCC, bring different implications for governance at the local and national levels. Despite concern over the top-down nature of these initiatives, international processes can open avenues of access to the decision-making process for local people. For example, the rights of indigenous peoples to FPIC are often explicitly recognised by international policy documents. While respect for indigenous rights in REDD+ has been far from perfect, it has in some cases, served as an avenue for indigenous peoples' strategy to 'import power' to the UNFCCC and have their rights taken into consideration (Wallbott, 2014).

Informal institutions remain critical for governance of ecosystem services

Institutions, often referred to as 'rules of the game' (North, 1990: 3), facilitate access to decision making and access to resources, and both shape and are shaped by governance arrangements and outcomes (Ostrom, 1990). Institutions are often differentiated between formal and informal; or bureaucratic, 'those formalised arrangements based on explicit organisational structures, contracts and legal rights, often introduced by governments or development agencies' (Cleaver, 2002: 13), and socially embedded, 'those based on culture, social organisation and daily practice institutions' (ibid.). Common property literature, for example associated with Elinor Ostrom's design principles (Ostrom, 1990), has tended to focus on how institutions can be designed for effective governance of common pool resources. Alternative perspectives, informed by political ecology and sociological institutionalism (Nunan et al., 2015), place more emphasis on the importance of socially embedded institutions, including institutions not necessarily designed for natural resource governance, such as gendered norms and kinship.

Literature referring to informal, or socially embedded, institutions often focuses on how institutions mediate livelihoods as well as governance, though governance and livelihoods are closely connected. Critical Institutionalism highlights the role of socially embedded institutions and reflects '(i) complexity of institutions entwined in everyday social life; (ii) their historical formation; and (iii) the interplay between the traditional and the modern, formal and informal arrangements' (Hall et al., 2014: 73). Cleaver's (2002) 'institutional bricolage' provides further insight into which institutions matter for natural resource governance and livelihoods by demonstrating how people piece together new institutions from existing institutions, whether formal or informal, to gain and maintain access to resources. An example of a Critical Institutionalism analysis of governance arrangements within inland fisheries, by Nunan et al. (2015), demonstrates how the composition and function of co-management structures is affected by power relations, gender relations and norms,

and kinship. Such institutions then affect how natural resources are governed and the outcomes in terms of the level of exploitation. They also affect who benefits: local people, migrants, men, women and people of different ethnicities.

A key finding in relation to the design and introduction of new institutions for natural resource governance is that this does not take place in an institutional vacuum. The existing plethora of formal and informal institutions affects how any new institutional arrangements are received, shaped and responded to (de Koning, 2014). This means that new institutional arrangements may look quite different between locations and over time. Furthermore, where new institutional arrangements, such as those related to decentralisation, are not fully implemented or supported, pre-existing institutions, particularly informal institutions, may remain important in determining access to resources and making decisions with consequences for the health of ecosystems. For example, in Kyrgyzstan, although Pasture Users Associations were introduced in 2009, they are not recognised as legitimate by local herders who operate outside of the governance mandate of those formal institutions, making their own decisions on where to graze animals and how many animals to pasture (Isaeva and Shigaeva, 2017). In a similar vein, and informed by research on institutions and natural resource governance, Patenaude and Lewis (2014) argue that building new governance structures on existing traditional systems is important for ensuring buy-in and operational simplicity.

One of the most important institutions determining the extent to which individuals and communities can control the benefits they derive from ecosystems is tenure. The 'bundle of rights' concept recognises that traditional tenure systems typically have layered rights to resources, ranging from the right to access a resource to the right to manage it and exclude others (Schlager and Ostrom, 1992). While over two billion people live in lands held under customary tenure (Alden Wiley, 2016), only one fifth of these are formally recognised (RRI, 2015). In some countries, requirements that land must be actively used to be owned can discourage farmers from practising traditional long-fallow systems which may provide many ecosystem services (Zwartendijk et al., 2017). Martin et al. (2016) argue that changing the formal tenure of indigenous territories to enable local control over land use would help to redress the power imbalance and make relationships more equal.

Conclusions

We conclude that there is no one governance approach that can definitively deliver on improved ecosystem health and human wellbeing. However, it is clear that the nature of involvement of resource users, particularly of women and the poor, in governance arrangements and processes is critical. Involvement, or participation, must be meaningful – that is, it must be sustained and have influence over decision making. This has proved far from easy to achieve as such participation challenges the power of government, the private sector and community members with greater social status and wealth. Yet, governments, the private sector and wealthier members of communities must also play a role in natural resource governance.

From this, we can learn that governance arrangements should be locally specific, developed and shaped by those involved in the social-ecological system, with potential to change over time in response to changing circumstances and new information. More effective governance for ecosystem health and poverty alleviation must challenge power relations and power dynamics within and across levels of governance.

A further conclusion is that much governance of ecosystems remains sectorally focused, even where ecosystem-based approaches are espoused, with forest management being mainly concerned with trees and fisheries management with fish. Ecosystem governance implies a more holistic approach to the governance of renewable natural resources, one that brings potential trade-offs to the fore and is concerned with resolving such trade-offs. A step towards such an approach would be greater cooperation and coordination between actors involved, including between parts and levels of government. This would also enable movement towards a more adaptive, responsive approach to governance, more able to respond to change and new information, as well as to cope with uncertainty.

These lessons are summarised in a set of governance principles outlined in Box 10.3. There are multiple examples of sets of natural resource governance principles (see, for example, Lockwood et al., 2010); however, this set provides a succinct summary of key points from the chapter.

This portrayal of how governance arrangements and processes need to progress suggests that there are two key outstanding areas of research: (i) how meaningful and sustained participation of all stakeholder groups in ecosystem governance, particularly of more marginalised groups, can be encouraged; and (ii) how greater coordination of policy and practice within and between administrative levels can be facilitated. To deliver on more effective and meaningful participation for pro-poor policy and practice, which also delivers on improved ecosystem health, we need to understand how the dominance of more powerful actors can be effectively challenged. This includes attention to government – resource-user relations, and to investigating how new governance arrangements and approaches can more effectively and appropriately take into account existing institutions, including customary governance systems. To deliver on greater cooperation and coordination within and between areas of policy and practice, evidence on the potential incentives and mechanisms for such practice is needed, with examples of what such cooperation and coordination might look like.

Finally, there is very little evidence available on the wider governance impacts from ecosystem governance. The plethora of participatory natural resource governance initiatives might, for example, be expected to empower people and incentivise engagement with broader governance systems, with the potential to improve accountability and planning. Investigation into whether such wider benefits exist, or how they could be encouraged, is needed. This could strengthen links between ecosystem governance and other governance systems and embed ecosystem governance arrangements in wider governance, leading to greater sustainability and coordination.

BOX 10.3 GOVERNANCE PRINCIPLES

While the literature reviewed in this chapter highlights the fact that there are no hard-and-fast rules about which governance arrangements achieve the best outcomes for ecosystem services and wellbeing in which contexts, there is widespread agreement that certain principles are important in all cases:

Accountability: Kairu et al. (2018) find that the 'implementation gap' between Kenya's progressive 2005 Forest Act and Participatory Forest Management on the ground is in part caused by forest officers having greater upward accountability (expressed in their role of forest law enforcers) than downward accountability as community facilitators.

Participation: Participation of resource users in the governance of ecosystems, whether through customary or new community-based approaches, can improve livelihood and ecosystem health outcomes (Patenaude and Lewis, 2014), but must be meaningful and sustained.

Adaptive management: There is increasing understanding that governance systems must be adaptive, able to cope with often rapid changes in the local context. For example, the expansion of hydro-power interests in the Himalayan foothills posed a real challenge to the nascent reciprocal water access agreement being negotiated between the small town of Palampur and upstream communities (Kovacs et al., 2016).

Information: Several studies highlight the need for good information to support effective and fair governance. In discussing the uncertain boundaries of Tanzania's Wildlife Management Areas, Bluwstein and Lund (2018: 461) note that 'the people drawing a map wield great power and can easily err'. Buytaert et al. (2014) argue that the availability of better and cheaper technology could potentially give citizens access to data that enable them to participate more effectively in decision making (see also Buytaert et al., this volume).

Capacity-building: Linked to the recognition of the need for adaptive management comes the need for ongoing capacity-building. Whether decentralising resource management to the local level or establishing a reciprocal water agreement (Kovacs et al., 2016), both community members and staff of facilitating government or non-government organisations need training to initiate and support sustainable interventions.

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