FIELD
Foundation for International Environmental Law and Development

Reducing Emissions from Deforestation and Forest Degradation in developing countries (REDD) - the link with wetlands

A background paper for FIELD by

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Purpose of this paper

This paper summarises the importance of wetlands in relation to climate change, as a basis for examining their potential role in the measures for Reducing Emissions from Deforestation and Forest Degradation (REDD) being discussed under the Kyoto Protocol. The question is addressed also in relation to relevant aspects of other intergovernmental agreements.

The views in this paper are those of the author, and do not necessarily reflect the views of FIELD.

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1. The Scope of the issues covered in this paper

REDD

1.1 The Intergovernmental Panel on Climate Change (IPCC) has estimated that preventing the release of carbon into the atmosphere from deforestation is the climate change mitigation option with the globally largest and most immediate carbon stock impact per hectare in the short term. Deforestation may account for up to 25% of global total anthropogenic emissions, and is said to be the largest single source category in the developing world.

1.2 Selective logging and other land-use activities in forest areas can also cause significant greenhouse gas emissions, and so it is important to address degradation and activities not limited to the forest sector itself, in addition to deforestation *per se*.

1.3 Suggestions concerning Reducing Emissions from Deforestation and Forest Degradation (REDD) in the context of the UN Framework Convention on Climate Change (UNFCC) were first formally tabled at the 11th meeting of the Convention's Conference of Contracting Parties (COP11) in 2005.

1.4 These suggestions have related specifically to developing countries, in order to address a perceived gap in the operation of the Kyoto Protocol. Under the Clean Development Mechanism (CDM) established by the Protocol, countries included in Annex I of the UNFCCC may meet a proportion of their target commitments by investing in emission reduction projects in developing countries. Qualifying projects can earn tradable certified emission reduction (CER) credits, each equivalent to one tonne of CO2. This may be a cheaper alternative to domestic measures in the proponent countries, while at the same time contributing to development assistance goals; but project outcomes must be genuinely additional to what would otherwise occur in both respects.

1.5 The list of eligible activities (agreed in the "Marrakesh Accords", 2001) included afforestation and reforestation, but expressly excluded measures to reduce deforestation, and hence did not provide a means for CDM funding to help developing countries tackle it. Some saw this as a key constraint on the participation of these countries in the international effort on climate (through "fair and equitable access to carbon emissions markets"), as well as being significant for forest conservation more broadly.

1.6 In response to proposals made by Papua New Guinea, Costa Rica and others in 2005, the UNFCCC COP agreed to investigate options (opinions differed on the merits of a free-standing voluntary Protocol, amending the Marrakesh Accords or amending the Kyoto Protocol). Details were discussed at a workshop in Austria in 2006 (Schlamdinger et al, 2006) and in the Convention's Subsidiary Body for Scientific and Technological Advice at its 24th meeting (SBSTA24) in the same year.

1.7 It was concluded that several options exist for financing the reduction of emissions from deforestation in developing countries. Some of these may be important for initial capacity-building; and in addition to an emissions trading scheme, the REDD discussions have referred to support for improving governance, monitoring deforestation and land-use changes, and implementing economic and social programmes to address the causes of deforestation and land-use change. For on-going funding of the avoidance of deforestation itself however, the carbon market appears to be the most promising source, due to its potential scale.

1.8 At COP13 in 2007 the UNFCCC Parties adopted Decision 2/CP.13 which contains a mandate for several types of action by Parties in respect of REDD, including capacity-building in developing countries. The SBSTA initiated a programme of work on methodological issues related to a range of policy approaches and incentives, and reported to COP14 in December 2008. Work continues in 2009 in the context of the Bali Action Plan (Decision 1/CP.13).

1.9 In order to measure avoided deforestation, a key technical requirement is the determination of a baseline historical rate of deforestation for each country. The REDD concept envisages credits being generated when deforestation is reduced beyond a target point below historical averages.

1.10 Credits accrue to the funding countries, ie the beneficiary developing countries gain the project funding but do not become the owners of the carbon credits, since these can only be traded among Annex I countries who have the Convention obligation to reduce emissions.

1.11 It has been argued that deeper commitments by developed countries to reduce emissions will be necessary to create sufficient demand for credits from REDD activities, and that the concept is thus dependent on increased participation by developed countries in the Kyoto Protocol beyond its first commitment period (ie post-2012) (Johns, 2006).

1.12 The emission targets accepted by developed countries under the Kyoto Protocol take into account the net difference between “emissions from sources” and “removals by sinks”, and one of the calculations they must do relates to the net changes from “direct human-induced land use change and forestry activities, limited to afforestation, reforestation, and deforestation since 1990, measured as verifiable changes in stocks” (Art 3.3). UNFCCC COP Decision 2/CP.13 encourages Parties to apply the IPCC Good Practice Guidance for Land Use, Land-use Change and Forestry (IPCC-NGGIP, 2003) for estimating and reporting emissions and removals arising from such activities. Article 2.1 further includes requirements for “protection and enhancement of sinks and reservoirs of greenhouse gases”, and “promotion of sustainable forest management practices, afforestation and reforestation”.

1.13 Since developed countries may trade certified credits between themselves (Art 6), and “additional” avoided deforestation in these countries can contribute to this, benefiting them economically in the trading system, it is not surprising that developing countries felt it unfair that their own efforts to avoid deforestation were ineligible to be rewarded in the same way. The 2005 proposals were a response

to the perceived unfairness - but as mentioned above, the redress envisaged consists not in allowing developing countries to join in the trade in carbon credits (which would be illogical given that they have no emission reduction obligations against which to redeem them), but in enabling them to receive project funding for producing the "raw material" (reduced emissions) which the Annex I countries trade among themselves as credits.

1.14 It is of course open to any country, whether developed or developing, to take steps to reduce emissions from deforestation and forest degradation on a voluntary basis, by whatever means may be economically and politically feasible.

1.15 Moreover, sources of financing other than the CDM may be able to support appropriate projects for generating credits that can be certified and traded in voluntary carbon markets outside the Kyoto regime, and this is also touched on in this paper. The CDM route however is the most significant, given its integral linkage to Kyoto certification.

1.16 Hence reducing emissions from deforestation and forest degradation is relevant to developed countries, and to developing countries beyond activities that can be supported by the Clean Development Mechanism. The scope of this paper however is largely limited to the specific proposals which have been advanced for CDM-supported opportunities for developing countries; and reference in this paper to the concept using initial capitals or the abbreviated form "REDD" relates only to the scope as defined in this way.

Developing countries

1.17 The interpretation of "developing countries" in the context of the UNFCCC relates to a listing that is specific to the Convention, although it broadly follows other schemes. The term is not defined in the Convention. Instead, the countries listed in Annex I (and Annex II, which is a sub-set of Annex I) are referred to as "developed" (including those with "economies in transition" in 1992). The implication is that all others not so listed are the developing countries; but in Convention documents reference is made to developing countries rather than to "non-Annex I countries", and the Secretariat has pointed out that the two cannot be assumed to be the same (UNFCCC Secretariat, 2001). Furthermore, developing countries may volunteer to become Annex I countries when they reach an appropriate level of development.

1.18 In the Ramsar Convention on Wetlands (dealt with further below), the concept of developing countries is normally interpreted in accordance with the List of Aid Recipients established by the Development Assistance Committee (DAC) of the Organisation of Economic Cooperation and Development (OECD). The World Heritage Convention refers instead to Least Developed Countries and Low Income Economies as listed by the UN Economic and Social Council's Committee for Development Policy.

1.19 The Convention on Biological Diversity (CBD) refers to developing countries, and only such Parties are eligible to receive funding through the Convention's financial mechanism; but it does not define the term. Article 20 requires the COP to establish a list of developed country Parties and other Parties that voluntarily

assume the obligations of developed country Parties. This list was duly adopted and last updated in Decision VIII/18 at COP in 2006. The inference is that any country other than the 25 listed is a developing country, in this context.

1.20 According to the rules of the Global Environment facility (GEF), a country shall be an eligible recipient of GEF grants if it is eligible to borrow from the World Bank (IBRD and/or IDA) or if it is an eligible recipient of UNDP technical assistance through its country Indicative Planning Figure (IPF).

1.21 Clearly there is no one simple definition of "developing country" for the purposes of this paper, and the basis for eligibility for REDD initiatives with linkages to different Convention mechanisms may vary according to the mechanism concerned.

Forests and wetlands

1.22 In the context of the Kyoto Protocol, forests are defined as follows: "a minimum area of land of 0.05–1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10–30 per cent with trees with the potential to reach a minimum height of 2–5 metres at maturity *in situ*. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high portion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10–30 per cent or tree height of 2–5 metres are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest" (IPCC-NGGIP, 2003). Countries are encouraged to use detailed ecosystem classifications in their calculations and in reporting.

1.23 "Wetlands" encompass a broader range of ecosystems than is often realised. Article 1.1 of the Ramsar Convention (Convention on Wetlands, Ramsar, Iran, 1971) defines them as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres".

1.24 There is an overlap between the two types of ecosystem, and many wetlands are forested. The Ramsar Convention's Classification System for Wetland Type (Ramsar Convention, 1999-2008) includes the following broad categories:

- I - Intertidal forested wetlands; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests;
- W - Shrub-dominated wetlands; shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils;
- Xf - Freshwater, tree-dominated wetlands; includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils;
- Xp - Forested peatlands; peatswamp forests.

1.25 The relevance of wetlands to REDD has another dimension too, namely that every forest exists in a water catchment; and its hydrological context is highly dependent on the functioning of wetlands within that catchment.

Conventions

1.26 The Ramsar Convention inevitably features strongly in this paper, as the only global treaty on wetlands. It has relevant collaborative links with other Conventions too: for example it has been appointed the CBD's "lead partner" on activities related to wetlands, and there have been successive Joint Work Plans between these two Conventions. CBD's COP4 in 1998 also confirmed (in a still underappreciated provision, in Decision IV/4), that certain Ramsar-related activities are eligible for funding by the Global Environment Facility, even though Ramsar was not one of the Rio Conventions that stimulated the setting up of the GEF.

1.27 Decisions of Conferences of Parties to the Ramsar Convention, and also the Conferences of the Conventions on Biodiversity, World Heritage, Desertification, Migratory Species, European Wildlife and the Agreement on African-Eurasian Waterbirds have been examined for provisions of relevance for wetlands, climate change and REDD; and these are summarised in section 3 below.

2. Wetlands and climate change

The global importance of wetlands

2.1 Wetlands encompass a significant proportion of the area of the planet. The global estimate is 1280 million hectares (equivalent to approximately 9% of the land surface) and this is recognised to be an under-estimate (Ramsar STRP, 2005). Wetlands deliver a wide range of critical services, arguably valued at US$14 trillion annually. These include food, fibre, water supply, water purification, regulation of water flows, coast protection, carbon storage, regulation of sediments, biodiversity, pollination, tourism, recreation and cultural services. Their benefits to people are essential for the future security of humankind, and this depends on maintenance of their extent, natural functioning and ecological character.

2.2 The principal supply of renewable fresh water for humans comes from an array of wetland types, including lakes, rivers, swamps and groundwater aquifers. Up to 3 billion people are dependent on groundwater as a source of drinking water, but abstractions increasingly exceed recharge from surface wetlands. Increasing demand for, and over-use of, water is jeopardising human well-being and the environment. Access to safe water, human health, food production, economic development and geopolitical stability are made less secure by the degradation of wetlands, driven by the rapidly widening gap between water demand and supply. Water governance urgently needs to be reformed: instead of being demand-driven, which promotes over-allocation of water, it should treat wetlands as our "natural water infrastructure", integral to water resource management at the scale of river basins.

2.3 The degradation and loss of wetlands is more rapid than rates for other ecosystems (Ramsar STRP, 2005). Similarly, the status of both freshwater and,

to a lesser extent, coastal species is deteriorating faster than that of species in other ecosystems. These trends have primarily been driven by land conversion and infrastructure development, water abstraction, eutrophication, pollution and over-exploitation. There are a number of broad, interrelated economic reasons, including perverse subsidies, why wetlands continue to be lost and degraded. This is leading to a reduction in the delivery of wetland ecosystem services, yet demand for these same services is projected to increase. Addressing this is of critical importance for achieving the Millennium Development Goals.

Impacts of climate change on wetlands

2.4 Literature on climate-wetlands interactions, as well as dealing with the role of wetlands in climate change effects, mitigation and adaptation, also covers the impacts on wetlands from climate change, and from climate change policies. Globally, the negative impacts of climate change on freshwater systems are expected to outweigh the benefits (Bates et al, 2008). Key review documents covering this are included in the reference list given at the end of this paper; but these aspects (ie impacts on wetlands) are not addressed further here, since the focus of this review is instead on the role of wetlands in potential responses.

Greenhouse gas emissions

2.5 Wetlands play a sometimes crucial role in regulating exchanges to/from the atmosphere of the naturally-produced gases involved in "greenhouse" effects, namely water vapour, carbon dioxide, methane, nitrous oxide (all associated with warming) and sulphur dioxide (associated with cooling). They tend to be sinks for carbon and nitrogen, and sources for methane and sulphur compounds, but situations vary widely from place to place, from time to time, and between wetland types (for more detail see Ramsar Secretariat, 2002 and Lloyd, in prep). (Overall, the long-term negative effect of methane emissions is lower than the positive effect of CO_2 sequestration - see below).

2.6 Wetland land-use, and discharge, treatment and re-use of waste water can all have profound effects on emissions and hence on the success of mitigation and adaptation strategies. The most robust generalisation is that degradation and disturbance of naturally-functioning wetlands can be (and already is) a major cause of increased carbon emissions (Ramsar Secretariat et al, 2007).

2.7 One of the best documented dimensions of this relates to peatlands, where the delicate balance between anaerobic production and aerobic decay causes them readily to switch from carbon sinks to sources following human interventions. Peatland degradation is now a major and growing cause of anthropogenic carbon dioxide emissions, with drainage, fires and extraction releasing an estimated minimum of 3,000 million tonnes per annum (two-thirds of which is from south-east Asia, mostly Indonesia, consisting of 600 Mt from decomposition and 1400 Mt from fires), equivalent to more than 10% of the global total (Parish et al, 2008).

Carbon capture and storage

2.8 Wetlands have always sequestered carbon and decomposed to produce carbon dioxide and methane; but their effect upon future climate change depends on how these processes depart from historical steady-state rates of production (Lloyd, in prep). Wetlands are different from other biomes in their ability to sequester large amounts of carbon, as a consequence of high primary production and then deposition of decaying matter in the anaerobic areas of their waterlogged soil. In such soils the normal production of carbon dioxide that occurs during decomposition is slowed or completely inhibited by the lack of oxygen; although these same conditions are also conducive to the production of methane.

2.9 It is the interplay between waterlogging, high plant productivity, sequestration of carbon in the soil, and production of carbon dioxide and methane that makes wetlands one of the most important terrestrial surfaces in climate change; complicated by the fact that different wetland types have markedly different greenhouse gas and carbon balance profiles (Lloyd, in prep). Climate change may itself of course also affect the wetland carbon sink, although the direction of the effect is uncertain due to the number of climate-related contributing factors and the range of possible responses (Ramsar Secretariat, 2002).

2.10 Sources estimate that wetlands account for about one-third of terrestrial carbon stores (Ramsar Secretariat, 2002). There is however a dearth of consolidated information on the role and importance of different types of wetlands and in different parts of the world in carbon sequestration and storage. Lloyd (in prep) reviews available information on a range of different types and regions, the implications for future storage and emissions under a changing climate, and gaps in knowledge. It is anticipated by the Ramsar Convention, whose Scientific & Technical Review Panel (STRP) commissioned Lloyd's work, that his report will assist countries in identifying which wetlands play a particularly significant role in climate change mitigation and adaptation, and should thus be a focus of attention for maintenance and restoration. It has been claimed that restoration of wetlands offers a return on investment up to 100 times that of alternative carbon mitigation investments (Ramsar Secretariat et al, 2007).

2.11 Peatlands are the most important long-term carbon store in the terrestrial biosphere. Although covering only 3% of the world's land area, peatlands contain as much carbon (400-700 Gt) as all terrestrial biomass, twice as much as all global forest biomass, and about the same amount as is in the atmosphere (Parish et al 2008). Intact peatlands can store up to 1,300 tons of carbon per hectare, compared to 500-700 tons in old-growth forests (Pena, 2008). They account for the majority of all carbon stored in wetland biomes worldwide. This would, if all converted to carbon dioxide, increase the atmospheric concentration of CO_2 by 200 ppm (Lloyd, in prep).

2.12 Although peatlands are known to be an overall sink for carbon, and in many regions are still actively sequestering it (Ramsar Secretariat, 2002), initial studies produced a confusing picture of this, with some sites appearing as carbon sinks and others as sources. As research studies have lengthened, a picture of inter-

year variability has become more apparent, with climatic and hydrological variability acting to switch the balances. There are now many long-term studies of overall carbon dioxide and methane exchange in temperate and northern peatlands which highlight the complex nature of the interaction between the various plant and soil components at work. Figures for different peatlands vary greatly: from a carbon uptake of more than 220g CO_2 m^{-2} yr^{-1} to losses of 310g CO_2 m^{-2} yr^{-1}. This complexity and range of variation will complicate any general predictions (Lloyd, in prep).

2.13 Peatland degradation is now a major and growing cause of loss of global carbon storage capacity. In addition to the contribution this makes to the global problem, the large size of some of the areas, for example in the northern hemisphere tundra and taiga zones, can result in modifications to energy, water, and gas fluxes that change local and regional climate, with local feedback effects (eg through increased incidence of fires) which exacerbate further emissions.

2.14 Any action that would avoid degradation of these wetlands would therefore be a beneficial mitigation option. Peatland restoration and mitigation programmes are beginning in Europe and north America. Mitigation is the most that can probably happen in the short-term as the current plant species are largely incapable of increasing production in response to higher temperatures and atmospheric CO_2 concentrations (Lloyd, in prep). Nonetheless, Erwin (2009) reports research in Canada showing a reduction in the magnitude of CO_2 losses from cutover peatlands after restoration and revegetating, and to other evidence of the switching of the carbon balance of Finnish cutover peatlands from sources to sinks within a few years of restoration. Wetlands International (2008b) report similar results from pilot projects in south-east Asia, Russia, Argentina and the Himalayas, indicating that relatively minor investments have significant emission reduction impacts. Carbon sequestration benefits should result from restoration of areas of other wetland types too (eg mangroves, saltmarshes, floodplain marshes), but there are as yet few documented case experiences relating to these.

Sea level rise

2.15 Coastal wetlands will play a major part in strategies for dealing with problems created by sea level rise. Mangrove forests, coral reefs and tidal flats can attenuate wave-energy and contribute to coast defences in a more cost-effective way than hard defences, providing enhanced protection against increasingly frequent storm-events as well as rising sea levels. In the Asian tsunami of 2004, areas behind intact mangrove forests and coral reefs were less affected than areas that lacked these natural physical buffers (Wetlands International, 2008a).

2.16 In addition to physical damage, inundation (causing loss of productive or otherwise valuable areas), upstream and underground salinisation (causing loss of freshwater supplies) and other impacts can also be lessened through maintenance or restoration of naturally-functioning coastal hydrology and wetland ecosystems.

2.17 Moreover, land-use change and hydrological modifications anywhere in a water catchment or river basin may have downstream impacts which interact in the

coastal zone with sea level rise risk factors. Changes in marine sediment cycles (affecting erosion and deposition rates, with huge economic impacts eg in delta regions), abstraction of water (affecting groundwater salinisation), lowering of water tables and subsidence (exacerbating seawater inundation), may all be involved (Bates et al, 2008). Integrated planning (as advocated in many technical and policy guidance materials adopted over the years under the Ramsar Convention in particular) is essential here.

Water management

2.18 Demand for water worldwide has more than trebled since 1950 and is projected to double again by 2035 (Postel, 1997, cited in Erwin, 2009). Globally, the area of land classified as "very dry" has more than doubled since the 1970s. Under climate change scenarios, some areas are projected to become wetter, others drier: precipitation is due to increase in high latitudes and parts of the tropics, and to decrease in some subtropical and lower mid-latitude regions. Water supplies stored in glaciers and snow cover are projected to decline, thus reducing water availability in regions supplied by meltwater from major mountain ranges, affecting more than one-sixth of the world's population (Bates et al, 2008).

2.19 Climate change is increasing the levels of uncertainty in water management, and making it more difficult to close the gap between water demand and supply. Irrigation already comprises 70% of water used globally, and this may increase under climate change and food production scenarios. The effects of climate change will increasingly be felt most directly through changes in the distribution and availability of water (Bates et al, 2008).

2.20 Adaptation options designed to ensure water supply during average and drought conditions require integrated demand-side as well as supply-side strategies. An expanded use of economic incentives to encourage water conservation, development of water markets and implementation of virtual water trade holds considerable promise for water savings and the reallocation of water to highly valued uses (including wetland-based climate change mitigation measures). Supply-side strategies generally involve increases in storage capacity, abstraction from watercourses, and water transfers. More integrated water resources management on the other hand provides an important framework for achieving adaptation measures across socio-economic, environmental and administrative systems (Bates et al, 2008). Once again, maintenance of the ecological character and ecosystem services provided by wetlands offers the clearest route to sustainable outcomes.

Other wetland services

2.21 Wetlands buffer climate change impacts and play a role in mitigation and adaptation strategies in some additional ways too. One of these is in the biodiversity and other non-water resources they provide for people, especially the poor, who may be affected by climate change through loss of agricultural land or productivity, or through being displaced from areas they normally live in or use.

2.22 Naturally-functioning wetlands regulate and buffer fluctuations in water levels over seasonal flood patterns, and this function may be doubly important where

these patterns become disrupted. Conversely, loss of this functionality increases risks, as has been seen for example with the reduced ability of many high-altitude wetlands in the Himalayas (through erosion, siltation, overgrazing and mining) to store water after heavy rainfall, which was implicated in the long-lasting floods in northern India in 2007 (Wetlands International, 2007).

2.23 Climate change itself of course is one threat to the ability of wetlands to deliver all the services mentioned in this paper, and it can exacerbate the effects of other stressors, often in a non-linear way. Current water management practices may not be robust enough to cope with the impacts of climate change on wetland services - indeed in many places, such practices cannot satisfactorily cope even with current climate variability, leading to major problems of floods and droughts. As a first step, improved incorporation of information about current climate variability into water-related management (and wetland restoration) would assist adaptation to longer-term climate change impacts (Bates et al, 2008; Erwin, 2009).

2.24 Wetlands are therefore vital parts of the “natural infrastructure” needed for addressing climate change, Degradation and loss of wetlands make climate change worse and leave people more vulnerable to its impacts. Conservation and restoration of wetlands, and safeguarding their resilience and range of functions, are therefore effective climate adaptation strategies (Erwin, 2009). According to Wetlands International (2007), “strategies for adaptation to climate change that do not address the continuing crisis in wetlands loss and degradation will have real limitations, and could result in maladaptation and reduced resilience”. By the same token, appropriate responses may not only address climate change impacts but could provide "win-win" benefits in relation to other problems caused by wetland loss and degradation.

2.25 Conversely, climate change responses involving afforestation/reforestation, bio-energy crops, hydrodams etc, if carried out without due regard to their consequences for the water cycle and other wetland functions, may be unsustainable and may do more harm than good.

3. Key decisions of international Conventions

3.1 This section provides an annotated and selective list of some key decisions of the Conventions on Wetlands, Biological Diversity, World Heritage, Desertification, Migratory Species, European Wildlife, and the Agreement on African-Eurasian Waterbirds, which appear to have particular relevance to the links between wetlands and climate change and/or may be relevant to REDD. Other Conventions and other decisions may also have a bearing on the issue; but those listed below are likely to be the most important to take into account in identifying mandates and developing positions on wetlands and REDD.

3.2 This list concentrates on the main decisions that are currently in effect, and does not attempt to present a historical inventory of those that relate to past action periods or may otherwise now be superseded. Decisions are presented in order of significance rather than chronology. Further key Convention documents (other

than COP decisions) are identified in the list of references at the end of this paper. Decisions of the Climate Change Convention itself are not included here, but are referred to instead in section 1 above.

Ramsar Convention on Wetlands	
General comments: • Some of the most important global source materials on climate-wetlands interactions are contained in the Ramsar Technical Reports series and in COP Information Documents referred to elsewhere in this paper. • The Convention's Scientific & Technical Review Panel has an on-going Thematic Work Area on "wetlands and climate change", led by Prof Max Finlayson. • Activities under the Convention include a private sector partnership with the Danone Group, who have established the Danone-Evian Fund for Nature, to be jointly administered by Ramsar, the company and IUCN. This links with Danone's pledge to reduce its carbon footprint by 50% by 2011 and to fund wetland restoration activities (initially mangroves) as a contribution to carbon capture objectives. • The Republic of Korea, as hosts of COP10 in 2008, set up a fund for offsetting the carbon footprint of the COP itself.	
Decision	Key elements
COP10 Resolution X.24: Climate change and wetlands (2008)	• The most extensive extant Ramsar COP positioning on climate issues. • Puts forward a range of conceptual, policy, cooperation, management and research priorities, key messages and actions. • Emphasises, inter alia: - the role of the maintenance of the ecological character of wetlands in climate change mitigation and/or adaptation policies; - the role and importance of different types of wetlands in carbon storage and sequestration; - a wide range of relevant key messages and conclusions from other intergovernmental processes; and - a range of issues relating to cooperation and synergy between Ramsar, UNFCCC and others. • Urges Parties to manage wetlands to increase their resilience to climate change, and to take advantage of opportunities to use wise wetland management as a response option for reducing the impacts of climate change, including in the context of UNFCCC and the Kyoto Protocol (a range of specific example actions is given). • Encourages Parties and others to pay attention to the potential of incentive measures and funding mechanisms under climate change adaptation and mitigation activities to support the sustainable use and restoration of wetlands, with associated benefits for poverty eradication.
COP8 Resolution VIII.3: Climate change and wetlands: impacts, adaptation, and mitigation (2002)	• Recognises the potentially serious implications of climate change for wetlands and the potentially important role of wetlands in climate change adaptation and mitigation. • Calls on Parties to ensure that their climate change responses including revegetation, forest management, afforestation and reforestation do not damage wetlands. • Recognises the ecological, social and economic vulnerability of Small Island Developing States to the impact of climate change and sea level rise. • (This Resolution is now wholly updated and superseded by Res X.24 (see above)).
COP10 Resolution X.1: The Ramsar Strategic Plan 2009-2015 (2008)	• Stresses the urgency of the need for national environmental governance to shift from sectoral, demand-driven approaches to an ecosystem-based approach to policy and decision-making that, *inter alia*, recognises the important role of wetlands in climate change mitigation and adaptation. • Includes Key Result Areas 1.7.iii ("National policies or guidelines enhancing the role of wetlands in mitigation and/or adaptation to climate change in progress or completed") and 3.1.ii ("Joint activities developed

	with the UNCCD and the UNFCCC").
COP10 Resolution X.10: Future implementation of scientific and technical aspects of the Convention (2008)	• Includes a "high priority" task for the Scientific & Technical Review Panel (STRP) to develop guidance, working with the IPCC and others, on the latest knowledge of the current and potential impacts of climate change on wetlands and on appropriate policy and management responses for addressing these impacts (includes five sub-tasks, including development of guidance on how wetland management and restoration can contribute to improving adaptation to climate change, linked with other tasks on wetland restoration elsewhere in work programme). • Includes a "high priority" task for the STRP to develop a multi-institutional programme of work with UNFCCC, CBD, UNCCD, IPCC, UNEP, UNDP, FAO and the World Bank to investigate the potential contribution of wetland ecosystems to climate change mitigation and adaptation, and develop guidance for mutually supportive adaptation and mitigation programmes. • Includes a task for the STRP to collaborate with the IPCC on scientific issues related to wetlands and climate change, and raise awareness in the climate change community on the importance of wetlands. • Includes a task for the STRP to undertake a review of biofuels issues and to produce further guidance as necessary (see also Res X.25 on biofuels, not listed separately here). • Includes a task for the STRP to undertake a scoping review of technical aspects of relevance to the Ramsar Convention in the finance, banking, investment, insurance and other economic sectors (an indicative list of topics is given), which may aid in developing perspectives on carbon trading issues.
COP10 Resolution X.3: The Changwon Declaration on human well-being and wetlands (2008)	• Complements the Strategic Plan by transmitting key messages on wetland-related issues to stakeholders and decision-makers beyond the Ramsar community, highlighting positive actions that can/should be taken for human well-being and security under five priority thematic headings, one of which is "climate change and wetlands".
COP7 Recommendation 7.1: A global action plan for the wise use and management of peatlands (1999)	• Notes the need to include wetland carbon sinks and sequestration initiatives as key issues in the Kyoto Protocol.
COP7 Recommendation 7.2: Small Island Developing States, island wetland ecosystems, and the Ramsar Convention (1999)	• Notes the urgent interests of Small Island Developing States in the impacts of climate change and the important role of wetlands in addressing these threats.
COP10 Resolution X.30: Small Island States and the Ramsar Convention (2008)	• Asks the Ramsar Secretariat, in considering the eligibility of projects in small island States for funding under the Ramsar Small Grants Fund (SGF), to take into account the vulnerability of such States to climate change and loss of wetlands, and to treat all such States for this purpose in a manner analogous to Small Island Developing States (SIDS). (Funding support from the SGF is based on the Parties' economic status, but SIDS governments have requested that their eligibility should be based instead on their vulnerability to climate change, in line with practices followed by other Conventions).
COP 7 Resolution VIII.4: Partnerships and cooperation with other Conventions, including harmonized information management infrastructures (1999)	• Includes a call for a Memorandum of Cooperation with the UNFCCC (not yet in place, although there are MoCs with UNCCD, CBD, CMS, World Heritage and others).
COP10 Resolution X.11: Partnerships and synergies with	• Calls on all concerned to make a special effort to contribute to the International Year of Biological Diversity (2010), including by drawing attention to the role of wetlands in responding to climate change.

Multilateral Environmental Agreements and other institutions (2008)	

Convention on Biological Diversity	
General comments: • The CBD collaborates on wetlands issues closely with the Ramsar Convention, through an MoC, a Joint Work Plan (the 4th is currently in effect) and under CBD COP Decision III/21 which established Ramsar as its "lead implementation partner" on wetlands. • An in-depth review of ongoing work under the cross-cutting issue of "biodiversity and climate change" is planned for COP10 in 2010.	
Decision	Key elements
COP9 Decision IX/16: Biodiversity and climate change (2008)	• The most extensive extant CBD COP positioning on climate issues. • Notes that reduced deforestation and forest degradation, and increased afforestation and reforestation, could provide multiple benefits for biodiversity and reducing greenhouse gas-emissions, and welcomes the consideration of REDD in the framework of the UNFCCC. • Decides that in future climate change issues will be integrated into each CBD programme of work, including the opportunities that mitigation and adaptation activities provide for conservation and sustainable use of biodiversity, and the contribution of biodiversity to adaptation measures. • Urges Parties to enhance the integration of climate-change considerations related to biodiversity in their implementation of the Convention, and requests a workshop on this for small island developing States in particular. • Establishes an Ad Hoc Technical Expert Group on Biodiversity and Climate Change, with a mandate to develop scientific and technical advice on biodiversity in relation to implementation of the UNFCCC, including identifying opportunities to deliver multiple benefits for carbon sequestration, inter alia through REDD; and allocates tasks to the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) in relation to the in-depth review of biodiversity and climate change issues planned for COP10. • Requests the Secretariat to summarise information on the conservation and sustainable use of biodiversity of relevance to REDD from documents including the report of the Viterbo Workshop on "Forests and Forest Ecosystems: Promoting Synergy in the Implementation of the three Rio Conventions" (2004), the Millennium Ecosystem Assessment and CBD Technical Series, and to provide this to the UNFCCC's Secretariat and its Ad Hoc Working Group on Long-term Cooperative Action. • Presents a summary of the findings of the Global Assessment on Peatlands, Biodiversity and Climate Change, encourages Governments to strengthen collaboration with Ramsar on implementing the actions identified in it and in the Guidelines for Global Action on Peatlands, and invites further collaboration with IPCC and the Ramsar STRP. • Requests the Secretariat, in collaboration with Ramsar, to analyse the potential of incentive measures and funding mechanisms under climate-change adaptation and mitigation in supporting biodiversity conservation and sustainable use in wetlands.
COP9 Decision IX/5: Forest biodiversity (2008)	• Asks the Secretariat to work with the other members of the Collaborative Partnership on Forests, in particular the Secretariat of the UNFCCC and the World Bank, to support Parties' efforts to address REDD in the framework of the UNFCCC.
COP 7 Decision VII/4: Biological diversity of inland water ecosystems (2004)	• The revised inland waters programme of work should pay particular attention to the impacts of climate change and the role of inland waters in mitigation of and adaptation to climate change, including the integration of appropriate adaptive management and mitigation responses into land and

	water-use management, and support for initiatives involving peatland conservation. • Assessment to be conducted of linkages between inland water ecosystems and climate change, including the role of wetlands in mitigation, notably the role of peatlands in carbon sequestration.
COP9 Decision IX/19: Biological diversity of inland water ecosystems (2008)	• The most recent invitation for further improved synergy and collaboration between Ramsar and the CBD in their work on climate change.
COP 8 Decision VIII/30: Biodiversity and climate change: guidance to promote synergy among activities for biodiversity conservation, mitigating or adapting to climate change and combating land degradation (2006)	• Welcomes the start of the process within the UNFCCC to consider ways of addressing REDD, and notes that effective actions to reduce deforestation could be a unique opportunity for biodiversity protection. • Encourages Governments to integrate biodiversity considerations into all relevant climate change response activities.
COP 7 Decision VII/15: Biodiversity and climate change (2004)	• Encourages Parties to manage ecosystems so as to help mitigate and adapt to climate change, and notes that mitigation and adaptation activities can be done in ways that offer mutual benefits among CBD, Ramsar, UNFCCC, Kyoto and other instruments, while also offering synergies with broader national development goals. • Takes note of Ramsar Resolution VIII/3 on climate change and wetlands (see above), especially its references to minimising degradation and promoting restoration of peatlands and other wetland types that are significant for carbon storage or sequestration, and supports the request by Ramsar Parties to IPCC for a technical paper on wetlands and climate change.
COP 5 Decision V/15: Incentive measures (2000)	• Urges Governments to explore ways in which incentive measures promoted through the Kyoto Protocol can support CBD objectives.
COP6 Decision VI/22: Forest biological diversity (2002)	• Forests Programme of Work Goal 2, objective 3 includes promoting forest biodiversity conservation and restoration in climate change mitigation and adaptation measures.

World Heritage Convention	
General comments: • The WH Convention's attention to climate issues has concentrated on potential impacts on World Heritage properties and appropriate measures to deal with them. • A key report on predicting and managing the impacts of climate change on World Heritage was prepared (UNESCO World Heritage Centre 2007), a Strategy to assist States Parties to implement appropriate management responses has been endorsed by the WH Committee, and a policy document was adopted by the General Assembly of States Parties (UNESCO World Heritage Centre 2008). • Although mitigation at the global and States Parties level is seen as a matter for UNFCCC/ Kyoto, it is acknowledged that potential mitigation measures at the level of World Heritage sites and the WH network should be investigated under the WH Convention, including the extent to which natural sites contribute to carbon sequestration. In addition, the WH Centre oversees a number of projects for restoring degraded habitats in natural sites, which indirectly contribute to sequestration, and the 2007 report suggests that this could be quantified in more detail. Total carbon sequestered in WH sites will be limited because of the limited area concerned; but the iconic character of the sites is seen as offering a powerful communication tool for promoting best practices. Furthermore, the Strategy indicates that "any adaptation measure should seek ways in which to mitigate". • Since 2007 the WH Committee has had a policy of trying "as far as possible" to make its meetings carbon neutral.	
Decision	Key elements
WH Committee Decision 31COM 7.1: Issues	• Urges the World Heritage community to integrate actions pertaining to climate change in risk preparedness policies and action plans, in order to

relative to the state of conservation of world heritage properties - the impacts of climate change on World Heritage properties (2007)	protect the value of WH sites. • Recommends that the World Heritage Centre strengthen its relations with the UNFCCC and IPCC Secretariats. • Priorities for research on natural heritage include identifying how WH sites contribute to greenhouse gas emissions, sequestration and storage, to assist in recognising carbon values of forest and other sites to increase leverage for conservation and potential for sustainable financing through carbon offset projects.
WH Committee Decision 30COM 7.1: Issues related to the state of conservation of World Heritage properties - the impacts of climate change on World Heritage properties (2006)	• Endorses the "Strategy to assist States Parties to implement appropriate management responses", requests all concerned to implement it, and notes the report on "Predicting and managing the impacts of climate change on World Heritage".
WH Committee Decision 29COM 7B.a: Threats to World Heritage properties (2005)	• Encourages States Parties to consider potential impacts of climate change within their management planning and risk preparedness strategies, and to take action in response to those potential impacts. • Encourages States Parties and the WH Advisory Bodies to use the network of World Heritage properties to highlight the threats posed by climate change to natural and cultural heritage, and use the network to demonstrate management actions that need to be taken to meet such threats, both within the properties and in their wider context.

UN Convention to Combat Desertification	
General comments: • As another of the "Rio" Conventions, the UNCCD stresses coordination with UNFCCC, including in Art 8.1 of the Convention text itself which requires Parties to encourage coordination of their activities under both Conventions (and the CBD). • A High-Level Round Table Discussion was held during COP8 in 2007 on "Desertification and adaptation to climate change", and a Declaration to the COP by Members of Parliament included a recommendation that that UNCCD implementation processes be much better linked with attainment of climate targets.	
Decision	Key elements
Decision 3/COP.8: The 10-year Strategic Plan and framework to enhance the implementation of the Convention, 2008–2018 (2007)	• Outcome statements in the Plan include: - sustainable land management and combating desertification/land degradation contribute to the conservation and sustainable use of biodiversity and the mitigation of climate change (Strategic Objective 3/3.1); - mutually reinforcing measures among desertification/land degradation action programmes and biodiversity and climate change mitigation and adaptation are introduced or strengthened (Operational Objective 2/2.5); and - innovative sources of finance and financing mechanisms are identified to combat desertification/land degradation, including from market-based mechanisms for climate change adaptation and mitigation (Operational Objective 5/5.4).
Decision 12/COP.7: Activities for the promotion and strengthening of relationships with other relevant conventions and relevant international organizations, institutions and agencies (2005)	• Encourages Parties and relevant institutions to explore opportunities to promote sustainable forest management, including forest conservation and sustainable use of forests, as an effective additional means of addressing relevant objectives of the three Rio Conventions.

Decision 2/COP.8: Follow-up to the outcome of the World Summit on Sustainable Development relevant to the Convention and preparation for the sixteenth and seventeenth sessions of the Commission on Sustainable Development (2007)	• Acknowledges the potential of the UNCCD to build on links between combating desertification and land degradation, conservation and sustainable use of biodiversity, adaptation to climate change and integrated water management.

Convention on Migratory Species	
General comments: • The interest of the CMS mainly concerns potential impacts of climate change on migratory species and their habitats, and it has received reports on this subject and held a technical round table on it in 2005. • COP Decisions and Scientific Council mandates follow the same lines of concern.	
Decision	Key elements
COP9 Resolution 9.07: Climate change impacts on migratory species (2008)	• Recognises that ranges of migratory species are changing as a result of climate change. • Recommends that Parties reduce threats to migratory species from climate change or climate change mitigation or adaptation activities. • Requests the incorporation of climate change impacts and adaptation measures into species-specific Action Plans.
COP8 Resolution 8.13: Climate change and migratory species (2005)	• Asks the Scientific Council to give high priority to climate change in its future programme, including strengthening links with UNFCCC
COP5 Recommendation 5.5: Climate change and its implications for the Bonn Convention (1997)	• Asks the Scientific Council to establish a working group to review scientific work done on climate change by others including CBD, Ramsar and UNFCCC; and calls for proposals for strengthening links with them.
COP8 Resolution 8.2: CMS Strategic Plan 2006–2011 (2005)	• Includes Target 2.6, for actions to be initiated or carried out to mitigate the most serious threats to migratory species, including from climate change.

African-Eurasian Waterbird Agreement	
General comments: • Similarly to the CMS (see above), the interest of AEWA mainly concerns potential impacts of climate change on migratory waterbirds and their habitats.	
Decision	Key elements
MOP4 Resolution 4.14: Adoption of conservation guidelines (2008)	• Adopts Guidelines on measures to help waterbirds adapt to climate change (document 4.28)
MOP4 Resolution 4.15: The effects of climate change on migratory waterbirds (2008)	• Notes the findings and recommendations of a Review of the effects of climate change on migratory waterbirds, presented to the MOP as document 4.27, including modelling of various type of impacts and identification of specific threats. • Advises on priorities for climate-related waterbird research, monitoring and conservation action.
MOP3 Resolution 3.17: Climate change and migratory waterbirds (2005)	• Instructs the Technical Committee to assess the effects of changing climate on migratory waterbirds and possible means of adapting to these changes. • Urges Parties to address climate change in so far as it is likely to change the ecological character of wetlands and affect the behaviour of migrating

	waterbirds. • Stresses the importance of including adaptation measures in species action plans.

European Wildlife (Bern) Convention	
General comments: • As with CMS and AEWA (see above), the Bern Convention's interests have concentrated on climate change impacts and adaptation, rather than measures for mitigation.	
Decision	Key elements
Standing Committee Recommendation 135: Addressing the impacts of climate change on biodiversity (2008)	• Gives a range of cross-references to relevant decisions and policies of other bodies, and to various technical reports. • Recognises the need to adapt conservation work to the challenges of climate change so as to minimise its impact on the species and natural habitats protected under the Convention • Recommends climate change adaptation activities for biodiversity according to guidance given in an Appendix to the Recommendation, which notes that successful adaptation requires biodiversity conservation to be integrated with other land and water management activities.
Standing Committee Recommendation 122: Conservation of biological diversity in the context of climate change (2006)	• Recommends the setting up of a Group of Experts on Biodiversity and Climate Change, to provide support on issues concerning impacts and adaptation.

4. Wetlands and the REDD negotiations

Voluntary carbon trading schemes

4.1 Before briefly outlining potential links with wetlands in the negotiations on REDD in the Kyoto CDM-funded sense described in section 1 above, it should be noted that a number of voluntary carbon trading initiatives of relevance are also in existence. Some of these may continue outside the UNFCCC regulatory regime; while others are conceived as pilots for what could eventually be embraced by that regime.

4.2 For example, the World Bank launched its first prototype carbon fund in 2000, and now has ten carbon funds, including BioCarbon (BioCF) which is financing 3 pilot REDD projects. In 2007 the Bank launched the Forest Carbon Partnership Facility, designed to give pilot experiences of REDD in a few countries as background for the UNFCCC negotiations (the payment structures are based on options under discussion in the Convention), as well as helping to build capacity on the issue (World Bank, 2007). Indonesia has recently (March 2009) asked for support under this programme for reducing emissions from loss of both forests and peatlands. The FAO, UNDP and UNEP are also collaborating in a joint UN REDD programme, financed by a multi-donor trust fund established in 2008.

4.3 Among NGOs, Wetlands International operates a Global Peatland Fund for investing in peatland restoration and conservation projects with associated socioeconomic development goals, initially in Indonesia, which are designed to generate verified and tradeable carbon credits (Voluntary Emission Reductions,

or VERs). The Fund will trade the VERs on international voluntary carbon markets, with a portion of profits going to the Fund's investors and the rest being used to support community development projects. The UK's Royal Society for the Protection of Birds is active with partner organisations in Europe on peatland restoration schemes (in Belarus, in particular) designed to operate in similar ways.

REDD in the post-2012 regime for the Kyoto Protocol

4.4 UNFCCC COP13 Decision 1/CP.13, known as the Bali Action Plan, sets out the process for preparing decisions to be made at COP15 in Copenhagen in December 2009 which will frame implementation of the Convention and the Kyoto Protocol in the period beyond 2012. The scope of this mandate includes deliberations on "various approaches, including opportunities for using markets, to … promote mitigation actions".

4.5 Numerous proposals have been developed by a variety of governments and organisations for schemes to institutionalise and finance REDD formally in the post-2012 regime. Parker et al (2008) give a guide to 33 of these proposed schemes, with cross-references to the UNFCCC technical documents relating to each of them. In addition, an open source data set and model to evaluate the carbon emission and financial implications of alternative approaches to providing positive economic incentives for REDD has been built by the Collaborative Modelling Initiative on REDD Economics, a consortium including the Terrestrial Carbon Group, Conservation International, the Environmental Defense Fund, the University of East Anglia and Woods Hole Research Center, with input from the International Institute for Applied Systems Analysis and the Prince's Rainforests Project.

4.6 Aspects of the legal options for an international agreement on REDD have also been reviewed by FIELD (2008). An agreement could take any one of a number of forms, including amendments to the Kyoto Protocol, a separate Protocol, or other decisions under the parent Convention. FIELD point out that in some places there are already relatively comprehensive frameworks of national nature conservation and forestry legislation that could provide an entry point. They also point out however that many indigenous peoples and local communities whose livelihoods depend on forests are not supportive of current proposals for REDD, because of concerns about their involvement and the frequent lack of good institutional structures for cascading benefits to them. FIELD therefore emphasise the need for REDD funds not to be focused solely on reducing emissions, but also to contribute to the improvement of forest governance and the achievement of the Millennium Development Goals. Moreover, a badly designed REDD mechanism could reinforce the perception of forests as valuable only or mainly in terms of the carbon that they contain, rather than taking into account other ecosystem services and types of values.

First wetland dimension: wetland forests

4.7 There are perhaps three potential dimensions to a linkage between wetlands and the concepts for REDD that are currently being advanced. First, as explained in section 1 above, some forests are also wetlands. UNFCCC Decision 2/CP.13

recognised that "reducing emissions from deforestation and forest degradation in developing countries can promote co-benefits and may complement the aims and objectives of other relevant international conventions and agreements", and this would be a basis for perceiving one form of synergy between REDD and the Conventions on wetlands (Ramsar) and biodiversity (CBD), for example. Avoiding deforestation can support conservation of soil, water, biodiversity and non-timber forest products.

4.8 As has been pointed out, however (Ecosystems Climate Alliance 2009), the carbon in natural ecosystems is resilient, and it might be more proper to consider biodiversity conservation as a core benefit rather than (in the terms of Decision 2/CP.13) a "co-benefit".

4.9 Moreover, given the different carbon storage potential of different soil types, and the high capacity for example of peatlands in this regard, the primary emission reduction objective itself can be enhanced in forests which are also wetlands (such as peatswamp forests). Hence even in terms solely of the achievement of Kyoto targets, there may be good reason (ie greater carbon benefit per dollar) to give priority to forested wetlands in implementing schemes for REDD.

Second wetland dimension: forest hydro-security

4.10 The functioning of any forest system that is subject to measures for REDD will be dependent on a range of external influences. A key one of these is the hydrological context: every forest exists in a water catchment, and the management of that catchment, of its water resources and all activities that can affect these will be a crucial part of the equation. This in turn is heavily bound up with the functioning of wetlands in the landscape. Forest management that involves replenishment planting may be particularly dependent on adequate water supplies for supporting young trees; but more generally too, forest areas involved in REDD should be more viable in areas where there is better wetland conservation and river basin management.

Third wetland dimension: extending REDD concepts to cover wetlands

4.11 There has been substantial advocacy in recent years for considering the role of ecosystems other than forests in contributing to "avoided destruction and degradation" methods of reducing emissions under the Kyoto Protocol. Peatlands and other wetlands have been acknowledged as obvious contenders for integration into a post-2012 framework (Royal Society, 2008).

4.12 Part of this debate relates to land use, land-use change and forestry (LULUCF) activities of developed countries within their own territory under Articles 3.3 and 3.4 of the Protocol. Discussion has focused in particular on the scope of coverage of emissions from soil and vegetation, where non-agricultural/non-forestry wetland soils and vegetation are not currently covered (Ecosystems Climate Alliance, 2009; Ramsar Secretariat et al, 2007; Wetlands International, 2008b; Wetlands International, 2009b). Since the focus of the present paper is on ideas for Certified Emission Reduction credits to be generated under Article 12 of the Protocol from CDM-funded projects in developing countries, this Art 3.3-3.4 dimension is not considered further here.

4.13 An extensive treatment of options for inclusion of peatlands in post-2012 climate agreements is given in Pena (2008), much of which would be relevant to a consideration of the scope for inclusion of other wetland types as well. Pena's review is critical of the human activity-based approach to addressing land management issues in Kyoto, and suggests for the future that an approach based on land types and sectors would be more effective, on the grounds of burden-sharing advantages and the ability to accommodate multiple-use situations.

4.14 Pena also assesses options for improving the effectiveness of the Clean Development Mechanism in this regard, given the potential for problems arising for example from competition between projects, or between CDM investment and investment in mitigation activities in developed (Annex I) countries. Although wetlands could be addressed by the CDM on a project basis, the general discussions on REDD have tended to focus on national-level approaches, which Pena's review considers attractive in respect of wetlands too.

4.15 The review recommends that to be effective it will be important to reduce the effort required to set baselines; to ensure that all relevant gases are within the scope; to cover both conservation and restoration of wetlands, and to minimise negative impacts on prices of land, food, feed and fibre. Further work is also recommended on quantifying relevant wetland carbon balances (see also Lloyd, in prep); among other things to ensure proper valuation of resulting credits.

4.16 In terms of instruments, current models for REDD could be expanded to cover wetlands; or analogous/parallel wetlands-specific models could be constructed. There is a concern that given the relatively small number of countries with a significant extent of peatlands compared to those with forests, it may be harder to mobilise a groundswell of advocacy among developing countries for a wetland-specific mechanism than it has been for REDD. This may make expansion of REDD a more practical option than aiming for a separate mechanism.

4.17 Concern about the magnitude of credits that might come to the market was one reason for the original exclusion of avoided deforestation from eligibility under the CDM, and this would need to be addressed for peatlands/wetlands too, perhaps by capping the proportional tonnage of targets that can be met from this source. Pena also considers ways to minimise problems arising from leakage (changes in emission balances that are attributable to projects but which occur outside the project boundaries), and cites some possible differences between forest schemes and peatland schemes in respect of the respective advantages of "project" and "national" approaches.

4.18 In the interests of developing countries which have not experienced significant deforestation, approaches to REDD have been suggested which aim to reward conservation of forests that are not currently experiencing deforestation or degradation. These would for example set "forward-looking" baselines that incorporate working assumptions about potential future loss/degradation, by reference to "business as usual" (BAU) scenarios or to historic trends. The same ideas could be applied to a mechanism for wetlands. These ideas are however at the ambitious end of what might be achieved in the current negotiations.

4.19 As one indication of the scale of ambition that may or may not be appropriate, at the time of UNFCCC COP14 in December 2008, the working group on methodologies for REDD decided (in relation to pilot projects) only to address above-ground biomass, and not to consider any soil carbon component. It has been said that this is a result of uncertainties surrounding measurement of soil emissions, but Wetlands International maintains that these difficulties have been exaggerated, at least as far as peat soils are concerned (Wetlands International website news item, 10 December 2008).

Links between Conventions

4.20 The decision tables in Section 3 above provide a stock-take of adopted intergovernmental positions and technical advice on wetlands and climate (mitigation) interactions, which offer several sources of additional political and scientific support for the potential extension of REDD-type concepts to cover wetlands.

4.21 Clearly one angle is the scope for synergy and mutual reinforcement among the agendas of the respective Conventions when a REDD or "wetland-REDD" mechanism produces associated benefits for conservation of biodiversity, wetlands, protected areas and so on. As pointed out in this paper, however, the links are potentially significant in a variety of other ways; not least that the implementation of these other Conventions can contribute much to the emission-reduction aims of the UNFCCC, including in ways that support socioeconomic objectives in developing countries at the same time.

4.22 The Ramsar Convention in particular is in a position to provide a direct read-across of international concepts, principles, methods and standards for understanding what constitutes avoidance of degradation of wetlands, and for guidance and norms on issues such as inventory, monitoring, vulnerability assessment and hydrological functions. These would be essential ingredients in operating any REDD-type mechanism in relation to wetlands.

4.23 Ramsar, like others, is making efforts to improve the science of calculating wetland carbon balances, though the forthcoming Ramsar Technical Report (Lloyd, in prep) and the on-going work of the Scientific & Technical Review Panel. This will offer vital assistance to the moves to address wetlands under Kyoto, and cooperation between the respective Conventions will be of increasing importance as the negotiations for UNFCCC COP15 gather pace.

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