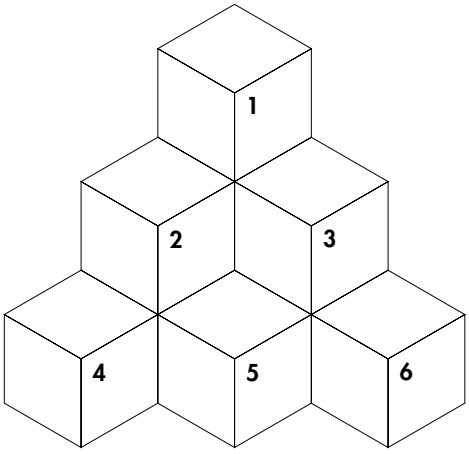
Building Biodiversity Business

Joshua Bishop, Sachin Kapila, Frank Hicks,
Paul Mitchell and Francis Vorhies



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6. Forest in the Garajonay National Park, Spain IUCN Photo Library © Jim Thorsell

Carlton Ward Jr. is an environmental photojournalist from Florida, USA with graduate training in ecology and anthropology. Through his photographs, he aims to promote conservation of natural environments and cultural legacies.

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Joshua Bishop[1], Sachin Kapila[2], Frank Hicks[3], Paul Mitchell[4] and Francis Vorhies[5]

2008

1 IUCN (International Union for Conservation of Nature)
2 Shell International Limited
3 Forest Trends
4 Green Horizons Environmental Consultants Limited
5 Earthmind

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This review should not be used as the basis for investments or related actions and activities.

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Dr Paul Mitchell is an independent consultant with over 15 years experience of management of environmental and social issues in the natural resources sector. His particular focus has been mining, aggregates and oil and gas in Europe, the Americas, Asia and Africa. In recent years he has worked closely with clients including the Energy and Biodiversity Initiative and the Business and Biodiversity Offset Program on guidance for companies that wish to improve their management of biodiversity. This report represents an opportunity for him to explore a complementary market-based approach and take a look at the 'bigger picture' of conserving biodiversity.

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Preface

The natural diversity of the living world, with its myriad species, complex ecosystems and constantly evolving genetic structure, is a priceless inheritance. At the same time, this biodiversity is commonly under-valued by modern economies, resulting in its rapid and accelerating disappearance. Some experts liken the current rate of biodiversity loss to the great extinctions of prehistoric eras, with the important difference that today's loss is entirely due to human activity.

Ironically, while the biological foundation of our lives is eroding beneath our feet, human economies continue to thrive, generating ever-greater quantities and qualities of material goods and consumer services. Poverty and conflict continue to afflict the lives of billions[1], but at the same time overall economic growth means that increasing numbers of people around the world enjoy unprecedented levels of prosperity.

On the one hand, diminishing biodiversity, and on the other, expanding economies. The two phenomena are not unrelated. Modern economies are very good at producing what people will pay for. They are not so good at preserving what is priceless. Much of the ongoing loss of biodiversity can be attributed, directly or indirectly, to the production and consumption of goods and services to meet human needs. The growing problem of climate change will further exacerbate biodiversity loss.

Action is urgently required to halt the loss of biodiversity, but governments and non-governmental organisations (NGOs) cannot do it alone. Policies and regulations that require business and consumers to reduce their environmental footprint are important, but not sufficient. Much existing biodiversity policy is essentially 'swimming against the tide' of economic growth, and constantly falling short. Taxing businesses and consumers or seeking charity from them could raise significant sums for biodiversity conservation, but does little to alter day-to-day decision-making in the market place.

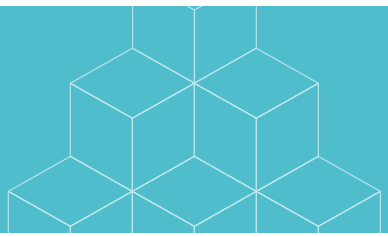
The question is how to enlist both the purchasing power of consumers and the productive capacity of business to help meet the global biodiversity challenge. This in turn requires that we find ways to make a stronger business case for biodiversity conservation.

With a little ingenuity (and political will), a compelling business case can be constructed for environmental protection and improvement. Twenty years ago, few people imagined that an entire industry could be created around mitigating climate change. Today it is a reality – the international carbon trade, for example, topped US$30 billion in 2006 and is expected to exceed US$50 billion by 2008. Why not the same for biodiversity?

Can we create or expand markets for genetic diversity, species conservation and ecosystem resilience in the same way that markets have been created at a global level for carbon, and in some countries for sulphur dioxide (SO_2), nitrogen oxide (NO_X) and groundwater salinity? The power of market-based environmental policy is no longer in doubt. But biodiversity is still largely neglected by private finance.

The challenge of building biodiversity business is not trivial. There is a need to develop new business models and market mechanisms for biodiversity conservation, while also raising awareness and persuading the public and policy-

1 Billion is equivalent to thousand million throughout this publication.



makers that biodiversity (or component ecosystem services) can be conserved on a commercial basis. Recent experience with market-based approaches to controlling carbon dioxide (CO_2) and other pollutants provides practical cautions as well as encouragement.

This report is the fruit of collaboration between IUCN and Shell International Limited, which aim to identify potential market-based mechanisms and new business opportunities to conserve biodiversity. It represents the results of consultation with more than 60 organisations, including commercial banks and insurance companies, private foundations, multilateral and bilateral aid agencies, NGOs, think-tanks, academics and investment fund managers.

Based on in-depth interviews and a detailed literature review, this report provides a snapshot of the biodiversity business landscape. It reviews a range of biodiversity business sectors, assesses what has worked (or not) and why, describes the main constraints and identifies opportunities to expand market-based biodiversity conservation within each sector. The report also reviews the policy frameworks, technical resources and financing mechanisms needed to enable biodiversity businesses to grow, in each case highlighting lessons learned from experience and future opportunities.

The authors conclude that there are numerous pro-biodiversity business opportunities that can generate positive financial returns as well as real biodiversity benefits. Many initiatives have been established with impressive results – however, none have achieved significant scale or leveraged substantial private investment. There is a need to build on existing initiatives, recruit additional investors and entrepreneurs, and 'raise the bar' in terms of both the scale and conservation benefit of private investment. To this end, three separate but related institutional functions must be fulfilled: namely the development of appropriate enabling policy; the provision of technical and managerial support tailored to biodiversity business; and access to appropriate finance from investors who understand the particular constraints and opportunities of creating new businesses and markets.

We hope this report will be of interest to a wide audience, including those who are new to biodiversity business, as well as current and future practitioners. For Shell and IUCN, this report provides the foundation for future collaboration on business-oriented approaches to biodiversity conservation. Yet this report is not just about Shell and IUCN, or what they can achieve by working together. The ultimate aim is to identify new opportunities and mechanisms that can mobilise a broad coalition of businesses, conservationists and other stakeholders around a shared vision of market-based biodiversity conservation.

Executive summary

Biodiversity forms the foundation and fabric of life on earth but is eroding beneath the feet of human activity. In the poorest countries, the deterioration of the natural environment is making it increasingly difficult for millions of people to meet even bare subsistence needs. Equally, as countries prosper, society is becoming less tolerant of environmental damage and increasingly aware of the extent to which our economies depend on healthy and diverse ecosystems.

Successive international treaties and national strategies have committed governments to stem the tide of biodiversity loss. An imposing edifice of environmental policy is in place in most countries. As much as US$20 billion per year is raised from public finance and private philanthropy for global conservation activities – much of this money is used to maintain over 100,000 protected areas covering nearly 12 percent of the world's land surface. Yet all this is not sufficient. The fact is that current efforts to conserve biodiversity are overwhelmed by the adverse impacts of growing human economies. Spending on protected areas remains deficient and undervalued ecosystem services are being eroded.

If current approaches to conservation are not sufficient, what more can be done? One answer is to harness the very market forces that are often blamed for biodiversity loss. The challenge is to re-orient the economic incentives that drive private investment, production and consumption, and to make biodiversity conservation a viable business proposition in its own right. In other words: *building biodiversity business*.

Biodiversity business is defined in this report as: *'commercial enterprise that generates profits via activities which conserve biodiversity, use biological resources sustainably, and share the benefits arising from this use equitably'*.

This definition reflects the three over-arching goals of the United Nations Convention on Biological Diversity (CBD), which also calls for increased efforts to enlist the private sector in biodiversity conservation, sustainable use and equitable benefit sharing. In both the environmental and business communities, there is growing recognition of the potential to conserve biodiversity on a commercial basis. If even a small proportion of private capital flows, international trade and national economic output could be harnessed for biodiversity business, the resulting contribution to conservation would be enormous. Increased private investment in biodiversity business would have the greatest impact in developing nations, where the conservation funding gap is most extreme and where many critically endangered species and habitats are virtually unprotected today.

This report presents a snapshot of the emerging biodiversity business landscape, its constraints, opportunities and requirements. It is based on a 12-month study involving literature review, analysis and extensive consultation with practitioners, policy-makers, donors and commercial investors.

From a conservation perspective, a major attraction of biodiversity business is the potential to generate new and additional investment in conservation activities. At the same time, some people remain sceptical of the motives of the private sector; while others worry that market-based approaches may distort conservation priorities. Nevertheless, this report argues that *not* exploring what markets can deliver is no longer an option.

From a business perspective, the reasons to invest in biodiversity business are increasingly compelling. They are most obvious in cases where private profitability depends directly on the health of ecosystems – ecotourism ventures, for instance. Similarly, it is now recognised that greater variability in genes, species and ecosystems is associated with increased resilience and biological productivity in agriculture, ranching, forestry and marine fisheries. Even businesses in urban areas, lacking a direct interaction with the natural world, can be motivated by new policy incentives and changing consumer preferences to 'go green'. Corporate action on biodiversity can help businesses distinguish themselves from competitors while also improving relations with investors, employees, local communities and others.

New biodiversity business models may also help reduce rural poverty. While employment and skills development are a normal part of every business, biodiversity business has the added benefit that it often stimulates a flow of funds from relatively wealthy urban centres to the countryside, as well as from industrialised to developing nations. Growing markets for ecosystem services and for biodiversity-friendly energy, food, fibre and recreation should provide ample opportunities for rural entrepreneurship and employment.

Today, biodiversity conservation is mainly viewed by business as a risk or liability, rather than a potential profit centre. However, this perception is beginning to change. As public awareness of the global biodiversity crisis grows, an increasing number of companies see a business advantage in developing processes to integrate biodiversity into their operations, as well as seeking market-based solutions and opportunities. Furthermore, even with modest initial returns from most biodiversity business investments – in the range of 5 to 10 percent per annum – there are significant profits to be made as the sector grows from niche markets to mainstream business.

A broad spectrum of different sectors and models of biodiversity business are examined in detail in this report. Their status and trends are described, along with constraints and opportunities for investment.

Examples include organic agriculture and certified timber. By demonstrating the potential of more sustainable production practices, these businesses are showing the way forward for mainstream agriculture and industrial forestry – sectors historically responsible for significant biodiversity loss. Although accounting for less than 5 percent of the overall market today, the growth rate of sustainable or certified products is three to four times greater than the market average. The market for sustainably harvested timber and organic agriculture, for example, has been growing at double-digit rates.

Businesses that provide a range of ecosystem services in emerging markets such as water quality and watershed protection are also considered in the report. One major area of growth is the demand for climate mitigation services through 'biocarbon' – i.e. biomass-based carbon sequestration in forests and wetlands and through soil conservation.

Another biodiversity business is based on the search for new compounds, genes and organisms in the wild, known as bioprospecting, an industry that could be worth US$500 million by 2050. The report also examines ecotourism, sport hunting and fishing. The latter sectors are already large and growing: ecotourism

is expanding at a rate of 20–30 percent per year as compared to 9 percent for tourism as a whole, while private expenditure on recreational hunting and fishing is estimated at US$70 billion per year in the USA alone.

Less conventional markets include biodiversity offsets, wetland mitigation, conservation easements and biodiversity banking. Such businesses can be based on either legislation or voluntary commitments that oblige companies to minimise the biodiversity loss resulting from their activities and to offset (compensate) for residual losses by restoring or enhancing comparable sites. Emerging experience in Australia, Brazil, South Africa and the United States has shown that such approaches can make a significant contribution to conservation efforts and generate substantial business opportunities for offset providers, although there are concerns about the environmental effectiveness of offsets.

One major hurdle facing all biodiversity businesses is developing practical indicators for measuring negative impacts and positive contributions to biodiversity. Experience in some countries shows that biodiversity assets, in the form of endangered species or natural habitat, can be registered, tracked and even traded under appropriate regulatory frameworks. Nevertheless, the world still lacks agreed standards, methods and indicators for valuing ecological assets and ecosystem services.

The development of biodiversity business also depends on a conducive enabling environment, namely the framework of laws, regulations, taxes, subsidies, social norms and voluntary agreements within which companies operate. For businesses to value biodiversity, it must ultimately become more profitable to conserve biodiversity than to ignore or destroy it. A combination of increased rewards for conservation, increased penalties for biodiversity loss and increased information on the biodiversity performance of business will help to create a biodiversity-friendly economy.

In many countries, significant reform of the enabling environment may be required to enable biodiversity business to grow, particularly where existing policies are predicated on conservation of biodiversity by governments and charities, where the role of business in conservation is limited by law, or where policy incentives such as 'perverse subsidies' are causing continued harm to ecosystems.

Another constraint on biodiversity business is the lack of understanding between the worlds of business and nature conservation. Priorities, time scales and jargon all differ. Natural scientists often lack the financial acumen and consumer orientation of the private sector; conservationists typically lack business planning and management skills. At the same time, most business people lack understanding of how their companies' operations affect and are affected by biodiversity and ecosystem services, or how to manage biodiversity in their operations. In addition, the long-standing difficulties of integrating conservation and development agendas still remain. Nevertheless, new biodiversity business tools are being developed that can bring these worlds together and bridge gaps in planning, management and performance assessment.

Even with the best policies and tools in the world, biodiversity benefits will not materialise or be sustained unless biodiversity businesses survive long enough to become commercially viable. Access to patient capital for investment and expansion is a critical factor in the growth of biodiversity businesses. While most businesses depend on financial support from banks or investors to cover initial start-up costs, in the case of biodiversity businesses there may be a need for some grant finance or subsidies to help entrepreneurs get beyond the pilot and learning phase and to stimulate demand for commercial conservation services.

Various existing financing instruments have been adapted for biodiversity business, ranging from grants to debt and equity finance. The experience of early and on-going initiatives can help guide the choice of an appropriate financing blend for new biodiversity businesses. While most biodiversity fund managers seek co-financing and prefer debt finance to equity, a range of innovative financial solutions are being tested that combine commercial and non-commercial investors. The integration of financing with technical and business support is increasingly common and can help ensure that biodiversity business delivers significant conservation outcomes as it grows.

These are early days for biodiversity business and there is much to learn. One clear need is for an integrated approach to building biodiversity business, combining policy advice, technical assistance and innovative finance, at a vastly increased scale compared to current efforts. This report outlines a proposed Biodiversity Business Facility, which would function as: (i) a think-tank, to address and influence the enabling environment and develop biodiversity business metrics; (ii) a business incubator, to build capacity and provide technical assistance to support new biodiversity business ventures; and (iii) a funding mechanism, to invest in and secure co-finance for growing biodiversity businesses. Although the eventual scope and form of such a Facility remains to be defined, its potential impact could be enormous. The first step is to assemble a portfolio of biodiversity business enterprise, in order to test, refine and demonstrate the viability of this new approach to conservation.

Around the world, there are mangrove forests that may soon be cleared to make way for shrimp farms, but which could instead be conserved through 'payments for ecosystem services' as natural fish hatcheries, storm buffers and water filtration systems. Similarly, there are thousands of fragments of degraded natural habitat that could be linked and restored, by means of biodiversity offsets, to form vital biological corridors for threatened species. And rural communities around the world could be supported to build the skills and networks necessary to market valuable non-timber forest products.

For such initiatives to flourish, for pro-biodiversity markets to develop, fixed ideas and institutional inertia need to be overcome. Experience is the best teacher and the coming years will be crucial to demonstrate, document and share the results of various market-based approaches to biodiversity conservation in different contexts.

Rhetoric is not sufficient. What is needed are more concrete examples of financially viable biodiversity businesses and functioning markets for ecosystem services. Only on the basis of practical experience will it be possible to convince all stakeholders – public and private – to work together to conserve biodiversity on a sustainable and commercial basis. The ultimate aim of this report is to promote more informed experimentation and investment, based on a clear understanding of what biodiversity business needs to thrive.

Chapter 1

Introduction

This report explores the potential of market-based approaches to biodiversity conservation and develops a framework for building new biodiversity business models.

Market mechanisms are not a panacea but can be a powerful complement to existing approaches to biodiversity conservation.

The report aims to learn from efforts to broaden the scope of biodiversity conservation, assess experience of market-based approaches and identify high potential opportunities to build biodiversity business.

This report explores the lessons and potential of market-based approaches to biodiversity conservation. The premise of this report is that international commitments to halt the loss of biodiversity cannot be achieved unless, and until, the conservation of ecosystems becomes a positive business proposition on a global scale.

The rationale for conserving biodiversity through the market is increasingly widely recognised. The Millennium Ecosystem Assessment (MA) – a peer-reviewed, four-year, global assessment of the consequences of ecosystem change for human well-being – concluded that: *"new business opportunities will emerge as demand grows for more efficient or different ways to use ecosystem services for mitigating impacts or to track or trade services"*[2].

There are many ways and means to engage business in biodiversity conservation, of course, including increased regulation and awareness-raising to discourage environmentally harmful activities, increased tax and / or charitable contributions by business to conservation activities, and more research and development (R&D) to promote biodiversity-friendly technologies. The focus of this report on building business models and markets for biodiversity does not imply any criticism or devaluation of such approaches, which should be seen as complementary.

The concept of 'biodiversity business' is developed in this report as a framework for identifying and promoting new business opportunities, linked to the conservation and sustainable use of biodiversity and equitable sharing of the benefits and costs arising from its use. More specifically, this report aims to:

- Learn from efforts in the public sphere to broaden the scope of biodiversity conservation across the landscape, both within and outside the network of protected areas (PAs); to restore degraded ecosystems and conserve intact habitat; and to ensure positive benefits for local communities, both as an end in itself and because conservation is not sustainable without their support.
- Assess the main obstacles to market-based approaches to biodiversity conservation, such as lack of finance, limited knowledge about how to supply biodiversity through the market, lack of enabling policy for market-based biodiversity conservation, and weak capacity of governments to develop and implement such policies.

2 Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-Being: Opportunities and Challenges for Business and Industry*. World Resources Institute: Washington, D.C. (www.maweb.org).

- Identify high potential opportunities to build biodiversity businesses, including investment in commercial enterprise as well as activities that build the foundations of biodiversity markets, such as market research and product development, pilot testing of biodiversity business concepts, pre-commercial purchase of biodiversity services based on competitive business principles, and, where appropriate, policy advice related to market creation for biodiversity.

Chapter 2 and **Chapter 3** of the report provide the context and rationale for focusing on market-based approaches to biodiversity conservation. They set out the business case for biodiversity and the conservation case for business, together with other perspectives on market-based biodiversity conservation. **Chapter 4** forms the core of the report, assessing a range of business models that generate biodiversity benefits, as well as gaps and opportunities for new investment. **Chapter 5** describes the enabling policies, business tools and financing instruments used to build biodiversity business, concluding again with an analysis of gaps and opportunities. Finally, **Chapter 6** provides an overall conclusion and recommendations for the further development of biodiversity business.

This report is intended to provoke discussion and debate, but also to provide a resource for all those who may be interested in market-based approaches to biodiversity conservation. More importantly, we hope that this report reinforces efforts to integrate economic development with biodiversity conservation, especially for rural communities in developing countries, whose livelihoods and security are intimately linked to the conservation and sustainable use of their surrounding biological resources.

Chapter 2

Context: the biodiversity challenge

Global environmental challenges and the persistence of poverty are increasingly well documented, as is the rapid erosion of biological diversity in most parts of the world.

Government-established protected areas cover 12 percent of the earth's land area, but many diverse ecosystems are under-represented, particularly marine ecosystems, while even well-managed protected areas are increasingly vulnerable to external pressures, such as climate change.

Inadequate funding and generally weak public sector institutions seriously handicap conservation efforts in developing countries.

Global funding for biodiversity conservation relies heavily on public spending and philanthropy, although in many countries the private sector plays an increasing role.

Estimates of the additional funding required to halt biodiversity loss on a global scale range from as little as US$1 billion per annum up to US$45 billion per annum, reflecting not only diverse ambitions but also the lack of reliable data on current spending and its effectiveness.

Contemporary concerns of conservationists and the wider sustainable development community focus on the continuing deterioration of the natural environment, together with the persistence of poverty in many parts of the world. The Millennium Ecosystem Assessment (MA) is the most recent comprehensive statement of the significant environmental challenges facing society today, which include climate change, biodiversity loss, increasing water scarcity, and nutrient deposition[3]. The challenge of poverty is likewise well documented by many different organisations, such as the World Bank and the UN Millennium Project. The need for a coordinated global response to environmental and development challenges has been recognised for many years and is illustrated by the proliferation of multilateral agreements and policy statements, notably the World Summit on Sustainable Development (2002) and the Millennium Development Goals (www.un.org/millenniumgoals).

2.1 Biodiversity, ecosystem services and conservation

This chapter focuses on responses to the loss of biological diversity (or 'biodiversity'), as articulated in the United Nations Convention on Biological Diversity (CBD). 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"* (Article 2).

3 www.maweb.org.

The CBD further defines and provides guidance for the 'sustainable use' of biodiversity and its component resources. The latter include *"genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity"*, while sustainable use is defined as *"the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations"*.

Put simply, biodiversity is 'life on earth'. At a fundamental level, all economies and all businesses depend, directly or indirectly, on biodiversity and its component resources. Biodiversity is similarly recognised in the MA as the foundation of all ecosystem services, which in turn support and protect economic activity and property[4]. The MA adopts an inclusive definition of ecosystem services, which consist of provisioning, regulating, supporting and cultural benefits provided by natural ecosystems.

A growing body of research documents how biological diversity increases economic productivity in a range of sectors, enhances our direct enjoyment of nature, reduces ecological and health risks, and improves resilience in the face of shocks[5]. Thus, by conserving biodiversity, we secure the ecosystem services upon which all economies rely.

Despite the socio-economic importance of biodiversity and ecosystem services, their values are not well reflected in contemporary economic and development policies, investment decisions and private consumption patterns. This has been highlighted repeatedly in multilateral policy discussions, for example the 2007 G8 environment ministerial meeting in Potsdam, which called for a study of *"the economic significance of the global loss of biodiversity"* as well as efforts to enhance public and private financing of conservation[6].

Humanity's dependence on biodiversity is increasingly apparent while the global loss of biodiversity is increasingly well-documented. The MA, for example, reports that the current pace of species loss is up to 1,000 times higher than the background rates typical over the earth's history (**Figure 1**). Habitat is disappearing rapidly, as we continue to develop land for farming, forestry, livestock pasture and other uses. For example, a total of 670,000 km^2 of tropical forests were lost in the Caribbean, Central and South America in the period 1980 to 1995[7]. Mangrove forests, once covering more than 200,000 km^2 of coastline, have suffered losses of up to 86 percent in certain locations and continue to disappear at a rate of 1–2 percent per year[8]. 20 percent of the world's coral reefs have been effectively destroyed and show no immediate prospects of recovery, with a further 24 percent considered at risk of imminent collapse[9].

4 EFTEC. 2005. *The Economic, Social and Ecological Value of Ecosystem Services: A Literature Review*. Final report for the Department for Environment, Food and Rural Affairs: London, UK (January); Farber, S.C., Costanza, R. and Wilson, M.A. 2002. Economic and Ecological Concepts for Valuing Ecosystem Services. *Ecological Economics* 41: 375–392; Pagiola, S., von Ritter, K. and Bishop, J. 2004. *Assessing the Economic Value of Ecosystem Conservation*. Environment Department Paper No. 101. The World Bank: Washington, D.C.

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6 www.g-8.de/Content/EN/__Anlagen/2007-03-18-potsdamer-erklaerung-en,property=publicationFile.pdf. Related initiatives include the CBD Work Programme on Incentives (www.biodiv.org/incentives/review.shtml), work by the Organisation for Economic Co-operation and Development on the economic aspects of biodiversity, the Environmental Valuation Reference Inventory (www.evri.ca), as well as the Bioecon research programme (www.bioecon.ucl.ac.uk), the Natural Capital Project (www.naturalcapitalproject.org) and the ecoSERVICES project of Diversitas International (www.diversitas-international.org/core_ecoserv.html), among many others.

7 See www.fws.gov/birds/documents/HabitatLoss.pdf for further examples of habitat change and loss.

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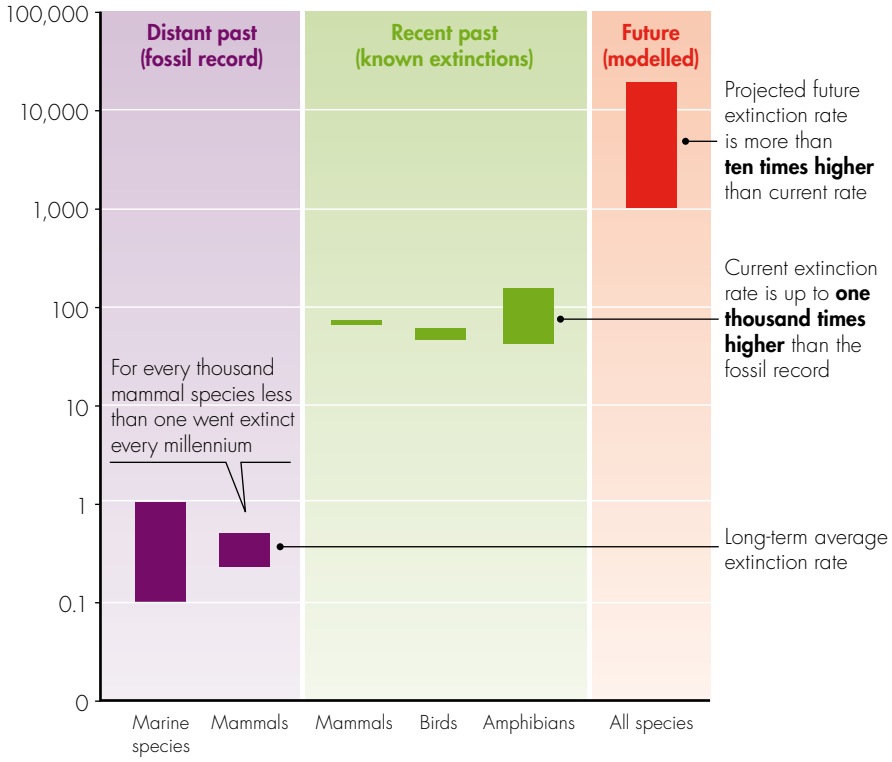
9 Wilkinson, C. (ed). 2004. *Status of Coral Reefs of the World: 2004*. Available at www.aims.gov.au/pages/research/coral-bleaching/scr2004.

Figure 1. Extinctions per thousand species per millennium



Source: Redrawn with permission, based on an original figure prepared for the Millennium Ecosystem Assessment by Philippe Rekacewicz and Emmanuelle Bournay of UNEP / Grid-Arendal.

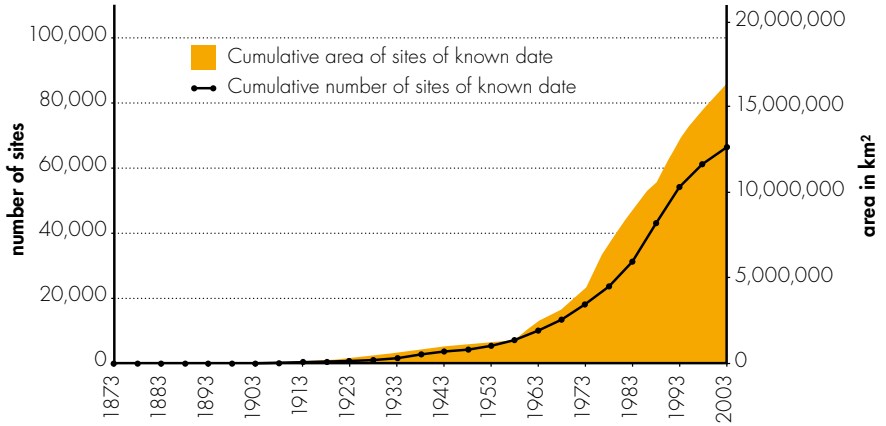
Efforts to conserve biodiversity are likewise changing, based on improved understanding of the drivers of biodiversity loss. At a global level, the main legal instrument for conservation is the CBD, which has been signed by more than 160 national governments and has three over-arching objectives[10]:

1. The conservation of biological diversity.
2. The sustainable use of its components.
3. The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

The most common means of conserving biodiversity is to restrict human activity in areas which are considered highly diverse, contain rare or endangered species, or which generate important ecosystem services (including cultural services). The CBD defines a protected area as *"a geographically defined area, which is designated or regulated and managed to achieve specific conservation objectives"* (Article 2). Over 12 percent of the global land surface is currently protected under a range of legal and customary arrangements designed to ensure the conservation of important ecosystem benefits (see **Figure 2**). Additional conservation measures include an expanding regulatory and enforcement toolbox, including Environmental Impact Assessments and a range of other measures and mechanisms designed to assess, avoid and / or mitigate the biodiversity losses often associated with economic activity.

10 Other important biodiversity-related international agreements include the Convention on Conservation of Migratory Species (www.cms.int), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (www.cites.org), the International Treaty on Plant Genetic Resources for Food and Agriculture (www.planttreaty.org), the Ramsar Convention on Wetlands (www.ramsar.org), and the World Heritage Convention (whc.unesco.org).

Figure 2. Growth of global protected areas over time[a]



a 38,427 protected areas covering some 4 million km² have no date and are not included in the cumulative graph.

Source: Redrawn with permission, based on Figure 1 in Chape, S., Harrison, J., Spalding, M., and Lysenko, I. 2005. Measuring the extent and effectiveness of protected areas as an indicator for meeting global biodiversity targets. *Phil. Trans. R. Soc. B* 360, 443–455. See www.unep-wcmc.org/resources/publications/GlobalTargets/Measuring_PA_Extent.pdf#search=%22chape%20harrison%20spalding%22.

While most 'official' protected areas are state property, local communities and private landowners also protect significant areas of land that do not appear in global statistics. In Namibia, for example, community-managed conservancies cover more than 74,000 km² or 9 percent of the country's land[11]. At a global level, one estimate is that the total forest area under 'community conservation' is roughly equivalent to the area conserved in public protected forests[12].

Despite the impressive growth of PAs and an expanding conservation toolbox, there are major gaps in the global conservation network. Many areas that contain some of the world's highest concentrations of endemism and species diversity still lack protection. Less than 1 percent of marine ecosystems, for example, are currently protected.

Even more disturbing is the evidence emerging from a range of sources which suggests that current efforts to conserve biodiversity are merely slowing, rather than reversing, the global erosion of biodiversity (see **Figure 3**). There is growing realisation that the world is unlikely to achieve "*a significant reduction of the current rate of biodiversity loss by 2010*", as agreed by government leaders at the World Summit on Sustainable Development in 2002[13]. Long-term prospects for conservation remain very uncertain, due to climate change and a host of other threats (e.g. the rapid spread of invasive alien species through trade, increasing concentration of human populations in coastal areas, developments in biotechnology). Growing awareness of climate change, in particular, has led to increasing concern about its adverse impacts on biodiversity, but also of the potentially significant role that biological resources can play in mitigating and adapting to climate change[14].

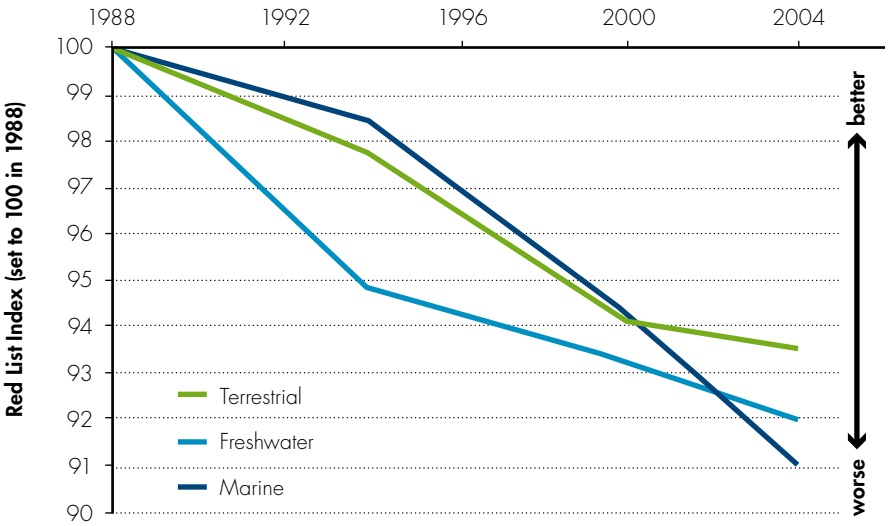
11 www.dea.met.gov.na/met/ArchivedNews/030824news.htm.

12 Molnar, A., Scherr, S.J. and Khare, A. 2004. *Who Conserves the World's Forests? Community-Driven Strategies to Protect Forests & Respect Rights.* Forest Trends: Washington, D.C.

13 www.biodiv.org/decisions/default.aspx?m=COP-06&id=7200.

14 Kapos, V., Herkenrath, P. and Miles, L. 2007. *Reducing Emissions from Deforestation: A Key Opportunity for Attaining Multiple Benefits.* UNEP-WCMC: Cambridge, UK.

Figure 3. The Red List Index for birds in different ecosystems



Source: Redrawn with permission, based on Figure 5 in Butchart, S.H.M., Stattersfield, A.J., Baillie, J., Bennun, L.A., Stuart, S.N., Akçakaya, H.R., Hilton-Taylor, C. and Mace, G.M. 2005. Using Red List Indices to measure progress towards the 2010 target and beyond. *Phil. Trans. R. Soc. B* 360, 255–268.

The biodiversity challenge is greatest in the developing world, where conservation efforts are often constrained by political and macroeconomic instability, widespread poverty, under-developed local economies, lack of capacity and resources and institutional weaknesses in relevant public sector bodies. It has been estimated that *"well over one half of all protected areas occur in nations where governance is weak"*[15]. The result is many poorly protected 'paper parks', a failure to conserve biodiversity, and, in other cases, conflict with local communities. Biodiversity in the high seas, beyond national waters, is likewise threatened by the absence of adequate international agreements and enforcement mechanisms. Major components of biodiversity – notably invertebrates – remain largely unknown to science and outside the scope of contemporary conservation efforts.

2.2 Funding biodiversity conservation

Biodiversity conservation has long relied on public finance and private philanthropy to secure the resources it needs. Unfortunately, reliable data on current biodiversity funding and expenditure is not readily available. One recent estimate is that the world spends approximately US$10 billion per annum on conserving ecosystems[16]. Another source suggests that global spending on PAs is about US$6.5 billion per annum[17], while a third source estimates spending on PAs by developing country governments at between US$1.3 billion and US$2.6 billion per annum[18]. Poor data on current funding is exacerbated by uncertainty about the effectiveness of conservation expenditure.

Published estimates of global conservation spending almost certainly underestimate the true level of effort and resources available. In the United States, for example, private charitable giving – mainly by individuals – to organisations involved in 'environment and animals' amounted to US$8.86 billion in 2005 (out of total donations of US$260 billion)[19]. The budget of the US National Park Service was US$2.256 billion in Fiscal 2006[20], while direct public spending on state-level wildlife conservation activities came to almost US$1 billion in 2005[21]. Spending on conservation measures under the 2002 Farm Bill adds another US$3.8 billion per year[22]. Even allowing for some double-counting, and bearing in mind that significant

15 Pearce, D.W. 2005. Paradoxes in Biodiversity Conservation. *World Economics* 6(3): 57–69.

16 Pearce, D.W. 2005. *ibid.*

17 James, A., Gaston, K.J. and Balmford, A. 2001. Can We Afford to Conserve Biodiversity? *BioScience* 51: 43–52.

18 Molnar, A., Scherr, S. J. and Khare, A. 2004. *Who Conserves the World's Forests? Community-Driven Strategies to Protect Forests and Respect Rights.* Forest Trends: Washington, D.C.

19 Giving USA. 2006. *The Annual Report on Philanthropy for the Year 2005.* AAFRC Trust for Philanthropy: New York, N.Y. See: www.afp-ggc.org/frm/presentations/Giving_USA2006-Turning_Data_Into_Action-Julia_McGuire.pdf.

20 www.nps.gov/faqs.htm.

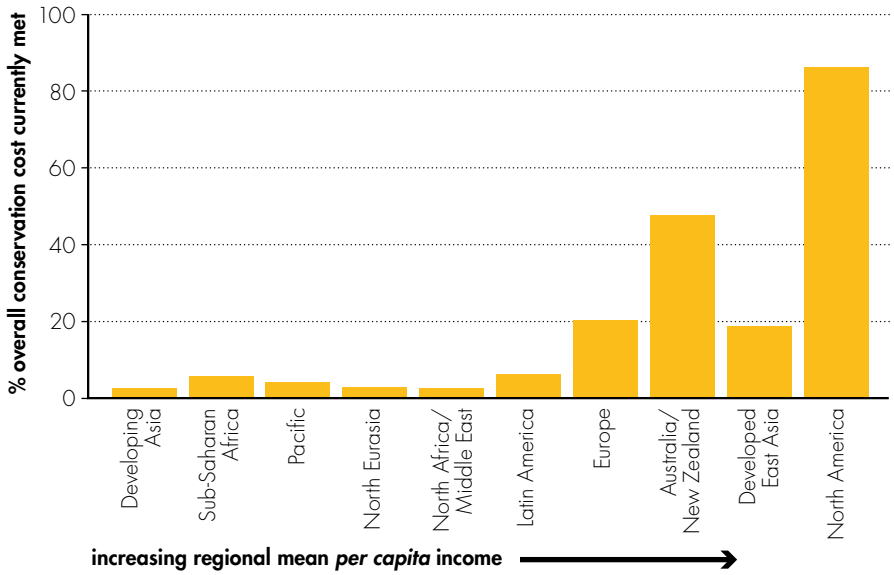
21 McKinney, C., Ris, L., Rorer, H. and Williams, S. 2005. *Investing in Wildlife: State Wildlife Funding Campaigns.* U. Michigan. See: www.teaming.com/pdf/Investing_in_Wildlife_Full_Report.pdf; www.snre.umich.edu/ecomgt/pubs/finalReport.pdf.

22 Mayrand, K., Dionne, S., Paquin, M. and Pageot-LeBel, I. 2003. *The Economic and Environmental Impacts of Agricultural Subsidies: An Assessment of the 2002 US Farm Bill & Doha Round.* Unisfera International Centre: Montreal, Canada (January).

spending on conservation by local governments and other public agencies is not included in the these figures, it seems clear that public and charitable spending on wildlife conservation in the USA alone exceeds US$15 billion per year. Moreover, even this figure is dwarfed by private spending on wildlife-related recreational activities such as hunting, fishing and observing wildlife, which amounted to US$120 billion in 2006 (just under 1 percent of GDP)[23].

The funding requirements for biodiversity conservation (or more narrowly for PAs) are equally uncertain, reflecting the different ambitions of analysts and a lack of consensus on how much area should be protected in order to conserve biodiversity. One modest assessment suggests that an additional US$1.1 billion is required to cover the basic expenses of PA management in developing countries and countries with economies in transition[24]. This is perhaps optimistic. Most analysts agree that there is a large unmet need for biodiversity finance, especially in the developing world (see **Figure 4**).

Figure 4. Regional variation in the percentage of the overall cost of effective reserve networks that are met



Source: Redrawn with permission, based on Figure 3 (Regional variation in the percentage of the overall cost of effective reserve networks that are met) in Balmford, A., Gaston, K.J., Blyth, S., James, A. and Kapos, V. 2003. Global variation in terrestrial conservation costs, conservation benefits, and unmet conservation needs. *PNAS* 100(3): 1046–1050 (4 February). Copyright 2003 National Academy of Sciences, U.S.A.

Other recent estimates of the global conservation funding gap include:

- US$12–13 billion per year over 10 years to expand and manage PA systems in developing countries[25].
- Up to US$45 billion per year (over 30 years) to secure an expanded network of PAs covering 15 percent of terrestrial and 30 percent of marine ecosystems, mainly in the tropics. Note that this estimate includes a provision for compensation of opportunity costs incurred by current resource users[26].

The latter estimate may seem daunting, particularly when compared to current government expenditure on conservation. When compared to private spending on nature-based recreation or the growth of 'green' consumer purchasing, on the other hand, such sums seem much less extraordinary.

23 US Fish & Wildlife Service. 2007. *2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: National Overview*. See: library.fws.gov/nat_survey2006.pdf.

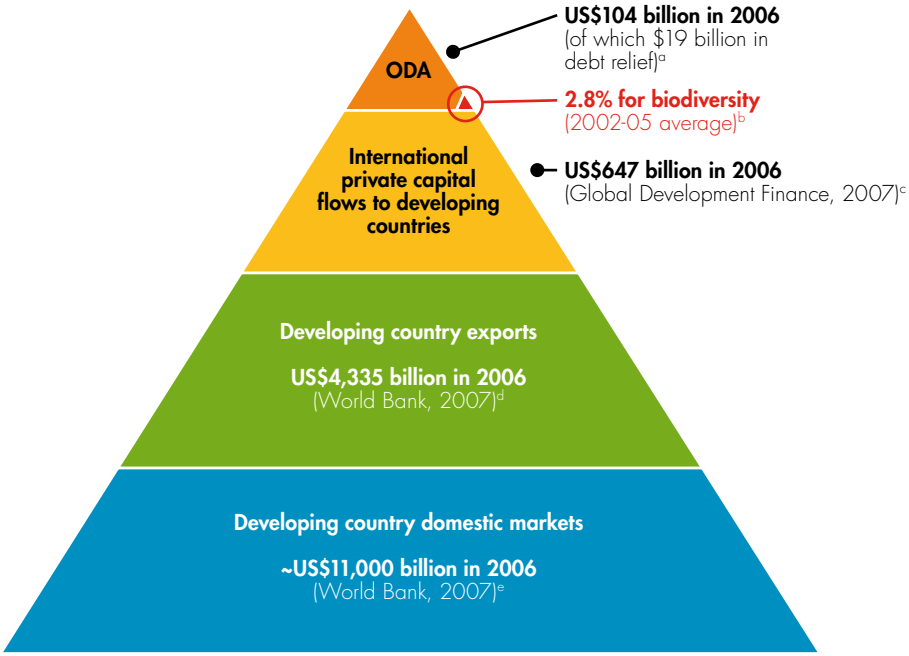
24 Vreugdenhil, D. 2003. *Protected Areas Management; Biodiversity Needs and Socioeconomic Integration*. World Institute for Conservation and Environment (available at: www.birdlist.org/downloads/PA_Systems.doc).

25 Bruner, A., Hanks, J. and Hannah, L. 2003. *How Much Will Effective Protected Area Systems Cost?* Presentation to the Vth IUCN World Parks Congress, 8–17 September: Durban, South Africa.

26 Balmford, A., Bruner, A., Cooper, P., Costanza, R., Farber, S., Green, R.E., Jenkins, M., Jefferiss, P., Jessamy, V., Madden, J., Munro, K., Myers, N., Naeem, S., Paavola, J., Rayment, M., Rosendo, S., Roughgarden, J., Trumper, K. and Turner, R.K. 2002. Economic Reasons for Conserving Wild Nature. *Science* 297: 950–953 (9 August).

The world as a whole is not short of funds. What is lacking is the motivation for increased private investment in biodiversity, especially in the tropics, where both the conservation need and funding gap are greatest. The potential for change through increased engagement of the private sector is highlighted in **Figure 5**, which contrasts the gap in biodiversity funding with the scale of development assistance, private capital flows, exports and domestic markets in developing countries. If even a small fraction of global economic activity can be mobilised for conservation, then prospects for biodiversity could be significantly improved. **Chapter 4** of this report describes recent experience in several countries and sectors that suggests how this can be done by building biodiversity business. First, however, we look more generally at the case for bringing the private sector into biodiversity conservation.

Figure 5. Biodiversity in development finance: tapping new sources



a www.oecd.org/document/17/0,3343,en_2649_34469_38341265_1_1_1_1,00.html.

b OECD. 2007. *Statistics on Biodiversity-Related Aid.* www.oecd.org/dac/stats/crs (July).

c World Bank. 2007. *Global Development Finance – The Globalization of Corporate Finance in Developing Countries. I: Review, Analysis, and Outlook.* The World Bank: Washington, D.C.

d World Bank. 2007. *Prospects for the Global Economy.* The World Bank: Washington, D.C. go.worldbank.org/PF6VWYXS10.

e Ibid.

Chapter 3

Rationale: why biodiversity business?

Biodiversity business generates profits through production processes that conserve biodiversity, use biological resources sustainably and share the benefits arising out of this use equitably.

Biodiversity business should complement rather than replace existing approaches to conservation.

There is a strong business case for biodiversity and a good conservation case for business, but more work is needed to present and demonstrate the case.

There are good reasons to expect biodiversity businesses to contribute to other global objectives, notably the reduction of poverty in developing countries. However, efforts to build biodiversity business must ensure that the very poor are not displaced from their jobs or cut off from natural resources that they previously exploited.

The preceding chapter identified biodiversity as a central component of sustainable development, highlighted growing evidence of biodiversity loss, and noted the inadequacy of traditional funding from public and charitable sources, as well as institutional weaknesses that undermine conservation efforts. This chapter develops the case for another approach to biodiversity conservation, building on the power of business and markets. We develop the concept of 'biodiversity business', which may be defined as:

Commercial enterprise that generates profits through production processes which conserve biodiversity, use biological resources sustainably and share the benefits arising out of this use equitably.

The idea of profiting from biodiversity conservation may seem strange, but this is in fact an essential condition for mobilising private investment in conservation. Without profit, business dies and markets stagnate. This chapter explores the case for enlisting business and the profit motive to complement existing mechanisms for delivering conservation results.

Some argue that the main positive contribution that business can make to biodiversity conservation is simply to provide cash, through taxes or charitable contributions, for conservation activities carried out by governments, NGOs or community organisations[27]. Others emphasise the need to reduce the biodiversity 'footprint' of existing businesses, through government regulations, binding voluntary agreements or under pressure from NGO advocacy campaigns[28]. All of these approaches have their place in the conservation 'toolbox'. The premise of this report, however, is that biodiversity would benefit from the development of complementary approaches that make conservation a profitable business activity in its own right.

27 See for example: www.iucn.org/themes/ceesp/Wkg_grp/Seaprise/Ref 5 Earth Profits Fund.doc.

28 Friends of the Earth International. 2005. *Nature for Sale: The Impacts of Privatizing Water and Biodiversity*. Issue 107 (January); Von Wiezkacker, E.U., Young, O.R. and Finger, M. 2005. *Limits to Privatization: How to Avoid Too Much of a Good Thing*. Earthscan: London.

Taxes on private wealth raise large amounts of money, which is used to provide valuable public goods and services, including biodiversity conservation. In practice, however, most government tax revenue is simply redistributed (e.g. from workers to pensioners). What little money remains tends to be spread thinly, used politically and very often inefficiently. In most countries, and especially at the global level, the share of public spending allocated to biodiversity conservation is trivial[29].

A more fundamental problem with this 'tax-and-spend' approach is that it fails to address the main threats to biodiversity. So long as private entities continue with business as usual – albeit at a reduced pace due to the burden of tax and / or charitable contributions – conservation efforts will continue to struggle against the adverse impacts of economic activity.

A second common approach to enlisting the private sector in biodiversity conservation is to persuade producers and consumers to reduce or refrain from environmentally harmful activities. This may be achieved through mandatory or voluntary measures. Examples include environmental assessment and mitigation requirements for large investments, land-use zoning, restrictions on allowable technology, emission standards to limit pollution, voluntary commitments to reduce waste and avoid damage to habitat. Private expenditure to undertake such actions can be substantial, where compliance is good. Like tax-and-spend, however, this approach also involves 'swimming against the tide'. So long as environmentally-harmful activities are less costly or more profitable than biodiversity-friendly ones, people might be tempted to cheat, or make only token contributions to environmental protection while continuing to devote most of their effort to damaging activities. As a result, governments (and some NGOs) are obliged to spend considerable effort on monitoring and enforcement.

Frustration with conventional approaches to conservation has led to a search for new ways to align private and public interests in biodiversity. This may be seen as part of wider efforts to enlist the private sector in the provision of public goods, through public–private partnerships, corporate social and environmental responsibility, and the use of economic incentives. Examples include cap-and-trade or tradable quota systems, resource user fees and pollution taxes, competitive tendering of management services and concessions, certification and labelling of environmental performance, performance bonds and bonuses. These instruments are described in more detail in **Chapter 4** and **Chapter 5**.

3.1 The business case for biodiversity

The business case for biodiversity is easy to make when a firm depends directly on biodiversity to operate. Nature-based tourism is one example where the income stream to private enterprise depends very clearly on the health of the surrounding ecosystem. In such cases, business owners and managers need little persuasion to invest in biodiversity management.

Examples can be found in other business sectors, where greater biodiversity is associated with lower costs, increased productivity and ultimately higher profits. In a range of contexts, scientists have discovered that greater variability in genes, species and ecosystems is associated with increased biological productivity, resilience and consumer preference[30]. For example:

- More diverse ecosystems are preferred destinations for tourism[31].

29 Pearce, D.W. 2005. Paradoxes in Biodiversity Conservation, *World Economics* 6(3): 57–69 (July–September).

30 Díaz, S., Fargione, J., Chapin III, F.S. and Tilman, D. 2006. Biodiversity Loss Threatens Human Well-Being. *PLoS Biology* 4(8): 1300–1305.

31 Naidoo, R. and Adamowicz, W.L. 2005. Economic Benefits of Biodiversity Exceed the Costs of Conservation at an African Rainforest Reserve. *The National Academy of Sciences of the USA*, www.pnas.org/cgi/doi/10.1073/pnas.0508036102.

- Biologically diverse soils are generally more productive for agriculture[32].
- Marine biodiversity is associated with increased productivity of fisheries[33].
- Crop genetic diversity is a key factor in maintaining disease resistance and yields[34].
- Diverse tropical forests are prime locations in which to find novel genes and compounds for agricultural, industrial and pharmaceutical uses[35].

Despite increasing evidence of the commercial benefits of conservation, for many businesses the case for investing in biodiversity remains unclear. Understanding what biodiversity means and how it affects business value is the first hurdle. As noted in the preceding chapter, the CBD offers a comprehensive definition of biodiversity and a comprehensive framework and guidelines for biodiversity management. Unfortunately, the language of conservationists does not always resonate with business audiences[36].

> *"The degradation of ecosystems and the services they provide … destroys business value and limits future growth opportunities."*
>
> ***Source:*** World Business Council for Sustainable Development. 2005. *Sustaining Ecosystems and Ecosystem Services,* Issue Brief, June.

For most business sectors and companies, biodiversity conservation remains a liability, an obligation or a cost, rather than a profit centre. The main drivers of private investment in conservation are thus legal requirements, charitable impulses

32 Tilman, D., Reich, P.B. and Knops, J.M.H. 2006. Biodiversity and Ecosystem Stability in a Decade-Long Grassland Experiment. *Nature* 441: 629–632.

33 Worm, B., Barbier, E.B., Beaumont, N., Duffy, J.E., Folke, C., Halpern, B.S., Jackson, J.B.C., Lotze, H.K., Micheli, F., Palumbi, S.R., Sala, E., Selkoe, K.A., Stachowicz, J.J., Watson, R. 2006. Impacts of Biodiversity Loss on Ocean Ecosystem Services. *Science* 314: 787–790.

34 Evenson, R.E. and Gollin, D. 1997. Genetic resources, international organisations, and rice varietal improvement. *Economic Development and Cultural Change* 45(3): 471–500.

35 Rausser, G. and Small, A. 2000. Valuing Research Leads: Bioprospecting and the Conservation of Genetic Resources. *Journal of Political Economy* 108(1): 173–206.

36 The CBD Secretariat has increased its efforts to engage business in the implementation of the Convention, including the preparation of a guide to the CBD for the private sector. See www.biodiv.org.

37 EEA. 2005. *Market-Based Instruments for Environmental Policy in Europe.* Technical report No 8/2005, European Environment Agency: Copenhagen; Huber, R.M., Ruitenbeek, J. and Seroa da Motta, R. 1998. *Market-Based Instruments for Environmental Policymaking in Latin America and the Caribbean: Lessons from Eleven Countries.* World Bank Discussion Paper No. 381, The World Bank: Washington, D.C.; Stavins, R. 2003. Market-Based Environmental Policies: What Can We Learn from U.S. Experience and Related Research? *Faculty Research Working Papers Series* RWP03-031, John F. Kennedy School of Government, Harvard University: Cambridge, MA; Tietenberg, T. 2002. The Tradable Permits Approach to Protecting the Commons: What Have We Learned? *Nota di Lavoro* 36. Fondazione Eni Enrico Mattei: Venice.

and informal pressure from investors, shareholders, local communities and / or NGOs. More generally, the business case for investing in biodiversity is expressed in terms of:

- Avoiding delays, securing access to natural resources as well as access to capital, insurance or partnerships.
- Relationships with employees, communities and regulators.
- Policy influence or the potential to inform emerging environmental regulations.

As awareness of the business case for biodiversity increases, more companies are seeking to distinguish themselves from competitors and gain favour with the public by supporting conservation efforts. This may include direct association of business product and services with natural environments in advertising campaigns; voluntary reporting of business impacts on biodiversity or of business contributions to conservation activities.

Other investors and entrepreneurs are discovering that biodiversity conservation can form the basis of profitable new business models. These include the supply of commodities and services according to emerging standards of biodiversity-friendly production, supported by independent certification or assurance mechanisms, as well as the supply of ecosystem restoration and management services to both public and private customers. **Chapter 4** of this report describes a wide range of these new biodiversity business models.

3.2 The conservation case for biodiversity business

Market-based and business-oriented approaches to environmental management are increasingly popular with governments, NGOs and businesses around the world. Growing evidence indicates that market-based policies can achieve some environmental objectives at lower economic cost than conventional approaches, such as uniform pollution standards or technology mandates[37]. Other advantages claimed for market-based approaches include greater flexibility and innovation, more sensitivity to consumer preferences, improved access to investment capital and, in some cases, reduced enforcement costs due to better alignment between private and public interests.

On the other hand, some people question the potential of market-based mechanisms for environmental management, particularly in countries where regulatory capacity is weak[38]. Others note that certain aspects of biodiversity may be difficult to address using market-based approaches, due to cultural barriers or institutional weaknesses. A fundamental barrier to assessing and comparing conventional and market-based biodiversity conservation is the lack of experience with biodiversity business. Examples are rare, small-scale and often poorly documented. What is clear is that market-based approaches to ecosystem management are attracting increasing support from both public agencies and private investors, as well as growing interest from the research community[39].

> *"Within a corporate governance framework geared more to sustainability and equity, the concept of sustainable profitability should therefore be viable – and perhaps even a necessary condition of making the transition to a sustainable economy as efficiently and painlessly as possible. Excelling in the pursuit of legitimate profitability while simultaneously making continuous progress towards genuine sustainability will become an increasingly important test of real business leadership."*
>
> ***Source:*** Jonathon Porritt. Earth, Wealth and Wellbeing. In *Resurgence* 234, January / February 2006.

38 Greenspan-Bell, R. and Russell, C. 2002. Environmental Policy for Developing Countries. *Issues in Science and Technology* Spring: 63–70.

39 Daily, G.C. and Ellison, K. 2002. *The New Economy of Nature and the Marketplace: The Quest to Make Conservation Profitable.* Island Press: Washington, D.C; Ferraro, P.J. and Kiss, A. 2002. Direct Payments to Conserve Biodiversity. *Science* 298 (29 November): 1718–1719; Fox, J. and Nino-Murcia, A. 2005. Status of Species Conservation Banking in the United States. *Conservation Biology* 19(4): 996–1007; Gutman, P. (ed.) 2003. *From Goodwill to Payments for Environmental Services: A Survey of Financing Options for Sustainable Natural Resource Management in Developing Countries.* Danida and WWF: Washington, D.C.; Jenkins, M., Scherr, S. and Inbar, M. 2004. Markets for Biodiversity Services. *Environment* 46(6): 32–42 (July–August); Johnson, N., White, A. and Perrot-Maître, D. 2001. *Developing Markets for Water Services from Forests: Issues and Lessons for Innovators.* Forest Trends with World Resources Institute and the Katoomba Group: Washington, D.C; Landell-Mills, N. and Porras, I. 2002. *Markets for Forest Environmental Services: Silver Bullet or Fool's Gold?* International Institute for Environment and Development: London; Mantua, U., Merlo, M., Sekot, W. and Welcker, B. 2001. *Recreational and Environmental Markets for Forest Enterprises: A New Approach Towards Marketability of Public Goods.* CABI Publishing: Wallingford; Pagiola, S., Bishop, J. and Landell-Mills, N. (eds) 2002. *Selling Forest Environmental Services: Market-Based Mechanisms for Conservation and Development.* Earthscan: London; Scherr, S., White, A. and Khare, A., with Inbar, M. and Molnar, A. 2004. *For Services Rendered: The Current Status and Future Potential of Markets for the Ecosystem Services Provided by Tropical Forests.* Technical Series No 21. International Tropical Timber Organization: Yokohama; Swingland, I. (ed.). 2002. *Capturing Carbon and Conserving Biodiversity: The Market Approach.* Earthscan: London; Wilkinson, J. and Kennedy, C. 2002. *Banks and Fees: The Status of Off-site Wetland Mitigation in the United States.* Environmental Law Institute: Washington, D.C.

A general difficulty with assessing biodiversity conservation (market-based or otherwise) is the lack of agreed targets or performance indicators that are applicable at a local or enterprise scale, together with a weak record of evaluation against those targets and indicators[40]. Progress towards the CBD 2010 biodiversity target, for example, is hard to measure in any context, even without trying to single out the contributions of market-based approaches[41].

3.3 The development case for biodiversity business

Market-based approaches to biodiversity conservation are not only of interest to businesses and environmentalists. There are reasons to expect the development of biodiversity businesses to contribute to other global objectives also, notably the reduction of poverty and inequality, especially in developing countries. While the empirical record is not yet clear on this point, the initial results based on experience with payments for carbon and other ecosystem services are encouraging[42].

> *"Market-based mechanisms have great potential to provide additional income sources to rural land users, as well as reduced risk through diversification and other indirect benefits. However, realising this potential often requires particular efforts to be made to ensure that the poor are not excluded, such as securing land tenure for marginalised groups, supporting cooperative institutions for bundling and bargaining, facilitating access to training and start-up capital, and of course designing the market itself."*
>
> ***Source:*** Pagiola, S., Bishop, J. and Landell-Mills, N. (eds). 2002. *Selling Forest Environmental Services: Market-Based Mechanisms for Conservation and Development.* Earthscan: London.

Traditionally, biodiversity policy and management has focused on the first two objectives of the Convention on Biological Diversity – conservation of biodiversity and sustainable use of biological resources. However, the framers of the Convention wisely included a third objective that calls for "*the fair and equitable sharing of benefits arising out of the utilisation of genetic resources*". This third objective relates directly to the broader goal of social sustainability.

Since the Convention was adopted at the Rio Summit in 1992, the focus of this third objective has been broadened to cover all biological resources – including ecosystems and species. Recent decisions adopted by the CBD Conference of the Parties explicitly refer to the "*equitable sharing of the benefits from the utilisation of biological diversity*" in the context of various biodiversity issues ranging from environmental impact assessment to plant diversity to ecotourism.

From a business perspective, the equitable sharing of biodiversity benefits requires a company to integrate the management of biodiversity with its approach to social responsibility. This can be done by adopting a stakeholder approach to biodiversity, involving customers, workers, investors, neighbours and other stakeholders who are affected by the company's relationship with biodiversity. Depending on the nature of the company, its relationship to biodiversity and to its stakeholders, a variety of issues can be addressed in the context of equitable benefit sharing. For example, the BioTrade programme of the UN Conference on Trade and Development, in its work with the natural ingredients sector, has identified the following benefit-sharing issues and principles:

- "*Build trust and dialogue among actors;*
- *Enhance business and legal skills of producers and communities;*
- *Promote fair and equitable commercial relationships, including an adequate price and the negotiation of other benefits;*

40 Agrawal, A. and Redford, K. 2006. *Poverty, Development and Biodiversity Conservation: Shooting in the dark?* Working Paper No. 26 (March), Wildlife Conservation Society: Bronx, N.Y; Ferraro, P.J. and Pattanayak, S.K. 2006. Money for nothing? A Call for Empirical Evaluation of Biodiversity Conservation Investments. *PLoS Biology* 4(4): e105, 0482–0488; Tucker, G. 2006. *A Review of Biodiversity Conservation Performance Measures.* Rio Tinto and Earthwatch Institute: Oxford.

41 The goal adopted by the Conference of the Parties to the Convention on Biological Diversity, at its 6th meeting in 2002, was: "*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.*" An Annex to the decision identifies 11 subsidiary goals and 21 targets, most of them very high-level (e.g. Target 1.1 "*At least 10% of each of the world's ecological regions effectively conserved*").

42 Corbera, E. 2007. Bringing Development into Carbon Forestry Markets: Challenges and Outcomes of Small-Scale Carbon Forestry Activities in Mexico. In Murdiyarso, D. and Herawati, H. (eds) *Carbon Forestry: Who Will Benefit?* Center for International Forestry Research: Bogor, Indonesia: 42–56; Grieg-Gran, M., Porras, I. and Wunder, S. 2005. How Can Market Mechanisms for Forest Environmental Services Help the Poor? Preliminary Lessons from Latin America. *World Development* 33(9): 1511–1527; Pagiola, S., Rios, A.R. and Arcenas, A. (forthcoming). Can the Poor Participate in Payments for Environmental Services? Lessons from the Silvopastoral Project in Nicaragua. *Environment and Development Economics*; Pagiola, S., Arcenas, A. and Platais, G. 2005. Can Payments for Environmental Services Help Reduce Poverty? An Exploration of the Issues and the Evidence to Date from Latin America. *World Development* 33(2): 237–253; Ravnborg, H.M., Damsgaard, M.G. and Raben, K. 2007. *Payments for Ecosystem Services: Issues and Pro-Poor Opportunities for Development Assistance.* Danish Institute for International Studies: Copenhagen, Denmark; Saunders, L. S., Hanbury-Tenison, R. and Swingland, I.R. 2003. Social Capital from Carbon Property: Creating Equity for Indigenous People. In Swingland, I.R. (ed.) *Capturing Carbon & Conserving Biodiversity – The Market Approach,* 218–230. Earthscan: London; Wunder, S. (forthcoming). Payments for Environmental Services and the Poor: Concepts and Preliminary Evidence. *Environment and Development Economics.*

- *Generate and share benefits outside relationships; and*
- *Increase recognition of the value of traditional knowledge"*[43].

A similar set of principles can be developed for other sectors and companies, to enable them to address the social as well as the ecological and the economic dimensions of biodiversity.

Such approaches are necessary in order to address real concerns about the potentially adverse impacts of market-based approaches to biodiversity conservation on the poor. Efforts to build biodiversity business must ensure that the very poor are not displaced from their jobs or cut off from natural resources they previously exploited. Complementary measures to enable poorer groups to participate as suppliers of biodiversity and ecosystem services are critical. Above all, more practical experience with market-based approaches to biodiversity conservation is needed to confirm whether and how it can contribute to sustainable development.

43 www.biotrade.org/BTFP/BS/Benefit-sharing.htm.

Chapter 4

The biodiversity business landscape

This chapter reviews a range of sectors and business models that can generate benefits for biodiversity through the conservation of biological diversity, sustainable use of biological resources, and equitable sharing of the benefits of using biodiversity.

Many established businesses can generate biodiversity benefits. However, the links between production practices and biodiversity performance are often tenuous. There is a pressing need to develop better monitoring and evaluation systems to demonstrate biodiversity impacts.

Emerging biodiversity business models across a range of sectors are generally small in terms of their current market size but are growing rapidly.

Both regulated and voluntary markets for environmental services are expanding and multiple platforms are being developed to promote more sustainable practices.

The business needs and opportunities in each sector can be grouped under three broad categories – policy / enabling environment; business development services; and investment opportunities.

Society has responded to biodiversity loss in many ways. Public and philanthropic support for conservation is essential and will clearly remain so. However, more is needed. Governments and NGOs cannot halt the loss of biodiversity by themselves. Charitable contributions from business are important, but do not fill the gap.

From a business perspective, contemporary approaches to biodiversity conservation are handicapped not only by insufficient funding, especially in developing regions, but more fundamentally by weak links between consumer willingness-to-pay and biodiversity finance, as well as by a general lack of business planning and management skills amongst those responsible for conservation.

Perhaps the greatest challenge is to create effective market demand for biodiversity conservation, sufficient to attract private investment and sustain profitable businesses. A related challenge for the development of new business models for biodiversity conservation concerns the technical aspects of managing ecological assets. Ultimately, the ability to identify, prioritise and value biodiversity must become standard practice for all businesses, but especially those businesses which seek to distinguish themselves on the basis of their biodiversity performance.

Innovative solutions are needed, including new institutional arrangements for generating financial and managerial resources to address these challenges. In particular, there is a need to develop and expand profitable biodiversity business models, in both established and emerging sectors.

The previous chapter defined biodiversity business in general terms as: *"commercial enterprises that generate profits through production processes which conserve biodiversity, use biological resources sustainably and share the benefits arising out of this use equitably."* This chapter explores the range of biodiversity business in more detail, including experience to date, constraints and opportunities. We examine various ways of classifying biodiversity business before describing experience in a range of different sectors and using different incentive mechanisms. The chapter concludes with a summary of potential business opportunities for further consideration.

4.1 The spectrum of biodiversity business

Most businesses today do *not* include biodiversity as a core business concern. This focus is what distinguishes biodiversity business from mainstream enterprise in a given sector. This focus also implies that biodiversity businesses must be assessed relative to some benchmark or baseline level of performance. The latter may be an alternative land use, a rate of resource extraction, a system of profit-sharing, or any number of other indicators that can be used to identify good practice in biodiversity management.

Good performance earns most respect when it is deliberate and difficult to achieve, rather than accidental or effortless. Hence more restrictive definitions of biodiversity business single out those enterprises which take deliberate, positive steps, at some significant cost, in order to conserve biodiversity, manage biological resources more sustainably, and / or share benefits more equitably than their peers.

Biodiversity business is not all pain and no gain. On the contrary, there is growing evidence that biodiversity conservation can enhance the competitive position and ultimately the profitability of many business ventures. Hence biodiversity business includes many commercial firms that generate *net positive cash flow* by delivering specific biodiversity benefits or services, either as a stand-alone product or in conjunction with the supply of other goods and / or services.

There are many ways to classify or categorise biodiversity business. One common distinction focuses on whether biodiversity is treated as a risk or as a business opportunity. According to the IFC, for example, *"each and every environmental and social issue* [can be seen] *from two perspectives: how to manage the risk and how to secure the opportunity"*[44]. Other classifications include distinctions between:

- Biodiversity as an input to production, as a competing use of resources, as an output for sale, *or* as the basis of liability and compensation claims.
- The relative emphasis on biodiversity conservation, sustainable use of biological resources, *and / or* equitable benefit sharing.
- The extent to which different business models focus on conserving the diversity of genes, species or ecosystems *or* capitalise on different values, i.e. direct use, indirect use, option and existence values[45].
- Biodiversity conservation as a by-product of other goods and services, *versus* conservation as a commercial service in its own right.

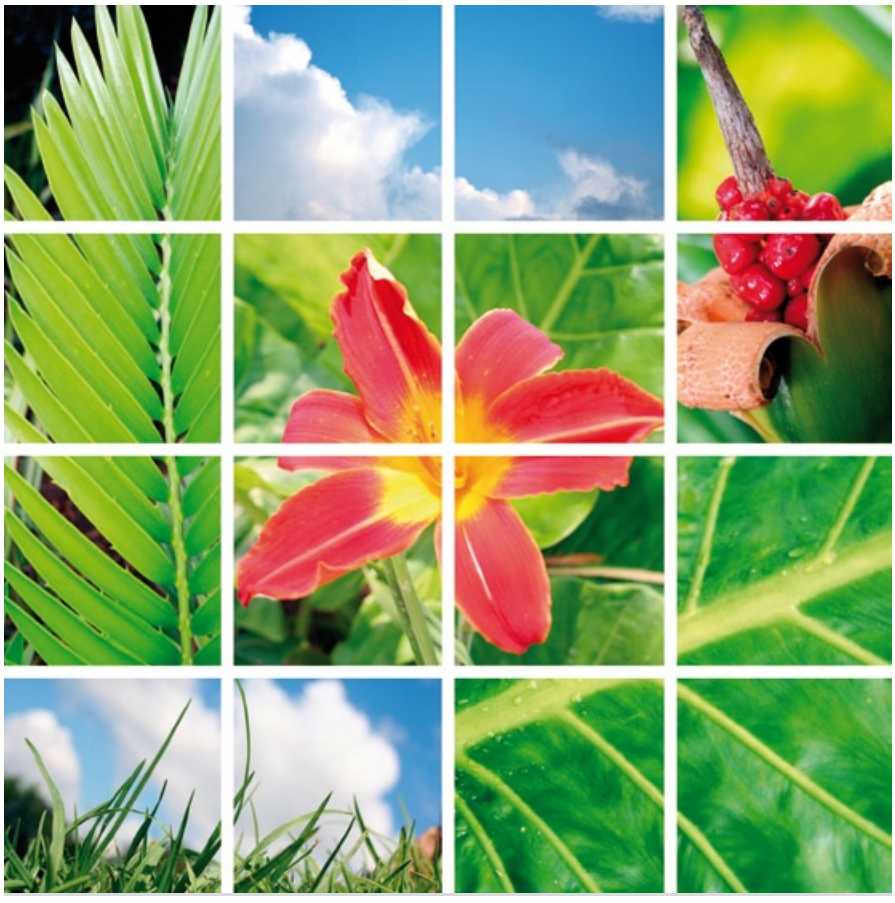
44 www.ifc.org/ifcext/enviro.nsf/Content/BiodiversityGuide_Intro.

45 Pagiola, S., von Ritter, K. and Bishop, J. 2004. *Assessing the Economic Value of Ecosystem Conservation.* Environment Department Paper No. 101. The World Bank: Washington, D.C.

In this report, we adopt a pragmatic mix of sector-based and activity-based categories. We cast a wide net, not only to capture the full range of biodiversity business models, but also because we believe that biodiversity conservation can be an opportunity for all industries. Hence the rest of this chapter is divided into the following sections:

- Agriculture – focusing on biodiversity-friendly practices (**Section 4.2**).
- Forestry – focusing on sustainable management (**Section 4.3**).
- Non-timber forest products (NTFP) – including commercial use of wild species (**Section 4.4**).
- Fisheries – including aquaculture (**Section 4.5**).
- Carbon sequestration in biomass (**Section 4.6**).
- Payments for watershed protection (**Section 4.7**).
- Bioprospecting (**Section 4.8**).
- Biodiversity management services (**Section 4.9**).
- Biodiversity offsets – including both mandatory and voluntary schemes (**Section 4.10**).
- Ecotourism (**Section 4.11**).
- Recreational hunting and sportfishing (**Section 4.12**).

The chapter concludes with a summary of potential business opportunities in each of these areas.



4.2 Agriculture

Public agencies and others are providing significantly increased funding for biodiversity conservation in production landscapes, in recognition of the need to work beyond protected areas.

Multiple platforms are being sponsored by the food and agriculture industries to promote sustainable agriculture / natural products, with growing collaboration from the public sector; leading examples include 'roundtables' on sustainable palm oil, soy, coffee, sugar and cocoa.

Although the growth of certified / verified sustainable production in these industries is much faster than for conventional products, the total volume and value of such products is still a small percentage of the overall market – typically less than 5 percent.

Few certification systems currently focus on biodiversity conservation, although several recent initiatives seek to fill this gap. Most certification systems require more cost-effective monitoring and evaluation methodologies, along with clear indicators, to assess impacts on biodiversity.

Sustainable agriculture systems that integrate the conservation and regeneration of native habitats and species require greater support.

Another priority is to promote biodiversity-friendly production practices for those agricultural commodities and industries that pose the greatest threats, including biofuel feedstocks.

4.2.1 What is 'biodiversity-friendly' agriculture?

The agriculture sector is one of several natural resource-based industries that can provide biodiversity benefits through the application of modified management systems and the adoption of alternative technologies and practices. However, biodiversity benefits are typically secondary considerations for agricultural producers. Moreover, agriculture has traditionally been a major source of biodiversity loss, through habitat conversion, degradation and pollution.

Increasingly, irrespective of scale, farmers are being called upon to reduce the environmental impact of their operations. Terms such as 'sustainable', 'green' and 'eco-agriculture' are widely used to describe environmentally-friendly agricultural practices, which often also have positive socio-economic impacts. The promotion of biodiversity-friendly agriculture tends to involve some or all of the following practices[46]:

- Creating biodiversity reserves or sanctuaries on farms.
- Developing habitat networks around and between farms; this can include the creation of 'biological corridors' that connect areas of significant biodiversity.

46 Based largely on information provided by Ecoagriculture Partners (www.ecoagriculturepartners.org).

- Reducing conversion of wild habitat to agriculture by increasing farm productivity and by protecting priority areas, such as watersheds, forest fragments, rivers and wetlands.
- Taking marginal agricultural land out of production and assisting regeneration of natural habitats.
- Modifying farming systems to mimic natural ecosystems as much as possible.
- Low-input or less environmentally damaging agriculture practices, focusing on reduced erosion and chemical or waste 'run off', through 'zero tillage' planting techniques, contour ploughing, use of vegetation and trees as windbreaks, use of leguminous species, etc.
- Sustainable livestock practices that range from modified grazing and pasture management systems to promoting the incorporation of trees and other vegetation into livestock grazing areas.

Various labels and certification standards are used to distinguish farms that adopt such practices from conventional agriculture, such as 'bird-friendly', 'shade-grown', 'conservation', 'sustainable', 'organic' and 'fair trade'.

These and other practices have the potential to be scaled-up significantly and, depending upon how they are implemented, to enable agribusinesses of all sizes to promote biodiversity conservation.

4.2.2 Agriculture – status and trends

Commercial and subsistence agriculture remain major sources of environmental damage and biodiversity loss, primarily in tropical and less developed countries. In recent years, some large-scale and widely publicised examples include the loss of vast tracts of the Amazon Rainforest and Brazilian 'Cerrado' ecosystems from the dramatic expansion of soybean and cattle production, and large areas of lowland rainforest in South-East Asia from the development of palm oil plantations. In Brazil alone, the Environment Ministry has reported that 26,000 km^2 of forest were lost from August 2003–04, with deforestation highest in the state of Mato Grosso, where just under half of this area was converted to soy fields[47]. Concerns are also growing regarding the potential negative impact of biofuels production on biodiversity (see **Box 1**).

Box 1. Biofuels and biodiversity

A wide-range of plant feedstock can be used to produce liquid biofuels for transport (e.g. palm oil, soya, sugarcane, oilseed rape, sugar beet, agricultural waste and wheat). Currently, the world's top commercially produced biofuels are ethanol – made from fermented sugar cane, beets and grain crops – and biodiesel – made from rapeseed, palm, coconut and other plant-based oils. There are alternatives. For example, Shell, in partnership with the Canadian biotech firm Iogen Corporation, is developing a second generation of biofuels from straw using enzymes – the product is called cellulose ethanol. This second-generation biofuel can be used as a blend in conventional cars, and if used neat can cut well-to-wheel CO_2 production by 90% compared with conventional petrol.

Some countries mandate the use of biomass feedstock in fuels. For example, a European Directive issued in 2003 requires a 5.75 percent biofuel component in all EU25 countries by 2010, while the Malaysian government has mandated the use of 5 percent refined palm oil in diesel fuel, starting in 2007. The rationale for these targets is the perceived environmental and social benefits of biofuels,

47 BBC News, 19 May 2005, citing the Brazilian National Institute of Space Research deforestation figures.

notably the mitigation of climate change through greenhouse gas (GHG) abatement, conservation of fossil fuels, energy supply security and employment in the agricultural sector. This, however, is only part of the story.

Concerns about the adverse environmental and social impacts associated with some biofuel feedstocks are increasing[48]. One fundamental challenge concerns the climate benefits of biofuels, which may be minimal when the entire life cycle of the product (from the field to production factory) is considered[49]. In addition, the following potential adverse biodiversity-related impacts have been highlighted:

- Conversion of natural forests to mono-crop plantations. For example, Indonesia and Malaysia produce over 80 percent of the world's palm oil and control over 90 percent of world exports. This has led to several million hectares of deforestation in both countries.
- Expansion of the palm oil industry in areas where prominent endangered species exist such as orangutans, Sumatran rhino and Asian elephants.
- Land clearing fires for the establishment of new plantations.
- Soil erosion and increased sedimentation.
- Pollution through use of fertilisers and pesticides.
- Pollution through palm oil mill effluents.
- Potential use of genetically modified varieties of feedstock crops.
- Conversion of land previously designated for nature conservation.
- Loss of access to common property land and resources by disadvantaged groups, particularly women.

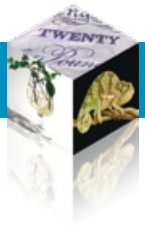
Various initiatives are underway to address the potential environmental and social impacts of biofuels. These include efforts to develop principles and criteria for sustainable production, implement codes of conduct, verify performance and promote uptake of sustainable materials in the marketplace. Examples include the Roundtable for Sustainable Palm Oil (RSPO), covering approx 65 percent of world volume (www.sustainable-palmoil.org), the Roundtable on Sustainable Soya, the Better Sugar Initiative (BSI), the Responsible Commodities Initiative implemented by the Sustainable Food Lab (www.sustainablefood.org/commodities) and draft Environmental Standards for Biofuels developed by the Low Carbon Vehicle Partnership (LowCVP) of the UK[50]. The Ecole Polytechnique Federale de Lausanne (EPFL) and the World Economic Forum (WEF) also recently convened a meeting to explore the need for new standards and a certification model for biofuels. Worldwatch and other NGOs have called for sustainable and proactive management of biofuel crops and there are several websites focusing on this issue, such as: www.planetark.com, www.environmental-finance.com, and www.insnet.org.

There is continuing rapid growth in the demand for certified sustainable agricultural commodities, notably in developed countries, but also in a number of large urban centres in less developed countries. However, despite the expansion of such certification schemes, with few exceptions, the total volume of certified agricultural produce in a given market segment tends to be small – less than 5 percent of the internationally traded volume. Certified coffee – where there is perhaps the greatest variety of certification systems – currently represents less than 2 percent of the volume of the global coffee market. However, the announcement in January 2007 that McDonald's UK is to source all its coffee from Rainforest Alliance Certified farms and extend that to serving sustainable coffee in its restaurants throughout

48 See, for example, *The Potential Environmental and Rural Impacts of Biofuel Production in the UK. Report of a Stakeholder Consultation Process*, prepared by the Institute for European Environmental Policy (March 2004); Dufey, A. 2006. *Biofuels Production, Trade and Sustainable Development: Emerging Issues*. International Institute for Environment and Development: London.

49 See, for example, McElroy, M. 2006. *Ethanol from Biomass: Can It Substitute for Gasoline?* Available at www-as.harvard.edu:16080/people/faculty/mbm/Ethanol_chapter1.pdf; Pimentel, D. and Patzek, T. W. 2005. Ethanol and Biodiesel from Crops Not Worth the Energy. *Natural Resources Research* 14(1): 65–76, www.biologynews.net; Doornbosch, Richard, and Steenblik, Ronald. 2007. *Biofuels: Is the Cure Worse Than the Disease?* Background Paper for the Round Table on Sustainable Development (SG/SD/RT(2007)3). OECD: Paris; Crutzen, P.J., Mosier, A.R., Smith, K.A., and Winiwarter, W. 2007. N_2O release from agro-biofuel production negates global warming reduction by replacing fossil fuels in *Atmos. Chem. Phys. Discuss.*, 7, 11191–11205; UN-Energy. 2007. *Sustainable Bioenergy: A Framework for Decision-makers*. United Nations: N.Y.

50 See, for example, *Draft Environmental Standards for Biofuels. A Report Commissioned by the LowCVP*, prepared by the Edinburgh Centre for Carbon Management, the International Institute for Environment and Development (IIED), ADAS and Imperial College in July 2006.



Europe during 2007 illustrates the potential for rapid growth should major retailers and consumers modify their policies.

There is increasing interest on the part of major food and agriculture companies to promote more sustainable agricultural practices, partly in response to pressure groups, but more fundamentally in order to secure their supply chains and consumer markets. Some examples include:

- The Sustainable Agriculture Initiative Platform (www.saiplatform.org), which aims to promote agricultural practices and production systems that preserve resources and enhance efficiency.
- The Sustainable Tree Crop Program for Africa (edcintl.cr.usgs.gov/treecropsaf.html), focusing on cocoa, coffee and cashews with support from the United States Agency for International Development (USAID), major chocolate and cocoa trading companies, and other businesses.
- The Common Code for the Coffee Community, coordinated and partially-funded by the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) (www.gtz.de), in conjunction with leading coffee traders, roasters and retailers.
- Business for Social Responsibility's Food and Agriculture Group (www.bsr.org), focusing on sustainable water use within its corporate members' supply chains.
- Based, in part, on the perceived growth in demand for more sustainable agricultural products and the potential benefits for biodiversity conservation, a number of agencies are launching new programmes to support this form of rural development. Three prominent examples are reviewed in **Box 2**. In addition, some investment banks and other financial institutions are becoming more active in the sustainable agriculture sector. Examples include Rabobank, Citigroup, Tridos Bank and ABN-Amro.

Box 2. Combining rural development and biodiversity conservation

Biodiversity and Agricultural Commodities Program (BACP) [a]

The Global Environment Facility (GEF) and the International Finance Corporation (IFC) have launched the first five-year phase of a 10-year market transformation programme, which will support projects submitted by businesses, NGOs, industry associations, commodity roundtables, governmental entities or foundations to promote biodiversity conservation in four agricultural commodity markets. The BACP will initially focus on cocoa and palm oil and subsequently on soybeans and sugarcane, providing grants and technical assistance to projects that:

- Promote the adoption of better management practices at the production level.
- Increase demand for biodiversity-friendly products.
- Improve financial institutions' ability to support the adoption of biodiversity-friendly practices.
- Improve the enabling environment by supporting existing commodity roundtable initiatives and working with governments to address relevant policy issues.

A monitoring and evaluation component, implemented and co-financed by Eco-agriculture Partners, will establish indicators of biodiversity impacts and link those to verification or certification systems.

Environmental Business Finance Program (EBFP) [b]

This initiative provides grants to financial intermediaries – commercial and retail banks, leasing companies, and microfinance institutions – which service small and medium enterprises whose activities benefit the global environment. Sectors eligible for EBFP financing include biodiversity and sustainable land management, such as shade-grown crops and organic agriculture in the buffer zones of protected areas.

Central American Markets for Biodiversity (CAMBio) [c]

This US$30 million, 6-year project is funded by the GEF and executed by the Central American Bank for Economic Integration (CABEI). The project works with financial intermediaries to develop and extend new financial products to biodiversity-friendly small and medium enterprises in Central America. GEF funds are used to provide partial risk guarantees and other loan enhancements.

Sources:

a www.bacp.net.
b www.ifc.org/ebfp.
c www.undp.org/gef/05/portfolio/writeups/bd/cambio.html.

Several specialised investment funds and lending institutions likewise provide finance to small and medium-scale, sustainable agricultural enterprises, often conditional on some form of certification. Examples include the EcoEnterprises Fund I of The Nature Conservancy (TNC) (www.ecoenterprisesfund.com), Verde Ventures of Conservation International (CI) (www.conservation.org/xp/verdeventures) and EcoLogic Finance (EF) (www.ecologicfinance.org) (renamed as Root Capital as of May 2007). These and other funds are described in more detail in **Appendix A**.

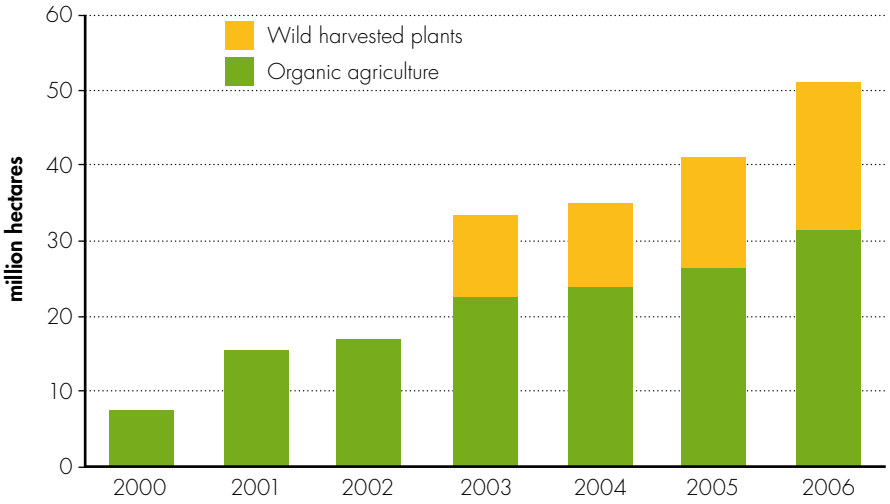
4.2.3 Agriculture – what is working / not working

In most developed countries the various forms of agricultural certification are well entrenched and growing. There is currently relatively little certified production in many developing countries.

Organic agriculture is by far the leading form of certified agriculture. The global market for organic products reached a value of €25.5 billion in 2005, with the vast majority of products consumed in North America and Europe. In addition, there is growing demand for non-food organic products, notably cotton and other plant fibres. A recent survey by the International Federation of Organic Agricultural Movements (IFOAM)[51] found more than 31 million hectares of farmland under organic management worldwide, a gain of around five million hectares on the previous year. A major increase in organic land was reported in China, where nearly three million hectares of pastoral land were recently certified. If 'wild harvested plants' are included, the total area under certified organic production is estimated at 51 million hectares (see **Figure 6**, overleaf).

51 IFOAM. 2006. *The World of Organic Agriculture, Statistics and Emerging Trends*. 8th rev. ed., February 2006.

Figure 6. Area of organic agriculture and wild harvested plants worldwide



Source: Redrawn with permission, based on Graph 3 in *The World of Organic Agriculture, Statistics and Emerging Trends*, 2006. IFOAM Publication, 8th, revised edition, February 2006, 196 pages, ISBN 3-934055-61-3, available at www.soel.de/inhalte/publikationen/s/s_74_08.pdf.

Excluding wild collection, Australia is the world leader in the total area of land devoted to organic farming, with 11.8 million hectares, followed by Argentina (3.1 million hectares), China (2.3 million hectares) and the USA (1.6 million hectares). On a regional basis, most of the world's organic farmland is in Oceania (39 percent), followed by Europe (23 percent) and Latin America (19 percent)[52]. In terms of the share of total agricultural area certified as organic, Austria, Switzerland and the Scandinavian countries lead the way. In Switzerland, for example, over 10 percent of agricultural land is managed organically.

While various forms of certified farming are growing at higher annual rates than conventional agriculture in many parts of the world, the base is still relatively small. The complexity and cost of implementing certification systems constitute significant barriers to the spread of agricultural certification, especially for small-scale producers in developing countries. In the case of organic certification, this is often exacerbated by the long transition period after abandoning chemical-intensive farming – typically several years – before products can be certified organic.

In response to these challenges, efforts are underway in various developing regions to adapt certification standards and practices to local conditions. One example is the East African Organic Standard[53], which is being developed by a public–private partnership of East African businesses, government agencies, organic movements and certification bodies, in cooperation with UNCTAD, UNEP and IFOAM. The aim of the partnership is to boost organic trade and market development in the region, define a common vision of organic agriculture in East Africa, raise awareness about organic produce among farmers and consumers, enable economies of scale in training materials and certification, and create a unified negotiating position that should help organic farmers win access to export markets. A further objective is to influence international organic standard setting processes.

Large food and agriculture companies are increasingly involved in promoting and buying certified produce. Prominent examples include Chiquita and Kraft foods, which are purchasing and promoting bananas, coffee and cocoa certified by

52 Willer, H. and Yussefi, M. (eds.) 2007. *The World of Organic Agriculture, Statistics and Emerging Trends, 2007*. IFOAM Publication, 9th ed., International Federation of Organic Agriculture Movements, Bonn, Germany & the Research Institute of Organic Agriculture (FiBL): Frick, Switzerland.

53 www.unep-unctad.org/CBTF/events/dsalaam2/EAS%20456-2007_Organic%20products%20standard_PRINT.pdf.

Rainforest Alliance (RA), and MacDonald's, Proctor & Gamble and Nestlé, which are major buyers of fair trade certified coffee.

At the same time, in some quarters, there are concerns about the proliferation of certification systems and labels. Potential problems include customer confusion in the face of multiple seals, as well as the related difficulty of clearly communicating the unique attributes of the various systems.

Some certification programmes give prominence to biodiversity and ecological criteria, notably the Rainforest Alliance and the Smithsonian Migratory Bird Centre ('bird-friendly'). Other schemes address such issues little or not at all. For example, organic certification focuses primarily on farming practices that avoid the use of industrial fertilisers, pesticides and some other agricultural inputs, as well as genetically modified organisms (GMO), but does not generally require protection of natural vegetation, water bodies, fauna, etc. (although IFOAM has draft criteria – see below).

There is little rigorous analysis or compelling evidence to support claims about the positive biodiversity benefits of certified sustainable agriculture. Most existing agricultural certification schemes focus on the individual farm level, with little or no attention to impacts on biodiversity at the landscape level. There is even less analysis of the cost-effectiveness of different practices or how these might be combined, sequenced over time or located physically within given landscapes to manage the trade-offs between biodiversity and agricultural production. Examples of biodiversity-friendly agriculture practices being promoted and adopted by producers on a large-scale are extremely scarce. In response, several agricultural certification systems are working to incorporate biodiversity in their standards. IFOAM, for example, has developed draft landscape and biodiversity standards that could be incorporated into its organic standards in the future[54]. In a similar vein, the BioTrade Initiative of UNCTAD is developing biodiversity certification mechanisms for its partners in developing countries. The Principles and Criteria are described in **Box 3**.

Box 3. UNCTAD BioTrade principles and criteria

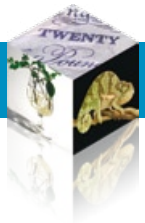
Based on several years' experience in countries around the world, a general set of principles has been defined for the UNCTAD BioTrade initiative, its programmes and partners:

1. Conservation of biodiversity.
2. Sustainable use of biodiversity.
3. Equitable sharing of benefits derived from the use of biodiversity.
4. Socio-economic sustainability (management, production and markets).
5. Compliance with national and international legislation and agreements.
6. Respect for the rights of actors involved in BioTrade activities.
7. Clarity about land tenure, use and access to natural resources and knowledge.

The BioTrade Principles provide a basis for defining other tools, such as a verification framework for BioTrade products (www.BioTrade.org/BTFP/BTFP-docs/Working_docs/BT_verification.pdf) and the BioTrade Impact Assessment System.

Source: www.BioTrade.org.

54 www.ifoam.org/about_ifoam/standards/norms/draft_standards/BiodiversityDraftStandardsD20050728.pdf.



4.2.4 Agriculture – gaps and business investment opportunities

A priority is to develop and promote more cost-effective monitoring and evaluation methodologies to assess the biodiversity impacts of agricultural practices, along with the associated metrics and indicators. One promising approach is to focus on reducing major threats to habitat and species. For example, if 'slash and burn' agricultural practices and the associated uncontrolled fires are identified as major threats to biodiversity in a given area, then measures could be taken to monitor the incidence and severity of man-made fires, in relation to efforts to educate farmers about alternative practices and fire prevention techniques. Foundations of Success, a USA-based conservation organisation, advocates such a threat-reduction approach to conservation monitoring and evaluation as a relatively simple, lower-cost and accessible means to gauge the impact of conservation measures, rather than seeking to collect and analyse more comprehensive information on conservation outcomes[55]. The monitoring and evaluation methodologies and associated sharing of information promoted by the Conservation Measures Partners Initiative[56] are also relevant. Using landscapes as the unit of analysis and planning, as advocated by EcoAgriculture Partners[57] and the Global Partnership on Forest Landscape Restoration[58], among others, may offer a practical way forward.

Specific opportunities for improving the biodiversity impacts of agriculture include:

1. Assist agriculture-based enterprises within important biodiversity landscapes. This approach would be more effective where agricultural expansion and current practices pose significant, but controllable, threats to biodiversity. This approach could build on the practice of using environmental screening systems to select suitable areas and enterprise activities. Organisations using this approach include Verde Ventures and the European Bank for Reconstruction and Development (EBRD)[59], which is developing a programme in Poland using the Natura 2000 network of protected areas as the reference for such decisions.
2. Support eco-agriculture approaches in priority production landscapes with specific private sector partners. Such activities could be implemented in partnership with development and conservation organisations and local government and community representatives. The development and application of cost-effective, credible monitoring and evaluation systems and practical biodiversity metrics would be central to such support.
3. Support donors and development organisations, notably eco-investment funds focusing on small and medium-sized enterprises, to scale-up their support for environmentally-friendly agricultural enterprises in existing target regions and to expand their operations to new regions, notably Africa and Asia.
4. Support efforts to convert marginal agricultural land to native habitat, via assisted natural regeneration – ideally with a focus on biological corridors – alongside intensifying agricultural production, using biodiversity-friendly practices, on more suitable land. This approach could be implemented through payments for environmental services, tax breaks, or other incentives.
5. Promote 'responsible' biofuel feedstock production. An initial step could be to 'map' different biofuel feedstocks and their impacts against a range of criteria, including social, environmental and economic, as an input to standard setting, certification and policy dialogue. This should include attention to trade policy aspects.

55 fosonline.org/Site_Page.cfm?PageID=4.
56 This initiative is coordinated by Foundations of Success (fosonline.org).
57 See www.eco-agriculturepartners.org.
58 See www.unep-wcmc.org/forest/restoration/globalpartnership.
59 See www.ebrd.com.

4.3 Forestry

Certification standards for forests and forest products are increasingly recognised by consumers and respected by producers. However, the total percentage of certified timber is low, particularly in developing countries.

In addition to certification schemes, other approaches to sustainable forest management include Joint Forestry Management and Community Forestry – which are most widespread in South Asia, and community-owned forestry enterprises – which are most common in Latin America.

There is a need to promote more efficient timber processing and charcoal manufacturing technologies, in order to improve the currently very low conversion rates in many developing countries.

A growing opportunity for many companies is to manage forest resources in ways that optimise a range of benefits, e.g. selling certified wood products, tapping into emerging markets for environmental services, NTFP, ecotourism and other 'green' products and services.

To enable more widespread adoption of sustainable forestry, there is a need to address policy issues related to land tenure, use rights and the decentralisation of forest management to involve local communities, and also to combat illegal logging and corruption in the timber trade.

4.3.1 What is sustainable forestry?

Sustainable forest management seeks to ensure that "*forest-related activities should not damage the forest to the extent that its capacity to deliver products and services – such as timber, water and biodiversity conservation – is significantly reduced. Forest management should also aim to balance the needs of different forest users so that its benefits and costs are shared equitably*"[60]. Sustainable forestry and related 'low impact' logging practices are designed to minimise adverse impacts on forests, rivers and streams, protect important habitats, maintain the various environmental services that forests provide, and allow for the sustainable harvesting of NTFP (see **Section 4.4**). Broader definitions of sustainable forestry include a range of socio-economic objectives such as poverty reduction, social equity and empowerment. From a biodiversity perspective, a key element of sustainable forestry involves identifying environmentally sensitive areas and managing them under relatively strict guidelines – see **Box 5** below on High Conservation Value Forests.

Increasingly, the credibility of claims regarding sustainable forest management are tested and validated through certification by qualified, independent organisations. Several certification standards are in use, including those developed by the Forestry Stewardship Council (www.fsc.org), the Sustainable Forest Initiative (SFI) (www.aboutsfi.org), the Canadian Standards Association (www.csa.ca), and

60 See International Tropical Timber Organization: www.itto.or.jp.

the Program for the Endorsement of Forest Certification (PEFC) (www.pefc.org/internet/html/about_pefc.htm).

4.3.2 Forestry – status and trends

According to the Food and Agriculture Organization's (FAO) 2005 Global Forest Resources Assessment, forests currently cover nearly 4 billion ha or 30 percent of the world's land area, with two-thirds concentrated in just 10 countries: Australia, Brazil, Canada, China, the Democratic Republic of the Congo, India, Indonesia, Peru, the Russian Federation and the USA. Between 1961 and the late 1990s, more than 500 million ha of forests were lost in the tropics[61], while consumption of forest products rose by 50 percent[62]. More recently, between 2000 and 2005, the world lost an average of 7.3 million ha per year (an area about the size of Panama) or 0.18 percent of global forest area, down from 8.9 million ha per year between 1990 and 2000. The apparent deceleration of forest loss is mainly due to new planting and natural expansion of existing forests in some regions.

Gains in forest cover do not necessarily occur in the same place as losses. Thus, during the period 2000 to 2005, South America suffered the largest net loss of forest (around 4.3 million ha per year), closely followed by Africa (4.0 million ha per year). Asia moved from a net loss of around 800,000 ha per year in the 1990s to a net gain of 1 million hectares per year between 2000 and 2005, primarily due to large-scale afforestation reported by China. Forest areas in Europe continued to expand, although at a slower rate than in the 1990s.

New forests are being planted at increasing rates, although plantations still account for less than 5 percent of total forest area. Moreover, planted forests are generally far inferior to natural forests in terms of their biodiversity value.

Market data on the supply of and demand for timber products can be found in the Forest Products Annual Market Review 2005–2006[63]. This and other sources show that raw log exports from tropical countries have declined over the long-term, largely due to export bans on unprocessed timber in Africa and Asia, and increasing exports of reconstituted panels, pulp, paper and secondary-processed wood products. Less familiar timber species are also being increasingly promoted as supplies of traditional woods become scarcer[64]. Unfortunately, timber conversion rates in sawmills in many developing countries remain low. Average rates are as low as 35 percent in some countries, notably in Africa. Hence increasing 'value added' through local processing often translates into less efficient use of raw materials and thus more logging.

Illegal logging, under-payment of forest taxes and illicit exports remain widespread. According to the World Bank, for most of the last 10 years illegal log production in Indonesia has exceeded legal harvesting[65]. Efforts to combat this problem globally include a range of intergovernmental and regional activities under the Forest Law Enforcement and Governance (FLEG) initiative[66].

Many of the world's poorest people live in or near and rely heavily on forests for a range of products and services[67]. Over half of all wood harvested is burned as fuel, mainly in developing countries[68]. In Nepal, Uganda, Rwanda, and Tanzania, woodfuels provide 80 percent or more of total energy requirements. Fuelwood consumption rose by nearly 80 percent between 1961 and 1998, slightly trailing world population growth of 92 percent over the same period. The largest increases in fuelwood consumption were reported in Asia and Africa.

The forest certification schemes mentioned previously are most developed in temperate and boreal forests. In 2002, only 8 percent of the total forest area certified by all schemes was in the tropics, mostly in Central and South America

61 FAO. 2000. *Commodity Market Review 1999–2000.* Commodities and Trade Division, FAO: Rome.

62 Gardner-Outlaw, T. and Engelman, R. 1999. *Forest Futures: Population, Consumption, and Wood.* Washington, D.C: Population Action International (www.populationaction.org/Publications/Reports/Forest_Futures/Summary.shtml).

63 Geneva Timber and Forest Study Paper 21, ECE/TIM/SP/21, United Nations Publications.

64 UN Economic Commission for Europe / FAO Forest Products Annual Market Analysis 2002–2004 (available from www.unece.org/trade/timber/docs/fpama/2003/fpama2003a.htm).

65 The World Bank. 2006. *Sustaining Economic Growth, Rural Livelihoods, and Economic Benefits: Strategic Options for Forest Assistance in Indonesia.* The World Bank Office, Jakarta, noted in Obidzinski, K., Andrianto, A. and Wijaya, C. 2007. Cross-Border Timber Trade in Indonesia: Critical or Overstated Problem? Forest Governance Lessons from Kalimantan. *International Forestry Review* 9(1): 526–535.

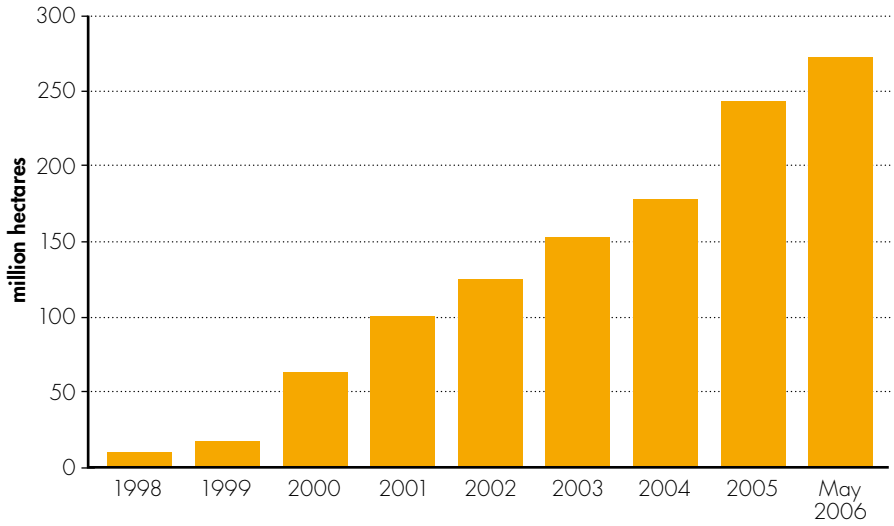
66 See www.iucn.org/themes/fcp/publications/files/fleg/iucn-fleg-brochure-may2006.pdf.

67 McNeely, J.A. and Scherr, S.J. 2003. *Ecoagriculture: Strategies to Feed the World and Save Biodiversity.* Island Press: Washington D.C.

68 FAO. 1999. *State of the World's Forests* (available from: www.fao.org/docrep/W4345E/w4345e00.htm).

and on plantations, with barely any in Africa. However, the pace of certification in the tropics is beginning to accelerate and several new initiatives are underway (see **Figure 7**). Forest industries in Africa have taken the initiative to develop a Pan African Certification Scheme, supported by the African Timber Organisation and The Center for International Forestry Research (CIFOR). Malaysia and Indonesia have also developed independent national certification schemes (Malaysian Timber Certification Council; Indonesian Ecolabelling Institute). The main markets for certified timber are currently the UK, Germany and the Netherlands, followed by the USA, Japan and France[69].

Figure 7. Certified forest area worldwide



Source: Redrawn with permission, based on Graph 1.2.2 in UNECE (2006) *Forest Products Annual Market Review: 2005-06*. Geneva Timber and Forest Study Paper 21. UN Economic Commission for Europe/FAO, New York and Geneva, available at www.unece.org/trade/timber/docs/fpama/2006/fpamr2006.pdf.

4.3.3 Forestry – what is working / not working

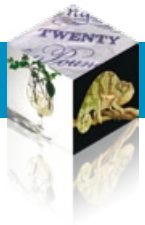
While the direct costs of certification may be insignificant for large forest operators, they can be a challenge for many small-scale forest producers, including most community forestry enterprises[70]. As well as the costs of the certification process itself, there are the additional costs of meeting the higher production standards required to access high-value markets. Meanwhile the timber market as a whole is increasingly driven by competition from relatively inexpensive plantation timber.

Alongside certification schemes, there are a number of other approaches to sustainable forest management (see for example **Box 4** and **Box 5**). Two examples that involve significant participation of local communities are Joint Forestry Management (JFM), which is widespread in parts of India, and Community Forestry in Nepal. Both systems are based on the partial delegation of forestry management responsibilities to local committees comprised of community users and local and national authorities. Typically local communities are provided with secure access and use rights to forest resources in return for in-kind contributions to forest management, conservation and / or rehabilitation. These and other initiatives to decentralise forest management have resulted in a doubling of community-owned and administered forest lands, to 22 percent of all developing country forests, or three times the area owned by private individuals and firms[71].

69 www.tropenbos.nl/DRG/certification.htm.

70 See, for example, *What Do We Know About the Costs and Benefits Of Tropical Timber Certification?* 2004. Timbmet Group Ltd: Oxford.

71 White, A. and Martin, A. 2002. *Who Owns the World's Forests? Forest Tenure and Public Forests in Transition*. Forest Trends and Center for International Environmental Law: Washington, D.C.



Box 4. Promoting certified timber markets in Central America

For several years WWF Central America has been promoting forest certification among producers, under the FSC Standards, while at the same time encouraging the use of certified forest products in the construction industry. The latter effort has targeted architects, hotels, construction firms, and manufacturers in Costa Rica and Nicaragua. On the supply side, WWF has been working at the Nicaragua's Northern Atlantic Autonomous Region, home of the Miskito and Sumo indigenous groups and the largest remaining block of forest in Mesoamerica. A major success for WWF and the indigenous community has been the negotiation of a favourable price for the certified wood, representing a 200 percent increase over the prevailing market rate. In addition, WWF and Nicaragua's national and local environmental agencies field-tested a participatory Environmental Impact Assessment methodology in two community forests covering over 40,000 ha, which has proved effective in achieving and maintaining FSC certification.

Box 5. High Conservation Value Network launched

The concept of High Conservation Value Forests (HCVF) was originally developed in the context of FSC certification but is increasingly used by timber buyers, land-use planners, conservation advocates and governments. In 2006, the HCV Resource Network was established by a group of organisations using the HCV approach, including environmental and social NGOs, international development agencies, timber and forest product certifiers, suppliers and buyers, and forest managers. The Network aims to encourage collaboration, provide information and support on the evolving usage of HCV, and ensure that a consistent approach to HCV is understood and applied throughout the world. Proforest serves as the Network's secretariat.

Source: www.hcvnetwork.org.

The JFM approach is currently applied to 27 percent of India's forest area and encompasses 85,000 village committees[72]. JFM forests are mainly used as a safety net during difficult economic periods or for seasonal subsistence products like fuelwood and fodder. To achieve the full potential of JFM, the World Bank has called for: (i) stronger forest rights and responsibilities for forest communities; (ii) more effective management systems targeted at communities involved with forestry; (iii) improved access to more efficient market systems for major and minor products; and (iv) more effective and flexible institutions and capacities.

Community-based and small-scale forest enterprises have emerged throughout the developing world[73]. In Mexico, 750 communities own timber enterprises. Forest communities in Nepal and India generate more than US$3 billion in economic activity annually. Forest producers in Indonesia and South-East Asia conserve highly diverse forests in agro-forestry systems. These enterprises have had a favourable impact on community incomes, rejuvenated cultural and social processes, built local institutional capacity for self-development, stabilised the resource base and checked deforestation with limited outside investment. Global demand for timber and NTFP continues to grow while at the same time forests are increasingly valued for their environmental services. Consequently communities will need to learn to manage these resources as multi-value assets, tapping into new revenue streams to optimise returns in the broadest sense.

72 World Bank. 2006. *India: Unlocking Opportunities for Forest Dependent People in India. Main Report: Volume 1.* Report No. 34481-IN. Agriculture and Rural Development Sector Unit, South Asia Region (6 February 2006).

73 Molnar, A., Scherr, S.J. and Khare, A. 2004. *Who Conserves the World's Forests? Community-Driven Strategies to Protect Forests & Respect Rights.* Forest Trends: Washington, D.C.

A number of organisations currently provide support for such producers to obtain certification and access to international markets – for example, the Rainforest Alliance Training Research, Extension, Education and Systems (TREES) programme, WWF's JagWood Program, Forest Trends and the Tropical Forest Trust[74]. However, there remains a need to expand the scale and geographic scope of such assistance to meet the needs of vastly underserved forestry communities globally.

4.3.4 Forestry – gaps and business investment opportunities

1. Support the adoption of certification standards in developing countries, particularly in regions where these are currently non-existent or embryonic. As with other certification systems, improved monitoring and evaluation systems for measuring the impacts of such practices on biodiversity and livelihoods are required.
2. Address the policy issues related to land tenure, use rights and the decentralisation of forest management to involve local communities, paying particular attention to vulnerable community members, notably women and ethnic / religious minorities. Such work should include a focus on the fuelwood and charcoal sectors, given their importance for forest conservation and community livelihoods in many parts of the world, and the relative lack of attention they currently receive from the international development and conservation communities.
3. Invest directly or indirectly (e.g. via existing eco-enterprise funds) in companies that market certified sustainable timber and timber products, particularly from High Conservation Value Forests. This could include technical assistance to help develop more profitable businesses and ensure sustainable management practices and access to markets.
4. Develop and promote more efficient timber processing and charcoal manufacturing technologies, in order to improve the currently very low conversion rates in many developing countries.
5. Invest in companies that manage forest resources to optimise the environmental benefits they provide, e.g. by selling certified timber and wood products, tapping into emerging markets for environmental services, in addition to NTFP markets, ecotourism and other 'green' markets.
6. Support efforts to implement new and enforce existing policies, and promote practices to combat illegal logging and corruption within the forestry sector, particularly in those countries and regions where these problems are most rampant.

74 www.rainforest-alliance.org/programs/forestry/trees/services/index.html; www.forest-trends.org; www.wwfca.org/php/resena/jagwood/JagWood3eng.php; www.tropicalforesttrust.com.

4.4 Non-timber forest products

Non-timber forest products, including 'bushmeat', are major sources of subsistence and cash income and are especially important to the rural poor. Efforts to promote more sustainable use of forests have led to increased interest in NTFP collection and marketing as an instrument for rural development.

The 'sustainability' of NTFP use depends upon a number of factors including the nature of government polices and their enforcement, the allocation of property rights, the ability of local people to claim and enforce such rights, market transparency, business management skills and of course the pressure on NTFP resources; there are currently few practical, scientifically-credible guidelines for sustainable NTFP harvesting.

The FSC has recently developed standards for NTFP certification that hold promise for providing such guidance; even so, FSC certification is probably still most appropriate for large-scale industrial NTFP operations, given its relatively high costs.

There is an opportunity to support NTFP enterprises that promote best management practices regarding sustainable harvesting and support for local communities; such efforts would need to address land tenure or NTFP access rights to be effective in the long-term.

A related need is to support the broader adoption of NTFP certification, the development of lower-cost systems, and research to measure the impacts of NTFP harvesting at both the individual product / species and the habitat / landscape level.

4.4.1 What are NTFP?

Non-timber forest products are natural products other than wood derived from forests or wooded land. While this section focuses on products derived from forests, there is also significant subsistence use and trade in other 'minor' products extracted from dryland, marine / aquatic and other ecosystems (**Box 6**). Examples of NTFP include edible nuts, mushrooms, fruits, herbs, spices, honey, gums and resins, rattan, bamboo, thatch, cork, ornamental plants and flowers, and an array of plant and animal products used for medicinal, cosmetic, culinary, cultural or other purposes. A significant category of NTFP is animal species hunted for their meat, skins, and other products, often referred to as the 'bushmeat trade'. It is important to note that NTFP introduced as cash or subsistence crops in some parts of the world have become invasive, posing a threat to local biodiversity.

Box 6. The value of wild plants, animals and freshwater fisheries in Senegal

The VALEURS project (*VALorisation des Espèces pour une Utilisation durable des Ressources Sauvages au Sénégal*) aimed to enhance the sustainable use

of wild species by rural people through appropriate national policies, planning and investment in Senegal. One of its objectives was to assess the economic value of wild resources relative to other activities and resources in Senegal.

Excluding the economic value of fuelwood, charcoal and building materials derived from wild plant resources, research suggests that a full accounting of the harvest of NTFP in two major producing regions in Senegal would add at least US$2 million per annum to national income, with the annual value added across the entire supply chain in the range US$2.3 to US$4.3 million. Extrapolation from the two regions surveyed to the rest of the country yields an estimated median annual value added of approximately US$6.3 million, equivalent to about 14 percent of the recorded value added in the forest sector in the year 2000 (which excludes most NTFP).

The economic contribution of freshwater fisheries was estimated at between US$15 and 20 million, equivalent to 19–26 percent of the reported value added in the marine fisheries sector in 2000. This includes value added from production through to wholesale markets and the market value of home consumption, but excludes value added in retail distribution.

Source: Ba, C.O. *et al.* 2006. *The Economic Value of Wild Resources in Senegal: A preliminary evaluation of non-timber forest products, game and freshwater fisheries.* IUCN: Gland, Switzerland, and Cambridge, UK.

4.4.2 NTFP – status and trends

Globally, millions of households depend heavily on NTFP for subsistence and / or cash income. Some 80 percent of people in the developing world use NTFP for food and medicine, with women from poor households being particularly reliant on NTFP for household use and income[75]. A synthesis of 54 case found shows that forest resources generate about one-fifth of household income, on average, in poor rural areas of developing countries[76]. Studies of NTFP commercialisation in Bolivia and Mexico concluded that NTFP provide between 7 and 95 percent of annual household cash income for the rural poor, and often provide a safety net when other sources of income fail[77]. In addition to local uses, many NTFP are traded internationally (see **Box 7**).

Box 7. Bamboo and rattan – facts and figures

- Over one billion people in the world live in bamboo houses.
- The world trade in bamboo and rattan is currently estimated at US$5 billion per year.
- Annual exports of bamboo shoots from Taiwan alone are approximately US$50 million.
- The paper industry in India uses 2.2 million tons (2 million tonnes) of bamboo each year.
- Indonesia is the major supplier of rattan, accounting for nearly 70 percent of global trade, with annual exports of US$700 million.

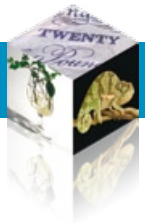
Source: International Network for Bamboo and Rattan: www.inbar.int/facts.htm.

One of the most important NTFP is bushmeat, or meat and other products from wild animal species. Bushmeat has ecological, nutritional, economic and intrinsic values, although present policies and practices have largely failed to reconcile these different values in a sustainable way. In many parts of the world, notably in large parts of West and Central Africa, South-East Asia, Australasia and the

75 Tropenbos website, www.tropenbos.nl.

76 Vedeld, P., Angelsen, A., Sjaastad, E. and Kobugabe-Berg, G., 2004. *Counting on the Environment: Forest Incomes and the Rural Poor.* Environment Department Papers 98. World Bank: Washington D.C.

77 Marshall, E., Schreckenberg, K. and Newton, A.C. (eds). 2006. *Commercialization of Non-timber Forest Products: Factors Influencing Success. Lessons Learned from Mexico and Bolivia and Policy Implications for Decision-makers.* UNEP World Conservation Monitoring Centre, Cambridge, UK. Available at www.unep-wcmc.org/forest/ntfp/outputs.cfm.



Amazon Basin, bushmeat is an important component of household food security and cash income. Estimates of the value of the bushmeat trade range from US$42 million to US$205 million per annum, across the countries of West and Central Africa[78]. In Ghana alone, another estimate is that every year 385,000 tonnes of bushmeat are harvested (valued at US$350 million) and 92,000 tonnes are marketed (valued at US$83 million), with 60 percent of all sales occurring in urban areas[79]. However, there is growing concern that current levels of bushmeat extraction are not sustainable and will lead to the extinction of many threatened species. Policy development to mitigate this risk is impeded by a lack of information on the bushmeat trade as well as its biological sustainability (see **Box 8**).

Box 8. The sustainability of the bushmeat trade[80]

A study by the Zoological Society of London suggests that the bushmeat trade may be sustainable in some parts of West Africa. Focusing on the city of Takoradi in Ghana and on ten mammal species (mostly small antelopes and rodents), accounting for 84 percent of the meat sold locally, the study demonstrated that hunters are capturing fewer animals than is theoretically sustainable, although past hunting seems to have caused slow reproducing species of monkeys, hogs, and antelopes to become rare or absent in local forests. The authors acknowledge that in much of West Africa, many large wildlife species are in decline or extinct due to the combined effects of habitat loss and hunting. The study concludes however that there is little to be gained from focusing on commercial hunting in areas where it has been practiced for many years. Instead, the biggest problems arise when new forest areas are opened for hunting by logging operations or new roads, or regions are settled for the first time. Moreover, the sustainability and biodiversity impacts of the bushmeat trade vary dramatically from region to region, so that the situation in Ghana is quite different from that in Central Africa, South-East Asia, and the dryland forests of Southern and Eastern Africa, for example. The study notes that in remote areas of Central Africa, for example, bushmeat is a more pressing conservation issue. Wildlife in aggregate may still be abundant, but scarce, slow-breeding species such as gorillas, chimpanzees, elephants, and bongo are at risk of local extinction. Equally, the bushmeat harvest needs to take into account the productivity of the ecosystem: productivity in tropical forests is generally low relative to tropical grasslands, while the productivity of secondary forests tends to exceed that of primary forests.

4.4.3 NTFP – what is working / not working

NTFP have attracted considerable interest in recent years due to their ability to support rural livelihoods while also contributing to conservation objectives. Efforts to promote more sustainable use of forests have led to increased interest in NTFP collection and marketing as an instrument for sustainable development (see example described in **Box 9**).

Box 9. Linking conservation and local economic development at Flower Valley, South Africa

South Africa's Cape Floral Kingdom is the world's most botanically rich habitat. Nearly 70 percent of the plant species there are found nowhere else on Earth. It is home to the heath-like fynbos vegetation type, the global record holder for floral diversity. However, the flowers of the fynbos are at great risk from agricultural (e.g. vineyards) and urban development, and other threats. Between 1999 and 2002, Fauna & Flora International (FFI) purchased 1,338 ha of

78 Davies G. 2002. Bushmeat and International Development. *Conservation Biology* 16: 587–589.

79 Ntimoa-Baidu Y. 1998. *Sustainable Harvesting, Production and Use of Bushmeat*. Accra: Wildlife Department, Ghana.

80 Bennett, E.L., Blencowe, E., Brandon, K., Brown, D., Burn, R.W., Cowlishaw, G., Davies, G., Dublin, H., Fa, J.E., Milner-Gulland, E.J., Robinson, J.G., Rowcliffe, J.M., Underwood, F.M. and Wilkie, D.S. 2007. Hunting for Consensus: Reconciling Bushmeat Harvest, Conservation and Development Policy in West and Central Africa. *Conservation Biology* 21(3): 884–887.

globally important fynbos land (and the associated flower harvesting operation – Flower Valley Farm) that would have otherwise been developed as vineyards. The Flower Valley Conservation Trust (FVCT) was established by FFI to assume ownership and assess opportunities to link conservation and local economic development through the sustainable use of natural resources.

In 2002, FFI engaged Shell South Africa and Shell International Limited to work with FVCT to develop a business model that utilised Shell's network of retail petrol stations in South Africa and the UK for flower sales. Shell Foundation also contributed US$240,000 to enable FVCT to hire an executive director and purchase farm equipment. In 2003, a new commercial entity, Fynsa, was created to manage the commercial operations and sold to investors, allowing FVCT to focus on non-profit activities. The Shell Foundation then assisted Fynsa to develop an innovative partnership with the UK retailer Marks & Spencer (M&S) to facilitate access to a much larger retail market. The Foundation has also funded some 20 neighbouring farms to meet international labour standards and supply Fynsa with flowers for M&S, thereby helping to ensure the continued use and protection of the natural flora.

Despite this emphasis, however, there is no guarantee of a positive outcome. NTFP have rarely delivered on their early promise. High estimates of the values of forest fruits and other products that were demonstrated for some ecosystems, for example in lowland Peru, have not been reflected in the development of markets to capture that value[81]. In addition, exploitation of NTFP requires the same measure of restraint and planning that is required for timber so that it remains sustainable. There have been several infamous examples of some species with medicinal properties being seriously over-harvested due to rapid surges in demand and the relatively high prices offered to collectors. Examples include *Prunus africana*, which is used to treat prostate cancer and has now virtually disappeared from the wild in Cameroon, as well as the trade in wild animal products for Chinese traditional medicines.

Recent research on NTFP commercialisation in Africa, Asia, and Latin America concluded that the greater the exploitation of NTFP for livelihood purposes, the lower the contribution of those NTFP to forest conservation[82]. At the species level, the commercial exploitation of wild products tends to lead to their depletion, while on a landscape scale NTFP can have a positive conservation impact as they represent an environmentally-friendly alternative to agriculture and competing other land uses.

While commercialisation of NTFP does not consistently contribute to poverty alleviation, it can form part of a broader development package. Factors determining the outcomes of NTFP development include the nature of government involvement, the existence / distribution of tenure or property rights, the ability of local people to claim and enforce such rights, market transparency, and pressure on the resource. Some recent studies highlight the positive role of 'middlemen' in helping communities bring their NTFP to the market[83]. However, researchers have also noted that poor people may not be able to compete with local 'elites' when new opportunities arise from the commercialisation of NTFP[84].

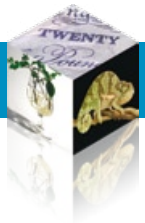
A particular challenge for the management of NTFP is to develop practical harvesting guidelines for local collectors and to verify that these harvesting practices are followed and are, in fact, sustainable. One illustration involves the harvest of *Illipe* nuts in South-East Asia. The trees from which these nuts are collected have highly variable production levels, in some years producing more than 10 times the

81 Sheil, D. and Wunder, S. 2002. The Value of Tropical Forest to Local Communities: Complications, Caveats, and Cautions. *Conservation Ecology* 6(2): 9. Available at www.consecol.org/vol6/iss2/art9.

82 Kusters, K., Achdiawan, R., Belcher, B. and Ruiz Pérez, M. 2006. Balancing Development and Conservation? An Assessment of Livelihood and Environmental Outcomes of Non-timber Forest Product Trade in Asia, Africa, and Latin America. *Ecology and Society* 11(2): 20. Available at www.ecologyandsociety.org/vol11/iss2/art20.

83 Marshall, E., Schreckenberg, K. and Newton, A.C. (eds). 2006. *Commercialization of Non-timber Forest Products: Factors Influencing Success. Lessons Learned from Mexico and Bolivia and Policy Implications for Decision-makers.* UNEP World Conservation Monitoring Centre: Cambridge, UK. Available at www.unep-wcmc.org/forest/ntfp/outputs.cfm.

84 Belcher, B. and Schreckenberg, K. 2007. Commercialisation of Non-timber Forest Products: A Reality Check. *Development Policy Review* 25(3): 355–377.



volume of 'normal' years. Determining and enforcing a sustainable harvest in any given year is no easy task, in such circumstances.

Recently, the FSC has developed standards for NTFP certification and established an NTFP Working Group to conduct trial certification assessments. FSC is investigating various models of community-based certification, e.g. where a number of harvesters are certified as a group or where a resource manager is certified to oversee multiple harvesting operations.

Another recent report explores why some NTFP initiatives succeed while others do not, based on 19 case studies from Mexico and Bolivia[85]. The authors conclude that: (i) a lack of market knowledge and financial capability combined with poor infrastructure are the main constraints on successful NTFP commercialisation; (ii) specialised marketing holds good promise, but the associated certification costs may be prohibitive for small-scale producers; (iii) innovation in both resource management and product processing and marketing is often critical to maintain market share; and (iv) entrepreneurs can play a key role in facilitating access to markets by providing information, skills and financial support. The report recommends that governments should: (i) support the development of the NTFP sector by clearly stating which laws apply to NTFP, when they apply, and who is responsible for implementing them; and (ii) encourage lending institutions to recognise the commercial potential of NTFP enterprises and facilitate access to credit for the rural poor and small-scale entrepreneurs.

Additional recommendations for interventions at the community level include: (i) targeting assistance to develop the business skills of rural communities to help them avoid exploitation by others; (ii) identifying and building the capacity of potential entrepreneurs and assisting socially-responsible entrepreneurs; and (iii) providing technical know-how and organisational skills to improve sustainable resource management and harvesting, domestication (where appropriate), and product processing (see **Box 10** for an example of an NTFP assistance initiative).

Box 10. PhytoTrade Africa[a]

PhytoTrade Africa is a non-profit trade association that promotes sustainable production and fair trade of natural products in southern Africa. It provides product development, marketing, technical advice, research and development and advocacy services for its members. Clients can be linked directly to suppliers, quality control assurances, ecological product profiles, and receive help with import / export regulations and contracts. The association also provides a clearinghouse for research and development information on African natural products. Through its European office, there is a strong emphasis on the development of close relationships with key players in the European market. PhytoTrade Africa focuses on no more than 10 different plant species at any one time for its product development work, and chooses those with the most immediate potential for commercial applications helping members with trading relationships, maintaining a reliable supply and adhering to relevant quality standards.

a See www.phytotradeafrica.com for further information.

85 Schreckenberg, K., Marshall, E., Newton, A., Rushton, J. and te Velde, D.W. 2005. *Commercialization of Non-Timber Forest Products: Factors Influencing Success. Methodological Procedures.* Project R7925/ZF0137 funded by the Forestry Research Programme of the UK Department for International Development (November 2000 – November 2005) (quin.unep-wcmc.org/forest/ntfp/cd/10_Data_collection_tools/a_Methodological_procedures.pdf).

4.4.4 NTFP – gaps and business investment opportunities

A broad strategy of support is required to promote businesses linked to sustainable use of NTFP, including:

1. Strengthen the business skills of NTFP suppliers and their local organisations, while at the same time assisting external buyers to understand and work effectively with them.
2. Support NTFP producers to overcome regulatory, research and development, and other hurdles to register new products and enter new markets, both in export and domestic markets.
3. Support policy initiatives to secure land tenure and / or NTFP utilisation rights, to promote more sustainable harvesting practices and longer-term investment in processing and other value-addition activities.
4. Provide training and technical assistance to NTFP producers in market research, product development, quality control, export marketing and supply chain management.
5. Improve knowledge and practice of monitoring and evaluating the ecological sustainability of NTFP production; this may include support for domestication of some species, where appropriate.
6. Support independent certification of NTFP sustainability and the associated market differentiation, as well as more equitable models for benefit sharing and / or price premiums for community-level suppliers, paying particular attention to disadvantaged or vulnerable community members, such as women and ethnic / religious minorities.

Some specific business opportunities linked to NTFP include:

1. Invest in a portfolio of NTFP enterprises, either in a small number of high potential product markets, or a broader 'market basket' of products, that promote best management practices with respect to sustainable harvesting and support for local communities. This approach may conserve biodiversity more effectively if it focuses on priority landscapes, as part of support for a range of biodiversity-friendly enterprises. Such efforts would likely need to address land tenure / NTFP access rights to be effective in the long-term.
2. Invest in existing SME funds that support NTFP businesses, with equity and / or debt financing; alternatively, create new funds that can focus on NTFP enterprises, particularly in regions with market and conservation potential that are not covered by existing funds, such as parts of Africa and Asia.
3. Support the broader adoption of NTFP certification, the development of lower-cost systems, and research to measure the impacts of NTFP harvesting at the individual product / species and habitat / landscape level.

4.5 Fisheries and aquaculture[86]

75 percent of commercially-important marine and most inland water fish stocks are currently either over-fished or on the verge of being over-fished.

Aquaculture is growing very rapidly, particularly in Asia, and is increasingly viewed as a potential solution to over-fishing of wild stocks, albeit one that comes with its own set of environmental issues.

Several certification schemes are being developed to promote sustainable capture fishery and aquaculture but only a fraction of the world's capture fisheries and aquaculture operations currently use environmentally-friendly practices.

There is a need to extend sustainable fisheries certification to address problems such as bycatch and also to expand coverage to developing countries, where certification is currently very limited.

There is an opportunity to invest in certified sustainable fishing and aquaculture; this could be combined with support to expand the operations of sustainable management programmes to a wider range of marine and aquatic species than are included in existing certification schemes.

It may be possible to apply the concept of payment for ecosystem services and / or biodiversity offsets to marine and aquatic protected areas, especially where such areas can be shown to make a significant contribution to fisheries productivity and ecotourism revenue or put forward as compensation for damage elsewhere.

4.5.1 What are sustainable fisheries?

As demand for fish and other marine and aquatic species continues to increase, and as the commercial fishing industry goes to ever greater lengths to access new fish resources, a consensus is emerging that the world's fisheries are in peril. The impact of fisheries on the wider marine and aquatic environment is also of grave and growing concern.

The Marine Stewardship Council (MSC) asserts that sustainable fisheries should be based upon: (i) the maintenance and re-establishment of healthy populations of targeted species; (ii) the maintenance of ecosystem integrity; (iii) the development and maintenance of effective fisheries management systems, taking into account all relevant biological, technological, economic, social, environmental and commercial aspects; and (iv) compliance with relevant local and national local laws, standards and international understandings and agreements[87].

86 Much of the information on aquaculture in this paper comes from WRI (*Farming Fish: the Aquaculture Boom*), available from www.mindfully.org/Food/WRI-Aquaculture-Boom.htm.

87 www.msc.org/assets/docs/fishery_certification/MSCPrinciples&Criteria.doc.

The main reasons for the seafood sector to engage with the issue of biodiversity include:

- *Securing supplies* of target fish. The health of ecosystems determines their productivity, hence an ecosystem approach to managing fisheries is needed to secure long-term supplies.
- *Reputation and access to markets.* Consumers and retailers are increasingly concerned about the impacts of fisheries on target and non-target species and seabed habitats, and are demanding assurances that these are addressed by the industry.

4.5.2 Fisheries and aquaculture – status and trends

The marine environment is particularly rich in biodiversity. Currently, more than 20,000 species of fish are known. Fish are the most globally significant source of wild food (including finfish, molluscs and crustaceans) in both developing and developed countries. A multitude of actors are involved in fisheries and the fish trade, including large companies, traders and retailers, government departments, scientific institutions, NGOs and consumers.

According to the World Resources Institute (WRI)[88]:

- 1 billion people – mainly in developing countries – depend upon fish as their primary source of animal protein, and an estimated 35 million people are involved, either full-time or part-time, in fishing and aquaculture.
- The global fish catch for 2000 was valued at US$81 billion, while the international fish trade was worth US$55 billion.
- Over the last 30 years, demand for seafood products has doubled and is anticipated to grow at 1.5 percent per year through to 2020.

WRI also notes that 75 percent of commercially important marine fish, and most inland water fish stocks, are currently either over-fished or are on the verge of being so. More detail is provided by the UN Food and Agriculture Organization (FAO), which reported that 10 percent of global fish stocks or species groups are significantly depleted; nearly 25 percent are overexploited, depleted or recovering from depletion; and 52 percent are fully exploited[89].

The WWF's Global Marine Programme[90] lists the following threats to sustainable fishery operations:

- Technological advances that have made large-scale fishing more efficient and far-reaching.
- Subsidies that support commercial fishing, keeping too many boats on the water.
- Unfair and poorly enforced fisheries partnership agreements that allow foreign fleets to over-fish in the waters of developing countries.
- Illegal fishing operators who do not respect fishing laws or agreements.
- Large unintentional bycatch of juvenile fish and other non-commercial species.
- Destructive fishing practices, such as bottom trawling and the use of poisons or explosives.
- Lack of sound fisheries conservation and management policies, practices and enforcement.

The development of fishing techniques in recent decades has resulted in more intensive and effective methods, which have in turn resulted in bigger catches and in an increase in the bycatch of non-target fish, sea turtles, birds and sea

88 WRI. 2004. *Fishing for Answers: Making Sense of the Global Fish Crisis*, p. vii (available from pubs.wri.org/fishingforanswers-pub-3866.html).

89 FAO. 2004. *The State of World Fisheries and Aquaculture* (available from www.fao.org/sof/sofia/index_en.htm).

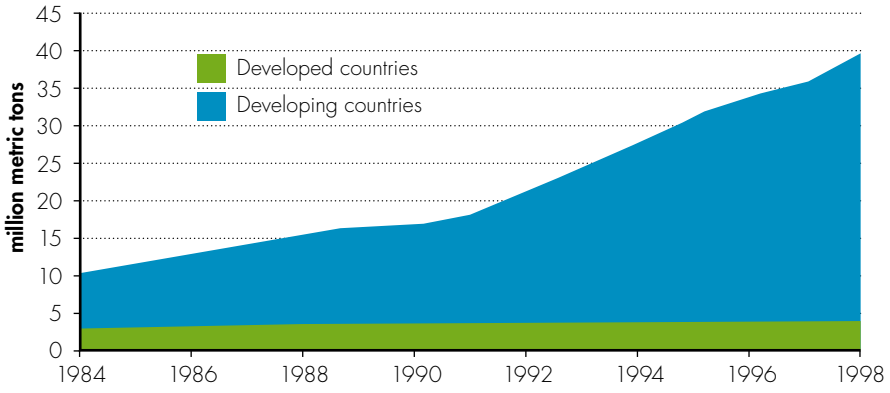
90 www.panda.org/about_wwf/what_we_do/marine/problems/problems_fishing/boats/index.cfm.

mammals. Historic concentration on the top predator species such as cod, tuna and swordfish has led to their depletion. As a result, the fishing industry has turned to species lower in the food chain – known as 'fishing down the marine food web'. The decline of certain species can have profound and lasting effects on marine ecosystems, even leading to a long-term change, the so-called 'system flip'. The collapse of the population of Atlantic cod off the coast of eastern Canada is a case in point. Cod fishing was relatively stable for over 400 years. Due to intensive fishing by Canadian and other fleets between the 1960s and the 1980s, this fishery collapsed. Although cod fishing was banned in 1992, the species has still not recovered. Today, species lower on the food chain, such as shrimps and crabs, dominate catches in the region.

Aquaculture is sometimes considered a potential solution to the decline of capture fisheries. Over the past 50 years aquaculture (both marine and freshwater) has become a commercially significant source of food in many countries. Aquaculture products fall into two distinct categories: high-valued species, such as shrimp and salmon, which are frequently grown for export, and lower-valued species, such as carp and catfish, that are primarily consumed locally. Whereas shrimp and salmon require relatively high-cost facilities and the use of fishmeal, carp and tilapia can be raised on low-cost, readily available vegetable-based feed, typically as a supplementary activity to regular crop agriculture.

Aquaculture today is the world's fastest growing food sector, with an overall annual growth rate of over 11.0 percent since 1984, compared with 3.1 percent for terrestrial farm animal meat production, and 0.8 percent for production from capture fisheries. Approximately 90 percent of world aquaculture production in 1998 was in developing countries, almost all of it in Asia (see **Figure 8**)[91]. China alone represented 69 percent of global aquaculture production or 27.1 million tonnes in 1998. However, production in developed countries is also significant. For example, in 2004, the EU-25 aquaculture sector represented 18.8 percent of total fisheries production[92].

Figure 8. Aquaculture production in developed and developing countries



Source: © FAO – Fisheries and Aquaculture Information and Statistics Service – data retrieval 19 September 2007.

The growth of aquaculture has generated its own set of environmental issues. Demand for space in coastal areas for aquaculture is on the rise, while the doubling of aquaculture production over the past 10 years has led to habitat loss, increased pressure on capture fisheries to supply fishmeal and fish oil, pollution from waste and effluent, and the introduction of invasive species.

91 FAO's Aquaculture and Inland Fisheries Statistics; FishStat Plus Version 2.3 (available at www.fao.org/fi/statist/FISOFT/FISHPLUS.asp).

92 See www.thefishsite.com/articles/296/eu27-fishery-products-annual-report-eu-policy-statistics-2007.

In China, for example, the concern over loss of arable land has led to restrictions on further conversion of farmland to aquaculture ponds. In Thailand, fresh water diversion for shrimp ponds has lowered groundwater levels noticeably in some coastal areas and caused saltwater intrusion in others. In just 6 years, from 1987 to 1993, the country lost more than 17 percent of its mangrove forests to shrimp ponds. Moreover, in several developing countries, such as Ecuador, Thailand, and Bangladesh, pollution and disease problems within shrimp and fishponds have also led to the complete collapse of aquaculture in some areas. Certain types of aquaculture place increased pressure on ocean fish stocks, as most carnivorous species depend on fishmeal. 10 to 15 percent of all fishmeal goes to aquaculture feeds and it takes roughly 2 kilograms of fishmeal to produce one kilogram of farmed fish or shrimp, resulting in a net loss of fish protein[93]. Others point to the role of aquaculture in the spread of invasive alien species, a major cause of biodiversity loss[94].

4.5.3 Fisheries and aquaculture – what is working / not working

Various policy and management interventions have been proposed to improve the sustainability of capture fisheries and aquaculture, albeit with only limited success to-date. It is indicative of the failure of fisheries resource management that less than 1 percent of the marine environment falls within a protected area. The global target for 2012, adopted by the CBD, is to increase the coverage of marine and coastal areas to 10 percent. It is hoped that this will promote the recovery of fish stocks, enhancing both the conservation of the marine environment and the viability of the fishing and seafood industries.

Other efforts to promote improved capture fishery and aquaculture practices include:

- The FAO Code of Conduct for Responsible Fisheries provides a voluntary framework for national and international efforts to ensure sustainable exploitation of aquatic living resources in harmony with biodiversity and the environment. It is one of the first points of call for any company wishing to understand the biodiversity and sustainability issues related to the capture and culture of fish (see www.fao.org).
- Seafood Choices Alliance is a global trade association – from fishermen and fish farmers to distributors, wholesalers, retailers and restaurants – that promotes ocean-friendly seafood. The Alliance is developing methods for making seafood recommendations (such as the Dutch 'Vis Wijzer', literally a 'Fish Pointer / Fish Wiser'[95]), undertaking public opinion research in key markets[96], and implementing targeted educational programmes for consumers and the seafood industry (see www.seafoodchoices.com).
- The Marine Stewardship Council is the only seafood certification system with both global coverage and credibility (see **Box 11**). At the centre of the MSC is a set of *Principles for Sustainable Fishing,* which acts as the cornerstone of good fishing practices (see above).
- WWF's International Smart Gear Competition, created in 2004, brings together the fishing industry, research institutes, universities, and government, to inspire and reward practical, innovative fishing gear designs that reduce bycatch – the accidental catch and related deaths of sea turtles, birds, marine mammals, cetaceans and non-target fish species in fishing gear such as longlines and nets (see www.smartgear.org).
- Similar sustainability initiatives have been developed for aquaculture, including Best Aquaculture Practices (Global Aquaculture Alliance)[97].
- Campaigns by conservation organisations and others have promoted dolphin- and turtle-friendly fishing, notably with reference to the tuna fishing industry, with

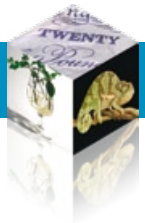
93 Holmes, B. 1996. Blue Revolutionaries. *New Scientist* (7 December 1996): 34.

94 Hewitt, C.L., Campbell, M.L. and Gollasch, S. 2006. *Review and Evaluation of Global, Regional and National Codes and Regulations for the Management of Alien Species in Aquaculture Systems.* Report to the World Conservation Union (June 2006).

95 www.goedevis.nl/media/File/viswijzer_nl.pdf.

96 See www.seafoodchoices.com/resources/documents/EUConsumer2005.pdf.

97 Further examples of sustainability initiatives for wild catches and aquaculture can be found in *Seafood Sustainability –Riding the Tidal Wave. Western Hype or Reshaping the Industry.* Rabobank International, 2006.



associated monitoring and evaluation activities (see **Box 12**). More embryonic approaches are being applied to the largely unregulated shark / ray fishing sector, where the sale of these species' fins into East Asia is leading to rapid population declines in several regions.

- The establishment of protected marine conservation areas is linked not only to the protection of critical and sensitive marine and coastal ecosystems, but also to the maintenance of fish and other marine creature breeding grounds and stocks of commercial species.
- The development and promotion of improved fish and shrimp farming techniques avoid the conversion of sensitive habitat – notably mangroves – reduce pollution, the spread of diseases and parasites to wild populations, and the risk of escaped farmed fish breeding with wild species and altering their genetic makeup.
- Progress in aquaculture production techniques includes development by Chinese researchers of a yeast-based protein supplement that can substitute for over half the fishmeal in aquaculture feed preparations[98].
- Organisations such as the International Marinelife Alliance and the Marine Aquarium Council (www.aquariumcouncil.org) are raising awareness of the use of destructive practices (e.g. cyanide and explosives) in the marine aquarium and live fish trade, and promoting alternative, environmentally-friendly practices.
- The Marine Aquarium Market Transformative Initiative (MAMTI), supported by the IFC and the Global Environment Facility, aims to develop an environmentally sustainable ornamental fish industry. MAMTI also seeks to strengthen the capacity of local marine aquarium fish suppliers and to increase their access to markets, information and finance[99].
- The Monterey Bay Aquarium has launched a Seafood Watch campaign to inform consumers about sustainable capture fishery and aquaculture practices, using a simple colour coding system (green – best, yellow – good, and red – avoid).
- Sixteen countries have adopted individual transferable quotas (ITQs) for capture fisheries, including New Zealand, which has had these systems in place since 1986. Experience to date suggests that appropriately designed ITQs can help to prevent over-fishing, restore stocks to sustainable levels and increase profitability[100].

Box 11. The Marine Stewardship Council and certification of fisheries

The Marine Stewardship Council is addressing the decline of fish stocks, safeguarding livelihoods and delivering improvements in marine conservation worldwide through the certification of fisheries. As of June 2007, there were 22 certified fisheries and 25 fisheries in full assessment or reassessment. More than 600 seafood products bear the MSC eco-label. Although the majority of fisheries certified by MSC to date are located in developed countries, in 2004, the Mexican Baja California Spiny Lobster Fishery was successfully certified and MSC is currently exploring the possibility of certifying further fisheries in several developing countries, including Papua New Guinea, Uganda, the Bahamas and Viet Nam. The announcement in January 2006 by Wal-Mart, the world's largest retailer, that within 3–5 years it would source all fresh and frozen wild-caught seafood from fisheries certified by the Marine Stewardship Council may also further raise the profile of MSC's certification process.

Source: Marine Stewardship Council: www.msc.org.

98 Folke, C. and Kautsky, N. 1992. Aquaculture with Its Environment: Prospects for Sustainability. *Ocean and Coastal Management* 17(1): 5–24.

99 See www.ifc.org/ifcext/enviro.nsf/Content/Biodiversity_HowWeWork_MAMTI.

100 Stavins, R. N. 2003. Taking Fish to Market: Why Not Trade Fishing Rights the Way Business Trades Pollution Credits? *Forbes*, 28 April 2003.

Box 12. ForTuna by WWF and TRAFFIC

WWF and The Wildlife Trade Monitoring Network (TRAFFIC) created ForTuna in 2004 to stimulate improvements in the management of global tuna populations. Demand for tuna is increasing dramatically and as a consequence entire marine ecosystems are adversely affected as these top-of-the-food-chain predators are rapidly depleted and other species, such as dolphins, turtles, sharks, rays and albatrosses are unintentionally killed by fishing nets and long-lines. Most industrialised tuna fleets fish in distant foreign waters courtesy of fisheries partnership agreements, mainly with developing countries. Alongside ecosystem impacts, the foreign industrial fleets often undermine the local fishing industry. ForTuna focuses on establishing ecosystem-based management, research and development of improved mitigation measures in tuna fisheries to support the restoration and maintenance of healthy open-sea ecosystems and the reduction of bycatch. ForTuna works closely with the six regional tuna fisheries management organisations to promote sustainable fishing levels.

Source: WWF Global Marine Programme, assets.panda.org/downloads/fortuna.pdf.

While all these developments are promising, only a fraction of the world's capture fisheries and aquaculture operations currently use environmentally-friendly practices. Furthermore, as only whole fisheries can currently be certified under MSC rules, individual operators that adopt improved practices may incur higher costs than their competitors, without any credible marketing advantage.

Several biodiversity funds have invested in sustainable fisheries and aquaculture. TNC's EcoEnterprises Fund has invested in a certified organic farm in Brazil, a saltwater shrimp farming enterprise in Ecuador and a company exporting scallops farmed immediately outside the Reserva de la Biosfera El Vizcaino in Baja California, the largest biosphere reserve in Mexico. Root Capital (formerly EcoLogic Finance) has provided loan financing to support the operations of MSC-certified spiny lobster fishermen, also located in the same area in Baja California.

4.5.4 Fisheries and aquaculture – gaps and business investment opportunities

1. Promote marine and aquatic PAs (or limited use zones) linked to the sustainable management of capture fisheries in priority marine ecosystems. This concept could be tied to the concept of ITQs or compensation for marine / aquatic degradation caused by extractive industries. In addition, it may be possible to apply the concept of payments for ecosystem services to marine PAs, where they make a significant contribution to fisheries' productivity (e.g. mangrove forests and coral reefs which act as fish nurseries) and / or to ecotourism.
2. Expand sustainable fisheries certification, such as schemes promoted by MSC, to cover critical issues, such as bycatch, and to developing countries. Support for such certification might be a necessary precursor to the following idea.
3. Invest in certified sustainable fishing and aquaculture enterprises, particularly in developing countries where these technologies are currently underutilised, and where poor communities and disadvantaged groups, such as women and ethnic minorities, currently have limited access. This concept could be combined with support to expand the operations of sustainable management programmes to a range of marine and aquatic species and ecosystems (currently few marine and aquatic species are included in certification schemes).

4.6 Biocarbon

While forestry and agricultural projects can sell carbon credits through the Clean Development Mechanism of the Kyoto Protocol, few transactions have been approved to date. There is little focus on biodiversity benefits under such schemes, which tend to involve mono-species forest plantations.

Most activity linking carbon to biodiversity has taken place within the growing voluntary market, as corporations and individuals seek to offset emissions to meet their own reduction targets.

Biocarbon is not sequestered indefinitely and is subject to greater risks and uncertainties, compared to renewable energy initiatives for example. Hence biocarbon producers are typically unable to sell carbon credits at the prevailing market price, but must instead accept lower prices negotiated on a bilateral basis (currently around US$5 / tonne).

In addition to using afforestation and reforestation as carbon sinks, as permitted under the Kyoto Protocol, there are increasing calls for nations to be compensated for conserving standing forests. At present, this activity is not eligible for credits through the Clean Development Mechanism, but many people are calling for this policy to be changed.

A key question is whether there would be significant numbers of buyers willing to pay a premium price for carbon sequestration that conserves biodiversity: a related challenge is to demonstrate the biodiversity benefits of such initiatives and to develop associated indicators and measurement protocols that are feasible for the private sector.

There is a need for further experimentation within the voluntary carbon market, including support for avoided deforestation and related initiatives that bundle payments for a range of environmental goods and services, including carbon as well as biodiversity benefits.

4.6.1 What is biocarbon?

Growing awareness of the risks of climate change has propelled national and local governments, companies and NGOs to take action to manage greenhouse gas (GHG) emissions, including the introduction of tradable quotas or 'caps'. At an international level, the main instruments driving the market in GHG emissions have been the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), which has been ratified by 163 countries, and the Emissions Trading Scheme (ETS) of the European Union.

Under the UNFCCC and some national schemes, participants can meet their emission reduction targets through a range of activities including 'land use, land use change and forestry' (LULUCF). LULUCF includes various forms of forest management, cropland management, grazing land management and re-vegetation, which are thought to 'sequester' carbon in biomass and thereby offset emissions from the use of fossil fuels and other sources.

Most LULUCF activities are not specifically designed with biodiversity conservation in mind. Nevertheless, LULUCF projects do provide a potential mechanism for financing biodiversity and they are likely to play an increasingly important role as the carbon market develops. The basic premise of 'biocarbon' is to combine climate mitigation and biodiversity conservation in the same activity, for example the restoration of degraded habitat through assisted natural regeneration using native species would meet both goals.

Recent work by Conservation International and others in Madagascar has demonstrated the potential of biocarbon as a means to finance rainforest conservation. Through the replanting of 3,000 hectares of tropical rain forest, 'green corridors' of indigenous tree species are used to link habitat fragmented by human activities such as slash and burn farming. Carbon sequestered by these activities is available for purchase on the voluntary market, with each hectare expected to generate 230 tonnes of carbon credits (www.alertnet.org).

Biocarbon is not without its concerns and controversies. The net climate benefits of re-vegetation are not always clear, with some research indicating that planting trees outside the tropics brings little if any climate benefit[101]. There are also concerns about the permanence of carbon storage in biomass. Equally, planting certain types of trees may have adverse impacts on land use or the livelihoods of local people. Mono-cultures of non-native, fast-growing species deliver higher profits and are often the preferred option for both timber production and carbon storage, while indigenous tree species generally provide a wider range of biodiversity and other local benefits.

4.6.2 Biocarbon – status and trends

Political commitment to reduce climate change is growing. In May 2007, after many years of weak USA support for global efforts to address climate change, President George W. Bush called for a series of meetings of the world's major emitters and energy consumers to complete a new framework by the end of 2008[102]. This was followed by an agreement of the leaders at the G8 Summit in June 2007 in Germany that *"global greenhouse gas emissions must stop rising, followed by substantial global emission reductions."*

The continued development of a global carbon market is likely to be a key element in future strategies to combat climate change. In recent years, the carbon market has grown from almost nothing to a multi-billion dollar industry (**Figure 9**)[103]. According to the World Bank: *"the carbon market grew in value to an estimated US$30 billion in 2006 (€23 billion), three times greater than the previous year. The market was dominated by the sale and resale of European Union Allowances (EUAs) at a value of nearly US$25 billion under the* Emission Trading Scheme *(ETS) of the EU (€19 billion). Project-based activities primarily through the Clean Development Mechanism (CDM) and Joint Implementation (JI) grew sharply to a value of about US$5 billion in 2006 (€3.8 billion). The voluntary market for reductions by corporations and individuals also grew strongly to an estimated US$100 million in 2006 (€80 million). Both the Chicago Climate Exchange (CCX) and the New South Wales Market (NSW) saw record volumes and values traded in 2006"* [104].

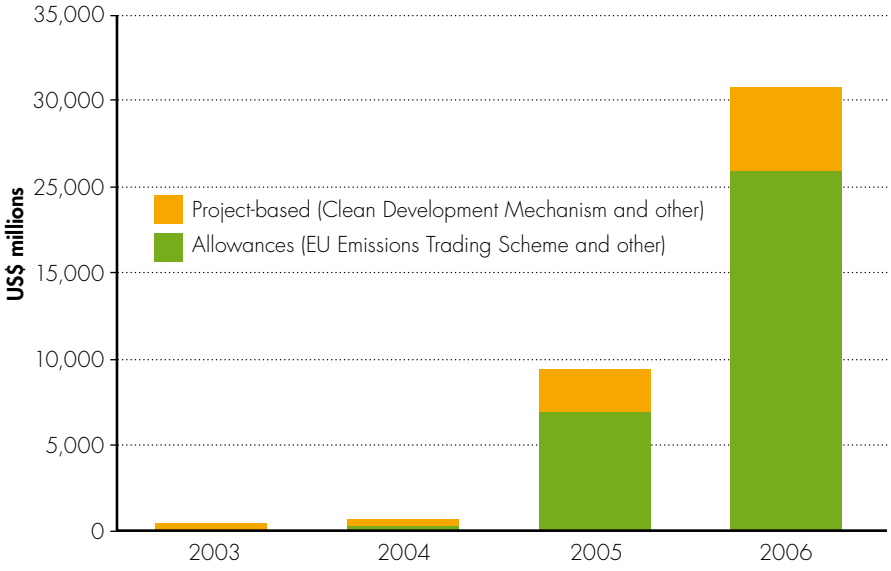
101 www.guardian.co.uk/uk_news/story/0,,1972648,00.html.

102 The story at state level in the USA is very different. For example, multi-pollutant legislation has been enacted in Illinois and North Carolina (see www.article13.com/A13_ContentList.asp?strAction=GetPublication&PNID=937); New York State and New Jersey have targets for the reduction of CO_2 emissions; new power plants in Massachusetts and California have offset requirements; 155 US municipalities are taking part in the International Cities for Climate Protection Campaign (see www3.iclei.org/us/participants.cfm) and AB32, the Californian Global Warming Solutions Act of 2006, establishes a statewide GHG emissions cap for 2020 (based on 1990 emissions) by 1 January 2008 (see www.arb.ca.gov/cc/factsheets/ab32factsheet.pdf).

103 Point Carbon. 2007. *Carbon 2007 – A New Climate for Carbon Trading.* Røine, K. and Hasselknippe, H. (eds).

104 carbonfinance.org/docs/Carbon_Trends_2007-_FINAL_-_May_2.pdf.

Figure 9. Growth of the global carbon market (value of carbon contracts)



Sources:

2003 data: Lecocq, F. 2004. *State and Trends of the Carbon Market 2004*. The World Bank: Washington, D.C. (June).

2004 data: Lecocq, F. and Capoor, K. 2005. *State and Trends of the Carbon Market 2005*. The World Bank: Washington, D.C. (May).

2005-06 data: Capoor, K. and Ambrosi, P. 2007. *State and Trends of the Carbon Market 2007*. The World Bank: Washington, D.C. (May).

Much of the activity linking carbon to biodiversity has taken place within the corporate sector under voluntary agreements with NGOs, notably through projects in developing countries, as a means of offsetting their own emissions and contributing to internal emission reduction targets. Recent commitments by the banking group HSBC and Wal-Mart to going 'carbon-neutral' are examples of the direction in which more and more companies are moving. The retail offset market – in which consumers are able to purchase offsets to render their activities or use of products and services partially or entirely carbon neutral – has also grown significantly during the past decade[105].

To service this demand, a growing industry of carbon credit suppliers and brokers has emerged. Many of these operations emphasise biodiversity benefits as well as climate mitigation (**Box 13**).

Box 13. A selection of biocarbon initiatives

Carbon Balanced by the World Land Trust (www.carbonbalanced.org) offers opportunities for both companies and individuals to offset their carbon emissions by supporting biodiversity conservation projects, particularly in forests. Their website explains "*Carbon balancing with the World Land Trust is intended to demonstrate the value of rainforests in climate regulation. We have calculated the amount of carbon dioxide produced by different activities, and used the latest scientific research coupled with our own studies in the project areas that we are working to estimate the amounts of carbon absorbed by rainforests. This means that you have the opportunity to donate funds to our conservation projects that will enable us to offset your carbon dioxide emissions.*"

The CarbonNeutral Company (www.carbonneutral.com) adopted a protocol in 2006 that includes the following commitment: "*Where relevant, project activities*

105 For further information, see for example: Ecosystem Marketplace. 2006. *Going Carbon Neutral. How the Retail Carbon Offsets Market Can Further Global Warming Mitigation Goals*. EM Market Insights: Carbon. Available at conserveonline.org/workspaces/climate.change/forest.carbon.US/em_going_carbon_neutral.pdf.

should be designed to protect and improve biodiversity". The company's forestry projects, in particular: "*need to conserve natural ecosystems and improve biodiversity.*"

The carbon broker CantorCO2e (www.co2e.com) proposes a GHG offset project described as "*vital to the conservation and understanding of biodiversity in a unique, fragile ecosystem, between the Amazonian rainforest and the Brazilian savannah*".

The VivoCarbon Initiative, initiated by the Global Canopy Programme (globalcanopy.org/vivocarbon) proposes a bilateral fund to "*develop, test, and implement a new market in ecosystem services, including storage of carbon, with the State of Amazonas (the Amazonas Initiative)*".

The Tourism Industry Carbon Offset Service (TICOS) (www.ticos.co.uk) "*is being developed as an industry wide programme to stimulate collective action by all operators and travel agents selling holidays which include air or other forms of travel. TICOS has agreed with UNESCO and the IUCN World Commission for Protected Areas to develop projects in World Heritage Sites where there is a strong tourism element.*"

The World Bank has pioneered several carbon funds that aim to mitigate climate change while providing benefits to local communities, in the case of the Community Development Carbon Fund (carbonfinance.org/cdcf), or to the natural environment, in the case of the BioCarbon Fund (BioCF) (carbonfinance.org/biocarbon). The BioCF's current support is focused on projects that sequester or conserve greenhouse gases in forest, agro- and other ecosystems.

The World Bank is currently developing a new international fund to address deforestation, targeting countries with significant rainforest areas (e.g. countries in Latin America, Central Africa and South-East Asia) and significant CO_2 emissions (e.g. Brazil, Congo and Indonesia). The proposed Forest Carbon Partnership Facility[106] will enlist public and private donors and work with governments, local communities and NGOs to establish guidelines for project monitoring and ensure that money flows only to those forest areas that meet stringent environmental criteria.

Shell is helping an Indonesian conservation organisation to quantify the carbon emissions that would be avoided through its efforts with the Indonesian government to safeguard approximately 300,000 ha of Borneo's peatland rainforest. By strengthening livelihoods and social services support to approximately 60 communities in the area, the project hopes to safeguard habitat for over 2,000 endangered orangutans and other threatened species.

BP, American Electric Power and other companies, in partnership with The Nature Conservancy, invested approximately US$10 million in a project to preserve 600,000 ha of Bolivian rainforest, motivated in large part by potential carbon savings. Both projects are anticipated to provide substantial GHG emission reductions by either avoiding, or reducing the rate of, deforestation.

In the USA Mississippi River Delta, electric utilities have funded reforestation and permanent retirement of marginal agricultural lands, providing atmospheric benefits, improved water quality and enhanced wildlife habitat, including that of the threatened Louisiana black bear.

Plan Vivo (www.planvivo.org) is a system for managing the supply of verifiable / quantified reductions in carbon emissions from rural community activities by which sustainable livelihoods are also promoted. Examples of acceptable

106 See carbonfinance.org/docs/FCPF_Presentation_06-07-07.ppt.

activities include small-scale timber plantations, restoration of degraded forests, agroforestry and small-scale electricity generation using biomass. Managed by BioClimate Research and Development, there are currently four Plan Vivo projects: Scolel Te in Mexico (which has been selling carbon offsets since 1997); Women for Sustainable Development in Southern India (promoting climate change mitigation and rural development); Nhambita Community Project in Mozambique (aiming to enhance sustainable livelihood creation for the 10,000 local people living within the buffer zone of the Gorongosa National Park) and Trees for Global Benefit in Uganda (working with small-scale farmers on forestry and agroforestry).

In many forested rural areas of developing countries, the main options for economic growth often require the disturbance or destruction of natural forests – either clearing for agricultural production (e.g. soy, palm oil, coffee, tea, sugar, rice) or through the sale of wood products. Hence in addition to using reforestation and afforestation to sequester carbon, there are increasing calls for nations to be compensated for conserving standing forests that might otherwise be logged, burned and / or cleared for agriculture. In principle, this would not only reduce carbon emissions (land use change is estimated to account for as much as one-quarter of anthropogenic emissions), but would also generate additional finance for the conservation of natural forests and the biodiversity they contain. Avoided deforestation is not currently creditable under the rules of the CDM, ruling out a potential source of funding for slowing deforestation (**Box 14**).

Box 14. The potential of avoided deforestation

"Significant potential lies in the fact that many 'natural' forests and certain other ecosystems are both major stores of carbon and areas of valuable biodiversity. Thus, any attempt at conserving these areas has the potential to yield both carbon and biodiversity benefits."

Source: Koziell, I. and Swingland, I.R. 2002. Collateral biodiversity benefits associated with 'free-market' approaches to sustainable land use and forestry activities. *Philosophical Transactions: Biological Sciences* (Royal Society of London) 360: 1807–1816.

"Curbing deforestation is a highly cost-effective way of reducing greenhouse gas emissions and has the potential to offer significant reductions fairly quickly. It also helps preserve biodiversity and protect soil and water quality."

Source: Chapter 25: Reversing Emissions. *Stern Review on the Economics of Climate Change.* 2007. www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm.

The Coalition of Rainforest Nations[107] aims to establish credible models for avoiding emissions by conserving forests, using a combination of income streams derived from carbon markets, as well as selective logging, eco-friendly 'cash crop' cultivation, biodiversity purchase and leases and other community-based ventures. Focusing specifically on the value of carbon sequestration, and assuming an average price of US$20 per tonne of CO_2, the combined forests of 10 of the largest coalition nations could be worth as much as US$1.1 trillion. In addition, these forests provide many other, less easily measured, but no less valuable services such as fisheries protection, biodiversity preservation, erosion and flood control, recreation and tourism value, harvest of renewable products, and water supply.

107 Coalition nations include: Bolivia, Central African Republic, Chile, Congo, Costa Rica, Democratic Republic of the Congo, Dominican Republic, Fiji, Gabon, Guatemala, Nicaragua, Solomon Islands, Panama, Papua New Guinea, and Vanuatu.

4.6.3 Biocarbon – gaps and business investment opportunities

There are many possibilities for conserving biodiversity and sustainably using biological resources through investing in carbon mitigation or offsets. One increasingly attractive option is to use carbon finance to tackle deforestation in the tropics[108]. Another possibility is creating carbon offsets in biodiversity-friendly agriculture through no-till cultivation. Nevertheless, a good deal of work remains to be carried out to identify and market new biocarbon products on a commercially viable basis.

One major challenge will be to strengthen the links between biodiversity performance indicators and carbon metrics and standards. The Climate, Community and Biodiversity Alliance (CCBA) (www.climate-standards.org) is tackling this challenge by developing standards for evaluating land-based carbon projects. These standards aim to identify land-based climate change mitigation projects that simultaneously generate climate, biodiversity and sustainable-development benefits (see **Box 15**).

Box 15. The Climate, Community and Biodiversity Standards

The Climate, Community and Biodiversity Project Design Standards comprise 15 required criteria and eight optional 'point-scoring' criteria for carbon sequestration projects. Once a project has been designed, a third-party evaluator uses standard indicators to determine which criteria are satisfied. Only projects that use best practices and deliver significant climate, community and biodiversity benefits will earn CCB approval. Silver or Gold status is awarded to exceptionally designed projects that go beyond the basic requirements (i.e. projects that use primarily native species, enhance water and soil resources, build community capacity, and adapt to climate change and climate variability or deliver net positive biodiversity impacts).

With a US$30 billion carbon market already upon us, and growing awareness of the significant role of land use in climate change, it seems likely that some portion of this market can be tapped to deliver both climate and biodiversity benefits. As noted by none other than the authors of the Stern Review of climate change: "*International support for action by countries to prevent deforestation should start as soon as possible. … The important step is to establish pilots to gain practical experience. Pilot schemes could be based on funds with voluntary contributions from developed countries, businesses and NGOs. … Practical experience will be needed for integration into global carbon markets or maintaining separate schemes.*"

108 See for example: www.joanneum.at/REDD.

4.7 Payments for watershed protection

Payments for watershed protection are increasingly used in many countries, ranging from payments by private water users to environmental agencies and NGOs, to direct payments by central government to private landowners.

Finding a willing buyer for watershed protection services is often the main barrier to introducing such schemes or maintaining them over the long term. The key is to identify downstream water users for whom payments are a more cost-effective option than water treatment, water demand management, or the development of alternative water supplies.

Despite numerous examples around the world, it appears that the potential to finance conservation through payments for water services has scarcely been exploited.

Although technical assistance to design and evaluate watershed payment schemes is increasingly available, the more significant funding needed to purchase watershed protection services from private landowners is scarce, particularly in developing countries.

Another option is to scale up existing efforts to create watershed protection funds where the private sector is financing protection.

4.7.1 What is watershed protection?

Demand for fresh water – for hydroelectric power generation, irrigated agriculture, and industrial, domestic and recreational uses – is growing. In some countries, water resource managers have discovered that conserving natural forests in watersheds and reducing pollutant loads in runoff from upland areas can be a cost-effective means of providing reliable supplies of fresh water.

The conventional policy response is to impose restrictions on the use of upland areas in sensitive watersheds. However, this may not be feasible where land is privately owned, where land users resist punitive measures or where demand for land is increasing. An increasingly popular alternative is to create positive incentives for forestry, soil and water conservation and other forms of watershed protection on private lands. Additional benefits of such schemes include the conservation or restoration of native vegetation and wildlife habitat on private land, as well as reductions in pollution of freshwater habitat. Some proponents claim that these Payment for Environmental Services (PES) schemes can also help to secure the land use rights of marginalised communities in upper watersheds, providing important social benefits as well as a new source of income. Payments for watershed protection have been applied in a variety of countries, and range from payments by private water users to environmental agencies and conservation NGOs, to direct payments by central government to private landowners (see **Box 16**).

Box 16. Payments for watershed protection in Costa Rica

Payments for watershed protection are provided under several initiatives in Costa Rica. At a national level, since 1997, the National Fund for Forest Financing (FONAFIFO) pays landowners and PAs for reforestation, forest management and forest conservation. Landowners involved in the scheme receive payments over 5 years for specified land use changes. Payments are set at slightly more than the opportunity cost of relatively low-value land uses such as pasture, about US$35–40 / ha / year for conserving forest, compared to US$538 / ha over five years for reforestation. At these prices, most landowners prefer to conserve existing forest, rather than undertake more expensive reforestation. Landowners are legally bound to honour their commitments under the scheme for 10–15 years after the payments cease. As of the end of 2001, about 4,500 contracts had been written covering over 250,000 ha, with pending applications for another 800,000 ha.

Funding for the scheme has come from various sources, including a fossil fuel tax, sales of carbon credits, a World Bank loan and a grant from the GEF. Some hydroelectric power utilities have made additional, voluntary contributions to finance conservation payments to farmers in watersheds that supply their reservoirs and turbines. As of 2001, contracts under negotiation with hydroelectric power companies were expected to generate about US$500,000 per year for the FONAFIFO programme. Related initiatives include a bilateral agreement between a private electricity producer, La Manguera S.A., and the NGO that owns the Peñas Blancas watershed, from which one of the firm's hydropower plants draws its water. In 1998, La Manguera agreed to pay the Monteverde Conservation League US$10 / ha / year to maintain the watershed under forest cover.

4.7.2 Payments for watershed protection – status and trends

Schemes to create economic incentives for watershed protection have been, or are being, developed in several Latin American countries[109]. There are comparable initiatives in Asia (e.g. Rewarding Upland Poor for Environmental Services – RUPES)[110], but relatively little experience of payments for watershed protection in Africa (although a World Bank initiative in Kenya with the Nairobi Water Authority is one example). In most developing countries, such initiatives have been supported by grants, loans and technical assistance from environment and development agencies including the GEF, the World Bank, bilateral development agencies and private foundations, as well as several NGOs (e.g. Forest Trends, IIED, WWF). In developed countries, the key players tend to be domestic government agencies and environmental NGOs. In a few cases industry has played a leading role as the main beneficiary and buyer of watershed protection services (e.g. Perrier-Vittel in France, Coca-Cola in Malawi)[111].

4.7.3 Payments for watershed protection – gaps and business investment opportunities

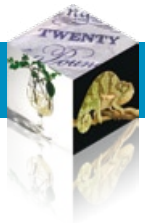
Finding a willing buyer for watershed protection services is often the main barrier to introducing such schemes or maintaining them over the long-term. The key is to identify downstream water users for whom payments are a more cost-effective option than water treatment, water demand management or the development of alternative water supplies. In general, experience suggests that payments for watershed protection are most appropriate when:

- Buying the resource outright is too expensive (and unnecessary).

109 Verweij, P. 2003. Payments for Forest Hydrological Services in Latin America: Trends and Perspectives. Presentation to the *Congress on Globalisation, Localisation and Tropical Forest Management in the 21st century*, 22–23 October 2003, Roeterseiland, Amsterdam, The Netherlands.

110 www.worldagroforestry.org/sea/Networks/RUPES/index.asp.

111 www.weforum.org/pdf/Initiatives/WI_Summary.pdf; www.forest-trends.org/documents/publications/casesWSofF.pdf; www2.coca-cola.com/presscenter/nr_20060531_africa_watershed_program.html.



- Payments are less expensive than alternative technical fixes (e.g. infrastructure).
- Provision of the desired service is verifiable and enforceable.
- Transaction costs are not prohibitive.
- Someone is willing to pay the price[112].

The potential of payment schemes for watershed protection to reduce poverty as well as secure water supplies remains uncertain. On the one hand, proponents argue that payments can increase rural incomes, diversify income sources, reinforce social networks and help develop new skills. On the other hand, sceptics point to various obstacles which may prevent poorer groups from benefiting from payments for watershed protection, including:

- Lack of secure property rights to land (i.e. you cannot sell what you do not own), notably concerns women.
- Large up-front costs to participation (barriers to entry and limited competition).
- Weak public capacity to implement incentives especially in poor countries (i.e. monitoring and enforcement costs, marketing, etc.).

Despite numerous examples around the world, it appears that the potential to finance conservation through payments for water services has scarcely been exploited. Key requirements for scaling-up and spreading payments for watershed protection include:

- Better information on the impact of land use on hydrological services.
- Flexible institutional arrangements with low transaction costs.
- Payments that better reflect both the opportunity costs of alternative land uses and the willingness-to-pay of beneficiaries. Tendering systems can help to reduce over-payments.

The technical and financial challenges of payments for watershed protection are significant. On the other hand:

- The approach is widely applicable but still relatively undeveloped, especially in Africa and Asia.
- There is significant potential to leverage co-funding from government and development agencies and, in certain locations, to transfer the scheme to local water users.
- Biodiversity benefits can be large, depending on the types of land uses that are supported by payments and their impacts on water supply.
- Contributions to poverty reduction can be substantial, due to the relatively low incomes of most upland farmers compared to downstream water users.
- Economic returns can be high, particularly where the alternative to watershed protection is investment in costly water treatment or development of new water supplies.

One option is to 'kick start' the demand for watershed protection services and help overcome the initial high set-up and learning costs experienced by many schemes. Although technical assistance to design and evaluate watershed payment schemes is increasingly available and not very expensive, the more significant funding needed to purchase watershed protection services from private landowners remains scarce, particularly in the developing world. As seen in Costa Rica, and more recently in Mexico, the sums involved can be substantial[113]. The challenge is to develop working payment schemes that can be 'sold' to local buyers – i.e. situations where local water users can be persuaded to make long-term financial commitments once the approach has been shown to deliver real benefits.

112 Kousky, C. 2005. *Choosing from the Policy Toolbox*, available at ecosystemmarketplace.com/pages/article.opinion.php?component_id=4002&component_version_id=5679&language_id=12.

113 An average of US$100 / ha / year over five years for a pilot programme targeting 100,000 ha would imply payments to landowners totalling US$50 million, excluding programme administration costs.

Another option is to scale up existing efforts to create watershed protection funds where the private sector is financing the protection, such as the Water Fund being managed by WWF in Guatemala (see **Box 17**).

Box 17. The Water Fund

WWF, in collaboration with local partners, is developing a water fund to finance responsible watershed management in Guatemala's Sierra de las Minas Biosphere. Under this initiative a range of water users – including bottling companies, distilleries, hydroelectric plants and paper processing mills – are making significant financial contributions towards environmental services in the region.

According to Carlos Morales, Freshwater Officer for WWF Central America, "*This Fund will encourage short-term investments to optimise water use in the industries as a means of reducing effluents to the Motagua and Polochic Rivers, as well as the vulnerability of the soils. Investments will also encourage better management of watersheds and water recharge zones in the upper reaches of the watershed to ensure a permanent water supply.*" Cooperative agreements have been signed with the Coca-Cola Bottling Company, the paper production plant, PAINSA, and the rum production plant Licorera Zacapaneca S.A In the future, WWF intends to work with agro-industry and household users of freshwater.

4.8 Bioprospecting

There are few hard numbers regarding the size of the bioprospecting industry, but growth to date has disappointed many advocates; one source suggests that the current market is worth US$17.5 – US$30 million, although by 2050 this could grow to over US$500 million.

Because novel products do not originate only in biodiversity-rich areas, the presumed link between bioprospecting and biodiversity conservation is not as clear as it might first appear.

There is ongoing debate concerning the overlap of, and distinction between, bioprospecting and biopiracy. Agreement on how much regulation is needed remains elusive, although most stakeholders accept that common standards and credible assurance mechanisms would help ensure equitable benefit sharing.

The development of high-throughput screening technologies may allow more efficient identification of useful natural products, enabling bioprospecting to compete more effectively with synthetic chemistry.

The socio-economic benefits of bioprospecting could be increased by supporting investments in rural communities that provide raw materials; domestication of plants / organisms that are susceptible to unsustainable levels of harvesting may help reduce potential adverse impacts on biodiversity, but would, of course, reduce the potential value of *in situ* resources.

4.8.1 What is bioprospecting?

Bioprospecting can be defined as "*the systematic search for genes, compounds, designs, and organisms that might have a potential economic use and might lead to a product development*"[114]. Bioprospecting is understood here to include also the collection of indigenous knowledge as a means of discovering and exploiting genetic or biochemical resources. It is important to recognise that both forms of bioprospecting – i.e. the collection of physical samples and the collection of traditional knowledge – are controversial, due to uncertainties and disagreements about intellectual property rights and the relation between commerce and culture.

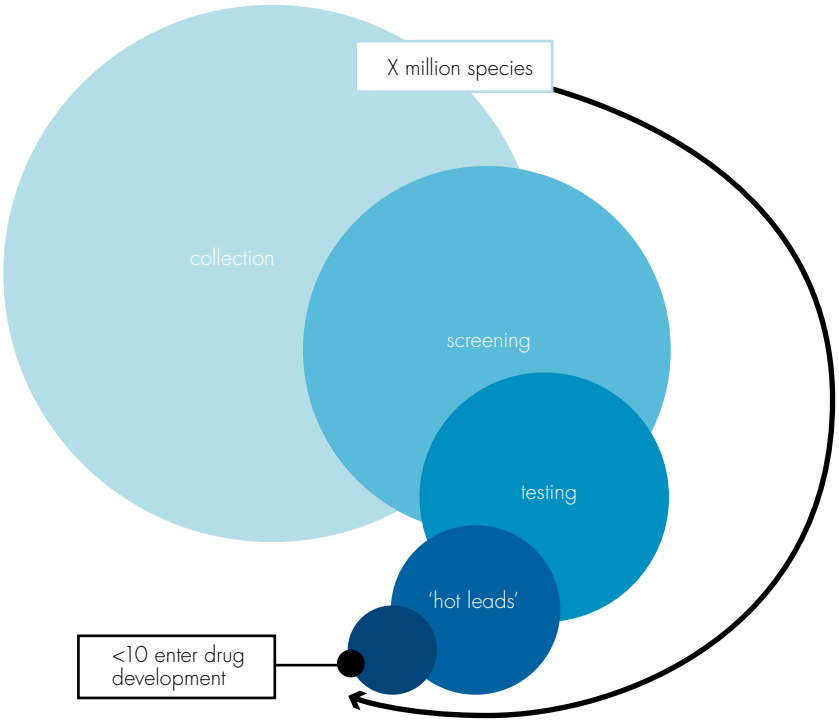
> "*Biological prospecting as a term means different things to different people. Some see it as nothing more than the extension of everyday research, others as a distinct type of research aimed exclusively at commercial products. Still others consider the term to be too emotive and tainted by its association with 'biopiracy' to be of any value.*"
>
> ***Source:*** UNU-IAS Report, *Bioprospecting in Antarctica*, May 2005.

114 Tamayo, G., Guevara, L. and Gamez, R. 2004. Biodiversity Prospecting: The INBio Experience (Chapter 41) in Bull, A.T. (ed.). *Microbial Diversity and Bioprospecting*. Washington, D.C, American Society for Microbiology. However, a recent United Nations University Institute of Advanced Studies (UNU-IAS) report, *Bioprospecting of Genetic Resources in the Deep Seabed: Scientific, Legal and Policy Aspects* (p.7) noted that there is no agreed formal definition of bioprospecting.

Both terrestrial and marine areas are targets for bioprospecting and there are many patents (but not necessarily products) involving genetic resources from both sources[115]. Novel products do not originate just in biodiversity-rich areas and therefore the presumed link between bioprospecting and sustainable use and management of the most threatened biodiverse regions is not as clear as it might first appear.

Bioprospecting is relevant to a wide range of sectors and activities, including biotechnology, agriculture, pharmaceutical and cosmetics industries, waste management and bioremediation, biomonitoring, health, pulp and paper processing, mining and fuel production from biomass. There are, however, many steps between identifying a potentially useful biological compound and marketing a commercial product; it is typically a long, expensive and uncertain process[116]. This is illustrated by **Figure 10**, which highlights the magnitude of sample sizes and research efforts required to produce drug development candidates for the pharmaceutical industry from material collected in the wild.

Figure 10. Orders of magnitude in drug discovery



Source: Based on information given in Figure 3 in Evans-Illidge, E.A. and Murphy, P.T. (undated). *A New Approach to Benefit Sharing in Bioprospecting*, available from www.biodiv.org/doc/case-studies/abs/cs-abs-au.pdf.

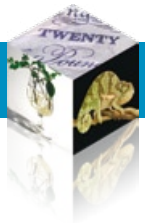
4.8.2 Bioprospecting – status and trends

International policies that address bioprospecting activities include the United Nations Convention on the Law of the Sea (UNCLOS) (www.un.org/depts/los/index.htm), the Convention on Biological Diversity, the World Intellectual Property Organization, the International Treaty on Plant Genetic Resources for Food and Agriculture (www.fao.org/ag/cgrfa/itpgr.htm) and a host of other measures and instruments designed to regulate access and benefit sharing (ABS) for genetic and other natural resources. Public authorities in several countries have also placed restrictions on the right to collect biochemical or genetic materials from naturally occurring organisms, on state land and elsewhere within their borders[117].

115 UNU-IAS. 2005. *Bioprospecting of Genetic Resources in the Deep Seabed: Scientific, Legal and Policy Aspects*, p.15.

116 United Nations University – Institute of Advanced Studies. 2005. Bioprospecting in Antarctica. Available from www.ias.unu.edu/binaries2/antarctic_bioprospecting.pdf.

117 Further information on the development of ABS policies can be found in ten Kate, K. and Wells, A. 2001. *Preparing a National Strategy on Access to Genetic Resources and Benefit-Sharing*. Royal Botanic Gardens, Kew. Available at www.undp.org/bpsp/thematic_links/docs/ABS_Manual_RBGK.pdf.



Recent examples of national policies to regulate bioprospectors' access to genetic resources include the 1998 Law of Biodiversity of Costa Rica (www.grain.org/brl_files/costarica-biodiversitylaw-1998-en.pdf), Executive Order 247 of the Philippines (www.elaw.org/resources/text.asp?ID=257), the Conditions for Access to and Benefit-sharing of Samoa's Biodiversity Resources (March 2000) and Decision 391 (Common Regime on Access to Genetic Resources) in Colombia[118]. A variety of access fees, royalties and profit-sharing arrangements for bioprospecting are employed and some proportion of the payment is typically allocated to *in situ* conservation efforts.

There are few hard numbers on the size of the bioprospecting industry, but its growth to date has disappointed many of its advocates. Forest Trends suggests that the current market is in the range of US$17.5 – US$30 million; although they estimate that by 2050 this could increase to over US$500 million. Some conservationists and tropical governments project the potential revenues as enormous, perhaps reaching hundreds of billions of dollars. Expectations of large revenue streams are often backed up by reference to Costa Rica's National Institute of Biodiversity (INBio – see **Box 18**), which received US$1.1 million from the USA pharmaceutical company Merck in exchange for a two year research and sampling contract. However, even this limited scale of investment has never been repeated.

Box 18. The National Biodiversity Institute of Costa Rica

The National Biodiversity Institute of Costa Rica (INBio) has a formal agreement with the Ministry of the Environment & Energy (MEE) that allows it to explore the use of biodiversity and promote its national inventory in government-protected areas. Under that agreement, INBio struck a deal with Merck – an international pharmaceutical company – that aimed to benefit both users and providers of biodiversity. Dating from the early 1990s, the arrangement between INBio and Merck grants the latter access to natural material from which compounds are extracted and screened using various bioassays to see whether they have medically useful properties. Under the terms of the agreement, Merck supports the strengthening of INBio's capacity to carry out its work, as well as promising a portion of the profits arising from any successful drug produced. INBio in turn provides a share of this funding to Costa Rica's protected areas.

INBio has negotiated similar risk-sharing agreements with more than 20 other companies, including Givaudan-Roure, Recombinant Bio-Catalysis, Bristol-Myers Squib, Analyticum and Indena, some of which have produced significant outputs (with commercial prospects). Despite criticism of these deals, mainly relating to concerns about transparency, public accountability and the price paid by companies for access to resources, INBio has demonstrated the potential of securing funds for public conservation from commercial bioprospecting (e.g. contribution to the Guanacaste Conservation Area and to national universities that are strategic partners in the execution of conservation projects). INBio has also been highlighted as a well-known example of an access and benefit sharing agreement in a 2002 news release by the CBD.

Sources:

McNeely, J. 1999. *Mobilizing Broader Support for Asia's Biodiversity: How Civil Society Can Contribute to Protected Area Management*, Asia Development Bank and IUCN – The World Conservation Union: Gland.

Tamayo, G., Guevara, L. and Gamez, R. 2004. Biodiversity Prospecting: The INBio Experience (Chapter 41). In Bull, A.T. (ed.) Microbial Diversity and Bioprospecting. ASM Press: Washington, D.C.

Quantifying the contribution that genetic resources make to the global biotechnology industry is complicated by a number of factors, not least of which is the competitive

118 Further examples can be found in Table 1 of Carrizosa, S., Brush, S.B., Wright, B.D. and McGuire, P.E. (eds). 2004. *Accessing Biodiversity and Sharing the Benefits: Lessons from Implementing the Convention on Biological Diversity*. IUCN: Gland, Switzerland and Cambridge, UK. Available at www.iucn.org/themes/law/pdfdocuments/EPLP54EN.pdf.

nature of product development. However, the *potential* magnitude can be illustrated by some pertinent facts[119]:

- More than half of the 150 most-prescribed drugs in the USA are derived from, or patterned after, natural sources[120].
- 62 percent of cancer drugs approved by the US Food and Drug Administration are of natural origin or modelled on natural products.
- A study of small-molecule new chemicals introduced globally as drugs between 1981 and 2002 showed that 61 percent can be traced to, or were inspired by, natural products. This figure rose to 80 percent in the period 2002–2003.
- Annual sales of products derived from traditional knowledge of genetic resources are estimated at US$3 billion for the cosmetic and personal care industry, US$20 billion for the botanical medicine sector, and US$75 billion for the pharmaceutical industry.

Despite these promising figures, the trend is away from research into novel organisms and compounds and towards the development of products based on known metabolites, driven by the low 'hit rate' of new products based on samples collected from the wild. This is, however, balanced in part by increasing consumer demand for 'natural' products and improvements in the techniques available for screening natural materials and subsequent data analysis. Bureaucracy, legal uncertainties and weak regulatory frameworks in developing countries are also seen as constraints to bioprospecting[121].

Alongside private corporations and multinationals, governments and policy-makers are key players in the bioprospecting business. They take the lead role in negotiating access and benefit sharing and government agencies may be assigned direct roles that include collecting and processing of biological samples. Indigenous groups, environmental groups and NGO advocates also play a significant role through the application of direct and indirect pressure on policy-makers and private companies. This pressure can serve both to support and to undermine the development of bioprospecting business, depending on the context and the groups concerned.

Equally important are local communities. Although this is in reality a disparate group covering a vast range of experience and perspectives, it is important to recognise that without the 'buy-in' of local communities, it is unlikely that bioprospecting will be sustainable (in as much as access may not be made available either centrally or at a local level). Concern about equitable sharing of benefits and the threat of over-harvesting of essential resources are two areas of direct relevance to bioprospecting that are likely to require long-term consultation and engagement with local communities[122].

4.8.3 Bioprospecting – what is working / not working?

There have been a number of high-profile bioprospecting arrangements since the early 1990s. The more well-known of these include the USA government's ongoing International Cooperative Biodiversity Groups' (ICBG) initiative (www.fic.nih.gov/programs/research_grants/icbg/index.htm), which has funded drug discovery partnerships between USA researchers and collaborators in Argentina, Chile, Mexico and Peru; a 1991 agreement between the drug company Merck and Costa Rica's INBio (see **Box 18**) and a US$3.2 million agreement between Extracta (Brazil) and Glaxo Wellcome to screen 30,000 samples from Brazil's biota[123].

119 United Nations University – Institute of Advanced Studies. 2005. *Bioprospecting in Antarctica.*

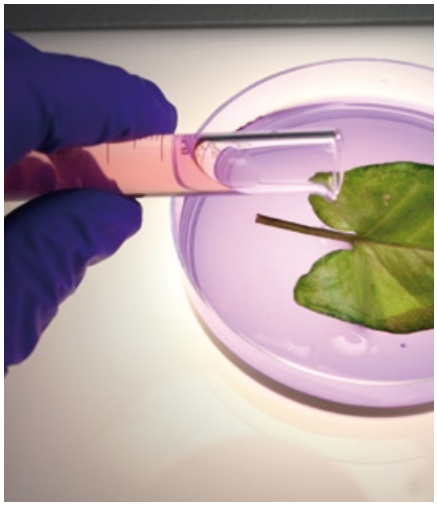
120 Grifo, F., Newman, D., Fairfield, A.S., Bhattacharya, B. and Grupenhoff, J.T. 1997. The Origins of Prescription Drugs. In: Grifo, F. and Rosenthal J. (eds.) *Biodiversity and Human Health*: 131–163. Island Press: Washington D.C.

121 Sampath, P.G. 2005. *Regulating Bioprospecting: Institutions for Drug Research, Access and Benefit-Sharing.* United Nations University Press.

122 See Vermeulen, S. and Sheil, D. *Partnerships for Tropical Conservation.* In press.

123 Bonalume Neto, R. and Dickson, D. 1999. $3m Deal Launches Major Hunt for Drug Leads in Brazil. *Nature* 400(6742): 302.

124 Adapted from Bioprospecting. *Conservation Finance Mechanisms* (available from guide.conservationfinance.org/chapter/index.cfm?Page=5).



The key factors that underpin successful bioprospecting from corporate and conservation perspectives include[124]:

- Prior informed consent of local communities and other users of biodiversity resources.
- Access on mutually agreed terms.
- Effective handling of intellectual property rights issues.
- Returns from bioprospecting for local communities and other resource users compare favourably with competing land uses (such as agriculture and cattle grazing).
- Government support of the processing of specimen exports with appropriate regulations.
- Absence of major threats to the future supply of resources.
- Resources harvested in a sustainable manner.
- Profits reinvested in appropriate conservation efforts.
- Benefits shared in a fair and equitable manner among all stakeholders.

An important concern is whether and under what conditions bioprospecting contributes to, or undermines, the *in situ* value of biodiversity. By focusing on individual species rather than their role in ecosystem health, there is a risk that biodiversity conservation may be negatively impacted by bioprospecting.

Equally, there is a concern that unsustainable harvesting of biological resources can have a direct negative impact on biodiversity conservation. A pertinent example is *Prunus africana*, a tree that is used in Africa as a source of traditional medicine (to treat, for example, fevers and malaria). However, its bark and bark extract are also exported to Europe and elsewhere for use in treatments for prostate cancer. Despite regulation of international trade in *Prunus africana* under the Convention on Trade in Endangered Species since 1995, excessive debarking and tree felling is placing the genetic diversity of the species under threat, increasing the risk of extinction, and placing traditional uses under increasing pressure[125].

As noted previously, prior informed consent is essential for successful and equitable bioprospecting activities. Conversely, the absence of consent at any level may undermine the support of local communities and other stakeholders. For example, the rural poor are often most dependent on local fauna and flora, and yet they are typically the last to be asked for consent by collectors.

> *"While once widely regarded as a 'saviour' of tropical forests – the size of the global drugs market is enormous and a reasonable part of it is based on materials derived from nature – the reality is that bioprospecting does not result in large financial flows to poor countries. This reflects the availability of substitute routes to derive drug materials (e.g. synthetics), the vast scale of tropical forests, and the low probabilities of finding successful drugs from a given sample of material."*
>
> ***Source:*** Pearce, D.W. 2005. Paradoxes in Biodiversity Conservation. *World Economics* 6(3): 57–69.

In many countries, including most developing nations, genetic resources and the traditional knowledge associated with their use are not private property and thus may be open to 'biopiracy'. Biopiracy is typically defined as non-consensual patenting and / or commercialisation by private companies of natural substances derived from wild plants and animals occurring on public or communal lands.

125 For further information, see for example, www.wwf.org.uk/filelibrary/pdf/pafricana.pdf, and *Sustainability of Harvesting Prunus Africana Bark in Cameroon*, available at unesdoc.unesco.org/images/0009/000987/098761E.pdf.

As it is not possible to patent living organisms, patents are often registered on particular chemicals isolated or developed from them, often in combination with a stated and documented use of those chemicals. Some observers fear that granting patents to scientific or industrial users over natural compounds or processes based on traditional knowledge about plants and animals may lead to restrictions on access by local communities and indigenous groups to resources on which they depend for their livelihoods (including communities that were the source of the knowledge in the first place).

There is ongoing debate concerning bioprospecting and biopiracy. Some believe they are essentially the same thing and that few if any conservation or socio-economic benefits will be delivered to local communities or national governments from this type of resource exploitation, irrespective of prior informed consent. Others argue that patents on products developed as a result of the efforts of bioprospectors are sometimes based so closely on traditional knowledge that they are a form of intellectual property theft. Conversely, there are also many who believe that biopiracy can be avoided and controlled through appropriate policies, and that bioprospecting can make an important contribution to biodiversity conservation. However, in the short-to-medium term it is possible that potential bioprospectors may be 'scared off' by the slow pace of negotiations or confusion and controversy as to who 'owns' the rights to biodiversity resources. Examples include the case of the International Cooperative Biodiversity Groups[126] project in Chiapas, Mexico, and the control of commercial bioprospecting under Decision 391 (Common Regime on Access to Genetic Resources) in Colombia and other Andean countries[127].

Some of the concern about bioprospecting arises from the difficulty and expense of monitoring the collection of samples and their subsequent use for commercial or non-commercial purposes. Once samples leave the country, it is often difficult to assess their use or how information regarding the samples is exchanged and used. Countries such as Nicaragua, the Philippines and Peru employ a variety of approaches (including compliance or ecological bonds, or requiring the bioprospectors to pay for monitoring and evaluation procedures), but these seem to be the exception rather than the norm[128].

4.8.4 Bioprospecting – gaps and business investment opportunities

At present, bioprospecting is perceived in some quarters as a relatively un-remunerative investment, compared to the value that can be realised from other non-consumptive uses of biodiversity. For example, Costa Rica has received US$4.5 million from bioprospecting accords, a small sum compared to the annual income of approximately US$400 million derived from ecotourism. Furthermore, collection of wild species (with payment for this collection) may be a one-off event or may stimulate an intense burst of unsustainable harvesting. Once a successful product has been developed, new discoveries yielding the same product may be redundant and, in effect, valueless from a commercial perspective[129]. As more countries enter the biochemical prospecting market with unique combinations of biological and technical resources for sale, market niches may become smaller, leading to declining profits and conservation incentives[130]. As a result, analysts have cautioned against undue optimism regarding the contribution of bioprospecting revenues to biodiversity conservation[131].

Potential investors in bioprospecting must demonstrate that both biodiversity and local communities are benefiting from their activities. Prior informed consent must be obtained at all appropriate levels. These are both essential prerequisites to the pursuit of bioprospecting business opportunities. There are substantial business risks associated with bioprospecting, not least of which is the potential damage to

126 See: www.fic.nih.gov/programs/research_grants/index.htm.

127 Reported at: www.idrc.ca/en/ev-86275-201-1-DO_TOPIC.html.

128 Carrizosa, S., Brush, S.B., Wright, B.D. and McGuire, P.E. (eds). 2004. *Accessing Biodiversity and Sharing the Benefits: Lessons from Implementing the Convention on Biological Diversity.* IUCN: Gland, Switzerland and Cambridge, UK. www.iucn.org/themes/law/pdfdocuments/EPLP541EN.pdf.

129 Simpson, R. D., Sedjo, R.A. and Reid, J.W. 1996. Valuing Biodiversity for Use in Pharmaceutical Research. *Journal of Political Economy* 104(1): 163–85.

130 McNeely, J. 1999. *Mobilizing Broader Support for Asia's Biodiversity: How Civil Society Can Contribute to Protected Area Management.* Asia Development Bank and IUCN – The World Conservation Union: Gland.

131 Barbier, E.B. and Aylward, B.A. 1996. Capturing the Pharmaceutical Value of Biodiversity in a Developing Country. *Environmental and Resource Economics* 8(2): 157–181; ten Kate, K. and Laird, S.A. (eds). 1999. *The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit Sharing.* Earthscan: London; Laird, S. and ten Kate, K. 2002. Linking Biodiversity Prospecting and Forest Conservation (Chapter 9) in Pagiola, S., Bishop, J. and Landell-Mills, N. (eds). *Selling Forest Environmental Services: Market-Based Mechanisms for Conservation and Development*: 151–172. Earthscan: London.

reputation arising from biopiracy claims. While this does not rule out bioprospecting entirely, as an investment opportunity, it does mean that the most appropriate opportunities will tend to be in countries with clear access and benefit sharing policies and a solid institutional framework. On this basis:

1. It may be possible to reduce risk by investing in companies that actively support the communities that provide the raw materials they utilise, including domestication of plants / organisms susceptible to unsustainable levels of harvesting.
2. Investing in the development of high throughput screening technologies / programmes to allow more efficient screening of natural products may enable bioprospecting to compete more effectively with synthetic compounds formulated in the laboratory.
3. Developing countries could improve their healthcare systems by asking major pharmaceutical companies to help them improve their ability to research and develop their own drugs in return for access to natural resources, rather than making unrealistic assumptions regarding the level of financial gains that are possible from bioprospecting[132].
4. Bespoke services to monitor in-country bioprospecting and subsequent use of samples and related data could be offered to government agencies and private corporations.

132 Sampath, P. G. 2005. *Regulating Bioprospecting: Institutions for Drug Research, Access and Benefit-Sharing.* United Nations University Press.

4.9 Biodiversity offsets

The use of legally mandated biodiversity offsets is growing and examples can be found in Australia, Brazil, Canada, Switzerland, and the USA. The Environmental Liability Directive passed by the European Commission in 2004 could lead to similar arrangements throughout Europe. Analogous policies are under development in Mexico, New Zealand and Uganda, among other countries.

In addition to mandatory offsets, there is growing interest in the potential of voluntary offsets. Some companies have made public commitments to implement biodiversity offsets linked to their 'footprint'; while several mainstream investors are looking at biodiversity offsets as a new business opportunity, as well as an indicator of good corporate governance.

Long-term prospects for biodiversity offsets may include international trade in conservation 'credits', along the lines of the market for carbon credits. Unlike carbon, however, biodiversity is not a homogenous commodity, but a complex system that makes the development of any trading regime more challenging.

International trade in biodiversity credits may be remote, but several informants highlight opportunities to develop biodiversity offsets as a new business sector at local, national and corporate levels.

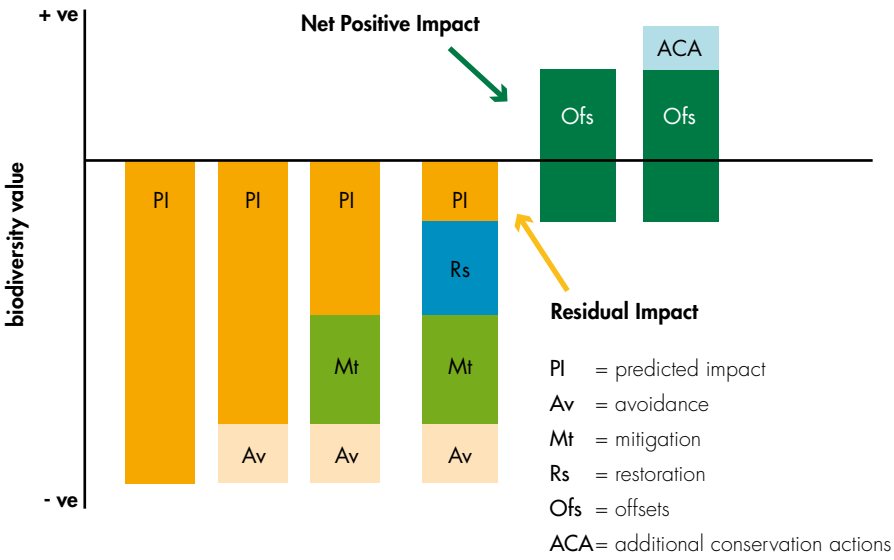
There are opportunities to develop biodiversity offsets as a commercial business, focusing on situations where there is significant unmet demand for offsets, or where demand could be stimulated more easily – examples include local ecosystem 'banks', ecosystem service 'brokers', and biodiversity 'offsets for imports'.

4.9.1 What are biodiversity offsets?

Biodiversity offsets are conservation activities intended to compensate for the residual, unavoidable harm to biodiversity caused by economic development projects[133]. The basic idea of biodiversity offsets is to extend the traditional mitigation hierarchy of avoid, reduce, rescue and repair in an effort to achieve no net loss or a net positive impact on biodiversity (**Figure 11**).

133 ten Kate, K., Bishop, J. and Bayon, R. 2004. *Biodiversity Offsets: Views, Experience, and the Business Case.* IUCN: Gland, Switzerland and Cambridge, UK and Insight Investment: London, UK (available from www.eldis.org/static/DOC16610.htm). Other terms commonly used to describe biodiversity offsets include 'compensatory mitigation', 'conservation banking', 'complementary' or 'compensatory remediation', 'reconstitution' or 'replacement' of 'affected ecosystems'.

Figure 11. Biodiversity offsets and net positive impact



Source: Redrawn with permission, based on an original graphic in *Private Sector Project Development as a Delivery Mechanism for Biodiversity Conservation: Achieving a Net Positive Impact* by Anstee, S.D, Richards, D.G., Dorward-King, E.J. and Laws, S. (in preparation, 2007).

Examples of biodiversity offsets range from one-off, voluntary initiatives (e.g. the creation of protected areas supported by a trust fund as 'compensation' for environmental damage resulting from the construction of the Chad–Cameroon oil pipeline) through nation-wide, legally mandated systems of third-party compensation for damage to natural habitat (e.g. wetland mitigation banking in the USA).

4.9.2 Biodiversity offsets – status and trends

One of the longest-established systems of biodiversity offsets is found in the USA, under federal and state laws requiring 'no net loss' of wetlands and the conservation of endangered species habitat. Regulations under the Clean Water Act of 1972 require both public and private developers to compensate or 'mitigate' the loss of wetlands, when adverse impacts are considered unavoidable, by financing the creation, restoration and / or protection of comparable wetland habitat (see **Box 19**). Similarly, regulations under the Endangered Species Act of 1973 require compensation for the loss of many other critical habitats.

Box 19. The Inland Sea Shorebird Reserve

Kennecott Utah Copper mine, a wholly owned subsidiary of Rio Tinto Plc, is North America's largest copper mine. During the mid-1990s the company needed to acquire land on which to store mining waste. The company purchased an area adjacent to its mining operations along the south shore of the Great Salt Lake. However, this property contained designated wetland habitat and Kennecott was, therefore, required by law to offset the loss by creating an agreed number of 'habitat units'. A wetland mitigation plan was developed that identified nesting and migratory shorebirds and waterfowl as the primary focus. Although the plan called for an offset of 426 ha of wetlands, Kennecott decided on a larger voluntary offset, aiming to enhance and restore a landscape which would be more likely to succeed in conservation terms. The company identified and purchased 1,010 ha suitable for wetlands mitigation, which became the Inland Sea Shorebird Reserve. A five-year monitoring programme showed that

wildlife numbers increased substantially following the creation of the reserve, with a 1,000-fold increase in bird numbers over the baseline for the same site. In 1997 the site was expanded from 1,010 ha to more than 1,450 ha and four ponds were added. In the long-term, the company plans to hand the site over to National Audubon to become part of its large bird reserve and contribute to eight-miles of contiguous shoreline habitat.

Source: Adapted from: ten Kate, K., Bishop, J., and Bayon, R. 2004. *Biodiversity Offsets: Views, Experience, and the Business Case.* IUCN: Gland, Switzerland, and Cambridge, UK.

In the USA, the developer need not directly carry out compensation for unavoidable losses of wetland and endangered species habitat. The possibility of off-site mitigation by third parties, where public authorities determine that it is feasible and appropriate, has stimulated an emerging market in mitigation services. Prices of mitigation credits are highly variable, depending on land purchase and restoration costs as well as the demand from developers. Reported prices range from as low as US$1,200 per hectare for wetland credits in some areas, up to US$300,000 per hectare for exceptional species conservation banks. At these prices, it is not surprising that private firms have become interested in supplying mitigation credits (see **Table 1**).

Table 1. Status of the USA mitigation market

Indicator	Wetland Banks (most data from 2005)	Endangered Species (2003)
Approved banks	405 (75 sold out)	60
Participating USA states	42	5+
Area approved	43,549 (FY03)	39,488 ha (cumulative)
Privately commercial banks	70 percent	63 percent
Credit prices (per ha)	US$7,410 – 864,840	US$7,410 – 370,650

Sources: Wilkinson, J. and Kennedy, C. 2002. *Banks and Fees: The Status of Off-site Wetland Mitigation in the United States.* Environmental Law Institute: Washington, D.C.; Fox, J. and Nino-Murcia, A. 2005. Status of Species Conservation Banking in the United States. *Conservation Biology* 19(4): 996–1007; Wilkinson, J. and Thompson, J. 2006. *2005 Status Report on Compensatory Mitigation in the United States.* Environmental Law Institute: Washington, D.C.; National Mitigation Banking Association (www.mitigationbanking.org); US Fish & Wildlife Service (www.fws.gov/endangered/pdfs/landowner/banking_7_05.pdf).

In the case of both wetland mitigation and conservation banking, for each hectare of habitat that is damaged or destroyed, developers must purchase credits from approved conservation banks to support conservation efforts in the surrounding area, for habitat that is similar to that which they intend to convert. A variant of mitigation or conservation banking in the USA is the payment of 'in-lieu-fees' by developers to environmental agencies. As before, the developer is allowed to transfer legal liability for adverse impacts to another party, who in turn assumes the responsibility to compensate for those impacts. In-lieu-fees are normally paid to a public agency to fund land acquisition and / or other conservation activities.

Other examples of legal support for biodiversity offsets can be found in Brazil (Protected Areas Law of 2002 and Forestry Code of 2001)[134]; Canada (Fisheries Act of 1985); Switzerland (Federal Law for Protection of Nature and Landscape of 1983), as well as Australia (e.g. Victoria's Native Vegetation Management Framework of 2002). The Environmental Liability Directive passed by the European Parliament in April 2004 could lead to similar arrangements throughout Europe, as

134 See also: Chomitz, K. M., Thomas, T. S. and Brandão, A.S. 2003. Creating Markets for Habitat Conservation When Habitats are Heterogeneous. Paper presentation at the *Fourth BioEcon Workshop on the Economics of Biodiversity Conservation – Economic Analysis of Policies for Biodiversity Conservation*, Venice International University, Venice, 28–29 August 2003.

firms seek to fulfil their legal obligation to compensate for environmental damage on or off site. Similar policies are under development in Mexico, New Zealand, South Africa and Uganda, among other countries.

An interesting variation on biodiversity offsets is a Brazilian law (Art. 36; Law 9.985/2000; SNUC), which requires industrial development projects to contribute at least 0.5 percent of their total capital cost to the National Protected Area System, as 'compensation' for environmental damage. In this case, however, all revenue is managed by the state and there does not appear to be any role for private providers of compensation services. Additional questions relate to the efficiency and transparency of the compensation fund.

In addition to mandatory offsets, there is growing interest in the potential of voluntary offsets. A few companies have made public commitments to implement biodiversity offsets linked to their impacts, e.g. BC Hydro, Rio Tinto and Wal-Mart, among others. Some mainstream investors are looking at biodiversity offsets as a new business opportunity, as well as an indicator of good corporate governance, e.g. ABN-Amro, Bank Paribas, Henderson Investors, Insight Investment, ISIS Asset Management, Vereniging van Beleggers voor Duurzame Ontwikkeling (VBDO), World Bank / International Finance Corporation and others. Finally, there have been a number of multi-stakeholder initiatives related to biodiversity offsets in recent years, including the Business and Biodiversity Offset Programme (BBOP), Biodiversity Neutral Initiative (BNI) and related work by the International Council on Mining and Metals (ICMM)[135].

There is growing interest in biodiversity offsets among business, government, local communities and conservation groups alike. While the benefits of biodiversity offsets are potentially large, several hurdles need to be crossed to achieve them. Some of the main concerns and questions include the following:

- Slippery slope: will biodiversity offsets lead to the approval of development projects that should not take place (e.g. a 'licence to trash', destruction of unique habitats, or irreversible loss)?
- Social equity: how to ensure equitable distribution of the costs and benefits of offsets, while respecting the rights and concerns of local and indigenous communities?
- Currency: can offsets provide biodiversity and livelihood benefits comparable to those of the original ecosystem? How to measure impact and determine a suitable offset?
- Responsibility: how far does responsibility for environmental impact extend? Should developers offset the indirect impacts of their projects (e.g. impacts arising from labour migration)? For how long should a developer be responsible for the offset? Who else should be involved and responsible for the offset and its evaluation?
- Additionality: how to ensure that offsets deliver new and additional biodiversity benefits, and that biodiversity loss is not simply displaced (i.e. 'leakage')?
- Sustainability: how to ensure that biodiversity offsets are secured in perpetuity or at least for the duration of the impact?
- Timing: should offsets be in place prior to any environmental impact? How can this be achieved?

4.9.3 Biodiversity offsets – gaps and business investment opportunities

Although biodiversity offsets are fraught with policy, legislative and technical challenges, they provide a real opportunity to make a positive contribution to biodiversity, especially when compared to the current level of activities displayed

135 BBOP: www.forest-trends.org/biodiversityoffsetprogram/; BNI: www.biodiversityneutral.org/index_content.html; ICMM: www.icmm.com/newsdetail.php?rcd=67.

by most project developers. As illustrated by the questions listed above, a key priority in many countries is to develop credible metrics and governance systems for biodiversity offsets, including effective mechanisms for stakeholder participation, oversight, monitoring and evaluation.

Long-term prospects for biodiversity offsets may include the potential for international trade in conservation 'credits', along the lines of the emerging international market for carbon credits. Proposals for international financial transfers based on the concept of 'tradable development rights' have been circulating for years, mainly in the academic literature[136]. Unlike CO_2, however, biodiversity is not a homogenous commodity, but a complex system of many parts. This makes it hard to imagine an international trading regime for biodiversity. Nevertheless, work on the potential scope and structure of international biodiversity offsets is continuing and may eventually yield fruit[137].

While international trade in biodiversity credits may be remote, there are immediate opportunities to develop biodiversity offsets as a new business sector at local, national and corporate levels. Even where government does *not* require compensation for biodiversity loss, some companies and agencies are beginning to pilot biodiversity offsets on a voluntary basis. Such initiatives could be encouraged more widely, with a focus on leading companies in land-using sectors, e.g. oil and gas, road construction, utilities, mining and agriculture[138]. A related opportunity is to develop mechanisms for independent certification of biodiversity offsets.

Other biodiversity offset opportunities include:

1. Local ecosystem 'bank': buy or lease land, restore it and sell habitat 'credits' to public agencies and / or private companies that need offsets for regulatory compliance or to meet voluntary 'no net loss' commitments.
2. Ecosystem service 'broker': purchase biodiversity credits from landowners (secured by development rights), rather than the land itself, e.g. biodiversity on top of other people's coffee, carbon or timber plantations, and fishponds. Sell credits to mitigation buyers, as in 1.
3. Biodiversity 'offsets for imports': identify global conservation priorities, define standards for credible offsets, and set up a verification system for companies, which would be encouraged to purchase voluntary offsets for all imports not already certified as 'sustainable' under recognised schemes (e.g. FSC, MSC, Rainforest Alliance). Offsets would be supplied by accredited providers and subject to independent verification and regular renewal.

136 See for example: Cervigni, R. 1993. Biodiversity: Incentives to Deforest and Tradable Development Rights. *CSERGE (The Centre for Social and Economic Research on the Global Environment) Working Paper GEC 93-07.* University College London: London; Graßl, H., Kokott, J., Kulessa, M., Luther, J., Nuscheler, F., Sauerborn, R., Schellnhuber, H.J., Schubert, R. and Schulze, E.-D. 2000. *Charging the Use of Global Commons.* Special Report, German Advisory Council on Global Change: Berlin; Panayotou. T. 1994. Conservation of Biodiversity and Economic Development: The Concept of Transferable Development Rights. *Environmental and Resource Economics* 4: 91–110; Swanson, T.M. 1995. The Theory and Practise of Transferring Development Rights: The Institutions for Contracting for Biodiversity, paper presentation at a *Workshop on Financing Biodiversity Conservation*, Harare, Zimbabwe, 13–15 September 1995.

137 See for example: www.unep.ch/etb/areas/ipes.php.

138 This is one aim of the Business and Biodiversity Offsets Program (BBOP). See www.forest-trends.org/biodiversityoffsetprogram/.

4.10 Biodiversity management services

This specialised market is expected to increase significantly as more companies come to view biodiversity as both a significant business risk and an opportunity; the public sector is also likely to become a more significant customer for biodiversity management services.

There is a need to develop specialist biodiversity management service providers to augment the services currently offered by conservation organisations, academic and scientific institutions and general environmental consultants.

There are several non-profit opportunities that could be supported by a think-tank and ultimately lead to the development of additional (for-profit) investment opportunities through civil society, research, partnership brokering and public sector capacity building initiatives.

More direct, for-profit, opportunities might include: integration of biodiversity with EIA processes; providing ecosystem restoration / rehabilitation services; benchmarking biodiversity performance; conducting and certifying Biodiversity Action Plans; or creating and certifying biodiversity offsets.

4.10.1 What are biodiversity management services?

Biodiversity management services (BMS) include a range of professional activities and services undertaken by public and private entities that deliver benefits for biodiversity, for which a fee is received by the service provider. Corporate demand for BMS is on the rise, driven by internal policies, regulation, stakeholder pressure and other factors. Sector-specific guidance on biodiversity management is increasingly well-articulated and trade associations are playing a greater role in promoting improvements (see **Box 20**).

Box 20. The International Petroleum Industry Environmental Conservation Association (IPIECA) and the International Association of Oil and Gas Producers (OGP) Biodiversity Working Group (BDWG)

The IPIECA / OGP Biodiversity Working Group is an industry-led joint initiative established in 2002 to develop technical guidance and promote good practice of biodiversity management in the oil and gas industry (see www.ipieca.org). The working group also provides a forum for members to exchange information and discuss how the industry can improve its biodiversity performance.

In response to this increasing demand for BMS, some companies have directly recruited biodiversity specialists onto their payrolls, whilst others have entered into one-off or long-term partnerships with external organisations, such as conservation NGOs or scientific institutions. As demand for BMS grows and supply becomes increasingly professionalised, private buyers are turning to specialist providers to supplement in-house skills and resources. These providers bring specialist

knowledge and expertise into the marketplace, with the aim of making a substantial contribution to the biodiversity performance of client companies. BMS thus represents a growing niche within an expanding market for environmental management services across the private and public sectors.

Existing (E) and potential future (F) biodiversity management services include the following types of activities:

a) *Policy and strategy:*
- Development of biodiversity policies and strategies (E).
- Development of biodiversity tools and guidelines (E).

b) *Project design:*
- Engineering-related (E).
- Scientific basis (E).
- Early risk analysis (E).
- Analysis of mitigation options (avoid – reduce – remedy – compensate) (E).
- Offset options (to address unavoidable residual biodiversity impacts) (F).

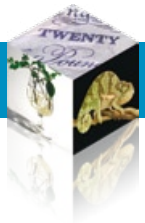
c) *Impact assessment:*
- Baseline measurements (E).
- Biodiversity Impact Assessments (including impact prediction and mitigation measures) (F).
- Environmental Impact Assessments (with integrated biodiversity) (E).
- Social Impact Assessments (with integrated biodiversity) (F).
- Strategic Impact Assessment (E).
- Strategic Environmental Assessment (E).

d) *Build & implement:*
- Restoration Programmes (E).
- Rehabilitation Programmes (E).

e) *Management:*
- Preparation of Biodiversity Action Plans (F).
- Adaptive management (E).
- Environmental Management and Monitoring Plans (with integrated biodiversity) (F).
- Stakeholder identification, analysis and engagement (E).

f) *Biodiversity monitoring:*
- Development and application of biodiversity indicators (E).
- Fauna and flora monitoring programmes (E).

g) *Performance monitoring:*
- Auditing of biodiversity management systems (E).
- Certification and auditing of Biodiversity Action Plans (against a standard) (F).
- Certification and auditing of biodiversity offsets (F).
- Conservation, sustainable use and benefit sharing outcomes (F).



h) Supply chain management:

- Development of certification methodologies (E).
- Materials / product certification (E).
- Certification of small-scale producers (e.g. agricultural and NTFP-related) (F).
- Certification of biodiversity management systems (F).

i) Capacity building:

- Training (E).
- Skills transfer (technical/scientific/management) (E).
- Database management (E).
- Knowledge management (E).
- Good practice guidance (E).
- Integration of biodiversity in Health, Safety and Environmental Management Systems (E).

Biodiversity management service providers come from a range of sectors, including:

- Public agencies.
- Conservation NGOs.
- Academic and research institutions.
- Scientific institutions.
- Commercial consultancies (e.g. civil engineering, environmental, biodiversity / ecological).
- Other professional companies / consultants (e.g. architects, land-use consultants, planners).

Although there is a degree of overlap between biodiversity management service providers, they remain relatively compartmentalised. **Table 2** summarises at a generic level the relationship between providers and the services they typically offer.

Table 2. Biodiversity management services offered by different providers

	Services								
Providers	**Policy & Strategy**	**Project Design**	**Impact Assessment**	**Build & Implement**	**Management**	**Biodiversity Monitoring**	**Performance Monitoring**	**Supply Chain Management**	**Capacity Building**
Public agencies	•	•							
NGOs	•		•		•		•		•
Academic & Research	•						•		•
Civil Engineers		•		•					
Environmental Consultants		•	•	•	•	•	•	•	•
Ecological Consultants		•	•		•	•	•	•	•
Others		•		•	•	•		•	

4.10.2 Biodiversity management services – status and trends

At a global level, the environment industry was estimated to have generated revenues of US$550 billion in 2001. Revenues were expected to reach US$620 billion by 2005, split equally between environmental goods and environmental services and with the fastest growth in transition and developing countries[139]. Environmental consulting represents a significant market where specialist providers thrive, often operating through alliances and contracts with long-term clients and other consultants to gain access to major contracts. The global market in corporate BMS is not well documented, but probably exceeds several US$ billion annually.

BMS is a specialist market with significant growth potential as more companies come to view biodiversity as a relevant business risk and opportunity, and begin to develop and implement biodiversity management strategies. Increased demand for services in the future highlights the need to develop additional specialist BMS providers to augment the capacity currently offered by conservation organisations, academic and scientific institutions, environmental and other consultancy firms. Moreover, potential is growing for the sale of services to public agencies and institutions, substantially increasing the client base for BMS providers.

4.10.3 Biodiversity management services – gaps and business investment opportunities

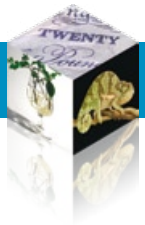
Provision of BMS is a specialist service and commercial providers are relatively thin on the ground. The few that exist today are typically small-to-medium size companies or consultancies, or in some cases, small divisions within larger engineering or environmental consultancies. Nevertheless, the growing attention to biodiversity issues across the private sector suggests that demand for BMS is likely to grow. Opportunities to provide BMS include both public sector and private sector clients. On the public side, there is a need for technical assistance on:

- How to move beyond environmental mitigation, e.g. via offsets.
- Mechanisms for valuing biodiversity, including market-based instruments.
- Improving understanding and capacity in EIA application, particularly with respect to integrating biodiversity.
- Capacity building of authorities in countries with less developed environmental legislation, including EIA, impact mitigation, offset and market-based instruments.

For-profit opportunities with respect to BMS include:

- Integration of biodiversity with the EIA process.
- Providing ecosystem restoration / rehabilitation.
- Benchmarking biodiversity performance.
- Conducting and certifying Biodiversity Action Plans.
- Creating and certifying biodiversity offsets.
- Ecosystem audits (i.e. assessing ecosystem functions in the context of a proposed project).

139 Data are from Environmental Business International, cited in: Kennett, M. & Steenblik, R. 2005. Environmental Goods and Services: A Synthesis of Country Studies. *OECD Trade and Environment Working Papers* 2005/3. OECD Publishing.



4.11 Ecotourism

Ecotourism is growing rapidly and there are many examples of operations that maintain high standards and provide direct support for biodiversity conservation. However, there is also widespread misuse of 'eco' labels and statements with little substance behind their claims: some ecotourism certification and verification systems are not very rigorous in terms of the standards they use and their inspection and rating protocols.

There are few examples of ecotourism operations that generate significant local economic benefits, build local management capacity and business skills, or actively involve local communities in the planning, management and evaluation of associated biodiversity conservation.

There is an opportunity to invest in ecotourism companies that professionalise the management of tourism concessions in national parks and / or create private ecotourism facilities in areas of significant biodiversity; any such tourism facilities / operations would need to be certified according to credible standards.

Another opportunity is to invest in and / or create a 'chain' of ecotourism hotels and related operations – with well-designed facilities, professional management, centralised 'back office' operations, and a common promotional strategy – to create a brand that is synonymous with the highest ecotourism standards. This goal could also be achieved by buying a number of leading ecotourism operations.

4.11.1 What is ecotourism?

The tourism industry is composed of a wide range of businesses, from small, local operations that operate within a local market, through to large transport, hotel and tour operator companies that serve global markets and organise several million tour packages every year. The tourism 'offer' is also highly varied, as summarised in **Table 3**.

Table 3. A tourism typology

Sub-sector	Definition
Mass tourism	Large-scale tourism that is typically associated with 'sun-and-sand resorts' and seasonal package tours. Holidays often consist of packages that comprise flights, local transfers, accommodation and meals, with optional local visits. The direct economic benefits to destination communities are often small and environmental / social issues may not be considered by service providers or by travellers
Nature-based tourism	Tourism that relies primarily on the natural environment for its attractions or settings. This can include higher-risk / specialised 'adventure tourism'. The primary objective of nature-based tourism (and ecotourism) is to visit or see natural environments and their wildlife (e.g. bird watching, whale watching, game viewing, scuba diving, botanical tours and nature photography)
Ecotourism	The accepted definition by The International Ecotourism Society (TIES) defines ecotourism as "*responsible travel to natural areas that conserves the environment and improves the well-being of local people*"
Geotourism	Tourism that sustains or enhances a location's geographical character (such as its natural and cultural environment, heritage and aesthetics)
Pro-poor tourism	Tourism that generates net benefits for the poorest sections of the host society / culture. There is potentially a significant overlap between pro-poor tourism and ecotourism
Responsible or sustainable tourism	Tourism that maximises the benefits to local communities, minimises negative social or environmental impacts, and helps conserve fragile cultures and natural ecosystems

Even more diverse are the types of tourism service providers, which include accommodation (hotels, bed and breakfasts, self-catering facilities, apartments, campsites and cruise ships); transport (trains, air carriers and airports, sea carriers, coaches and cruises); catering (restaurants, bars, food stores, and local commerce / markets); ground transport (car rentals, boat rentals, coach rentals and fuel providers); cultural and social events (excursion and tour providers, sports facilities, recreational facilities, and shops) and environmental, cultural and heritage destinations (protected site managers, private concessionaires and owners). It is these service providers that give tourists access to a range of destinations, some of which fall into the ecotourism category[140].

Although most forms of tourism rely upon a pristine or healthy environment, it is by no means a given that the key actors in the tourism industry are taking, or will take, the steps necessary to protect the environment. Reasons for this dichotomy include the potential time lag between profit generation and environmental degradation; the fragmented responsibility for managing resources that are often public and the difficulty of developing a coordinated approach among the different actors. Indeed, tourism can have a number of direct and indirect impacts on biodiversity, such as land use conversion, disturbance of species, unsustainable consumption, introduction of invasive or alien species, discharge / disposal of waste, pollution and other emissions. It is worth noting that tourism is a significant contributor to

140 United Nations Environment Program. 2005. *Forging Links Between Protected Areas and the Tourism Sector. How Tourism Can Benefit Conservation.* Available at www.uneptie.org/pc/tourism/documents/forging%20links/Forging%20links%20final.pdf.

climate change, which directly and indirectly impacts biodiversity. Some estimates suggest that tourism is responsible for approximately 5 percent of total greenhouse gas emissions, with a predicted rise to 10–20 percent by 2030[141].

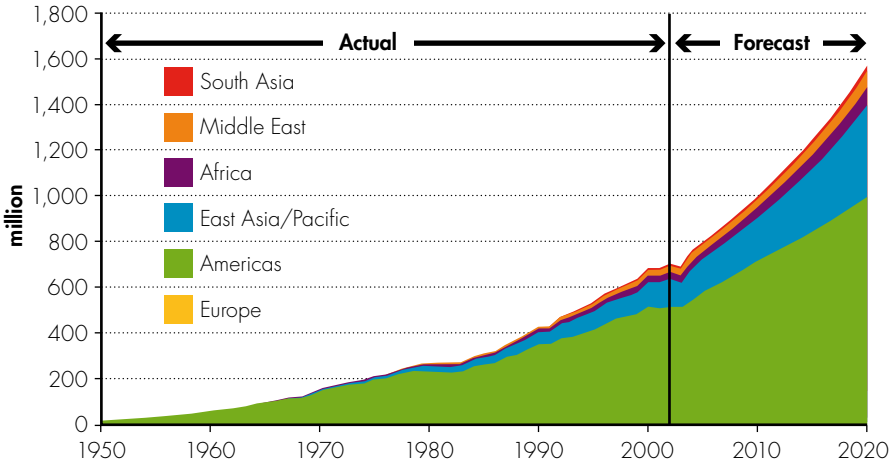
TIES defines ecotourism as a subset of the industry that explicitly addresses the need for conservation of the environment from which the tourist services and products are derived. TIES has developed an ambitious set of ecotourism principles, namely to:

- Minimise impact.
- Build environmental and cultural awareness and respect.
- Provide positive experiences for both visitors and hosts.
- Provide direct financial benefits for conservation.
- Provide financial benefits and empowerment for local people.
- Foster sensitivity to host countries' political, environmental, and social climate.
- Support international human rights and labour agreements.

4.11.2 Ecotourism – status and trends[142]

Tourism is the largest industry in the world economy, employing 200 million people, generating US$3.6 trillion in economic activity and accounting for one in every 12 jobs world-wide (equivalent to 8 percent). The growth in international tourist arrivals is shown in **Figure 12**. In more than 150 countries tourism is one of the five top export earners, and in 60 countries it is the top export. It is particularly important in developing countries, being a principal foreign exchange earner in 83 percent of such countries, and for the world's 40 poorest countries, second only to oil as a source of foreign exchange.

Figure 12. The growth of international tourist arrivals



Source: © UNWTO, 2007, # 92844/35/2007.

According to TIES, sun-and-sand resort tourism has now matured as a market and reached a growth plateau. In contrast, experiential tourism, which TIES defines as encompassing ecotourism, nature, heritage, cultural, and soft adventure tourism, as well as sub-sectors such as rural and community tourism, is one of the tourism sectors predicted to grow most rapidly over the next two decades. Since the 1990s, the rate of growth for ecotourism has been high – in the range 20–34 percent per year, a rate perhaps three times that of tourism as a whole.

141 Olsder, K. and van der Donk, M. 2006. *Destination Conservation. Protecting Nature by Developing Tourism*. IUCN National Committee of the Netherlands: Amsterdam. November 2006.

142 The statistics in this section are primarily from The International Ecotourism Society, Ecotourism Fact Sheet, 2005 (www.ecotourism.org/WebModules/WebArticlesNet/articlefiles/15-NEW%20Ecotourism%20Factsheet%20Sept%2005.pdf). Additional information is available from the UN World Tourism Organization (www.world-tourism.org) and the World Travel & Tourism Council (www.wttc.org).

Although a niche market, the potential for ecotourism to make a local difference is still significant:

- In Costa Rica, tourism (mostly ecotourism) generates US$1000 / visitor while in France 'standard' tourism generates only US$400 / visitor.
- In Dominica, 'stay over' tourists using small, nature-based lodges spent 18 times more than cruise passengers while visiting the island.

"Ecotourism and nature-based tourism in general have been tipped as the key segments of the tourism sector that will generate and spread benefits into conservation. However, in order to gain any benefits from this type of tourism, it is necessary for policy makers, conservation managers and protected area administrators to understand these tourism markets and how to use these to attract tourists."

Source: Font, X., Cochrane, J. and Tapper, R. 2004. *Tourism for Protected Area Financing: Understanding tourism revenues for effective management plans.* Leeds Metropolitan University: Leeds (UK).

The global importance of ecotourism is highlighted by several international agreements including: The UN Commission on Sustainable Development, 7th Session (1999); the UN World Tourism Organization Code of Ethics (1999); The Guidelines on Biodiversity and Tourism Development issued by the CBD (2003); The Quebec Declaration on Ecotourism (2002); and the World Summit on Sustainable Development (2002). Guidelines and standards relating to sustainable / responsible tourism (including specific reference to biodiversity) are also being developed (see **Box 21**).

Box 21. Guidelines and standards in the tourism industry

The Tour Operators' Initiative for Sustainable Development is creating environmental guidelines for hotels, resorts and tourist attractions in biodiversity hotspots. Guidelines on 'Sustainable Hotel Siting, Design and Construction' have been adopted by many large hotel chains (see www.celb.org/xp/CELB/news-events/press_releases/09142005.xml). In a partnership with the tourism industry, the Convention on Biological Diversity has also developed 'Guidelines on Biodiversity and Tourism Development' (see www.biodiv.org/doc/publications/tou-gdl-en.pdf).

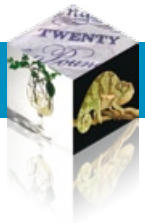
In reviewing the status and trends in ecotourism, it is useful to consider two distinct, but interlinked aspects:

- Tools for managing impacts, for example, voluntary initiatives, guidelines, and eco-labels.
- Contribution to conservation, for example, the positive financial and other contributions that ecotourism can generate.

4.11.3 Tools for managing impacts

Multiple national, regional and state ecotourism societies are involved in promoting ecotourism and improved ecotourism practices. While TIES is perhaps the leading organisation in this sector, it alone refers to more than 40 ecotourism associations on its website[143]. In addition, there is a growing number of ecotourism certification and labelling initiatives worldwide. The Final Report of the World Ecotourism Summit held in 2002 recommended that guidelines on certification schemes for ecotourism should be provided that are global in concept, but local in application

143 www.ecotourism.org.



and that the access of very small-scale enterprises to certification schemes should be facilitated. The long-proposed international Sustainable Tourism Stewardship Council (STSC) (see **Box 22**) may offer a route to harmonisation of approaches, but this is by no means certain and progress is slow.

Box 22. Sustainable Tourism Stewardship Council

The STSC is a proposed global accreditation body for sustainable tourism and ecotourism certification programmes. The Sustainable Tourism Division of the Rainforest Alliance conducted an 18-month feasibility study to investigate the possibility of establishing an international accreditation body, and subsequently established an advisory group to support the development of this entity. Rainforest Alliance is working in partnership with TIES to launch the Sustainable Tourism Certification Network of the Americas. Future steps may include establishing an STSC Association to market certified tourism products, provide guidance to countries seeking to establish or upgrade tourism standards, and facilitate agreement on standards and processes. The ultimate aim is to recognise and market programmes that meet agreed standards and demonstrate capacity to conduct certification.

Source: www.rainforest-alliance.org/programs/tourism/certification/network-of-americas.html.

The 'Linking Conservation of Biodiversity and Sustainable Tourism at World Heritage Sites' project, funded by the United Nations Foundation and developed in partnership with the United Nations Educational, Scientific and Cultural Organization, United Nations Environment Programme and RARE, ran from 2001 to 2005. The project involved pilot initiatives in six World Heritage sites (four in Central America and two in Indonesia) in an attempt to develop replicable approaches and tools to help World Heritage sites and national parks managers worldwide develop tourism in a way that benefits both biodiversity and local communities.

4.11.4 Ecotourism contributions to conservation

There are numerous examples of how ecotourism is making direct, significant contributions to biodiversity conservation. One approach is through revenue generated to support protected areas. Some protected areas generate significant revenue from visitor fees collected at the point of entry or as user fees applied as, for example, part of an overall package cost. In South Africa, some 60 percent of foreign tourists visit a national park or game reserve and the South African National Parks Board finances up to 80 percent of its annual budget from tourism receipts[144].

In addition to the payment of fees, financial contributions may be generated through the sale of licences, concessions and leases. Public authorities often delegate responsibility for managing tourism operations in protected areas to private businesses, NGOs, individuals or local communities. In Indonesia, for example, the management plan for Komodo National Park (an IFC / GEF project with TNC and others) establishes an ecotourism concession operated by a business–NGO joint venture[145]. Similarly, the South African National Parks Board grants concessions to private companies to build and operate tourism facilities in national parks.

In some cases, private entities (including NGOs) have voluntarily assumed certain responsibilities for public protected areas or funded other conservation activities. In Bonaire, Saba and the British Virgin Islands, for example, commercial dive operators perform basic interpretive, information and surveillance functions on

144 Eagles, P. 1999. Cited in Emerton, L. and Bishop, J. with Thomas, L. 2005. *Sustainable Financing for Protected Areas: a Global Review of Challenges and Options*. Available at: www.iucn.org/bookstore/HTML-books/BP13-sustainable-financing/cover.html.

145 The Nature Conservancy, *Komodo National Park: Collaborative Management Initiative* (www.tnc.org).

behalf of marine protected area authorities[146]. Several reports detail the different forms of support that the tourism industry can provide to protected areas, such as *Pay Per Nature View*[147]; *Wildlife Watching and Tourism*[148] and *Forging Links Between Protected Areas and the Tourism Sector*[149].

Many countries also impose indirect taxes on tourists and tourism facilities, with a proportion of the revenues earmarked for conservation. In Belize, for example, the Protected Areas Conservation Trust receives much of its revenue from an airport tax, paid by visitors upon departure, as well as a small commission on cruise ship passenger fees. Similarly, the government of the Turks and Caicos Islands earmarks a portion of hotel tax receipts to support the country's PAs.

Other conservation benefits that ecotourism can generate include providing alternative livelihoods based on businesses that value biodiversity. The report *Destination Conservation. Protecting nature by developing tourism*[150] describes 27 projects supported by the IUCN NL Biodiversity & Tourism Micro Fund. The focus of this fund is the financing of small tourism projects that can generate income based on the sustainable use of biodiversity, in effect developing tourism as a tool to protect nature and for community development.

4.11.5 Ecotourism – what is working / not working

While ecotourism is growing rapidly and there are many positive examples of operations that maintain high standards and provide direct support for biodiversity conservation, there is also the perception of widespread, and often blatant, 'green washing' in which tourism operations make use of the 'eco' label with very little substance to support their claims. In addition, some ecotourism certification / verification systems are less than rigorous both in terms of the standards they use and their inspection and rating protocols.

There are many examples of tourism developments that result in environmental damage and / or undermine the very values upon which the tourism is based. This is a potential risk for the development and promotion of ecotourism, which depends upon the conservation and sustainable use of natural environments. Moreover, even when credible ecotourism certification standards exist and are implemented, there are few ecotourism operations that can provide credible evidence that their activities result in significant biodiversity conservation. It is also rare for local communities to share in a significant portion of the profits from ecotourism operations, although the latter often do generate local employment and demand for local goods and services, and can provide models that spur the creation of locally owned ecotourism operations. An example is described in **Box 23**.

Box 23. Rainforest Expeditions

Rainforest Expeditions (RFE) is an ecotourism project co-financed by EcoEnterprises Fund and the project principals, Conservation International, and Root Capital (formerly EcoLogic Finance). It offers comfortable, low-impact lodging in the Peruvian Amazon. The company incorporates local sustainable development and environmental education and research into its rainforest experience, including the protection of macaw nurseries and harpy eagle nests. RFE also has a unique relationship with the indigenous Ese'eja community of Infierno. Ese'eja owns one of RFE's two lodges and receives 60 percent of the profits from the lodge, generating almost US$250,000 for this indigenous community since 1998. The community receives additional benefits from its partnership with RFE, including employment, training, and sale of goods. The lodges are located in the buffer zone of the Tambopata–Candamo Reserve Zone, part of a biological corridor that is one of CI's hotspots. The area also features a significant diversity of plant

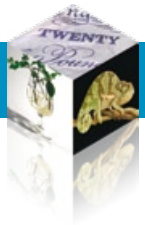
146 Geoghegan, T. 1998. *Financing Protected Area Management: Experiences from the Caribbean.* Caribbean Natural Resources Institute. Available from www.canari.org/finance.pdf.

147 Available at assets.panda.org/downloads/paypernatureviewphotos.pdf.

148 Available at www.cms.int/publications/pdf/CMS_WildlifeWatching.pdf.

149 Available at www.unep.fr/pc/tourism/documents/forging links/Forging links final.pdf.

150 Olsder, K. and van der Donk, M. 2006. *Destination Conservation. Protecting nature by developing tourism.* 2006. IUCN National Committee of the Netherlands: Amsterdam, November 2006. Printed copies available via www.iucn.nl/nederlands/publicaties/publicaties/allepubl.htm, priced €12.50.



life. Tourism has become an increasingly important economic livelihood for the local peoples, mitigating the threats from illegal logging, hunting, and slash-and-burn agriculture. RFE was a winner in the World Resources Institute's New Ventures Business Plan Competition in October 2001. In 2003, the company was selected by Outside Magazine as one of the World's Best Ecolodges, and has received similar accolades in previous years. The Nature Conservancy honoured the Ese'eja community in 2002 as one of the Equator Prize finalists for outstanding achievement in sustainable development.

4.11.6 Ecotourism – gaps and business investment opportunities

It is important to distinguish between failures that derive from a lack of inherent potential and those that derive from poor management. This remains a largely embryonic sector – and a complex one at that. Although ecotourism is already widespread and growing in terms of international coverage, there are relatively few developing countries that are major ecotourism destinations in terms of total visitor numbers and tourism revenues. Even within these destinations, ecotourism tends to be concentrated in a small number of regions and facilities. There is potential to promote ecotourism within regions where ecotourism is currently quite modest, but holds significant promise, if designed, managed and promoted effectively, such as some areas in West or Central Africa. Such efforts would probably be most effective if they focused initially on niche markets within the ecotourism sector, such as birdwatchers or ecotourists with a strong interest in local culture, art, music, or sportfishing.

More generally, there is scope for further work on how to maximise the conservation benefits of ecotourism. This might include analysis of the key actors that connect the demand and supply sides, and their roles and options for improving conservation benefits. Additional analysis might include the role and responsibilities of national and local authorities, and the policies and tools that would support tourism businesses that are both profitable and able to make a net positive contribution to biodiversity and poverty reduction.

Specific investment opportunities include:

1. Invest in ecotourism companies that can then take on the (business) management of tourism concessions in national parks (making the case to countries for the private management of tourism facilities in public PAs, where these facilities are currently managed by government or parastatal agencies). These companies could also create or invest in private ecotourism facilities in areas of important biodiversity. These investments could range from joint partnerships with existing ecotourism or hotel management companies to the creation of new companies. Any tourism facilities / operations would need to be certified according to credible standards.
2. Investment in joint ventures (public–private partnerships), particularly between communities and the private sector (and government), based on participatory and equitable negotiations.
3. A variation on this theme would be to invest in and / or create a 'chain' of ecotourism hotels and related operations – with well-designed facilities, professional management, centralised 'back office' operations, and a common promotional strategy – to create a brand that is synonymous with the highest ecotourism standards. This goal could also be achieved by buying a number of leading ecotourism operations.
4. Invest in existing eco-funds, and / or create new investment funds, that include ecotourism in their portfolios (a variation on this is shown in **Box 24**). These

funds could be focused on ecotourism operations that are not only certified according to credible standards, but also set new standards in terms of local community participation and benefits.

5. In the generation of sustainable livelihoods via businesses that value biodiversity, there are opportunities to improve marketing (from product development to distribution); performance indicators to measure conservation results and poverty reduction; improved procedures for knowledge transfer between different projects, and investment in small / community-based operators whose services and products can be integrated in the mainstream tourism industry.

Box 24. Establishment of an ecofund through tourist contributions

The Hotelplan Swiss Group, a Swiss tour operator that offers mainly package and guided tours, established an ecofund in January 2001. Funds for the programme are raised through a contribution of about US$3 per customer booking a package from Hotelplan's 'Holidays at the Seaside' catalogue. Bookings from this catalogue account for 20–25 percent of the company's sales and raised approximately US$750,000 for the programme in 2002. These funds are used to support sustainable tourism projects, environmental efforts by partners at Hotelplan destinations, and emergency help or one-off projects. The philosophy of the ecofund is communicated directly to customers via posters, brochures and briefings. Further project information is also presented in Hotelplan's corporate Environmental Report, Annual Financial Report and on its website (www.hotelplan.ch). Staff also receive information via meetings and training sessions.

Source: Tour Operators Initiative, www.world-tourism.org/tour/about/profiles/profiles_Hotelplan.htm.

4.12 Recreational hunting and sportfishing

Recreational hunting and fishing are significant sources of conservation funding in developed and some developing countries: as international travel and tourism continue to expand, the demand for recreational hunting and fishing in developing countries can be expected to increase.

A prerequisite for successful management of sport hunting and fishing is the ability of government agencies to develop regulations and associated monitoring and enforcement capacity to ensure that the activity does not lead to unsustainable use of permitted or other species.

The CAMPFIRE Initiative in Zimbabwe is one of the best known examples of a recreational hunting programme that has achieved significant biodiversity conservation and community economic development benefits on a wide scale. This approach has been replicated in several other African countries, even as the original initiative has succumbed to the economic crisis in Zimbabwe.

There is an opportunity to replicate the CAMPFIRE approach in other countries where potential for recreational hunting exists, and applying the same principles to sportfishing: in such cases, it will be important to support research to determine the sustainable harvest and to monitor relevant animal populations as well as the health of associated ecosystems.

Opportunities exist to work with recreational hunting and fishing organisations with good records in supporting biodiversity conservation in developed countries, to open more chapters, or enter into mentoring relationships with similar organisations in developing countries, to implement conservation programmes.

4.12.1 Hunting and sportfishing – status and trends

Many people who engage in recreational hunting and fishing are strong supporters of environmental conservation. The various associations and organisations they support contribute significant resources to habitat and species conservation. Although these organisations are found mainly in developed countries, there are several examples of recreational hunting and fishing operations that support biodiversity conservation in developing economies. North America, Europe and Africa are the principal areas for recreational hunting, with – for the moment – more limited activities in the rest of the Americas and in Asia. Potential growth in previously isolated areas (such as Central Asia) is a real possibility, but brings with it the risk of exposure of endangered species to poorly managed or regulated recreational hunting businesses.

More than 47 million people participate in recreational hunting or fishing in the USA[151], and recreational fishing is often ranked as *the* most popular outdoor activity in the country. There are a further estimated 25 million recreational anglers in Europe and 17 million in Japan[152]. Annual expenditure on recreational hunting and fishing in the USA is estimated at around US$70 billion. In 2001, USA anglers alone spent US$34 billion on fishing trips[153], and in 1996, USA anglers and hunters spent US$700 million and US$600 million, respectively, on licences and permits.

In South Africa, during 1997, the recreational hunting industry generated over R176 million (approximately US$38.2 million) from tariffs and trophy fees paid by some 7,500 foreign hunters. There are currently some 9,000 privately owned game ranches in South Africa, expanding at an average rate of 300,000 ha per annum and representing capital investments of approximately R6 billion[154] (approximately US$1.3 billion).

In some cases – particularly in developed countries – the revenue generated from hunting and fishing licences may be used to support the operational expenses of wildlife agencies involved in the management of protected areas and the regulation of hunting and fishing activities. In other cases, the revenues largely benefit individual operators and do not contribute to management activities.

In some countries, fees from licences constitute the bulk of these operating expenses. One estimate suggests that these fees provide 75 percent of USA state wildlife departments' annual budgets[155]. Often these fees are specifically earmarked for the conservation and protection of wildlife habitat and the species that are hunted. For example, the USA federal government imposes an 11 percent excise tax on all sales of hunting weapons and ammunition, which generates more than US$300 million each year. Half of this amount is used to finance the US Wildlife Restoration Fund. A similar 10 percent USA federal excise tax on sales of sportfishing equipment and motorboat fuel is used to finance the US Aquatic Resources Trust Fund[156].

In North America, Europe, Australasia and parts of East Asia there are numerous recreational hunting and fishing organisations that provide additional support for conservation activities using membership dues and other private financial sources. Two examples from the USA are noted in **Box 25**.

Box 25. Hunting and fishing associations and conservation activities

Ducks Unlimited (DU) is the world's largest private, non-profit, waterfowl and wetland conservation organisation, with over 1 million supporters in the USA, Canada and Mexico. Other DU affiliates are in Australia, New Zealand and Europe. Since its inception in 1937, DU has conserved more than 3.8 million ha of waterfowl habitat throughout North America and raised nearly US$1.6 billion for conservation.

Source: Ducks Unlimited, www.ducks.org.

FishAmerica Foundation is the conservation and research arm of the American Sportfishing Association. Over the last 20 years, the Foundation has provided more than US$6 million in matching grants for over 750 grassroots conservation and research projects. In 2006 the Foundation announced a partnership with the National Oceanic and Atmospheric Administration (NOAA) Community-based Restoration Program to provide US$800,000 to restore marine and freshwater fisheries habitat, including salt marshes, seagrass beds, mangroves and rivers important to fish species that spawn in freshwater and migrate to the sea, such as salmon and striped bass.

Source: American Sportfishing Association, www.asafishing.org/asa.

151 US Fish and Wildlife Service. *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. 2001* (available at: federalasst.fws.gov/surveys/surveys.html).

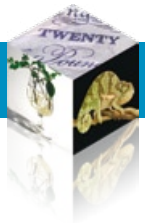
152 European Fishing Tackle Trade Association (www.eftta.com/english/default.html) and Japanese External Trade Organization (www.jetro.go.jp).

153 US Fish and Wildlife Service. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. 2001. Available at: biodiversity action plans federalasst.fws.gov/surveys/surveys.html.

154 Republic of South Africa Department of Environmental Affairs and Tourism website, www.environment.gov.za. Note: the average conversion rate for the US dollar to the South African Rand in 1997 was $1 to 4.6 Rand.

155 ConservationForce, www.conservationforce.org.

156 Conservation Finance Alliance, www.conservationfinance.org.



Informal associations of traditional hunters and fisher-folk can be found in many developing countries, although few of these are formally recognised by public authorities. Exceptions can be found in regions where recreational hunting or sportfishing have become an important part of the tourism economy, such as eastern and southern Africa for recreational hunting, and the Caribbean and Central America for sportfishing. Here such organisations are more common.

One noteworthy initiative that generated significant funding for local communities from hunting activities over many years is the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe[157]. Although the CAMPFIRE programme has suffered setbacks recently, due to wider political and economic difficulties in Zimbabwe, a number of similar initiatives have been developed in Namibia, Zambia and several other African countries. One example in Zambia is described in **Box 26**.

Box 26. The Luangwa Integrated Resource Development Project in Zambia

The Luangwa Integrated Resource Development Project (LIRDP) arose out of efforts to reduce elephant and rhino poaching in the Luangwa Valley in Zambia. Originally designed as an integrated development project, the LIRDP evolved during the 1990s into an initiative combining management of the South Luangwa National Park (SLNP) with a community-based natural resource management programme for 40,000–50,000 people in the Lupande Game Management Area. The SLNP is Zambia's premier wildlife tourism attraction and is known internationally for its abundant wildlife and charismatic large animals such as elephants, leopard, lions, hippos, buffaloes, giraffe, and antelope. A key feature of the project in its later stages was the transition from managing wildlife for local people to managing wildlife by the people, driven by fiscal empowerment and democracy. In its later stages, the project focused particular attention on cutting costs and increasing revenues from tourism. Although total financial independence remains elusive, the project increased cost recovery from 7 percent to 60 percent in a period of four years, while at the same time improving park management and increasing local community participation in wildlife protection and sustainable use.

As international travel and tourism continue to expand, the demand for recreational hunting and fishing in developing countries might also be expected to expand and to become more widespread geographically.

It remains to be seen if the growth of an urban middle class in several developing countries (notably in China and India, but also in an increasing number of African countries) will also fuel this growth. However, outside of the USA, recreational hunting is largely associated with 'gentry' rather than the middle or working class. In India, cultural norms may limit the growth of recreational hunting and while many species are utilised in China, recreational hunting may likewise be of limited interest.

4.12.2 Hunting and sportfishing – what is working / not working

Despite strong differences of opinion that continue to exist between and within conservation organisations regarding the ethics of recreational hunting and fishing, there is a growing acceptance that these industries and organisations can be positive forces for conservation. For example, in several countries, sportfishing operators are increasingly requiring that their clients respect 'catch and release' policies for large sportfish (notably marlin and sailfish) in an effort to maintain fishing numbers. They are also promoting the use of circle-shaped, versus the

157 An excellent recent analysis of CAMPFIRE is presented in Frost, G.H. and Bond, I. 2006. *CAMPFIRE and the Payment for Environmental Services*. International Institute for Environment and Development: London.

standard 'J-shaped', hooks, which cause significantly less damage to fish. Costa Rica is a leading example of such approaches.

One issue surrounding the promotion of recreational hunting and fishing in developing countries is the ability to develop sufficiently rigorous regulations and the associated monitoring and enforcement capacity to ensure that the approval of hunting licences does not exacerbate the depletion of wild species due to habitat loss and / or poaching. A counterargument is that illegal hunting and the bushmeat trade are already rampant in many developing countries, hence the approval of relatively small numbers of licences could provide additional resources and incentives to improve the monitoring and enforcement of hunting and fishing operations. A related concern is whether ministries of environment, and parks and wildlife departments in many developing countries have sufficient information regarding wildlife population dynamics and ecosystem function to develop sustainable hunting and fishing quotas.

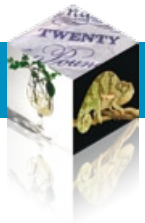
Some observers do not, however, consider quotas to be a high priority, noting that for the most part, the industry respects certain norms – such as hunting males – that protect against damage (although selective trophy hunting may have some impacts on conservation genetics). A greater concern is the corruption associated with the control of hunting and fishing licenses and revenues in some countries.

The potential for developing independent certification of 'conservation hunting' initiatives has been widely discussed, although it remains unclear as to whether this would deliver any substantial conservation benefits. However, by allowing clients to distinguish between those operators that contribute to conservation and community development and those that do not, certification could create incentives for operators to improve the conduct of their business.

A related debate in several countries concerns whether catch and release sportfishing should be allowed in marine protected areas, as a way of generating additional revenue for conservation efforts. Opponents are concerned that not enough is currently known about the potential adverse affects of fishing on wild fish populations and other components of PAs. In contrast, recreational fishermen often claim that their impacts are negligible, especially compared to commercial fishing boats that operate immediately adjacent to PAs and sometimes invade them.

4.12.3 Hunting and sportfishing – gaps and business investment opportunities

1. Replicate the CAMPFIRE approach in other countries where good potential for recreational hunting exists; focusing on countries with similar property rights structures (such as Tanzania and Kenya) and extend where possible to sportfishing – taking into consideration the questions of who has rights to what resources (e.g. national and international waters) and how to demarcate areas of use (particularly given the 'patchy' and temporal distribution of fish). This approach might involve taking an ownership position in existing recreational hunting and fishing companies to redirect their operations, entering into joint partnerships with existing hunting organisations or creating new companies. These companies would share a percentage of the revenues generated with local communities. They could also collaborate with national governments and NGOs to support associated community education and conservation projects. Given the potential sensitivity and negative public image that such an approach could entail, it would be important to support research to provide a sound scientific basis for determining sustainable offtake numbers and to monitor the population dynamics of the animals in question, in addition to the health of the associated ecosystems.



2. Identify and work with recreational hunting and fishing organisations from developed countries with good records in supporting biodiversity conservation to open more chapters, or enter into mentoring relationships with similar organisations in developing countries to implement similar conservation programmes.

4.13 Conclusions on the Biodiversity Business Landscape

This chapter has described a range of business models for biodiversity conservation, as well as key gaps and opportunities. A summary of the suggestions made with respect to each business sector is provided below. These are grouped under three broad themes, namely:

- The policy / enabling environment.
- Business development services.
- Investment opportunities.

The potential for market growth in some of these areas is summarised in **Table 4**.

Table 4. Selected ecosystem markets and their potential for growth

Ecosystem Market	Current Size (US$ per annum)	Potential Size – 2010 (US$ per annum)	Potential Size – 2050 (US$ per annum)
Certified Agriculture and Fisheries	$26,000 million in global sales; $21,000 million	$60,000 million	$200,000 million
Carbon Sequestration through Forestry (e.g. Kyoto, and LULUCF)	$100 million (much of this in developing countries)	$1,500 million (if EU ETS allows sinks by 2008)	$6,000 million
Certified Products (Timber and NTFP)	Forestry Stewardship Council alone estimated at $5,000 million	$15,000 million	$50,000 million
Government Payments for Water-Related (WRP) Ecosystem Services	Mexico programme $15 million; Costa Rica programme $5 million; China Program $1+ billion?	$3,000 million	$20,000 million
Private Watershed Management Payments	$5 million (many public payments for environmental services are partially public – like Costa Rica approx. 30 percent private funds for electricity, also Ecuador, public utility revenues)	$50 million	$10,000 million
Bioprospecting	$17.5–30 million	$35 million	>$500 million
Regulatory Driven Ecosystem Offsets (including US Wetland Mitigation Banking)	$200 million – just private for profit wetland and stream; $1,000 million total (including in-lieu fee etc.) Unknown how many ecosystem offsets are driven by EIA regulation in developing countries	$600 million (banks); $1,500 million total	$2,000 million (banks); $3,000 million total
Regulatory Driven Species Offsets (including US Conservation Banking)	$45 million in the USA. Programme just begun in Australia and possibly similar programme in France, size unknown	$65 million	$200 million
Voluntary Conservation Payments and Biodiversity Offsets	$20 million (increased if money flowing through conservation organisations is included)	$25 million	$150 million – if corporations take to the concept

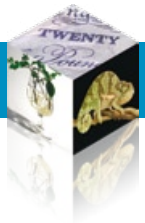
Table 4. Selected ecosystem markets and their potential for growth (continued)

Ecosystem Market	Current Size (US$ per annum)	Potential Size – 2010 (US$ per annum)	Potential Size – 2050 (US$ per annum)
Government Conservation Payments and Biodiversity Offsets	$3,000 million – just flora and fauna oriented programmes (not including water and soil conservation); in developing countries, government involvement may be through state electricity, water and road agencies	$4,000 million	$10,000 million
Land Trusts, Conservation Easements (and expenditure by NGOs for conservation)	$6,000 million in USA alone. Size and use of easements in developing countries is unclear	$10,000 million	$20,000 million

Source: Adapted from information supplied by Michael Jenkins (Forest Trends) (Personal Communication, 2006).

4.13.1 Enabling environment

1. Support efforts to convert marginal agricultural land to native habitat, via assisted natural regeneration – ideally with a focus on biological corridors – alongside intensifying agricultural production, using biodiversity-friendly practices, on more suitable land. This approach could be implemented through payments for environmental services, tax breaks, or other incentives (agriculture).
2. Support the adoption of certification standards in developing countries, particularly in regions where these are currently non-existent or embryonic. As with other certification systems, improved monitoring and evaluation systems for measuring impacts of such practices on biodiversity and livelihoods are required (forestry).
3. Address the policy issues related to land tenure, use rights and the decentralisation of forest management to involve local communities. Such work should include a focus on the fuelwood and charcoal sectors, given their importance for forest conservation and community livelihoods in many parts of the world, and the relative lack of attention they currently receive from the international development and conservation communities (forestry).
4. Promote marine and aquatic PAs (or other limited use zones) linked to the sustainable management of capture fisheries in priority marine ecosystems. This concept could be tied to the concept of Individual Transferable Quotas or compensation for marine / aquatic degradation caused by extractive industries. In addition, it may be possible to apply the concept of payments for ecosystem services to marine PAs, where they make a significant contribution to fisheries productivity, e.g. mangrove forests and coral reefs which act as 'fish nurseries' (fisheries and aquaculture).
5. Expand sustainable fisheries certification, such as schemes promoted by Marine Stewardship Council and the Aquaculture Certification Council to cover critical issues, such as bycatch and to developing countries (fisheries and aquaculture).
6. Support policy initiatives to obtain land tenure and / or NTFP utilisation rights, to help promote more sustainable harvesting practices and longer-term investment in processing and other value-addition activities (NTFP).



7. Support NTFP producers to overcome regulatory, research and development, and other hurdles to register new products and enter new markets, both in export and domestic markets (NTFP).
8. Support independent certification of NTFP sustainability and the associated market differentiation, as well as more equitable models for benefit sharing and / or price premiums for community level suppliers (NTFP).
9. Develop research in areas such as the development of indicators for biodiversity performance and the establishment of facilities for biocarbon finance (biocarbon).
10. Demonstrate credible models of climate mitigation through forest conservation and other land use activities, in order to provide a basis for the eventual relaxation of restrictions on carbon sinks in international climate policy, as recently proposed by the Coalition of Rainforest Nations for example (biocarbon).
11. Identify water users for whom payments for watershed protection are a more cost-effective option than water treatment, water demand management, or the development of alternative water supplies (watershed protection).
12. Work at policy level to overcome obstacles preventing poorer groups from benefiting from payments for watershed protection, including lack of secure property rights; up-front costs; and weak public capacity to implement incentives (watershed protection).
13. R&D to help scale-up and spread payments for watershed protection including better information on the impact of land use on hydrological services; flexible institutional arrangements with low transaction costs; and payments which better reflect both the opportunity costs of alternative land uses and the willingness-to-pay of beneficiaries (watershed protection).
14. Work with recreational hunting and fishing organisations with good records in supporting biodiversity conservation in developed countries to open chapters, or enter into mentoring relationships with similar organisations, in developing countries to implement similar conservation programmes (recreational hunting).
15. Review global conservation priorities, define standards for credible offsets, and set up a verification system for major commodity importers. Companies would be encouraged to purchase voluntary offsets for all imports not already certified as 'sustainable' under recognised schemes (e.g. FSC, MSC). Offsets would be supplied by accredited providers and subject to independent verification and regular renewal (biodiversity offsets).

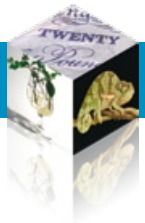
4.13.2 Business development services

16. Promote 'responsible' biofuel feedstock production. An initial step could be to 'map' different biofuel feedstocks and their impacts against a range of criteria, including social, environmental and economic, as an input to standard setting, certification and policy dialogue. This should include attention to trade policy aspects.
17. Develop and promote more efficient timber processing and charcoal manufacturing technologies, in order to improve the currently very low conversion rates in many developing countries (forestry).
18. Strengthen the business skills of NTFP suppliers and their local organisations, while at the same time assisting external buyers to understand and work effectively with them (NTFP).

19. Provide training and technical assistance to NTFP producers in market research, product development, quality control, export marketing and supply chain management (NTFP).
20. Improve knowledge and practice of monitoring and evaluating the ecological sustainability of NTFP production; this may include support for domestication of some species, where appropriate (NTFP).
21. Develop cost-effective, credible monitoring and evaluation systems and practical metrics that can demonstrate a clear benefit to biodiversity in the context of private sector time frames and decision-making processes (biocarbon).
22. Develop new screening technologies / programmes to allow more efficient screening of natural products, allowing materials derived from bioprospecting to compete with synthetic compounds (bioprospecting).

4.13.3 Investment opportunities

23. Develop / set up eco-enterprise funds to scale up their investments in environmentally friendly agricultural businesses in existing regions, and to expand their operations to new regions, notably in Africa and parts of Asia (agriculture).
24. Assist agricultural enterprises within important biodiversity landscapes. Use environmental screening systems to select suitable areas and enterprise activities (agriculture).
25. Invest in companies that market certified sustainable timber. This could include technical assistance to help ensure sustainable management practices and improve access to markets, and / or tapping into emerging markets for environmental services in addition to NTFP markets, ecotourism and other 'green' markets (forestry).
26. Invest in companies that link healthcare with bioprospecting. For example, ask pharmaceutical companies to help developing countries improve their ability to research and develop their own drugs in return for access to their natural resources, rather than make unrealistic assumptions regarding the level of financial gains that are possible from bioprospecting (bioprospecting).
27. Buy or lease land, restore it and sell habitat 'credits' to public agencies and / or private companies that need offsets for regulatory compliance or to meet voluntary 'no net loss' commitments (biodiversity offsets).
28. Invest in companies that assist communities that provide the raw materials they utilise; possibly supporting domestication of plants / organisms susceptible to unsustainable levels of harvesting (bioprospecting).
29. Establish a bespoke service to monitor in-country bioprospecting and subsequent use of samples and related data could be offered to government agencies and private corporations (bioprospecting).
30. Purchase biodiversity credits from landowners (secured by development rights), rather than the land itself, e.g. biodiversity on top of other people's coffee, carbon or timber plantations, fishponds, (i.e. act as an ecosystem service broker). Sell credits to mitigation buyers, as above (biodiversity offsets).
31. Invest in ecotourism companies that can 'professionalise' the management of tourism concessions in national parks. These companies could also set up private ecotourism facilities in areas of important biodiversity. Investments could range from joint partnerships with existing ecotourism or hotel management companies to the creation of new companies (ecotourism).



32. Invest in businesses that include ecotourism in their portfolios, focusing on operations that are not only certified according to credible ecotourism standards, but also set new standards in terms of local community participation and benefits (ecotourism).

33. Create a 'chain' of ecotourism hotels and related operations – with well-designed facilities, professional management, centralised back office operations and a common promotional strategy – to create a brand that is synonymous with the highest ecotourism standards. This could also be achieved by buying out existing ecotourism operations (ecotourism).

34. Establish investment in joint ventures (public–private partnerships) particularly between communities and private sector (and government) based on participatory and equitable negotiations (ecotourism).

35. Extend the CAMPFIRE approach to other countries where potential exists for sustainable recreational hunting / viewing, focusing on countries with similar property rights structures (such as Tanzania and Kenya) and extend where possible to sportfishing. This would probably involve taking an ownership position in existing recreational hunting and fishing companies, entering into joint partnerships with existing enterprise or creating new companies. These companies would share a percentage of the revenues generated with local communities and collaborate with national governments and NGOs to support associated community education and conservation projects (recreational hunting).

36. Invest in certified sustainable fishing and aquaculture enterprises, particularly in developing countries where sustainable technologies are currently underutilised and where poor communities and disadvantaged groups, such as women and ethnic minorities, currently have limited access. This concept could be combined with support to expand the operations of sustainable management programmes to a range of marine and aquatic species and ecosystems (fisheries and aquaculture).

37. Invest in NTFP enterprises that adopt best management practices regarding sustainable harvesting and support for local communities. This approach would probably be more effective if it was focused on priority landscapes and as part of support for a range of biodiversity-friendly enterprises, particularly in regions with good market and conservation potential that are not targeted by existing funds, e.g. Africa and Asia (NTFP).

38. Purchase watershed protection services from private landowners, for resale to private water users. This approach could include setting up watershed management institutions and incentive schemes to link upstream land users and downstream water users (watershed protection).

39. Establish or invest in companies delivering biodiversity management services, such as:

    - Integrating biodiversity with Environmental Impact Assessment.
    - Companies doing restoration / rehabilitation work.
    - Benchmarking biodiversity performance.
    - Developing and certifying Biodiversity Action Plans.
    - Creating and certifying biodiversity offsets.
    - Assessing ecosystems and their functions in the context of proposed projects (BMS).

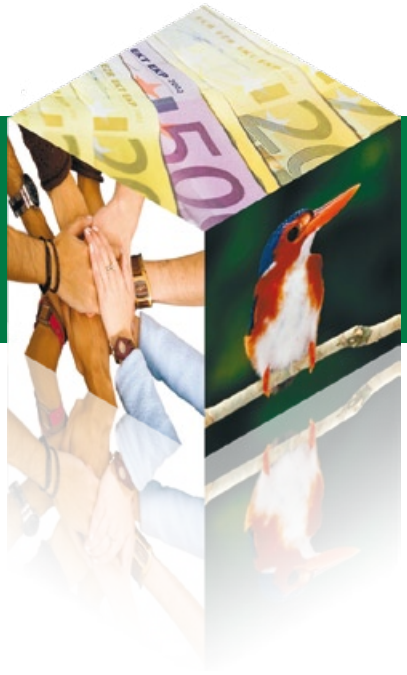
In general terms, the opportunities listed above all point to the need to combine investments in given business sectors with efforts to address related policy

constraints and to improve business management practices. Several crosscutting themes emerge from this review, including the need to:

- Develop practical biodiversity screening criteria that can be consistently applied to potential eco-investments.
- Improve the effectiveness and use of monitoring and evaluation methodologies, in order to provide more credible information about the causality and impact of investments on biodiversity conservation, especially at the landscape level.
- Promote more widespread adoption of sustainable certification and verification standards, and ensure that such systems devote sufficient attention to measuring the impact of sustainable practices on biodiversity, versus general environmental impacts.
- Provide business skills training and technical advice to help overcome a number of common constraints that eco-entrepreneurs tend to face, such as new product development, quality control, accessing export markets.
- Engage relevant policy-makers in an effort to alleviate constraints to scaling-up promising pilot initiatives, notably concerning land tenure and / or access rights to local communities that depend upon natural resources in biodiversity rich environments.

In addition, this review has revealed several new investment opportunities, including market creation or enhancement concepts such as:

- Making payments for watershed protection or biodiversity conservation to create positive incentives for more sustainable practices where markets currently fail to reward them.
- Working with potential buyers of biocarbon credits to help drive the expansion of this emerging market, including the concept of carbon credits for forest conservation.



Chapter 5

Review of biodiversity business promotion mechanisms

Various mechanisms are used to promote biodiversity business, ranging from policy and institutional reform to dedicated biodiversity business tools and a range of financing instruments. Such mechanisms are most effective when used together in a coordinated fashion.

Policy and institutional reforms have the greatest potential to transform markets in ways that support biodiversity, but they are also the most difficult mechanisms to design and implement, often requiring painstaking consensus building.

Biodiversity business tools that combine business development assistance with biodiversity management and financing can be very effective, although most existing tools are still relatively weak when it comes to assessing biodiversity outcomes.

A range of financing instruments for biodiversity business has been used successfully. Specialised investment funds are still relatively few in number and small in size. Many appear to rely on partial grant funding to cover the additional costs of biodiversity management for small and medium-size business.

The previous chapter described a range of economic sectors and business models that can generate biodiversity benefits. This chapter reviews various mechanisms used to promote the development of biodiversity business, including enabling policies, regulations and norms; business 'tools' (including technical assistance) and, of course, finance.

5.1 Mechanisms to promote biodiversity business

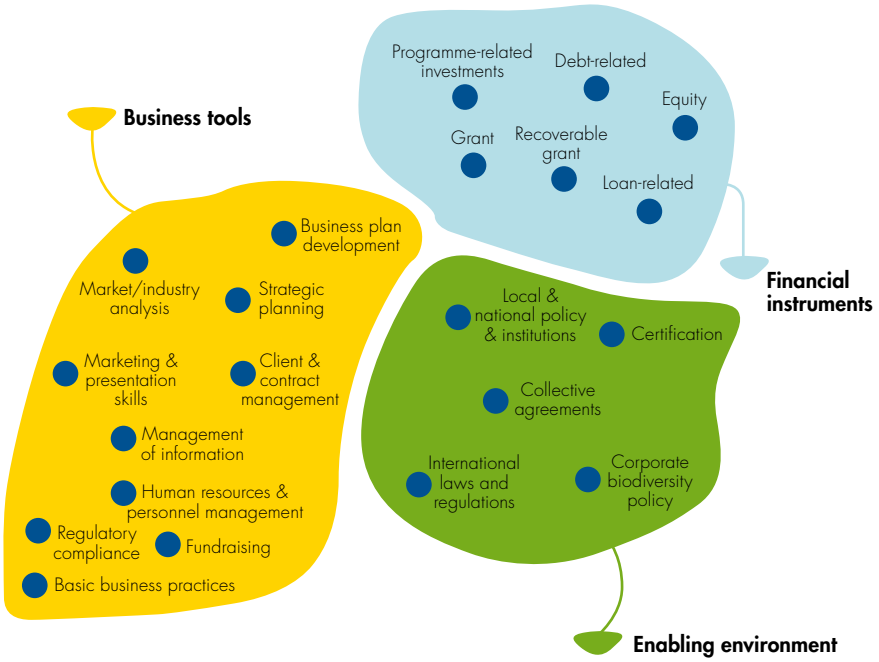
All firms depend on supportive policies and norms that govern how business is conducted. Most businesses also rely, at some point in their development, on financial support from banks or investors to capitalise their operations and acquisitions, or to cover initial operating costs when revenues may be minimal. Many businesses further owe their success, at least in part, to technical assistance and development services provided by various state agencies, industry associations, non-profit organisations and commercial service providers[158].

Mechanisms to promote biodiversity business can be distinguished in terms of their influence on business outcomes and the extent to which they imply direct control over firm-level decisions. For example, environmental laws can have major impacts on an entire business sector, but need not imply the direct, 'hands-on' involvement of regulators in day-to-day business decisions. At the opposite extreme, the purchase of a company by a private venture capital fund can yield total control over the target firm and its assets, but may have relatively little impact on the sector as a whole. Based on this typology, we define the 'playing field' of interest here

158 Other drivers of business investment and performance include consumer preferences, the actions of competitors, access to technology, insurance and other inputs, as well as skilled staff. These and other factors are not considered here.

as those business promotion mechanisms that focus on building biodiversity into existing business practices, or the creation of new markets and businesses based on the conservation and sustainable use of biodiversity (**Figure 13**).

Figure 13. The 'playing fields' of interest



In the following pages, we review a range of biodiversity business promotion mechanisms under three broad headings, namely:

- Enabling environment.
- Business tools.
- Sustainable financing instruments.

5.1.1 Enabling environment

All businesses operate within a framework of property and use rights, legal liabilities and social norms. Government taxes, subsidies and regulations, as well as voluntary commitments, likewise influence the profitability of both private and public enterprise. These enabling conditions reflect public expectations about the rights, responsibilities and role of business in society.

In the case of biodiversity business, the necessary enabling frameworks are often poorly developed. Biodiversity is generally treated as a public good[159] for which government and charities take responsibility. For most private investors and business managers, if biodiversity means anything at all, it represents a resource to be exploited or an environmental liability, rather than an asset to be conserved and managed in its own right.

159 Technically, a public good is something that (i) any number of people can enjoy without congestion effects (non-rivalry) and (ii) people cannot be prevented from enjoying (non-excludability). Quasi-public or 'club' goods may exhibit attenuated rivalry or excludability. For details see: Cornes, R. and Sandler, T. 1996. *The Theory of Externalities, Public Goods and Club Goods*. Cambridge University Press: Cambridge.

The view that biodiversity is essentially a public good may have limited the development of an enabling environment which encourages conservation through the sustainable use of biological resources. From an economic perspective, the various components of biodiversity may be either or both a public and a private good. Plants and animals – even wild ones – can be and often are owned and used as private goods. Even ecosystems or habitats can be and sometimes are owned or managed as private goods. For example, national parks and private protected areas often make money by their ability to exclude recreational users; they can charge entrance fees.

In many respects, biodiversity today is effectively a *nationalised* good. In many countries, wildlife is owned by the state, as are rivers, lakes, forests, mountains, coasts, seas and so on. It is precisely because biodiversity is owned and managed as a nationalised asset that it is often challenging to develop market processes and business models to manage biodiversity sustainably.

Another way to look at the public / private nature of biodiversity is to consider the positive externalities of biodiversity, i.e. its social benefits. In this respect, biodiversity conservation shares certain features with activities such as education, which generate both private and public benefits. Education is a private good, in the sense that students can be excluded from schools and admission fees may be charged. Similarly, biodiversity may be managed as a private good that is provided by the market. At the same time, like education, biodiversity generates significant positive social benefits, beyond those enjoyed by the immediate beneficiary. Hence there may be a case for subsidies or other economic incentives to ensure that markets supply enough of it.

A conducive enabling environment is required to make it more profitable to conserve biodiversity than to ignore or destroy it. While certain components of biodiversity are relatively easy to value in the marketplace, such as hunting, fishing and ecotourism, other aspects of biodiversity are more difficult to commercialise, let alone to sell. Similarly, many government agencies charged with managing biodiversity fail to capture the potential economic 'rent' from consumers of the resources under their control. Nevertheless, as described above, promising approaches are being piloted in several countries which suggest that even intangible biodiversity benefits such as 'existence value' can form the basis of viable businesses and / or generate substantial revenue for public resource management agencies, provided the right rules are in place.

One reason why private conservation efforts typically under-supply biodiversity is that a significant portion of the total 'demand' for biodiversity is not backed by money. Although surveys suggest that people are willing to pay for conservation, even in foreign countries they have no intention of visiting, mechanisms are generally lacking to convert this hypothetical willingness-to-pay into real cash flow[160].

Enabling policies to increase rent recovery and stimulate private investment in biodiversity business may be mandatory or voluntary. They include a range of sub-national, national and international laws and regulations, as well as fiscal policy (taxes and subsidies), property law and legal liability regimes. Voluntary enabling frameworks include firm-level biodiversity policies (where these exceed legal requirements) as well as collective agreements. The latter include voluntary certification standards for specific products (e.g. FSC timber), sector-wide initiatives (e.g. the Roundtable on Sustainable Palm Oil), or multi-sector performance and reporting commitments (e.g. the Global Reporting Initiative).

160 See for example: Kramer, R. and Mercer, E. 1997. Valuing a Global Environmental Good: U.S. Residents' Willingness to Pay to Protect Tropical Rain Forests. *Land Economics* 73: 196–210.

5.1.2 Business tools

Growing consumer environmental concerns have stimulated markets for products and production practices that conserve biodiversity. Demand for organic food, sustainably harvested timber and ecotourism, for example, has been growing at double-digit rates[161]. However, to date there has been only limited technical support to small and medium-scale enterprises seeking to engage in these markets. The little support available has mainly come from NGOs, foundations and aid agencies. Target firms are typically small-to-medium-scale enterprises engaged in activities such as nature-based tourism, organic agriculture, certified 'sustainable' forestry, the collection and processing of wild food products[162]. Impressive results have been achieved in some sectors in some parts of the world, notably organic foods and certified timber, while other efforts have been less successful.

5.1.3 Financing instruments

Private capital (debt or equity) for biodiversity businesses is scarce – most commercial banks are not familiar with the issue, many projects are too small for direct financing, and most venture capital funds have focused on other, more lucrative sectors. In response, some governments, international agencies, NGOs and private investors have set up programmes to provide long-term finance, often combined with technical assistance, to commercial ventures based on the conservation or sustainable use of biodiversity. These programmes are generally still quite young and small-scale, and have had mixed results, with some no longer being operational, while others have managed to expand and maintain solid repayment rates, if not strong financial returns to date. Such programmes employ a range of financing instruments when investing in such eco-enterprises.

If biodiversity and ecosystem markets are going to grow, there must be room to invest and make money. One problem may be that pilot investments in biodiversity business to-date have been undertaken mostly by conservationists. The challenge is to entice profit-seeking business people, who can find the business opportunities in biodiversity conservation.

Because of the hybrid nature of biodiversity – as both a public and a private good that generates both social benefits and private returns – it is likely that biodiversity business will require innovative financing arrangements. Commercial instruments such as debt and equity financing need to be combined with traditional conservation finance mechanisms such as grants, subsidies and user fees. Lessons may be learned from the various pilot facilities that have focused on financing biodiversity business.

5.2 Review of mechanisms

This section reviews experience with biodiversity business promotion mechanisms in different parts of the world, illustrated with examples from the interviews and literature consulted as part of this study. The section first discusses the broader enabling environment for biodiversity business, i.e. policies and institutions including corporate and voluntary initiatives, before looking at a range of business tools and financing instruments used to build biodiversity business at the enterprise level.

161 See for example: www.ecotourism.org, www.ifoam.org, and www.unece.org.

162 Bovarnick, A. and Gupta, A. 2003. *Local Business for Global Biodiversity Conservation: Improving the Design of Small Business Development Strategies in Biodiversity Projects.* UNDP: New York.

5.2.1 Creating an enabling environment for biodiversity business

Policies and institutions to promote biodiversity business have been developed at various levels, from corporate policy to national legislation and multilateral instruments. The most innovative approaches are often at the company or local level.

Both mandatory (binding) and voluntary policies can be used to promote biodiversity business; voluntary initiatives often lead the way where governments are reluctant to move quickly or strongly.

Biodiversity policy relies increasingly on 'market-based' approaches which harness the profit motive to conserve biodiversity, rather than relying on government mandates, restrictions or charity.

A high priority is to reform existing policies that undermine biodiversity, e.g. so-called 'perverse' subsidies that stimulate resource conversion and extraction.

Consensus, capacity-building and rigorous monitoring and reporting are key prerequisites for the introduction of market-based biodiversity policy, especially in developing countries.

Policies and institutions to promote biodiversity business must support both biodiversity conservation and business success. Until the value of biodiversity is fully reflected in market prices, no single variable will express both objectives.

Indicators of business success include trends in sales, profits and return on capital. Additional macro-level indicators include the number and average size of firms involved in a sector, total employment, export revenues and so on.

Indicators of biodiversity conservation for businesses are harder to define. The Millennium Ecosystem Assessment assessed 24 key ecosystem services, but acknowledged the importance of many others for which data were unavailable. The Convention on Biological Diversity (CBD) has adopted a framework of 11 goals and 20 targets to assess progress towards the globally agreed aim of *"a significant reduction in the current rate of biodiversity loss by 2010"*. However, most of these targets are quite general and difficult to measure even at national levels. Although work is underway to develop more specific biodiversity indicators, at present there are no reliable indicators of biodiversity performance that can be easily measured at the level of a company or enterprise[163]. Despite numerous examples of site-level biodiversity indicators, the problem lies in aggregation of site-level data to a company-wide level for monitoring, reporting or target setting.

Even where relevant indicators can be identified, isolating the specific influence of policies and institutions on biodiversity outcomes or business performance is an inexact science. Different criteria and indicators may be needed depending on the scope of the policy (e.g. from corporate to global), the type of business and its relation to biodiversity. Experience and data built up over many years are required to evaluate policy impacts with any degree of confidence.

163 Tucker, G. 2006. *A Review of Biodiversity Conservation Performance Measures*. Rio Tinto plc and Earthwatch Institute: London and Oxford. See also: www.conservationmeasures.org/CMP/Initiatives_Active.cfm; www.insightinvestment.com/Responsibility/Engagement/ecosystem_management.asp.

For this study, we assess enabling policies and institutions in terms of their likely impacts on biodiversity business, based on a combination of theory, expert opinion (from the interviews) and a review of the available empirical literature. We start with mandatory (binding) policies and then turn to voluntary initiatives. We include not only policies explicitly intended to promote biodiversity business, but also some other policies – notably subsidies for resource-intensive industry – that have significant impacts on the viability of biodiversity business.

5.2.2 Mandatory policy

Policy-makers can choose from a wide range of policy instruments and institutional frameworks to promote biodiversity business. Their choice depends partly on the capacity of public agencies and the convictions of policy-makers, as well as the nature of property rights over the resource (public or private, concentrated or dispersed), and the scope of government authority (from local to global).

So-called 'command-and-control' policies are most common, perhaps because they are relatively simple to conceive (if not to enforce). Such policies typically require firms to limit their activity in sensitive areas, adopt certain performance standards or use particular technologies. In their efforts to satisfy these requirements, firms often seek assistance from external consultants to assist with business planning or development of new capacities. The provision of biodiversity management services is a major market in its own right, as described in the preceding section.

In contrast, 'market-based' policies seek to make biodiversity conservation profitable in its own right. We can distinguish mechanisms intended to influence private use of publicly-owned natural resources from mechanisms designed to influence private use of privately-owned resources. The former include various user fees / charges and concession agreements, typically used to maximise the recovery of resource rents by government, while the latter include:

- Property rights and legal liability (e.g. tradable fishing quotas or biodiversity offsets).
- Fiscal policy and public services (taxes and subsidies, including some forms of payment for ecosystem services, and the provision of public infrastructure).
- Information instruments (e.g. mandatory certification, corporate sustainability reporting, public access to information).

Finally, policies and institutions for biodiversity business can be distinguished in terms of the scale at which they apply, from local to global. The discussion below begins at the international level, before turning to national and local policies and institutions.

5.2.3 International laws and regulations

Environmental protection is supported by a growing body of international law and regulations. In 2002, UNEP identified more than 500 international treaties and other agreements related to the environment, including 323 regional agreements. Most of these were negotiated over the past 30 years. By far the largest cluster concerns the marine environment. Biodiversity-related conventions form an important, but smaller cluster, including the World Heritage Convention (1972), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1973), the Convention on Migratory Species (CMS) (1979), the CBD (1992), and the International Treaty on Plant Genetic Resources for Food and Agriculture (2001).

International biodiversity policy tends to be restrictive rather than enabling of business, where it has any impact at all. A good example is CITES, which requires

Parties to ensure that exports of species covered by the Convention are maintained within levels that do not threaten species survival, and that species considered to be endangered are not imported for 'primarily commercial purposes'. The most potent instrument under CITES is to ban trade in endangered species or in products derived from them, e.g. elephant ivory or textiles based on endangered camelids. The effectiveness of trade bans on wildlife conservation is hotly debated. Impacts on business are likewise mixed, with some business enterprises undermined by trade bans while others may benefit. For example, the introduction of a ban on trade in endangered species will undermine the business of many traders but may also create new opportunities for captive breeding (or for smuggling). Recent discussions within CITES have explored opportunities to develop positive economic incentives to encourage the conservation and sustainable use of wild fauna and flora, as a complement to existing, more restrictive policies.

Other international environmental policies with significant impacts on biodiversity business include:

- The Cartagena Protocol on Biosafety, under the CBD, which regulates international transfers of genetically modified organisms.
- The Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising Out of Their Utilization, a voluntary agreement under the CBD.
- The International Treaty on Plant Genetic Resources, negotiated under the auspices of the Food and Agriculture Organization.
- The Kyoto Protocol, under the Framework Convention on Climate Change, which includes provisions for mitigating climate change through forestry and land use activities that affect biodiversity.

The last of these is particularly interesting, from a biodiversity business perspective, due to the rapid growth of a commercial demand for climate mitigation services. Most climate mitigation is currently provided through industrial-scale destruction of greenhouse gases, capture of methane from landfill, energy efficiency and renewable energy supply[164]. However, as discussed in **Section 4.6**, there is considerable potential to provide cost-effective climate mitigation through forestry and other land use activities that sequester atmospheric carbon in biomass and / or soils.

The adoption by the CBD of Decision VIII/17 on Engagement of the Private Sector, at the recent Conference of the Parties in Curitiba, Brazil, in early 2006, suggests an emerging consensus regarding the need to enlist business in the conservation and sustainable use of biodiversity. There is an opportunity for businesses and others to show leadership by implementing this decision. The instruments and tools identified in this decision to facilitate business contributions to the objectives of the CBD include:

- Awareness-raising materials and training workshops on business and biodiversity issues.
- Guidance on the integration of biodiversity considerations into existing voluntary or mandatory reporting and performance standards, guidelines and indices in order to mainstream biodiversity considerations into business practice.
- Certification schemes reflecting the full range of biodiversity-related issues to facilitate consumer choice based on companies' biodiversity performance.
- Internationally agreed standards on activities that impact biodiversity.

164 Lecocq, F. and Capoor, K. 2005. *State and Trends of the Carbon Market 2005* (May); Point Carbon. 2006. *Carbon 2006*, Hasselknippe, H. and Røine, K. (eds).

- Guidance and tools to assist companies in implementing good practice with regard to biodiversity.
- Biodiversity policies and action plans to define and operationalise companies' biodiversity commitments.
- Biodiversity benchmarks to guide and assess companies' biodiversity management practices.
- Guidelines for incorporating biodiversity-related issues into existing environmental impact assessment procedures and strategic impact assessment.
- Partnerships to facilitate knowledge-sharing with regard to good practice.
- Public-private partnerships.
- Tools, guidance and standards on biodiversity-related issues relevant to the private sector.
- Tools for assessing the value of biodiversity and ecosystem services, for their integration into decision-making.
- Guidance for potential biodiversity offsets in line with the objectives of the Convention.
- Guidance on integrating biodiversity into industry standards, certification schemes and guidelines.
- A guide to the Convention on Biological Diversity for the private sector.
- Guidance for parties on how to engage the private sector, in accordance with national needs and circumstances.

5.2.4 Local and national policy and institutions

Many local, state / provincial and national governments rely increasingly on market-based instruments to conserve biodiversity. A comprehensive review is beyond the scope of this study. Nevertheless, we highlight here some major themes and examples based on the interviews and literature review.

As noted above, one broad category of biodiversity policy includes mechanisms that influence how private firms (or consumers) use *nationalised or publicly-owned natural resources*. Many of the biodiversity business sectors described in the previous section are based on the commercial (legal) use of publicly owned resources, such as:

- Forestry operations based on the harvest of timber from public lands.
- Capture fisheries that exploit fish stocks in national and / or international waters.
- Sustainable harvest of NTFP from public lands.
- Commercial bioprospecting based on wild genetic resources.
- Ecotourism enterprise linked to public protected areas.

In all such businesses, public policy and institutions play a critical role, as they determine the conditions under which private enterprise (or individual consumers) can secure access to natural resources. Well-designed and effectively enforced policies can help ensure the conservation and sustainable use of public resources (**Box 27**). Badly designed or ineffective policies, on the other hand, can lead to rapid depletion of valuable resources, excessive pollution or other adverse environmental effects, inequitable distribution of costs and benefits, waste, fraud, etc.

Box 27. Biodiversity policy in the forest sector

Almost four-fifths of the world's forests are – under national law – owned and administered by governments. Up to half of this 'public forest estate' is managed for timber production under concession agreements with private firms. Contemporary policy debates with respect to the use of forest lands by private timber interests focus on:

- The division of resource rents between public landowners and concessionaires.
- The environmental impacts of logging operations and how to reduce them.
- Reducing illegal logging and exports (e.g. harvests in excess of quotas or outside concession areas, smuggling where policy forbids the export of certain species or unprocessed logs, transfer pricing).

A variety of economic incentives are used to address such concerns. With respect to rent capture, an important innovation is to switch from administratively determined concession fees and export taxes (which often fail to keep up with market prices) to competitive tendering for logging rights or export quotas. Illegal logging, smuggling, transfer pricing and other illicit behaviour is generally less amenable to simple policy interventions, although some countries have had good results by contracting out export monitoring services.

Various mechanisms are used to reduce the environmental impacts of logging on public forest lands. One option is to require private timber concession holders to post a bond that is reimbursable subject to meeting certain performance standards (e.g. damage to residual vegetation, impacts on wildlife or water supply). Provided the bond is set at a realistic level (i.e. where company profits are significantly at risk) and effective monitoring and enforcement is in place, the influence on company performance can be considerable. Another mechanism that has received significant attention in recent years is the certification of environmental (and in some cases, social) performance by third parties, as discussed below.

Another broad category of biodiversity policy focuses on how to influence the private use of *privately-owned resources*. The rationale for policy intervention, in this case, is to 'internalise' the environmental impacts of private resource use in business decisions, particularly where such impacts fall outside the normal profit-and-loss calculus of business managers.

As noted previously, most biodiversity policy relies on so-called 'command and control' approaches. These typically specify what private resource users must do (or not do), as well as when, where and how they must do it (or not do it). Examples include technological mandates (e.g. minimum mesh size of fishing nets, bans on hunting with certain types of traps), geographic restrictions (e.g. land use zoning), harvest quotas or size class limits (e.g. minimum diameter rules for logging), closed seasons (e.g. allowing hunting only during part of the year), or maximum allowable emissions of pollutants to air and water from industrial facilities.

More recently, many governments have begun to employ 'market-based' policies for biodiversity conservation. These seek to align private incentives with public objectives, such as conservation and sustainable use, by harnessing and guiding market forces rather than simply restraining them. One of the simplest and most common forms of market-based incentive is tax relief on private donations. In the USA, for example, income tax relief on charitable contributions has encouraged donations of land or 'development rights' to environmental trusts around the country,

protecting over 800,000 ha[165]. Similar tax incentives are used in Europe[166] and some developing countries (**Box 28**).

Box 28. Fiscal incentives for private reserves in Brazil

Under Brazil's Program for Private Reserves of Natural Heritage (RPPN), private landowners can voluntarily declare all or any part of their property to be permanently protected. Launched by Federal Decree (1996) and State Decree (1998), the RPPN Program was revised and incorporated in legislation passed by Congress in 2000. To date, six of Brazil's 26 states have enacted legislation that mirrors the federal law. Landowners must apply for RPPN status with the Brazilian Environmental Institute or, where laws permit, with local officials. If approval is granted, landowners receive breaks on property taxes and priority access to certain public financing programmes, such as the National Environmental Fund. Under the RPPN programme, land use is restricted to research, environmental education, ecotourism and limited resource extraction. The RPPN has been especially useful as a means of consolidating fragments of natural habitat and creating ecological corridors. Approximately half a million hectares of privately-owned land are now protected by state and federal laws in Brazil, representing just under 0.5 percent of total conservation units in the country. Since 1990, nearly 600 individuals, corporations and activist groups have voluntarily registered private property under the RPPN scheme.

Sources: Hinchenberger, B. 2004. *Private Reserves Embrace Ecotourism in Brazil* (www.brazilmax.com); Bernades, A.T. Undated. Brazil – Federal Conservation Units. *Biodiversity in Development Case Study Series*. European Commission, UK Department for International Development and IUCN – The World Conservation Union: Brussels.

While tax credits can be a useful mechanism to promote private conservation in developed and some middle-income countries, fiscal policy is not always supportive of conservation. One informant noted that in South Africa, private philanthropists pay a 'donations tax' rather than receiving a tax credit if they donate land for conservation purposes. Similarly, local rates (land taxes) in South Africa are generally lower for agriculture than for conservation.

A variation on tax incentives is the notion of 'payments for ecosystem services'[167]. Existing systems of PES seek to create financial incentives for resource users and managers to adopt, voluntarily, activities and technologies that generate environmental benefits. PES is a recent phenomenon – most schemes were developed in the last decade or so – but the approach is increasingly popular as a tool for conservation on private land.

Many PES schemes are funded by government and administered by agricultural ministries, as a less market-distorting alternative to food price supports or input subsidies. Examples of PES include payments by government or other private parties to private landowners to conserve or restore native vegetation or to adopt low-external-input production methods. In theory, payment schemes could be developed for any ecological benefit generated by the land. In practice, PES schemes are most often developed for ecosystem services that are relatively easy to measure and most highly valued by beneficiaries. These conditions vary from one country to another, leading to diverse experiences with PES for different ecosystem services in different locations.

Another market-based approach to biodiversity conservation involves the creation by government of new rights and liabilities affecting the use of resources. Examples include the emergence of wetland banking in the USA[168]; trade in forest conservation obligations in Brazil[169]; and emerging markets for groundwater salinity

165 Clark, D. and Downes, D.1996. *What Price Biodiversity? Economic Incentives and Biodiversity Conservation in the United States*. Centre for International Environmental Law: Washington D.C.

166 Shine, C. 2004. *Using Tax Incentives to Conserve and Enhance Biological and Landscape Diversity in Europe*. Report to the 8th meeting of the Committee of Experts for the development of the Pan-European Ecological Network, Krakow, 5–6 October 2004 (available from: www.strategyguide.org/); Bräuer, I., Müssner, R., Marsden, K., Oosterhuis, F., Rayment, M., Miller, C. and Dodoková, A. 2006. *The Use of Market Incentives to Preserve Biodiversity: Final Report*. Framework contract for economic analysis ENV. G.1/FRA/2004/0081. Ecologic (July).

167 Also sometimes referred to as 'markets for environmental services', 'rewards for ecological services', 'compensation for ecosystem services', etc.

168 Wilkinson, J. and Kennedy, C. 2002. *Banks and Fees: The Status of Off-Site Wetland Mitigation in the United States*. Environmental Law Institute: Washington, D.C.

169 Chomitz, K. M., Thomas, T. S. and Brandão, A.S. 2003. Creating Markets for Habitat Conservation when Habitats are Heterogeneous. Paper presentation at the *Fourth BioEcon Workshop on the Economics of Biodiversity Conservation – Economic Analysis of Policies for Biodiversity Conservation*, Venice International University, Venice, 28–29 August 2003.

credits in Australia[170]. What these initiatives have in common is the possibility of trading, namely buying and selling, environmental obligations to meet government mandates. Without a trade mechanism, or another financial incentive such as a tax credit, there is only the legal obligation to comply with the mandate. This may be sufficient to achieve public environmental goals, assuming that enforcement is effective, but it does not provide any positive incentive to provide environmental benefits and is likely to result in higher costs of compliance.

Tax incentives, payments for ecosystem services and habitat banking (or 'offsets') all have the potential to stimulate more conservation on private land, particularly in countries where such incentives are not yet in place. At the same time, an urgent priority in most countries is to remove or reform existing 'perverse' incentives that damage biodiversity or undermine conservation efforts. These include government subsidies for a range of sectors and uses of natural resources (**Table 5**). Such reforms can relieve pressure on natural resources and have the additional merit of saving money, although they can be difficult to enact in the face of opposition from vested interests[171].

Table 5. Global subsidies 1994–1998 (US$ billion per annum)

	OECD	Non-OECD	World	OECD subsidies as percent of world subsidies
Natural resource sectors				
Agriculture	335	65	400	84
Water	15	45	60	25
Forestry	5	30	35	4
Fisheries	10	10	20	50
Mining	25	5	30	83
Energy and industry sectors				
Energy	80	160	240	33
Road transport	200	25	225	89
Manufacturing	55	negligible	55	100
Total	**725**	**340**	**1065**	**68**
Total as percent GDP	3.4	6.3	4.0	

Source: van Beers, C. and van den Bergh, J. 2001. Perseverance of Perverse Subsidies and Their Impact on Trade and Environment. *Ecological Economics* 36: 475–486.

There are many barriers to the reform of perverse incentives and wider use of market-based incentives for biodiversity conservation. Chief among these is the lack of technical and enforcement capacity in many environmental agencies, especially in the developing world, to design and implement biodiversity-friendly policy reforms[172]. There is also concern, in some quarters, about the potential adverse equity impacts of market-based approaches to environmental management[173]. Equity issues may arise within rural communities (i.e. elite capture of new sources of income) as well as between local, national and global levels (i.e. ensuring 'fair trade' in ecosystem services).

170 van Bueren, M. 2001. *Emerging Markets for Environmental Services: Implications and Opportunities for Resource Management in Australia.* RIRDC Publication No 01/162, Rural Industries Research and Development Corporation: Barton, Australia.

171 World Bank. 2005. *Environmental Fiscal Reform: What should be done and how to achieve it.* The World Bank: Washington, D.C.

172 Bell, R.G. and Russell, C. 2002. Environmental Policy for Developing Countries. *Issues in Science and Technology,* Spring: 63–70.

173 Friends of the Earth International. 2005. *Nature for Sale: The Impacts of Privatizing Water and Biodiversity* (January): 107.

Additional challenges include the relatively narrow and shallow tax base of the least developed countries, where priority is given to broadening the tax base and increasing revenues rather than granting tax exemptions or making payments for activities often considered 'unproductive,' such as biodiversity conservation. In this context, it may be more realistic to identify the *private* beneficiaries of ecosystem services and develop incentives which can mobilise their willingness-to-pay, rather than relying on public funds.

5.2.5 Voluntary policies

Partly out of frustration at the slow pace of official policy reform and innovation with respect to biodiversity, some NGOs, international agencies and far-sighted companies have developed a range of voluntary policy initiatives to promote biodiversity conservation in existing businesses, or to develop new biodiversity businesses. Some of these initiatives are discussed below, starting with company-level policy before turning to collective agreements involving several businesses or entire sectors.

Private participation in biodiversity conservation is not only motivated by profit or tax savings. Many companies undertake voluntary action to support biodiversity conservation, far in excess of regulatory requirements. Such contributions can generate significant business for biodiversity service companies as well as funding for conservation organisations.

Typically, the first step for a business seeking to develop a biodiversity policy is to undertake a biodiversity risk assessment of its operations. This may focus narrowly on the direct 'footprint' of the company on the land or seascape. Alternatively, it may extend to a 'lifecycle' analysis of the company's raw material supply chains, employee lifestyle choices, and the biodiversity impacts of how customers use and dispose of their products. Benchmarks may be defined internally or relative to other leading firms in the same (or another) sector. The results of such a risk assessment are often used to define corporate biodiversity performance targets, combined with management assessment, reporting and incentive systems to motivate continuous improvements over the long term, and are eventually reported either internally or publicly.

Most stages in the development and implementation of corporate biodiversity policy require external support, which may be provided by commercial consulting firms or non-profit organisations. At a global level, the environment industry was estimated to have generated revenues of US$550 billion in 2001. Revenues were expected to reach US$620 billion by 2005, split equally between environmental goods and environmental services and with the fastest growth in transition and developing countries[174]. As noted previously, however the global market in corporate BMS is not well documented.

In the case of companies with a relatively large 'footprint' on the land or seascape – such as energy, mining, agriculture, forestry or fisheries – conservation action may be linked explicitly to the environmental impacts of the companies' operations. The mining company Rio Tinto, for example, announced their aim to have a 'net positive impact' on biodiversity, going beyond conventional impact mitigation and rehabilitation measures by making additional contributions to biodiversity conservation in regions where they operate[175]. BC Hydro, a Canadian electric power utility, has likewise committed itself to a long-term goal of 'no net incremental environmental impact', entailing investments in ecological compensation and restoration where adverse impacts cannot be avoided[176]. Several other companies have reported similar voluntary initiatives.

174 Data are from Environmental Business International, cited in: Kennett, M. and Steenblik, R. 2005. Environmental Goods and Services: A Synthesis of Country Studies. *OECD Trade and Environment Working Papers* 2005(3). OECD Publishing: Paris.

175 www.riotinto.com/library/microsites/SocEnv2004/landacc/211c_guidprincip.htm.

176 www.bchydro.com/info/reports/2005annualreport/newpurpose_0_4.html.

While company-level biodiversity initiatives have had some success, in some cases stimulating parallel efforts by competitors, the quickest route to sector-wide change typically involves several leading companies working together, often with NGOs and governments. Several business networks for sustainable development have emerged in recent years, at both national and global levels (e.g. World Business Council for Sustainable Development (WBCSD) and its national affiliates, World Environment Center (WEC), International Business Leaders Forum (IBLF)). Many of these have dedicated significant resources to work on biodiversity or ecosystem management, helping to raise awareness in business circles, identify and share best practice, develop common standards for corporate biodiversity management and reporting, etc. Such initiatives can be seen as part of broader efforts to raise the standard of corporate social and environmental responsibility (**Box 29**).

Box 29. Corporate social responsibility standards and biodiversity

Corporate social responsibility (CSR) refers to the idea that business should improve its performance with respect to environmental and social issues, over and above compliance with the law. The term is new if not the practice; some 19th Century industrialists, for example, invested in social-welfare projects only distantly related to their commercial interests. More recently, public agencies, NGOs and industry groups have defined and promoted a wide range of social and environmental standards, guidelines, performance assessment tools and / or reporting systems for particular products and industries or for common business processes. Leading examples include:

- ISO 14001, an environmental management standard developed by the International Organization for Standardization (www.iso.org).
- Equator Principles, which set a benchmark for the financial industry to manage social and environmental risk in project financing (www.equator-principles.com).
- Global Reporting Initiative, which provides a framework for organisational reports on economic, environmental and social performance (www.globalreporting.org).
- Performance Standard 6 on Biodiversity Conservation and Sustainable Natural Resource Management developed by the International Finance Corporation for all projects it finances (www.ifc.org/ifcext/enviro.nsf/Content/PerformanceStandards).
- ISO 26000 will provide voluntary guidelines for social responsibility (SR) and will be published in 2008.

The impact of CSR standards on business performance is mixed. In some cases, such standards can help to identify or add impetus to cost-saving measures that clearly benefit the bottom line (e.g. energy efficiency). In other cases, the benefits of achieving certain CSR standards may be less tangible, such as improvements in employee morale or how a company is perceived by its customers. It is often suggested that CSR is simply a form of 'green wash' that seeks to improve the image of business, but involves little significant change in behaviour or impact. To counter this perception, CSR standards increasingly require companies to adopt quantitative targets and to submit to independent validation or certification of their performance. Biodiversity has not traditionally been a central focus of CSR, but this is changing due to increasing public and business awareness of the issue, notably since the publication of the Millennium Ecosystem Assessment in 2005.

One of the most well-known forms of collective agreement is the use of voluntary eco-labelling and certification schemes to recognise more sustainable products

and services, based on their social and environmental performance[177]. Typically initiated by NGOs, certification schemes often seek early endorsement from groups of industry leaders (e.g. buyers' clubs) in an effort to gain market share. Several certification schemes have gained wide consumer recognition and a small, but rapidly growing share of total sales in some markets (e.g. coffee, timber, fish, organic food). These trends can be expected to continue in the short and medium term, and probably beyond, with demand for a range of certified goods and services growing at a higher rate than for 'conventional' products. The strengths and weaknesses of certification, using coffee as an example, are examined in **Table 6**. Other examples of collective agreements for biodiversity conservation involving business are described in **Box 29** (see previous page).

177 See for example: Bass, S., Thornber, K., Markopoulos, M., Roberts, S. and Grieg-Gran, M. 2001. *Certification's Impacts on Forests, Stakeholders and Supply Chains*. International Institute for Environment and Development: London; Eba'a Atyi, R. and Simula, M. 2002. *Forest Certification: Pending Challenges for Tropical Timber*. Background Paper. ITTO: Yokohama; Upton, C. and Bass, S. 1995. *The Forest Certification Handbook*. Earthscan: London.

Table 6. Certification strengths and weaknesses: the case of coffee

Issue	Strengths	Weaknesses
1. Complexity	Variable (there are at least 7 different systems). All require internal controls, detailed information systems, and traceability / segregation of product. Subsidised technical assistance available for small producers in many countries	Difficult for small producers without subsidised technical assistance. Certification under multiple schemes is common, adding to complexity. National policies / requirements vary significantly for organic standards
2. Costs	Typically covered by financial returns, although start-up / transition costs can be prohibitive. Costs include: (i) initial investments in new production practices, infrastructure, systems, training, etc. (ii) annual fees and (iii) annual inspection. In the case of organic, there may be reduced production during a transition period (3 years). Donor and NGO support may be available to cover some costs. Economies of scale possible with larger areas / volumes	High initial costs; often prohibitive for small producers without external assistance Annual costs are typically several thousand US$ for larger farms and cooperatives. Under most systems, costs must be incurred before the sale of certified product; limited finance for such expenditure
3. Market Access	Generally improved with certification, though varies by system and demand for specific origins and characteristics. Demand for some systems / origins is growing more rapidly than conventional markets	Market supply exceeds demand for some systems and origins, notably organic and fair trade. Total volume of all certified coffee < 2 percent of global volume
4. Price Premiums	Varies significantly by system; only fair trade has price floors and fixed premiums (Utz Kapeh also has a minimum price)	Declining over time for certain systems and origins. Increasingly linked to product quality. Significant volumes of certified products end up sold as conventional
5. Availability	Organic, Fair Trade and Utz Kapeh are available in most origins	Rainforest Alliance, Bird-friendly / Shade, Starbucks' C.A.F.E. Practices and Conservation Coffee (CI) are mainly available in Latin America, though expanding to other regions
6. Credibility	Most systems have rigorous, consistent standards, with third party verification / certification. In general, standards and practices are becoming more rigorous and consistent over time	Not all are accredited with independent entities that monitor implementation standards and practices. The rigour and requirements of verifiers / certifiers can vary significantly
7. Biodiversity Conservation	Rainforest Alliance, Shade / Bird-friendly, C.A.F.E and BioTrade all have relatively comprehensive biodiversity requirements. Other systems are incorporating more environmental components over time. Some small-scale pilot carbon sequestration and watershed protection projects	Few systems have solid biodiversity monitoring and evaluation requirements. Only Conservation Coffee attempts to measure impact at a landscape level, although Rainforest Alliance is implementing landscape-level pilot projects

5.2.6 Key lessons / challenges and opportunities

Establishing policies and institutions to enable biodiversity business is not easy. The first step is to build consensus that biodiversity is sufficiently important to justify policy and institutional reform. Legislative change, in particular, can be difficult to secure where there are large economic interests at stake. As can be seen in the case of climate policy, achieving consensus on the need for change is a painstaking process. Biodiversity can be even harder to 'sell', due to its inherent

complexity (genes, species and ecosystems). Economic valuation of biodiversity benefits can help make the case for policy change, as well as clarifying priorities and trade-offs[178].

Proposals for policy reform must be technically and financially feasible. In other words, business managers need to understand how existing production systems or uses of resources can be modified, at reasonable cost, to achieve biodiversity benefits. This implies the need for biodiversity management and assessment tools that can deliver credible results at the level of individual enterprise.

There is also a need for consensus on the potential and desirability of market-based approaches to conservation. Both practical and ideological objections to the use of market-based mechanisms may be raised. Practical concerns mainly relate to capacity constraints for biodiversity policy analysis, design and implementation, particularly in developing countries. This implies the need for capacity strengthening in the use of market-based incentive mechanisms. Ideological arguments are more difficult to address, but imply the need for more information about the relative effectiveness, efficiency and equity impacts of alternative biodiversity policy mechanisms.

Where consensus is lacking to introduce mandatory policy reforms for biodiversity business, progress can be made (and useful lessons learned) using voluntary approaches. Voluntary enabling policies for biodiversity business tend to rely more heavily on 'carrots' than 'sticks', given their lack of robust compliance mechanisms (i.e. legal prosecution). The same applies at an international level, due to the absence of a global police force and the reluctance of most governments to impose or submit to international sanctions. Hence there is heavy reliance on voluntary certification and reporting on business performance and processes with respect to biodiversity. An exception is *firm-level* biodiversity policy, which may be voluntary for the firm, but is mandatory for employees or suppliers, and can include significant sticks as well as carrots. A key factor determining the choice of policy is the possibility of imposing sanctions for non-compliance, e.g. dismissal of staff or cancellation of contracts.

178 Pagiola, S., von Ritter, K. and Bishop, J. 2004. *Assessing the Economic Value of Ecosystem Conservation*. Environment Department Paper No. 101. The World Bank: Washington, D.C. (October).

5.3 Biodiversity business tools

Conservation organisations often lack basic business planning and management skills, while many businesses lack biodiversity management systems. Both needs can be addressed using new biodiversity business tools.

Business development assistance to biodiversity business is most effective when linked to biodiversity management advice and financing, and vice versa. Such assistance should continue well beyond the set-up phase.

Biodiversity business tools have been developed to help companies to comply with environmental regulations, but also for business planning, management, governance and performance assessment.

Indicators and measurement tools to assess business biodiversity performance are in the early stages of development. They need to be credible, but also cost-effective and adapted to the time frame of business investment decisions.

5.3.1 Introduction

Chapter 3 highlighted some deficiencies with conventional approaches to biodiversity conservation, including a lack of business planning and management skills. Much is known about general business planning and many organisations provide this as a service to non-profits and small business alike, such as Technoserve[179] or GroFin[180]. There has been less experience of applying such tools to conservation, although some recent efforts have sought to address this gap, for example the Conservation Finance Alliance[181] and the management effectiveness work carried out under the Enhancing our Heritage Project (EoH)[182].

One lesson from this study is the critical importance of linking business and technical assistance with appropriate financing. Often these are kept separate, usually with consultants brought in to prepare finance (not business) plans, and fund managers who have limited understanding of the business risks that investees face. Furthermore, the costs of providing business development assistance should not be underestimated. This is a particular challenge in developing countries, where qualified personnel may be scarce, leading to reliance on expensive international consultants. Developing adequate financial management systems is a priority during the early phases of operation, as these determine whether a project can be commercially viable, without which any biodiversity benefit may not be sustained.

5.3.2 A typology of biodiversity business tools

Most existing biodiversity business tools are project specific and focus on helping businesses comply with permitting processes or in getting business to better integrate biodiversity considerations into existing processes such as environmental impact assessments. Examples include:

- Biodiversity and Impact Assessment[183].

179 www.technoserve.org.

180 www.grofin.com.

181 www.conservationfinance.org. The Business Planning Committee was recently created for CFA members to share experiences of applying business and financial planning tools to protected areas management, biodiversity conservation and sustainable development activities.

182 The EoH is a joint venture project between UNESCO, United Nations Foundation, The Nature Conservancy, World Commission on Protected Areas and the University of Queensland, Australia (see www.enhancingheritage.net/about.htm).

183 www.iaia.org/Non_Members/Pubs_Ref_Material/SP3.pdf; www.theebi.org/products.html.

- Integrating biodiversity into management systems[184].
- Integrating biodiversity into the oil / gas lifecycle[185].
- Biodiversity Action Plans[186].
- Biodiversity indicators for business[187].

These tools are not, however, oriented towards assisting biodiversity-related business investments. An attempt to do just this was made by the IFC and IUCN (funded by the GEF) in the preparation of draft tools to support several proposed biodiversity business initiatives (e.g. the European Conservation Farming Initiative, the Kijani Initiative). These 'BioTools' (see **Table 7**) were intended to facilitate setting up, financing, managing or monitoring biodiversity business investments. Potential users include financial institutions, entrepreneurs and groups of companies interested in biodiversity business opportunities, as well as other organisations, such as NGOs, Protected Area authorities, or government agencies, interested in supporting biodiversity businesses.

Table 7. BioTools for biodiversity business

Tool	Purpose
BioDefinition	To establish the biodiversity context of the business and identify potential linkages between the business and biodiversity in the bioregion. The BioDefinition tool is used to guide early decisions about creating or investing in a biodiversity business. It provides businesses and investors with an initial idea of the biodiversity-related risks and opportunities associated with the business. Potential investors and sponsors can use results to screen potential investments for their positive contribution to biodiversity
BioSwot	To analyse the key strengths, weaknesses, opportunities and threats in the linkages between the business and the biodiversity in the bioregion. The BioSwot is used to guide the further development of a Biodiversity Business Plan (BBP) or to prepare a more detailed analysis of an investment opportunity
Biodiversity Management Plan	To define a set of actions by which biodiversity performance of the business can be optimised, and to assist in integrating the Biodiversity Management Plan (BMP) with the business development plan. The BMP is usually developed during the later stages of business planning or as a key element of pre-investment appraisal, following the application of the BioDefinition and BioSwot tools
BioGovernance	To put in place structures to preserve the biodiversity integrity of the business and to secure achievement of biodiversity performance. The BioGovernance tool is applied when institutional arrangements for the biodiversity business are developed and is closely linked to the development of the BMP and BBP
BioPerformance Monitoring	To evaluate and report on the business' achievement of objectives. The tool is applied throughout the life of the project from the time business activity commences, or at any time during the lifetime of the biodiversity business, after the completion of the key inputs, namely determination of biodiversity objectives and BMP completion

184 www.theebi.org/products.html.
185 www.ipieca.org.
186 www.ipieca.org.
187 www.theebi.org/products.html.

The IFC / IUCN projects never came to fruition and the tools were never fully tested in practice, hence it is difficult to assess their efficacy. Nevertheless, elements of the BioTools could be adapted for future biodiversity business initiatives, while the process of developing them offers useful lessons about collaboration between private investors and conservation groups. In the meantime, the IFC has continued its support for the development of biodiversity business (see **Box 30**).

Box 30. IFC and biodiversity on the opportunity side

In partnership with businesses, NGOs, industry associations, other financial institutions and a variety of donors, the IFC incubates new biodiversity-based business models along four models of engagement. These combine conservation, risk mitigation and business opportunity in order to achieve sustainable wealth creation for communities and the environment:

1. Helping existing companies improve the efficiency of their operations or tap new business avenues such as market demand for biodiversity-friendly products.
2. Developing new markets and incubating enterprises that base their business on nature. These 'bio-businesses' profit from applying a practice or technology, which maintains nature in its capacity as main supplier of tradable goods or services.
3. Transforming large markets by supporting the implementation of best practices proposed by multi-stakeholder roundtable initiatives. Established by the private sector, with the support of IFC, and other stakeholders, these initiatives define targets for environmental and social improvement, as well as possible solutions, such as voluntary codes of conduct, and verification or certification systems.
4. Exploring new ways for the private sector to protect biodiversity via research and development activities in several areas, such as long-term financial products, biodiversity offsets trading, and other private markets for ecosystem services.

The Global Environment Facility is the largest donor to the IFC Biodiversity Program. IFC is, in turn, the executing agency with the largest private sector portfolio supported by the GEF. By leveraging GEF financing, IFC is able to provide various forms of funding, including grants, low interest or fully commercial loans, and equity, in order to support businesses with a biodiversity focus. The IFC biodiversity programme also utilises funds from the in-house Sustainability Business Innovator, which blends contributions from IFC's profits and donors such as Luxembourg and the Netherlands.

A number of the projects and programmes described in this report were, are now, or will be, part of the IFC biodiversity programme. These include BACP (see **Box 2**), Komodo (see **Section 4.11**), Verde Ventures (see below) and Terra Capital (see **Box 32**). IFC has been a major partner in project design, in facilitating action at ground level, and in sharing lessons learned.

Verde Ventures is one of the few bio-enterprise investment funds with a well-developed, pre-investment biodiversity review process (supplemented by post-investment biodiversity monitoring using a pressure–state–response model). In the pre-investment stage, Verde Ventures analyses the location of the enterprise and its contributions to biodiversity-related outcomes on protected areas, threatened species and biological corridors. Only after these aspects have been reviewed is the proposal presented to a committee of Conservation International scientists.

Verde Ventures tends to rely on grant funds to conduct biodiversity baseline studies. These cost, on average, US$9,000 per baseline and take 8–12 months to prepare.

5.3.3 Key lessons / challenges and opportunities

One difficulty facing all conservation interventions is to define outcome indicators that can be assessed in a timely fashion, whether for pre-investment appraisal or ongoing performance monitoring and evaluation. This is a particular challenge for biodiversity business, where rapid decision-making is essential. For example, the average time taken by Verde Ventures to close a deal (from conception) is between 8 and 12 weeks. A recent report lists some factors related to developing appropriate biodiversity indicators, shown in **Box 31**.

Box 31. Indicators of biodiversity performance

- "*Performance evaluations should ... include an integrated assessment of responses to biodiversity conservation needs (i.e. the quantity and quality of actions and processes) and their impacts on pressures on biodiversity (i.e. threats).*"
- "*Measures of conservation project performance should also assess impacts on control sites (i.e. representative areas outside the influence of the conservation activities) to assess additionality and displacement effects.*"
- "*Ideally measurements should include a pre-project period to establish baseline trends in biodiversity and pressures, and extend to long-term monitoring of the entire period that the project may influence.*"
- "*Most systems that have been developed or recommended for biodiversity conservation performance measurements have focused on indirect indicators that measure inputs, activities, processes or outputs, rather than impacts.*"
- "*Independent verification and audit systems may ... be needed to ensure credibility with all stakeholders.*"

Source: Earthwatch Institute (Europe). 2006. *A Review of Biodiversity Conservation Performance Measures* (March 2006).

Both investors in, and managers of, biodiversity business need reliable tools to determine their added value, i.e. the magnitude of their impact on biodiversity. This challenge is not to be underestimated and requires:

- Screening criteria that provide an effective filter for financially attractive investment propositions while at the same time 'weeding out' those that are unlikely to deliver biodiversity benefits.
- Tools (e.g. criteria, indicators, checklists) that can also ensure benefits to the poor (or at least no adverse impact on vulnerable groups).
- Targets, criteria and indicators of biodiversity benefits adapted for use in different business contexts (e.g. commodity producers, service providers).
- Cost-effective tools that match the level of effort required to implement them with the level of investment in a given enterprise.

One of the most significant challenges for the development of biodiversity business relates to the technical aspects of monitoring ecological assets and ecosystem services. The ability to identify, prioritise and value biodiversity assets is a key component of any business model, and is essential to define the 'product' that is to be marketed. It is equally important to do so in a way that incorporates the landscape and regional context rather than simply focusing on site level indicators.

In other words, spatial scale is crucial. This is particularly challenging because (unlike carbon) biodiversity assets consist of a diverse range of species and habitats all with unique territories. Useful guidance may be drawn from related efforts, such as the designation of High Conservation Value Forests under Forest Stewardship Council certification standards[188], or biodiversity indicators under the Canadian Standards Association[189] and conservation and wetland banking in the USA[190]. The substantial body of research on identifying conservation priority areas[191] could also contribute to the development of standards for biodiversity business.

Other lessons learnt during this study are as follows:

- Business development assistance is critical to the success of any business; the key is to couple this assistance with financing and to continue assistance throughout project implementation.
- Similarly, biodiversity management expertise should be closely coordinated with business development / financial expertise.
- Biodiversity filters should be based on widely-agreed definitions and objectives (e.g. the CBD goals and indicators). Investors should seek to ensure there are no negatives on all dimensions of biodiversity related to a particular project.
- At the early stages of investment appraisal, it is often more appropriate to concentrate on process indicators than potential biodiversity outcomes.

188 Jennings, S., Nussbaum, R., Judd, N. and Evans, T. 2003. *The High Conservation Value Forest Toolkit.* Edition 1. Proforest: Oxford, UK. www.proforest.net.

189 Canadian Council of Forest Ministers (CCFM). 2003. *Defining Sustainable Forest Management in Canada: Criteria and Indicators 2003.*

190 Fox, J. and Nino-Murcia, A. 2005. Status of Species Conservation Banking in the United States. *Conservation Biology* 19: 996–1007.

191 See for example: Margules, C.R. and R.L. Pressey. 2000. Systematic Conservation Planning. *Nature* 405: 243–253.

5.4 Financing instruments

Various financing instruments developed by mainstream investors have been adapted for use in biodiversity business; these cover the gamut from grant, partial grant, debt and equity finance.

Several specialised biodiversity investment funds have been set up in recent years; most are capitalised at between US$10–15 million. A few funds or proposed funds have failed, generating useful lessons about the particular constraints of investing in biodiversity business.

There appears to be a tension between financial return and biodiversity benefit, with the most successful investments (in financial terms) reported in conventional sectors or businesses that generate indirect biodiversity benefits.

There is a trend in favour of debt finance over equity, to facilitate 'exit', as well as a strong preference for co-financing on the part of fund managers to spread risk and share information.

Financing for biodiversity management often requires an element of subsidy or grant finance, which commercial lenders and investors are disinclined to provide.

5.4.1 Financing instruments – the range

An array of financing instruments is available to biodiversity-oriented investment funds, ranging from low-risk / short-term to high-risk / longer-term options, as depicted in **Table 8**. The choice of instrument (or combination of instruments) for any given investment opportunity will depend on various factors, as discussed overleaf.

Table 8. The financing spectrum

Financial Instruments	**Financial risk** (probability of losing the investment)	**Transaction costs** (staff time and other costs to implement the instrument)	**Ability to exit** (ease of recouping an investment within an acceptable time frame)	**Sustainability** (likelihood of generating competitive returns over the long-term)
Grant	L	L	H	L
Recoverable grant	L	L	H	L
Interest rate writedowns	L / M	M	H	L
Loan guarantees	L / M	M	H	L
Short-term loans	M	M	M	L
Medium / long-term loans	M / H	M	M	H
Mezzanine finance (convertible long-term debt)	M / H	M	M	H
Programme-related investments	M / H	H	M	M
Equity investments (minority shareholder)	H	H	L	H
Majority / outright ownership	H	H	L	H

Key:

H = High M = Medium L = Low

Grants are not normally considered commercial financing instruments, but are included here due to their current importance in biodiversity finance and to show the extreme end of the risk continuum. Grant finance is typified by the support of the Global Environment Facility (GEF), the World Bank and other public-sector institutions for a range of biodiversity conservation activities, including both commercial and non-commercial projects (see **Box 32**). Other financing instruments listed in **Table 8** are more risky and typically more complex to implement. They tend to have higher transaction costs, which result in larger deals to justify the expense. Long-term financing is also more difficult to recoup and therefore the required financial returns tend to be significantly higher in order to compensate for the added risk. Conversely, higher expected financial returns reduce the need for subsidies from government or other donors.

Box 32. The GEF, World Bank and biodiversity finance

The Global Environment Facility is one of the main sources of funding for biodiversity conservation in developing countries. Financed by grants from rich-country governments, the GEF channels its resources through the World Bank, UNDP and UNEP. Over the period 1991–2001, the GEF provided about US$1.1 billion in grants and leveraged an additional US$2.5 billion in co-financing for biodiversity-related projects. Most of these were grants to developing country governments and NGOs, used to support more than 1,000 protected sites covering 226 million hectares in 86 countries. Funding for biodiversity projects involving the private sector has been more limited and focused on *"capacity building and technical assistance in eco-tourism, agro-forestry… certification of commodities, payments for environmental services, and conservation of medicinal and herbal plants"*. Much of the latter work was overseen by the IFC.

In 2006 the GEF Secretariat developed a revised strategy to enhance engagement with the private sector. Key elements include: (i) a new US$50 million 'public / private partnership fund' intended to attract more private sector involvement and resources; (ii) increased use of 'non-grant / risk mitigation instruments' (such as loan guarantees, concessional credit, insurance, debt-for-nature swaps); and (iii) various communication activities to promote private sector engagement. Particular emphasis is placed on finding a role for the GEF that is *"clearly additional to what the private sector is carrying out on its own"* and ensuring that the GEF does not 'subsidise' business as usual or 'standard mitigation activities'. With respect to biodiversity, the strategy sets out an ambitious agenda *"to internalise the goals of biodiversity conservation and its sustainable use into production systems, supply chains, markets, sectors, development models, policies and programmes"*. Target sectors include *"agriculture, banking and insurance, fisheries, forestry, infrastructure, mining and gas, oil, tourism, and transport"*. If the strategy is successful, it could lead to significant new investment by the private sector in biodiversity conservation in developing countries.

Apart from its role as an implementing agency, on behalf of the GEF, the World Bank is a major financier of biodiversity conservation in its own right. Between 1988 and 2004, World Bank funding for biodiversity involved over 426 projects with about US$1.5 billion of IBRD / IDA resources, over US$964 million of GEF funds and an additional US$2.2 billion in co-funding from other donors, governments, NGOs, foundations and the private sector, for a total Bank-managed biodiversity portfolio of about US$4.7 billion. World Bank support in the area of biodiversity involves the establishment and strengthening of protected areas (including activities in buffer zones), sustainable use of biodiversity outside protected areas, eradication of alien species, and biodiversity conservation through improved management and sustainable use of natural resources in the production landscape. All of these activities have important links to poverty alleviation initiatives. In the future, it is expected that the Bank's activities in support of conservation and sustainable use of biodiversity will further emphasise mainstreaming of biodiversity in the production landscape, including agriculture, fisheries, and other rural development activities.

Moving along the risk / return gradient from outright grants, 'recoverable' grants are effectively zero interest rate loans, where the principal is returned to the lender on either a short- or long-term basis. The advantage of this form of finance is that it can be structured like a grant, avoiding the exhaustive due diligence and legal costs associated with debt or equity finance. At the same time, requiring repayment creates a level of financial rigour that grants typically lack. Some investors see recoverable grants as a steppingstone to prepare relatively unsophisticated organisations to take on debt or equity finance at later stage. Recoverable grants can be particularly attractive when dealing with countries that have different legal codes and procedures, or significant foreign currency or other risks.

Interest rate 'write-downs' and loan guarantees are both designed to encourage financial institutions, typically commercial banks, to extend credit to clients they would otherwise refuse. Loan guarantees can be structured to cover all or a portion of the credit provided (typically only the principal), and to be drawn upon under varying circumstances (typically only after standard debt collection practices have been exhausted). Interest rate write-downs, or subsidies, can also be structured in many ways, but are typically designed to allow the borrower to pay a lower interest rate than the lender normally requires, with the entity providing the write-down paying the difference to the lender. Of course, banks also compete for business, which may undermine the incentive for firms to borrow from those lenders

which impose additional biodiversity management requirements. Loan guarantees and other innovative financing structures can help attract borrowers in such cases. Capital is a particular constraint for many small companies, which cannot easily access conventional finance (because they cannot offer sufficient guarantees and / or because their financial needs often fall under the minimum lending threshold of most banks).

Short-term and long-term loans are self explanatory, but can be structured in various ways, with subordinated debt having a higher risk than preferred debt (though a lower risk than equity in the case of bankruptcy). Generally, long-term loans imply greater risk and thus higher interest rates.

Mezzanine finance is a hybrid between debt and equity, with many possible permutations. Generally, this consists of debt that is convertible to shares / equity within a specified period, and / or is based on certain conditions or performance benchmarks.

Programme-related investments (PRIs) are typically provided by foundations or similar organisations with endowments that are invested to produce income to support grant making. In some cases, instead of investing all of their endowment funds in conventional stocks, bonds and other instruments that generate 'market' returns, a portion of these funds may be invested in initiatives that will yield below-market returns, but generate 'programmatic' benefits in keeping with the foundations' charitable mission. For example, a foundation or investment fund might invest some of its endowment in an eco-enterprise that yields less than a market rate of return, but which also generates significant biodiversity benefits, thereby helping to achieve the funder's larger goals. PRIs can be structured as debt or equity or a combination of the two.

Equity investments are, by definition, more long term and risky than debt, with risk being proportional to the percentage of ownership in an enterprise. In general, the major exit strategies for equity investors are to sell the entire enterprise (if they have a controlling stake), or to sell their share to other investors via stock markets or through mergers or acquisitions by other companies or investors. In some cases, the company's owners / managers may buy out the original investor(s).

All of these financing instruments face additional currency, political and other risks. In some instances, this risk can be insured (e.g. by the Overseas Private Investment Corporation (OPIC) in the USA), although often at high cost.

The biodiversity-oriented investment funds currently active have typically been in existence for less than five years and have less than US$10 million as loan or investment capital. Most focus on Latin America and the Caribbean, with relatively little involvement in Africa or Asia. Two large funds are no longer operational – Terra Capital Investors (see **Box 33**) and the Environmental Assistance Enterprise Fund (EEAF). Other proposed biodiversity business facilities, such as the Kijani Initiative and the European Conservation Farming Initiative, which aimed to invest in biodiversity businesses in Africa and Central / Eastern Europe respectively, did not get off the ground.

Box 33. Terra Capital Biodiversity Enterprise Fund for Latin America

The Terra Capital Biodiversity Enterprise Fund for Latin America (Terra Capital) was set up in 1996 with support from the International Finance Corporation and the Global Environment Facility. Terra Capital was designed as a private equity fund to invest in and catalyse private enterprises that have ratified the CBD and generate conservation benefits through sustainable use of biodiversity in the

region. Terra Capital's commercial objective was to realise long-term capital appreciation through equity or quasi-equity investments in biodiversity-benefiting enterprises and, thereby, demonstrate both to entrepreneurs and investors that such enterprises are viable.

An initial grant of US$5 million from the GEF was intended to cover the higher-than-average costs associated with the biodiversity-specific screening of the fund's investments. Additional contributions were sought from private investors. The fund began operations in late 1999, with core capital of US$15 million, and undertook investments in a range of commercial biodiversity-related projects, including organic agriculture, aquaculture, certified timber and non-timber forest products, and ecotourism ventures. The fund specifically targeted investments of US$500,000 to US$2.2 million, given that this range is typically too high for conservation NGOs and too low for the IFC and other institutional investors. Equity transactions were structured so that local entrepreneurs retained a majority of shares and management of the company. Terra Capital provided not only capital, but also business assistance and technical advice on biodiversity management.

During its six years of operation, Terra Capital experienced difficulty in identifying investments that met both its financial return criteria and offered biodiversity benefits. Only four investments, totalling US$6 million in commitments, were approved by the fund. Following a mid-term review in 2003, the investors decided not to renew the contract of the fund manager and ceased making new investments. Reasons given for cancelling the project included deteriorating macro-economic conditions in Latin America, resulting in high interest rates, and (according to the GEF) weak financial management. Moreover, many of the companies that Terra Capital invested in faced financial challenges from the outset, limiting their potential to deliver significant biodiversity benefits.

Sources: Adapted from Ganzi, J., Seymour, F., and Buffett, S., with Navroz K. Dubash. 1998. *Leverage for the Environment: A Guide to the Private Financial Services Industry.* World Resources Institute: Washington, D.C.; www.gefweb.org/Outreach/outreach-PUblications/06 Status of GEF Projects.pdf; and www.ifc.org/ifcext/enviro.nsf/Content/TerraCapital.

5.4.2 Key lessons / challenges and opportunities

Several specialised biodiversity investment funds have been established in recent years, including: EcoEnterprises Fund I (TNC), Root Capital (formerly EcoLogic Finance) and Verde Ventures (CI). In addition, several other organisations with broader investment and loan objectives that have significant involvement in natural resource-based sectors have been active investors in biodiversity business, notably: the IFC, Corporación Andina de Fomento (CAF), Global Environment Fund, the Small Enterprise Assistance Funds (SEAF), EBRD, Rabobank, and ABN-Amro. Some of these initiatives are profiled in **Appendix A**. Several other organisations are actively considering the creation of new biodiversity business ventures, e.g. EBRD, the European Centre for Nature Conservation (ECNC) and the European Investment Bank (EIB).

In general, the financial returns realised by biodiversity investment funds still in existence have been lower than initially projected, and below those of conventional investment funds. In those cases where returns have been competitive, the investments have tended to focus on certified plantation timber, agriculture, aquaculture or ecotourism operations, with well-developed market channels for the products in question. The biodiversity benefits generated by these investments, however, are not always evident.

On the other hand, these markets are still very immature, while the few funds that have operated in this sphere to date are quite small and have endured various restrictions and limitations specified by their investors. The expected future growth of markets for biodiversity and ecosystem services suggests that there will be significant opportunities of good returns for patient investors. Early lessons are being learned and acted upon:

- Both EcoEnterprises Fund and Verde Ventures reported reducing their equity investments and focusing increasingly on debt financing, given the higher risks of the former, especially regarding feasible 'exit strategies' for equity investments.
- Both funds have adopted policies to disburse investment funds gradually, in tranches, based on business performance and the provision and analysis of financial and other information.
- EcoEnterprises Fund provides debt financing and typically seeks repayment from the clients of developing country producers, rather than from producers themselves; more recently it has provided longer-term equipment loans as opposed to seasonal agricultural harvest finance.
- Several fund managers noted the benefits of co-investing in the same ventures, not only to help reduce their risk exposure and extend their limited capital, but also to improve their ability to monitor investments by sharing information gained during site visits and other interactions.
- SEAF suggested that the primary challenges faced by EEAF and Terra Capital were insufficient deal flow, due partly to the difficulties of trying to meet both financial and environmental criteria, and high transaction costs; this combination made it very hard to generate sufficient returns.
- Several organisations noted the benefits of focusing on one or a few sectors to develop expertise in these areas, rather than investing across a broad range of sectors.
- There is general agreement that technical assistance is often required to ensure both sound business management and the development of meaningful biodiversity conservation plans, though how to pay for such assistance is not so clear.
- Several organisations underscored the need for additional R&D, given that these markets are not mature, in combination with sophisticated monitoring and evaluation (M&E) in order to capture the lessons and crosscutting impacts. The IFC cited its Sustainability Business Innovation Group as a relevant example.

5.5 Conclusions on business promotion mechanisms

There are many ways to develop biodiversity business. The greatest potential appears to lie in creating policy incentives for the private sector to adopt improved management of both public and private natural resources. Efforts to promote biocarbon markets, potentially linked to the concept of forest conservation and specific certification standards, could also be a productive short-term strategy.

Conversely, there are relatively few examples of practical tools and well-tested forms of assistance being used by environmentally-friendly businesses or related investment and loan funds to meet their specific needs. In particular, it will be important to develop cost-effective means for providing ongoing business development and technical assistance services to environmentally-friendly enterprise. Some of this assistance may need to be provided though grant finance, at least initially.

There is a pressing need to develop and apply biodiversity management and monitoring and evaluation systems that are feasible for SMEs to use and which are

also credible to the conservation community. Equally, it is necessary to ensure that environmental certification and verification systems can demonstrate the biodiversity impact of the businesses they endorse. In many cases, biodiversity monitoring and evaluation can be outsourced to third parties, particularly those dimensions that need to occur at a landscape level.

With respect to financing biodiversity business, more experimentation is needed to determine which instruments and combinations are most appropriate under various conditions. While debt financing may be more appropriate for small-scale enterprises, mezzanine finance or equity investments may be suitable for medium to large-scale companies that seek to generate biodiversity benefits. More effort is required to develop innovative blends of grant and commercial finance, appropriate to the mix of public and private benefits provided by biodiversity business.

Chapter 6

Conclusions

The most promising way to mobilise significant private investment in biodiversity is by making conservation a viable business proposition.

The main reason to focus on biodiversity business is the enormous capacity of markets to drive change, as well as their potential to leverage new investment.

Examples of biodiversity business can be found in a range of sectors, based on various mechanisms and business models.

Experience suggests that market-based incentives, business tools and financing can be used effectively to align private and public interests in biodiversity conservation.

These different elements may be brought together in the form of a Biodiversity Business Facility which would combine the roles of policy research institute, business advisory service and financing mechanism.

Whether combined in a single facility or addressed separately, all three of these functions need to be fulfilled for the promise of biodiversity business to be fully realised.

The preceding chapters reviewed the main approaches and many specific opportunities for increasing private investment in biodiversity conservation. This chapter provides a summary of our findings, together with recommendations for action. Our general conclusions are presented in **Section 6.1**, followed in **Section 6.2** by an identification of the critical success factors that need to be in place in order to realise the opportunities that exist. This analysis underpins a proposition to bring together the key elements in the form of a Biodiversity Business Facility, outlined in **Section 6.3**. We conclude with some final remarks in **Section 6.4**.

6.1 Key findings and opportunities

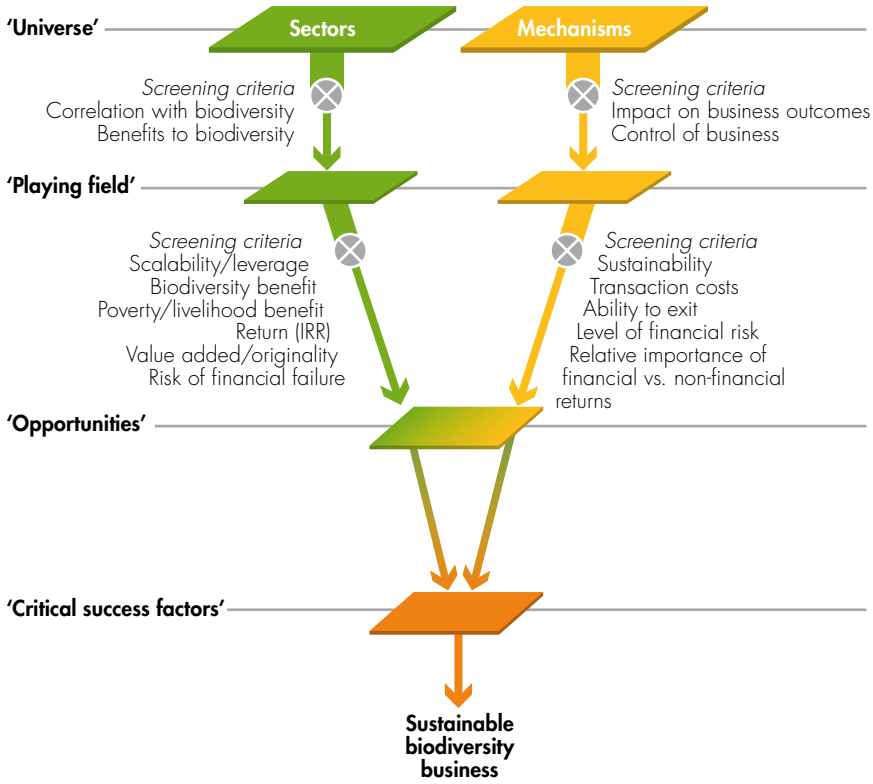
This report has examined various aspects of the biodiversity-business nexus. Our conclusions are based on a synthesis of published research, wide stakeholder consultation, and our own analysis and interpretation. Our overall aim in this report has been to:

- Provide a snapshot of the current biodiversity business landscape, in order to understand what has and has not worked, where the main bottlenecks or constraints lie, and where the main opportunities exist to expand market-based biodiversity conservation.
- Review the policy, legal and fiscal frameworks that enable biodiversity businesses to develop, highlighting key weaknesses as well as what is required to move forward.

- Assess the level of technical capacity and resource material available with regards to practical tools for building biodiversity business.
- Analyse various approaches to financing biodiversity businesses and examine some existing biodiversity funds to identify the lessons learned from experience to date.
- Assess the key components or critical success factors needed to deliver significant change in both private investment and conservation outcomes.

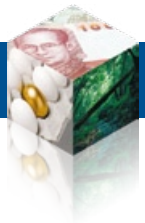
The general screening process we have applied is encapsulated in **Figure 14**.

Figure 14. General screening process



So what have we learned? Our key findings may be summarised as follows:

- Governments and NGOs cannot meet the biodiversity challenge by themselves. There is an urgent need to engage the business community in conservation efforts.
- Global efforts to conserve biodiversity conservation must become:
  - Larger in scale – perhaps 10 times current public expenditure; from 12 percent of land under protection to 15 percent plus a vast increase in marine protected areas; from niche markets for green products and services to general market dominance.
  - Better quality – more cost-effective, socially equitable and wealth enhancing.



  - Faster and more responsive – to keep pace with rapid changes in land use, climate and biotechnology, as well as evolving public opinion and consumer preferences.
- Mechanisms to stimulate biodiversity conservation by the private sector should include:
  - Sticks – increasing the penalty for damage or loss of habitat.
  - Carrots – increasing the rewards for conservation efforts.
  - Flexibility – accounting for variation in consumer preferences and producer costs.
- There is growing consensus and experience to suggest that viable biodiversity business opportunities can be found in most regions of the world. These opportunities are *not* fully realised, partly due to the limited scale and reach of support for such ventures.
- Significant expertise has been developed by existing initiatives that deliver technical assistance and finance to small and medium-size eco-enterprises. These experiences can form the basis of market transformation on a larger scale.
- A key question is how business can support the need for biodiversity conservation at a landscape scale, in addition to project or site level activities.
- One option is to 'un-bundle' the biodiversity benefits of landscape-level activities, such as organic farming and aquaculture, sustainable forestry or carbon sequestration, in the form of conservation credits or biodiversity offsets, for sale to other land users. Similarly, there may be potential to expand markets for biodiversity-friendly climate mitigation, through forest, wetland and soil conservation and other activities that sequester carbon in biomass.
- In some contexts it may be possible to 'kick-start' the market by treating biodiversity or habitat as a tradable commodity and adopting a forward-looking trading position. In other words, investors can treat biodiversity as a product in its own right, rather than simply as an 'attribute' of established goods and services.
- A related possibility is to create biodiversity banks, both terrestrial and aquatic, which can be used to offset habitat loss or environmental degradation arising from business activities. Extractive industries that use and manage land could be both buyers and sellers of biodiversity credits (e.g. in the form of voluntary offsets) to other buyers.
- There is plenty of liquidity in the market – i.e. the availability of investment capital is not the main constraint on biodiversity business. The real bottleneck is finding projects that deliver a reasonable financial return at an acceptable level of risk, as well as measurable biodiversity benefits.
- 'Viability' in biodiversity business must be qualified by recognition that financial returns are likely to be modest (well under 20 percent internal rate of return and often in the 5–10 percent bracket). This implies a need for grant finance for project development and assessment, alongside mainstream commercial investment, at least until institutional arrangements are in place that will allow private investors and entrepreneurs to capture private willingness-to-pay for the public benefits of biodiversity.
- Turning the benefit of biodiversity conservation into cash flow is a major challenge for most market-based approaches to conservation. Experience to date has largely focused on approaches that deliver biodiversity conservation benefits indirectly, alongside more traditional goods and services (e.g. food, fibre, recreation). Such approaches often rely on independent certification systems to inform consumers about what they are buying. Most certifications schemes, however, rarely address biodiversity conservation *per se*.

- Such approaches can be effective at achieving large-scale impact. However, they are sometimes constrained by the imperfect match between conserving biodiversity and producing other goods and services for the market. More work is needed to strengthen biodiversity monitoring and management systems in biodiversity business models, while reducing certification costs and expanding market share for the companies involved.
- Direct payments for biodiversity avoid some of the problems associated with certified products and services, but are less well-developed internationally. Experience in several countries, especially the USA, but also Australia, Brazil, Canada and some European nations, demonstrates that biodiversity, in the form of endangered species or natural habitat, can be effectively commoditised and traded under new regulatory frameworks (e.g. mitigation or conservation banking or payments for ecosystem services). Such approaches can generate significant business opportunities as well as conservation gains.
- Extending market-based approaches to biodiversity conservation to developing countries and to different ecosystems (e.g. marine) is a major need and opportunity. However, unfamiliarity with species / habitat payment and trading models in many countries suggests the need for an experimental phase of voluntary action, based on the willingness of far-sighted companies and public agencies to pilot new approaches to biodiversity conservation. Opportunities in the short-term include one-off biodiversity offsets for site-specific development projects and on-going payments for ecosystem services.

6.2 Critical success factors

Based on the analysis summarised above, we can identify several critical success factors, which underpin and stimulate private investment in biodiversity conservation. Perhaps the most important is the presence of adequate policy frameworks, but many other factors also matter. Our analysis shows that there is no single 'silver bullet', but rather several interlinked prerequisites for increased private investment in biodiversity business:

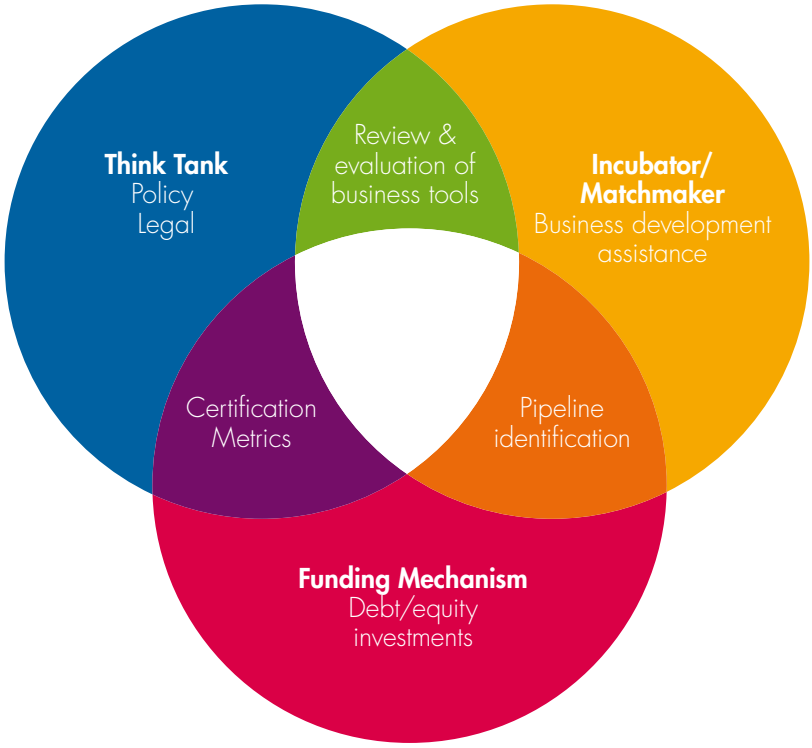
- **Multi-stakeholder participation and 'ownership'** of biodiversity business initiatives, involving the full gamut of private stakeholders (e.g. investors, entrepreneurs, brokers, auditors, customers), but also public agencies and NGOs. A prerequisite for moving forward in this area is to clarify the respective roles and commitments of different stakeholders in developing biodiversity business.
- **The importance of public policy** for stimulating biodiversity business. Voluntary action is clearly a valuable tool for raising awareness and testing alternative business approaches to biodiversity conservation. Voluntary initiatives such as eco-labelling and certification can also drive major market changes, where consumer preferences for 'sustainable' goods and services are strong. However, regulatory reform is often required to ensure wide uptake, especially for intermediate goods (e.g. timber), or where consumers are unaware of the environmental implications of alternative production methods (e.g. biofuels).
- **Realistic standards linked to technical assistance**. A major challenge is to integrate biodiversity audit and management systems into standard investment 'due diligence' and business management processes, while ensuring that such additional measures do not unduly burden either investors or business managers. Putting too many conditions on biodiversity business, especially in developing countries, may be impractical where there is little technical capacity or support for meeting the most stringent standards. Graduated standards that recognise and reward incremental improvements in business performance may be a realistic alternative, in many cases.

- **Flexible financial models coupled with business development support**. Various financing instruments are used to promote biodiversity business, including combinations of debt and equity financing, on a commercial, non-commercial or 'sub-commercial' basis. Some practitioners indicate a preference for debt or quasi-debt finance, due to concerns about barriers to exit by equity investors in biodiversity business, but there is no strong consensus on this point. More experimentation and analysis is required. More importantly, experience indicates that finance is most effective when linked to business development support and technical assistance to biodiversity entrepreneurs.
- **Biodiversity business plans and performance indicators**. Integrated biodiversity business plans and project-level biodiversity management plans need to include both commercial and biodiversity performance indicators. Both process and output indicators can be used to assess the extent to which biodiversity is reflected in business management decisions, products and services. The development and promotion of biodiversity and 'ecosystem audit' tools tailored to different business scales and sectors is an urgent priority.

6.3 Towards a Biodiversity Business Facility

The critical success factors listed above can equally be seen as obstacles to the development of biodiversity business. Based on the analysis in this report, we believe that an integrated approach to developing biodiversity business needs to combine three distinct capacities or functions (see **Figure 15**), namely: policy advice, technical assistance and finance.

Figure 15. Overview of a Biodiversity Business Facility



These three functions can be, and in some countries are, provided separately by different public agencies, not-for-profit institutions and commercial service providers. However, it is also clear that the current level of support is not sufficient to stimulate significant private investment in biodiversity business. We believe that it is both

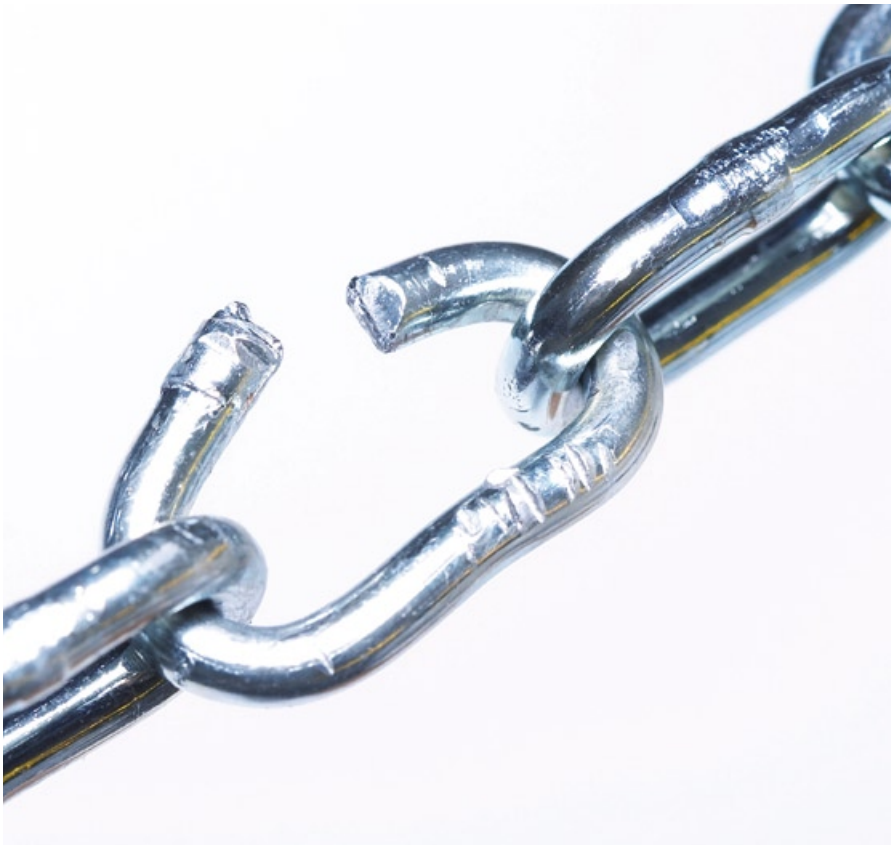
desirable and feasible to bring the different capacities together in an integrated Biodiversity Business Facility (BBF), which would aim to reinforce and accelerate existing efforts at a regional or even global scale. The main components of a BBF would include:

- **'Think-tank'**. One of the main obstacles to biodiversity business is weak or missing enabling policy. A key task of a BBF would be to identify and promote opportunities to develop appropriate policy, legal and fiscal regimes for biodiversity business, as well as addressing issues such as trade barriers, biodiversity metrics and indicators, and the evaluation of technical assistance delivery mechanisms. Such a think-tank would need to be supported by grant funds and might also provide small grants, on a limited basis, to develop and test new business models (e.g. biodiversity banking). Its efforts might also include advising policy-makers at a strategic level (with appropriate safeguards to avoid conflicts of interest with any affiliated trading arm).
- **'Business Advisory Service'**. Many new businesses, especially in novel and emerging sectors, require assistance to develop to the point where they can sustain themselves or attract mainstream finance. As well as providing a range of tailored biodiversity business development services, the BBF could also conduct applied research on how to improve the effectiveness of such assistance. In addition, it could pilot promising business concepts to test their viability. As with the think-tank, a Business Advisory Service would rely at least partly on grant funding, but could operate on a partial cost-recovery basis and, over time, spin-off services that generate financial returns (such as consultancy). Some of this work could be outsourced or conducted in collaboration with other organisations.
- **'Funding Mechanism'**. Access to capital is a critical factor for any business, including biodiversity business. This component of a BBF would invest in (or lend to) businesses that demonstrate the potential to deliver both financial returns and biodiversity benefits. It would seek to attract co-investors from both the public / philanthropic and commercial sectors, targeting especially those who are keen to see this market develop. The Funding Mechanism would provide loans and / or grant finance to deliver ongoing business development assistance and biodiversity management support to selected businesses. Specialist skills would be required to match the level and type of finance with potential investment opportunities, using a combination of debt, equity and other instruments.

A simple way to assess the BBF concept is in terms of its Strengths–Weaknesses–Opportunities–Threats (SWOT), as outlined in **Table 9**.

Table 9. Biodiversity Business Facility – SWOT analysis

Strengths	Weaknesses
• Combining all three functions (policy, technical assistance, finance) in a single entity would enhance synergies and thus potential impact • Innovative mechanism to address the long-term funding gap for global conservation • Build on past and on-going efforts to support biodiversity business while taking proven approaches to a larger scale • Potential to enhance the reputation and capacity of the institutions involved	• Difficulty of accommodating the different timeframes of policy frameworks, financial mechanisms and target audiences • Difficulty of developing appropriate metrics to measure conservation benefits within reasonable time frames • Potential trade-offs between financial, environmental and social benefits associated with investments • Significant up-front investment – a stand-alone fund probably needs at least US$75 million to cover operating costs
Opportunities	**Threats**
• Potential to attract private capital, develop markets and make a significant contribution to biodiversity conservation • Potential to engage diverse stakeholders and collaborators • Potential to develop new models and metrics for biodiversity conservation and business performance	• May be seen as direct competition to existing and ongoing efforts • Difficulty to secure external investors, identify pipeline of viable projects, keep costs low while meeting high conservation and other goals • Delay or resistance to development of enabling policies and regulations



The three components of the BBF are further elaborated in **Table 10** with respect to the following key performance criteria:

- Scale / leverage.
- Biodiversity benefits.
- Financial returns.
- Livelihood benefits.
- Value-added / innovation.

Table 10. Attributes of a Biodiversity Business Facility

Component	Scale / leverage	Biodiversity benefits	Financial return	Livelihood benefits	Value-added / innovation
Think-tank					
• Identify areas of additional research needed to support biodiversity business • Convene government agencies of trade and commerce, environment and agriculture to identify ways to remove barriers to develop market sectors • Activities might include developing certification methodologies, metrics or accreditation schemes for BAPs and offsets • A forum for discussion and generation of new ideas	• Options range from establishing a single think-tank (centrally located) or at selected hub locations, or investing in existing and respected think-tank organisations (see for example **Appendix B**). The scale will depend on what option is chosen	• Not immediately realised or obvious – this is about developing a new generation of tools, metrics, information, etc. that will help sustain future markets and businesses	• It is not anticipated that the Think-tank will generate a financial return and will therefore need to be grant-financed or cross-subsidised	• Provision of these services requires specialist skills – it is difficult to estimate the knock-on effects in terms of jobs created or pro-poor benefits from companies or markets which may be established	• There are several well-known and respected think-tanks and individuals working on biodiversity business, albeit in a fragmented way. What is needed is to assemble a critical mass of expertise, backed by sufficient institutional support to attract resources and win attention from decision-makers in both public and private sectors
Advisory Service					
• Seek to grow companies that produce high-value products and services, based on the sustainable use of biological resources • Provide business, management and technical skills and / or training • Provide market information and improved market access	• Low potential for scale – may consider developing a number of incubation facilities in key locations (e.g. mega-biodiverse countries, or countries where capital markets are more sensitised to environmental issues such as London, New York, Hong Kong)	• Not immediately realised or obvious – this is about supporting businesses with planning, management and technical skills so they can achieve both commercial and biodiversity objectives	• One option is that the Service facility(s) do not realise a financial return, but are grant financed by public agencies, foundations or NGOs • Another option is that the Service facility(ies) are run on a for-profit model by charging for services	• Service(s) will need skilled professionals with expertise in finance, legal, negotiation, business planning, communication, marketing and branding • It is difficult to estimate the knock-on effects in terms of jobs created or pro-poor benefits from companies established	• Several small-scale biodiversity business incubators exist or are in development. The IFC also provides similar services. However, the range and depth of services are extremely limited, particularly in developing countries

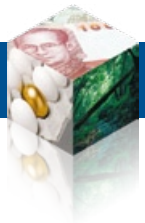


Table 10. Attributes of a Biodiversity Business Facility (continued)

Component	Scale / leverage	Biodiversity benefits	Financial return	Livelihood benefits	Value-added / innovation
Funding Mechanism					
• Identify potential investors • Develop fit-for-purpose financing for individual investments	• There is enormous potential to attract private capital through banks, high-net worth individuals, funds etc. – this is of course dependant on there being a sufficient number of bankable projects	• The biodiversity benefits are indirectly associated with the investments made – they will only be realised if the appropriate level and type of financing is made and supported	• The intention is to invest in companies or entrepreneurs who can deliver a financial return. The IRR expected with such investments, however, may be lower than other typical investments (e.g. 5–10%)	• The livelihood benefits are indirectly associated with the investments made – they will only be realised if the appropriate level and type of financing is made and supported	• There is not sufficient private capital being invested in biodiversity conservation at present and therefore the potential to add value is very high

6.3.1 What exactly would a Biodiversity Business Facility do?

There are various paths that a BBF could follow to stimulate market-oriented approaches to biodiversity conservation:

- One approach is to **focus on the 'tough nuts'** that currently receive insufficient business attention, such as illegal logging, the fuelwood and charcoal trade, unsustainable bushmeat consumption. A key question with such an approach is whether viable business models can be created, even on a cost-recovery basis, to tackle such challenges.
- An alternative approach is to focus initially on **relatively easy and 'quick wins',** to create credibility and a sense of momentum, before seeking to scale-up and / or address more challenging opportunities.
- A major challenge will be to manage the perceived **tension between achieving biodiversity benefits and financial returns**. The BBF could focus initially on activities that generate competitive financial returns, even if these are not high conservation value investments. Alternatively, it could focus on maximising biodiversity benefit, which would require more support from co-investors willing to accept 'blended' returns (financial, social, biodiversity).
- Whatever approach is adopted, there is a need to **develop clear targets and indicators of success** in terms of biodiversity, social benefits and financial performance. A BBF will need to show how it contributes to wider concerns about corporate sustainability rather than just biodiversity conservation.
- **Sell-on successful pilot initiatives**. Silicon Valley may be a model for biodiversity venture capital, where multiple small businesses are set up and successful ones are sold to large investors or established firms that can take them to scale.
- **Consider long-range innovative approaches** such as an eBay-like platform for biodiversity services, where members of the public could make an investment in conservation (one-off or a long-term easement) in return for benefits such as, for example, access to webcams covering the conservation site, regular video updates, opportunities for hands-on involvement in conservation activities and so on.

6.3.2 How to develop a Biodiversity Business Facility

Two main options have been identified to establish a BBF:

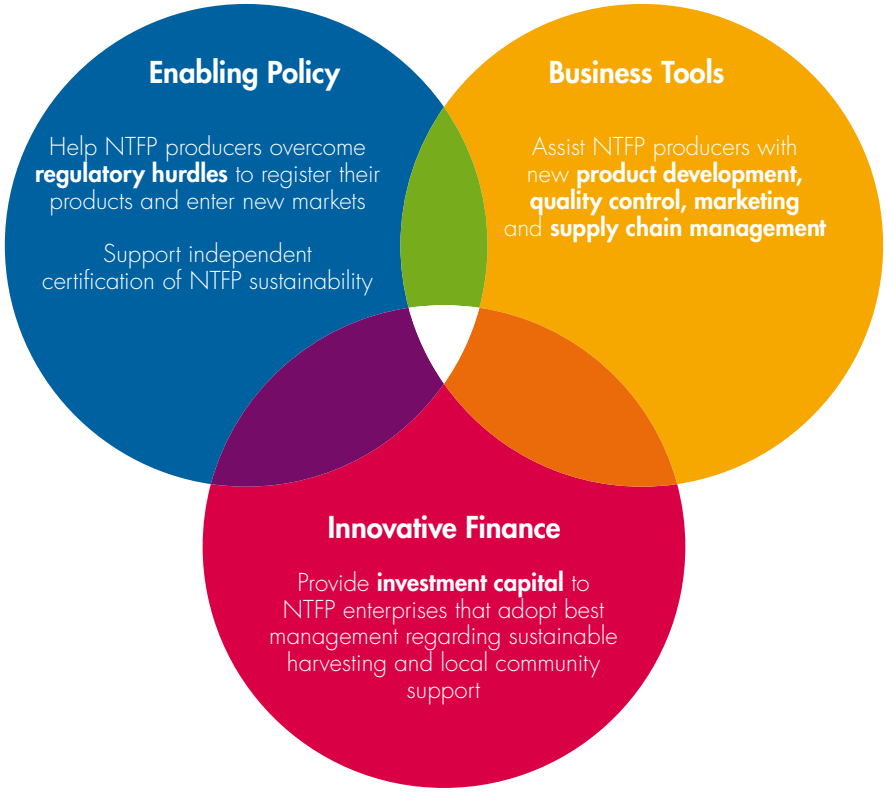
- Develop the three components of a facility simultaneously – establish the BBF as a stand-alone institution, recruit expertise, identify potential investors,

collaborators and potential projects accordingly. This would require a substantial effort to develop the concept of the BBF, before any investments could be undertaken.

- Alternatively, it may be possible to accelerate the process by implementing a small number of biodiversity business pilot initiatives and nurture the BBF through these investments. This might include work on policy reform, finding (co-)investors to support specific investment ideas, and business, management and / or technical assistance.

In practice, the second option is probably more efficient and lower risk. Purely as an illustration, **Figure 16** highlights what the different components of a BBF might do if it were to focus on one of the ideas listed above, namely NTFP.

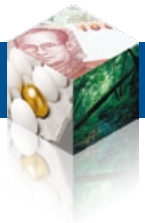
Figure 16. What would a Biodiversity Business Facility do? An illustration for NTFP



6.4 Closing remarks

The challenge of halting biodiversity loss should not be underestimated. Agreeing on conservation priorities is one major hurdle, whether that means setting aside more protected areas, securing existing areas, wider policy and regulatory reform, improved communication and awareness raising, etc. The other question, of course, is who will pay for it?

Biodiversity conservation desperately needs more resources, as well as more efficient allocation of existing budgets. This report argues not only that current conservation finance is insufficient, but, more fundamentally, that the resources required to halt biodiversity loss are beyond the capacity of current donors and funding models.



A new biodiversity business model is needed – one that can deliver large and sustained financing even in the poorest countries. Our report cites numerous examples of successful business models and markets for biodiversity from around the world. Experience suggests that the biggest barriers to change are fixed ideas, habits and inertia, including the notion that biodiversity is best conserved by non-profit organisations working in the public interest, rather than by people (including companies and communities) working for their own benefit. The challenge is to convince governments and international policy-makers, conservation organisations, multilateral agencies, private and investment banks, private companies and individual consumers to work together on a fundamental market transformation.

The case for market-based biodiversity conservation is based on a combination of frustration with conventional approaches, the apparent success of market-based instruments in addressing other environmental issues, and awareness of the dynamism of markets more generally. A particular attraction of market-based approaches is their potential to attract new and large sources of funding for a notoriously under-funded activity.

Of course, markets are fickle beasts. It is impossible to predict how much additional investment will be mobilised or where biodiversity will be protected through efforts to promote biodiversity business. Who could have foreseen the explosive growth of demand for organic foods in some countries over the past 10 years? Who would have thought that European forests would come to dominate the supply of certified timber? In both cases, however, it is clear that those leading the campaign achieved large changes in corporate and consumer behaviour with relatively modest investments. The key question is how to identify the most cost-effective market-based mechanisms, in terms of immediate biodiversity outcomes and financial advantage. Experience to date suggests that rapid innovation can be achieved through voluntary, sector-wide initiatives, e.g. certification standards, but that widespread and sustained change in environmental performance often requires institutional and / or regulatory reforms, underpinned by the force of law[192].

Whatever the prospects for market-based approaches, it is clear that governments and NGOs will continue to play a key role in biodiversity conservation. Market-based mechanisms cannot succeed without effective environmental regulations, transparent assurance systems and equitable governance at local, national and international levels. There will likewise remain a need for NGO vigilance to provide constructive criticism and public campaigns, where appropriate, against ill-considered private investments.

A more immediate opportunity (and challenge) for many conservation groups will be to collaborate effectively with businesses to deliver concrete biodiversity outcomes through the market. Government and non-governmental organisations are the world's main source of conservation information and expertise today. Their technical capacity will be essential to identify investment opportunities that generate the greatest biodiversity benefit, to develop effective biodiversity management systems for businesses (e.g. standards, guidelines and metrics), as well as to provide technical inputs for the design and evaluation of market-based biodiversity policy and incentives. There is likewise a need for guidance to protect the public reputation, independence and credibility of conservation groups that choose to work with business.

This report provides an overview of the main approaches, opportunities and constraints on the development of market-based biodiversity conservation. It also describes the key functions or capacities that need to be fulfilled if biodiversity business is to thrive. We conclude that a Biodiversity Business Facility can unite

192 Johnstone, N. (ed.) 2007. *Environmental Policy and Corporate Behaviour.* Edward Elgar: Cheltenham, UK.

the necessary capacities and demonstrate the real potential of market-based biodiversity conservation – a new way of working together that brings private sector skills to bear, raises capital from new sources, combines finance, business support and biodiversity management assistance to fledgling business, establishes robust management systems to evaluate progress, creates new partnerships and, ultimately, new markets.

Appendix A

Overview of selected biodiversity funds

	BioCarbon Fund (BioCF) Tranche 2 (World Bank)	Brazilian Biodiversity Fund (FUNBIO)	Natural Capital Investment Fund (NCIF)	EcoEnterprises Fund (EcoEmpresas, TNC)	Root Capital (formerly EcoLogic Finance)
Geographic Focus	Global	Brazil	USA – Rural West Virginia	Latin America and Caribbean. 14 projects in TNC sites and 6 in World Heritage Sites	Rural, low-income communities in Africa, Latin America, and South-East Asia, including Belize, Bolivia, Brazil, Costa Rica, Ecuador, Honduras, Kenya, Mexico, Nicaragua, Peru, Rwanda, Uganda
Sector focus	Window 1: Afforestation and reforestation in developing countries (consistent with the Kyoto Protocol rules); any LULUCF activity in economies in transition Window 2: any LULUCF activity beyond afforestation and reforestation in the CDM, e.g. forest restoration or management, revegetation, avoided deforestation, and agriculture	As of 2004: 44 percent non-timber forest management; 41 percent agro-biodiversity; 10.3 percent conservation and environmental education; 3.97 percent management of fish and animal resources; 0.59 percent timber forest management 37 percent invested in community and producers' associations and cooperatives, 42 percent in NGOs, 16 percent in private companies and 5 percent in government organisations	Sectors of particular interest include: heritage and recreation-based tourism, value-added and sustainable agriculture, water / wastewater treatment, sustainable forestry and forest products, integrated waste management, and recycling	Focused on 'green' sectors, such as sustainable agriculture, aquaculture, forestry, ecotourism and NTFP	Target sectors include agroforestry (shade-grown and sustainable agriculture), wild-harvested products, certified wood, sustainable fisheries, and ecotourism
Fund size (US$)	Tranche 2 would be declared operational at a minimum of approximately US$10M. Maximum size of ~ US$50M. Participant chooses in which Window to participate. The minimum contribution to a Window is US$1 million	FUNBIO received a US$20M grant from GEF. GEF resources complemented by fundraising and partnership with private sector to ensure long-term activities. FUNBIO can receive donations from corporations & other institutions	Fund size not known NCIF will consider loans in the range of US$15,000 to US$250,000. NCIF equity investments range from US$50,000 to US$250,000	There is US$5.2m risk capital in the 10 year closed-in fund made up with US$2.6M Inter-American Development Bank (IADB) and US$2.6M TNC money; generated US$20M (leveraged finance)	Not known

	MMA Sustainable Land Investments (Municipal Mortgage & Equity, LLC)	Verde Ventures Fund (CI)	Equator Ventures	Central American Markets for Biodiversity (CAMBio)	Corporación Financiera Ambiental (CFA)	Sea Change
	USA	Africa, Asia, Caribbean, and Latin America	Projects that contribute to biodiversity in CI and Equator Initiative priority areas are eligible	Central America: Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua	Central America	Not known
	Market-based and incentive programmes: Wetland Mitigation Banking, Stream Mitigation Banking, Conservation (Endangered Species) Banking, water leases and water quality trades, sustainable (certified) timber and agriculture, recreation – hunting, fishing, tourism, limited development, conservation easement sales, CO_2 sequestration – forestry	Coffee, cocoa, tourism, NTFP. Looking at other sectors such as cotton and carbon	Viable small and medium-sized biodiversity businesses	SMEs that sustainably use or protect natural resources – these may include renewable energy, energy efficiency, sustainable forestry, alternative / organic agriculture and aquaculture, ecotourism, and recycling	Environmental businesses in the following sectors: • Organic agriculture • Sustainable forestry • Renewable energy • Energy efficiency • Recycling, reduction and treatment of pollution, in addition to clean technologies and products • Sustainable tourism, esp. related to biodiversity	Companies that avoid: • Damage to aquatic habitats through the use of destructive fishing gear, pollution, the introduction of invasive species • Mismanagement through over-fishing of targeted stocks or a lack of regulatory oversight and enforcement • Wasteful use of marine resources (e.g. bycatch or for aquaculture) • Accidental threats to species of special concern
	US$125M – not yet operational	US$6.5M – would like to grow this to a US$15M fund in the next 2 years	Launched in January of 2005 with a US$1M million pilot fund. Pending success of the pilot, the fund will be expanded	US$30M	US$10M	Not known

	BioCarbon Fund (BioCF) Tranche 2 (World Bank)	Brazilian Biodiversity Fund (FUNBIO)	Natural Capital Investment Fund (NCIF)	EcoEnterprises Fund (EcoEmpresas, TNC)	Root Capital (formerly EcoLogic Finance)	
Amount invested to date (US$)	Not known	US$11M, of which 60 percent invested through the 'Partnership programme', in which FUNBIO contributes a maximum of 50 percent of the funding for a given project	Not known	Invested > US$4M in 10 countries. Recently funded 20th project (reviewed >370); provided follow-on financing to 3 portfolio companies; 3 projects to be financed within 6 months. 16 debt instruments; 6 equity investments. Investments range from US$50,000 to 500,000 (average investment US$325,000). Six projects repaid to date	Since its inception in late 1999, Root Capital has made over 250 loans with a gross value of nearly $45 million to over 125 clients in 20 countries, with a 99 percent repayment rate	
Internal Rate of Return (percent)[193]	NA	Non-profit	Not known	20 Projects with an IRR of 1 percent (projected = 6 percent)	Not known	
Term of Fund	Tranche 2 is currently expected to remain open for subscriptions until end of 2007 (tentative)	Not known	Not known	Fondo EcoEmpresas, S.A. is a Panamanian investment company with a 10 year-life. Fund wind down in 2008 / 2009	Not known	
Type of Fund	Closed	Maximum 50 percent loans	NCIF is certified as a 'Community Development Financial Institution Fund' (CDFI) by the US Department of the Treasury's CDFI Fund. NCIF offers loans to businesses with at least five years of operating history. Loan proceeds can be used for inventory, machinery and equipment, real estate acquisition, or other working capital purposes. Loan amounts range from US$50,000 to US$150,000; terms are 10 to 15 years with interest rates tied to prime	Fund is a closed-end fund to wind down in 2009. Fund only provides financing for up to 50 percent of any single venture. Clients paying back on quarterly basis – payments go back into fund Technical Assistance: US$1.75m from TNC / IADB (US$1M from IFC) – this also covers operating costs. Total: US$8.7m	Root Capital manages a portfolio of $25,000 to $500,000 loans to small and medium-sized enterprises that do not meet traditional requirements to access loans from local financial institutions. With few exceptions, Root Capital lends to rural producer organisations with established market linkages to values-driven buyers engaged in direct commerce with their suppliers	

193 Note that a high rate of financial return is not the primary aim of most funds, some of which have a substantial grant based funding element. Moreover, different funds account in different ways for their operating costs and subsidies. For example, within the 1 percent IRR noted for EcoEnterprises, more than one-third of the fund's operating expenses are included. Without these costs, the IRR jumps to 11 percent.

	MMA Sustainable Land Investments (Municipal Mortgage & Equity, LLC)	Verde Ventures Fund (CI)	Equator Ventures	Central American Markets for Biodiversity (CAMBio)	Corporación Financiera Ambiental (CFA)	Sea Change
	Investment Period of 3–5 years; 15–20 investments; Range of deal size: US$3M–10M	Invested S$7.8M (as of May 2006)	Not known	Only very recently established	Not known	Not known
	NA	Getting 8 percent returns across the fund	Not known – currently in pilot phase	Not known	Rate of return on investments 25–30 percent. 12 percent debt w / conversion features. Rate of return on fund 9.5 percent	Not known
	10 – 12 years	Rotating fund – no exit date	Not known – currently in pilot phase	7 years	Not known	Not known
	Standard Private Equity Structure	The fund is structured using subordinated debt with observer's rights. A scoring system that determines pricing If BD / social targets are met, clients, incentives are provided (e.g. increased capital flow or lower interest rates). Exits are established using equity kickers (price warrants), share buy-back deals, management buy-outs and royalties (e.g. percent of sales); good upsides to this as one is able to grow with the company	Its mission is to provide a 'blended' offer of debt finance and enterprise development support. Loans between US$30,000 to US$500,000	Will work with Central American Bank for Economic Integration, and network of financial intermediaries. Aim is to increase lending to biodiversity-friendly SMEs. CABEI will provide credit lines to its financial partners. GEF funds will cover bank risk through the provision of partial risk guarantees and other loan enhancements	US$100,000–750,000 equity and long term debt, mainly subordinated debt and expansion capital for established companies.	The Fund is capitalised with a PRI from the David and Lucile Packard Foundation, matched by a private equity investment

	BioCarbon Fund (BioCF) Tranche 2 (World Bank)	Brazilian Biodiversity Fund (FUNBIO)	Natural Capital Investment Fund (NCIF)	EcoEnterprises Fund (EcoEmpresas, TNC)	Root Capital (formerly EcoLogic Finance)
Biodiversity Metrics / Screens	Tranche 2 is expected to seek projects that achieve multiple benefits, namely carbon sequestration or conservation coupled with social and environmental enhancements. Social and environmental enhancements could be paid for separately or, in the absence of a separate payment system, receive a premium embedded in the price of a ton of carbon dioxide equivalent. The price of a ton of carbon dioxide would then include the value of carbon sequestration / conservation, plus that of the social service and the environmental service. The premium would depend on the quality of the social and environmental services	Funds used to support: • Biodiversity conservation • Sustainable use associated to conservation of biological diversity • Applied research in conservation and sustainable use of biodiversity	Not present.	EcoEnterprises Fund incorporates biodiversity assessment in pre and post investment processes. As part of due diligence and investment approval process, a set of guidelines is used to evaluate the biodiversity dimensions of a project (i.e. the conservation hypothesis and how the project mitigates threats to biodiversity). The Investment Committee of the Board of Directors includes biodiversity experts who assess and advise on biodiversity aspects of the investment, which alongside additional biodiversity 'indicators' are taken into consideration and incorporated into a monitoring and evaluation tool. Information is reviewed over the life of the investment	Preference is given to businesses that: • Demonstrate the ability to provide meaningful employment and increases in household income to disadvantaged groups, especially farmers, women, and indigenous people • Operate in threatened habitats; provide sustainable economic alternatives to environmental destruction; and act as responsible stewards of wildlife, forests, rivers, coasts, and other resources • Are unable to secure financing from conventional commercial sources
Web Link	www.biocarbonfund.org	www.funbio.org.br	www.wvncif.org	www.ecoenterprisesfund.com/	www.rootcapital.org
Funding Agencies / Sources	National and sub-national governments; private sector entities having at least $5 million in assets and otherwise acceptable to the Trustees	World Bank (GEF), Private sector partners (e.g. Ford Foundation), NGOs (e.g. WWF) and government	NCIF obtains operating capital, technical assistance funding, and loan funds from a variety of state and federal agencies, private foundations, and financial institutions	Fund's shareholders include IADB, Multilateral Investment Fund, socially responsible investors, foundations and TNC. TNC investment was made with donor funding. Fund's grant-based support for technical assistance is from IADB, IFC / GEF, foundations, Conservancy donors	EF is an alternative investment vehicle for over 50 investors, including individuals, SRI firms, foundations, faith-based investment funds and coffee roasters. EF partners with loan guarantors to serve higher-risk, high-impact applicants, e.g., the Development Credit Authority of the US Agency for International Development provides the fund with a 50 percent guarantee on disbursements of up to US$4 million

	MMA Sustainable Land Investments (Municipal Mortgage & Equity, LLC)	Verde Ventures Fund (CI)	Equator Ventures	Central American Markets for Biodiversity (CAMBio)	Corporación Financiera Ambiental (CFA)	Sea Change
	Not known	BD review process specifically related to desired CI outcomes They use the IFC grant money to do the BD baselines (average cost is US$9 thousand per baseline) and take on average 8–12 months (after the deal is done)	Five core principles: • Integrate biodiversity conservation and poverty alleviation into enterprise delivery • Enhance capacity for impact, scaling-up and repayment • Measure and report to share learning • Build an active public–private community that is supportive of environmentally sustainable entrepreneurship • Achieve financial sustainability	Not known.	Environmental entrepreneurs interested in obtaining CFA funds must: • Manage an established SME, or have plans to undertake a new project • Have the financial capacity to co-invest with CFA • Provide a brief business proposal, with emphasis on the environmental and financial qualities	SeaChange invests in seafood companies, which meet conservation criteria based on those of the MSC & Monterey Bay Aquarium's Seafood Watch Program. Fund's objective is to expand market for environmentally-preferable seafood by demonstrating that sustainable seafood is good business for the seafood industry and for investors. The SeaChange Investment Fund provides capital for the industry to expand the market for environment-ally-preferable seafood
	www.ebxusa.com/alliances/ and www.conservationfund.org/	www.conservation.org/xp/verdeventures/	www.undp.org/equatorinitiative/equatorventures/EquatorVentures.htm	www.bcie.org/english/bcie/index.php	www.cfa-fund.com	www.seachangefund.com
	Bunting Management Group (Family Office)	IFC ($1.75M), OPIC ($2.5M) and Starbucks ($2.5M)	Partners include Gov. of Canada, CI, the German Federal Ministry for Economic Cooperation and Development (BMZ), the International Development Research Centre, IUCN, TNC, Television Trust for the Environment (TVE) and the United Nations Foundation	CABEI (US$17M), GEF (US$10M) and associated financing (US$11M) via 'select' financial intermediaries	Multilateral Investment Fund, managed by the Inter-American Development Bank. Shareholders: Swiss Office of Foreign and Economic Affairs, Swedfund Int. AB, FINNFUND, Stichting Hivos/Triodos Fonds, Environmental Enterprises Assistance Fund, Citizen's Energy Corporation, Global Partners LLC, Private investors	David and Lucile Packard Foundation plus private investors

Appendix B

Overview of selected think-tanks and business incubators

Organisation	Primary Interests / Expertise; Comments
CIFOR	Think-tank / research institution: sustainable forestry / NTFP regarding a wide range of issues from management to policy
CI / CELB	Think-rank / incubator: focus on policy issues and company-specific new approaches to agriculture & fisheries, forestry, energy & mining, travel & leisure industries, and climate change
CSIRO, Australia	Think-tank / research institution: broad involvement in the agriculture, mining, sustainable energy and environmental sectors; leading expertise in environmental service mechanisms and payments
Eco-agriculture Partners	Think-tank / incubator: sustainable agriculture, environmental service payments, pilot sites to test landscape-level approaches
Environmental Defence	Think-tank: focus on influencing USA governmental and corporate environmental policy and practice; international programmes focus on large infrastructure projects and indigenous peoples
Forest Trends	Think-tank / incubator: sustainable forestry, environmental service payments, biodiversity offsets; combining these approaches with corporate partners
IFC's Sustainability Business Innovator	Think-tank / incubator
IIED, UK	Think-tank: sustainable agriculture, natural resource management, participatory appraisal; major focus in Africa and South Asia
IMAZON, Brazil	Think-tank / research institution: within the Amazon – applied research and policy advocacy on the impact of private and public land use and environmentally-friendly alternatives
IUCN	Think-tank: broad involvement in an array of environmental and conservation issues; particular emphasis on linking research to policy
NBI, South Africa	Think-tank / research institute: within South Africa, research and policy advocacy re plant ecology and conservation, conservation farming, climate change, invasive species and desertification
RECOFTC	Think-tank; sustainable forestry / NTFP; East / SE Asia focus
Resources for the Future	Think-tank / research institute: involved in applied research on a broad array of environmental issues with a focus on informing US public policy
Thailand Environmental Institute	Think-tank / research institute: applied research and policy advocacy on a variety of environmental issues focused on Thailand; a focus on engaging the business community and energy sector
TIES	Think-tank / association: ecotourism, promoting lesson sharing and best management practices; global
TNC	Think-tank / conservation NGO: policy advocacy on a broad range of conservation topics in developing countries; expertise in conservation on private lands and conservation finance mechanisms

Organisation	Primary Interests / Expertise; Comments
WBCSD	Think-tank / business forum: the largest business forum dedicated to promoting sustainable practices and policies by its large corporate members; covers a range of market-based approaches to conservation
WRI, New Ventures	Think-tank / incubator: broad involvement in many environmental issues; incubator of small-scale eco-enterprises in Latin America
Worldwatch Institute	Think-tank / research institute: interdisciplinary research on global environmental, social, and economic trends; advocacy re how to transition to an environmentally sustainable and socially just society
WWF	Think-tank / conservation NGO: its forest, marine, freshwater, climate change and agriculture and biodiversity programmes all include market-based approaches to conservation

Appendix C

Glossary and list of acronyms

Glossary

1. Biocarbon

The basic premise of 'biocarbon' is to combine climate mitigation and biodiversity conservation in the same activity, usually through afforestation, reforestation or the conservation or enhancement of existing biomass.

2. Biodiversity (or biological diversity)

Article 2 of the Convention on Biological Diversity 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.*"

3. Biodiversity business

A commercial enterprise that generates profits through production processes which conserve biodiversity, uses biological resources sustainably, and shares the benefits arising out of this use equitably.

4. Biodiversity business tools (bio-tools)

A set of tools for use by those involved in setting up, financing, managing or monitoring biodiversity investments, or determining biodiversity outcomes resulting from such investments.

5. Biodiversity management services

Biodiversity management services (BMS) include a range of professional activities and services undertaken by public and private entities that deliver benefits for biodiversity, for which a fee is received by the service provider.

6. Biodiversity offset

Biodiversity offsets are conservation actions intended to compensate for the residual, unavoidable impact on biodiversity caused by development projects, to ensure at least no net loss of biodiversity and, where possible, a net gain.

7. Bioprospecting

Bioprospecting is "*the systematic search for genes, compounds, designs, and organisms that might have a potential economic use and might lead to a product development*"[194].

8. Ecosystem services

Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual,

194 Tamayo, G., Guevara, L. and Gamez, R. 2004. Biodiversity Prospecting: The INBio Experience (Chapter 41). In Bull, A.T. (ed.). *Microbial Diversity and Bioprospecting*. American Society for Microbiology: Washington, D.C.

recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth.

[From the MA report *Ecosystems and Human Well-being: A Framework for Assessment* available at www.millenniumassessment.org/en/Products.EHWB.aspx – downloads].

9. Ecotourism

The International Ecotourism Society defines ecotourism as *"responsible travel to natural areas that conserves the environment and improves the well-being of local people"*.

10. Enabling framework

The mix of policies, institutions, social norms and collective agreements that can be used singly or in combination, by government, business and other stakeholders, to promote biodiversity business and other socially-beneficial activities. The enabling framework may include both voluntary incentives and mandatory requirements.

11. Endowment fund

A financial portfolio that is managed to preserve and / or grow capital, while providing current income from investments.

12. Environmental Impact Assessment

Environmental Impact Assessment can be defined as the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made (International Association for Impact Assessment – www.iaia.org).

13. Equity investment

Refers to the acquisition of equity (ownership) participation in a private or publicly-listed company.

14. Impact mitigation

Measures and actions taken to avoid, minimise, reduce, remedy and / or compensate for the adverse impacts of development. In general, a hierarchy of 'avoid – reduce – remedy – compensate' is used to establish an order of preference (beginning with avoid) for mitigation measures (www.theebi.org/pdfs/glossary.pdf).

15. Incubator

A means of providing various forms of assistance to potential investment opportunities in order to develop them to the point where they could be funded as viable businesses, for example a range of business development

services, piloting of promising business concepts to demonstrate their viability (or otherwise).

16. Intellectual property rights (IPR)

Collectively IPR refers to issues including patents, trademarks, design rights, copyright and business names. Generally, IPR are the exclusive rights granted by law to an inventor or assignee to develop and commercialise an invention and / or licence it to other manufacturers.

17. Loan guarantees

A legal obligation to compensate a lender if the borrower fails to repay a loan. This reduces the risk of lending, allowing the borrower to receive funds on more favourable terms. Loan guarantees can be structured to cover all or a percentage of the credit provided (typically only the principal), and to be drawn upon under varying circumstances (typically only after standard debt collection practices have been exhausted).

18. Market-based approach

An approach to providing goods and services, notably public services and environmental protection, which seeks to align market incentives with the public interest and thereby attract private entrepreneurs and investors. In the case of biodiversity conservation, market-based approaches include a range of legal measures and voluntary initiatives that seek to make it profitable to conserve biodiversity and to use biological resources sustainably.

19. Mezzanine finance

Mezzanine finance is a hybrid between debt and equity, with many possible permutations in terms of how it is structured. Generally, this consists of debt that is convertible to shares / equity within a specified period, and / or based on certain conditions or performance benchmarks.

20. Non-timber forest products

Natural products other than wood derived from forests or wooded land. Examples of NTFP include edible nuts, mushrooms, fruits, herbs, spices, honey, gums and resins, rattan, bamboo, thatch, cork, ornamental plants and flowers, and an array of plant and animal products used for medicinal, cosmetic or cultural purposes.

21. Payments for watershed protection

Positive financial or other incentives for forestry, soil and water conservation and other forms of land use thought to enhance water quantity or quality, or to reduce flooding and landslides.

22. Program-related investments (PRIs)

PRIs are typically provided by foundations, or similar organisations, that have endowments invested to produce funds that support annual grant making. Instead of investing all of the endowment funds in stocks, bonds and other instruments that have 'market rate' returns, a portion of these funds can be invested in initiatives that will yield below-market rate returns, but generate 'programmatic' benefits in keeping with the foundations' (charitable) principles.

23. Protected areas

The Convention on Biological Diversity defines a protected area as "*a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives*".

24. Recoverable grants

Recoverable grants are, in essence, zero interest rate loans, in which the principal is returned to the donor / lender, on either a short-term or long-term basis depending upon the objectives and circumstances.

25. Sustainable use

The Convention on Biological Diversity defines sustainable use as "*the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations*".

26. Think-tank

A physical or virtual facility that can undertake a number of advisory roles that support the promotion of biodiversity businesses at the company and policy / strategy level (e.g. regulatory advice; education; knowledge management and transfer and facilitating access to relevant business tools).

Acronyms

ABN-Amro	An international bank based in the Netherlands
ABS	Access and benefit-sharing
ADAS	Acronym serves as the name
BACP	Biodiversity Agriculture Commodities Program
BAP	Biodiversity Action Plan
BBF	Biodiversity Business Facility
BBOP	Business and Biodiversity Offset Program
BBP	Biodiversity Business Plan
BDWG	Biodiversity Working Group
BioCF	BioCarbon Fund
BMP	Biodiversity management plan
BMS	Biodiversity management services
BMZ	German Federal Ministry for Economic Cooperation and Development
BNI	Biodiversity Neutral Initiative
BSI	Better Sugar Initiative
BTFP	BioTrade Facilitation Programme
CABEI	Central American Bank for Economic Integration
CAF	Corporación Andina de Fomento
CAMBio	Central American Markets for Biodiversity
CAMPFIRE	Communal Areas Management Program for Indigenous Resources
CBD	Convention on Biological Diversity
CBDS	Convenio Bilateral de Desarrollo Sostenible
CCBA	Climate, Community and Biodiversity Alliance
CCFM	Canadian Council of Forest Ministers
CCX	Chicago Climate Exchange
CDFI	Community Development Financial Institution Fund
CDM	Clean Development Mechanism
CELB	Center for Environmental Leadership in Business (a CI department)
CEO	Chief executive officer
CFA	Corporación Financiera Ambiental
CI	Conservation International
CIFOR	Center for International Forestry Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
CO_2	Carbon dioxide
CSERGE	Centre for Social and Economic Research on the Global Environment
CSIRO	Commonwealth Scientific and Industrial Research Organization (Australia)
CSR	Corporate social responsibility
DU	Ducks Unlimited

EBFP	Environmental Business Finance Program
EBRD	European Bank for Reconstruction and Development
ECNC	European Centre for Nature Conservation
EEAF	Environmental Assistance Enterprise Fund
EF	EcoLogic Finance, now Root Capital
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EoH	Enhancing our Heritage Project
EPFL	Ecole Polytechnique Federale de Lausanne
ETS	Emission Trading Scheme
EU	European Union
EUAs	European Union Allowances
FiBL	Research Institute of Organic Agriculture, Switzerland
FLEG	Forest Law Enforcement and Governance
FAO	Food and Agriculture Organization
FAOSTAT	FAO Statistical Databases
FFI	Fauna & Flora International
FONAFIFO	National Fund for Forest Financing
FSC	Forestry Stewardship Council
FUNBIO	Brazilian Biodiversity Fund
FVCT	Flower Valley Conservation Trust
GEF	Global Environment Facility
GHG	Greenhouse gas
GMO	Genetically modified organism
GRI	Global Reporting Initiative
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HCV	High Conservation Value
HCVF	High Conservation Value Forests
HSBC	An international banking group
HSEMS	Health, Safety and Environmental Management System
IADB	Inter-American Development Bank
IBLF	International Business Leaders Forum
ICBG	International Cooperative Biodiversity Groups
ICMM	International Council on Mining and Metals
IFC	International Finance Corporation
IFOAM	International Federation of Organic Agriculture Movements
IIED	International Institute for Environment and Development
IMAZON	Amazon Institute of People and the Environment
INBio	National Institute of Biodiversity (Costa Rica)
IPIECA	International Petroleum Industry Environmental Conservation Association
IRR	Internal rate of return
ISSR	Inland Sea Shorebird Reserve (USA)
ITQ	Individual transferable quota
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
JFM	Joint Forestry Management (India)
JI	Joint Implementation
LEI	Indonesian Ecolabelling Institute
LIRDP	Luangwa Integrated Resource Development Project (Zambia)
LowCVP	Low Carbon Vehicle Partnership (UK)
LULUCF	Land use, land-use change and forestry
M&S	Marks & Spencer
MA	Millennium Ecosystem Assessment
MAMTI	Marine Aquarium Market Transformative Initiative
MEE	Ministry of the Environment & Energy (Costa Rica)
MSC	Marine Stewardship Council
MTCC	Malaysian Timber Certification Council
NBI	National Biodiversity Institute, South Africa
NCIF	Natural Capital Investment Fund
NGO	Non-governmental organisation
NO_x	Nitrogen oxide
NOAA	National Oceanic and Atmospheric Administration
NSW	New South Wales Market
NTFP	Non-timber forest products
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
OGP	International Association of Oil and Gas Producers
OPIC	Overseas Private Investment Corporation (USA)
PA	Protected area
PEFC	Pan European Forest Council
PENSA	Program for Eastern Indonesia Small and Medium Enterprise Assistance
PES	Payment for Environmental Services
PRI	Program-related investments
R&D	Research and Development
RA	Rainforest Alliance
RECOFTC	Regional Community Forestry Training Center for Asia and the Pacific
REDD	Reducing emissions from deforestation and degradation
RFE	Rainforest Expeditions
RPPN	Programme for Private Reserves of Natural Heritage (Brazil)

RSPO	Roundtable on Sustainable Palm Oil
RUPES	Rewarding Upland Poor for Environmental Services
SEAF	Small Enterprise Assistance Funds
SFI	Sustainable Forest Initiatives
SLNP	South Luangwa National Park (Zambia)
SMART	Specific, measurable, achievable, relevant and timely
SME	Small and medium-sized enterprise
SO_2	Sulphur dioxide
SR	Social responsibility
STSC	Sustainable Tourism Stewardship Council
SWOT	Strengths–Weaknesses–Opportunities–Threats
TA	Target audience
TIES	The International Ecotourism Society
TNC	The Nature Conservancy
TRAFFIC	The Wildlife Trade Monitoring Network (WWF)
TREES	Training Research, Extension, Education and Systems program
TVE	Television Trust for the Environment
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNECE	UN Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNU-IAS	United Nations University Institute of Advanced Studies
USAID	United States Agency for International Development
VALEURS	VALorisation des Espèces pour une Utilisation durable des Ressources Sauvages au Sénégal
VBDO	Vereniging van Beleggers voor Duurzame Ontwikkeling (Netherlands)
WBCSD	World Business Council for Sustainable Development
WB PEC	World Bank Public Education Centre
WCS	Wildlife Conservation Society
WEC	World Environment Center
WEF	World Economic Forum
WRI	World Resources Institute
WRP	Water-Related Payments

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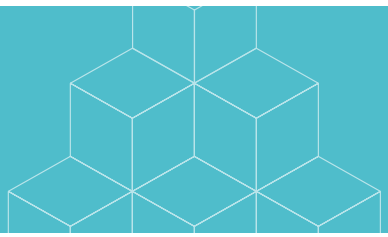

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