

Biodiversity and poverty: old debates, recent evidence and emerging controversies

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Achieving the goal of liberating half of the world's poor from their poverty by 2015 will either mark the true beginning of sustainability or the end of biodiversity at the hands of the best-intentioned policies.

Sanderson & Redford, 2003.

1. Old debates, emerging consensus

1.1. Why does biodiversity matter for poor people?

Because three quarters of the more than one billion people living on less than one dollar a day live in rural areas, the poor often depend on a wide range of natural resources and ecosystem services for their well-being, and are therefore potentially affected by their degradation. For example, over one billion people worldwide draw their living from forest-based assets. For poor people, biodiversity loss is often equivalent to the loss of biological insurance (MA, 2005). Richer groups of people are usually less affected because of their ability to purchase substitutes or to offset local losses of ecosystem services by shifting production and harvest to other regions¹. According to the Organization for Economic Cooperation and Development (OECD)², in low-income countries, environment-based wealth accounts for around 25% of the total wealth (compared to less than 4% in OECD countries).

More precisely, biodiversity matters to poor people directly in four principal ways (Timmer & Juma, 2005):

- Food security and health: Many poor people have limited access to land ownership and water and so are especially dependent on wild plants and animals for their food security. In many forest countries, bushmeat is an important source of protein. In Ghana for example, 75% of the population eat bushmeat regularly and wild animals constitute the main source of animal protein for rural households. However, in many countries, the availability of bushmeat and wildlife is declining and this is having negative impacts on nutrition (DFID, 2002). Declining ecosystems can also have negative impacts on health, particularly on that of poor women, as they increase the burden of searching for and carrying heavy loads of water, wood or fodder.
- Income generation and livelihoods: For the majority of poor people living in rural areas, dependence on agriculture is high. The agricultural labour force, most of it in the developing world, includes over 20% of the world's population and accounts for almost half of its total labour force (MA, 2005). This means that their livelihoods rely on several ecosystem services that are crucial to agriculture, and on the diversity of food crops available. In many climatically vulnerable regions, poor households prefer traditional varieties or so called land

¹ For example, as fish stocks have been depleted in the North Atlantic, European and other commercial capture fisheries have shifted their fishing to West African seas, but this has adversely affected coastal West Africans who rely on fish as a cheap source of protein.

² http://www.oecd.org/document/0/0,2340,en_21571361_36099755_36099814_1_1_1_1,00.html. Accessed on 09/04/2011.

rices of rice and other crops due to their greater resilience to climate fluctuations. For example, in Jeypore, India, cyclonic conditions, long spells of drought and very high temperatures within a crop season can result in yield stress: land races of rice have proved genetically resilient and withstand the harsh weather while so called “high yielding varieties” in nearby areas suffer irretrievably (Steele, Oviedo & McCauley, 2006).

- Reduced vulnerability to shocks: Poor people are often highly vulnerable to shocks and stresses associated with climatic events. These shocks can be amplified by ecosystem degradation, while better ecosystem management can reduce the impact of such events. There is growing evidence of the role of coastal vegetation (like mangroves) and natural protection (like coral reefs) in mitigating coastal storms and cyclones. Where these ecosystems are declining, poor coastal populations often become more vulnerable. In Bangladesh, the disappearing swamp forests of the *haor*, which have served as a natural barrier in the past against the monsoon waves, has led to much more severe erosion. As a result, poor households have been compelled to increase spending to protect their tiny homesteads every year (Steele, Oviedo & McCauley, 2006).
- Cultural and spiritual values: For many poor people, biodiversity is inextricably linked with identity, culture and spirituality. It is therefore an integral part of their very existence. In India for example, there are over 50,000 sacred groves that play an important role in the religious and socio-cultural lives of local people (Gohkale et al., 2001). Located within wilderness areas, protection is provided to patches of forests dedicated to deities and ancestral spirits. A number of religious celebrations take place in these groves, which are an integral part of the spiritual beliefs of the communities.

1.2. A complex relationship: the biodiversity–poverty nexus

In many ways linking conservation with poverty reduction is more of an art than a science
Fisher et al., 2005.

1.2.1. An unresolved debate at the general level

Biodiversity matters to the poor, but the linkages between biodiversity and poverty are much more complex and dynamic (Billé, 2006a). The intense debate on this nexus demonstrates that there are no simple causal relationships between biodiversity and poverty, although they do coincide in many ways according to an increasing body of evidence (see Hernandez-Morcillo *et al.*, 2010). Widespread concepts such as “pro-poor conservation”, often utilized in an incantatory manner, tend to overlook such complexity (Billé & Chabason, 2007). Nevertheless, conservationists and development practitioners and policy makers often have different opinions on how—and whether—to link biodiversity conservation with poverty reduction. The growing volume of literature on the subject highlights how complex and context-specific poverty-conservation linkages are, and how subjective is their interpretation (Roe & Elliott, 2005).

In this context, attempts to find common ground often result in platitudes that fail to confront real problems faced by development projects, plans and policies (Brockington *et al.*, 2006). This is why endeavours to address real issues—rather than pretending they do not exist— as well as efforts to be more specific about definitions, contexts and activities when undertaking assessments, are so badly needed. As a matter of illustration: (i) natural resources broadly speaking (e.g. timber) are sometimes mistaken for biodiversity (Balmford *et al.*, 2008 show that biomass may provide greater benefits to poor people than diversity of species), (ii) poverty indicators will never comprehensively encapsulate the thinking on poverty complexity, and (iii) conservation of biodiversity differs substantially from the sole presence of biodiversity because the former depends closely on how conservation is performed (e.g. does ecotourism lead to equitable distribution of the revenues? Does conservation mean promotion of agroforestry or exclusion of people from protected areas?).

For instance, the International Institute for Environment and Development's (IIED) Poverty and Conservation Learning Group typically aims at addressing the real issues beyond platitudes. Among others, it has provided useful insights on a number of key hypotheses (see Box 1), all of which would deserve a whole section of this paper. However, here we shall only briefly discuss two questions that we think are particularly critical (Billé & Pirard, 2007):

- Is biodiversity conservation a route to poverty alleviation? And/or
- Is poverty alleviation a route to better biodiversity management?

Some have argued that biodiversity conservation is incompatible with lifting poor people out of poverty; others that the most effective intervention for biodiversity conservation is poverty reduction. Such questions are quite sensitive and may have very concrete consequences for the way development policies and projects are designed. We shall mainly introduce the debate here and underline simplifications that should be avoided—not necessarily answer these questions, which remain partly open.

Box 1. What do we know about conservation–poverty linkages? Accepted and contested relationships

Hypothesis 1: There is a geographical overlap between biodiversity and poverty

Conclusion: At the global level there is a geographical overlap between biodiversity and poor people but it becomes less pronounced the more 'the South' is disaggregated. At the national and sub-national levels the two occasionally coincide, but governance factors are generally more significant than geography in determining where biodiversity prevails, where poor people live and how the two interact.

Hypothesis 2: Poor people depend on biodiversity

Conclusion: All of humanity is dependent on biodiversity for the goods and services it provides, but the poor appear to be particularly dependent (although this is hard to quantify). In a large part this dependency is related to the role that biodiversity plays in poor people's farming systems and the degree of resilience and adaptability to environmental change that poor people have developed.

Hypothesis 3: Poor people are responsible for biodiversity loss

Conclusion: Poverty may contribute to biodiversity loss, but it is only one of a number of factors. Whether poor people conserve or over exploit biodiversity is dependent on specific circumstances and contexts—and particularly on the influence of external governance factors—and not a question to which a generalized answer can be given.

Hypothesis 4: Conservation activities hurt poor people

Conclusion: The impacts of conservation activities are not evenly spread. Some forms of conservation activity may have negative consequences for poor people. Others may benefit poor people or even be initiated by poor people. Governance factors appear to be critical once again.

Hypothesis 5: Poor people can undermine conservation

Conclusion: Unless different priorities for biodiversity and incentives for conservation are recognised, local people are often bound to be perceived as 'undermining' conservation, and indeed may proceed to do so. Local people need to be engaged to conserve aspects of biodiversity that are critically important to their livelihoods, if broader-based, long-term public support for protection of globally threatened biodiversity is also to be achieved.

Hypothesis 6: Biodiversity is irrelevant to poverty reduction

Conclusion: A lack of quantitative data—particularly at national levels—makes it difficult to challenge the assumption that biodiversity is irrelevant for poverty reduction. In general, poverty reduction

policies tend to rely on agriculture—both at the household level through supporting smallholder farmers for their subsistence and income-earning potentials, and at the national level through agriculture’s potential to drive economic growth. Making a better case for biodiversity in poverty reduction therefore means clearer articulation of the links between biodiversity and agriculture and between biodiversity and ecosystem services (those that support agriculture and those that generate other benefits)³.

Hypothesis 7: Poverty reduction activities can cause biodiversity loss

Conclusion: Historical patterns of rural development—based on primary commodity production—have not performed well for biodiversity—nor in many cases have they performed well for poor people either. Innovative approaches to poverty reduction that are founded on local knowledge, institutions and processes are critical—both to achieving the Millennium Development Goals (MDGs) and tackling biodiversity loss.

Source: Roe & Elliott, 2005.

1.2.2. Is biodiversity conservation a route to poverty alleviation?

Conserving biodiversity is not always favourable to the poor. Many examples have been documented worldwide where conservation activities have negatively affected poor people living nearby (Brockington, 2003; McLean & Straede, 2003). This seems to be especially true of the establishment and management of protected areas, and of related donor-funded projects. Nevertheless, the risk of further marginalizing and impoverishing poor people is clearly not specific to conservation (beside the fact that conservation takes various forms with various impacts as mentioned above). It is part of the vicious circles deeply embedded in most societies that tend to make poor people poorer and rich people richer. The development of any economic activity—including conservation but also forest exploitation, handicraft, trade, tourism, infrastructure, etc.—has a tendency to reinforce these circles (“poverty traps”) unless appropriate attention is paid to the issue. To take this one step further, in a given country, with funding from a given donor, conservation activities are usually just as democratic, participatory and pro-poor as the rest of a government and donor’s policy (Billé, 2006b). When the political context does not take into account the needs and desires of marginalized groups of stakeholders, especially the poorest, when their access to natural resources, their right to participate in the decisions that directly affect their lives, are denied, projects and policies whose primary objective is biodiversity conservation cannot be expected to be transparent and equitable. Good governance at the national and local levels is obviously necessary for biodiversity conservation to bring expected benefits.

However, that biodiversity conservation can contribute to poverty alleviation is supported by a broad consensus—many even argue that the potential of biodiversity conservation to contribute to poverty reduction is still largely unrecognised by developing country governments and international development agencies (DFID, 2002; Koziell & McNeill, 2002). Much depends on the *how*: how conservation projects are designed and carried out, how poor and marginalized people are consulted, involved in and associated with the conservation objectives and activities, how poverty alleviation is mainstreamed in biodiversity projects and policies, etc. Much also depends on the alternative without conservation: does conservation take place instead of local development by local people (e.g. agriculture), or does it take place instead of biodiversity degradation as a consequence of activities undertaken by (and for the benefit of) companies unsustainably extracting natural resources (e.g. forest conversion for export-oriented oil palm production)? That said, there are many

³ For instance Pretty et al. (2006) demonstrate in 56 developing countries how productivity of crops was increased by almost 70% due to investments in ecosystem services and biodiversity.

examples where biodiversity conservation has benefited poor people in developing countries. More precisely, this happens in two main ways (Steele, 2004), at the local and national levels:

- A route out of poverty for poor people: biodiversity can, particularly in areas with few other economic opportunities, provide a way for poor households to generate a surplus and eventually invest in other economic activities and escape poverty.
- A route out of poverty for poor countries: at a macro-level, biodiversity and ecosystem services can, under certain conditions, generate growth at an economy-wide level that may in turn, under certain conditions, benefit poor people. Biodiversity-related natural resources often provide a key export, foreign exchange earner and source of government revenues, as illustrated by the importance of seafood exports from Africa and Asia.

Both ways, however, demand that biodiversity not be exploited beyond sustainable levels, and that the growth generated be reinvested to shift away from biodiversity-dependence. Moreover, the highly speculative character of the convergence between conservation and poverty alleviation is reinforced by the various, contrasted meanings of “poverty” (Billé & Pirard, 2007). For example, depending if material wealth or flexibility is favoured, the conversion of a primary forest into a mono species industrial plantation may be seen as a driver of enrichment (with increased cash incomes in the short term) or on the contrary of impoverishment (reduced choices in the long run, vulnerability to commodity markets fluctuations...). This was summarized by Wunder (2001) when opposing the roles of “poverty trap” and “safety nets” played by biodiversity-rich areas, of which tropical forests are an emblematic example.

The biodiversity-poverty relationship clearly has to be addressed in dynamic terms. We need to be cautious about statements on the dependence of the poor on biodiversity - this dependence being demonstrated in many studies reviewed by Roe (2010). To say that poor people depend on biodiversity does not say much about their fate in case of biodiversity loss, which may be better (alternative sources of income) or worse (disappearance of livelihoods). In other words biodiversity conservation may be an obstacle to economic improvement of people’s lives, or on the contrary it may be extremely important because of positive impacts on vulnerability and an absence of alternatives. All in all, Roe (2010) mentions that “at least six conservation mechanisms have been a route out of poverty for some people in some places: community timber enterprises, nature-based tourism, fish spillover, protected area jobs, agroforestry and agrobiodiversity conservation”.

1.2.3. Is poverty alleviation a route to better biodiversity management?

This hypothesis is supported by the well-known Environmental Kuznets Curve, which suggests that environmental quality declines as income rises until income reaches a certain level, at which point environmental quality improves. However, this curve is strongly disputed, be it by pessimists or optimists (Dasgupta *et al.*, 2006), and even for its advocates the extent to which it applies to biodiversity is questionable: once a species is lost, it is gone forever.

A majority of analysts actually seem to believe that poverty alleviation will not in itself achieve conservation goals. For example, experience from Africa and Asia shows that as wealth increases, so too does the demand for wildlife (Robinson & Bennett, 2002) and even more impactful is the availability of capital for more destructive and large-scale activities. More pertinent questions may therefore be: can reducing poverty actually *contribute* to halting biodiversity loss? If yes, how?

Swanson, among others, highlights the apparent incompatibility between biodiversity and development: “states with high material wealth have low biodiversity wealth and *vice versa*” (in Koziell & Saunders, 2001). In the same perspective, the MA scenarios suggest that “future development paths that show relatively good progress toward meeting the poverty, hunger reduction, and health targets also show relatively high rates of habitat loss and associated loss of species over 50 years. This does not imply that biodiversity loss is, in and of itself, good for poverty

reduction. Instead, it indicates that many economic development activities aimed at income generation are likely to have negative impacts on biodiversity unless the values of biodiversity and related ecosystem services are factored in”.

Consequently, while poverty can be a root cause of biodiversity loss, this is just as true of wealth and economic development: “deforestation, for example, is partly caused by local demand for agricultural land or construction materials, but is even more fundamentally driven by the industrialized world’s demand for timber and the growing international trade in forest products” (UN Millennium Project, 2005), as well as by demand for biofuels. Do poor people degrade their environment because they are poor? Do increasing incomes affect the way in which poor people exploit natural resources? IIED’s Poverty and Conservation Learning Group came to the conclusion that “issues of governance, security of land tenure and access to resources are likely to have a significantly greater impact on the way in which people over-exploit now or conserve for the future. (...) Poverty is only one factor driving biodiversity loss. Reducing poverty will not necessarily, therefore, lead to biodiversity conservation unless the other drivers are also addressed” (Roe and Elliott, 2005). Poverty alleviation may thus yield better biodiversity conservation only if tied to explicit conservation objectives, strategies, policies and actions, in an appropriate governance context (World Resources Institute, 2005).

1.2.4. An intricate problem with no “silver bullet”

The aim of this short discussion is mainly to acknowledge that the linkages between poverty and conservation are dynamic and context specific, reflecting geographical, social and political issues among the groups involved (Kepe, Saruchera & Whande, 2004) more than their actual poverty level. For instance Indonesian hunters-gatherers and slash-and-burn farmers never deeply degraded surrounding biodiversity, contrary to what migrants did through wood harvesting and land clearance for agriculture. In material terms, though, they are equally poor.

In any case, linkages between poverty and conservation are so complex that they rarely authorize simple cause-and-effect analyses. Synergies and positive externalities between sustainably managing biodiversity and alleviating poverty do exist. They are sometimes obvious, but more often win-win solutions to poverty and conservation dilemmas are elusive, and trade-offs tend to be the more realistic outcome (Petersen & Huntley, 2005): trade-offs between biodiversity and economic development on the one hand, between those who benefit and those who bear the costs on the other hand. Unfortunately, there is no “silver bullet” (Robinson & Bennett, 2002) for the twin goals of conserving biodiversity and preventing the people whose lives now depend on biodiversity from being driven further against the wall.

2. New insights from the TEEB study

2.1. Conservation as an economic stimulant with equitable returns

Traditional economic measurement indicators like GDP, National Income and Household Consumption fail to reflect the true value of the flows of ecosystem services and biodiversity for society. TEEB for National and International Policy Makers – Chapter 3, states that for developing countries, where the rural poor are dependent on natural resources for employment and subsistence, the exclusion of ecosystem services flows from national accounting systems results in an unsustainable future for generations to come. Additionally, this leads to a tyranny of the average where there is an implicit assumption that a measure of average progress like GDP can reflect progress in the distribution of wellbeing within society at large (TEEB D1 for National and International Policy Makers – Chapter 3 2009). For low-income groups in rural areas, which mainly rely on free services supplied by ecosystems that have little or no market value, the inadequate recognition of environmental resources in national accounts (focusing on productive functions of ecosystems: timber, energy, etc) causes an extraction of valuable commodities from ecosystems at the expense of the free services that the poor depend on (TEEB Climate Issues Update 2009), although admittedly also at their benefit when land development takes place in an appropriate manner (cf section1). Consequently, the degradation of the natural capital substantially reduces the welfare of a significant part of the population that is poor.

A decline in future ecosystem services and biodiversity coupled with the poor getting poorer has serious implications for the continued economic growth and progress of countries. This is because the importance of natural resources to economies is likely to be under-appreciated resulting in sub-optimal use of these assets, economically, environmentally and socially (TEEB Climate Issues Update 2009). Thus, in an assessment by TEEB's Climate Issues Update, if the assets are underperforming and getting eroded, natural capital gets run down and future benefit streams of the country get increasingly smaller. The long-term sustainability and economic performance of a country are then in question.

Haiti for example (left with only 3.8 percent of its forest cover in 2004, see box 2), is facing strong ramifications from severe environmental degradation and deforestation resulting from an inadequate recognition of the significance of natural resources for the country. Due to a loss of natural capital, disposable incomes and critical assets of the poor have disappeared, translating into political turmoil, health concerns and an emergence of environmental refugees that have effects on the stability of Haiti and its relations with neighbouring states (Peduzzi, 2005).

Box 2: Environmental degradation and vulnerability: Haiti and the Dominican Republic

The relationship between environmental degradation and impacts on vulnerable populations is evidenced by the differing impact of Hurricane Jeanne in Haiti and the Dominican Republic (DR).

Haiti was originally fully forested but from 1950-1990 the amount of arable land almost halved due to soil erosion. Deforestation reduced evaporation back into the atmosphere and total rainfall in many locations has declined by as much as 40 percent, reducing stream flow and irrigation capacity. By 2004 only 3.8 percent of Haiti was under forest cover compared to 28.4 percent of DR.

In Haiti, floods and Hurricane Jeanne killed approximately 5,400 people due to destruction of mangroves and the loss of soil-stabilising vegetation, causing landslides that led to most casualties. In DR, which is much greener and still has 69,600 hectares of mangroves, Jeanne claimed less than 20 lives (Peduzzi 2005).

Haiti



Dominican Republic

Credits: NASA/Goddard Space Flight Center
Scientific Visualization Studio

This stark difference reflects the impacts that deforestation and resource degradation have on the resilience of poor people in the face of environmental hazards. It also highlights the higher risks experienced by vulnerable populations that do not have enough disposable income, insurance or assets to recover from disasters. With an average monthly income of US\$30.5, Haitians are deeply affected by the worsening state of the environment.

Source: Peduzzi 2005

A new adapted measure of GDP such as GDP of the Poor is required to reflect the dependence of the poor on natural resources and integrate environmental, economic and social aspects to reflect the vulnerability of poor people if valuable ecosystem services are lost. The resulting 'real income' based on the true cost of biodiversity loss would demonstrate the actual well-being of the poor and have cascading impacts on the longevity of economic prosperity in a country, as it would ensure equitable benefits reaching the poor from evident growth.

2.2. A Tale of Two Tragedies: the measurement gap around the rural poor

Traditional measures of national income like GDP, which measures the flow of goods and services, can be misleading as indicators of societal progress in mixed economies because they do not adequately represent natural resource flows. This misrepresents the state of weaker sections of society, especially in rural areas.

To move beyond paradigms focused on income, human development indices (HDI) have been developed to provide a broader-based measure of development. However, HDI also fails to take account of the contribution of natural resources to livelihoods. The World Bank has published total wealth estimates (Dixon, Hamilton and Kunte, 1997), which seek to account for the contribution of natural capital, but this is a stock concept. There is also a need for a flow variable, which adequately captures the value of natural resource flows, even though these are mainly in the nature of public goods.

Developing "green accounts", with adjustments to GDP to account for natural capital depletion, is a step in this direction but does not show the social dimension. Similarly, the Genuine Savings Indicator (Pearce and Atkinson, 1993) does not indicate the real cost of natural resource degradation at the micro level, even though this is where real and often acute costs are felt by the poorest and most vulnerable sections of society.

Particularly for developing countries, where many poor people are dependent on natural resources for employment and subsistence, the result is often a tale of two tragedies. The first is that the exclusion of ecosystem service flows from the accounts of society, including GDP, results in a lack of policy attention and public investment in ecosystem and biodiversity conservation.

The second tragedy, which is intra-generational rather than inter-generational, is because of the “tyranny of the average”, or an implicit assumption that an increase in any measure of average progress (such as “GDP Growth”, for example) can reflect progress in the distribution of well-being within society at large. This is as much a matter of inappropriate psychological conditioning as it is bad economics, because “GDP growth” as a headline indicator has become so ubiquitous that it is used in everyday conversations as a proxy for all forms of national economic performance which it was never intended to be, not least as a measure of progress.

2.3. *Measuring what we manage: GDP of the poor*

A “beneficiary focus” helps better recognize the human significance of observed losses of ecosystems and biodiversity. The costs to the welfare of poor and vulnerable sections of society of the depletion or degradation of natural capital (water availability, water quality, forest biomass, soil fertility, topsoil, inclement micro-climates, etc.) are real and can be acute at the micro-level, but are not recorded systematically or brought to the attention of policy makers. Hence the need to move beyond broad measures of income such as GDP, and to focus sharply on the well-being of the poor. For transitional economies where rural and forest-dweller poverty is a significant social problem, we advocate using a measure of GDP, which is sectoral and focused on their livelihoods: TEEB calls this “GDP of the poor”.

Like sustainable development frameworks, TEEB argues that what we need is a three dimensional metric, which can integrate the economic, environmental and social aspects together, and which can show the dependence of poor people on natural resources, and the links between ecosystems and poverty, thereby indicating the vulnerability of these sections of the population if valuable natural resources are lost.

TEEB proposes a new indicator named “GDP of the poor”, as the key beneficiaries of forest biodiversity and ecosystem services are in fact the rural poor and forest-dwellers. The proportion of GDP that can be attributed to the rural and forest-dependent poor directly is termed “GDP of the poor”. We measure this for mixed economies (i.e. where rural and urban economies differ, and where the former are more agricultural and the latter more industrial and service-sector) where at the same time there are wide income disparities (such as India, Indonesia and Brazil).

We find that the lower-income, rural and forest-dependent sectors are much more vulnerable to any loss in biodiversity than the country’s economy as a whole. Thus the “GDP of the Poor” indicator adjusted for the contribution of ecosystem services can be used along with other income indicators for targeting holistic improvements in livelihood incomes for the poor, accounting not just for their recorded incomes (included in National Accounts / GDP) but also their benefits from ecosystem services.

Sound development would imply growing a holistic measure of income, i.e., an environmentally adjusted “GDP of the Poor”. Thus, this indicator could reflect the impact of loss in biodiversity to the “real income” and well-being of the poor. In a society in which the “GDP of the poor” has a high percentage of ecosystem services included, that indicates that a loss in biodiversity would harm the poor more, thereby invoking the vicious circle of poverty and environmental degradation.

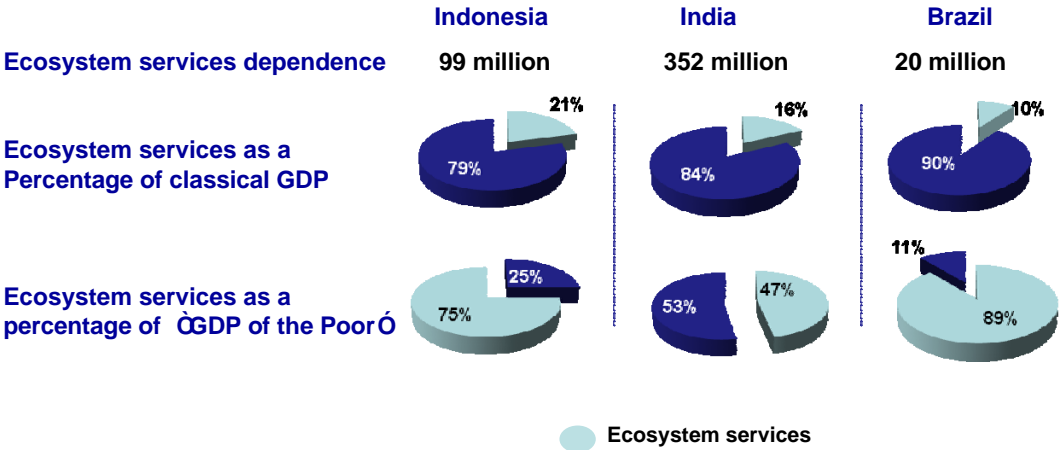
Compared to “average” Environmentally Adjusted GDP calculations (i.e. unrecorded ecosystem service values as a percent of national GDP) there are stark differences visible when we estimate ecosystem service values flowing to the poor as a percent of the “GDP of the Poor”. We give in Figure

1 the results of these calculations done for three nations (Indonesia, India, Brazil), which have mixed agrarian and industrial economies.

Figure 1.

Ecosystem Losses and Poverty

“GDP of the Poor” is most seriously impacted by ecosystem losses



Source: Gundimeda and Sukhdev, D1 TEEB

It is apparent that the extent of dependence of the rural poor on ecosystem services is very high, and measuring this at a national level must become a matter of priority in order to support an improved development paradigm, in which access of the poor to ecological resources and ecological regulation from natural areas is ensured as part of a holistic development strategy. It is often said that in developing countries, “biodiversity policy is development policy” and TEEB’s work on this does appear to evidence the wisdom of this observation.

For India, the main natural resource-dependent sectors – agriculture, forestry and fisheries – contribute around 16.5 percent to GDP. When the value of ecosystem services provided by forests and the value of products not recorded in GDP statistics are added, this increases the adjusted contribution of agriculture, forestry and fishing to GDP from 16.5 percent to 19.6 percent. For the rural poor, the average per capita value from these combined sectors was US\$138.8. When non-market goods are included as well as the value of ecosystem services, per capita effective income goes up to US\$260. This is a much larger increase than for the average across the economy as a whole. A similar pattern, with even more significant increases, is also observed in the Brazilian and Indonesian case studies.

2.4. Practical steps towards measuring the GDP of the Poor

Tackling poverty and biodiversity loss calls for efficient and sustainable utilization of natural resources. Development paradigms should take into account the nexus between growth, poverty and environment. We should emphasize that degradation of ecosystems and loss of biodiversity has different impacts at the macro and micro level. At the micro level, it leads to the erosion of the resource base and environmental services. Viewed from an “equity” perspective, the poverty of their beneficiaries makes these ecosystem service losses even more acute as a proportion of their incomes and livelihoods.

The first step for economies where rural and forest-dweller poverty is a significant social problem is to use a sectoral GDP measure focused on and adapted to their livelihoods. At a micro-level, including ecosystems and biodiversity as a source of economic value increases the estimate of their effective income and well-being provided that all services are systematically captured. Initially, adding the income from ecosystem services to the formal income registered in the economy will appear to reduce the relative inequality between the rural poor and other groups, as urban populations (rich and poor) are less dependent on free flows from nature. However, once natural capital losses are factored in, the picture of inequality changes as these affect the rural poor much more: it becomes clear that where natural capital is being lost, the rural poor are even less well off. Moving towards this kind of measurement would be useful for policy making.

3. Two inconvenient truths? (Re)emerging issues on development and biodiversity

3.1. The “environmentalist paradox”

The MEA (2005) closed on the diagnosis that the degradation of ecosystem services over the last decades had led to significant improvements in human well-being. This finding can be qualified as a paradox if one considers the environmentalist’s expectation that degrading biodiversity has adverse consequences in terms of well-being, as abundantly evidenced in specific cases (cf. previous sections). This is indeed a prominent argument in favour of biodiversity conservation for the sake of ecosystem services’ continued provision over time. Stimulating hypotheses have been proposed by Raudsepp-Hearne *et al.* (2010) to explain this apparent paradox: (i) inadequate capture of human well-being by existing indicators; (ii) contrasted importance of the various categories of ecosystem services, with food production outweighing the others; (iii) decoupling between human well-being and ecosystem services due to technological substitution; and (iv) the existence of a time lag between degradations of ecosystems and their impacts on human well-being. Despite their efforts to test these four hypotheses, the authors do not draw clear conclusions as to which one(s) is/are determinant.

We find it useful here to make a link between these hypotheses – a substantial food for thought – and the issue of poverty alleviation. Raudsepp-Hearne *et al.* point to the possibility that increased in food production overall is a key factor explaining the environmentalist paradox. But one may wonder if this increase in food production has benefited evenly to all categories of the population. It is no mystery that rural populations have often been dominated for a long time by urban ones, both in developed and developing countries, and from a political, social and cultural point of view. Undernourishment is likely to have diminished more in urban areas than in rural areas, and it is important in this respect to remember that among the 840 million undernourished people (Griffon, 2006), about three-thirds live in rural areas and make a living of agriculture. For reasons of socio-political) domination by urban elites and the correlation between national prices for agricultural products and international markets, poor rural populations both sell their products at rather low prices and get a small share of the added value. In this context, one could argue that increased food production as a factor explaining the environmentalist paradox does not necessarily support the interest of the poor, at least in rural areas.

Regarding the hypothesis that human well-being is poorly captured in the MEA, and according to the previous section highlighting the specific effects of the degradation of ecosystem services on poor people, it can also be argued that this is all the more true for those living nearby preserved ecosystems. Beside productive functions as defined by the MEA (and to which food production belongs), cultural functions play an important role in terms of human well-being. Who would assert that living next to an oil palm plantation is equivalent, *ceteris paribus*, to living near a natural forest where biodiversity plays a key role in terms of games, culture and other social practices (Sheil *et al.*, 2005)? Examples from around the world, including again from sacred groves in India, are many and extremely telling.

Arguably, the possibility that there is a time lag between the degradation of ecosystem services and their consequences on human well-being deserves scrutiny. Would it be a hasty answer to an extremely complex question? In a more dynamic approach, it could for instance be argued that if the degradation of ecosystem services generates development, it allows for the substitution of natural capital by man-made capital. Then the poor who suffer from the erosion of biodiversity are those who remain poor as ecosystem services degrade, whereas those who manage to embark in the development process are not considered “poor” anymore: in that sense the actual benefits that the poor retrieve from biodiversity loss tend to remain invisible. Such a view would tend to support the idea that conservation is not directly linked to poverty alleviation, although it may at least avoid more extreme poverty owing to the “safety net” argument.

3.2. Poverty or inequalities? Re-opening the Millennium consensus

While fighting poverty is undoubtedly a noble cause, setting it as a global sustainable development priority is a choice that may need to be debated, at least when it comes to biodiversity conservation. Indeed, there are conceptual and practical reasons why a hasty consensus on the actual global objective may conflict with the biodiversity agenda. Even if accepting as a postulate that the poor should be provided with the right to choose their future and with the opportunity to escape poverty, some important issues should not be overlooked:

- First, despite numerous and valuable attempts at complexifying the concept of poverty so as to account for its many dimensions, in practice poverty is still widely measured in terms of the money a person lives on. Just like GDP remains the main gauge of development, key institutions around the world, at all levels, still assess poverty against this extremely simplistic if not misleading indicator.
- Therefore, the conceptual frameworks on which policies are grounded, developed and implemented largely fail to account for the complexity and variety of situations. For example, to what extent is someone living with 10 USD a day in the suburb of a huge, polluted, crowded megacity, working 12 hours a day in a stressful industrial environment and commuting for 4 hours every day better off than someone who lives on less than a dollar a day in a remote tropical forest? The answer is not straightforward.
- Challenges are actually such that there is still a worrying – as far as biodiversity is concerned – lack of evidence that poverty alleviation may be decoupled from growth in the consumption of material goods. Hence there is little doubt that current development trends in the South are leading to a somewhat desperate endeavour to catch up with the level of material consumption of the group immediately higher on the social scale.

On the other hand, evidence is mounting on the adverse effects of inequalities in various dimensions of human well-being. For instance, in “the Spirit Level: why more equal societies almost always do better”, Wilkinson and Pickett (2009) argue that there are “pernicious effects that inequality has on societies: eroding trust, increasing anxiety and illness, (and) encouraging excessive consumption”. They demonstrate that the situation is significantly worse in more unequal rich countries as far as 11 health and social issues are concerned⁴. Interestingly, some recent publications also demonstrate the negative impact of inequalities (more than poverty) on biodiversity (e.g. Holland *et al.*, 2009; see summary in box 3). Inequalities are likely to be a fundamental missing piece of the biodiversity-poverty puzzle, finally putting coherence in fragmented observations that, for instance, poverty is a cause of biodiversity erosion while clearly wealth is an even greater one. If the poor are to develop

⁴ These are: physical health, mental health, drug abuse, education, imprisonment, obesity, social mobility, trust and community life, violence, teenage pregnancies, and child well-being.

and if the natural resources that ecosystems provide are limited, a drastic reduction in the gap between the rich and poor may be a first and foremost requirement.

On the whole, the belief that poverty – not inequality – is the core problem with regard to biodiversity and sustainable development in general, and that the answer lies in increasing the GDP, may turn out to be an example of the blindness that comes with dogma. The poverty/inequality debate is obviously a very political one because it is hardly presented as a win-win scenario in contrast with “poverty alleviation”: some believe that reducing inequalities is not a legitimate objective; others do want to reduce inequalities, and believe GDP growth is the best way to achieve it; others believe there is no direct relationship between GDP and inequalities – which does not necessarily mean that GDP growth should be avoided, but that it is not sufficient. Worth noting, little robust literature articulates poverty, inequalities, GDP and biodiversity.

The Millennium consensus at the end of the 1990s set the international agenda on poverty for clear political reasons, although they remained implicit and the choice was usually presented as "neutral". It has seldom been challenged by governments, NGOs or scientists, despite some isolated attempts to at least couple the poverty alleviation agenda with the inequalities issue⁵. It should therefore today become a priority to gather more evidence on the role inequalities play with regard to sustainable development, among others biodiversity erosion. The 2015 Millennium Development Goals horizon, as it is quickly approaching, may be the perfect opportunity to bring new arguments to a debate that definitely needs to be revived, as politically incorrect as it may be.

Box3. A Cross-National Analysis of How Economic Inequality Predicts Biodiversity Loss - Summary

We used socioeconomic models that included economic inequality to predict biodiversity loss, measured as the proportion of threatened plant and vertebrate species, across 50 countries. Our main goal was to evaluate whether economic inequality, measured as the Gini index of income distribution, improved the explanatory power of our statistical models. We compared four models that included the following: only population density, economic footprint (i.e., the size of the economy relative to the country area), economic footprint and income inequality (Gini index), and an index of environmental governance. We also tested the environmental Kuznets curve hypothesis, but it was not supported by the data. Statistical comparisons of the models revealed that the model including both economic footprint and inequality was the best predictor of threatened species. It significantly outperformed population density alone and the environmental governance model according to the Akaike information criterion. Inequality was a significant predictor of biodiversity loss and significantly improved the fit of our models. These results confirm that socioeconomic inequality is an important factor to consider when predicting rates of anthropogenic biodiversity loss.

Source: Holland et al., 2009

⁵ See e.g. Ministère des affaires étrangères et européennes, 2011: “Fighting poverty and reducing inequalities” appears as one of the four strategic goals of the French development policy.

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