



Environment & Development Series **16**

Financialisation, Biodiversity Conservation and Equity: Some Currents and Concerns

Sian Sullivan

TWN
Third World Network

**Financialisation,
Biodiversity Conservation
and Equity:
Some Currents and Concerns**

Sian Sullivan

TWN

Third World Network
Penang, Malaysia

**Financialisation, Biodiversity Conservation and Equity:
Some Currents and Concerns**

is published by
Third World Network
131 Jalan Macalister
10400 Penang, Malaysia.
Website: www.twinside.org.sg

© Sian Sullivan 2012

Printed by Jutaprint
2 Solok Sungei Pinang 3, Sg. Pinang
11600 Penang, Malaysia.

ISBN: 978-967-5412-69-1

CONTENTS

Executive Summary	vii
1. ON ELEPHANTS AND ECONOMICS	1
2. 'WHAT IS NATURE WORTH?': INCORPORATING ENVIRONMENTAL HEALTH AND HARM	3
3. KEY STEPS TOWARDS THE FINANCIALISATION OF BIODIVERSITY CONSERVATION	8
4. CURRENTS IN FINANCIALISED CONSERVATION	11
5. SOME CONCERNS	24
6. CONCLUSION	29
Endnotes	31

Acknowledgements

Mike Hannis, editor of *The Land* magazine (<http://www.thelandmagazine.org.uk/>), and Gerard Sullivan have been generous with comments on an earlier version of this paper. Any errors of interpretation of course remain my own.

Executive Summary

WHEN nature is viewed in monetary terms, is it the nature that is valued, or the money? And what implications does this have for ecosystems and equity, given a financialised economy that rewards money products and their brokers, and that tends towards speculative and volatile dynamics?

The current biodiversity crisis is giving rise to calls for a massive mobilisation of financial resources to conserve biodiversity and to reduce the drivers of biodiversity loss. The possibility for 'innovative mechanisms' to assist with resource mobilisation needs is included in the Strategic Plan for Biodiversity (2011-2020) of the Convention on Biological Diversity (CBD). This has generated a fizz of interest around what might constitute 'innovative financing mechanisms' for biodiversity.

At the same time, much attention is directed to questions of how much nature is worth, and of how this worth might be signalled through prices that move decision-making in directions that are more ecologically sustainable. The recent UN programme on The Economics of Ecosystems and Biodiversity (TEEB) gives added impetus to the incorporation of monetised ecological values into national and corporate decision-making and accounting practices, and is welcomed as such in the CBD's current Strategic Plan. Financial support for TEEB comes from the European Commission, Germany, the United Kingdom, the Netherlands, Norway, Sweden and Japan.

Accounting for nature in terms of 'natural capital' and 'ecosystem services' also creates wealth-generating opportunities through the possibility that proxies for conserved or restored nonhuman nature can be mobilised as capital-bearing assets. This reflects a 'Green Economy' ideology proposing that social equity and environmental sustainability are compatible with further economic growth and entrepreneurial activity. A pillar of this ideology is the conversion of nature health and harm into capital assets that can be traded and financialised, and requires the following:

Numerical representation. First, nature needs to be conceptually 'cut up' into units that can be represented as numbers. These numbers, often referred to as 'metrics', act as surrogate or proxy measures for valued aspects of ecosystems. Numerical representation reduces ecosystem complexity to create apparent equivalence and commensurability between different locations and times. Through this, trade-offs between sites of development and sites of conservation become possible.

Monetisation. This is the process whereby something is conceived of in monetary terms, and thus behaves as a commodity that can be exchanged for a monetary payment. The use of metrics for turning aspects of nonhuman nature into numerical scores helps generate monetary figures for use in cost-benefit analyses and cognate economic models. As noted by economists, these can produce monetised values that, whilst useful, may be ad hoc, unreliable and even deceptive.

The state as market facilitator. Legal markets require state participation in numerous ways. In environmental markets for conservation, the state provides regulatory frameworks to generate demand, creates terms attractive to investors and entrepreneurs through tax breaks and subsidies, and can

underwrite loans bound with nature assets to make these investable by the private sector.

These processes enable measures of nature health and harm to become marketised, capitalised and financialised in various ways:

Trading nature. Payments for Ecosystem Services (PES) are considered to compensate for economic opportunity costs in contexts where environmental uses are altered so as to conserve the integrity of particular ecosystem functions. PES might take the form of relatively simple direct payments for transformed behaviour so that ecosystem service managers maintain a defined environmental good. Examples include water users paying upstream farmers not to engage in practices that might damage water quality downstream, or payments to tropical forest dwellers for the maintenance of carbon stored in trees constructed as an 'offset' for industrial CO₂ emissions. Many existing national ecosystem services markets are maintained through substantial government subsidies. New legislative structures also make it possible for developers to offset new environmental harms, through purchasing conservation activity on formally owned land areas elsewhere, and thereby trading environmental harm for environmental health. Examples include species and wetland mitigation banking in the USA, habitat banking in the UK and various biodiversity offset schemes globally, all of which trade fungible units of species, habitats and biodiversity.

Nature markets. The conversion of nature aspects into numerical scores associated with monetary payments enables markets in conservation indicators. To create and service these markets, as well as to facilitate 'price discovery' through linking buyers and sellers, voluntary market exchanges for conservation

measures currently are being established by nature brokers and environmental-financial entrepreneurs. Examples include the US 'Earth Exchange' of Mission Markets™, and the UK's Environment Bank Ltd., through which conservation credits can be traded as commodities. The prospect of financial gain from these markets is attracting large entrepreneurial investors.

Bonding nature. Once elements of nature have been conceived as monetised units, they can also be leveraged as a new class of capital asset. As such, they may become the collateral for capital-releasing loans bonded with the designated monetary value of the underlying nature aspect. New environmental bond structures are suggested for the 'frontloading' of predicted future incomes from conserved ecosystems, which would act as collateral for loans by private investors and multilateral donors. This would connect investor finance now with infrastructural developments considered in time to enhance environmental sustainability and to generate financial returns. 'REDD+ bonds', for example, would permit the mobilisation of predicted future payments for expected emissions reductions provided by standing forests under the United Nation's REDD+ mechanism (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) to act as collateral for loans to finance upfront investments in REDD+ and other environmental infrastructure. The World Wide Fund for Nature (WWF), the Global Canopy Programme, the Climate Bonds Initiative, Goldman Sachs and the private bankers Lombard Odier similarly propose that through 'forest bonds' guaranteed by the national governments of forest-rich countries, the 'natural capital' of tropical forests could be 'materialised' to leverage finance for development from global capital markets. It is unclear who would own collateralised (i.e., pledged) 'natural capital' in the case of possible payment defaults.

Nature derivatives. As observed for the recently created market in tradable carbon units, the big money tends not to be in the credits themselves, but in poorly regulated voluntary and bespoke over-the-counter (OTC) trades in financialised products derived from these credits. As units of conserved or restored nature are leveraged as ‘natural capital’ in environmental markets, bonds and mortgages, these might be similarly ‘securitised’ into derived money-bearing products. This could transform the risk of species extinction and biodiversity decline, for example, into speculative opportunities. It is unclear what implications this would have for the ‘underlying’, which in this case could be credits for species populations, biodiversity and habitats.

These are significant inroads into the financialisation of biodiversity conservation, which may contribute to a scaling-up of financial resourcing for the sustenance of biodiversity. But these innovations also generate concern:

Conservation markets such as habitat banking require development-related ecological harm for their existence, so as to maintain the sorts of prices that might fund the conservation considered to offset development-related environmental harm. This generates a perverse situation in which ecological harm ensures market values for conservation, such that degradation is needed in order to sustain market demand for this conservation mechanism.

The raising of economic rents for land areas through the enhanced monetary values commanded by credit-bearing indicators of nature health may act to displace people from land areas as governments and investors seek to ‘grab’ these new values. Such *enhancement of inequity* is both unethical and *may amplify the drivers of biodiversity degradation* by diluting

the possibility of collective action in support of conservation policies. The legal and customary rights of indigenous peoples and local communities will also be impacted.

Finally, conversion of complex landscapes into numerical and monetised metrics instrumentalises peoples and nonhuman natures so that these conform to *a homogenising system* in which money is the mediator of all value. This can *displace local eco-cultural knowledge, practices and values which may be more benign for biodiversity*, thereby reducing options for transferring maximum socio-ecological diversity to our descendants.

CHAPTER ONE

ON ELEPHANTS AND ECONOMICS

IN 1993, Australian ecologist Graeme Caughley published a paper in *Conservation Biology* on elephant conservation and market reasoning.¹ Responding to proposals that clear ownership designations and the ability to sell harvested ivory on a free market would incentivise the conservation of African elephants, he showed that this might instead encourage the liquidation, i.e., the extinction, of this 'asset'. This was because interest rates on money stored in bank accounts were higher than the replacement rates of harvestable populations for elephants. Given the high price of ivory and the low rates of replacement for elephants, free-market logic meant it would be most rational to convert the asset of elephants into saleable ivory and deposit the proceeds, so as to accrue income at higher interest. In economic parlance, without government resources to subsidise incomes from elephant conservation, a market in this case would act as a perverse incentive, contributing to the destruction of the very thing it was intended to conserve.

This example illustrates the care needed when supporting the conceptual conversion of biological species and ecosystems into capital assets that can be freely traded on markets or spliced into derived commodities. Perhaps more importantly, it highlights that *when nature aspects are converted into a dollar sign in a capitalist market economy, it may be the dollar that is valued, not the nature that underlies this.* As well as diluting

other reasons for caring for nonhuman nature, this is highly relevant in a financialised economy that rewards money products and their brokers, and that tends towards speculative and volatile dynamics.² Current economic structures suggest that when entities are configured as money-bearing assets, i.e., commodities, their monetary value moves towards existing and inequitable concentrations of capital. Specifically, in commodity markets, intermediaries rather than producers tend to be privileged, with monetary return directed massively upwards towards players in secondary markets for derivative products.³ This wraps conserved nature – the ‘underlying’ – into the unstable gains and losses associated with financial markets, thereby working against the environmental stability sought through these proposals. Recent crises in the financial sector and the deleterious impacts of repeated bailouts from public sector coffers on the livelihoods of many, signal warnings regarding the incorporation of conserved nature ‘assets’ into these risky financial(ised) domains.

Current approaches in conservation that designate what nature is worth in monetary terms, and that create tradable and financialisable assets from this, warrant clarification of both their ideology and their possible social and ecological effects. This paper is an attempt to speak to this situation. Many of the resources referenced in the endnotes are available online for further consultation.⁴

CHAPTER TWO

‘WHAT IS NATURE WORTH?’⁵: INCORPORATING ENVIRONMENTAL HEALTH AND HARM

THE third *Global Biodiversity Outlook* report, released in 2010 by the Secretariat of the United Nations Convention on Biological Diversity (CBD), confirmed what many suspected: that the target set in 2002 for a reduction, by 2010, of the current rate of biodiversity loss had not been met.⁶ The Conference of the Parties (COP) to the CBD in Nagoya, Japan, in 2010 thus renewed commitment to reductions in the rate of loss. This means attending to the varied drivers of this loss, including habitat transformation due to economic growth and development. Target 5 of the Aichi Targets adopted at Nagoya⁷ seeks at least a halving of the rate of loss of all natural habitats by 2020. It is considered that this will require a scaling-up of financial resources, as emphasised in Target 20 on the ‘mobilization of financial resources’. The Annex to the COP’s Strategic Plan for Biodiversity in 2011-2020 speaks additionally of the possibility that ‘innovative mechanisms’ might assist with meeting resource mobilisation needs.⁸ This has generated something of a fizz of interest around what exactly might constitute ‘innovative financing mechanisms’ (IFMs) for biodiversity conservation, together with what may be the roles of the corporate and financial sectors in designing these.⁹

In this context, much attention is currently devoted to the question of how much nature is worth. Ecological economist Robert Costanza and colleagues estimated in 1997 that the

annual value of 'ecosystem services' globally is between \$16-54 trillion.¹⁰ Such statements of nature's monetary value now abound. The expanding discipline of Environmental Economics, under the leadership of David Pearce, former advisor to Conservative UK Prime Minister Margaret Thatcher, asserts that attributing monetary value to nature health and harm will encourage incorporation of these 'externalities' into market-based economic decision-making. The suggestion is that with clear property rights and appropriate state regulatory intervention, economic valuation of impacted environmental measures will incentivise business and policy choices that are efficiently oriented towards environmental sustainability.¹¹

The recent European Union and UN programme on The Economics of Ecosystems and Biodiversity (TEEB)¹² gives new impetus to the incorporation of monetised ecological values into national and corporate decision-making and accounting practices, and is welcomed as such in the CBD's current Strategic Plan. TEEB's recommendations are now being applied in varied contexts. Thus, the financial firm KPMG has teamed with Fauna & Flora International and the United Nations Environment Programme Finance Initiative (UNEP FI) to enhance climate change and sustainability services, with a view to understanding the competitive advantages gained from responding proactively to the risk of 'Biodiversity and Ecosystem Services (BES) Degradation'.¹³ The UNEP FI's banking commission has issued a guide for practitioners in the banking sector regarding 'the meaning and implementation of sustainability'. This emphasises 'the business drivers for sustainability' and a belief in the achievement of 'sustainable development' through 'allowing markets to work within an appropriate framework of cost efficient regulations and economic instruments'.¹⁴ And the World Business Council for Sustainable Development (WBCSD),¹⁵ together with

PricewaterhouseCoopers,¹⁶ the International Union for the Conservation of Nature (IUCN) and Environmental Resources Management (ERM),¹⁷ recently published a *Guide to Corporate Ecosystem Valuation*. This is intended as an accounting methodology to facilitate 'better-informed *business decisions* by explicitly *valuing* both *ecosystem degradation* and the *benefits* provided by *ecosystem services*'.¹⁸

In the current run-up to the UN Rio+20 summit on 20-22 June 2012, several additional statements have been published regarding initiatives that encourage better 'green accounting' through incorporating non-produced environmental resources in accounts. The 'Natural Capital Declaration' signed by CEOs of financial institutions commits the financial sector to taking 'natural capital' into account in all financial products and services.¹⁹ The WAVES (Wealth Accounting and Valuation of Ecosystem Services) initiative of the World Bank Group (WBG) is a key element of the WBG's recently published new 'Environment Strategy', comprising a methodology for incorporating 'natural capital' and ecosystem measurements into national 'wealth accounts', in part 'to establish the true value of biodiversity'.²⁰ And WAVES is set within the context of a substantially energised System of Environmental-Economic Accounting (SEEA), agreed in 2012 by the UN Statistical Commission as an international standard for combining economic and environmental data, including 'ecosystem services' and 'natural capital', in a single accounting system.²¹

Such initiatives encourage the private and public sectors to internalise the environmental costs of their endeavours, as well as the risk to their portfolios of environmental degradation. As a UNEP FI (2010) 'CEO Briefing' entitled *Demystifying materiality* affirms, the materiality of biodiversity and ecosystem services is increasingly acknowledged to be *hardwired into finance*,

generating risk to portfolios through factors such as declining resource bases, enhanced government regulation and public demand for responsible practice.

At the same time, disaggregating, monetising and accounting for nature in terms of owned and impacted 'natural capital' and 'ecosystem services' is also creating wealth-generating opportunities. The World Resources Institute advises that the monetising of nature measures permits treatment of 'nature's benefits as wealth-creating assets'.²² The WBG suggests that predicted 'future streams of payments for expected emissions reductions' provided by standing forests under REDD+ (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries²³) might be monetised and 'serve as collateral to loans to finance the upfront investments in [REDD+] programs', in effect creating 'REDD+ bonds'.²⁴ World Bank loan funding is also being directed to supporting countries such as the Republic of Congo to become providers of monetised and marketable 'environmental services to the emerging global markets'.²⁵ This would include supplying forest carbon credits under a REDD+ mechanism, as well as through biodiversity offsets, the demand for which comes in part from ecological pressure exerted by extractive industry and plantation forestry, which are also supported by the World Bank.²⁶ In the corporate world, the WBCSD claims that 'sustainability-related global business opportunities in natural resources may be in the order of US\$2-6 trillion per annum by 2050'.²⁷

These statements represent current excitement around the possibility that proxies for various aspects of conserved or restored nonhuman nature can be monetised and mobilised as new capital-bearing assets. They reflect a 'Green Economy'²⁸ ideology proposing that social equity and environmental sustainability are compatible with further economic growth and

entrepreneurial activity. A pillar of this ideology is the transmutation of nature health and harm into tradable and financialisable capital assets. It is relevant, therefore, to ask how this is accomplished and to consider the possible equity, ethical and environmental effects.

CHAPTER THREE

KEY STEPS TOWARDS THE FINANCIALISATION OF BIODIVERSITY CONSERVATION

THE following procedures pave the way for the treatment of aspects of conserved or restored biodiversity as money-bearing assets.

(i) Numerical representation

First, biodiversity needs to be conceptually ‘cut up’ into units that can be represented as numbers. These numbers, often referred to as ‘metrics’, act as surrogate or proxy measures that represent the ecosystem aspect under consideration for its conservation value. They require the mapping and reduction of complex ecological parameters – including the presence and population health of particular species, the condition of specific habitats and species richness – into numerical scores considered to adequately capture particular dimensions of nature. A good and accessible example of the work required is provided by the UK’s Department for Environment, Food and Rural Affairs (DEFRA), who are currently devising a simple metric for scoring terrestrial habitats, such that they can be brought into biodiversity offset exchanges for the mitigation of environmental harm due to economic development.²⁹ Numerical representation creates apparent equivalence and commensurability between different locations and times. It is this symbolically created equivalence that permits trade-offs between sites of development and sites of conservation. Once aspects of conserved or restored

nature have been symbolised as numbers, it becomes relatively easy for these 'values' to be turned into tradable monetary entities.

(ii) Monetisation

Monetisation here is the process whereby something can be converted into money, and thus behave as a commodity that can be exchanged for a monetary payment. A key strategy is the recent discursive shift towards the use of language that brings ecology into the domains of economics and accountancy. Terms such as 'natural capital' and 'ecosystem services' are powerful signifiers that encourage a vision of nature – in all its diversity, interconnectedness and nonlinear complexity – as collapsible into the simplifying value sphere of money. The use of metrics for turning aspects of nonhuman nature into numerical scores also facilitates the application of economic valuation methodologies. Monetised values for 'ecosystem services' tend to arise through methods such as contingent valuation, involving estimates of 'willingness to pay' for specified aspects of nature; or 'benefit transfer', whereby ecosystem service valuation is projected from unit values (dollar estimates of economic value on a per-unit basis) derived from particular use and non-use values measured at specific different sites. These generate numbers for nature measures that are in monetary terms, and thus can be used in cost-benefit analyses and cognate economic models. As noted by economists, however, they may also produce monetary values that are ad hoc, unreliable and even deceptive.³⁰

(iii) The state as market facilitator

Legal markets require state participation in numerous ways. State regulation can generate demand, by establishing

regulatory mechanisms that enforce development-related conservation measures. Governments ‘can engender market confidence by establishing the property status of [conservation] credits through legislation’.³¹ Their resources can be utilised in such a way as to create terms attractive to private sector investors and entrepreneurs, for example through tax breaks and subsidies. They can also provide regulatory certainty for maintenance of the value of environmental credits, thereby removing private sector risk in environmental markets. Examples include the UK government’s decision to set a floor price for carbon that protects low-carbon electricity investments (including nuclear),³² and the US government’s promise that credits purchased now for currently unscheduled but imperilled species will satisfy mitigation requirements for future land use activities if the species later becomes listed.³³ Governments can also underwrite loans bound with nature assets such that these become investable by the private sector,³⁴ and can bail out institutions responsible for poorly conceived risk management, lending and banking practices.

CHAPTER FOUR

CURRENTS IN FINANCIALISED CONSERVATION

THE above phenomena enable measures of nature health and harm to be marketised, capitalised and financialised in various ways. A rapidly expanding 'product range' of commodities and assets in nature health is appearing, including items such as biodiversity offsets, species credits, forest bonds, ecosystem services and perhaps even biodiversity derivatives. A parallel stream of variously privatised conservation and voluntary trades is creating biodiversity market options, alongside more conventional approaches for *in situ* conservation. For many these terms can be opaque and even bewildering. This chapter details some examples of these new nature products.

(i) Trading nature

Market-oriented ideology assumes that good environmental governance and the equitable distribution of environmental services will derive from the correct pricing of quantified environmental goods and services, combined with the self-regulating market behaviour that will emerge from their market exchange. A key logic is that such Payments for Ecosystem Services (PES) will compensate economic opportunity costs in contexts where environmental-use practices are altered so as to conserve 'ecosystem services'. This might take the form of relatively simple direct payments for transformed behaviour to maintain a particular and clearly defined environmental good.

In water management, for example, the water available to those living downstream can be negatively affected by water users upstream, and PES schemes may be established to alter upstream behaviour so as to maintain downstream water quality and access. Paradigmatic here is the case of Vittel (Nestlé Water) in north-east France, who came to a financial agreement to compensate farmers for altering their nitrate-based fertilising practices upstream which were contaminating the aquifer producing the bottled mineral water sold by the company.³⁵ In this case the key parameters were relatively clear. They included the environmental good (uncontaminated water), the potential 'servicers' of that good (nitrate-using farmers), the environmental problem (contamination by nitrate-based fertilisers) and the purchaser of the environmental good (Vittel).

Further critical factors are embodied here with implications for the applicability of such initiatives elsewhere and over broader geographical scales, such as between contexts in the urban industrialised North and the rural 'underdeveloped' South. The wealth of the purchasing company and the continued market value of its product provided economic sustenance for its interest in pursuing the ecosystem services exchange. The land constituting the source area for the water is enclosed as private property under clear tenure arrangements, permitting the establishment of relatively direct contracts between service purchasers and providers. And Vittel was able to collaborate with a professional and well-funded four-year research project on the connections between farming practices, water quality and potential collaborative alternatives, prior to the long-term establishment of a PES scheme. Even with these factors, the initiative cost Vittel some 24.25 million euros to develop in its first seven years (an estimated 980 euros per hectare per year),³⁶ and it took some 10 years following the initial four-year period of research for the scheme to become operational.

PES schemes are being devised for complex public ecosystem goods such as forests and biodiversity, in situations with varied tenure arrangements. A dominant justification is that they will allow people to access new income from living in maintaining relationships with landscapes now valued nationally and globally, thus preventing their conversion into less desirable forms at the same time as permitting economic growth. Whether or not such redistributions occur in practice is context-dependent. As Esteve Corbera and colleagues observe, 'markets are blunt instruments with respect to issues such as procedural fairness and equitable distribution', and 'those who benefit from the market exchange are not necessarily the direct resource users'.³⁷ A compounding factor is the extent to which communities can assert property rights over newly tradable ecosystem service commodities. Formal market exchanges require inalienable property rights over traded commodities, and additional complexities are raised when these services are situated in non-formal common property regimes. Many existing national ecosystem services markets turn out to be possible largely through substantial government subsidies, and to direct resources disproportionately to larger landowners.³⁸

New legislative structures also make it possible for developers to *offset* new environmental harms, through purchasing conservation activity on formally owned land areas elsewhere, thereby trading environmental harm for environmental health.³⁹ Although working through the mitigation hierarchy is encouraged, whereby harm is first avoided, mitigated and/or rehabilitated, the last resort of compensating for 'unavoidable harm' can be justified in a planning application, as long as this is offset appropriately.⁴⁰ This has been occurring in US wetland mitigation banking since the 1970s⁴¹ and in US species banking since the 1990s,⁴² and is currently proposed in support of a new biodiversity offsets initiative in the UK.⁴³

US species banking, for example, is oriented towards species protected under the Endangered Species Act (ESA), and is currently expanding to include imperilled but as yet unscheduled species.⁴⁴ In this, 'species credits' are awarded to offset providers by the regulators (the US Fish and Wildlife Service (FWS)) for the same species that will be harmed elsewhere through development. These credits tend to be based on proxy measures (such as acreage of appropriate habitat conserved, created or restored on owned land that becomes termed a 'species bank'), and occasionally on actual populations of breeding pairs of the credited species. Currently species banks are on land areas in relatively close geographical proximity to the affected species population. In a survey in June 2010 of US species banking, most (107 of 123) banks were listed as preserving already conserved habitat.⁴⁵ As such, species banks amplify the credit-bearing value of land areas under formal, usually private tenure, but it is not clear that they constitute conservation additionality in the sense of enhancing conservation effect beyond the 'counter-factual' scenario of there being no species bank.

Habitat banking in the UK has a slightly different emphasis in that it is being proposed precisely to facilitate a brokered trade in biodiversity offsets to mitigate the site impacts of economic development. In this context, application of a habitat scoring metric, which scores habitat condition as 'poor', 'moderate' or 'good', and biodiversity distinctiveness as 'low', 'medium' or 'high', facilitates the creation of equivalence between development and conservation sites that can be both geographically distant and of different temporal moments. Offset '[c]redits can be produced in advance of, and without ex-ante links to, the debits they compensate for, and [can be] stored over time'.⁴⁶ This mirrors forward-selling in the US wetland mitigation banking industry, in which conservation credits can

be sold after sites have received their status as a conservation bank but *prior to* being able to demonstrate ecological performance compliance.⁴⁷ In effect, this paves the way for development activity to happen in advance of conservation compliance, and as such is of conservation concern, particularly at a time when apparently rapid climate change adds complexity to the already difficult process of predicting successional dynamics in ecosystems. As ecosystem values are transmuted into numerical ones, additional scoring 'multipliers' can be added into the mix. These deal with varied sources of risk, although as candidly noted by DEFRA, '[i]f the worst case risk is realised (i.e. if the restoration or expansion fails to deliver), a multiplier will not solve the problem'.⁴⁸ Financial insurance is also proposed such that the offset provider could take out insurance against their failure to deliver the right number of units.⁴⁹ Whether or not financial insurance and associated payouts can equate with the nature entities that may have been lost through development is another question.

Note that what is exchanged in these offsetting schemes are the numerical indicators calculated by metrics such as those described above. These may or may not provide a 'good fit' with the material natures they represent, and thus may or may not adequately represent the ecological measures being lost through development in specific places. Ecological theory and common sense suggest that offsets over large spatial and temporal distances are likely to fit less closely with specific impacts than those that are distance-near and with close temporal (i.e., successional) correspondence with impacted localities. Of course, no offset can fully replace the specific spatial and temporal ecological qualities of the individuals, populations, species and ecological relationships between these that stand to be harmed through development.

(ii) Nature markets

The conversion of biodiversity aspects into numerical scores associated with monetary payments enables the creation of markets for conservation indicators. To establish and service these new markets, as well as to facilitate 'price discovery' through linking buyers and sellers, voluntary market exchanges for environmental conservation measures are being created by nature brokers and environmental-financial entrepreneurs. As promoted in a recent publication of the World Resources Institute, '[a]n independent market broker may create efficiencies and economies of scale by facilitating the buying and selling of credits, managing the financial transactions, providing liquidity in the market, verifying and monitoring credits, and managing the potential default of credits'.⁵⁰ Entrepreneurs envisage the establishment of such markets as an expansionary endeavour, thus:

As a centre of global finance and trade, the UK can play a pivotal role in creating market rules that are workable and possess robust environmental integrity. [...] Getting it right in the UK could transform the way we value nature and finance its protection globally. [...] There is a unique opportunity to successfully render a working and effective system that can be replicated, improved and expanded across Europe and throughout the world.⁵¹

There are several forerunners in this field. The 'Earth Exchange'⁵² of Mission MarketsTM,⁵³ whose founder and CEO has more than 20 years' experience in capital markets on Wall Street, including a vice-presidency at Bear Stearns, is described as 'the first online platform facilitating transactions for multiple environmental credits and conservation finance mechanisms'. The Exchange's website claims that '[c]urrent markets for ecosystem services have been estimated to be between \$1.8 and \$2.9 billion annually', and thus that 'investments in the earth make great business'.⁵⁴ Mission MarketsTM has recently collaborated with

the UK's Environment Bank Ltd. to create an online conservation credit trading platform, hosted in the US, for the buying and selling of UK conservation credits, particularly biodiversity offsets.⁵⁵ The Environment Bank is a private company established by professional ecologists who have been enthusiastic protagonists in stimulating a habitat banking and biodiversity offsets discourse in the UK.⁵⁶ Described as an independent broker for the delivery of 'mitigation and compensation schemes associated with planned development',⁵⁷ it received £175,000 in 2011 from the Shell Foundation⁵⁸ to assist with development of ecosystem service markets.⁵⁹ The Chairman of The Environment Bank, Prof. David Hill, who since 2011 has also been the Deputy Chairman of the UK government body Natural England, states that habitat banking 'is a definitive market mechanism' and that 'the purchase of conservation credits will explicitly and transparently demonstrate developers [*sic*] commitment to the environment, and will deliver truly sustainable development'.⁶⁰

The promise of these new layers of environmental markets is attracting interest from investors. EKO Asset Management Partners, for example, is 'a specialized investment firm focused on discovering and monetizing unrealized or unrecognized environmental assets',⁶¹ and aligning 'smart capital with people, projects, and companies that are poised to profit from emerging markets for ecosystem services'.⁶² Similarly, the Terra Bella fund of Terra Global Capital is 'a private investment fund specializing in assets from environmental markets', with investments directed to 'voluntary markets where regulations are uncertain or non-existent', 'emerging ecosystem markets' and 'undervalued derivative instruments on environmental assets'.⁶³ And Ecosystem Investment Partners (EIP) is 'a private equity firm established in 2006 to capitalize on the Payments for Ecosystem

Services (PES) markets surrounding wetland, stream, and endangered species habitat mitigation throughout the US'.⁶⁴

In these examples, offset metrics create the promise of offset markets, in which numerical scores for nature aspects become purchased and traded as commodities, with financial expertise required and rewarded for the brokering of exchanges. Of course, the use of markets in which polluters can trade units of pollution (debits) for environmental credits elsewhere is a well-established approach for the mitigation of environmentally degrading development activity. Capped trades in SO₂ credits under the US Clean Air Act, and in CO₂ credits as part of the United Nations Framework Convention on Climate Change (UNFCCC), for example, encourage polluters to reduce emissions such that they can gain financially through trading allocated credits that are above their emissions requirement. In these it is to some extent relatively easy to represent the element being traded in numerical terms that can be monetised,⁶⁵ although perhaps less easy in the case of carbon to demonstrate environmental improvement in terms of overall emissions reductions.⁶⁶

It is harder in practical and ethical terms to create fungible units of species, habitats and biodiversity. These are indivisible and embedded as part of place-based ecological assemblages, and may embody millennia of maintaining practices enacted by peoples with which they also are historically and currently associated. Arguably, the conceptual 'cutting up' of these interrelationships into units for trading purposes is profoundly 'unecological'. It also raises significant social justice implications by fostering a privatising trajectory that displaces the different tenure and value practices of peoples associated with current global locations of high biodiversity. The irony is that the latter often have effected greater long-term maintenance of ecological relationships and diversities than the economic developments

that new trade in commodified conserved nature is now intended to 'offset'.

(iii) Bonding nature

Once elements of biodiversity have been conceived and calculated as units to which monetary value can attach, they can also be leveraged as a new class of capital asset. As such, they may become the collateral for capital-releasing loans that are bonded with the putative monetary value of the underlying nature aspect. The Climate Bonds Initiative claims that '[t]he bond market is the great innovation that distinguishes western capitalism from previous economic systems'.⁶⁷ New environmental bond structures are proposed to utilise this innovation so as to 'frontload' future funds, thereby connecting investor finance now with infrastructural developments considered in time to enhance environmental sustainability. Climate Bonds and Green Bonds, for example, encourage borrowing against the future economic and environmental (especially climate) benefits predicted from these investments.⁶⁸ The World Bank Treasury currently issues a variety of bonds focused on climate-related goals, including 'Cool Bonds',⁶⁹ 'Eco Bonds'⁷⁰ and 'Green Bonds'.⁷¹ These target an emerging class of investors in sustainability, interested in investing in companies whose 'sustainability performance' may be linked to financial ratings indices that include environmental proxies.⁷²

Such innovations are stimulating applications of bond logic to biodiversity. A 'high-level workshop' to consider the development of bonds to finance 'ecological infrastructure such as tropical forests' – or 'Forest Bonds' – was hosted recently by the World Wide Fund for Nature (WWF),⁷³ the Global Canopy Programme⁷⁴ and the Climate Bonds Initiative, with the global investment banking and securities firm Goldman Sachs⁷⁵ and the Swiss

private bankers Lombard Odier⁷⁶ as financial partners.⁷⁷ The proposal here is that public-sector funds and incentives such as tax breaks are used 'to support private-sector investment in forests'. The 'natural capital' of tropical forests thus would be 'materialised' to 'leverage additional finance from global capital markets'.

This capital in theory would be invested to pay for a country's economic transition to forest-friendly eco-entrepreneurial activity, rather than in destructive land uses such as oil palm, soya and cattle-ranching.⁷⁸ Multilateral donors could also 'play an additional catalytic role by issuing a forest bond themselves and helping to pump-prime the forest bond market', thereby creating an attractive new investment frontier.⁷⁹ It is advised that 'the investment proposition needs to be large and liquid to attract the largest investors', with issuers such as the governments of forest-rich countries thereby raising 'large-scale finance now that will be repaid by existing and anticipated future income'.⁸⁰ It is suggested that this income will derive from sources such as forest carbon revenue (which might include the advanced market value of emerging REDD+ credits for forest carbon, i.e., constituting 'REDD+ bonds'), ecosystem service markets, sustainable timber and agriculture and taxes.⁸¹ Whilst these proposals state that all 'stakeholders', including forest-dwelling peoples, should benefit appropriately, such proposals generate concerns regarding the transfer of forest conservation value to private investment capital and intermediaries. In particular, clarification is needed regarding what happens to this collateral in cases of default on payouts built into the bond, and corresponding fears of possible takeover and enclosure of this 'natural capital' by investors in such circumstances. The documents cited here are opaque on this point, asserting, for example, that '[i]f for any reason ... earmarked cash flows did

not arise, the issuer would draw on other [unspecified] financial resources to meet its obligations'.⁸²

Related proposals exist for communities in low-income nations to mortgage the environmental 'values' now associated with their land as collateral for affordable financial services provided by international investors in exchange for the conservation of mortgaged environments.⁸³ Questions again arise regarding who then possesses or has governing powers over the collateral (particularly in the case of default); how, exactly, greater indebtedness to the global monetary economy enhances local livelihoods; and how the pricing of local ecologies might intersect with other socially embedded environmental values.

World Bank economists have also considered the design of bond structures attractive to private investors in association with funding the conservation of specific charismatic species. 'Tiger Bonds', for example, have been proposed, again with the intention of frontloading future funds for subsequent repayment through the capitalisation of nature assets associated with tiger territories.⁸⁴ These assets might include future forest carbon revenues from the REDD+ mechanism as it plays out in such territories, or created through '[e]stablishing biodiversity as collateral for lending'.⁸⁵

(iv) Nature derivatives

As observed for the recently created market in carbon credits, the big money tends not to be in the credits themselves, but in bespoke over-the-counter (OTC) trades and derivatives markets in financialised products derived from these credits.⁸⁶ Derivatives are financial instruments that promise payments derived from bets on the future value of something, known as the 'underlying'.⁸⁷ Derivatives contracts permit businesses to 'hedge

against the occurrence of unpredictable adverse events'.⁸⁸ As such, they are associated with the construction and 'securitisation' of risk (including the risk of adverse environmental change) as a tradable commodity. They also permit speculative returns based on bets on the chances of the derivatives contract itself,⁸⁹ thus creating chimerical 'assets' that are decoupled from any underlying, but that nonetheless can have significant social and material effects. The use of derivatives to hide true liabilities was a key cause of the volatility associated with the recent and ongoing financial crisis, as acknowledged repeatedly in the final report of the US Financial Crisis Inquiry Commission.⁹⁰ It is surprising, then, to see derivatives described as '[f]inancial products used to minimise volatility of cash flows' and listed as amongst the 'risk mitigation tools' proposed for forest bonds.⁹¹

'Biodiversity derivatives' are a similarly perplexing proposition.⁹² The suggestion here is that markets be used to reduce the costs of conservation by applying derivatives to the risk of species extinction. The proposal is that 'governments issue modified derivatives contracts to sell species' extinction risk to market investors and stakeholders', thus providing incentives that take 'advantage of the market to reduce costs in conservation'.⁹³ It is argued that this will align the interests of conservationists, governments and landowners, by making species presence more valuable to landowners than modifying habitat through development. Contracts would be priced on current interest rates and the probability of a payout or default due to species decline below an agreed threshold. If triggered through species decline, the principal paid by investors would be made available for remediation and recovery of the species in advance of it being placed on an endangered species list. Biodiversity derivatives based on risk of species extinction would be akin to insurance derivatives 'issued with modifications to allow responsible action

to decrease the likelihood of the insured event' (i.e., decline or extinction of a species) so as to encourage 'social change that is incentivized through market forces'.⁹⁴ It seems perverse, however, to transform the value of species survival into a price whose rise or fall is entangled with bets on their susceptibility to irreversible loss, underscored by a calculus whereby species value rises with rarity, or greater risk of extinction. This is particularly so given broad views that gambling on prices creates 'heightened volatility',⁹⁵ coupled with a situation whereby derivative products can gain in value with enhanced volatility and vice versa.⁹⁶ Are price incentives that favour volatility desirable for biodiversity?

To date, as far as I am aware, there are few financial derivative products being traded specifically in units of conserved biodiversity. Nevertheless, as units of conserved or restored nature are leveraged as 'natural capital' in environmental markets, bonds and mortgages, these might also be linked with additional derived money-bearing products, as has occurred in markets for financial products derived from tradable carbon units.⁹⁷ Proposals such as biodiversity derivatives, for example, act to enhance ways in which environmental change, including the risk of species extinction and biodiversity decline, can become 'a speculative opportunity like any other in a market hungry for critical events'.⁹⁸ Unregulated and poorly understood trade in derivatives leveraged on the subprime mortgage market spiralled into a financial crisis and led to the foreclosure of the homes of many, even in the wealthy economy of the USA. It is unclear what the implications would be for livelihoods, landscapes and biodiversity if tradable products in conserved nature and debts leveraged on 'natural capital' in less developed countries were to become derived in this way; or how appropriate safeguards could be designed for what is an inherently opaque and poorly regulated area of finance.

CHAPTER FIVE

SOME CONCERNS

THE developments described above constitute significant inroads into the financialisation of biodiversity conservation, which add to heightened interest in the possibility for such choices to scale up financial resourcing for the sustenance of biodiversity. But these innovations are not without their problems. Here I focus on three areas of concern.

(i) Enhancing development-related harm

None of the above mechanisms would arise if there was no market demand for a monetised conserved nature. This raises paradoxes. Market demand here flows from the apparent unavoidability of development that is deleterious to nature health. The model is development-led: it requires ecological degradation in order for conservation units or credits to attain market value. This generates the conundrum whereby parameters of environmental health, including biodiversity, become more valuable as they become more scarce due, for example, to harmful development. Indeed, much of the domestic and international demand for marketable offsets that direct financial resources to aspects of environmental health is driven by growth in extractive and large-scale developments that are intrinsically harmful to environmental parameters such as biodiversity.⁹⁹ Offset structures thus may incentivise development-related environmental harm by increasing the

mechanisms whereby such harm can seemingly be offset. In so doing, they act to foster the illusion that environmentally harmful development enhances environmental health.

Tradable value, i.e., price, tends to be positively related to scarcity, such that the tradable value of conserved nature also rises in conjunction with its growing scarcity. This is alarming since in species and biodiversity terms, scarcity signals rarity and the risk of extinction. A simple illustration of this is the following statement promoting forward purchase of credits for 'candidate species' in US species banking markets: 'the buyer can save the credits for later use to meet offset requirements if and when the species is listed under the ESA'.¹⁰⁰ The logic here seems to be to encourage buyers to buy early in order to benefit from a later likely scheduling of a species, which in turn creates a perverse incentive for the conditions whereby a species may indeed need to be designated as threatened. The binding of dynamic, nonlinear and complex assemblages of species with the very different value-creating logics of capital thus may encourage something of an own goal: amplifying scarcity rather than abundance in aspects of nature health.

(ii) Enhancing inequity and associated drivers of biodiversity degradation

A key aspect of creating market-based approaches for conservation is the ability to purchase the permission to degrade environmental measures such as biodiversity in one location, through paying for the maintenance of a somehow equivalent 'piece' of environmental health elsewhere. This intentionally raises economic rents for land areas through the enhanced monetary values commanded by credit-bearing indicators of nature health at these sites. Rising economic rents tend to be accompanied by two connected phenomena: (1) an impetus to

appropriate and privatise new sources of rent value, in order to capture the financial income that might accrue from their sale on markets; and (2) financial speculation on newly 'rentable' assets, so as to push up their market value.

History tells us that these processes also tend to generate contexts whereby land, and today the newly 'valued' conservation entities associated with land areas, can become more valuable than the people on it. This is occurring in current land-grabbing for food and biofuel production, in which perceived scarcity, coupled with volatility in prices of agricultural commodities, is pricing out the poorest farmers from escalating markets for land rights.¹⁰¹ Communal and collective forms of land tenure are being displaced by formalised leasehold exchanges between governments and corporate investors for newly privatised tracts of land. The effects of this are to erode long-established mixed food production systems that feed cultures variously embedded in rural areas. Recent research claims that a similar land-grabbing dynamic is occurring for conservation or 'green' land values in which the corresponding raising of money rents for parameters of environmental health is pushing out poorer land users unable to either pay or command these rents.¹⁰² As new eco-monetary values materialise in markets and as collateral for loans, they can thus act to raise economic rents for land areas formerly under different forms of tenure, value and livelihood which thereby become altered and/or displaced.¹⁰³ To add insult to injury, conservation-related displacements sometimes are justified through framing long-term local land use practices, associated with current high biodiversity values, as environmentally degrading.¹⁰⁴

There are real issues here for biodiversity. Research suggests that economic *inequality* is a robust predictor of biodiversity loss.¹⁰⁵ Measurements of the Gini coefficient among countries

and among US states in conjunction with biodiversity parameters indicate a sustained 'connection between income inequality and biodiversity loss' even 'after controlling for biophysical conditions, human population size, and per capita GDP or income'.¹⁰⁶ One possible reason is that inequality may thwart the collective action required for the sustenance of public goods, making redistributive economic reform a prerequisite for effective conservation:

In general, unless current trends toward greater inequality are reversed, it may become increasingly hard to conserve the rich variety of the living world. Conversely, if we can learn to share economic resources more fairly with fellow members of our own species, it may help us to share ecological resources more fairly with our fellow species.¹⁰⁷

(iii) Can money adequately convey the value of living entities and complexes?

The financialisation currents identified above assume that money is a good conveyor of nature value. For many, this is already a step into a particular constructed way of understanding the world that is infused with ideologically driven assumptions. Money is a homogenising force, and financial products become attractive to investors to the extent that they are standardised: thus, '[t]he more standardised and commoditised a forest bond is, the more attractive it will be to institutional investors'.¹⁰⁸ The derivation of biodiversity-related financial products requires systemic simplifications of nature's complexity, to construct interchangeable metrics and proxies for biodiversity elements that are inherently *noninterchangeable*.¹⁰⁹ Simplifying and standardising measures have always been an imperial practice, through which what is measured is brought into the fold of colonising political, economic and management structures. Conversion of

bioculturally diverse and ecologically complex landscapes into numerical and monetised metrics is a way of instrumentalising peoples and nonhuman natures such that these conform to a homogenising system in which money is the mediator of all value. This is in tension with the different ecocultural systems associated with particular land areas, habitats and species assemblages, contributing to sometimes violent conflict as these value spheres become entangled.

CHAPTER SIX

CONCLUSION

WHEN the concerns discussed above are raised, they tend to be dismissed as ‘ideological opposition to markets’,¹¹⁰ without recognising that market-based and financialising policies are themselves ideological. They foster certain trajectories in the distribution of monetised wealth, and also tend towards particular separations between human and nonhuman natures which seem antithetical to global ecological integrity. And so, to those involved directly with designing and supporting such policies and associated products, I make a plea for you to pause and ask the following questions:

- How does the marketing and financialising of conserved nonhuman nature connect with a historical trajectory that consolidates capital, including ‘natural capital’, in the hands of a minority of people?
- How might these approaches further disrupt the self-sufficiency of communities, or break the relationships binding diverse species into resilient ecological assemblages?
- Do these ‘mechanisms’ enable us to live more gently, both with each other and with the mysterious diversity of species that are our companions here on earth?
- Are they respectful to our ancestors, and do they transfer the most socio-ecological diversity possible forwards to our descendants?

- Do they honour the life and sentience of living beings?
- And do they create space for listening to, and learning from, the diverse other ways of knowing and living with 'biodiversity' embodied by peoples who value things differently?

Finally, if you have read this far, it remains only for me to thank you for your attention.

Endnotes

- 1 Caughley, G. (1993), Elephants and economics. *Conservation Biology*, 7(4): 943-945.
- 2 Mathematician Benoit Mandelbrot speaks of *the wild randomness of markets* (see Mandelbrot, B. (2004), *The (Mis)behavior of Markets: A Fractal View of Risk, Ruin and Reward*. New York: Basic Books). And a special report on financial risk in *The Economist* (13 February 2010, p. 2) claims that '[i]f financial markets followed the normal distribution curve, in which meltdowns are very rare, the stockmarket crash of 1987, the interest rate turmoil of 1992 and the 2008 crash would be expected only once in the lifetime of the universe'.
- 3 As detailed in The Munden Project (2011), *REDD and Forest Carbon: Market-Based Critique and Recommendations*. <http://www.mundenproject.com/forestcarbonreport2.pdf>
- 4 All URLs were live at the time of writing in April 2012.
- 5 This question, written in exactly this way, is foregrounded in the promotional film for the Natural Capital Project (<http://www.naturalcapitalproject.org>), a collaboration between Stanford University, the World Wide Fund for Nature (WWF) and The Nature Conservancy (TNC). Available for viewing at <http://www.worldwildlife.org/sites/videos/nature-worth.html>
- 6 Secretariat of the Convention on Biological Diversity (2010), *Global Biodiversity Outlook 3*. <http://www.cbd.int/doc/publications/gbo/gbo3-final-en.pdf>
- 7 See <http://www.cbd.int/sp/targets/>
- 8 See <http://www.cbd.int/sp/>
- 9 Thus in March 2012 the CBD Secretariat and partners hosted a 'Dialogue Seminar' on biodiversity and finance with the intention of clarifying possibilities for resource mobilisation so as to inform the next COP in Hyderabad in October 2012 (see http://www.dialogueseminars.net/quito/quito_home.html). A proposal arising from this discussion is that the term 'innovative financing mechanisms' might in fact be avoided, precisely because it is unclear and rings alarm bells for many concerned with possible financialisation implications associated with the term 'innovative'. It was suggested that this might be replaced with the term 'biodiversity financing mechanisms' (see Farooqui, M.F. and Schultz, M. (2012), *Co-chairs' Summary of Dialogue Seminar on Scaling Up Biodiversity Finance, Quito 6-9 March 2012*. Montreal: Secretariat of the Convention on Biological Diversity. <http://www.dialogueseminars.net/resources/Quito/Report/Quito-report-8-April.pdf>, p. 32).
- 10 Costanza, R., d'Arge, R., de Groot, S., Farber, M., Grasso, B., Hannon, K., Limburg, S., Naeem, R., O'Neill, J., Paruelo, R., Raskin, R., Sutton, P. and van den Belt, M. (1997), The value of the world's ecosystem services and natural capital. *Nature*, 387: 253-260.

- 11 See, for example, Pearce, D.W., Markandya, A. and Barbier, E. (1989), *Blueprint for a Green Economy*. London: Earthscan; Pearce, D.W. and Turner, R.K. (1990), *Economics of Natural Resources and the Environment*. Hemel Hempsted: Harvester; Pearce, D.W. and Warford, J. (1993), *World Without End: Economics, Environment and Sustainable Development*. Oxford: Oxford University Press; Pearce, D.W. (1998), *Economics and the Environment*. Cheltenham: Edward Elgar.
- 12 <http://www.teebweb.org/>
- 13 Tholen, J., Mulder, I. and Howard, P. (2011), *Sustainable Insight: The Nature of Ecosystem Service Risks for Business*. Amsterdam: KPMG, Fauna & Flora International, UNEP FI. http://www.unepfi.org/fileadmin/documents/Sustainable_Insight_May_2011.pdf
- 14 UNEP FI (2010), *Demystifying materiality: hardwiring biodiversity and ecosystem services into finance*. Geneva: UNEP FI. http://www.unepfi.org/fileadmin/documents/CEO_DemystifyingMateriality.pdf, pp. 12-13.
- 15 This is a CEO-led global coalition of some 200 corporations in the industrial sector. Paradoxically (perhaps), its billionaire founder and current Honorary Chairman, Stephan Schmidheiny (former owner of the fibre cement company Eternit), was sentenced in February 2012 by an Italian court to 16 years in prison for 'deliberate and wilful failure to protect their employees and nearby residents from exposure to asbestos' (Peacock, M. (2012), Billionaire, baron get 16 years for asbestos deaths. ABC News Online. <http://www.abc.net.au/news/2012-02-14/billionaire-baron-get-16-years-for-asbestos-deaths/3828204>).
- 16 A network of firms assisting with corporate value creation through assurance, tax and advisory services, <http://www.pwc.com/gx/en/about-pwc/index.jhtml>
- 17 Described as 'a leading global provider of environmental, health, safety, risk, and social consulting services', <http://www.erm.com/About-Us/>
- 18 WBCSD (2011), *Guide to Corporate Ecosystem Evaluation*, online. <http://www.wbcd.org/work-program/ecosystems/cev.aspx>, p. 4, emphasis in original. Also see Hanson, C., Ranganathan, J., Iceland, C. and Finisdore, J. (2012), *Guidelines for identifying business risks and opportunities arising from ecosystem change*. Version 2.0. Washington: World Resources Institute.
- 19 <http://www.naturalcapitaldeclaration.org/>
- 20 World Bank Group (2012), *Toward a Green, Clean, and Resilient World for All: A World Bank Group Environment Strategy 2012-2022*. Washington: World Bank Group, pp. 48, 51. http://siteresources.worldbank.org/ENVIRONMENT/Resources/Env_Stratgy_2012.pdf; WAVES (2012), *Moving Beyond GDP: How to Factor Natural Capital into Economic Decision-Making*. Washington: The World Bank. <http://siteresources.worldbank.org/EXTSDNET/Resources/Moving-Beyond-GDP.pdf>

- 21 WAVES, *op. cit.*, p. 10; European Commission, Food and Agriculture Organisation, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations and World Bank (2012), *System of Environmental-Economic Accounting: Central Framework*. http://unstats.un.org/unsd/envaccounting/White_cover.pdf; UN (2012), *The System of Environmental-Economic Accounts (SEEA): Measurement Framework in Support of Sustainable Development and Green Economy Policy*. <http://unstats.un.org/unsd/envaccounting/Brochure.pdf>
- 22 Ranganathan, J., Irwin, F. and Procopé Repinski, C. (2009), *Banking on Nature's Assets: How Multilateral Development Banks Can Strengthen Development by Using Ecosystem Services*. Washington: World Resources Institute, online. <http://www.wri.org/publication/banking-on-natures-assets>, p. 5.
- 23 <http://www.un-redd.org/>
- 24 World Bank Group (2012), Modalities and procedures for financing results-based actions on REDD+. Submission to the UNFCCC secretariat, online. <http://unfccc.int/resource/docs/2012/smsn/igo/71.pdf>, pp. 1-2. Also see submissions by the UNFCCC Ad Hoc Working Group on Long-term Cooperative Action 'on modalities and procedures for financing results-based actions', for the 15th Session in Bonn 15-24 May 2012, <http://unfccc.int/resource/docs/2012/awgla15/eng/misc03.pdf>
- 25 World Bank (2011), Congo, Republic of – Forestry and Economic Diversification Project, AB6677, online. <http://documents.worldbank.org/curated/en/2011/06/14597637/congo-republic-forestry-economic-diversification-project>, p. 3.
- 26 *Ibid.*, p.13. The World Wide Fund for Nature thus is researching opportunities for biodiversity offsets to offset mining investments and impacts within the Republic of Congo (see http://wwf.panda.org/what_we_do/where_we_work/congo_basin_forests/wwf_solutions/extractives/oil_and_mineral_extraction/).
- 27 WBCSD, *op. cit.*, p. 4.
- 28 <http://www.unep.org/greeneconomy/>, on which see analysis by Brockington, D. (2012), A radically conservative vision? The challenge of UNEP's *Towards a Green Economy*. *Development and Change*, 43(1): 409-422.
- 29 DEFRA (2012), *Biodiversity offsetting pilots technical paper: the metric for the biodiversity offsetting pilot in England*. <http://www.defra.gov.uk/publications/files/pb13745-bio-technical-paper.pdf>
- 30 On which, see, for example, Spash, C. (2008), Ecosystems services valuation. *Socio-economics and the Environment in Discussion, CSIRO Working Paper Series*, <http://csiro.au/files/files/pjpp.pdf>; and Plummer, M.L. (2009), Accessing benefit transfer for the valuation of ecosystem services. *Frontiers in Ecology and the Environment*, 7(1): 38-45, online. <http://www.esajournals.org/doi/pdf/10.1890/080091>

- 31 Crowe, M. and ten Kate, K. (2010), *Biodiversity offsets: Policy options for governments. A draft for discussion*. Washington: BBOP Secretariat. <http://www.cbd.int/financial/doc/bbop-innovative-financial-mechanisms-2011-en.pdf>, p. 4.
- 32 See http://www.hm-treasury.gov.uk/consult_carbon_price_support.htm
- 33 Gartner, T., Donlan, J. and Mulligan, J. (2012), *'Candidate Species' Marketplace Can Help Protect Gopher Tortoise Habitat*. Washington: World Resources Institute, online. <http://insights.wri.org/news/2012/02/candidate-species-marketplace-can-help-protect-gopher-tortoise-habitat>
- 34 Climate Bonds Initiative (2009), Financing a rapid, global, transition to a low-carbon economy. Draft paper for discussion. http://climatebonds.net/wp-content/uploads/2009/12/climate_bonds_28Dec09.pdf, pp. 2, 4.
- 35 See analysis in Perrot-Maitre, D. (2006), The Vittel payments for ecosystem services: a 'perfect' PES case? London: International Institute for Environment and Development (IIED), online. <http://www.katoombagroup.org/documents/tools/TheVittelpaymentsforecosystemservices2.pdf>
- 36 *Ibid.*, p. 18.
- 37 Corbera, E., Brown, K. and Adger, W.N. (2007), The equity and legitimacy of markets for ecosystem services. *Development and Change*, 38(4): 587-613, pp. 608, 588.
- 38 cf. Vatn, A., Barton, D.N., Lindhjem, H., Movik, S., Ring, I. and Santos, R. (2011), Can markets protect biodiversity? An evaluation of different financial mechanisms. *Noragric Report*, 60. http://www.umb.no/statisk/noragric/publications/reports/2011_nor_rep_60.pdf; Fletcher, R. and Breitling, J. (2011), Market mechanism or subsidy in disguise? Governing payment for environmental services in Costa Rica. *Geoforum*, doi:10.1016/j.geoforum.2011.11.008.
- 39 See extensive discussion in Vatn *et al.*, *op. cit.*
- 40 See, for example, the Business and Biodiversity Offsets Programme (BBOP) (2009), *Biodiversity offset design handbook*. Washington: BBOP, online. http://www.forest-trends.org/documents/files/doc_3126.pdf, p. 3. Also see: ten Kate, K. (2003), Biodiversity offsets: mileage, methods and (maybe) markets. Background paper for discussion at Katoomba VI private meeting. Insight Investment, online. http://www.forest-trends.org/documents/files/doc_659.pdf; 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, online. <http://cmsdata.iucn.org/downloads/bdoffsets.pdf>, pp. 9-10. The BBOP has recently published guidelines for the instituting of voluntary business standards for biodiversity offsets; see BBOP (2012), *Standard on Biodiversity Offsets*. Forest Trends, online. http://www.forest-trends.org/documents/files/doc_3078.pdf

- 41 On which, see the US Environmental Protection Agency's 'mitigation fact sheet' at <http://www.epa.gov/owow/wetlands/facts/fact16.html>, and the National Mitigation Banking Association website at <http://www.mitigationbanking.org/>. For in-depth analyses of wetland mitigation banking, see Morgan Robertson's work, for example: Robertson, M.M. (2006), The nature that capital can see: science, state, and market in the commodification of ecosystem services. *Environment and Planning D: Society and Space*, 24: 367-387, online. <http://www.envplan.com/abstract.cgi?id=d3304>; Robertson, M.M. (2011), Measurement and alienation: making a world of ecosystem services. *Transactions of the Institute of British Geographers*, doi: 10.1111/j.1475-5661.2011.00476.x.
- 42 <http://www.speciesbanking.com/>
- 43 <http://www.defra.gov.uk/environment/natural/biodiversity/uk/offsetting/>
- 44 See Gartner *et al.*, *op. cit.*
- 45 Pawliczek, J. and Sullivan, S. (2011), Conservation and concealment in SpeciesBanking.com, US: an analysis of neoliberal performance in the species offsetting industry. *Environmental Conservation*, 38(4): 435-444. Themed Issue on Payments for Ecosystem Services, p. 439.
- 46 eftec, IEEP *et al.* (2010), *The use of market-based instruments for biodiversity protection – The case of habitat banking – Technical Report*, online. <http://ec.europa.eu/environment/enveco/index.htm>, p. 9.
- 47 See Robertson, M. and Hayden, N. (2008), Evaluation of a market in wetland credits: entrepreneurial wetland banking in Chicago. *Conservation Biology*, 22(3): 636-646.
- 48 DEFRA (2011), *Biodiversity offsets technical paper: proposed metric for the biodiversity offsetting pilot in England*. London: DEFRA, online. <http://archive.defra.gov.uk/environment/biodiversity/offsetting/documents/110714offsetting-technical-metric.pdf>, p. 10.
- 49 *Ibid.*, pp. 9, 11; Kett, H. (2011), Ensuring mitigation by insuring banks. Online. http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=8802§ion=biodiversity_market&eod=1
- 50 Gartner *et al.*, *op. cit.*
- 51 Caldecott, B. and Dickie, I. (2011), *Habitat Banking: Scaling Up Private Investment in the Protection and Restoration of Our Natural World*. London: eftec and Climate Change Capital. <http://www.climatechangecapital.com/media/3696/Habitat%20Banking.pdf>
- 52 <http://mmearth.com>
- 53 <http://missionmarkets.com/>
- 54 <http://mmearth.com/about/what-we-do/>
- 55 The Ends Report (2012), Trading platform for biodiversity offsets launched. *The Ends Report*, 16 February 2012, online. <http://www.endsreport.com/32603/trading-platform-for-uk-biodiversity->

- offsets-launched; The Environment Bank (2012), Environment Bank and Mission Markets launch online conservation credit platform. Press release, 14 February 2012, online. <http://www.environmentbank.com/docs/Environment%20Bank-Mission%20markets%20release%20feb2012.pdf>.
- 56 See, for example, Briggs, B.D.J., Hill, D.A. and Gillespie, R. (2009), Habitat banking: how it could work in the UK. *Journal for Nature Conservation*, 17: 112-122.
- 57 <http://www.environmentbank.com>
- 58 <http://www.shellfoundation.org/>, the UK registered charity of the energy and petrochemical conglomerate <http://www.shell.com/>
- 59 The Ends Report (2011), Environment Agency backs 'biobanking' trading scheme. *The Ends Report*, 3 May 2011, online. <http://www.endsreport.com/28553/environment-agency-backs-biobanking-trading-scheme>; The Environment Bank (2011), Environment Agency partners with The Environment Bank to create Eco Markets for coastal flood management and habitat banking. Press release, 7 April 2011, online. <http://www.environmentbank.com/docs/Environment-Agency-partners-with-Environment-Bank-April-2011.pdf>
- 60 The Environment Bank (2012), *op. cit.*, pp. 1-2.
- 61 <http://ekoamp.com>
- 62 <http://ekoamp.com/approach/>
- 63 <http://terraglobalcapital.com/Funds.htm>
- 64 <http://www.ecosystempartners.com/>
- 65 Although, of course, for many it is still a stretch too far to create equivalence between industrial emissions and the carbon stored in long-evolved and diverse assemblages of species in forests such that this carbon can be accounted for in market mechanisms including the Clean Development Mechanism (CDM) and REDD+.
- 66 Thus, '[t]otal GHG [greenhouse gas emissions] for 2010 are estimated to have increased by more than 6 per cent, a historical record' (Hoffman, U. (2011), Some reflections on climate change, green growth illusions and development space. *Discussion Paper* 205. Geneva: United Nations Conference on Trade and Development (UNCTAD)); and the World Bank Group reports that 'we are currently on a path towards an average global temperature rise of 3-4°C (in the best case scenario with current pledges), which by far exceeds the 2°C goal of the UNFCCC framework' (World Bank Group (2012), *Toward a Green, Clean, and Resilient World for All*, *op. cit.*, p. 30).
- 67 <http://climatebonds.net/>
- 68 Climate Bonds Initiative, *op. cit.*; Kerste, M., Weda, J. and Rosenboom, N. (2010), *Innovations in Financing Environmental and Social Sustainability: Literature Overview*. Amsterdam: Duisenberg School of Finance and Holland Financial Centre. <http://www.seo.nl/en/page/article/innovations-in-financing-environmental-and-social-sustainability/>

- 69 The first bond linked in part with future market prices in Certified Emissions Reductions (CERs) ‘and the actual versus estimated delivery of CERs that will be generated by a hydropower plant located in the Guizhou Province in China’. See: <http://treasury.worldbank.org/cmd/htm/CO2LBond.html>
- 70 Designed with Netherlands banking conglomerate ABN AMRO (<http://www.abnamro.com>), ‘Eco Bonds’ were issued in 2007 and are comprised of coupons that are ‘linked to an equity index, the ABN AMRO Eco Price Return Index, comprised of companies that produce alternative forms of energy, engage in water and waste management, or are involved in the production of catalysts used to reduce pollution’ (see: <http://treasury.worldbank.org/cmd/htm/Eco3PlusNoteInaugural.html>).
- 71 Designed with Skandinaviska Enskilda Banken, ‘the top bank for large corporate clients and financial institutions for the entire Nordic region’ (<http://sebgroun.com/pow/wcp/sebgroun.asp>), Green Bonds have been issued by the World Bank Treasury since 2008 to encourage ‘fixed income investors to support World Bank lending for eligible projects that seek to mitigate climate change [including through avoided deforestation] or help affected people adapt to it’ (World Bank Treasury (2012), *Green Bond Fact Sheet*. <http://treasury.worldbank.org/cmd/pdf/WorldBankGreenBondFactSheet.pdf>, p. 1; also see: <http://treasury.worldbank.org/cmd/htm/WorldBankGreenBonds.html>).
- 72 As described by fund manager Matthew Kiernan, former Director of the World Business Council for Sustainable Development, in *Investing in a Sustainable World: Why Green Is the New Colour of Money on Wall Street* (2009, New York: Amacom). Kiernan is founder of Inflection Point Capital Management (IPCM), which compiles and manages a proprietorial database to provide information on companies’ sustainability performance to investors (see <http://www.inflectionpointcm.com>).
- 73 <http://www.worldwildlife.org>
- 74 <http://www.globalcanopy.org/>
- 75 <http://www.goldmansachs.com/>
- 76 <http://www.lombardodier.com/en/>
- 77 Cranford, M., Henderson, I.R., Mitchell, A.W., Kidney, S. and Kanak, D.P. (2011), *Unlocking Forest Bonds: A High-Level Workshop on Innovative Finance for Tropical Forests*. WWF Forest and Climate Initiative, Global Canopy Programme and Climate Bonds Initiative. <http://www.globalcanopy.org/materials/unlocking-forest-bonds>, p. 5. Also see Cranford, M., Parker, C. and Trivedi, M. (2011), *Understanding Forest Bonds: A Guide to Raising Up-front Finance for Tropical Forests*. Oxford: Global Canopy Programme. http://www.globalcanopy.org/sites/default/files/UnderstandingForestBonds_0.pdf
- 78 Cranford, Henderson, Mitchell, Kidney and Kanak, *op. cit.*, pp. 6-7, 12, 14, 23.

- 79 *Ibid.*, pp. 7, 12.
- 80 *Ibid.*, p. 6.
- 81 *Ibid.*, pp. 6, 15. The possibilities of adding tradable REDD credits from developing countries to the portfolios of private equity timber management organisations (TIMOs) in the US and elsewhere is also already being discussed. See PEI Media (2010), *Investing in Timberland: A Comprehensive Intelligence Source for Investors, Fund Managers and Advisers Focused on Forestry and Commercial Woodland*. London: PEI Media. <http://www.peimedia.com/timberland>
- 82 Cranford, Henderson, Mitchell, Kidney and Kanak, *op.cit.*, p. 14.
- 83 See, for example, Donlan, C.J. (2009), Why environmentalism needs high finance. http://seedmagazine.com/content/article/why_envronmentalism_needs_high_finance/; and Mandel, J.T., Donlan, C.J., Wilcox, C., Cudney-Bueno, R., Pascoe, D. and Tulchin, D. (2009), Debt investment as a tool for value transfer in biodiversity conservation. *Conservation Letters*, 2(5): 233-239.
- 84 Kiess, J. (2009), *Innovative Sustainable Finance for the Global Tiger Initiative*. The World Bank. <http://www.globaltigerinitiative.org/download/huahin/GTI-Innovative-Finance-Hua-Hin.pdf>
- 85 *Ibid.*, p. 24. Not to be confused with Treasury Investors Growth Receipts (TIGR), also known as 'Tiger Bonds', which are 'a type of zero-coupon bond originally issued by the US Treasury' and 'do not pay interest over time, but instead are sold at a severe discount and, once mature, pay out at the full market price they had when issued', http://www.ehow.com/info_7793057_tiger-bonds.html
- 86 The Munden Project, *op. cit.*
- 87 Stulz, R.M. (2005), Demystifying financial derivatives. *Milken Institute Review*, Third Quarter: 20-31, p. 20.
- 88 Cooper, M. (2010), Turbulent worlds: financial markets and environmental crisis. *Theory, Culture & Society*, 27(2-3): 167-190, p. 177.
- 89 *Ibid.*, p. 177.
- 90 Published in 2011 and online here: <http://cybercemetery.unt.edu/archive/fcic/20110310173538/http://www.fcic.gov/report>. Also see investment broker Graham Summers on 'Why derivatives caused financial crisis' (2010), <http://seekingalpha.com/article/198197-why-derivatives-caused-financial-crisis>
- 91 Cranford, Henderson, Mitchell, Kidney and Kanak, *op. cit.*, p. 17.
- 92 Mandel, J., Donlan, C.J. and Armstrong, J. (2010), A derivative approach to endangered species conservation. *Frontiers in Ecology and the Environment*, 8(1): 44-49. See critique in Raffensberger, J.F. and George, J.A. (2009), *A Touching Belief in the Market: Comment on 'A Derivative Approach to Endangered Species Conservation'*. http://www.mang.canterbury.ac.nz/people/jfraffen/CV_and_refs/Raffensberger%20&%20George,%20A%20Touching%20Belief%20in%20the%20Market.pdf

- 93 Mandel, Donlan and Armstrong, *op. cit.*, p. 44.
- 94 *Ibid.*, pp. 45-46.
- 95 Strange, S. (1998), What theory? The theory in Mad Money. CSGR Working Paper. <http://www2.warwick.ac.uk/fac/soc/csgr/research/workingpapers/1998/wp1898.pdf>, p. 17; Mandelbrot, *op. cit.*
- 96 Mackenzie, D. and Millo, Y. (2003), Constructing a market, performing theory: the historical sociology of a financial derivatives exchange. *American Journal of Sociology*, 109(1): 107-145.
- 97 See trade in carbon units on the Intercontinental Exchange (ICE) (<https://www.theice.com/emissions.jhtml>).
- 98 Cooper, *op. cit.*, p. 177.
- 99 For an example of how demand for biodiversity offsets is arising to seemingly mitigate the very significant environmental effects of uranium extraction and power production, see Sullivan, S. (2012), After the green rush? Biodiversity offsets, uranium power, and the 'calculus of casualties' in greening growth. <http://tinyurl.com/sullivan-offsets-uranium>
- 100 Gartner *et al.*, *op. cit.*
- 101 As documented by Olivier De Schutter, the UN Special Rapporteur for Food, in De Schutter, O. (2011), The green rush: the global race for farmland and the rights of land users. *Harvard International Law Journal*, 52(2): 503-559, online. http://www.harvardilj.org/wp-content/uploads/2011/07/HILJ_52-2_De-Schutter.pdf.
- 102 As highlighted in a recent special issue of the *Journal of Peasant Studies* entitled 'Green grabbing: a new appropriation of nature?', edited by Fairhead, J., Leach, M. and Scoones, I. (2012), the introductory paper for which is online here: <http://www.tandfonline.com/doi/pdf/10.1080/03066150.2012.671770>
- 103 Tyrrell, T.D. and Alcorn, J. (2011), *Analysis of Possible Indicators to Measure Impacts of REDD+ on Biodiversity and Indigenous and Local Communities: A Report to the Convention on Biological Diversity*. CBD SBSTTA 16 Information Document UNEP/CBD/SBSTTA/16/INF/21. Montreal: Tentera. <http://tentera.org/wp/wp-content/uploads/2012/04/sbstta-16-inf-21-en.pdf>
- 104 For recent examples see, for example: Beymer-Farris, B.A. and Bassett, T.J. (2011), The REDD menace: resurgent protectionism in Tanzania's mangrove forests. *Global Environmental Change*, doi:10.1016/j.gloenvcha.2011.11.006; Seagle, C. (2012), Inverting the impacts: mining, conservation and sustainability claims near the Rio Tinto/QMM ilmenite mine in Southeast Madagascar. *Journal of Peasant Studies*, 39(2): 447-477; Benjaminsen, T.A. and Bryceson, I. (2012), Conservation, green/blue grabbing and accumulation by dispossession in Tanzania. *Journal of Peasant Studies*, 39(2): 335-355.
- 105 Mikkelsen, G., Gonzalez, A. and Peterson, G.D. (2007), Economic inequality predicts biodiversity loss. *PLoS ONE*, 2(5): e444,

doi:10.1371/journal.pone.0000444. <http://www.plosone.org/article/info:doi%2F10.1371%2Fjournal.pone.0000444>

106 *Ibid.*

107 *Ibid.*

108 Cranford, Henderson, Mitchell, Kidney and Kanak, *op. cit.*, p. 12.

109 Discussed further in Walker, S., Brower, A.L., Theo Stephens, R.T. and Lee, W.G. (2009), Why bartering biodiversity fails. *Conservation Letters*, 2: 149-157, p. 150. <http://www.bushlinks.com/Biodiversity%20reference%20docs/Walker%20et%20al%202009%5B1%5D.pdf>

110 E.g., Cranford, Henderson, Mitchell, Kidney and Kanak, *op. cit.*, p. 24.

FINANCIALISATION, BIODIVERSITY CONSERVATION AND EQUITY: SOME CURRENTS AND CONCERNS

Present high rates of biodiversity loss have directed attention towards market-based mechanisms that seek to create tradable financial assets out of species and ecosystems. This 'financialisation' is said to encourage biodiversity conservation by incorporating monetised ecological values into economic decision-making.

This paper explores how financialisation of conservation is made possible through the monetisation of nature and the establishment of environmental markets. It surveys the latest developments in this field, which encompass esoteric financial instruments such as forest bonds, species credits and biodiversity offsets.

The paper cautions that these innovations should not blind conservation advocates to the dangers of financialisation, which include perverse incentives for ecological harm. More fundamentally, the value of biodiversity, and the complexity of nature, cannot be conserved simply by conveying and incorporating these in monetary terms, although this indeed may facilitate their inequitable capture as 'natural capital'. Instead, as the author suggests, both ecology and ethics call for recognition and restitution of 'the diverse other ways of knowing and living with "biodiversity" embodied by peoples who value things differently'.

SIAN SULLIVAN is a Senior Lecturer in Environment and Development at the Department of Geography, Environment and Development Studies, Birkbeck College, University of London.

TWN ENVIRONMENT & DEVELOPMENT SERIES

is a series of papers published by Third World Network on the increasing challenges to the relationship between the environment and development, in particular those posed by the process of globalisation, liberalisation and new technologies. It aims to advance a Third World perspective of analyses, strategies and proposals for reforms of policy, practice and institutions, at both the international and national levels – towards greater social justice, equity and ecological sustainability.

ISBN 978-967-5412-69-1

