

Linking Biodiversity Conservation and Poverty Alleviation: What, Why and Where?

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Biodiversity conservation and poverty alleviation: separate or linked challenges?

Biodiversity conservation and poverty alleviation are both important societal goals demanding increasing international attention. At first glance they may appear to be separate policy realms with little connection. The former is largely the concern of ministries of environment, conservation organisations and ecologists; the latter falls within the remit of ministries of finance and planning, development organisations and economists. The Convention on Biological Diversity (CBD), agreed in 1992, was drafted in response to escalating biodiversity loss and provides an international policy framework for biodiversity conservation activities worldwide. Similarly, the Organisation for Economic Co-operation and Development (OECD) International Development Targets of 1996 – reiterated as the Millennium Development Goals (MDGs) in 2000 – focus international development efforts on global poverty alleviation.

Biodiversity Conservation and Poverty Alleviation: Exploring the Evidence for a Link, First Edition.

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On closer inspection, although ostensibly aimed at very different communities of interest, both of these policy frameworks recognise links between their objectives:

- The preamble of the CBD acknowledges that “economic and social development and poverty eradication are the first and overriding priorities of developing countries”. In 2002 the Conference of Parties (CoP) to the CBD agreed a Strategic Plan which included a target to “achieve by 2010 a significant reduction of the current rate of biodiversity loss . . . as a contribution to poverty alleviation and to the benefit of all life on Earth” (CBD, 2002). The new *Strategic Plan for Biodiversity 2011–2020* has a mission to halt the loss of biodiversity thereby contributing to human well-being and poverty eradication (CBD, 2010). The 2010 CoP also adopted a decision on the “integration of biodiversity into poverty eradication and development” (Decision X/VI).
- Beyond the CBD, at the UN World Summit in 2005, the secretariats of the five major biodiversity conventions – CBD, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Migratory Species of Wild Animals (CMS), the Ramsar Convention on Wetlands and the World Heritage Convention – issued a joint statement emphasizing the important role that biodiversity plays in the achievement of the MDGs: “Biodiversity can indeed help alleviate hunger and poverty, can promote good human health, and be the basis for ensuring freedom and equity for all” (Biodiversity Liaison Group, 2005).
- The seventh of the eight MDGs (MDG7) is to “ensure environmental sustainability” which originally included a sub-target to “reverse the loss of environmental resources” with biodiversity-related indicators (e.g. protected area coverage and forest land). The CBD “2010 Biodiversity Target” was included as a new target within MDG7 following the 2006 UN General Assembly (United Nations, 2006) with additional biodiversity indicators (United Nations, 2008).

The international policy statements described here contain an explicit assumption that conserving biodiversity (or reducing the rate of biodiversity loss) will help to tackle global poverty. There is, however, considerable variation in the potential nature and scale of biodiversity–poverty links.

Nadkarni (2000) describes six different relationships between poverty and environment: from a vicious cycle of poverty leading to environmental degradation and thence to more poverty; to a win–win scenario where environmental conservation contributes to poverty alleviation. The same is true of the underlying relationship between poverty and biodiversity. For example, the Millennium Ecosystem Assessment (MA) – an authoritative review of the state of the world’s ecosystems which concluded in 2005 – highlights the different winners and losers from biodiversity use. It notes that the use (and loss) of biodiversity has actually benefitted many social groups (largely in allowing for current levels of food production). Meanwhile, as a result of that biodiversity loss, “people with low resilience to ecosystem changes – mainly the disadvantaged – have been the biggest losers and witnessed the biggest increase

in not only monetary poverty but also relative, temporary poverty and the depth of poverty” (MA, 2005: 40). It suggests giving priority to protecting those elements of biodiversity, and the services it provides (Box 1.1), that are of particular importance to the well-being of poor and vulnerable people.

Box 1.1 Biodiversity, ecosystem services and human well-being

The conceptual framework of the Millennium Ecosystem Assessment (Figure 1.1) describes biodiversity as underpinning the delivery of a range of ecosystem services which in turn contribute to human well-being. The ecosystem services include provisioning services (e.g. food and fuel wood),

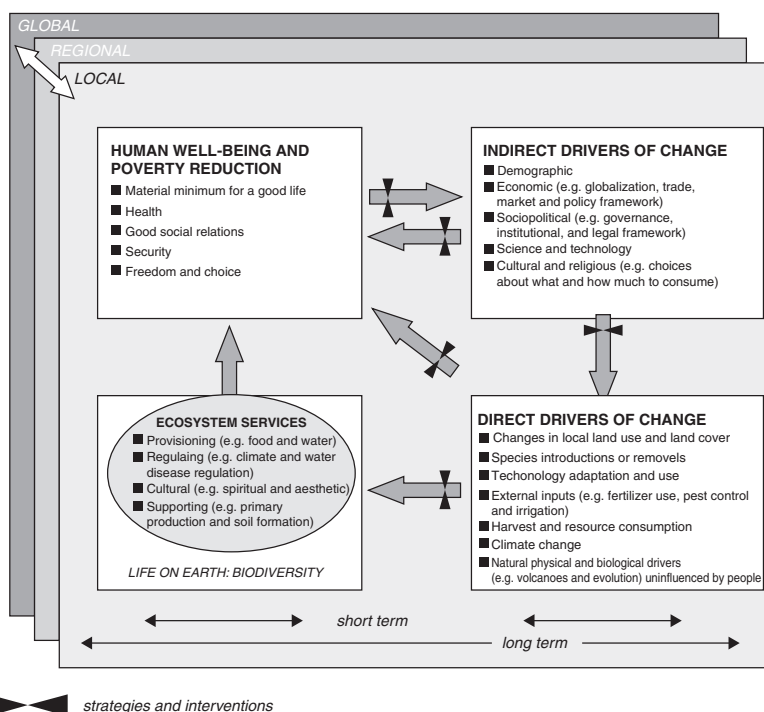


Figure 1.1 Biodiversity, ecosystem services and human well-being: the conceptual framework of the Millennium Ecosystem Assessment. Source: Millennium Ecosystem Assessment (2003).

regulating services (e.g. local climate control), cultural services (e.g. spirituality) and supporting services (e.g. soil formation). These services contribute to different dimensions of human well-being: basic material for a good life, health, good social relations and freedom of choice and actions. These dimensions of well-being are very closely aligned with dimensions of poverty – poverty being “a pronounced deprivation of wellbeing” (MA, 2003: 12). The MA framework also shows how ecosystem services are affected by external drivers – including economic, governance and demographic factors. Thus different development pathways have different implications for biodiversity and ecosystem services and different outcomes for human well-being.

In practice, different organisations – and individuals – have very different perspectives on the links between biodiversity conservation and poverty alleviation and their roles and responsibilities in addressing these links. A useful framework for thinking about this logic is provided by Adams *et al.* (2004), who propose a typology of four positions which can be adopted on the relationship between biodiversity conservation and poverty alleviation. In the first, poverty and conservation are seen as separate realms. In the second, poverty is seen as a critical constraint on conservation, meaning it must be tackled to achieve conservation goals. In the third, conservation activities must not compromise poverty. In the fourth, poverty alleviation is the goal, and is seen as being dependent on resource conservation. Recognising these fundamentally different value positions can help to explain the behaviour of different actors when they are faced with difficult trade-off decisions between conservation and development goals (Leader-Williams *et al.*, 2010).

Where is the evidence for biodiversity–poverty linkages? The objectives and structure of this book

Recognising the diversity of opinion as to the nature and scale of biodiversity–poverty links and the most appropriate mechanisms that can help to maximise them, this book is intended to explore the current state of knowledge on different aspects of this relationship. The book is based on a symposium held in April 2010 at the Zoological Society of London that brought together leading experts to discuss the nature of the links between biodiversity and poverty in different ecological contexts and for different groups of poor people. The symposium was built on the foundations of three fundamental questions:

- Is there a geographical overlap between biodiversity and poverty?
- Are poor people dependent on biodiversity?
- Is biodiversity conservation an effective mechanism for poverty alleviation?

Through the symposium and in the chapters of this book, a richer and more nuanced set of issues were explored:

- Which aspects of biodiversity are particularly useful or not useful to the poor?
- Does the relationship between biodiversity and poverty differ according to particular ecological conditions?
- How do particular conservation interventions differ in their poverty impacts?
- How do distributional and institutional issues affect the poverty impacts of interventions?
- How do broader issues such as climate change and the global economic system affect the biodiversity–poverty relationship at different scales?

This chapter sets the scene for the rest of the book by highlighting the broad policy statements that are made about the links between biodiversity and poverty, and the assumptions these statements imply. Lack of clarity over terminology is a major obstacle to better understanding the true nature of the relationship between biodiversity and poverty, and we highlight areas where confusion may lie. After this chapter the book is divided into five parts, informed by the set of questions posed here. Part I provides an overview of the relationship between biodiversity and poverty – particularly focusing on the delivery of ecosystem services and their role in supporting the poorest. In Part II we examine the different nature of the biodiversity–poverty relationship in different ecological contexts – from forests to farmland, and from drylands to coastal zones. In Part III we compare the poverty impacts of a wide range of common conservation interventions and approaches – including protected areas, enterprises and community-based conservation. In Part IV we assess distributional and institutional issues associated with biodiversity–poverty linkages, notably the use of payments for ecosystem services (PES) mechanisms, the distribution of benefits in pastoralist and other community areas and the use of local organisations as an entry point. Finally in Part V we look at the relationship between biodiversity and poverty in the context of larger scale drivers of environmental degradation – climate change, consumption and the nature of development itself. In the final chapter of Part V (Chapter 20), we present our conclusions with respect to the fundamental questions addressed by chapter authors, the emerging themes and their implications for policy makers and practitioners going forwards.

A note on terminology

The issue of definitions and terminology is critical. There exists a tendency to talk in generalisations – for example, that biodiversity conservation can contribute to poverty alleviation – without clearly defining either what we mean by these terms or how we are measuring impacts and outcomes. *Biodiversity* is defined by the CBD as “the *variability* among living organisms”, but it is often used to refer to *amount* in terms of abundance of species and populations, or to specific elements of biodiversity rather than variety per se.

Biodiversity *conservation* is variously defined depending on different values, objectives and world views. These vary from place to place, culture to culture and even individual to individual. In general terms, however, it can be taken to mean the protection, maintenance and/or restoration of living natural resources to ensure their survival over the long term. The way in which biodiversity is conserved and managed also varies hugely from place to place, from strict preservation to commercial consumptive use – with much debate about the relative merits and effectiveness of these different approaches.

Poverty is another term with many different definitions. The simplest usually relate to some level of material wealth – for example, the Millennium Development Goal to “eradicate extreme poverty” refers to the billion-plus people whose income is less than US\$1 a day. However, poor people often do not define themselves in cash income terms – indeed, the concept of cash is completely meaningless for some indigenous communities who live outside of the cash economy. In many cases, issues such as power and voice, opportunity and a healthy environment are valued more highly than money. It has therefore become increasingly recognised that poverty is multidimensional. The World Bank, for example, describes poverty as

a pronounced deprivation in well being. . . . To be poor is to be hungry, to lack shelter and clothing, to be sick and not cared for, to be illiterate and not schooled. But for poor people, living in poverty is more than this. Poor people are particularly vulnerable to adverse events outside their control. They are often treated badly by the institutions of state and society and excluded from voice and power in these institutions. (2001: 15)

Similarly *poverty reduction* implies lifting people beyond a defined poverty line – transforming them from poor to non-poor. But often poverty is alleviated (i.e. some of the symptoms of poverty are addressed but people are not actually transformed from ‘poor’ to ‘non-poor’) or prevented (i.e. people are prevented from falling into – or further into – poverty) rather than actually being reduced (Figure 1.2).

Finally, there is a need to be clear that the relationship between biodiversity and poverty/poor people is different from the one between biodiversity *conservation interventions* and poverty/poor people. The difference may seem semantic but is crucial.

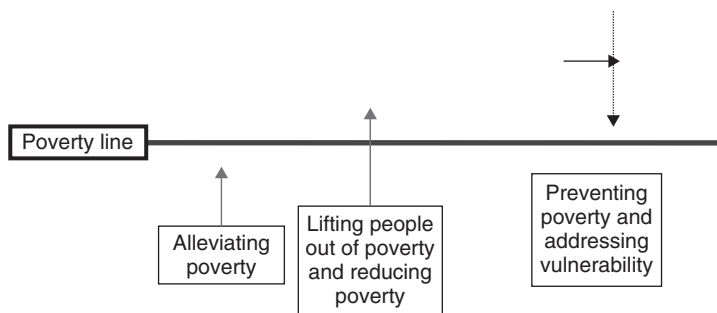


Figure 1.2 **Poverty reduction, alleviation and prevention.** Source: Adapted from King and Palmer (2007).

For example, because the rural poor depend on biodiversity for their day-to-day livelihoods, it is logical that if it is conserved (maintained, enhanced or restored) it can continue to provide livelihood support functions. However, the conservation *intervention* that is employed to reach that outcome may have a negative poverty impact.

Biodiversity, ecosystem services and poverty – the potential for synergies

In the first section of the book, authors explore the links between biodiversity, ecosystem services and poverty globally through spatial analysis, case studies and literature review. Spatial overlap is often presented as a rationale for why biodiversity conservation and poverty alleviation should be pursued together, although patterns of co-location are complex and vary depending on the elements of biodiversity and poverty being compared (Fisher & Christopher, 2007; Redford *et al.*, 2008; Sachs *et al.*, 2009; Roe *et al.*, 2010). However, spatial overlap, as we shall see, is not enough to guide policy makers as to the synergies. The nature of the specific linkages, and in particular their relation to property rights, has to be understood at the local level if policies are to reflect and address these linkages. Emerging efforts to map the distribution and flows of ecosystem services could be a valuable way of identifying where the connection between biodiversity (that in part underpins the supply of ecosystem services) and the poor (who in part depend on such services) is most acute. This, in turn, could help to identify where conservation action could have the greatest impact for the well-being of the poor.

In Chapter 2, Turner *et al.* use global data sets to investigate the overlaps between areas of high biodiversity value, areas supplying ecosystem service value and areas

occupied by poor people. They find a strong relationship between biodiversity conservation priorities and ecosystem service provision – particularly those services used by the poor. The study confirms the difficulty of geographically separating efforts to manage biodiversity from those to reduce poverty, and finds that the most important places for effective PES mechanisms are also the same places where the poor depend on essential ecosystem services. If effective and equitable PES mechanisms were implemented comprehensively, the value of ecosystem services to the poor would exceed US\$1 per person per day for 30% of an estimated 1.1 billion people living in poverty. The chapter concludes that, at the national level, ecosystem services may provide a substantial subsidy for the world's poorest countries, representing a significant contribution towards meeting the Millennium Development Goals.

Whether or not there is a geographical overlap between poverty and biodiversity says little about the nature and consequences of this link. What is arguably more important is to understand the multidimensional interactions and dependencies between biodiversity and poverty which cannot be easily captured in a two-dimensional map.

In Chapter 3, Wittmer *et al.* take the analysis of 'realised' ecosystem services one layer deeper, to examine the property rights of the human population using these services. They analyse the 'GDP of the poor' to estimate overall dependence of livelihoods on non-marketed natural resources and other ecosystem services, and demonstrate that standard measures of GDP fail to capture the costs to the rural poor of degradation in natural capital. They conclude that policy makers should focus on securing access to and continued availability of those ecosystem services most essential to poor citizens and ensure that policies and projects do not unintentionally degrade them.

Continuing to drill down to the local scale, in Chapter 4 Vira and Kontoleon examine the evidence of the extent to which poor people depend upon biodiversity and the nature of this dependence, whether for subsistence, income and/or insurance (risk reduction). Their exploration of what is understood by the terms *biodiversity* (or 'nature's resources') and *poverty* affirms their call for more careful and disaggregated identification of the pathways by which changes in biodiversity affect poor peoples' livelihood choices and strategies. They find a surprising lack of empirical data. Furthermore, where studies exist they show considerable variation in the contribution of nature's resources to household income. They find that when participation in biodiversity-based livelihood activities is broken down by wealth class, it is the poor who typically show higher levels of dependence. This is not, however, the case for high-value natural resources which tend to be appropriated by richer groups, often pushing poorer households into 'poverty traps'.

Besides subsistence and income dependency, the chapter highlights that agrobiodiversity provides the poor with a form of cost-effective and readily accessible insurance against the risk of food insecurity, but that the role of other aspects of biodiversity in risk reduction is poorly understood.

Biodiversity and poverty relationships in different ecological settings

Part II explores the linkages between biodiversity and poverty in different ecological settings – from coasts to drylands, and from forests to farms. The benefits of biodiversity as an insurance and risk reduction mechanism appear to cut across ecological settings, but so does the risk of overdependence on, and unequal access to, natural resources.

In Chapter 5, Belcher explores the interactions between forests and poverty. He notes that for many remote communities, forest-based livelihood contributions are more valuable than those from agriculture, particularly when fuel wood supplies are included. He explores what he calls the ‘naïve’ assumption that local people will conserve forests if they benefit from them, finding that the same factors that help to conserve forests may also contribute to perpetuating poverty, such as remoteness from markets, absence of infrastructure and poor soils. Competing claims to forest resources can lead to ‘poverty traps’ whereby high competition for open-access resources leads to the poorest people engaging in overharvesting, which in turn leads to price reductions. The poorest are the most dependent on forest resources for subsistence purposes, but the wealthiest are the main beneficiaries of forest-related income opportunities, notably from timber production.

In Chapter 6, Campbell and Townsley note the diverse biomes encompassed by the coastal environment which provide many opportunities for the poor. They note the difficulty of identifying the scale of linkages between poverty and coastal fisheries. The high diversity of coastal species provides for access by a wide spectrum of social groups (of different genders, ages and wealth groups), and a safety net in times of stress. Access to coastal biodiversity is, however, changing rapidly as a result of expanding population coupled with rapid coastal development, coastal degradation, resource overexploitation, climate change and other factors. This results in increased competition for resources – often with the effect of reduced access for the poor. To date there is a lack of evidence that improved coastal zone management can achieve both conservation and poverty reduction aims.

In Chapter 7, Mortimore describes how drylands are often considered as ‘biodiversity deserts’ – a strong contrast with forest and coastal ecosystems – where biodiversity loss is associated with overgrazing, overcultivation and deforestation. In drylands, biodiversity is often the product of co-evolving human and ecological systems. Genetic management (crop breeding, animal breeding, wild plant protection and harvesting) is the key ‘bridge’ between the human and ecological systems. The dependence of the poor is not so much on ‘wild nature’ but on agro-diversity (cultivars), useful plants (spontaneously regenerating), protected and spontaneous on-farm trees and domesticated livestock. The chapter corroborates Vira and Kontoleon’s identification (in Chapter 4) of the importance of biodiversity as an insurance against risk, and

concludes that the primary determinant of poverty in dryland systems is the state of health of the human and ecological systems.

In Chapter 8, Douma focuses on agricultural landscapes and confirms the role of agro-biodiversity in supporting the livelihoods of poor smallholder farmers – particularly in terms of improving their capacity to maintain productivity and cope with climate change. The chapter notes that ‘sustainable’ agricultural practices such as composting, crop rotation, zero tillage, application of green manure and abstention from chemical pesticides and fertilisers increase household incomes and reduce food security risks to poor farmers. The chapter shows that low-external-input agriculture, organic agriculture and smallholder systems have positive effects on both carbon sequestration and biodiversity and argues for further exploration of PES as a mechanism to reward poor farmers for their safeguarding of sustainability.

Poverty impacts of different conservation interventions

In the third section of the book, authors assess alternative types of conservation interventions for their impact on poverty, and find common ground in the relative lack of disaggregated poverty impact data. They also recognise that conservation interventions are generally, and understandably, targeted at delivering those livelihood benefits thought to be most likely to incentivise conservation action, rather than tackling poverty alleviation per se. The question of whether conservation interventions could and should do more to reach the poorest is an important one. Our authors appear to agree that conservation interventions are largely not reaching the poorest and argue that truly large-scale poverty alleviation requires government action at a level beyond the reach of the conservation sector alone.

Leisher *et al.* reviewed over 400 documents in order to explore the empirical evidence for biodiversity conservation as a mechanism for poverty alleviation. In Chapter 9, they find a relative lack of robust data, particularly with regard to poverty impacts other than income. They identify 10 types of intervention varying from nature tourism and local management of marine areas to improved agro-forestry and grassland management. They find that in many cases, it is *biomass* rather than *biodiversity* per se that determines the poverty alleviation potential of a conservation intervention – although it should be noted that biodiversity is often important for generating high biomass. They find some evidence of community-based forestry enterprises, nature-based tourism, fish spill-over from no-take zones in marine conservation areas, agro-forestry and grassland management interventions supporting routes out of poverty. They confirm that some interventions may lead to poverty traps, particularly where elites gain control of resources, noting that better-off households with greater physical and social capital are more likely to participate in conservation initiatives.

In Chapter 10, Holmes and Brockington evaluate the social impacts of protected areas (PAs), which remain a central strategy of conservation practice. Recognising that other chapters have focused on the potential positive links between biodiversity conservation and poverty alleviation, they review some of the more problematic aspects of this relationship. They find that social impacts of PAs tend to be concentrated at the local level in close proximity to the conservation area. Impacts include physical displacement, and the more common but less visible 'economic displacement' in which economic opportunities are curtailed. Social relations can also be changed by PAs, often negatively, although in some cases indigenous and community conserved areas (ICCAs) may protect the rights of vulnerable people. In terms of who is affected by PA impacts, the authors find that three factors are crucial: local existing micro-politics, PA governance regimes and wider political economies. As with so many other chapters in this book, the authors find that data on the impacts of PAs are seriously lacking. However, they also caution that the complexity of the relationship between PAs and local people may make it impossible to draw strong inferences from case studies, no matter how many are available.

In Chapter 11, Sandbrook and Roe explore the poverty impacts of the conservation of particular charismatic species, drawing on the example of great apes. They find that despite a high level of investment, positive impacts on poverty tend to be limited. Various strategies for linking species conservation and poverty alleviation have been implemented including tourism, community-based natural resource management (CBNRM) and integrated conservation and development. However, the focus of species-based conservation is on species, not poverty alleviation, and the benefits for local people are often too low or poorly distributed to make a significant difference to poverty levels. At the same time, the presence of species-based conservation can greatly increase the level of conservation law enforcement, which may exacerbate poverty for resource-dependent people in the short term.

In Chapter 12, Jones *et al.* explore the poverty impacts of community conservancies in Namibia, widely touted as a flagship example of a successful CBNRM programme. They evaluate whether benefits are fairly shared and reaching the household level, while at the same time pointing out that it would be misleading to frame CBNRM as a poverty alleviation strategy *per se*. They find that most conservancies have elected to provide benefits to members through social projects rather than make payments to members or households, and that those benefits that are paid at the household level in cash or kind are not being seized by elites. Jobs are the most significant benefit in terms of providing pathways out of poverty. With the exception of jobs, most benefits from CBNRM probably help alleviate poverty but do not transform people from poor to non-poor. Wildlife numbers are steadily growing in conservancy areas, creating new challenges as the livelihood costs of growing human–wildlife conflict fall more heavily on the poor.

In Chapter 13, Elliott and Sumba analyse whether biodiversity-based enterprises (e.g., tourism and the wild products trade) can deliver both conservation and poverty benefits. They find some positive examples in value chain interventions that affect a whole sector by improving incomes for primary producers. They find extensive evidence of income and employment benefits, but note that in many cases the beneficiaries appear to place significant value on non-economic benefits, notably improved livelihood security and empowerment, which are hard to quantify. The evidence suggests that the enterprise approach works best for high-value species and habitats but is not suitable for resources of low economic value – which tend to be the ones of importance to the poorest. They find that the very poorest and most marginalised members of society are hard to reach without the support of government welfare provisions. This finding is not limited to conservation enterprise and resonates with the experience of the development sector in supporting small enterprises.

Distributional and institutional issues

In Part IV authors explore in more depth some of the main cross-cutting distributional and institutional issues identified in earlier chapters. They shed further light on the pervasive challenges to fair and equitable distribution of benefits from conservation initiatives, and on the need for locally based actions to complement actions at national and international levels.

In Chapter 14, Wunder and Börner offer insights into the poverty impacts of PES schemes on three groups of poor people – those who supply the services, those who buy the services and those not included in the scheme. They note a lack of evidence of any ‘poverty trap’ effect for suppliers to PES schemes and conclude that in most cases PES has positive effects (though small impacts on poverty alleviation) as long as participation is voluntary and the poor have secure rights over environmental assets, usually land. PES schemes are often targeted at areas of low population density, which can increase the participation of the poor. They find that poor buyers or beneficiaries of PES also receive significant benefits, particularly in watershed protection schemes. However, in common with other conservation initiatives, the poor who are not included in a PES scheme tend to be losers, with the landless and marginalised most likely to lose. They conclude that the key going forward is to expand the coverage of PES schemes and to incorporate safeguards to prevent elite capture in larger schemes, notably in Reduced Emissions from Deforestation and Forest Degradation (REDD) schemes.

In Chapter 15, Homewood *et al.* identify serious issues in the creation and sharing of tourism benefits around protected areas in Kenya and Tanzania. They compare impacts of conservation on Maasai livelihoods in both countries and find only one site in five where significant benefits are delivered at the household level, with the bulk of

(often significant) revenue levels typically captured by elites within the communities, by the private sector, government and NGOs. They find the situation in Tanzania to be significantly worse than in Kenya due to benefit capture by state agencies, community elites and global investors as well as a history of (and fear of future) conservation exclusions. Even within Kenya's Maasai Mara, where nature-based tourism income is significant, they find that the wealthiest group captures the majority of the income. At the same time the poorest are increasingly losing access to resources – with serious implications for livelihood security and for the future of conservation initiatives.

In Chapter 16, Thomas investigates the important role of local grassroots organisations in addressing conservation–poverty links, and specifically in addressing issues of sustainability, efficiency, legitimacy and fulfilment of rights. He concludes that their importance today is nowhere more apparent than in the opportunities emerging from PES schemes – including payments for REDD and from access and benefit sharing (ABS) schemes. Strengthening the capacity, tools, administrative skills and finance of grassroots organisations is important, but ultimately communities and their organisations need favourable conditions of rights, tenure and long-term security if they are to invest in local stewardship that delivers both conservation and sustainable livelihood benefits.

In Chapter 17, Berkes explores community incentives for conservation. Through analysis of case studies, he concludes that political, social and cultural objectives are equally as or more important than monetary objectives and that empowerment is almost always a key objective. He finds that for indigenous groups, political and empowerment objectives are usually central. The fact that objectives differ greatly between and within communities makes it impossible to design 'blueprint' solutions. He unravels the complexities of trying to link livelihood incentives to biodiversity conservation given the complex and multidimensional nature of poverty, and argues that the first step in doing a better job with the linked incentives model is to acknowledge the trade-offs. He finds that intra-community differences in needs and objectives are inevitable and hard to incorporate; conservation interventions tend not to reach the poorest directly, but better social organisation and increased social capital help communities to take care of their poor through sharing networks.

Biodiversity and poverty relationships in the context of global challenges

In Part V, the final section of the book, the linkages are placed in their global context. The implications of existing and anticipated rates of biodiversity loss are huge for all, but particularly for the world's poorest people. Will acting swiftly on global poverty help save biodiversity? Or will investing more in biodiversity conservation solve the

poverty problem? Or are both part of a much bigger question – that of how we choose to live our lives, grow our economies and govern our sharing of the world's resources?

In Chapter 18, MacKinnon locates these questions within the context of the threat that climate change poses to sustainable development. She finds that climate change provides a unique opportunity to re-emphasize the multiple values of natural ecosystems and that biodiversity conservation can contribute to reducing the impacts of climate change, especially for the most vulnerable communities, notably by safeguarding water and food supplies and by reducing vulnerability to natural disasters. Greater investment in natural ecosystem management and the goods and services they provide is, she argues, a priority if we are to address the coming global challenges.

In Chapter 19, Adams emphasises that both biodiversity conservation and poverty alleviation are intensely political activities. Attempts to integrate them have proved difficult, expensive and often socially divisive. He argues that the focus on local 'win-wins' for both rural poverty and pristine biodiverse environments has side-tracked thinking about the broader linkages and resulted in failure to acknowledge or address overconsumption as the chief cause of biodiversity loss. He cites evidence that conservation has both positive and negative poverty impacts at the local scale, but finds evidence that fewer than 1% of the poor live in areas of 'intact ecosystems', which must limit any capacity for conservation in those places to contribute to poverty alleviation. Adams points out that 'frontier' conservation ignores 'transformed' urban and agricultural zones and therefore some of the biggest challenges to global biodiversity. Economic growth fuelled by resource and energy consumption has been the driving model for both poverty alleviation and wealth creation since the Second World War, and is now pushing us beyond planetary boundaries. Conservation interventions are largely framed within this neoliberal capitalist paradigm, he argues, instead of challenging it. He challenges conservation to move beyond concepts of wilderness and monetary value. If we are to survive the 'Anthropocene' era, we must find new paths to delink energy generation from carbon emissions and delink energy consumption from economic growth, while redistributing wealth and resource use.

Finally in Chapter 20, Roe *et al.* review the preceding chapters and highlight the need to be much more careful in making claims about biodiversity–poverty linkages. While some international policies and proclamations assert that conserving biodiversity and eliminating poverty are two sides of the same coin, it is clear from the chapters in this book that it is not a given that this will be a win-win relationship: all sorts of politics, power relationships, global environmental and economic pressures and governance issues mediate the relationship. Indeed, it is clear that biodiversity conservation is not a panacea for poverty alleviation. But neither is the current model of development. Biodiversity loss and persistent poverty share common driving forces:

overconsumption, poor governance and unsustainable development paths. It is in tackling these bigger issues that solutions to both problems are likely to be found.

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