

# LINKING BIODIVERSITY CONSERVATION AND POVERTY REDUCTION: WHAT, WHY AND HOW?

**Dilys Roe  
Matt Walpole  
Joanna Elliott**

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## **CONTENTS**

### **Executive Summary**

- 1. Introduction: Symposium rationale, aims and objectives**
- 2. Context: The politics and economics of biodiversity and poverty**
- 3. Is there a geographical overlap between biodiversity and poverty?**
- 4. Do poor people depend on biodiversity?**
- 5. Can biodiversity conservation be a route out of poverty?**
- 6. Local – Global: different approaches to linking biodiversity conservation and poverty reduction in practice**
- 7. Reflections on symposium findings**
- 8. Co-hosts' conclusions and recommendations**
- 9. Endpiece: Moving forward - feeding the symposium findings into policy processes**

### **Annexes -**

- A. Symposium Agenda**
- B. List of presenters and panellists**
- C. List of research posters presented**

## EXECUTIVE SUMMARY

### 1. Symposium rationale and objectives

The fundamental links between environment and development have long been accepted in principle, but only relatively recently have the specific links between biodiversity conservation and poverty alleviation been explored and debated. The Convention on Biological Diversity (CBD) has been a spur for this: in 2002, it adopted a target “to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level *as a contribution to poverty alleviation* and to the benefit of all life on earth”. This wording assumes a positive link between biodiversity conservation and poverty alleviation – but is this justified? It is clear that biodiversity loss will continue beyond 2010—but what will this mean for poverty reduction? Even if conservation efforts were successful, would they really contribute to poverty reduction? There is a diversity of opinion as to the nature and scale of biodiversity conservation–poverty reduction links and the most appropriate mechanisms that can help to maximise them. Claims are often made on the basis of a limited number of case studies, limited number of contexts, or localised definitions of success or failure in conservation or poverty reduction. The causal relationships are not so simple that one can say either that poverty causes biodiversity loss, or that improvements in biodiversity reduce poverty. This suggests a need to be more specific in defining what types of poverty and biodiversity issues are being assessed.

As a contribution to clarifying the contested claims, IIED, UNEP-WCMC and the African Wildlife Foundation organised a symposium in April 2010. The purpose of the symposium was to explore the current state of knowledge and the evidence base for claims and counter-claims, in order to better understand what is assumption rather than fact. Drawing on a wide range of disciplines across academia as well as from conservation and development agencies, the symposium included case study presentations, a series of “state of knowledge” reviews, panel discussions and posters.

### 2. Symposium structure and coverage

Two keynote presentations outlined the political and economic contexts for thinking about biodiversity-poverty linkages, highlighting the scale of the challenges ahead in a world where major institutions still do not take sustainable development seriously. Three specially-commissioned state-of-knowledge reviews then explored what is known about often-cited biodiversity-poverty relationships using three common assumptions as a starting point:

1. That there is a *geographical overlap* between areas of high biodiversity – and hence conservation interest – and high poverty – and hence development interest;
2. that the *poor are dependent* on biodiversity for their day to day livelihoods; and
3. that biodiversity conservation can be a *mechanism for poverty reduction*.

The symposium then moved to biodiversity conservation-poverty reduction linkages in different *environments* (e.g. forests, drylands, coastal zones, agricultural lands) and FOR different conservation *interventions* (e.g. protected areas, payments for environmental services, enterprise, community conservation). It also explored the

approaches adopted by different *organizations* – from national policy interventions to working through local organizations.

In a departure from the standard format for such events, two panel discussions enabled representatives from different sectors to present brief individual perspectives on biodiversity-poverty linkages, and in the concluding panel to reflect on the evidence presented during the symposium.

### 3. Key conclusions

- 1) **There is a broad *geographical overlap* between poverty and biodiversity at a global scale; but the specific overlaps between biodiversity and the value of ecosystem services provided are not as clear.** The geographical overlap between biodiversity and poverty is particularly pronounced in areas with high forest cover, where levels of poverty are high but numbers of poor people are low. However, spatial mapping efforts to date have largely focussed at the global scale with limited utility beyond revealing very broad patterns. Finer-scale analysis is likely to provide more useful insights into factors that affect biodiversity-poverty links - such as governance. Emerging efforts to map the distribution and flows of *ecosystem services* at sub-national levels could be a valuable way of identifying where (and when) the connection between biodiversity and poverty is most acute. A more detailed and quantitative understanding of connections between biodiversity and ecosystem services at local level might also enable improved engagement by the development community.
- 2) **The poor *depend disproportionately* on biodiversity for their subsistence needs – both in terms of income and insurance against risk.** Despite a surprising lack of empirical data, the available evidence indicates that it is often the relatively low value or ‘inferior’ goods and services from biodiversity that are most significant to the poor in subsistence contexts, notably in forest ecosystems. Resources of higher commercial value attract the attention of the more affluent groups, often crowding out the poor unless deliberate efforts are made to support the poor and marginalised (as in some conservation enterprises). Although the evidence does seem to verify – in general terms – the assumption that poor people do depend on biodiversity, it does question this as a rationale for development community interest in biodiversity. Where the development community is focussed on transformational change, resource *dependence* is not seen as a route out of poverty, rather a *status quo* that will have costs and benefits at micro and macro levels. In this sense, the dependence of the poor on ecosystem services should be recognised in national macro-economic policy.
- 3) **Biodiversity conservation can be a *route out of poverty* under some circumstances but more often it acts as a *safety net* to keep people from falling deeper into poverty, and occasionally it can become a *poverty trap*.** Few conservation interventions measure their impact on poverty *per se*, tending to use quantitative livelihood indicators as proxies. Even when they can be shown to make a contribution to poverty reduction, the scale or longevity of impact may be limited. Regardless of the specific

mechanism employed, few conservation interventions specifically target the poorest - indeed, households with greater assets and higher levels of social capital are more likely to participate in conservation initiatives. Furthermore, elites often capture the benefits of a conservation initiative – sometimes crowding out the poor in the process. Despite some good intentions many conservation interventions just do not lend themselves well to poverty. However, others may create new opportunities: community resource management and other institutional innovations, growing and changing markets for both timber- and non-timber products, value chain interventions through well-designed conservation enterprises, and the tremendous new interest in payment for environmental services schemes (especially REDD).

- 4) **A focus on cash benefits obscures the real poverty reduction potential of biodiversity conservation.** Benefits and incentives are much too narrowly conceived in the conservation literature, focusing on monetary benefits as if following the income-poverty model of the 1960s. Yet it is widely documented that communities have a diversity of objectives for engaging in conservation - economic, environmental, political, social and cultural – and this is consistent with the idea that poverty is not simply the result of low income but also reflects a deprivation of the diverse requirements for meeting basic human needs. These findings may help design more appropriate community incentives for conservation partnerships, and lead to more effective ways of measuring the real human impacts of conservation actions.
- 5) **Biomass may matter more than biodiversity – at least in the short term – but biodiversity matters in the longer term.** In the short term, it is not so much the diversity, or variety of biological resources, that makes an important contribution to poor peoples' livelihoods – immediate needs (e.g. for food and fuel, and for generating cash) are met by their abundance or mass. And biodiversity-based business may also be reliant on a very small subset of the world's biodiversity. Wildlife tourism, for example, depends immediately on remarkably few species, e.g. 'the big five' and large migrations or populations of single species. Diversity does however provide both poor people and businesses with a strategy for risk management – particularly the ability to switch to alternative resources in the face of changing conditions such as climate change and harvest failure. This is particularly true for agricultural biodiversity: evidence shows that indigenous and local communities rely on a wide diversity of cultivars. Furthermore, biodiversity is known to underpin biomass production in some ecological systems – for example fisheries.
- 6) **Improved understanding of the relationship between biodiversity and poverty remains hindered by a lack of clarity and consensus as to the definitions of key terms.** "Biodiversity" as defined by the CBD is "the variability among living organisms from all sources...this includes diversity within species, between species and of ecosystems". This definition tries to capture, in one term, the full range of living natural resources (or biological resources) that make up life on earth. Most conservation organisations, when referring to biodiversity, do not focus on the diversity of living resources but on a smaller subset of species and habitats – in particular rare species (whether

threatened or endemic) and threatened habitats (particularly if they include rare species). Agricultural biodiversity is not usually included within this understanding. Development organisations, on the other hand, focus more on agricultural biodiversity and less – if at all – on wildlife.

Similarly, “poverty” is widely recognised as being multi-dimensional and has been defined by the Millennium Ecosystem Assessment as a “profound deprivation of well-being” – where well-being includes security, health, freedom of choice and action, as well as the basic materials for good life (food, shelter, livelihoods, access to goods). Yet it is often measured only in terms of the presence or absence of material goods – in MDG1, for example, the poor are defined as those who live on less than \$1/day. This is despite the fact that non-monetary assets or their deprivation can be as – if not more – highly valued by the poor themselves, particularly empowerment, land and resource rights, and resource security/sustainability. The focus on cash income also tends to reinforce the bias towards biomass (rather than biodiversity) in poverty reduction.

- 7) **Improved understanding of the relationship between biodiversity and poverty is also hindered by reliance on a weak evidence base.** Despite the wealth of case studies on biodiversity-poverty linkages, the existing body of work suffers from an overload of conjectural and anecdotal assertion rather than evidence (the links have not been considered important in policy, and so incentives and procedures to monitor and assess them have understandably been weak). Full understanding of the links between biodiversity conservation and poverty reduction in any given context requires the ability to make causal inferences about a counterfactual – and very few studies are able to do this. At the same time a reliance on scientific data raises many questions about what kind of evidence/knowledge is valid and how to incorporate traditional knowledge and anecdotal evidence into “scientific” assessments and analyses.
- 8) **The relationship between biodiversity and poverty is different to, and should not be confused with, the relationship between conservation and poverty.** The debate as to whether or not *biodiversity* contributes to poverty reduction is often described interchangeably with whether *conservation interventions* do or do not contribute to poverty reduction – or indeed whether conservation exacerbates poverty. Although it is clear that the poor depend on biodiversity and thus its conservation is critical to their livelihood security, how conservation interventions and projects are designed and implemented has as much to do with poverty causes and impacts as the role of biodiversity itself. Conservation interventions may actually reduce the access of poor people to biodiversity and hence have a negative effect on poverty reduction.
- 9) **The biodiversity –poverty debate is currently being addressed at the international level and at the local level. There is a missing link at the national level.** The focus of the International Biodiversity Day in 2010 was on biodiversity, development and poverty reduction – and numerous international events (such as this symposium) and policy processes (such as

the CBD) deliberate over biodiversity-poverty linkages. Equally at the local level, there is a plethora of on-the-ground initiatives linking biodiversity conservation and poverty reduction (the Equator Initiative being one source of such examples). Yet local-level success stories and international policy proclamations will never be enough to optimise the contribution of biodiversity to poverty reduction. It also requires serious engagement at the national level – e.g. with finance and planning ministries in wealth accounting and public expenditure reviews, and not solely environment ministries.

**10) Green economy debates and initiatives offer a promising platform to identify and scale up biodiversity-poverty solutions – in the context of a world still wedded to a paradigm of ever increasing consumption.** The debate about biodiversity-poverty linkages may be but one conversation needed on how to bring about truly sustainable development. Biodiversity loss and acute poverty are symptoms of much larger issues such as excessive and unsustainable consumption, economic growth that does not take account of ecological limits, poor governance, and so on.

#### 4. Where next?

Our conclusions lead us to suggest the following in moving forward:

- **Knowledge gaps:** Some clear research gaps need to be refined with targeted policy analysis, for example:
  - i. *Spatial links:* ‘mapping’ local links between biodiversity and ecosystem services;
  - ii. *Causal links:* assessing aggregate poverty (and not only livelihood) impacts of conservation programmes;
  - iii. *Risk assessment:* due diligence on the implications of failure of development programmes to address declines in biodiversity and ecosystem services
- **Definitions and measures:** Absolute clarity is needed about how “biodiversity” and “poverty” are being defined, understood and measured when making claims – or drawing assumptions – about the relationship between the two.
- **Scaling up success stories:** Better understanding and articulation of the nuances in the biodiversity-poverty relationship (in the face of often speculative generalisation) needs to be achieved without getting in the way of identifying ‘successful’ actions/approaches and communicating these clearly to policymakers. Policy makers need to be made better aware of what has been learned about successful conservation action/approaches, so that they can then better support the scaling up of local successes to national level.
- **Political support and action:** Both biodiversity conservation and poverty reduction are highly political issues. The political context needs to be borne in mind when thinking about the conditions for success, or when processes for achieving integration and trade-offs are being promoted and utilised.
- **Mainstreaming:** Currently biodiversity is treated as an environmental issue and is addressed at the national level by environment ministries. But maximising the contribution of biodiversity to poverty reduction requires

acknowledgement that this is *also* a development issue and requires serious engagement by finance, planning and sector ministries. The CBD has been recommending the mainstreaming of biodiversity since its inception. This requires not just better dialogue between environment and development communities at the national and international level, and better integration of agendas, but also vertical coordination and coherence between global and regional agreements, national policies and local implementation.

Without such approaches, biodiversity and ecosystem services will continue to be depleted and their potential to act as a safety net for the poor – let alone to contribute to poverty reduction – will be in jeopardy.

Further details of the symposium, including all of the abstracts and presentations together with links to news articles, can be found at:

<http://povertyandconservation.info/en/>

## 1. INTRODUCTION: Symposium rationale, aims and objectives

Over recent decades, biodiversity conservation and poverty reduction have both become international societal goals. The Convention on Biological Diversity (CBD), agreed in 1992, was drafted in response to escalating biodiversity loss. The OECD International Development Targets of 1996 focussed the international development community on poverty reduction and were reiterated in the Millennium Development Goals (MDGs). Although aimed at very different communities of interest, both of these overarching policy frameworks recognise a link 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” while the 2002-2010 Strategic Plan includes 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”
- the seventh of the eight MDGs is to “ensure environmental sustainability” which originally included a sub-target to “reverse loss of environmental resources” with biodiversity-related indicators (protected area coverage, forest land). Since 2006 the 2010 biodiversity target was included as an additional target within MDG7.

The Millennium Ecosystem Assessment (MA), published in 2005, re-emphasised this link: the MA conceptual framework sees biodiversity underpinning the delivery of a range of “ecosystem services”, which in turn contribute to human well-being (with poverty being “the pronounced deprivation of wellbeing”).

Despite this apparent convergence at the international policy level, there is considerable divergence of opinion at the practical level as to the nature and scale of biodiversity-poverty links and the role and responsibilities of different interest groups in addressing them. One of the reasons for this divergence of opinion is that there is no single, linear relationship between biodiversity conservation and poverty reduction – it varies hugely from context to context with different patterns of winners and losers and different outcomes over time and space. Furthermore, claims are often made on the basis of a limited range of case studies, contexts or definitions of success or failure in conservation or poverty reduction.

This issue of definitions is critical. There exists a tendency to talk in generalisations – for example, that biodiversity conservation can contribute to poverty reduction - 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 this focus on variability is often missing when assertions such as the example above are made – species abundance or biomass, or economic value of a single species or habitat being far more significant than variability. 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 it is prevented (i.e. people are prevented from falling into – or further into – poverty) rather than actually being reduced. Furthermore, the beneficiaries of biodiversity conservation are often not “the poor” (i.e. those identified as living below a defined threshold of income or wellbeing) but simply rural communities, those who live local to conservation areas,

or who are primary users of living natural resources (who may or may not be poor). Even defining “the poor” is not easy - the target beneficiaries of MDG1 are the 1.2 billion people living on less than a dollar a day, but it is widely recognized that poverty is multi-dimensional and includes a lack of power, security, voice – not just a lack of money.

Compounding the issue of terminology is the state of the evidence base. Even if we can agree common understandings of key words and concepts, what evidence is there that reducing the rate of biodiversity loss can make a contribution to poverty alleviation – as assumed in the CBD 2010 target and elsewhere? In many cases the evidence is constrained because case study outcomes are measured differently and so are difficult to compare or aggregate. In other cases the empirical evidence is weak, both in terms of quantity and quality. In addition, causality is often assumed but not proven where biodiversity conservation and poverty reduction coincide.

The purpose of the symposium was therefore to better understand - or at least, better *clarify* - the nature and extent of biodiversity conservation-poverty reduction linkages in order to determine the key knowledge, policy and practice gaps that are constraining greater synergies between these two international policy objectives. We use, as our starting point, three common assumptions that often underpin arguments for linking biodiversity conservation and poverty reduction:

- There is a geographical overlap between areas of high biodiversity – and hence conservation interest – and high poverty – and hence development interest.
- The poor are dependent on biodiversity for their day-to-day livelihoods.
- Biodiversity conservation can be a mechanism for poverty reduction.

The symposium looked at biodiversity conservation-poverty reduction linkages in different environments (e.g. forests, drylands, coastal zones, agricultural lands) and in different conservation interventions (e.g. protected areas, payments for environmental services, enterprise, community conservation). It also explored the approaches adopted by different organizations – from national policy interventions to working through local organizations. In each case it aimed to explore what the current state of knowledge really is, what evidence claims and counter claims are based on, what is assumption rather than fact, and to identify the knowledge gaps and priorities for future focus.

This document is not a verbatim report of the symposium proceedings<sup>1</sup> but is intended to draw out the key themes of the meeting and to present some conclusions and recommendations for researchers, practitioners and policymakers. Sections 2-6 present a structured account of the main content of the presentations. Section 7 presents a summary of a panel discussion held at the end of the symposium to reflect on the material presented. Section 8 compiles some of the key conclusions and recommendations identified by the co-organisers. It is hoped that these will stimulate further thought, debate and action.

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<sup>1</sup> The abstracts of the papers and posters and well as the powerpoint presentations can be found on the website of the Poverty and Conservation Learning Group ([www.povertyandconservation.info](http://www.povertyandconservation.info))

## 2. Context: The politics and economics of biodiversity and poverty

**Bill Adams**, Moran Professor of Conservation and Development at the University of Cambridge, opened discussions at the symposium in a keynote presentation which emphasised that both biodiversity conservation and poverty alleviation are intensely political activities. The challenges of addressing each – and the links between them - must therefore be understood within an explicitly political framework. Of key importance is the recognition of the fact that both generate losers as well as winners and require trade-offs among the poor, between poor and rich, between local and global, North and South, current and future generations. Furthermore, the rate of increase in consumption patterns has accelerated dramatically in the past fifty years, to the point where the scale of the challenges to biodiversity conservation is well beyond the scope of current responses. Different strategies have been tried and can be learned from – community based conservation, integrated conservation and development, pro-poor conservation – but ultimately what is urgently required are hard political - rather than technical - choices about what elements of the earth's living diversity survive, who gets to benefit from them, and who gets to decide.

Adams argues that we are looking at biodiversity conservation and poverty reduction from far too narrow a perspective. Neither problem can be separated from the wider issue of economic development and its impacts on both biodiversity and poverty. Linking biodiversity conservation and poverty reduction requires more than a suite of technical interventions – it requires us to embrace the concept of truly sustainable development in which three elements are implicit: 1. Decarbonise the world economy; 2. Commit to a path of justice and global equity; 3. Protect the biosphere. Solutions need to be conceived that cross scales – from organism to biosphere, from individual consumer to humankind. The challenge if we are to survive the 'anthropocene' era is considerable.

In a second keynote presentation, **Pavan Sukhdev**, Study Leader of The Economics of Ecosystems and Biodiversity (TEEB) initiative, proposes economics as one tool for informing those hard political decisions, for example by enabling payments to be made to local people in return for them taking non-local interests into account. The concept of "ecosystem services" is a way of better understanding – and communicating - the flows of natural assets that are central to maintaining and improving livelihoods – particularly those of poor people.

GDP – the traditional measure of national income and economic progress – is a misleading indicator of societal progress since it does not take into account changes in the national stocks and flows of natural resources or measures of distribution. However there are examples of "green accounting" approaches that do take natural assets into account - a study in India showed that ecosystem services accounted for 7% of national GDP. The contribution of ecosystem services is more pronounced if the GDP approach is focussed on a subset of the national population – the poor. In the Indian case the percentage of GDP changes from 7% of national GDP to 57% of "GDP of the poor". More widespread application of this adapted measure of GDP

would provide much greater recognition of the importance of ecosystem services and the link between biodiversity and poverty alleviation.

As well as contributing to a more rounded calculation of GDP, acknowledging the value of the full suite of ecosystem services provides for more informed decision making over a variety of land-use options and allows for a more nuanced identification of winners and losers from conservation interventions.

### **3. Is there a geographical overlap between biodiversity and poverty?**

The existence of a spatial link between biodiversity and poverty is often presented as a rationale for why biodiversity conservation and poverty reduction should not be pursued separately. Others argue that the areas of most interest to conservationists are those undisturbed areas with low numbers of poor people where the potential for linking conservation and poverty reduction is limited.

**Monica Hernandez-Morcillo, Phillip Martin and Matt Walpole** of UNEP-WCMC reviewed the substantial body of work that has attempted to map the coincidence of areas of high biodiversity and areas of high poverty, at a range of scales. The results of such mapping exercises vary according to which measures of poverty and which measures of biodiversity, or conservation interest, are used, and there is no universal pattern of overlap.

Nevertheless, Hernandez-Morcillo *et al* concluded that such geographic linkages do exist, and there are important overlaps between extreme poverty and key areas of global biodiversity – particularly noticeable in Sub-Saharan Africa, the Caribbean, and South Asia, where current trends of poverty are increasing due to the economic crisis and where the transformation of ecosystems is more dramatic, leading to a more pronounced biodiversity decline. Although the highest *density* of poor people is found in highly transformed areas, the greatest depth of poverty often occurs in remote, more ecologically intact areas. One study found a positive relationship between extreme poverty, low human density and wild areas with high forest cover. Moreover, many of these poor belong to ethnic minorities which tend to live in less accessible areas.

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. However, emerging efforts to map the distribution and flows of ecosystem services could be a valuable way of identifying where (and when?) 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 most impact for the well-being of the poor.

Most mapping exercises have been undertaken at a global scale and there is a limit to what they can really tell us beyond very broad patterns. **Katrina Brandon**

described research by staff at Conservation International that has applied a finer scale of analysis, exploring the biodiversity–poverty relationship at sub-national levels. In this study global maps of biodiversity, physical factors, and socioeconomic patterns have been overlaid in order to a) assess the flows of ecosystem services from conservation priority areas, and b) estimate the value of these areas to the poor through direct benefits and those possible through potential ‘payments for ecosystem services’ (PES) schemes.

The findings of this relatively fine-scale analysis show significant overlaps, estimating a value of over US\$1/person/day for a substantial fraction of the world’s poorest people, with aggregate benefits three times the estimated opportunity costs. However, the degree to which ecosystem service delivery is dependent on biodiversity appears to vary – some low biodiversity systems such as the Canadian tundra appear to deliver disproportionately high ecosystem service values, although the role of differing socio-economic contexts should not be ignored.

The study reinforces the merit of resolving challenges to PES implementation and concludes that more effort needs to be made to examine the nature of the biodiversity-ecosystem service-poverty linkages at national and local level. This finer scale analysis might also permit the exploration of relationships with socio-political issues such as governance, devolution and so on.

#### **4. Are the poor dependent on biodiversity?**

The MA noted that “poor people, particularly those in rural areas in developing countries, are more directly dependent on biodiversity and ecosystem services and more vulnerable to their degradation.” The assumption that the poor depend on biodiversity underpins assertions that the development community should pay more attention to biodiversity; that the conservation community could and should pay more attention to meeting the needs of poor people; and that conservation approaches that exclude poor people from access to natural resources cause or exacerbate poverty.

**Bhaskar Vira** and **Andreas Kontoleon** from the University of Cambridge examined the evidence on the extent to which the poor depend upon biodiversity. Their first finding was the surprising lack of available empirical data - of 200 studies reviewed, very few included robust empirical evidence. They found considerable variation in the contribution of biodiversity-based resources to household income, but some dependence is very specific to particular groups, especially the poor. They also found that when participation in biodiversity-based livelihood activities was broken down by wealth class it was again the poor who typically showed higher levels of dependence. This finding was backed up by **Pavan Sukhdev** who noted that ecosystem services and non-market goods proved to be an important part of total income of the rural poor in case studies from India (46,6%), Indonesia (74,6%) and Brazil (89,9%).

Besides income, Vira and Kontoleon highlight that the evidence also suggests that biodiversity provides the poor with a form of cost-effective and readily accessible insurance against risk, particularly food security risks, risks from environmental

hazards, and health risks. This dependence on biodiversity for dealing with risk is higher among the poor because they have few alternative options for protecting themselves.

Interestingly, the evidence suggested that it is the relatively low value goods and services from biodiversity on which the poor tend to depend disproportionately. Resources of higher commercial value attract the attention of more affluent groups - often crowding out the poor in the process. This dependence of the poor on low-value activities (and on biodiversity as a last resort against various forms of risk) may confirm the suggestion in some recent literature of a resource-based 'poverty trap' – that dependence is a matter of necessity rather than choice - suggesting that the poor may need to break their dependence on biodiversity in order to improve their livelihood outcomes.

**Brian Belcher**, CIFOR Associate at Royal Roads University, explored the dependence issue in more detail within a forest context where estimates of the number of 'forest-dependent poor people' range from the tens of millions to the hundreds of millions. People use forest products for their own subsistence, for trade, and for inputs into processed products. A smaller but still substantial number are employed in forest sub-sectors. This high current use and 'dependence' has been widely interpreted as an indication that forests have high potential to contribute more to poverty reduction. However, concurring with Vira and Kontoleon, Belcher notes that many forest products are economically inferior. The poverty reduction potential of those that do have higher value is often constrained by poor market access, weak property rights, or other factors such as remoteness, poor education etc. When these constraints are absent, forest products are often captured by elites and managed in ways that are not compatible with conservation. Overall, Belcher estimates that it is the poorest quintile who are the most dependent on forest resources for subsistence purposes, but the wealthiest quintile who are the biggest beneficiaries of forest-related income.

**Jock Campbell** and **Phil Townsley** from Integrated Marine Management (IMM) highlighted the coastal environment as another biome that, by virtue of its high biological and ecological diversity, provides many opportunities for the poor. There are an estimated 170 million fisherfolk and over 500 million people who are dependent on fisheries. However, the levels of "dependence" vary enormously - some access the coast on a full-time basis, others part-time, seasonally or as a safety net. Their access to, and use of, biodiversity is often socially differentiated (e.g. by age, gender, wealth etc) and is part of wider, complex household-livelihood strategies. Access to coastal biodiversity is, however, changing rapidly as a result of expanding populations coupled with coastal degradation, resource over-exploitation, climate change and other factors. This results in increased competition for resources – often with the effect of reduced access.

**Mike Mortimore**, from Drylands Research, described how drylands are often considered as "biodiversity deserts" – a strong contrast with forest and coastal ecosystems – where biodiversity loss is associated with over-grazing, over cultivation and deforestation. Yet drylands are also complex environments that are home to large human and livestock populations. Here 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. Indeed, Mortimore notes that biodiversity is *intrinsic* to indigenous agro-pastoral systems, but this dependence is not necessarily manifested in monetary terms. Sustainability, besides production, has value. This corroborates Vira and Kontoleon's point about the importance of biodiversity as an insurance against risk.

Mortimore argues that, because of the interdependence of human and ecological systems in a dryland context, perhaps the best form of poverty reduction is to secure biodiversity from further damage by economic interests often beyond the users' control. Policies and interventions, whether those of governments or NGOs, should (1) recognise the managers, their priorities, capacities and constraints, and (2) empower them with knowledge enhancement, opportunities, market links and incentives to invest, in the interest of co-managing creatively a 'useful biodiversity'.

**Willy Douma** of Hivos-Netherlands also emphasised the role of agro-biodiversity in supporting the livelihoods of the poor – particularly in terms of improving the adaptive capacity of the poor and vulnerable groups to maintain productivity and cope with climate change. For example, higher biodiversity in and around farms improves the resilience of food-production systems: soil fertility increases, water supply services improve and pests are better controlled. Functionally diverse systems may be better able to adapt to climate change and produce better than functionally impoverished systems. Douma agrees that empowerment of the poor should be a basic starting point for setting research, trade and policy agendas. With agricultural species being lost every day and 1.7 billion farmers now highly vulnerable to climate change, urgent action is needed to make conservation benefits immediately accessible.

A poster by **Philip Atkinson** (British Trust for Ornithology) and Ugandan colleagues also highlighted the role of "wild" biodiversity in more intensive agricultural systems. In a study of smallholder coffee production in Uganda (a major livelihood strategy across the country) they found that at high cropping intensities, pollination became a limiting factor - bee diversity was lower in more intensive systems and bird diversity declined rapidly after a threshold cropping intensity. The optimum yield and income occurred at approximately two-thirds cropping, one-third fallow. Biodiversity is therefore of direct economic value to the livelihoods of farmers and improved landscape management in many of the more intensive small-holder coffee systems would increase incomes and improve livelihoods as well as minimise part of the biodiversity loss associated with intensifying agricultural systems.

## 5. Can biodiversity conservation be a route out of poverty?

The CBD 2010 target views poverty alleviation as one rationale for biodiversity conservation. The 2005 World Resources Report "The Wealth of the Poor" takes a more positive stance and sees ecosystem management as a potential route out of poverty. Others are more sceptical and warn that dependence on biodiversity could be a poverty trap. A team from The Nature Conservancy (TNC) led by **Craig Leisher**, in collaboration with **Andreas Kontoleon** from Cambridge University, reviewed over 400 documents in order to explore the empirical evidence for biodiversity conservation as a mechanism for poverty reduction. Again, the first

finding was the relative lack of robust data. However, the TNC team identified eight primary interventions or mechanisms with empirical evidence of benefits to both the rural poor and nature: non-timber forest products (NTFPs), community-based timber enterprises, payments for environmental services (PES), nature-based tourism, fish spillover, mangrove restoration, agroforestry and grasslands management.

Sometimes these mechanisms are a route out of poverty for local people – those with particular potential were community-based timber enterprises, nature-based tourism, fish spillover from no-take zones, marine tourism and agroforestry. More often, however, they are a safety net to keep people from falling deeper into poverty, and when up-ended, a few can become poverty traps – those with the highest risk appearing to be NTFP production where elites may gain control of the resources, and PES schemes with *de facto* compulsory participation.

A case study of Namibia, presented by **Brian Jones**, Environment and Development Consultant, provides a good example of how even seemingly hugely successful initiatives can have limited poverty *reduction* impacts. Jones reports that in 2008 despite earnings by communal conservancies of more than N\$26 million (about US\$3.25 million) in direct cash income and game meat to the value of N\$3.06 million (about US\$382 500) the direct contribution to poverty *reduction* is low. Those that gain full-time jobs can be lifted out of poverty but these are rare. A few conservancies provide direct cash payments to households ranging from about N\$100 to N\$300 per conservancy member. These amounts going to some of the poorest people in Namibia can help to *alleviate* poverty but there are many other livelihood impacts, which are highly valued. For example, the Marienfluss Conservancy in Kunene Region uses its income to provide transport to clinics and other services nearly 200 km away. Several conservancies provide support to local schools and other social projects, such as soup kitchens for pensioners and support to HIV-AIDS affected orphans.

Leisher *et al* identified a number of common issues, including several inter-related problems, limiting the poverty reduction potential of conservation interventions:

- households with higher assets and higher levels of social capital are more likely to participate in a conservation initiative,
- elites often capture the benefits of a conservation initiative, and
- discrimination against women and the poor is an ongoing challenge to resolve.

Their main conclusion, however, was that in many cases it is *biomass* rather than *biodiversity per se* that determines the poverty reduction potential of a conservation intervention – although it should be noted that biodiversity is often important for generating high biomass.

**Daudi Sumba** and **Joanna Elliott** from the African Wildlife Foundation provide more insights into market-based mechanisms for linking biodiversity conservation and poverty reduction through their analysis of conservation enterprise designed for delivering both conservation and local livelihood gains. Some evidence indicates that conservation enterprise can contribute to poverty reduction (though causality is often difficult to prove) – in particular, value chain interventions such as WWF's "good woods" project or AWF's Congo River trade initiative. Much evidence exists as to the

income and employment benefits of conservation enterprise, but in many cases beneficiaries appear to value other benefits more highly, notably improved security and empowerment, which are hard to quantify. Other evidence indicates 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 just limited to conservation enterprise and resonates with the experience of the development sector.

The evidence also seems to suggest that the enterprise approach works best for high value species and habitats and is not suitable for resources of low economic value. As **Brian Belcher** points out, however, it is the resources of low economic value which are usually those available to the poor. Nevertheless, enabling wildlife to 'pay its way' through flows of cash and other benefits from locally owned businesses is an important step forward from the position of ensuring that conservation activities simply 'do no harm' to the poverty reduction agenda.

High value species are not just of interest to local elites and wealthier groups, they also tend to be subject to particularly intensive conservation efforts – their value in this case being derived from their rarity, charisma, or the support of a celebrity champion. **Chris Sandbrook**, IIED, explored the circumstances under which species conservation can contribute to poverty reduction drawing on the example of great apes, and found that despite the high level of attention and investment of resources, poverty impacts tend to be limited. Various strategies for linking conservation and poverty reduction have been implemented including tourism, community based natural resource management, and integrated conservation and development. However, the overall focus of species-based conservation remains on species, not poverty reduction, and the benefits for local people are often too limited or too 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 enforcement, which is likely to lead to an increase in poverty for resource-dependent people in the short term. The challenges for species-based approaches were also illustrated in a poster by **Gabriela Lichtenstein** (*Instituto Nacional de Antropología y Pensamiento Latinoamericano*) in the context of vicuna conservation where the socio-economic achievements have thus far proved modest. Most of the benefits are being captured by traders and international textile companies, rather than local communities.

Much depends, however on the land tenure rights of the people living near focal species. **Chris Banks** (Zoos Victoria) and **Jim Thomas** (Tenkile Conservation Alliance) describe in a poster how conservation of the highly endangered Scott's Tree-kangaroo, or Tenkile, in Papua New Guinea is integrated with social development objectives, recognising that since over 97% of land in PNG is under customary ownership, active community engagement is crucial. The conservation programme is now the area's largest employer, making a significant impact on local poverty levels.

**Katherine Homewood, Pippa Trench and Dan Brockington** shed further light on the issue of who benefits from conservation in their analysis of revenue distribution from tourism around protected areas in Maasailand. They compared impacts on Maasai livelihoods in two Tanzanian (Longido, Tarangire) and three Kenyan sites

(Amboseli, Kitengela, Mara) and found that while in Mara, households adjacent to the Reserve earn over 20% of their income on average from conservation-related activities, the other four sites show remarkably low household-level returns from conservation, despite the very significant revenues accruing to conservation across the area as a whole. As with the PNG case study above, they find that the difference can be attributed to the local ownership of land in the Mara compared to relatively weak land tenure rights elsewhere. However, even within the Mara where conservation income is significant, they find that it is the highest wealth group that captures the majority of the income (up to 75% in this case). In all cases, it seems, the poor lose out. They conclude that at the same time the pace and scale of loss of access to resources driven by conservation has serious implications for livelihoods security and impoverishment.

This concern is echoed in a poster presentation by **Barry Ferguson** (University of East Anglia) who highlights the case of Madagascar - renowned as both a biodiversity hotspot and one of the poorest nations in the world. Over the last 7 years, the hotspot status has led to a massive expansion of protected areas across the island. Most new terrestrial reserves are established for forest conservation, and are in areas of long-term human habitation and forest resource use. Ferguson points out that ecotourism, honey production, tree planting and family planning, which are the conservation organisations' favourite alternative livelihood strategies, are inadequate to compensate communities for the changes in their livelihoods activities enforced by the state and international NGO partners.

**Sven Wunder** and **Jan Börner** of CIFOR pick up on another of Leisher et al's mechanisms, providing further insights into the poverty reduction potential of PES. PES schemes carry the promise to convert hard conservation tradeoffs into win-win situations because the winners from environmental interventions are able to pay off the losers. They note that contrary to widespread suspicions about poor service providers becoming 'trapped' in PES schemes that are to their disadvantage, the evidence appears to show that they generally become better off from their participation – as long as their participation is voluntary and they have secure rights over environmental assets. The benefits of participation are both monetary and non-monetary – although quantitative welfare effects are bound to remain small-scale, compared to national poverty-alleviation goals. Non-income effects include improved tenure security, better organization and enhanced visibility – effects that in some cases are seen as more desirable than cash.

This finding is confirmed by **Fikret Berkes** from the University of Manitoba who explored community incentives for conservation and concluded that:

1. Community objectives that create incentives for conservation are complex, and cannot be characterized as 'poverty reduction' in the income-poverty sense;
2. Economic objectives are important, but in many cases, political, social, cultural objectives are more important than monetary objectives; empowerment is almost always a key objective;

3. There is almost always a mix of community objectives, but the mix is case-specific, making it impossible to design ‘blueprint’ solutions;
4. With indigenous groups in particular, the political objectives of control of traditional territories and resources are of prime importance because such control is seen as the first step to development.

Wunder and Borner also point out that it is important to consider poor service *users* and *non-participants*, as well as the service providers. Effects on service users are positive if the environmental goals are achieved – especially as many poor users are effectively “free riders”. However, there can be negative effects on non-participants – particularly in terms of lost employment, for example in agriculture or forestry industries, as land is set aside for conservation. This is likely to have a particular impact in large-scale schemes such as Reduced Emissions from Deforestation and Forest Degradation (REDD).

**Dan Brockington** and **George Holmes** from the Universities of Manchester and Leeds picked up on the theme of land set aside for conservation in their analysis of the social impacts of protected areas. They found a number of problems with the studies conducted to date, making it difficult to draw conclusions on their overall impacts, in particular noting an emphasis on assessing benefits rather than costs. The most important task, however, is to address the conceptualization of protected areas and the way they affect people. Protected areas need to be understood as part of larger political and economic regimes. This point emphasises that made by **Jock Campbell** in his discussion of poor people and coastal biodiversity, noting that conservation can only address some of the issues affecting local access to resources and needs to engage with a highly complex network of interacting factors that influence livelihood change.

## **6. Local – Global: different entry points in linking biodiversity conservation and poverty reduction in practice**

A myriad of different organisations work on enhancing the links between biodiversity conservation and poverty reduction – including indigenous and local community organisations, conservation NGOs, development agencies, higher education institutes, government departments, the private sector and UN agencies. These operate at different levels – from working on the ground with local people to participating in international policy processes – and with different entry points.

**David Thomas** from BirdLife International remarked that there seems to be widespread institutional consensus - from both conservation and development communities - that working with local organisations as an entry point for conservation and poverty reduction is a positive approach. In part this is because working with local organisations can help to ensure that actions and interventions are informed by local perspectives, controlled by local stakeholders and are thus more relevant and more effective. Working with local organisations also brings potential benefits in terms of sustainability, efficiency, legitimacy and fulfilment of rights.

Experience to date shows that there is potential for delivering on both conservation and poverty reduction goals through this approach. However, there are challenges that need to be overcome – particularly in relation to the fact that while biodiversity conservation and poverty reduction both need to be tackled locally, the drivers of both biodiversity loss and persistent poverty are often at the national and global level – beyond the reach of local organisations. Further, local organisation priorities may not necessarily be aligned with those of national or international conservation or development organisations. Working with local organisations therefore needs to be complemented with upward linkages to the national and international level.

CARE International is a development organisation that, like BirdLife, attempts to provide this linkage - particularly from the local to national level. **Phil Franks** described how CARE seeks to improve social outcomes of conservation interventions through a natural resource governance approach - focussing on the procedural rights of local people – particularly the most marginalised groups and supporting the duty bearers – particularly national governments – to fulfil their responsibilities. Although good governance is assumed to be critical, a challenge in this approach is making a direct link between improved governance and poverty reduction. Franks notes that “better” governance does not necessarily lead to improved equity, which in turn does not necessarily deliver poverty reduction. Governance work takes time to deliver social outcomes and needs to be accompanied by interventions that provide rapid, tangible livelihood benefits.

In Namibia, **Brian Jones** described how local level natural resource governance is considered an integral part of national development and poverty reduction strategies. In 1996 Namibia passed legislation enabling rural communities to gain user rights over wildlife and tourism through forming common property-management institutions called conservancies. There are now 60 registered conservancies, covering more than 15% of the total land surface and with about 10% of the national population. This Community-Based Natural Resource Management (CBNRM) approach has been adopted in the country’s Vision 2030 for Sustainable Development, National Development Plan III, national food security strategies, and the National Poverty Reduction Action Programme. The policy change was facilitated by the independence of Namibia in 1990. Giving rights to black communal farmers reformed discriminatory policies of the former *apartheid* regime.

There is a limit to governance reform, however. Despite official government endorsement of CBNRM, factions and interest groups within government often negatively affect implementation of policies and legislation. Recent attempts to further extend rights to communities foundered because some officials are reluctant to give up power and because politicians and others are beginning to realize the value of the wildlife and tourism assets and want a slice of the pie.

Moving from national to international policy, **Eileen de Ravin** explained how the importance of linkages from local to global levels is exemplified by the Equator Initiative - a partnership that brings together the United Nations, governments, civil society, businesses, and grassroots organizations to build the capacity and raise the profile of local efforts to reduce poverty through the conservation and sustainable use of biodiversity. The Equator Initiative recognises the evolving trend

of local leadership in advancing innovative projects in biodiversity conservation and poverty reduction.

While the Equator Initiative has been successful in showcasing local action and demonstrating the collective contribution that local initiatives can make to global conservation and development goals, it is beset by many of the same problems that have been discussed throughout the symposium - a lack of hard, empirical data, use of different measures of poverty reduction and biodiversity conservation success, lack of baselines and so on.

## 7. Panel reflections on symposium findings

The purpose of this symposium was to better understand - or at least, better *clarify* - the nature and extent of biodiversity conservation-poverty reduction linkages in order to determine the key knowledge, policy and practice gaps that are constraining greater synergies between these two international policy objectives. A final panel consisting of **Bill Adams** (Cambridge University); **Steve Bass** (IIED); **Katrina Brandon** (Conservation International); **Willy Doumas** (Hivos-NL) and **Jayant Sarnaik** (Applied Environmental Research Foundation) were invited to reflect on the symposium presentations and discussions.

*Blurring of definitions: what do we mean by “biodiversity” and “poverty reduction”?*  
What was immediately clear in trying to address the question of whether or not poor people depend on biodiversity and to what extent biodiversity conservation can lift them out of poverty was the blurring of definitions and understandings of key terms – particularly what we mean by biodiversity and what we mean by poverty reduction. From a conservation organisation perspective, biodiversity is primarily about threatened or endemic ‘wild’ species while others have a broader understanding, which encompasses ‘managed’ biodiversity such as genetic diversity of agricultural crops – an issue well outside of the remit of most conservation organisations. This raised the issue of whether any conservation organisation could legitimately claim to have a focus on biodiversity in its fullest sense when in fact its concerns rest largely with “feathers, fur or fins”.

Similarly regarding poverty reduction, much was made of the need to demonstrate financial impacts in order to be able to claim a poverty reduction impact and questions were asked throughout the symposium of what to do if there was no tourism, marketable product or other money-generating potential? Yet a number of presenters made the point that from the perspective of the poor themselves, non-monetary impacts can be as – if not more – highly valued, particularly empowerment, land and resource rights, and resource security/sustainability. It was noted from the panel that the perspectives and priorities of the poor should be the most important in determining whether or not poverty had been reduced. Furthermore, “the poor” should not be limited to those who fall below a poverty line defined in some material way. Most of the rural residents of developing countries that are the focus of conservation interest are poor by international standards – whether or not they fit some arbitrary economic criteria.

*Does a focus on ecosystem services and human wellbeing help?*

The concept of “ecosystem services” has been useful in bridging the environment-development gap – particularly in terms of communicating an environmental message to the development community. A focus on “risk management” and “security” has also helped communicate the link between biodiversity and poverty/rights – especially in the context of agricultural biodiversity and adaptation/resilience to climate change. The ecosystem services terminology seems to be less useful in communicating to the conservation community. If a conservation organisation claimed to have a focus on ecosystem services and human wellbeing, rather than on particular species groups or ecosystems, it might be seen to have too broad a focus and to be attempting to be all things to all people (although some are re-branding in this way).

#### *What is the state of the evidence base?*

Much of the symposium highlighted the lack of hard empirical evidence, weaknesses in data, problems of research design and analysis. The panellists reflected on the real significance of this pointing out that the problem was less about the state of the data and more about properly identifying the questions we needed to ask and answer. Questions of whether conservation can lift people out of poverty and to what extent poor people depend on biodiversity are at the wrong scale when the real issue may be how to survive the 21<sup>st</sup> Century. No one individual piece of research regardless of how much data we have is going to be able to address these wider problems. But at the same time we need to get better at translating our discussions about these big issues into practical action on the ground. Key to this is research to identify which policy interventions are most effective and what factors affect success.

#### *Getting to grips with the bigger picture....*

The symposium focussed a lot on practical experience in linking poverty reduction and biodiversity conservation and ways to improve outcomes in the field. But biodiversity problems and poverty problems are symptoms of much larger issues such as excessive and unsustainable consumption, economic growth that does not take account of ecological issues and so on. As well as the practical experience we need more attention to policy, and how to influence policy. Pushing an environmental message is not sufficient if we do not understand how policy decisions are made.

#### *....and the smaller picture*

There is evidence of local success stories but up-scaling (rather than repetition) is required to have a significant and lasting impact. For that to happen we need to pay far more attention to power issues, to equity issues and to mechanisms for promoting more effective devolution.

## **8. Co-Hosts’ Conclusions and Recommendations**

The purpose of this symposium was to better understand - or at least, better *clarify* - the nature and extent of biodiversity conservation-poverty reduction linkages. In particular we set out to explore the evidence to support three common assumptions that often underpin arguments for linking biodiversity conservation and poverty reduction:

- i. There is a geographical overlap between areas of high biodiversity – and hence conservation interest – and high poverty – and hence development interest.
- ii. The poor are dependent on biodiversity for their day to day livelihoods
- iii. Biodiversity conservation can be a mechanism for poverty reduction.

From the presentations and discussions during the symposium we, the co-hosts conclude the following:

1. **There is a broad *geographical overlap* between poverty and biodiversity at a global scale; but the specific overlaps between biodiversity and the value of ecosystem services provided are not as clear.** The geographical overlap between biodiversity and poverty is particularly pronounced in areas with high forest cover, where levels of poverty are high but numbers of poor people are low. However, spatial mapping efforts to date have largely focussed at the global scale with limited utility beyond revealing very broad patterns. Finer-scale analysis is likely to provide more useful insights into factors that affect biodiversity-poverty links - such as governance. Emerging efforts to map the distribution and flows of *ecosystem services* at sub-national levels could be a valuable way of identifying where (and when) the connection between biodiversity and poverty is most acute. A more detailed and quantitative understanding of connections between biodiversity and ecosystem services at local level might also enable improved engagement by the development community.
2. **The poor *depend disproportionately* on biodiversity for their subsistence needs – both in terms of income and insurance against risk.** Despite a surprising lack of empirical data, the available evidence indicates that it is often the relatively low value or ‘inferior’ goods and services from biodiversity that are most significant to the poor in subsistence contexts, notably in forest ecosystems. Resources of higher commercial value attract the attention of the more affluent groups, often crowding out the poor unless deliberate efforts are made to support the poor and marginalised (as in some conservation enterprises). Although the evidence does seem to verify – in general terms – the assumption that poor people do depend on biodiversity, it does question this as a rationale for development community interest in biodiversity. Where the development community is focussed on transformational change, resource *dependence* is not seen as a route out of poverty, rather a *status quo* that will have costs and benefits at micro and macro levels. In this sense, the dependence of the poor on ecosystem services should be recognised in national macro-economic policy.
3. **Biodiversity conservation can be a *route out of poverty* under some circumstances but more often it acts as a *safety net* to keep people from falling deeper into poverty, and occasionally it can become a *poverty trap*.** Few conservation interventions measure their impact on poverty *per se*, tending to use quantitative livelihood indicators as proxies. Even when they can be shown to make a contribution to poverty reduction, the scale or longevity of impact may be limited. Regardless of the specific mechanism employed, few conservation interventions specifically target the

poorest - indeed, households with greater assets and higher levels of social capital are more likely to participate in conservation initiatives. Furthermore, elites often capture the benefits of a conservation initiative – sometimes crowding out the poor in the process. Despite some good intentions many conservation interventions just do not lend themselves well to poverty. However, others may create new opportunities: community resource management and other institutional innovations, growing and changing markets for both timber- and non-timber products, value chain interventions through well-designed conservation enterprises, and the tremendous new interest in payment for environmental services schemes (especially REDD).

4. **A focus on *cash benefits* obscures the real poverty reduction potential of biodiversity conservation.** Benefits and incentives are much too narrowly conceived in the conservation literature, focusing on monetary benefits as if following the income-poverty model of the 1960s. Yet it is widely documented that communities have a diversity of objectives for engaging in conservation - economic, environmental, political, social and cultural – and this is consistent with the idea that poverty is not simply the result of low income but also reflects a deprivation of the diverse requirements for meeting basic human needs. These findings may help design more appropriate community incentives for conservation partnerships, and lead to more effective ways of measuring the real human impacts of conservation actions.
5. **Biomass may matter more than biodiversity – at least in the short term – but biodiversity matters in the longer term.** In the short term, it is not so much the diversity, or variety of biological resources, that makes an important contribution to poor peoples' livelihoods – immediate needs (e.g. for food and fuel, and for generating cash) are met by their abundance or mass. And biodiversity-based business may also be reliant on a very small subset of the world's biodiversity. Wildlife tourism, for example, depends immediately on remarkably few species, e.g. 'the big five' and large migrations or populations of single species. Diversity does however provide both poor people and businesses with a strategy for risk management – particularly the ability to switch to alternative resources in the face of changing conditions such as climate change and harvest failure. This is particularly true for agricultural biodiversity: evidence shows that indigenous and local communities rely on a wide diversity of cultivars. Furthermore, biodiversity is known to underpin biomass production in some ecological systems – for example fisheries.
6. **Improved understanding of the relationship between biodiversity and poverty remains hindered by a lack of clarity and consensus as to the definitions of key terms.** "Biodiversity" as defined by the CBD is "the variability among living organisms from all sources...this includes diversity within species, between species and of ecosystems". This definition tries to capture, in one term, the full range of living natural resources (or biological resources) that make up life on earth. Most conservation organisations, when referring to biodiversity, do not focus on the diversity of living resources but on a smaller subset of species and habitats – in particular rare species (whether threatened or endemic) and threatened habitats (particularly if they include

rare species). Agricultural biodiversity is not usually included within this understanding. Development organisations, on the other hand, focus more on agricultural biodiversity and less – if at all – on wildlife.

Similarly, “poverty” is widely recognised as being multi-dimensional and has been defined by the Millennium Ecosystem Assessment as a “profound deprivation of well-being” – where well-being includes security, health, freedom of choice and action, as well as the basic materials for good life (food, shelter, livelihoods, access to goods). Yet it is often measured only in terms of the presence or absence of material goods – in MDG1, for example, the poor are defined as those who live on less than \$1/day. This is despite the fact that non-monetary assets or their deprivation can be as – if not more – highly valued by the poor themselves, particularly empowerment, land and resource rights, and resource security/sustainability. The focus on cash income also tends to reinforce the bias towards biomass (rather than biodiversity) in poverty reduction.

7. **Improved understanding of the relationship between biodiversity and poverty is also hindered by reliance on a weak evidence base.** Despite the wealth of case studies on biodiversity-poverty linkages, the existing body of work suffers from an overload of conjectural and anecdotal assertion rather than evidence (the links have not been considered important in policy, and so incentives and procedures to monitor and assess them have understandably been weak). Full understanding of the links between biodiversity conservation and poverty reduction in any given context requires the ability to make causal inferences about a counterfactual – and very few studies are able to do this. At the same time a reliance on scientific data raises many questions about what kind of evidence/knowledge is valid and how to incorporate traditional knowledge and anecdotal evidence into “scientific” assessments and analyses.
8. **The relationship between biodiversity and poverty is different to, and should not be confused with, the relationship between conservation and poverty.** The debate as to whether or not *biodiversity* contributes to poverty reduction is often described interchangeably with whether *conservation interventions* do or do not contribute to poverty reduction – or indeed whether conservation exacerbates poverty. Although it is clear that the poor depend on biodiversity and thus its conservation is critical to their livelihood security, how conservation interventions and projects are designed and implemented has as much to do with poverty causes and impacts as the role of biodiversity itself. Conservation interventions may actually reduce the access of poor people to biodiversity and hence have a negative effect on poverty reduction.
9. **The biodiversity –poverty debate is currently being addressed at the international level and at the local level. There is a missing link at the national level.** The focus of the International Biodiversity Day in 2010 was on biodiversity, development and poverty reduction – and numerous international events (such as this symposium) and policy processes (such as the CBD) deliberate over biodiversity-poverty linkages. Equally at the local

level, there is a plethora of on-the-ground initiatives linking biodiversity conservation and poverty reduction (the Equator Initiative being one source of such examples). Yet local-level success stories and international policy proclamations will never be enough to optimise the contribution of biodiversity to poverty reduction. It also requires serious engagement at the national level – e.g. with finance and planning ministries in wealth accounting and public expenditure reviews, and not solely environment ministries.

**10. Green economy debates and initiatives offer a promising platform to identify and scale up biodiversity-poverty solutions – in the context of a world still wedded to a paradigm of ever increasing consumption.** The debate about biodiversity-poverty linkages may be but one conversation needed on how to bring about truly sustainable development. Biodiversity loss and acute poverty are symptoms of much larger issues such as excessive and unsustainable consumption, economic growth that does not take account of ecological limits, poor governance, and so on.

These conclusions lead us to suggest the following in moving forward:

- **Knowledge gaps:** Some clear research gaps need to be refined with targeted policy analysis, for example:
  - i. *Spatial links:* ‘mapping’ local links between biodiversity and ecosystem services;
  - ii. *Causal links:* assessing aggregate poverty (and not only livelihood) impacts of conservation programmes;
  - iii. *Risk assessment:* due diligence on the implications of failure of development programmes to address declines in biodiversity and ecosystem services
- **Definitions and measures:** Absolute clarity is needed about how “biodiversity” and “poverty” are being defined, understood and measured when making claims – or drawing assumptions – about the relationship between the two.
- **Scaling up success stories:** Better understanding and articulation of the nuances in the biodiversity-poverty relationship (in the face of often speculative generalisation) needs to be achieved without getting in the way of identifying ‘successful’ actions/approaches and communicating these clearly to policymakers. Policy makers need to be made better aware of what has been learned about successful conservation action/approaches, so that they can then better support the scaling up of local successes to national level.
- **Political support and action:** Both biodiversity conservation and poverty reduction are highly political issues. The political context needs to be borne in mind when thinking about the conditions for success, or when processes for achieving integration and trade-offs are being promoted and utilised.
- **Mainstreaming:** Currently biodiversity is treated as an environmental issue and is addressed at the national level by environment ministries. But maximising the contribution of biodiversity to poverty reduction requires acknowledgement that this is *also* a development issue and requires serious engagement by finance, planning and sector ministries. The CBD has been

recommending the mainstreaming of biodiversity since its inception. This requires not just better dialogue between environment and development communities at the national and international level, and better integration of agendas, but also vertical coordination and coherence between global and regional agreements, national policies and local implementation.

Without such approaches, biodiversity and ecosystem services will continue to be depleted and their potential to act as a safety net for the poor – let alone to contribute to poverty reduction – will be in jeopardy.

## **9. Endpiece: Moving Forward - feeding the symposium findings into policy processes**

At the international level, the new CBD strategic plan beyond 2010 continues to recognize the dual challenge of linking conservation and sustainable use of biodiversity with development and poverty reduction. **Alberto Vega** from the CBD Secretariat suggests that to address this, a *biodiversity mainstreaming strategy* needs to be developed and implemented worldwide. This requires not just better dialogue between environment and development communities at the national and international level and better integration of national and international biodiversity and development agendas, but also vertical coordination and coherence between global and regional agreements, national policies and local implementation.

The CBD has been advocating mainstreaming since its inception: Article 6(b) calls for the integration of the conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans, programmes and policies. Failure to address this need for integration has been highlighted at various Conferences of Parties. At CoP VI in 2002 it was noted in The Hague Ministerial Declaration that “the objectives of the Convention would be impossible to meet until consideration of biodiversity was fully integrated into other sectors” while CoP IX in 2008 noted “with concern, the inadequate mainstreaming of biodiversity, in particular in sectoral planning processes and in national development and poverty eradication strategies”. Most recently in 2009/10, 70 Parties (out of 85 National Reports) reported “Lack of mainstreaming/ fragmented decision making /communication/coordination”.

Rectifying this situation, suggests Vega, requires a capacity development process targeted at policy-makers, practitioners (including from relevant public, private and business sector, local communities and indigenous organizations) and scientists/researchers from different disciplines, with efforts focussed on translating emerging scientific/traditional/local knowledge and practical evidences into policy and practice-relevant information. This may be one way to encourage wider decision-making that takes biodiversity into account.

## Annexes

### A. Symposium Agenda

#### AGENDA

- 9.15–9.30 **Welcome from Ralph Armond, Director General, ZSL**
- 9.30–10.00 **INTRODUCTION: Linking biodiversity conservation and poverty reduction: how, what and where?**  
*Dilys Roe, Joanna Elliott and Matt Walpole*

#### SESSION I: KEYNOTE PRESENTATIONS – THE GLOBAL CONTEXT

Chair: Jon Hutton

- 10.00–10.30 **Poverty reduction and biodiversity conservation: an economic perspective**  
*Pavan Sukhdev, Heidi Wittmer and Uta Berghöfer*
- 10.30–11.00 **Biodiversity and poverty: a political perspective**  
*Bill Adams*
- 11.00–11.30 **POSTER SESSION (TEA/COFFEE)**

#### SESSION II: BIODIVERSITY–POVERTY LINKAGES – STATE OF KNOWLEDGE REVIEWS

Chair: Eileen de Ravin

- 12.00–12.30 **Dependence of the poor on biodiversity – which poor, what biodiversity?**  
*Bhaskar Vira and Andreas Kontoleon*
- 12.30–13.00 **Biodiversity as a poverty trap, safety net or route out of poverty?**  
*Craig Leisher and S. Neil Larsen*
- 13.00–14.00 **LUNCH**

#### SESSION III: BIODIVERSITY–POVERTY LINKAGES FOR DIFFERENT GROUPS OF POOR PEOPLE

Chair: Nigel Leader-Williams

- 14.00–14.30 **From Sahelian agropastoralism to global drylands: biodiversity-poverty linkages**  
*Michael Mortimore*
- 14.30–15.00 **Pastoralists and conservation – who benefits?**  
*Katherine Homewood, Pippa Chenevix Trench and Dan Brockington*
- 15.00–15.30 **Forest conservation and poor people**  
*Brian Belcher*
- 15.30–16.00 **POSTER SESSION (TEA/COFFEE)**
- 16.00–16.30 **Biodiversity and poverty in coastal environments**  
*Jock Campbell and Phil Townsley*
- 16.30–17.00 **Biodiversity: a strategic value in resilient food systems**  
*Willy Douma*
- 17.00–18.30 **POSTER SESSION with cash bar**
- 18.30 **End of Day One**

19.00–21.00 **Symposium dinner for speakers and guests with tickets**

**SESSION VI: DIFFERENT RESPONSES TO BIODIVERSITY LOSS AND THEIR  
POVERTY IMPLICATIONS**

Chair: Matthew Hatchwell

- 9.00–9.30 **Payments for environmental services – benefits for conservation and poor people**  
*Sven Wunder and Jan Börner*
- 9.30–10.00 **Conservation priority areas, poverty, and payments for ecosystem services: a global view**  
*Will Turner and Thomas Brooks (presented by Katrina Brandon)*
- 10.00–10.30 **Species conservation and poverty reduction: Experiences from African great ape conservation**  
*Chris Sandbrook*
- 10.30–11.00 **POSTER SESSION (TEA/COFFEE)**
- 11.00–11.30 **Community-based approaches for linking conservation and livelihood objectives**  
*Fikret Berkes*
- 11.30–12.00 **Conservation enterprise – what works, where and for whom?**  
*Daudi Sumba and Joanna Elliott*
- 12.00–12.30 **Protected areas and human well-being: benefits, costs and governance regimes**  
*Dan Brockington and George Holmes*
- 12.30–13.00 **CBD – framework for poverty reduction and development beyond 2010**  
*Alberto Vega*
- 13.00–14.00 **LUNCH**

**SESSION V: “REAL WORLD” EXPERIENCE**

Chair: Joanna Elliott

- 14.00–15.00 **Policies, plans or practice – what works best for linking biodiversity conservation and poverty reduction?**  
*Panel presentations followed by discussion*
- **Approaches to conservation and poverty reduction: entry point – working with local organisations** (*David Thomas*)
  - **Entry point – natural resource governance** (*Phil Franks*)
  - **Namibia: Entry point – national policy and programmes** (*Brian Jones*)
  - **Entry point – celebrating local success in linking conservation and poverty reduction** (*Eileen de Ravin*)
- 15.00–15.30 **Discussion** – facilitated by Steve Bass
- 15.30–16.00 **POSTER SESSION (TEA/COFFEE)**
- 16.00–17.00 **Research needs and practice gaps**  
Concluding panel presentations and discussion – facilitated by Matt Walpole  
*Panel to include Bill Adams, Willy Douma, Katrina Brandon, Steve Bass and Jayant Sarnaik.*
- 17.00 **End of Symposium**

## B. List of presenters and panellists

Alberto Vega	Secretariat of the Convention on Biological Diversity	alberto.vega@cbd.int
Andreas Kontoleon	Department of Land Economy, University of Cambridge	ak219@cam.ac.uk
Bhaskar Vira	Department of Geography, University of Cambridge	bv101@cam.ac.uk
Bill Adams	University of Cambridge	wa12@cam.ac.uk
Brian Belcher	Royal Roads University	brian.belcher@royalroads.ca
Brian Jones	Environment and Development Consultant, Namibia	bjones@mweb.com.na
Chris Sandbrook	Consultant, IIED	cgsandbrook@gmail.com
Craig Leisher	The Nature Conservancy	cleisher@tnc.org
Dan Brockington	University of Manchester	daniel.brockington@manchester.ac.uk
Daudi Sumba	African Wildlife Foundation	dsumba@awfke.org
David Thomas	BirdLife International	david.thomas@birdlife.org
Dilys Roe	IIED	dilys.roe@iied.org
Eileen de Ravin	Equator Initiative	eileen.de.ravin@undp.org
Fikret Berkes	University of Manitoba	berkes@cc.umanitoba.ca
George Holmes	University of Leeds	g.holmes@leeds.ac.uk
Heidi Wittmer	TEEB - The Economics of Ecosystems and Biodiversity. Helmholtz Centre for Environmental Research UFZ	heidi.wittmer@ufz.de
Jan Börner	CIFOR (Center for International Forestry Research)	jborner@cgiar.org
Jayant Sarnaik	Applied Environmental Research Foundation (AERF)	jayantsarnaik@aerfindia.org
Joanna Elliott	African Wildlife Foundation	joanna.elliott@ukonline.co.uk
Jock Campbell	IMM	j.campbell-IMM@exeter.ac.uk
Jon Hutton	UNEP-WCMC	jon.hutton@unep-wcmc.org
Katherine Homewood	Anthropology, University College London	k.homewood@ucl.ac.uk
Katrina Brandon	Conservation International	k.brandon@conservation.org
Matt Walpole	UNEP-WCMC	matt.walpole@unep-wcmc.org
Matthew Hatchwell	Wildlife Conservation Society	mhatchwell@wcs.org
Michael Mortimore	Drylands Research	mike@mikemortimore.co.uk
Monica Hernández Morcillo	UNEP-WCMC	Monica.HernandezMorcillo@unep-wcmc.org
Neil Larsen	The Nature Conservancy	sneillarsen@gmail.com
Nigel Leader-Williams	University of Cambridge	nl293@cam.ac.uk
Pavan Sukhdev	TEEB - The Economics of Ecosystems and Biodiversity; UNEP	pavan@unep-wcmc.org
Phil Franks	Care International	pfranks@careclimatechange.org
Phil Townsley	IMM	ptownsley@libero.it
Philip Martin	UNEP-WCMC	philip.martin.1981@googlemail.com
Pippa Chenevix Trench	Anthropology, University College London	
Steve Bass	IIED	steve.bass@iied.org
Sven Wunder	CIFOR (Center for International Forestry Research)	s.wunder@cgiar.org
Thomas Brooks	NatureServe	tbrooks@naturereserve.org

Uta Berghöfer	Helmholtz Centre for Environmental Research UFZ	uta.berghoefer@ufz.de
Will Turner	Conservation International	w.turner@conservation.org
Willy Douma	Hivos	wdouma@hivos.nl

### C. List of research posters presented

Title of poster	Author(s) of poster	Contact email address for representative
A new approach in Rwanda: engaging local institutions in conservation and development through payments for ecosystem services	Adrian Martin <sup>1</sup> , Nicole Gross-Camp <sup>1</sup> , Joseph Munyarukaza <sup>1</sup> , Louis Rugeriyange <sup>2</sup> , Nsengi Barakabuye <sup>3</sup> , Bereket Kebede <sup>1</sup> and Shawn McGuire <sup>1</sup> <sup>1</sup> University of East Anglia, Norwich NR4 7TJ; <sup>2</sup> Rwandan Development Board, Kigali, Rwanda; <sup>3</sup> Wildlife Conservation Society, B.P 1699, Kigali, Rwanda.	adrian.martin@uea.ac.uk; n.gross-camp@uea.ac.uk
Assessing and compensating biodiversity loss due to agriculture in the North–South context	Michael Curran*, Laura De Baan, Francesca Verones, Stephan Pfister, Annette Koehler, Thomas Koellner and Stefanie Hellweg *Swiss Federal Institute of Technology (ETH).	curran@ifu.baug.ethz.ch
Bats – What, why and how to conserve for poverty reduction	Mackie, I.J., Crawford, A., Russ, J. and Saksang, Y., Wildlife for Development	iainmackie@wildlifefordevelopment.org
Collaborative management of Important Bird Areas in Africa: benefiting birds, biodiversity and people	Alex Hipkiss, Jo Phillips and Sarah Sanders, RSPB, in collaboration with NatureKenya, Nigerian Conservation Foundation, NatureUganda, Conservation Society of Sierra Leone and BirdLife South Africa	alex.hipkiss@rspb.org.uk
Community management of wetland biodiversity	Paul Thompson <sup>1</sup> , Parvin Sultana <sup>1</sup> and Robert Arthur <sup>2</sup> <sup>1</sup> Middlesex University, Trent Park, Bramley Road, London N14 4YZ; <sup>2</sup> MRAG, 18 Queen Street, London W1J 5PN	paul@agni.com; r.arthur@mrage.co.uk; parvin@agni.com
Community-based biodiversity conservation, ecological restoration and ecotourism at Kuyucuk Lake, Kars, Turkey	Cagan H Sekercioglu, Sean Anderson, Mehmet A Kirpik, Emrah Coban, Onder Cirik, Sedat Inak and Yakup Sasmaz, KuzeyDoga Society, Kars, Turkey	cagan@kuzeydoga.org
Conservation agreements: a strategy for linking habitat conservation and livelihoods in Northern Western Ghats of India	Jayant Sarnaik, Sameer Punde and Archana Godbole, Applied Environmental Research Foundation (AERF) Pune, India	jsarnaik@gmail.com
Conservation and sustainable use of wild <i>Coffea arabica</i> in Ethiopia – linking biodiversity and poverty reduction issues	Tadesse Woldemariam Gole, Feyera Senbeta, Kassahun Tesfaya, Franz Gatzweiler, Manfred Denich, Bettina Hedden-Dunkhorst, Federal Agency for Nature Conservation, Bonn, Germany	bettina.hedden-dunkhorst@bfn.de

<p>Conserving biodiversity in the modernising farmed landscapes of Uganda: do farmers optimise ecosystem services provided by biodiversity?</p>	<p>Philip W. Atkinson<sup>1</sup>, Theodore Munyuli<sup>2</sup>, Dianah Nalwanga-Wabwire<sup>2</sup>, David Mushabe<sup>3</sup>, Raymond Katebaka<sup>2</sup>, Maurice Mutabezi<sup>2</sup>, Olivia Nantaba<sup>4</sup>, Annet Nakyeyune<sup>4</sup>, Achilles Byaruhanga<sup>3</sup>, Philip Nyeko<sup>5</sup>, Derek E. Pomeroy<sup>2</sup>, Simon G. Potts<sup>5</sup>, Simon Bolwig<sup>7</sup> and Juliet A. Vickery<sup>1</sup>  <sup>1</sup>British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, UK; <sup>2</sup>Makerere University Institute of Environment and Natural Resources (MUIENR), PO Box 7298, Kampala, Uganda; <sup>3</sup>NatureUganda, PO Box 27034, Kampala, Uganda; <sup>4</sup>Uganda Wildlife Society, PO Box 7422, Kampala, Uganda; <sup>5</sup>Faculty of Forestry and Nature Conservation, Makerere University, Kampala, Uganda; <sup>6</sup>Centre for Agri-Environmental Research (CAER), School of Agriculture, Policy and Development, The University of Reading, Earley Gate, Reading RG6 6AR, UK; <sup>7</sup>Risø National Laboratory for Sustainable Energy, Frederiksborgvej 399, PO Box 49, 4000 Roskilde, Denmark</p>	<p>phil.atkinson@bto.org</p>
<p>Expanded micro-enterprise program to address economic development and promote conservation, Budongo Forest Reserve, western Uganda</p>	<p>B. Lehnen<sup>1</sup>, L. Pintea<sup>2</sup>, P. Apell<sup>3</sup>, C. Erongot<sup>4</sup>, S. Young<sup>1</sup>, P. Arscott<sup>1</sup> and C. Bernadi<sup>1</sup>  <sup>1</sup>Village Enterprise Fund, USA; <sup>2</sup>The Jane Goodall Institute, USA; <sup>3</sup>The Jane Goodall Institute, Uganda; <sup>4</sup>Village Enterprise Fund, Uganda</p>	<p>susany@villageef.org</p>
<p>Forest dependency and alternative livelihoods of Tandroy people in Madagascar's new protected areas</p>	<p>Barry Ferguson, School of International Development, University of East Anglia, Norwich</p>	<p>ferguson.barry@gmail.com</p>
<p>Keeping stingless bees (Meliponini) in a tropical forest: conservation in practice</p>	<p>Athayde Tonhasca Jr., Scottish Natural Heritage, Great Glen House, Leachkin Road, Inverness IV3 8NW</p>	<p>athayde.tonhasca@snh.gov.uk</p>
<p>Lebialem Hunters' Beekeeping Initiative</p>	<p>Juliet H. Wright, Lebialem Hunters' Beekeeping Initiative</p>	<p>juliet@bee4bushmeat.org</p>
<p>Linking vicuña conservation and poverty reduction: challenges and opportunities</p>	<p>Dr. Gabriela Lichtenstein, Chair South American Camelid Specialist Group (IUCN SSC GECS); Instituto Nacional de Antropología y Pensamiento Latinoamericano (INAPL)/CONICET</p>	<p>lichtenstein.g@gmail.com</p>
<p>Panacea or placebo? Evaluating the effectiveness of an expanding community conservation network in northern Kenya</p>	<p>Louise Glew, Dr. Malcolm D. Hudson and Dr. Patrick E. Osborne, School of Civil Engineering and the Environment, University of Southampton, Highfield, Southampton, Hampshire, U.K. SO17 1BJ</p>	<p>l.glew@soton.ac.uk; mdh@soton.ac.uk</p>
<p>Parks and people: biodiversity and socio-economic factors in Amazonian Kichwa communities in Ecuador</p>	<p>Johan A. Oldekop<sup>1</sup>, Anthony J. Bebbington<sup>2</sup>, Nathan K. Truelove<sup>1</sup>, Niklas Tysklind<sup>3</sup> and Richard F. Preziosi<sup>1</sup>, University of Manchester.  <sup>1</sup>Faculty of Life Sciences, The University of Manchester, M13 9PT, UK; <sup>2</sup>Institute of Development Policy and Management, School of</p>	<p>johan.oldekop-2@postgrad.manchester.ac.uk</p>

	Environment and Development, The University of Manchester, M13 9PL, UK; <sup>3</sup> College of Natural Sciences, Bangor University, LL57 2UW, UK	
Poverty, conservation and the poverty of cost-benefit analysis	Neal Hockley, Gareth Edwards-Jones and John Healey, Bangor University	neal.hockley@univ.bangor.ac.uk
Relationships in crisis: cross-sectoral collaboration to conserve biodiversity and rebuild livelihoods following natural disaster and human conflict	Helen Anthem, Fauna & Flora International	Helen.Anthem@fauna-flora.org
Sustainable forest management for poverty reduction through agroforestry options in the uplands of eastern Bangladesh	Syed Ajijur Rahman, Research Fellow, Department of Sociology, University of Rajshahi, Rajshahi 6205, Bangladesh	sumonsociology@yahoo.com
Ten years of adaptive community-governed conservation: evaluating biodiversity protection and poverty alleviation in a West African hippopotamus reserve	Donna J. Sheppard <sup>1,2,3</sup> , Axel Moehrenschrager <sup>4</sup> , Jana M. McPherson <sup>4</sup> and John J. Mason <sup>2</sup> <sup>1</sup> Conservation Outreach Department, Calgary Zoological Society, 1300 Zoo Road NE, Calgary, Alberta, T2E 7V6, Canada; <sup>2</sup> Nature Conservation Research Centre, P.O. Box KN925, Accra, Ghana; <sup>3</sup> Wechiau Community Hippo Sanctuary, P.O. Box 569, Wa, Upper West Region, Ghana; <sup>4</sup> Centre for Conservation Research, Calgary Zoological Society, 1300 Zoo Road NE, Calgary, Alberta, T2E 7V6, Canada	axelm@calgaryzoo.ab.ca
Tenkile Conservation Program: integrating biodiversity conservation and social development in Papua New Guinea	Chris Banks <sup>1</sup> and Jim Thomas <sup>2</sup> <sup>1</sup> Manager of Conservation Partnerships, Zoos Victoria, Australia; <sup>2</sup> Director, Tenkile Conservation Alliance, Papua New Guinea	cbanks@zoo.org.au; tenkileconservationalliance@yahoo.com.au
The Gorilla Organization	The Gorilla Organization, 110 Gloucester Avenue, London NW1 8HX	jillian@gorillas.org
Using participatory methods to value wetland resource use at Koshi Tappu Wildlife Reserve, Nepal	Dr Seb Buckton <sup>1</sup> and Bhagwan Raj Dahal <sup>2</sup> <sup>1</sup> Community Wetlands Programme Manager, Wildfowl & Wetlands Trust, Slimbridge, Glos GL2 7BT, UK; <sup>2</sup> Bird Conservation Nepal, PO Box 12465, Kathmandu, Nepal	seb.buckton@wwt.org.uk
The biodiversity conservation role of Indigenous and Community Conserved Areas	Colleen Corrigan, UNEP-WCMC	colleen.corrigan@unep-wcmc.org
Carbon, biodiversity and livelihoods	Kekilia Kabalimu <sup>1</sup> , Bruno Bahane <sup>1</sup> , Corinna Ravilious <sup>2</sup> , Lera Miles <sup>2</sup> , Nathalie Doswald <sup>2</sup> , Valerie Kapos <sup>2</sup> , Monika Bertzky <sup>2</sup> and Barney Dickson <sup>2</sup> <sup>1</sup> Ministry of Natural Resources and Tourism, Forestry and Beekeeping Division, P.O. Box 426, Dar es Salaam, Tanzania; <sup>2</sup> UNEP World Conservation Monitoring Centre, 219 Huntingdon Road, Cambridge, CB3 0DL, UK	Nathalie.Doswald@unep-wcmc.org
REDD Alert? Livelihood impacts of forest conservation policy in Tanzania	Julia E. Latham <sup>1</sup> , Samartha Thankappan <sup>1</sup> , Steve Cinderby <sup>2</sup> , Andrew R. Marshall <sup>1,3</sup> <sup>1</sup> The University of York, UK; <sup>2</sup> Stockholm Environment Institute;	julialatham@gmail.com

	<sup>3</sup> Centre for the Integration of Research, Conservation and Learning (CIRCLE), Flamingo Land, North Yorkshire, UK	
A new livelihood function for bushmeat in a West African cocoa farming system	Björn Schulte-Herbrüggen and Laura Kurpiers	bjorn.schulte-herbruggen@zsl.org
Island environment protection and livelihood enhancement: a Seacology-supported project in Madagascar (2005–2009)	Seacology UK	lucy@seacology.org.uk

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