Using Carbon Investment to Grow the Biodiversity Bank

SARAH A. BERKESSY* AND BRENDAN A. WINTLE†

*School of Global Studies, Social Science and Planning, RMIT University, GPO Box 2476V, Melbourne 3001, Australia, email sarah.bekessy@rmit.edu.au

†School of Botany, University of Melbourne, Victoria 3010, Australia

Introduction

The fervor with which carbon initiatives are being adopted (Capoor & Ambrosi 2007) presents a unique opportunity to restore biodiversity while creating new financial and marketing incentives for investors. We argue that current approaches to carbon offsetting that rely largely on investment in monoculture plantations will rapidly lose appeal as the public becomes aware of their dubious carbon benefits (Guo & Gifford 2002; Glenday 2006) and the related environmental and social harm that they may bring (Jackson et al. 2005; Lamb et al. 2005). Here we describe a scheme that is more robust to uncertainty about carbon sequestration and is guaranteed to have broad environmental benefits, including restoration of degraded natural systems and endangered species habitats. The proposed scheme provides a mechanism for investing in the world's most threatened ecosystems that makes carbon, biodiversity, and financial sense. The idea is simple: investors should be allowed to reap the dual benefits of carbon and biodiversity credits from one parcel of land and those credits could later be traded on the relevant markets. Current approaches place investors' hopes in future carbon and timber values that may be risky given available evidence about the real sequestration value of short-rotation plantations (Guo & Gifford 2002) and the rapid rise in monoculture plantations (FAO 2005), which could lead to a reduction in demand and a slowing of the plantation timber market. Investors risk massive losses if the carbon benefits are proven to be dubious or if the market for plantation timber falters. A diverse portfolio of carbon and biodiversity investment makes more sense for investors and the environment.

The Policy Context

In May 2007 Rupert Murdoch declared that News Corporation would be carbon neutral across all of its businesses by 2010, committing to reducing and offsetting its greenhouse gas emissions. This follows commitments by the World Bank Group, Formula One, and VirginBlue, to name just a few big players. Together with the offsets funded by governments and individuals, the carbon market is shaping up as a very big business proposition (Capoor & Ambrosi 2007), and the acquisition of carbon offsets will be the biggest financial investment in the environment sector to date. This heralds a new era in environmental management and presents an important opportunity to address the biodiversity crisis (Western 1992). The key to maximizing biodiversity benefits lies in integrating biodiversity and carbon initiatives. Allowing carbon offsetters to accrue biodiversity credits when the biodiversity benefits of a carbon-sequestration project can be demonstrated will encourage carbon investors to favor biodiversity-friendly carbon-offset schemes.

Carbon-Offsetting Schemes

Carbon-offsetting schemes typically fall into 2 categories: reduction of further emissions through energy efficiency or renewable-energy initiatives, and sequestration of carbon through tree planting (biosequestration). Although reducing emissions is critical to addressing climate change, biosequestration is the only way to reduce atmospheric carbon and turn the clock back on climate change. On the whole, carbon biosequestration schemes,

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as they currently operate, provide little biodiversity benefit, largely because tree plantations are often more akin to an agricultural crop than a forest (Kanowski et al. 2005). In some instances the establishment of plantations comes at the cost of missed opportunities for biodiversity restoration, for example, planting monocultures of nonnative species on former agricultural land that may have reverted to native vegetation cover if left alone. Plantation establishment can also have substantially negative impacts on biodiversity, for example, when native vegetation is cleared to establish plantations (Noss 2001). Obtaining carbon credits for clearing native vegetation and planting nonendemic species (Ban van Wesemael 2001; Niesten et al. 2002; Orlando et al. 2002) is a potentially perverse outcome of carbon-trading schemes that must be guarded against in the evolution of carbon-trading rules. As it currently stands, the Kyoto Protocol may well be contributing to biodiversity loss by exacerbating deforestation and forest degradation in developing countries (Niesten et al. 2002).

The Biodiversity Bank

Biodiversity banking is emerging as one of the key mechanisms for managing the world's biodiversity crisis (ten Kate et al. 2004; Blundell 2006). This framework encourages a market-based approach to valuing and trading vegetation loss and gain. Under a biodiversity banking framework, clearing of native vegetation may be allowed if offsets are established elsewhere in the landscape (e.g., wetland trading in the United States [Reppert 1992]; biobanking in Australia [Department of Environment and Conservation 2005]). Banked biodiversity credits (i.e., habitat created above and beyond "duty of care" [Bryan et al. 2005]) may be bought or sold on an established market. Accrued investments could be sold to a party wishing to liquidate an equivalent amount and quality of vegetation elsewhere in the landscape. The way that ecological principles are incorporated into such schemes will be crucial to their success or failure and must be carefully considered (Gibbons & Lindenmayer 2007). The ecological equivalence, spatial arrangement, and irreplaceability of habitats will be central to the development of a coherent biobanking scheme. Land-use management practices likely to maintain biodiversity and ecological functioning with climate change (Noss 2001) would also need to be considered. Owing to substantial uncertainties about the way in which planted biodiversity assets mature (Morris et al. 2006; Esty 2007), it has been proposed that, at least to begin with, the biodiversity bank should be a savings bank (S.A.B. et al., unpublished data). This amounts to requiring the value of biodiversity assets (savings) be demonstrated before they can be used as an offset to loss of biodiversity elsewhere.

Motivation for Investing in the Biodiversity Bank

Deforestation is a primary driver of biodiversity loss, and it currently outweighs afforestation by 2 to 1. It is estimated that the deforestation rate is approximately 13 million ha/year, whereas afforestation is thought to be occurring at only 7 million ha/year (FAO 2005), and only a very small proportion of afforestation would be considered primary habitat with anything like the biodiversity value of the 13 million ha being lost every year. It is unlikely that the biodiversity bank alone will contribute substantially to reversing land clearance and the biodiversity crisis. Investment and trading on the biodiversity bank is likely to be slow (Fox & Nino-Murcia 2005) unless it can be linked to a more vigorous market such as the carbon market. The BioCarbon Fund (McDowell 2002) recognized the carbon sequestration advantages of biodiversity-focused projects, but relies on funding from the World Bank. We argue that the biodiversity bank could be funded through private investment at a much higher rate by linking it to the carbon bank. This will serve a range of biodiversity benefits, such as stimulating investment in restoration research and increasing the financial value and research profile of ecosystems that are important for developers.

But why would carbon investors want to invest in the biodiversity bank when in many instances carbon credits can be gained along with financial returns on plantation harvests (Brown et al. 2000)? We believe there are 2 basic reasons: public relations and investment risk spreading. Public relations gains are most simply envisaged. The big-player carbon offsetters described earlier tend to be companies with significant public profiles, for whom image is everything. On top of whatever financial gains they can make from trading the biodiversity credits they accrue, we foresee major public relations bonuses for companies who can advertise their dual role in saving us from climate change and threatened species from extinction. Conversely, this approach avoids the potential for bad press through attacks on schemes that simply invest in existing plantation projects (Total Environment Centre 2007).

Hard-nosed economic arguments for diversifying investment portfolios to include a biodiversity bank component require some substantial modeling and may not crystallize until the rules of biodiversity banking and carbon trading are set. Nevertheless, there are some compelling reasons to suggest that such a diversification will be a robust strategy. For example, there is conjecture in the scientific literature about the benefits of carbon sequestration arising from short-rotation plantation establishment that involve regular soil disturbance (Guo & Gifford 2002; Grandy & Robertson 2007). A multitude of uncertainties will influence the ability of a plantation project to sequester carbon (de Jong 2001), including the

climatic conditions (Conant et al 2001) and history (Guo & Gifford 2002) of the site, choice of silviculture (Johnson & Curtis 2001), life span of the product (Seidl et al 2007), and future impact of climate change on dynamics of the system (Hamilton et al. 2002). Furthermore, there is evidence to support the allocation of higher carbon sequestration credits to growers of permanent indigenous forests than to those of short-rotation plantations. In a meta-analysis of the influence of land use on soil carbon stocks, Guo and Gifford (2002) found that conversion from other land uses to native forest has the most promising carbon sequestration benefits. More recent studies support these findings (e.g., Glenday 2006; Grandy & Robertson 2007; de Jong et al. 2007). Even native grasslands are effective carbon sinks (Conant et al. 2001). The negative consequences of exotic monoculture tree plantations to the water cycle (Jackson et al. 2005) and other ecological goods and services (Lamb et al. 2005) present another motivation for planting species adapted to the local conditions of a site. That combined with uncertainties about the future demand for wood pulp given rapid growth in plantation establishment (FAO 2005) may make the biodiversity bank an appealing and relatively secure investment option.

Designing the Carbon Market to Support Biodiversity Initiatives

As it is currently specified under the Kyoto protocol, the carbon market presents little prospect of contributing substantially to biodiversity conservation (Niesten et al. 2002). The Kyoto protocol identifies land-use, land-use change, and forestry options that allow countries to meet their emissions-reduction obligations. Such options may perversely encourage damaging practices, such as clearance of native vegetation for plantations (Niesten et al. 2002). Carbon accounting under Kyoto must be revised to remove incentives that could exacerbate the biodiversity crisis and to ensure that appropriate credit is given to activities that restore native vegetation. Some key issues that need to be examined include accounting for the carbon emissions associated with deforestation (Niesten et al. 2002), incorporating soil carbon dynamics in accounting schemes (Johnson & Curtis 2001), considering nonforest ecosystems (Koziell & Swingland 2002), and greater acknowledgement of the uncertainties in carbon-sequestration projects (de Jong 2001). Without careful consideration of the implication of carbon-offsetting rules, it is unlikely that biodiversity-friendly schemes will be competitive.

Many activities that offset carbon occur outside the Kyoto protocol and often lack a framework of formal accreditation (Total Environment Centre 2007). Such schemes require a formal accreditation framework, such as those in place for forest-management standards (FSC 1996) to ensure best practice and avoid sequestration strategies that damage biodiversity. Establishing an accreditation system for carbon-offsetting projects could mainstream the inclusion of biodiversity issues in accounting methods, although quality information on the capacity of native vegetation to sequester carbon under a variety of conditions will be required.

Conclusion

The convergence of schemes to sequester carbon and conserve biodiversity present an opportunity to revolutionize environmental management. If correctly harnessed, the power of carbon initiatives could fuel a major biodiversity renaissance. An important step in encouraging investment in biodiverse vegetation restoration will be to allow investors to simultaneously accrue carbon and biodiversity credits from the one parcel of land. Currently, there is little scope in the sequestration market for rewarding actions other than soaking up carbon. Although the economic arguments for and against investment in the biodiversity bank must be fleshed out, there is plenty of motivation for conservation scientists to encourage a rigorous examination of the detail, including an exploration of the costs and benefits of various sequestration strategies. Likewise, investors who are funding the establishment of biodiversity-useless and carbon-dubious plantations may be happier in the knowledge that their investments are contributing to broader environmental outcomes, such as saving endangered species. Ultimately, they may end up with both a warm heart and a bulging biodiversity bank account.

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