doi: 10.1111/emr.12001

The integration of biodiversity and climate change: A contextual assessment of the carbon farming initiative

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Summary The Carbon Farming Initiative (CFI) allows the creation of tradable Australian Carbon Credit Units (ACCUs) derived from across the ecosystem sector via project-level baseline and credit activities: it is the first national offset scheme in the world to broadly include farming and forestry projects. Because these activities have the potential to produce both biodiversity and climate change benefits, a crucial outcome is for widespread uptake of the policy. However, the design, complexity and cost of the CFI project development process, and low prices as a result of ACCUs trading in the voluntary market, will all likely militate against this. This article shows how international politics and policy surrounding the Kyoto Protocol have influenced the design of the CFI, with its potential to proliferate complex and narrow methodologies and counter-productive approaches to integrity standards such as permanence. The article shows that despite the pressing need to integrate biodiversity and climate change considerations as equally important challenges, their global integration remains poorly articulated. Biodiversity considerations are also not integrated into the CFI but, rather, are dealt with indirectly through safeguard measures that avoid perverse incentives and unintended harm, and as an optional co-benefit via the development of an index. This article suggests that we need to move past the shackles of Kyoto towards streamlined and standardized approaches such as risk-based assessments and the use of regional baselines. Using regionally specific baselines such as for avoided deforestation would allow landholders to opt-in to regional-scale mitigation opportunities. Activities that Australia accounts for, such as reforestation and deforestation, should also be able to opt-in for coverage under the Clean Energy Act (and out of the voluntary carbon market) to obtain a secure price.

Key words: *additionality, agricultural landscape, biodiversity conservation, climate change, habitat restoration, permanence, policy.*

Australia's Carbon Farming Initiative

The Carbon Faming Initiative (CFI) is the first national offset scheme in the world to include carbon credits derived broadly from the ecosystem sector, including farming, landfill and forestry projects. This article investigates the global context and history of this policy, which informs how biodiversity considerations are dealt with in the CFI, and how this policy could evolve to help restoration and biodiversity outcomes on the land.

The Objectives of the CFI are to help Australia meet its obligations under the Kyoto Protocol; to create incentives for people to undertake land sector abatement; and to do that in a manner consistent with protecting Australia's environment (Commonwealth of Australia 2011).

It works in conjunction with Australia's Clean Energy Act and accompanying legislative package, but trades in the voluntary market. The CE Act establishes an emissions trading scheme, starting on 1 July 2012.

The CE Act imposes obligations on the nation's biggest polluters to reduce greenhouse gas emissions through the surrender of tradable permits or the use of domestic or international offset projects (CMI 2011). Emissions from the land sector are not covered by the Scheme, but instead the land sector is permitted the opportunity to generate tradable carbon credits called Australian Carbon Credit Units (ACCUs) under the CFI.

Carbon Farming Initiative offsets are generated from project-level baseline and credit activities. They are differentiated into sequestration and emissions avoidance projects (Commonwealth of Australia 2012). Those derived from sequestration projects involve the sequestration of carbon dioxide in vegetation and soil and avoidance of carbon dioxide emissions from the disturbance of soil or vegetation. Emissions avoidance projects are those that derive from avoidance of methane and nitrous oxide emissions from agriculture and feral animals.

The meanings of the definitions used in the CFI are derived from accounting commitments under the Kyoto Protocol (United Nations 1998). Annex B countries (developed countries) committed, for instance, to accounting for afforestation, reforestation and deforestation during the first commitment period 2008. Accounting for forest management, revegetation, cropland management and grazing land management is voluntary, and Australia elected

not to count these towards its Kyoto obligations.

Australian Carbon Credit Units are, accordingly, of two kinds, those that are Kyoto consistent and those that are not. Kyoto-consistent ACCUs include reforestation, reduction in nitrous oxide emissions from fertilizer use and managing methane emissions from piggeries and dairies. Non-Kyoto-consistent ACCUs include soil carbon and improved forest management. Only Kyoto-consistent ACCUs are eligible for trade within compliance schemes such as the CE Act. Non-Kyoto ACCUs can only be used in voluntary markets or in domestic Government programmes. Kyoto ACCUs can be exchanged for Kyoto units and sold to foreign buyers. Australia would not be able to count these units towards its Kyoto accounts.

The CFI project development process is complex, and involves a number of steps and processes, each with their own complexity. Before a project can be developed to generate ACCUs, a methodology for the project type must be approved through the statutory Domestic Offset Integrity Committee. Once there is a methodology, the processes to implement a project include: becoming a recognized offset entity; opening a registry account; becoming an eligible offset project; undertaking a project according to approved methodologies; submitting regular audit reports; and applying for ACCUs and having them issued.

Rigorous 'integrity standards' are required to guarantee genuine abatement and include proving additionality, leakage considerations and permanence obligations of 100 years for sequestration projects. Additionality means that activities must demonstrate emissions reduction that would not otherwise have happened, for example, avoided deforestation as a direct result of the CFI. Leakage refers to the unanticipated increase in emissions outside a project's accounting boundary as a result of the projects implementation, for example, forest being cleared elsewhere as a result of a CFI project. Permanence is the guarantee that an emissions reduction, such as avoided deforestation, will remain so for a meaningful amount of time.

Australian Carbon Credit Units are considered financial instruments and this further triggers policy frameworks established under Australia's Corporations Act and other legislation. For instance, a project proponent must hold an Australian Financial Services Licence to trade them, and general consumer provisions under other legislation are also triggered, incurring additional transaction costs.

Polluters covered under the CE Act can purchase international permits [e.g. from the European Union and Clean Development Mechanism (CDM)] to meet Scheme obligations after an initial fixed price period to bed the Scheme in. This is aimed to provide access to the lowest cost abatement.

Biodiversity is dealt with as a co-benefit and project developers will be given the opportunity to note biodiversity co-benefits on the Register of Offset Projects. This co-benefit notification will likely be via an index that will be specified in the regulations and provide proponents with a low-cost avenue to obtain a market premium (Commonwealth of Australia 2011).

Biodiversity and the extent to which it is integrated into Australia's climate change response is strongly influenced by global events past and present.

The Integration of Biodiversity and Climate Change: A Short History

An important foundation stone of humanity's attempts to deal with the two major global crises of biodiversity decline and climate change came in 1992 with the United Nations Conference on Environment and Development, commonly known as the Rio Earth Summit. Boutros Boutros-Gali, then Secretary General of the United Nations, opened the Summit with 2 min of silence on behalf of life on Earth. His impassioned speech had a focus on nature and warned that we had 'only a few years or a few decades to act' (United Nations 1993). The pivotally integrated United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) were opened simultaneously for signature: one is committed to conserving the work of creation and not unravelling it, and one aims at keeping greenhouse gases in the atmosphere at safe limits (United Nations 1993).

The Kyoto Protocol, adopted in 1997 in Kyoto Japan, crystallized the commitment of the UNFCCC. The Protocol works through targets and timetable structure: setting legally binding targets for developed countries to reduce their greenhouse gas emissions starting with a first commitment period of 2008–2012. The Protocol introduces the CDM that allows developing countries to provide offsets for developed countries.

The need to integrate the two conventions could not have been made clearer. Yet the options for linking biodiversity conservation with climate change mitigation has to this day not been properly articulated (Phelps *et al.* 2012). In 2003, the inter-linkages between biodiversity and climate change were first enunciated in a report (Secretariat of the CBD 2003) that itself was an outcome of the 2002 World Summit on Sustainable Development, commonly called 'Rio + 10'. The report made it clear that we were losing the battle of slowing biodiversity loss. The Summit set a biodiversity target: that the current rate of biodiversity loss at the global, regional and national levels would be significantly reduced by 2010 (Secretariat of the CBD 2010). Yet another 5 years elapsed before a formal decision emerged in 2008 to integrate climate change activities within the programmes of the CBD. Decision IX/16 of the Convention of Parties (COP) to the CBD, led to another technical report *Connecting Biodiversity and Climate Change Mitigation and Adaptation* (Secretariat of the Convention on Biological Diversity 2009).

A year later, Ban Ki-moon, current Secretary General of the United Nations, prefaced the 2010 Global Biodiversity Outlook by reminding us that the target set at Rio + 10 had not been met (Secretariat of the CBD 2010). 'The conservation of biodiversity makes a critical contribution to moderating the scale of climate change and reducing its negative impacts by making ecosystems – and therefore human societies – more resilient. It is therefore essential that the challenges related to biodiversity and climate change are tackled in a coordinated manner and given equal

priority' (BAN Ki-moon in Secretariat of the CBD 2010).

The 2010 Global Biodiversity Outlook tracks the decline in all three main components of biodiversity – genes, species and ecosystems. We know that ecosystem services themselves are underpinned by biodiversity and are the basis of human well-being as summarized below (Table 1).

There is also global consensus on a strategy for the integrated management of land, water and living resources, called the 'ecosystem approach' adopted by the Conference of Parties to the CBD in 2000 (http://www.cbd.int/decision/cop/?id=7148) and outlined in Box 1.

Most recently, species loss has been shown to have ecosystem effects rivalling those of ozone, acidification and elevated CO_2 (Hooper *et al.* 2012).

The first UNFCCC decision on the integration of biodiversity and climate change only appeared in 2011 at the Durban COP. It merely recognizes that policy approaches in the forest sector can promote biodiversity benefits (UNFCCC 2011).

Two terms, 'safeguards' and 'co-benefits', are recent terms adopted by the UNFCCC in reference to biodiversity (Pistorius *et al.* 2010). Safeguards are minimum requirements, such as legislation and regulations, for avoiding apparent risks to biodiversity (Phelps *et al.* 2012). Biodiversity co-benefits refer to benefits above an agreed upon baseline, which requires some form of measurement, and is what is implied under the development of a regulated index that can note biodiversity co-benefits for 'projects that go the extra mile' (Commonwealth of Australia 2012) under the CFI.

Throwing the Baby Out with the Bathwater

Despite the best intentions, the integration of biodiversity conservation and climate change mitigation seems as distant as ever. Biodiversity is more often than not considered as an ancillary or co-benefit (Diaz 2009), an after-thought (BAN Ki-moon in Secretariat of the CBD 2010) or worse, a burden (Gardner 2012).

Climate Change and biodiversity loss converge most critically in tropical forests (Phelps *et al.* 2012). Tropical deforestation accounted for most of the ecosystem sectors (agriculture, forestry and other land use) and around a quarter of all anthropogenic carbon emissions in the 1980s and 1990s (Laurance 2007).

In the 14 years, since the Kyoto Protocol was signed, about 200 million hectares of mostly rainforest have been cleared (based on figures from FAO 2010). Using conservative figures and assuming around 200 tC/ha in these forests (Ramankutty *et al.* 2007), this amounts to about 147 Gt, equating to 245 years of Australia's CO_2-e emissions at current rates. The cleared area of 200 million hectares does not include increases in the area of degraded forests, which is about 25% more (derived from figures in Markku *et al.* 2007). Excluding forests from the Kyoto equations has added to the certain, permanent and massive loss of biodiversity without any influence whatever on United States and Australian consumption patterns.

Table 1. Ecosystem services to humanity

Ecosystem service	Description
Supporting service	Maintain conditions for life including oxygen production, soil formation, nutrient cycling, primary production, pollination and seed dispersal
Regulating services	Regulates ecosystem processes including air and water quality, flood and erosion control, waste treatment, biological control of agriculture and disease
Provisioning services	Provide products from ecosystems including food, water, wood, fibre, biochemicals and medicines
Cultural services	Non-material benefits including spiritual and religious values, knowledge systems and educational values

Source: Adapted from Millennium Ecosystem Assessment (2005).

Within Australia, the ongoing deforestation rate in the Wet Tropics, for example, has averaged 1660 ha/year for the past 20 years (unpublished data from the Department of Environment and Resource Management 2009), equivalent to a release of at least 450 000 t CO_2-e/year. By contrast, historical data show that reforestation using environmental plantings is occurring at only about 40 ha/year: <1% of the potential sequestration benefits of avoided deforestation and degradation.

In the lead up to the Rio Earth Summit, and in the early 1990s, conservationists could be forgiven for thinking that climate change at last provides an effective motivation to finance avoided deforestation (van Oosterzee & Garnett 2008). How did we get from here to the current international climate change policy frameworks that arguably throw the baby out with the bathwater by discarding the link between carbon reduction and biodiversity conservation – the very thing that it was essential to keep (van Oosterzee *et al.* 2010)?

Mostly, the reason is political (Laurance 2007; van Oosterzee & Garnett 2008; Havemann 2009) and stems from negotiations leading up to the Kyoto Protocol where Europeans – fundamentally reacting to American consumerism – objected to the possibility that the United States and countries like Australia could 'buy their way out' of reducing their emission through private enterprise offsetting their emissions through investing in forests.

In global climate change deliberations, this logic had the affect of demoting biodiversity to a mere aside or after-thought: an offset for something else implicitly of greater importance. Instead of seeing the ecosystem sector working together with abatement as a way of driving deeper cuts earlier (Schlamadinger *et al.* 2007) – clearly the original intention – political sides were taken and farcically played out with Europeans broadly 'against' forests and Americans 'for' them (van Oosterzee *et al.* 2010).

Technical difficulties in measurement were seen to be insurmountable barriers. Notions of permanency and certainty were considered obstacles. In reality, notions such as these are indicators of real-world complexity, not necessarily unique to

Box 1. The 12 principles of the ecosystem approach of the convention on biological diversity

1 The objectives of management of land, water and living resources are a matter of societal choice.
2 Management should be decentralized to the lowest appropriate level.
3 Ecosystem managers should consider the effects (actual and potential) of their activities on adjacent and other ecosystems.
4 Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem management programmes should be given as follows:

- Reduce those market distortions that adversely affect biological diversity (i.e. eliminate perverse subsidies);
- Align incentives to promote biodiversity conservation and sustainable use;
- Internalize costs and benefits in the given ecosystem to the extent feasible (including full accounting for ecosystem goods and services).

5 Conservation of ecosystem structure and functioning, to maintain ecosystem services, should be a priority target of the ecosystem approach.
6 Ecosystems must be managed within the limits of their functioning.
7 The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
8 Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
9 Management must recognize that change is inevitable.
10 The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
11 The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
12 The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

carbon projects (Rayden *et al.* 2010) and not applied as strictly to other Kyoto areas. Accounting for problems of leakage, permanence and additionality tend to form an 'unholy trinity' against forest-based projects even though these concepts can be overstated or contrived (Macintosh & Waugh 2012; van Oosterzee *et al.* 2012). A 100-year permanence rule, such as Australia has, is one of the major obstacles to investment. Investment in the Climate Action Reserve, the only other scheme that seems to use it, has stalled due to caution in committing to 100 years of permanence. Ironically, rather than adding value because of higher integrity, the reverse effect of discounting forest credits is occurring due to their perceived complexity and hence riskiness.

In reality, the logic of the 100-year rule is weak. Carbon dioxide has no single atmospheric lifetime and varies from 5 years for individual carbon atoms to thousands of years depending on different physical and chemical aspects (Macintosh & Waugh 2012). Risk-based assessment approaches, now widespread, and emerging insurance approaches can provide viable and rigorous alternatives (van Oosterzee *et al.* 2012). These approaches estimate the risk that sequestered carbon is eventually released again within the timeframe of the project. The risk buffer generated can compensate for future losses. Insurance mechanisms can also reduce the risk embedded in uncertain futures.

With the European Union, not permitting offsets derived from ecosystems in its emissions trading scheme, the worldwide demand for forestry offsets has been taken up by the voluntary market, which has become a significant player in exploring, piloting and shaping future compliance carbon markets. The fact that innovative solutions have so readily emerged in this market, and that these innovations are now being embraced in compliance markets (for example, California's forthcoming ETS), underscores the arguably contrived nature of the arguments that kept ecosystems out of the global carbon equations in the first place.

Australia, however, has largely paralleled international sentiment. Here, Hamilton (cited in van Oosterzee & Garnett 2008) states that reforestation will let polluters off the hook. Downie (2007) warns against offsets, particularly those associated with forestry projects because 'sooner or later the forest will be felled, burned or destroyed'. According to Downie (2007), an Australian scheme should be integrated with the European Union's scheme, which excludes forestry projects entirely. From a global market perspective, this action suggests forests are worth more dead than alive (Mitchell quoted in Tollefson 2008).

A significant problem of not including the full potential of forests in the Kyoto Protocol is that it denied public and political willingness to pay for avoided deforestation and reforestation, and this willingness is now in decline (van Oosterzee *et al.* 2012). Most importantly it has denied the opportunity to buy time. Maintaining carbon in forests even if uncertain and impermanent, postpones global warming with its droughts, floods and other disasters. This would have represented a prevention of all the damages that would have occurred during even a temporary period of postponement (Fearnside, 2001).

The opportunity was missed to use the Kyoto Protocol to correct the failure of not properly valuing forests and avoiding their loss. Only narrowly defined afforestation (the direct human-induced conversion of land that has not contained a forest for at least 50 years to forested land) and reforestation (the direct human-induced conversion of non-forested land as of 31 December 1989) were permitted with in the Kyoto Protocol's CDM. Today, these politically tainted projects make-up a tiny proportion of the total projects in the

CDM: there are only 30 afforestation/reforestation projects or 0.75% of the total CDM projects totalling 7.8 $MtCO_2e$ (Diaz *et al.* 2012). And there is only one major buyer, the World Bank's BioCarbon fund.

The CDM, responding to the toxic global politics leading up to the Kyoto Protocol, instigated a reactionary proliferation of complex and narrow methodologies. Currently, there are 20 methodologies for afforestation/reforestation of which less than half are actually used by registered projects (Diaz *et al.* 2012). The process of validation itself takes more than 600 days. Not surprisingly, there are global calls to simplify AR CDM rules to be more pragmatic and better accommodate realities (Platonova-Oquab *et al.* 2012).

Being a creature guided by the Kyoto Protocol and its CDM, Australia's CFI has also adopted a project-level baseline and credit design. While it is early days, an indication of the potential to develop a raft of complex and narrow methodologies can be seen in the approved 'Methodology for Quantifying Carbon Sequestration by Permanent Environmental Plantings of Native Species using the CFI Reforestation Modelling Tool' where environmental plantings are narrowly defined as 'comprising native species that are native to the local area and which can consist of a mix of tree and understory species or a single species if monocultures naturally occur in the area'. This ignores the significant amount of research being undertaken on the use of monocultures as establishment and 'framework' species that allow other local native species to grow up underneath the canopy at considerably reduced cost (Goosem & Tucker 1995; Bristow *et al.* 2006; Piotto 2008). The Permanent Environmental Plantings methodology, being the first forestry methodology enacted, sets a prescriptive precedent. If a project proponent wished to use a native that would not normally form a monoculture as a framework species, a new methodology would need to be submitted and approved.

The cost for developing a methodology is estimated to be around $125 000 and takes 2 years to develop from inception to approval (World Bank 2010). Likewise, the CFI will incur high transaction costs. As an example of the sorts of costs likely to be incurred, contracting a surveyor to map and register one stand of forest could cost in the order of $500–$10 000 or more depending on the complexity of the forest stand. At $10/t CO_2-e a cumulative return from sales might be in the order of $120 for one hectare of forest in the third year after planting (based on a wet tropics forest). This return would not cover the costs of registering legal rights to the carbon, let alone the cost of survey and plan preparation or the costs of establishing the forest. The real cost of project development and implementation is high to the landholder despite the expectation that forests deliver low-cost abatement.

REDD

Largely, as a result of the continuing loss of forests and of biodiversity, the idea of compensating countries for keeping and managing their forests once again emerged under the banner of reducing emissions from deforestation and degradation (REDD) at the 2005 Conference of Parties to the UNFCCC. Instructions to consider and stimulate action on REDD followed at the Bali COP in 2007. At the 2009 Copenhagen COP, REDD+ (incorporating conservation and management of forests) was recognized as crucial in climate mitigation efforts, although the term 'REDD+' itself was only clearly defined a year later at the Cancun COP. However, this 2010 COP faltered on decisions regarding financial structures to actually pay for REDD (used here to include all its variations) and the role of market versus non-market approaches based on the ideological arguments in the lead up to the Kyoto Protocol continued to be divisive.

In reality, the argument against using market approaches is not sound: resources required to reduce deforestation and degradation (i.e. REDD) by 50% range from US$17 to 28 billion per year (O'Sullivan *et al.* 2010) – four to seven times higher than the figure of US $4 billion per year currently pledged from 2010 to 2012 to non-market-based REDD efforts. The 2011 Durban COP at least opened a way for both public and private sources of finance, and new market-based solutions are emerging (van Oosterzee *et al.* 2012).

At the country level, a number of multilateral funds have been established, the most important of which are the World Bank's Forest Carbon Partnership Facility and Forest Investment Programme, and the United Nations REDD programme. These struggle to disburse funds, largely because of the complexity of rules, difficulty of coordinating country-level projects and high transactions costs. As a result, REDD, too, has stalled, and this uncertainty has knock-on effects for essential private sector enthusiasm.

While REDD has come to focus on developing countries, deforestation also occurs in industrialized countries. Australia, in particular, has a history of high deforestation. In 1990 – the Kyoto base year – deforestation accounted for 132 Mt CO_2-e or 23% of Australia's total emissions (Macintosh & Waugh 2012). During negotiations for the Kyoto Protocol in 1997, Australia threatened to abandon the Protocol unless it could count its 1990 base year deforestation emissions (these had fallen by over 50% between 1990 and 1997 and could be used to offset emissions). As deforestation has since fallen, Australia will receive a deforestation offset worth up to 100 Mt CO_2-e/year (Macintosh 2012) during the first commitment period. This offset is the main reason Australia will achieve its emission target of 108% on 1990 levels. It will not be in Australia's best interests, therefore, to allow Kyoto ACCUs to be sold to foreign buyers and lost to Australia's accounts.

In 1999, Australia was the fifth highest deforester in the world (Steffen *et al.* 2009). Australian Treasury figures show land-use change (clearing of forests and woodlands) still accounts for 74 Mt CO_2-e per annum, equivalent to 13% of Australia's emissions using 2005 figures. For most of its history, Australia's deforestation reform via regulation has had mixed results at best (Macintosh 2012) and would potentially achieve a much needed boost through carbon markets.

Trading in the Voluntary Market

The CFI trades in both the voluntary and compliance carbon markets, the latter

dominated by the CDM, which does not allow offsets from the ecosystem sector. This voluntary market is tiny, with 95 Mt CO_2e transacted in 2011 across 61 countries worth $576 Million or about 0.1% of the global carbon markets. Mostly, this market comprises energy-based projects. Of the total volume in 2011, 15% was from afforestation/reforestation and REDD projects (7.6 Mt CO_2-e and 7.3 Mt CO_2-e, respectively). Overall, nearly three quarters of the world's forest projects were developed only in the past 2 years. Over the past three decades, 312 projects have contracts to develop forest offsets (Diaz *et al.* 2012). The average price for Verified Emissions Reductions is low at $6.20/t CO_2-e.

That the market has set a key requirement for projects that deliver benefits to biodiversity is indicated by the fact that nearly half of the forest-based projects are also tagged with the additional Climate Community and Biodiversity Standard, although a price premium for these credits was not detected (Diaz *et al.* 2012).

Due to the complexity of rules and high transaction costs, most forest-based projects in the world are located on private land and dominated by a handful of heavy players. This is exemplified in South America where 60% of the REDD market is derived. Two countries, Brazil and Peru dominate largely because ownership of carbon is clear in these places (Diaz *et al.* 2012). VCS REDD credits from Africa stem from two mega projects (>1 Mt CO_2-e) in Kenya and the Congo from the same project developer (Peters-Stanley 2012). Arguably, the complexity of rules has resulted in perverse outcomes that currently militate against local people and communities.

In New Zealand, prescriptive rules intended to constrain activities of 'carbon cowboys' have deterred new activity (Peters-Stanley 2012). The value of forest credits in NZ is tied to the price of CERs, which are so low as to stall foresters selling units (Diaz *et al.* 2012).

In Australia, an indication of the impact of trading in the voluntary market can be seen by recent Treasury figures (Australian Government 2011) (Table 2).

Under the 'medium global action' scenario, which broadly reflects a CFI regime, reforestation activities sequester 72 Mt CO_2-e accumulatively by 2050 or just under 2 Mt CO_2-e/year on average. Under the 'ambitious global action' reforestation activities sequester 865 Mt CO_2-e accumulatively or about 23.4 Mt CO_2-e/year on average. This ambitious action is broadly similar to figures calculated for the Australian Government's earlier proposed Carbon Pollution Reduction Scheme (CPRS) scenario where forestry was voluntarily able to opt-in under the legislation and receive a higher price. The lower estimates for the CFI credits are mainly due to trade in the global offset market. This has considerably lower prices than if forestry credits were part of Australia's ETS, and traded at the domestic price as was to be the case in the CPRS. Permanence restrictions, water interception and pricing, risk of reversal buffer and other restrictions add to the limited role forestry has under the CFI regime.

In reality, even these lower estimates may be difficult to achieve under the CFI. For example, one methodology is currently under consideration for native forest protection, essentially a REDD project (http://www.climatechange.gov.au/en/government/initiatives/carbon-farming-initiative/methodology-development/methodologies-under-consideration/native-forest-protection-projects.aspx). This methodology is associated with a single project of about 7000 t CO_2-e/year (http://www.forestcarbonportal.com/projects), which is a small fraction of the estimated 4 Mt CO_2-e scenario presented in the earlier table for 2013.

How to Incorporate Biodiversity as if it Really Mattered

Australia has made the unprecedented step of allowing the creation of compliance-grade carbon credits broadly from the ecosystem sector. Given this, perhaps the single most important outcome for biodiversity is for widespread uptake of the CFI. A way to do this is to move quickly and comprehensively to landscape-scale and standardized approaches.

However, despite the generous coverage of the CFI, the design, complexity and cost, and price will all likely militate against this. Global experience has warned about the disproportionate focus on complex, conservative and restrictive methodologies and integrity standards at the expense of emissions reductions and environmental outcomes (World Bank 2010, Platonova-Oquab *et al.* 2012). In Australia, where 86% of agriculture and forestry businesses are small businesses (ClimateWorks Australia 2010), high transaction costs associated with this approach will favour large land holdings and specifically discriminate against small holders from participating in the CFI.

To enhance uptake, a shift to more streamlined and standardized approaches has recently begun internationally including using standardized sector and regionally specific baselines, and a shift to rewarding certain activities (such as no-till practices) rather than individual project-level emissions (World Bank 2010, Platonova-Oquab *et al.* 2012). In Australia, it would be possible for instance to set regional baselines for avoided deforestation as was carried out in a pilot scheme, developed for the Wet Tropics Region in northern Australia (van Oosterzee *et al.* 2012).

Using a regional baseline it would be possible to use a streamlined approach that allows landholders to opt-in to regional-

Table 2. Predicted impact of trading carbon credits in the voluntary market

	Medium global action				Ambitious global action			
	2013	**2020**	**2050**	**Cumulative**	**2013**	**2020**	**2050**	**Cumulative**
Agriculture Abatement (Mt CO_2-e/year)	2	2	4	100	2	2	5	127
Land use change Abatement (Mt CO_2-e/year)	4	4	11	252	6	6	18	403
Forestry Sequestration (Mt CO_2-e/year)	<1	<1	6	72	1	9	41	865
Total abatement (Mt CO_2-e/year)	6	6	21	424	9	17	64	1395

Abatement from the CFI (from Australian Government 2011).

scale avoided deforestation opportunities using standardized templates. This would also mean moving away from assessing 100% of projects, and instead using quality control and risk-based approaches to focus on non-compliance as is carried out in other frameworks such as financial due diligence (Platonova-Oquab *et al.* 2012).

In the short term, Kyoto-based activities should be able to immediately opt-in for coverage under the CE Act, to obtain a sustainable price for mitigation, cancel the need for integrity standards such as for additionality, and enhance uptake of sustainable farming initiatives. Other activities should be opted-in as Australia begins to account for them.

Acknowledgements

I thank Noel Preece for his encouragement, helpful comments and assistance. I also wish to thank the two anonymous reviewers for helpful and constructive comments.

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