

WORLD GROWTH

# Forestry and Biodiversity:

A Healthy Report

December 2009



## EXECUTIVE SUMMARY

A great deal of criticism has been leveled at the global forest industry for its apparent contribution to biodiversity loss.

Those undertaking forestry in natural forests are accused of wholesale forest destruction, leading to significant biodiversity loss. At the same time, those in the private sector that are establishing forest plantations are accused of propagating “sterile monocultures” that harbor little or no biodiversity.

Consequently, the perception of forestry in the global environmental debate is that it is the enemy of flora and fauna.

This perception rests on two assumptions. First, that forestry – plantation or natural – is a major cause of deforestation and therefore biodiversity loss. Second, that forest plantations harbor no biodiversity.

While poor forest management of natural forests will inevitably lead to degraded forests or deforestation, the attribution of the majority of deforestation to the forest industry is unwarranted. Similarly, accusations against the plantation forest industry that it is responsible for the majority of forest loss are equally unwarranted.

Of all deforestation – that is land use conversion from natural forest to other uses – just 7 per cent can be attributed to plantation forestry. The remaining 93 per cent of the conversion is a function of agricultural expansion.

The world’s leading forest research organizations – FAO and CIFOR – appreciate that the causes of deforestation lie outside of the forest sector and that forestry on its own is not land-use change.

Linked into this is that a significant percentage of the world’s forests has been set aside for conservation. Globally, more than 11 per cent of the world’s total forest area has been designated biodiversity conservation. Since 1990, forest areas designated for conservation have risen by 32 per cent – an estimated increase of 96 million hectares since 1990.

The second assumption – that plantations harbor no biodiversity – is also without merit.

Numerous studies have concluded that plantation forests have higher biodiversity values than other landscapes used for agriculture. Moreover, they have found that when native species are used for plantation forestry there is very little difference between plantations and natural forests.

Recent research has also demonstrated clearly that plantations – native or exotic – serve natural forests and biodiversity much better than other land uses such as agriculture.

First, plantations do harbor biodiversity values. Studies in Latin America have indicated that they are particularly amenable to some species that are threatened or endangered.

Second, plantations are able to act as a buffer zone for forests that protect typical forest functions, and also inhibit encroachment by illegal loggers.

Third, the capacity of plantations to provide feedstock takes pressure off using natural forests for the supply of timber.

Why, then, has plantation forestry garnered such a reputation?

The perception of plantation forestry has largely been driven by environmental NGOs. It has been achieved through NGO definitions of forests that exclude plantation forestry, through the development of biodiversity metrics that preclude any biodiversity values within forests, and through conservation strategies that are at odds with economic development, particularly in developing countries.

Respected research bodies and intergovernmental organizations do not distinguish between plantation forests and forests. The definitions used by organizations such as the FAO place simple technical criteria upon what defines a forest. The FAO has previously advocated a ‘spectrum’ approach to forestry based on the level of management intensity within a forest. At one end there are intensively managed production plantations; at the other there is natural forest, devoid of management.

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This has not been the case within conservations organizations and particularly among environmental NGOs.

The definition of forest landscapes used by Greenpeace is exclusive rather than inclusive. It is based on forest area rather than the biodiversity values it contains. It excludes forest areas that are interrupted by navigable rivers. It effectively sets out to communicate that there is less natural forest than there actually is.

The use of broader indicators that take in values other than biodiversity values – such as WWF's high conservation value forest indicator – is effectively a conservation strategy rather than an indicator. Biodiversity is both complex and abstract. Its measurement defies simplistic indices or numbers. Moreover, the data on biodiversity in developing countries is poor, and the best way to conserve biodiversity is far from agreed.

Rather than seeking to conserve forests in areas that have already been designated as conservation areas using top-down national planning, HCVF seeks to employ land already designated for economic purposes for environmental purposes.

The danger here is twofold. First, poor countries need economic growth to manage their environment better; this can be seen in the fact that it is the world's larger private resource firms have better environmental management systems. They are the ones that can afford them. It is no surprise that rates of deforestation and subsequent biodiversity loss taper off with increased living standards.

Second, reducing the productivity of land designated for economic purposes – by large firms or small landholders – places further economic burdens on poor populations. This, in turn, creates higher pressures on natural forest areas, whether designated for conservation or production.

This is particularly acute where there are high rates of population growth, or high rates of urbanization. These are precisely the areas that have been designated by NGOs as being particularly threatened; it is not surprising that publicizing 'human animal conflict' has been a publicity strategy for NGOs.

But using these conflicts for publicity masks a greater problem for NGOs – their strategy for biodiversity is effectively at odds with the economic needs of developing countries and also the Convention on Biological Diversity, which clearly makes the economic development a priority.

Rather than pressuring governments and the privates for greater protected areas in developing countries, campaigners should contribute to improving the management of existing conservation areas. For example, more than one quarter of Indonesia's land area has been designated for conservation, but enforcement is still a problem. Campaigners have instead put resources into pressuring economically important industries.

In this regard, the question environmental campaigners should be broadened. They call for action to be taken, yet have few suggestions on who is to take the action.

NGOs need to decide if they are simply going to campaign against economic development in poor countries – which appears to be their current strategy – or if they actually want to give both the poor and the environment a stronger chance for survival

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# ACRONYMS AND ABBREVIATIONS

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## Acronyms and Abbreviations

<b>CBD</b>	Convention on Biological Diversity
<b>CF</b>	Conservation Fund
<b>CIFOR</b>	Center for International Forestry Research
<b>COP</b>	Conference of the Parties
<b>CSIRO</b>	Commonwealth Science and Industrial Research Organization
<b>EU</b>	European Union
<b>FAO</b>	United Nations Food and Agriculture Organization
<b>GMO</b>	Genetically Modified Organism
<b>HCV</b>	High Conservation Value
<b>HCVF</b>	High Conservation Value Forest
<b>IFL</b>	Intact Forest Landscape
<b>ITTO</b>	International Tropical Timber Organization
<b>IUCN</b>	International Union for the Conservation of Nature
<b>NGO</b>	Non-government Organization
<b>UK</b>	United Kingdom
<b>UN</b>	United Nations
<b>UNEP</b>	United Nations Environment Programme
<b>USAID</b>	United States Agency for International Development
<b>WCS</b>	World Conservation Society
<b>WTP</b>	Willingness to pay
<b>WWF</b>	World Wildlife Fund

***The loss of biodiversity is regarded by many politicians, environmentalists and public citizens as a grave concern that requires immediate political action at both local and global levels.***

This concern has prompted the development of a number of international institutions and organizations with a specific mandate to address the problem.

However, the perceived ineffectiveness of these institutions and a lack of consensus on the value of preserving biodiversity in developing economies have prompted many organizations – particularly environmental non-government organizations (NGOs) – to pressure the private sector to become the key agents in biodiversity protection.

This pressuring of the private sector has incorporated a broad public policy debate, which has oversimplified the biodiversity issue. This has particularly been the case in the description of the impact of forestry upon biodiversity.

While the authors of this report concede that forestry operations can have a significant impact upon biodiversity, the singling out of the forestry industry – particularly forestry plantations – has been far from helpful in the international forest policy debate.

This report examines biodiversity in relation to private sector commercial plantation forestry.

First, it examines the emergence of the concept of biodiversity and the development of its associated institutions.

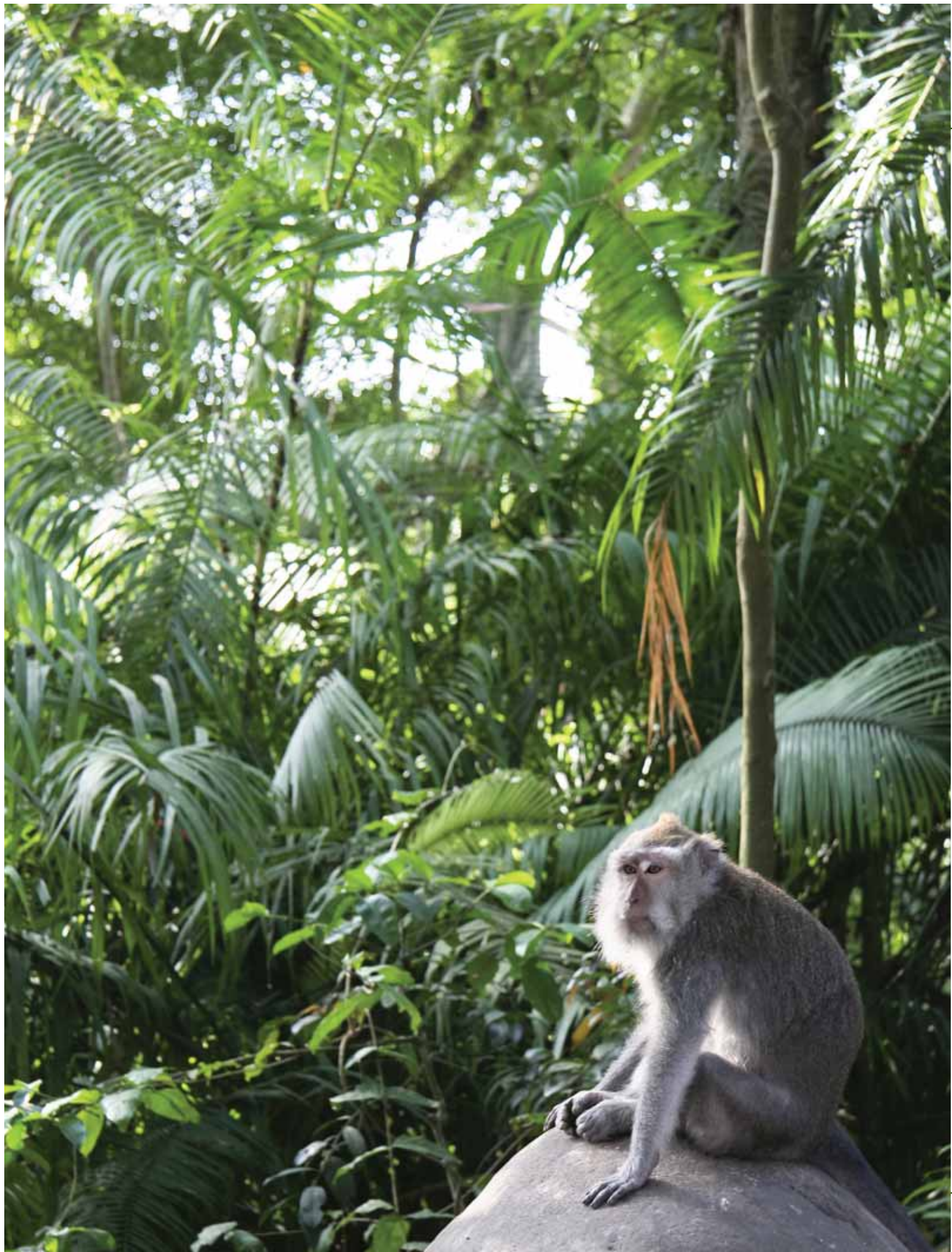
Second, it gives an overview of how biodiversity is measured in the field according to mainstream scientific literature, and compares this against metrics and conservation strategies developed by NGOs.

Third, it describes the current state of global biodiversity protection in the world's forests and its relationship to biodiversity targets set under the Convention on Biological Diversity.

Fourth, it analyses the failure of attempts to place an economic value on biodiversity protection.

And fifth, it examines the role of plantation forestry in biodiversity protection.

Lastly, it undertakes a case study of biodiversity protection and population growth in the province of Riau, Indonesia.



## 2. THE EMERGENCE OF BIODIVERSITY

Biodiversity is a relatively new concept; it first gained prominence in the 1980s. It is an abstract and extraordinarily complex concept that is often used in the current public policy debate without full understanding of what it entails. More often than not, it is simply used as a proxy description of habitat or wilderness; when the phrase 'biodiversity loss' is used, it is more often than not a description of habitat loss or deforestation.

### 2.1 The emergence of the concept and its institutions

The first usage of 'biodiversity' appeared during the 1960s in a book by US ecologist Raymond Dasmann which examined environmental degradation in California. Dasmann was the director of international programs at the Conservation Foundation (CF) during the 1960s; CF eventually merged with the World Wide Fund for Nature (WWF) in 1990.<sup>1</sup> Dasmann used the term to distil three aspects of biological diversity – ecological diversity, species diversity, and genetic diversity.

The term was popularised in specialist circles during the 1980s by prominent biologists such as Edward O. Wilson and Thomas Lovejoy. The broad-stroke nature of biodiversity was outlined in the first book bearing the name, *Biodiversity* (1988), which was the published proceedings of the 1986 conference in Washington, the National Forum on BioDiversity.<sup>2</sup>

The proceedings did not offer a definition of the term other than 'the vast array of topics covered in the Washington forum'.<sup>3</sup> However, the forum covered equally biology, economics, politics, policy and culture. It indicated from the outset that biodiversity is not simply about animal populations or conservation – it is an umbrella-style political approach to the interactions between human populations and the environment.

The growing popularity of the term in the 1980s coincided with the International Union for the Conservation of Nature (IUCN) commencing lobbying for an international binding agreement on biological diversity in 1981.

The United Nations Environment Program (UNEP) called for such an international treaty in 1987; it emerged as the Convention on Biological Diversity (CBD), which was negotiated in the lead-up to the Rio Earth Summit in 1992.

The negotiations over the treaty were marked with a fierce split between developing countries and developed countries and NGOs. The rift was driven by developing countries' fears that a binding agreement would prevent them from exploiting natural resources for economic development.

Initial negotiations focused upon priority conservation measures to be taken in tropical developing countries, using the reasoning that tropical forests host a substantial proportion of global biodiversity.<sup>4</sup> Attempts were also made to have the convention explicitly deal with tropical forests; however these were roundly rejected by developing countries.<sup>5</sup>

European states and the IUCN had called for a list of threatened species to be incorporated into the treaty that would have imposed stringent conservation commitments upon developing countries, but without providing the mechanism for financing such commitments.<sup>6</sup> The European Union and IUCN positions were echoed in lobbying efforts by international environmental campaigners such as Greenpeace, WWF and Friends of the Earth. Their efforts on drawing commitments from developing countries were met with opposition from developing countries, but clauses on indigenous knowledge, public participation and the role of women were included.<sup>7</sup>

1. Doh, Jonathan P., and Hildy Teegeen. *Globalization and NGOs: Transforming Business, Government, and Society*. Westport, Conn: Praeger, 2003

2. National Forum on Biodiversity and Wilson, Edward Osborne, and Peter, Frances M. and Smithsonian Institution. and National Academy of Sciences (U.S.) *Biodiversity* / E.O. Wilson, editor, Frances M. Peter, associate editor National Academy Press, Washington, D.C. : 1988

3. Hawksworth, David L. *Biodiversity Measurement and Estimation*. Philosophical transactions, Vol. 345, nr. 1311. London: The Royal Society, 1994

4. Rosendal, G. Kristin. "Overlapping International Regimes: The Case of the Intergovernmental Forum on Forests (IFF) between Climate Change and Biodiversity." *International Environmental Agreements: Politics, Law and Economics*. 1. 4 (2001): 447-468.

5. Guruswamy, Lakshman D. "The Convention on Biological Diversity: Exposing the Flawed Foundations." *Environmental Conservation*. 26. 2 (1999): 79-82.

6. Hannigan, John A. *Environmental Sociology*. London: Routledge, 2006.

7. Humphreys, D. *Redefining the Issues: NGO Influence on International Forest Negotiations* *Global Environmental Politics - Volume 4*, Number 2, May 2004, pp. 51-74

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## 2.2 Convention on Biological Diversity

The resultant Convention on Biological Diversity (CBD) was signed by over 150 governments at the 1992 United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil (the 'Earth Summit').

The CBD defines biodiversity as “the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems”.

The convention's goals are the conservation and sustainable use of biological diversity and the fair sharing of products made from gene stocks. To accomplish these goals, parties are to develop plans and national strategies to: conserve biological diversity, including in situ and ex situ conservation measures, and environmental impact assessments of projects for adverse impacts on biodiversity; to ensure commercial access to biological resources and to share fairly those revenues among source countries and developers; and to establish safety regulations and accept liability for risk relating to biotechnology.

To date there are 191 Parties to the Convention. In April 2002 at the Sixth Conference of the Parties (COP) of the CBD<sup>8</sup>, the Ministers committed 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”.

Significantly, the CBD bound in a commitment to economic development in poor countries Article 20 of the treaty – “economic and social development and eradication of poverty are the first and overriding priorities of the developing country Parties”

## 2.3 The Popular Success of Rio

The key success of the Earth Summit for biodiversity was the popularisation of the term itself. Following Rio, the usage of the term in the print media rose up until the Earth Summit's successor meeting in Johannesburg in 2002; it has since declined.<sup>9</sup>

As with all technical concepts, its popular usage was simplified. The term became used more as a reference point for 'biodiversity loss', or species extinction, rather than a quantifiable metric for ecological diversity. Typically, then, it became the description of and environmental problem, rather than a useful metric for environmental management.<sup>10</sup>

Emblematic of this was the popularity of the Amazon as a *cause celebre* in the 1990s. Rather than representing varying ecological systems – steppes, tundra, marine environments – biodiversity in the popular context became synonymous firstly with tropical forests, and secondly with Amazonian forests.<sup>11</sup> This was despite the fact that there were significantly higher rates of deforestation and habitat loss that were taking place in other parts of the world.<sup>12</sup> It also became a proxy for habitat area or charismatic species, rather than being a useful description of distributions of biological diversity within a habitat.

A second key driver in its popularisation was that it presented an intersection between economics and conservation for developed world policymakers. This altered the frame of biodiversity such that biodiversity loss also constituted a problem for economic development.<sup>13</sup>

As a consequence, tropical biodiversity loss was portrayed in the developed world as a potential loss of huge numbers of undiscovered species that would have commercial value, such as cures for cancer – an idea popularised in Hollywood cinema. It was also portrayed as a problem for developing world farmers and communities reliant upon environmental systems for subsistence livelihoods.

This shift prompted the international aid community – particularly USAID under the Clinton-Gore administration – to place considerable resources into the biodiversity conservation initiatives. USAID launched the Conservation of Biological Diversity Project and provided funding for the Biodiversity Support Program, comprising WWF, the Nature Conservancy and the World Resources Institute.<sup>14</sup>

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8. The COP is the governing body of the Convention, and advances implementation of the Convention through its decisions.

9. Hannigan (2006)

10. Hannigan (2006)

11. Southgate, D., and H. L. Clark. "Can Conservation Projects Save Biodiversity in South America?" *Ambio -Stockholm-*. 22. 2/3 (1993): 163.

12. Southgate, D., and H. L. Clark. (1993)

13. Hannigan (2006)

14. Hannigan (2006)

## 2.4 The politics of forest biodiversity

### *Politics in the CBD*

Since the Rio Summit, the CBD has come under high levels of criticism from NGOs. The agreement has been roundly criticized by NGOs since then for lack of commitment from contracting parties and institutionally weak commitments. Greenpeace has laid the blame squarely at the United States, Australia and Canada for undermining the treaty.<sup>15</sup> Environmentalists have also taken issue with Article 20 of the treaty – “economic and social development and eradication of poverty are the first and overriding priorities of the developing country Parties” – charging that the clause diminishes the notion of sustainable development.<sup>16</sup>

This has been the case with the treatment of forests under the treaty, which occasionally re-emerges during COP meetings. In 2002 at the sixth COP, a work program on forest biodiversity was adopted which parties were asked to implement on a voluntary basis, in the spirit of Article 20 of the treaty. Moves were made to create an additional CBD protocol base on the work program, but this was opposed on two fronts. First, by Parties in favor of strengthening the International Forum on Forests (IFF), and by developing countries that insisted upon priority for economic utilization of forests.<sup>17</sup>

### *NGO politics and biodiversity*

Commercial forest industries have been portrayed for a number of years as ‘enemies’ of biodiversity. The main contention of NGOs is that forest industries cause deforestation, and that deforestation results in biodiversity loss.

This logic is flawed in two ways. First, forestry is not deforestation. The United Nations Framework Convention on Climate Change (UNFCCC) has stated that commercial forestry is directly responsible for less than 15 per cent of all deforestation; most deforestation is caused by agriculture.<sup>18</sup> This has been echoed by the Food and Agriculture Organization (FAO) and the Centre for International Forest Research (CIFOR), which have stated that most deforestation is driven by

factors outside of the forestry sector.<sup>19</sup> Indeed, recent reports by WWF and Greenpeace have pointed the finger directly at the agricultural industries in areas such as the Amazon.<sup>20</sup>

Deforestation or land-use change does not immediately result in irreversible or unique biodiversity loss. If top-down landscape planning is undertaken by national governments, which designates representative areas to be annexed, representative biodiversity values will be retained.<sup>21</sup>

Despite this, NGOs have instead developed their own biodiversity concepts for campaigning against the forest industries in particular. These concepts are based on reducing the area available for commercial forestry in natural forests, reducing the area available for plantation forestry, and reducing the potential productivity of plantation forests through genetically modified organisms (GMOs).

- ***Forest area***

Greenpeace uses the concept of Intact Forest Landscapes (IFLs) for the preservation of biodiversity. The concept (explored more fully in the next chapter) relies upon area as its basis, not biodiversity values. IFLs are defined as “a territory within the forest zone” which contains forest and non-forest ecosystems that have been minimally disturbed by human economic activity; the area of which is at least 500 square kilometres; and the minimum width (i.e. diameter) of which is 10 kilometres.

WWF defers to high conservation value forest definitions (see next Chapter) and specifically HCVF2. On area, this defines the conservation value as “Forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and

15. Greenpeace International. *Who to blame Ten years after Rio? The role of The USA, Canada, and Australia in undermining the Johannesburg Summit*. Greenpeace, 2002.

16. Guruswamy (1999)

17. Thoyer, Sophie, and Benoît Martimort-Asso. *Participation for Sustainability in Trade. Global environmental governance series*. Aldershot, England: Ashgate, 2007.

18. UNFCCC, *Investment and financial flows to address climate change*, Bonn, Germany, 2007

19. World Growth. *Forestry and Development*. World Growth, Arlington VA, 2009.

20. Greenpeace International. *Slaughtering the Amazon*. Greenpeace, Amsterdam, 2009.

21. Higgins, Jonathan V., Mark T. Bryer, Mary L. Khoury, And Thomas W. Fitzhugh. “A Freshwater Classification Approach for Biodiversity Conservation Planning.” *Conservation Biology*.

19. 2 (2005): 432–445.

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abundance.” While the HCVF principles are a guidance document, the definition itself is open ended.

- ***Plantation forestry***

Greenpeace also opposes the establishment of ‘monoculture’ plantation forestry, which it says turns landscapes into ‘biological deserts’ – which is not an accurate description of plantation forests (See Chapter 5). WWF on the other hand formally supports plantations and argues that they should remove pressure to source timber from natural forests. Yet it insists on compliance to a rule of no conversion of natural forest for plantation development. It also supports an FSC principle that an ad hoc proportion of plantation area to be used for native landscape restoration, which is considered by some foresters to be economically unviable.

- ***GMOs***

Greenpeace (as with most other NGOs) flatly opposes GMOs, whether for tree species or any other purposes. There is no scientific, evidence-based reasoning on this position. WWF calls for moratoria on the release of GMO-based tree species and has stated that the economic benefits of GM technology are yet to be demonstrated,<sup>22</sup> despite market-based evidence to the contrary. WWF also claims that GM trees represent a threat to biodiversity; however the UK review cited by WWF in 2003 points out there are very few differences between the risks from GM technology for crops as there are for conventional farming systems.

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22. WWF Switzerland. Genetically Modified Organisms (GMOs): *A Danger To Sustainable Agriculture* A contribution by WWF Switzerland to the international public debate Updated version - May 2005 (Initial version - November 2003)



## 3. MEASURING BIODIVERSITY AND CONSERVATION

Biodiversity metrics are considered to be a valuable tool for both scientists that are attempting to record accurate environmental information, and by environmentalists and policymakers, who are aware that biodiversity is both complex and generally poorly understood. The function of metrics in this second context is to describe status and trends in biodiversity, as well as measure the successes or failures of policy implementation.

However, metrics – particularly in a field that is relatively new – can be politicised even when scientifically based. This is particularly the case when the metrics and associated concepts are developed by conservation organisations that have political goals as well as conservation targets as part of their agenda.

This is compounded by the difficulty in determining baseline values for biodiversity. The choice of baseline will impact significantly upon results and may be as much political as it is scientific.<sup>23</sup>

### 3.1 Biodiversity Metrics

A key problem in biodiversity indicators is that they attempt to distil large amounts of information into small and readable indicators. Even then, status and trends may be impacted upon by natural variations, disturbances and habitat successions. Sudden changes may be insignificant, but long-term declines will, highlighting the role of experts in interpreting indicators. For example, there are very well developed indicators for birds in Europe;<sup>24</sup> part of the reliability of these indicators is in fact cultural – bird watching has a long cultural history across Europe and the United Kingdom.

Moreover, the “scaling” of biodiversity indicators from locally collected information to a national or regional set of indicators – necessary for national or international policy formulation – presents potentially misleading information about causes or changes in biodiversity indicators.<sup>25</sup> This is compounded further by a lack of agreed international indicators for biodiversity under the CBD.

There are three key ways of measuring status and trends in biodiversity: census data, umbrella species and red lists or hot spots.

#### *Census data*

The most broadly used unit for biodiversity measurement is that of species. The reasons for this are simple: it is both easily understood by the public and easily defined in a legal context. There are other units that are used: genetic diversity, community diversity and ecosystem diversity. How these are deployed depends upon the conservation context and strategy. These units are recognised across three levels:

- **Alpha diversity** - the number of species within a specific site or ecological community;
- **Beta diversity** - the number of species among ecological communities, indicating the differences between communities and associated trends;
- **Gamma diversity** - takes into account alpha and beta diversity to give a landscape level picture – it is an indicator of diversity within a landscape.<sup>26</sup>

A key point to note is that not only are species unique, but the distribution patterns of species are also unique, adding to the complexity of attempting to describe biodiversity.

#### *Umbrella species*

It is not a realistic expectation to collect census data on all species. The resources and techniques simply do not exist. Conservation biologists therefore resort to the use of ‘umbrella species’, i.e. using a species as a proxy for biodiversity trends. This assumes that one species – often large mammals – will provide benefits to other species and are in effect ‘keystones’. There is, however, little evidence to suggest that using umbrella species is an accurate measure of biodiversity; rather studies have suggested that many populations operate independently.<sup>27</sup>

23. European Academies' Science Advisory Council. *A Users' Guide to Biodiversity Indicators*. Brussels, 2004.

24. Easton, Thomas A., and Theodore D. Goldfarb. *Taking Sides. Clashing Views on Controversial Environmental Issues*. Maidenhead: McGraw-Hill Education, 2004., Birdlife International. *State of the World's Birds*. Cambridge, England: Birdlife International, 2004.

25. Liebhold, A., and N. Kamata. "INTRODUCTION Are Population Cycles and Spatial Synchrony a Universal Characteristic of Forest Insect Populations?" *Population Ecology*. 42 (2000): 205-210.

26. Humphries, C. J., P. H. Williams, and R. I. Vane-Wright. "Measuring Biodiversity Value for Conservation." *Annual Review Of Ecology And Systematics*. 26 (1995): 93-112.

27. Prendergast, J. R., R. M. Quinn, J. H. Lawton, and B. C. Eversham. "Rare species, the coincidence of diversity hotspots and conservation strategies." *Nature*. 365. 6444 (1993): 335.

### Red lists and hotspots

Conservation biologists have used census data to create lists of species where populations are declining; the metric in these cases is based on a perceived threat to the viability of these populations. The most prominent of these is the IUCN Red List. However, as one prominent conservationist has pointed out, “no list ever protected anything ... protection must be accomplished by first identifying where threatened species live, determining what measures must be taken in those areas to ensure their survival, and then finding people with the will, influence, resources, and authorization to carry out the plan.”<sup>28</sup>

Hotspots provide an additional tool that identifies areas for conservation that are to be prioritised, based on biodiversity values and perceived threat. A significant problem for the ‘hotspot’ method for measuring both biodiversity and threat is that ‘threat’ is based upon historical human intervention, indicating increasing human populations. In practice, this requires conservation strategies that are not only site-specific,<sup>29</sup> but also require negotiation with local and often poor communities.

## 3.2 Problems with Data

There is an inverse relationship between the quality of data about biodiversity within a region or country and the conservation value of biodiversity itself; places with the best data on biodiversity have the most degraded wildlife populations.

For example, countries such as the UK have highly detailed information about species, but are almost devoid of natural habitat, have no megafauna, and have lost significant biodiversity values as populations grew. Moreover, economic development took place in a historical period where environmental impact assessments were unheard of.

Countries such as those in the Congo Basin or the Amazon still contain large swaths of natural habitat. However, inventories of species, census data and descriptions of most species simply do not exist. This lack of data makes setting realistic baselines for measuring status and trends in biodiversity close to impossible.

For example, attempts to set up a monitoring system for a conservation project covering seven provinces of central Vietnam have produced few results; species census data remain virtually unknown, even for large predators such as the tiger.<sup>30</sup>

In some cases, lack of data has shown dire predictions have been incorrect. Recent surveys of elephant numbers indicate that population numbers are stronger than expected. The Wildlife Conservation Society (WCS) estimates elephant numbers in two national parks in Southern Sumatra (Bukit Barisan Selatan and Way Kambas) are approaching 700. According to WCS the results indicate that, “Sumatra’s remaining elephant populations may be larger than expected”.<sup>31</sup>

## 3.3 Conservation Strategies and NGO Indicators

### Strategies

There are several different approaches to biodiversity conservation which can be placed into nine different categories:

- **Ecoregions** – prioritizes conservation of ecosystems facing the highest threats of destruction and degradation;
- **Hotspots** – selects landscapes with the highest species diversity per unit area;
- **Endemic Bird Areas** – prioritizes areas with the highest densities of endemic bird species;
- **Centres of Plant Diversity** – targets areas with exceptional plant diversity per unit area;
- **Megadiversity Countries** – identifies nations with the highest levels of biodiversity, and designs conservation plans sensitive to national interests and boundaries;
- **Global 200 Ecoregions** – ranks the Earth’s most biologically outstanding terrestrial, freshwater and marine habitats;

28. Van Dyke, Frank. *Conservation Biology Foundations, Concepts, Application*]: Springer, 2008.

29. Harris, Grant M., Clinton N. Jenkins, And Stuart L. Pimm. “Refining Biodiversity Conservation Priorities.” *Conservation Biology*. 19. 6 (2005): 1957-1968.29

30. Dudley, N., Baldock, D., Nasi, R., Stolton, S., 2005. *Measuring biodiversity and sustainable management in forests and agricultural landscapes*. Philosophical Transactions of the Royal Society B 360, 457–470.

31. Wildlife Conservation Society, *Elephant Conservation in Sumatra*, accessed at <http://www.wcs.org/international/Asia/Sumatra/sumatraelephants>, on 28 March 2008

- **High Biodiversity Wilderness Areas** – identifies areas that combine high levels of biodiversity, relatively low human population density, and high landscape connectivity;
- **Frontier Forests** – targets the world’s remaining large intact natural forest ecosystems; and
- **Last of the Wild** – places conservation priority on areas representing the largest and relatively “wildest” (lowest human population and environmental impact) places in each of their biomes (Brooks et al. 2006).

Most, if not all of these approaches have been developed by conservation organisations. They all take different approaches to conservation. They can be classified further as being either proactive or reactive; and describe either vulnerability and threat or uniqueness and irreplaceability, and occasionally both.

There is a degree of overlap of suggested conservation areas by NGOs, particularly in relation to threats. This is driven by existing human pressures upon conservation areas, which are largely driven by poverty.

All approaches set target units that are geographic areas rather than biodiversity indicators, e.g. census data.<sup>32</sup>

These strategies do not address economic concerns for both local and national economies. The problem generated here is whether the conservation of these areas is in fact feasible from a monitoring and evaluation perspective. This problem of feasibility will be amplified if local economies falling within a mooted conservation strategy area are undergoing a process of rapid economic growth, as has been the case in Riau, Indonesia (see case study). In these cases, ‘threat’ will be amplified, and the case for convincing local poor communities to forego potentially productive land will be more difficult. Conservation organisations that do place a greater emphasis upon threats do therefore place themselves at odds with economic development objectives. Moreover, unless conservation strategies implemented at the local level contribute to regional or national goals, their usefulness will be limited.<sup>33</sup>

### *NGO Criteria*

There are three key metrics that have been used and developed by NGOs for preserving biodiversity within forests. These metrics are different in that they form part of a larger conservation strategy. They are listed below.

#### *Greenpeace – Intact Forest Landscapes*

Greenpeace has adapted the term intact forest landscape from the term frontier forest, which was initially employed by the World Resources Institute (WRI) in a report that it published in 1997 entitled *The Last Frontier Forests: Ecosystems and Economies on the Edge*. Several objects are excluded from the Greenpeace definition of intact forest landscapes, including: navigable rivers, settlements (with a buffer zone of one kilometre); territories that have been disturbed by economic activity during the past 70 years, such as logging and mining; and forests and tree plantations that have been artificially restored. The frontier forest concept is highly proactive, however the campaign context in which it is deployed is reactive, and Greenpeace’s campaigning implies both irreplaceability and vulnerability.

A problem with the frontier forest definition is that does not define what is an acceptable level of human intrusion, for example, eco-tourism. Nor does it attempt to determine the ideal amount of forest to protect within a particular forest system, making it particularly unrealistic. Equally unrealistic is that it is completely irrelevant to forest environments that are fragmented. Moreover, the assumptions it uses give no indication of status and trends in biodiversity. So, while IFL may be a useful and understandable campaigning tool, it gives no information for those wishing to implement conservation strategies.

#### *WWF – High Conservation Value Forests (HCVF)*

HCVF is a form of assessment that has been developed by the Forestry Stewardship Council for its certification programs. However, it has been heavily promoted by WWF and is a key element in its campaigning activities. While described as a planning tool, it is a conservation strategy. Its significant difference is that it calls for a proactive approach to biodiversity conservation (calling

32. Elizabeth A.Gordon, Oscar E.Franco and Mary L.Tyrrell. *Protecting Biodiversity: A Guide to Criteria Used by Global Conservation Organizations*. Global Institute of Sustainable Forestry Yale School of Forestry & Environmental Studies, 2008.

33. Guynn, D. C., S. T. Guynn, P. A. Layton, and T. B. Wigley. “Biodiversity Metrics in Sustainable Forestry Certification Programs.” *Journal Of Forestry*. 102 (2004): 46-52.

for large tracts of conservation areas) within a reactive context (forestry or palm oil developments), and emphasises species irreplaceability (the precautionary principle) within a context of vulnerability (economic development pressures).

In addition, HCVF attempts to incorporate landscape functions (such as hydrology) as well as cultural sensitivities. The net result appears to be a conservation strategy that incorporates greater net areas than a conservation strategy that focuses solely on biodiversity values. Moreover, HCVF is deployed in areas that have generally already undergone high-level landscape planning assessments by national governments.

While HCVF is used as the basis for sustainable forest management, it does not incorporate economic viability into its assessment. This raises concerns that HCVF does not adequately balance its cost for, say, biodiversity monitoring and evaluation, with the economic feasibility of doing so.

### *WWF – Global 200 Ecoregions*

Additionally, WWF has developed ecological methodology to delineate 867 global terrestrial ecoregions. ‘Ecoregions’ are a relatively new environmental concept, which takes a larger, landscape level view of biodiversity and conservation. From the 867 regions, it has determined 200 ‘priority’ regions, which WWF considers to contain the most outstanding biodiversity values. It has also determined the level of threat to these regions, placing a greater quantitative emphasis upon land conversion for human needs. Since the largest contributor to land-use change is in fact agriculture, it is not unreasonable to assume that WWF considers food production to be the greatest threat to biodiversity conservation.

This is consistent with WWF’s mission and goals, which do not prioritise human welfare. It is also consistent with WWF’s policy on conversion of forested land, which singles out demand for agricultural commodities as an underlying cause of forest conversion.



## 4. FOREST BIODIVERSITY TARGETS AND ACHIEVEMENTS

Forests cover approximately 30 per cent of the world's landscape and harbor as much as 80 per cent of the terrestrial biodiversity. Protected areas, defined by the CBD as "a geographically defined area, which is designated or regulated and managed to achieve specific conservation objectives", form an integral part of countries' biodiversity conservation response strategy. In recognition of the important role of forest protection in biodiversity conservation, countries worldwide have invested in the creation of more than 100,000 protected areas, encompassing an area of over 19.6 million sq km – roughly 13 per cent of Earth's total land area.

### Targets and achievements

In 2002 the Parties to the CBD set as one of its targets the conservation of "at least 10 per cent of the world's forest types" by 2010. The target was subsequently endorsed by the World Summit on Sustainable Development and the United Nations General Assembly and was incorporated as a new target under the UN Millennium Development Goals- Goal 7, targeting to achieve by 2010, a significant reduction in the rate of biodiversity loss.

More than 11 per cent of the world's total forest area has been designated biodiversity conservation. Since 1990, forest areas designated for conservation have risen by 32 per cent – an estimated increase of 96

million hectares since 1990. According to the FAO such increases have been experienced in all regions. The proportion of forest designated for protection of soil and water resources has also increased – from 8 per cent in 1990 to 9 per cent in 2005, constituting an increase of more than 50 million hectares over the 15-year period.

Protected areas also constitute one of the Earth's most significant land uses, with terrestrial protected area coverage reaching 13.4 per cent. The growth in number and area under legal protection has been significant, particularly in developing countries and within terrestrial ecosystems. At the global level over 102,102 protected areas have been established – a more than ten-fold increase since the early 1960s.

In 2007, the United Nations Environment Program (UNEP) reported that 13.5 per cent of the world's forests have already been conserved within protected areas.<sup>34</sup> However, targets to protect forest types have so far only been met in 18 of the 28 forest types defined by UNEP.

The FAO reports that the area designated for conservation increased by 96 million hectares, or 32 per cent, between 1990 and 2005 (see Table). More than 11 per cent of total forest area is now designated primarily for conservation of biological diversity globally.

Forest area designated primarily for conservation

REGION	AREA IN 2005 '000 HA	ANNUAL CHANGE 1990-2000	'000' HA 2000-05
Latin America and the Caribbean	128,777	3,948	2,268
North America	79,741	64	1,871
Asia and Pacific	79,478	796	1,199
Africa	69,528	-89	723
Europe	36,760	1,548	576
<b>TOTAL WORLD</b>	<b>394,283</b>	<b>6,267</b>	<b>6,638</b>

Source: FAO (2005)

34. United Nations Environmental Programme World Conservation Monitoring Centre (UNEP-WCMC), World Wide Fund for Nature (WWF) Network, World Resources Institute (WRI), Institute of Forest and Environmental Policy (IFP). Global Ecological Forest Classification and Forest Protected Area Gap Analysis: Analyses and recommendations in view of the 10% target for forest protection under the CBD, University of Freiburg University Press, May 2008

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The case has been made by a number of ENGOs that levels of protection in tropical forests – and particularly the forested areas of Indonesia and South America – are too low. Both areas have been subjected to extensive campaigning by organisations such as the World Wide Fund for Nature (WWF) and Greenpeace.

Yet figures show that higher levels of protection are afforded to tropical moist and tropical dry forests (23.8 percent) than other forest types (14.7 percent).<sup>35</sup> Similarly, there are higher levels of protection in South Asia/South-East Asia and the Neotropics (South America) with levels of protection at 13.6 per cent and 21.3 percent respectively. According to Conservation International's criteria for biodiversity hotspots, Sundaland (comprising Java, Sumatra, and Borneo) and the Atlantic Forest have met the protection targets.<sup>36</sup> UNEP figures show there are lower levels of forest protection in Central America, the Mediterranean Basin and West Russian and Siberian taiga forests.<sup>37</sup>

The 1982 World Parks Congress recognized that “protected areas in developing countries will survive only insofar as they address human concerns”. The importance of integrating biodiversity conservation with sustainable economic development was reiterated in the 1987 World Commission on Environment and Development report. Subsequently the 1992 Fourth World Congress on National Parks and Protected Areas called for conservation and development in which both human use of natural resources and its preservation could occur simultaneously. These consensus reached at high-level meetings all point to the fact that actions to protect biodiversity must be justified on economic as well as environmental merits.

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35. Mulongoy, K.J., Chape, S.P. (Eds) 2004. *Protected Areas and Biodiversity: An overview of key issues*. CBD Secretariat, Montreal, Canada and UNEP-WCMC, Cambridge, UK., p. 28

36. Mulongoy, K.J., Chape, S.P. (Eds) 2004. *Protected Areas and Biodiversity: An overview of key issues*. CBD Secretariat, Montreal, Canada and UNEP-WCMC, Cambridge, UK., p. 28.

37. Mulongoy, K.J., Chape, S.P. (Eds) 2004. *Protected Areas and Biodiversity: An overview of key issues*. CBD Secretariat, Montreal, Canada and UNEP-WCMC, Cambridge, UK., p. 28.



## 5. VALUING BIODIVERSITY

Recently there have been attempts to place an economic value on biodiversity, and then construct markets for this value. This requires those estimating the value that the biodiversity function of a particular area – forest or otherwise – provides a particular service. In some cases, the value of environmental services is more straightforward, particularly in the valuation of watersheds. However, in the case of biodiversity, it is not immediately apparent what the service provided to users – if they do indeed exist – actually entails.

The emergence of this notion has been part of a broader attempt to construct the argument that biodiverse areas – particularly forests – are worth more standing than they are cut down. However, no market has clearly demonstrated this to be true.

### 5.1 Interpreting the value of biodiversity

It is a widely held belief that the true value of biodiversity is its intrinsic and that attempting to quantify an instrumental value is in fact pointless.<sup>38</sup> Few economists readily accept that biodiversity actually directly contributes to production and consumption – although contributing to opportunities, such as tourism.<sup>39</sup> The generally accepted logic among ecologists is that biodiversity impacts human welfare and therefore economic aspects of human welfare.<sup>40</sup> This has become the basis of reports such as the *WWF Living Planet Report*.

Additionally, it has also been suggested that a monetary value can be placed upon biodiversity as a type of infrastructure, which creates certain opportunities for indigenous and subsistence communities that harvest non-timber forest products for subsistence use.<sup>41</sup> Again, problems arise when trying to define not just the monetary value of the said infrastructure, but even the value of subsistence goods within a non-market (subsistence) economy.

More often than not, the economic estimations of the value of biodiversity is an estimation of the value of non-timber forest products within a particular forest

area. In these cases, the value of said products has been grossly overestimated.<sup>42</sup>

The key problem with this perspective is that biodiversity assessments do not produce monetary indicators, no matter what the circumstances. While some ecologists have suggested that a willingness to pay (WTP) model could be constructed for changes in the value of biodiversity using localized or centralized indices,<sup>43</sup> markets simply do not exist. Moreover, if they were to exist, the value of markets would be questionable without either a use value for biodiversity (contrast this with the constructed market for carbon credits within the EU) or a simply defined unit of value for biodiversity, or both.

### 5.2 Valuation studies

There have, however, been a number of valuation studies that have given biodiversity an economic or financial value. These are summarized below.

#### *Values for genetic diversity and bioprospecting*

The concept of as-yet-undiscovered species that contain economically valuable chemical compounds in forest tracts has been popularised. In terms of market actualisation, this has taken place in a number of agreements between pharmaceutical firms and states. These include deals between the Costa Rican government and chemical companies Merck and Bristol Myers Squibb. The deal between Merck and Costa Rica was worth US\$1 million plus royalty fees upon market debut.

#### *Values for species preservation*

A number of studies have attempted to examine willingness to pay (WTP) in relation to individual species;<sup>44</sup> however, these are surveys of hypothetical markets and accrued emblematic value or passive uses rather than actual functioning markets. WTP studies often rely upon a contingent valuation (CV) method. Most CV studies lack a uniform, clear perspective on biodiversity as a distinct concept from

38. Ehrenfeld, D. *Readings from Conservation Biology To Preserve Biodiversity*. John Wiley & Sons Inc, 2009.

39. Fromm, Oliver. *Ecological Structure and Functions of Biodiversity As Element of Its Total Economic Value*. Volkswirtschaftliche Diskussionsbeiträge, Nr. 4. Kassel: GhK, Fachbereich Wirtschaftswiss, 2000.

40. Randall, A., "What mainstream economists have to say about the value of biodiversity", E. O. Wilson (ed), Biodiversity, Washington, DC: National Academy of Sciences/Smithsonian Institution, 1988.

41. Barbier, Edward, Joanne C. Burgess, and Carl Folke. *Paradise Lost?: The Ecological Economics of Biodiversity*. London: Earthscan, 1994.

42. Godoy, R., D. Wilkie, H. Overman, A. Cubas, G. Cubas, J. Demmer, K. McSweeney, and N. Brokaw. "Valuation of Consumption and Sale of Forest Goods from a Central American Rain Forest." *Nature*. 6791 (2000): 62-63.

43. Perrings, Charles. *Biodiversity Loss: Economic and Ecological Issues*. Cambridge: New York, 1995.

biological resources. In fact, the empirical literature fails to apply economic valuation to the entire range of biodiversity benefits. Therefore, available economic valuation estimates should generally be regarded as providing a very incomplete perspective on, and at best lower bounds, to the unknown value of biodiversity changes.<sup>45</sup>

### *Values for habitat preservation*

Similar hypothetical market studies have been undertaken for the conservation of specific ecosystems;<sup>46</sup> again, these studies are WTP estimates, as opposed to real contributions. A more valuable type of WTP estimate has emerged by linking biodiversity values to areas where there are indirect economic benefits from biodiversity, e.g. tourism and recreation. The advantages of such a study is that they can be linked with tourism revenues associated with specific conservation sites, such as the Galapagos Islands,<sup>47</sup> or Rwandan gorilla tourism, which was estimated at one point to generate US\$68/ha (1994 prices).<sup>48</sup> However, the price achieved is dictated by the popularity of the park, which is ultimately determined by a host of other factors, e.g. transport infrastructure and marketing. The question of the biodiversity preserved by particular ecotourism sites would, from an ecological perspective, be muddled by the contribution of tourism to other types of environmental degradation such as carbon emissions and the impact of road developments upon habitat, which has been criticised heavily by environmentalists.

### *Values for payment for environmental services*

Payment for environmental services (PES) has gained significant international attention over the past two decades. The basic principle is that a market is constructed for services that a landscape provides, e.g. water purification within a watershed, erosion control from forest areas in mountain landscapes. PES is, however, a fraught area.

The economic value of environmental services is inherently difficult to value in absence of functioning markets for these services. Most economic studies tend to measure biological resources rather than biodiversity.<sup>49</sup> They find that contingent valuation – or revealed preferences, asking people what they are willing to pay – is the best method of applying monetary valuations to biodiversity. However, this has been determined to be an unreliable method of calculation. As well, markets are immature, if not non-existent.

A review of market development examining 287 existing PES schemes, largely from developing countries<sup>50</sup> concluded that “in the majority of situations markets remain nascent affairs characterized by unsophisticated payment mechanisms, low levels of price discovery, high transaction costs and thin trading”. The review also found the market for biodiversity is largely experimental, with market development hindered by: difficulty in defining and measuring services required; existence of a threshold land size for benefits; and high transaction costs. The market for landscape beauty is found to be immature largely due to the resistance of ecotourism operators to pay for this previously ‘free’ good. Developing a market for watershed services has also proved difficult due to the large transaction costs and coordination efforts required to bring together the large numbers of buyers and sellers and avoid ‘free-riders’.

There are significant constraints to further market development in developing countries. In particular, the public good nature of environmental goods, high transaction costs and significant risks require government intervention and the setting up of specialized market institutions.<sup>51</sup> There are also high transaction costs involved including negotiating with landowners and monitoring performance, that particularly effect the potential for PES to benefit smallholders.<sup>52</sup>

44. Boman, Mattias, Göran Bostedt, and Bengt Kriström. Obtaining Welfare Bounds in Discrete-Response Valuation Studies: A Non-Parametric Approach. Arbetsrapport // Institutionen för skogsekonomi, Sveriges lantbruksuniversitet, 236. [Umeå]: Institutionen för skogsekonomi, Sveriges lantbruksuniversitet, 1997.

45. Nunes P. A. L. D., van den Bergh J. C. J. M. (2001) “Economic valuation of biodiversity: sense or nonsense?” *Ecological Economics*, 39: 203-222

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47. World Tourism Organization (WTO, 1997)

48. (AG Ökotourismus/BMZ, 1995AG Ökotourismus/BMZ, 1995. Ökotourismus als Instrument des Naturschutzes? Forschungsberichte des BMZ, München, value cited in Gössling, S., 1999. Ecotourism: a means to safeguard biodiversity and ecosystem functions? *Ecological Economics* 29, 303–320.AG Ökotourismus/BMZ, 1995).

49. Nunes P.A.L.D. & van den Bergh J.C.J.M (2001) “Economic Valuation of Biodiversity: Sense or Nonsense?” *Ecological Economics*, 39, 203-22.

50. Landell-Mills, N., and Porras, I.T. (2002) “Silver bullet or fool’s gold? A global review of markets for forest environmental services and their impact on the poor”, *Instruments for Sustainable Private Sector Forestry*. London: IIED

51. Scherr, S., White, A. and Khare, A. (2004) “For services rendered: The current status and future potential of markets for the ecosystem services provided by tropical forests”, *ITTO Technical Series*, No 21

52. Wunder, S. (2005)



## 6. BIODIVERSITY AND PLANTATIONS

Environmentalists have roundly criticized plantation forestry for its impact on biodiversity. This is entirely unjustified.

Plantations can harbor biodiversity; it is just more often than not excluded from NGO methodology. There is also a bias in the literature; plantations are nearly always compared to natural forests, not to the previous condition of the land. But plantations inevitably have higher biodiversity values than many other land uses. Additionally, metrics for biodiversity that form part of conservation strategies are completely inapplicable to plantations, but strict biodiversity metrics can be applied.

Plantations can also be used as a buffer zone against encroachment and therefore conversion to land with even lower biodiversity values; and, the use of plantations for raw materials removes pressure upon natural forests.

### 6.1 The 'monoculture' myth

There is a common perception, particularly within the conservation community, that plantations are "sterile monocultures" and their biodiversity value is close to zero. However, there have been numerous studies that directly contradict this view.<sup>53</sup>

Nations with the highest areas of plantations all have large areas of degraded landscapes. Plantations have effectively contributed to the restoration of the landscapes.<sup>54</sup>

While industrial plantation techniques have often resulted in uniform forest stands that reduce the potential for biodiversity, newer tree establishment techniques – such as those currently being used in the Pacific and South East Asia – provide a more environmentally appropriate forest landscape,<sup>55</sup> and have been extensively promoted by the International Tropical Timber Organization (ITTO). It is based on the planted forest stand providing numerous uses, i.e. economic, social and environmental.

Even simple management techniques within plantations that are "unnatural" can provide habitat for locally specific and important native species. This has been the case in the management of dipeteryx plantations in Costa Rica, which have provided habitat for endangered Green Macaw.<sup>56</sup> Similarly, abandoned plantations can allow natural regeneration underneath the forest canopy, providing abundant biodiversity values; this has been seen in US Forest Service plantations in Puerto Rico.

The use of corridor-type management in Borneo, undertaken by the CSIRO, has provided biodiverse areas within a zone that has previously been used for both agriculture and logging; more than 400 vertebrate species have been observed.<sup>57</sup>

Afforestation of agricultural land can assist conservation by providing complementary forest habitat, buffering edge effects, and increasing connectivity. Regional deforestation for agriculture may mean that afforestation for plantations is in fact a "lesser evil".<sup>58</sup>

Plantations are commonly compared with biodiversity within plantations; yet often these comparisons are inappropriate. It is conceded that plantation forests generally offer higher biodiversity values; however the difference between biodiversity values in plantations and forests is not uniform, even within the same geographic area.<sup>59</sup> Longer rotation species in particular have been found to have relatively small differences in biodiversity values from natural forests.

They also have much higher biodiversity values than other land use types, e.g. grasslands used for agriculture, and have higher conservation values than areas of intensive agriculture.

A spectrum approach to plantations and to planted forests, such as that adopted by the FAO is a more useful approach than simply attempting to classify all plantations as "sterile monocultures". Such a spectrum indicates that less intensively managed forests – across an entire landscape, not just the forest management

53. Sayer, J.A., Elliot, C. and Maginnis, S. *Protect, manage and restore – conserving forests in multi-functional landscapes*. Proceedings of the 12th World forestry congress, Quebec, Canada. 2003 and Sayer, J.A., Elliot, C. *Reinventing Forests in the 21st Century* Mery, Gerardo, et. al (eds). Forests in the Global Balance – Changing Paradigms. IUFRO. 2003

54. Sayer, J.A., Elliot, C. *The Role of Commercial Plantations in Forest Landscape Restoration* in Forest Restoration in Landscapes: Beyond Planting Trees, S. Mansourian, D. Vallauri, and N. Dudley, Eds. Springer, October 2005.

55. Whisenant, S. 1999. *Repairing Damaged Wildlands: A Process-orientated Landscape-scale Approach*. Cambridge University Press, Cambridge, UK.

56. Daniel Piotto, Florencia Montagnini, Luis Ugaldea and Markku Kanninen. "Performance of forest plantations in small and medium-sized farms in the Atlantic lowlands of Costa Rica". Forest Ecology and Management. Volume 175, Issues 1-3, 3 March 2003, Pages 195-204

57. Sue Cartledge. "Saving Biodiversity in Sarawak Tree Plantations to Protect Borneo's Endangered Environment". Reforestation website, posted May 12, 2008. Accessed at: [http://reforestation.suite101.com/article.cfm/saving\\_biodiversity\\_in\\_sarawak#ixzz0XdMReyZZ](http://reforestation.suite101.com/article.cfm/saving_biodiversity_in_sarawak#ixzz0XdMReyZZ)

58. Brockerhoff, Eckehard, Herv e Jactel, John Parrotta, Christopher Quine, and Jeffrey Sayer. "Plantation Forests and Biodiversity: Ozymoron or Opportunity?" Biodiversity and Conservation. 17. 5 (2008): 925-951.

59. Barlow, J., T. A. Gardner, I. S. Araujo, A. B. Bonaldo, J. E. Costa, M. C. Esposito, L. V. Ferreira, J. Hawes, M. I. M. Hernandez, R. N. Leite, N. F. Lo-Man-Hung, J. R. Malcolm, M. B. Martins, L. A. M. Mestre, A. L. Nunes-Gutjahr, W. L. Overal, L. Parry, S. L. Peters, M. A. Ribeiro-Junior, C. da Silva Motta, M. N. F. da Silva, and C. A. Peres. 2007. *Quantifying the biodiversity value of tropical primary, secondary and plantation forests*. Proceedings of the National Academy of Science of the United States of America 104 (47): 18555-18560

unit – will provide higher biodiversity values. Indeed, highly managed forest units could play a part in a landscape in which a number of functions – economic, environmental and social – are possible.

There is also strong evidence that afforestation with plantations can in fact assist the reestablishment of native species. This has particularly been the case in tropical areas.<sup>60</sup>

Encroachment of forest landscapes by small-scale agriculturalists is a leading cause of deforestation, habitat and biodiversity values. Plantation forestry can play a particularly useful role in preventing habitat fragmentation and biodiversity loss in three ways:

- **Habitat supplementation** – providing additional habitat area for species within native plantations;
- **Connectivity** – improving connectivity between forest remnants for indigenous species, particularly across riparian areas;
- **Buffering effects** – as well as providing a buffer from encroachment from local communities, plantations can also act as a buffer against microclimate changes taking place through deforestation, which can lead to lowered humidity and increased risk of fire.

While natural forest loss through conversion to plantations is always possible, adequate landscape planning undertaken by governments and forest authorities will avoid adverse biodiversity loss. The greater loss of natural forest is caused by agriculture. Conversion to agriculture drives roughly 93 per cent of natural forest loss; just 7 per cent is driven by plantations. Biodiversity values within this 7 per cent will be higher than the habitat provided by agriculture.

Social criticisms of plantation forestry rarely take into account the benefits of the establishment of plantations through the provision of jobs, infrastructure, and value added through integrated operations such as processing into wood products or pulp and paper. Moreover, these criticisms rarely take into account the fact that plantation investments, particularly when coupled with downstream processing are long-term investments.

## 6.2 Biodiversity assessments within plantations

Criteria for the assessment of biodiversity values within plantations have not been developed. Development of such criteria would be vital to developing a consensus on sustainable forest management, particularly the gulf between developed and developing countries on sustainable forest management.<sup>61</sup>

A problem in assessing plantations for biodiversity is that there is often no distinction made between native species plantations and exotic-species plantations. This bias is supported in academic literature; most comparisons of biodiversity values compare exotic plantations to natural forests. Very few studies compare exotic plantations to other native ecosystems, e.g. savannah, grasslands or even agriculture. However, studies have indicated that plantations of native species offer similar or slightly lower biodiversity values than natural forests.

Biodiversity indicators preferred by NGOs and/or conservation strategies preferred by NGOs do not offer metrics for assessing biodiversity within plantations; nor is there the possibility of incorporating potential biodiversity values into assessments such as HCVF. This is a significant gap in knowledge, and reveals there is a more intellectually honest approach to plantations than simply considering them as “sterile monocultures”.

There are currently attempts to address this currently being undertaken by the CSIRO. The Plantation Biodiversity Score is a raw index of potential biodiversity benefit for a plantation based on set management guidelines. It assesses potential rather than absolute biodiversity benefits. The approach utilizes a bottom-up approach to landscape management (which makes the tacit assumption that the plantation will fall into top-down, state-level landscape planning measures). In doing so, it allows for a multitude of tenure arrangements, including diverse community ownership, or highly fragmented agricultural landscapes. This is particularly appropriate for the developing world, where tenure problems have been a serious spur to deforestation.

60. Parrotta, J. A., 1992. *The role of plantation forests in rehabilitating degraded tropical ecosystems*. Agriculture, Ecosystems and Environment 41:115-133.

61. Sample, V.A. “Sustainable forestry and biodiversity conservation: Toward a new consensus.” *Journal of Sustainable Forestry*. 2003



## 7. CONCLUSIONS AND RECOMMENDATIONS

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The ongoing international negotiations on climate change under the United Nations Framework Convention on Climate Change (UNFCCC) have placed environmental concerns high on the public policy agenda. However, while climate change and biodiversity loss are a pressing issue for wealthy countries, they are much further down the pecking order for the world's poor.

This has resulted in several studies that have attempted to monetize biodiversity value in developing countries, using this as an economic justification for biodiversity conservation. Yet, the test of the economic merits of biodiversity conservation – the market – has shown many of these studies to be overly optimistic.

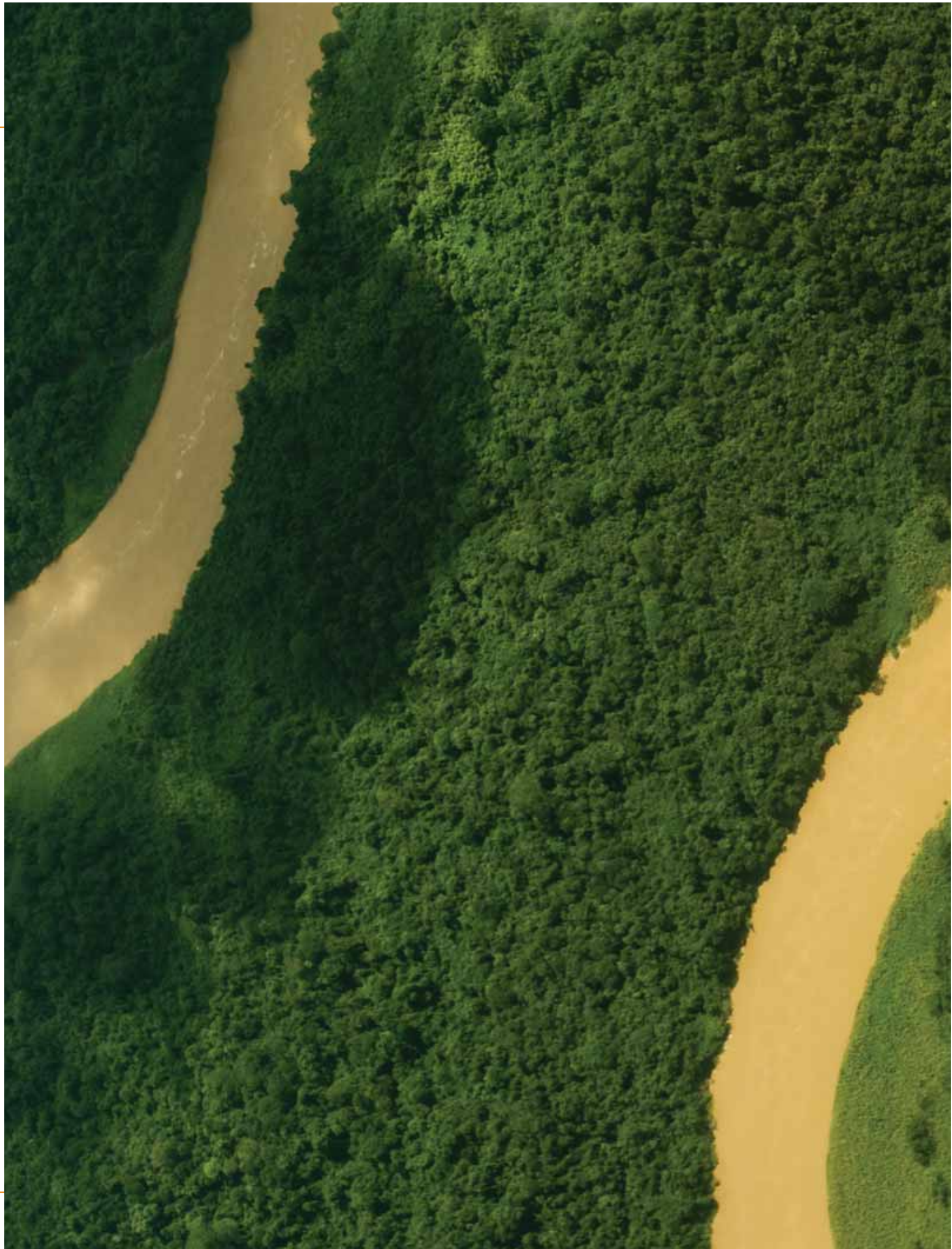
The developing world has made significant commitments to biodiversity conservation. The problem has been guaranteeing the resources to maintain conservation areas. In the background is a continual campaign by Western environmental campaigners that demand greater conservation areas in developing countries, but are blind to the problems plaguing existing areas. Against this background, World Growth makes the following recommendations:

### *To Western environmental campaigners:*

- Divert resources towards improving effectiveness of existing conservation areas;
- Ensure that conservation proposals are supported with sound economic impact assessments for communities and regions;
- Ensure that statements made on the environmental and economic impacts of plantation forestry have a scientific basis;
- Ensure that a genuine account of conservation levels is given in all public campaign materials.

### *To donor organizations:*

- Prioritize economic growth as a means to achieving long-term environmental outcomes;
- Ensure that programs funded for conservation are implemented only after undertaking economic and social impact assessments;
- Prioritize on-ground conservation work and rigorously assess programs that contain advocacy components.



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## ANNEX : BIODIVERSITY AND POPULATION GROWTH – A CASE STUDY

“Human-animal conflict” has become a buzzword within the conservation community over the past few years.

It is a term that has been heavily spruiked by WWF in particular, particularly in relation to their conservation campaigns related to megafauna. It is not a term that is used by any other conservation groups or intergovernmental organizations. Its use by WWF is consistent with its position on the human threat to biodiversity.

While the term seems self-explanatory, it is more often deployed as a term to describe situations in which animal fatalities arise from either poaching or human self-protection. Neither of these are new phenomena; indeed, anecdotal evidence on the shooting of tigers peninsular Malaysia to protect either people or food is readily available.

But it is also a euphemism to describe processes that have already taken place in the industrialized world: rapid population growth and urbanization.

A number of NGOs have claimed that the operation of the pulp and paper industry in Riau, Sumatra, threatens populations of Sumatran tigers and Sumatran elephants. They are alleged to drive rapid large-scale deforestation, thus leading to a fragmentation of the species' habitat. They have also criticized infrastructure developments which, according to NGOs, increase the incidence of human-animal conflicts.

However, the NGO accusations against the industry have overlooked the population factors at work in Riau, choosing simply to blame the private sector rather than development.

The pressing issue for species conservation is the growing population in Sumatra, particularly in Riau. Riau's growth in population growth has been spectacular. Between 2000 and 2005, population growth in Riau has been higher than in all the other provinces in Sumatra – about 4.3 per cent.<sup>62</sup> Riau is also

forecast to encounter the highest population growth in Sumatra during 2005–2010 (4.11 per cent) and 2010–2015 (3.79 per cent).

In Indonesia there is a positive correlation between poverty and forest cover, and a negative correlation between poverty and agricultural suitability of land.<sup>63</sup> In other words, forests are cleared for agricultural production to escape poverty.<sup>64</sup>

Additionally, poor economic conditions in Indonesia have historically prompted higher levels of land clearing for agricultural purposes.<sup>65</sup> During the Asian financial crisis the number of households clearing forestland for agricultural purpose increased by as much as 40 per cent.<sup>66</sup>

Planting of crops is also used by smallholders as a means of establishing land tenure in a country where land tenure is often ambiguous.<sup>67</sup>

These factors exert significant pressure on existing forest resources. The result is a general disregard for land-use management and conservation policies. This pressure has even been documented by NGOs, which have noted that the Tesso Nilo National Park<sup>68</sup> is being encroached upon by trans-provincial immigrants. In Bukit Barisan Selatan National Park, the majority of the forest loss is due to forest areas being converted to coffee plantations and paddy fields<sup>69</sup>, not commercial forestry plantations.

Sound land management practices are not economically feasible for a great number of smallholders. For example, the establishment of agriculture and estate crops on peat lands requires careful irrigation, drainage and water management systems with a high level of planning and technical expertise. This is often outside the expertise of smallholders, who produce low yields and have poor management practices.<sup>70</sup> Similarly, a 'no-burn' land clearing by smallholders is not economically feasible<sup>71</sup>, resulting in broad, uncontrolled slash-and-burn clearing by smallholders.

62. Badan Pusat Statistik (BPS), Population Projection of Indonesia 2000 - 2025

63. Tacconi, L. and Kurmiawan, I. (2006). *Forests, agriculture, poverty and land reform: the case of the Indonesian Outer Islands*. Occasional Paper No. 9. Australian National University, Asia Pacific School of Economics and Government, Canberra, Australia.

64. Sunderlin, W.D. (2007). *Poverty and forests: multi-country analysis of spatial association and proposed policy solutions*. CIFOR, Bogor, Indonesia

65. Cf. William D. Sunderlin, Ida Aju Pradnja Resosudarmo, Edy Rianto, and Arild Angelsen (2000). *The Effect of Indonesia's Economic Crisis on Small Farmers and Natural Forest Cover in the Outer Islands*. CIFOR, Bogor, Indonesia.

66. Ibid.

67. Chip Fay, Martua Sirait, Ahmad Kusworo (2000). *Getting the Boundaries Right: Indonesia's Urgent Need to Redefine its Forest Estate*. Southeast Asia Policy Research Working Paper, No. 25 and Deininger, K. (2003) *Land Policies for Growth and Poverty Reduction*. The World Bank, Oxford University Press, Washington DC.

68. The Tesso Nilo forest in Riau Province is one of the largest forest tracts in Sumatra and an important habitat for the elephant population

69. Ministry of People's Welfare (2003). *Submission for Nomination of Tropical Rainforest Heritage of Sumatra by the Government of the Republic of Indonesia*, The Coordinating Minister for People's Welfare, Jakarta, January 2003.

70. Government of Indonesia (2007). REDDI – Summary for Policymakers. [www.dephut.go.id/INFORMASI/LITBANG/IFCA/Summary%204%20policy%20makers\\_final.pdf](http://www.dephut.go.id/INFORMASI/LITBANG/IFCA/Summary%204%20policy%20makers_final.pdf)

71. V H.J. Sargeant (2001). *Vegetation fires in Sumatra, Indonesia. Oil palm agriculture in the wetlands of Sumatra: destruction or development?*. Government Of Indonesia, European Union and Natural Resources International Limited. Brussels.

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However, in large-scale plantations, detailed planning must be undertaken. This includes AMDAL (environmental impact assessments) as well as macro- and micro-delineation for the existing landscapes. AMDAL reports and planning documentation must be submitted to the Ministry of Forests for approval before any plantation activity can be undertaken.

Acacia plantations, a key source of feedstock for the pulp and paper sector, have also been found to harbor orang utan populations. A recent assessment of orang utan populations in a group of acacia concessions in East Kalimantan estimated there are between 2,168 and 4,950 individuals living within the concessions. The upshot of the research is that roughly 3.8 per cent of Bornean orang utans live in the surveyed concessions - far more than an equivalent protected area in Lesan, Borneo.<sup>72</sup>

The pulp and paper sector contributes significantly to poverty reduction in Indonesia. Formal (and informal) employment alleviates the need for subsistence farming and swidden agriculture. Similarly, community forestry programs and the allocation of lands for community use as required by Indonesian law<sup>73</sup> within forestry concessions restrict small-scale forest encroachment to confined areas and provide security of land tenure.

Simply, blaming the private sector for biodiversity loss in these cases is neither useful nor justified. The absence of the pulp and paper sector from Riau – which contributes significantly to poverty alleviation – could potentially increase threats to biodiversity by increasing levels of poverty and thereby increasing pressure on forest resources using poor environmental practices.

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72. Albar, Guillaume (2009). "Study of orang utan densities and distribution in acacia mangium plantation concessions in East Kalimantan, Indonesian Borneo." Universite Montpellier 2, The Nature Conservancy, USAID Orangutan Conservation Program

73. Ministry of Forestry Decree 70/Kpts-II/1995





### **About World Growth**

World Growth is a non-profit, non-governmental organization established with an educational and charitable mission to expand the education, information and other resources available to disadvantaged populations to improve their health and economic welfare. At World Growth, we embrace and celebrate the new age of globalization and the power of free trade to eradicate poverty and improve living conditions for people in the developing world.

### **Our Philosophy**

World Growth believes that helping the developing world realize its full potential is one of the great moral aims for those of us fortunate to live in the wealthy developed world. We also believe that a misdiagnosis of what ails the underdeveloped world has yielded policy prescriptions that have been useless or even harmful to the world's "bottom billion."

World Growth believes that there is enormous untapped human and economic potential around the world. In order to unlock that potential, and allow the poorest of the world's poor a better life, it is necessary to realize changes in institutions and policies that permit growth and human flourishing.

Instead of aid and handouts, what the populations of developing countries need are social and political situations and infrastructure that foster productive economic activity and generate robust economic growth. These include, but are not limited to, property rights and protections, the rule of law, free markets, open trade, government accountability and transparency.

For too long, well-meaning governments, aid agencies and others have promoted policies that fail to address the true problems that afflict poor societies. As a result, too many people around the globe remained locked in pre-modern conditions where their talents and inherent capacities are shackled.

The people of the developing world are fully capable of helping themselves to ensure a more prosperous existence. The path to prosperity does not begin with handouts from the West. Instead it requires identifying the genuine obstacles to growth and highlighting paths to reform that will yield sustainable and lasting change.

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