



Payments for Ecosystems Services Findings and Perceptions from the USA

Policy Summary

Jenna Coull, **Forestry Commission**
Gregory Valatin, **Forest Research**

January 2008

Contents

Executive Summary	2
1. Introduction	3
2. Payments for Ecosystem Services	5
3. Mitigation Banks	7
4. Water Quality Trading	10
5. Carbon Trading	13
6. Forestry Offsets	15
7. Tropical Deforestation	17
8. Conclusions	20
Glossary	21

Executive Summary

i. Often ecosystem services have been regarded as 'free goods', particularly those for which there is no market. In many cases this has led to ecosystems becoming degraded or destroyed through a lack of incentives to protect them. Payments for Ecosystem Services (PES), including public and voluntary payment schemes and cap and trade schemes, attempt to rectify this, often through market mechanisms. The use of these schemes has become more widespread particularly in the USA and some developing countries.

ii. If designed and implemented well PES offer great potential for protecting ecosystems. There remain a number of unresolved issues around ensuring that additional services are provided, in assessing the cost and environmental effectiveness of schemes, ensuring that property rights are clearly defined and designing schemes to take account of multiple ecosystem services.

iii. In the field of wetland and conservation protection in the USA, large mitigation banks have emerged which provide credits for an area of wetland or habitat created or restored elsewhere. They are now widely accepted in the USA as the most effective option in meeting stringent offsetting legislation in this arena.

iv. Water quality trading has developed in the US, representing an innovative approach to meeting requirements under the Clean Water Act. This approach has been largely overlooked in Europe so far.

v. In the absence of, but partly in anticipation of, federal regulation, the world's largest voluntary carbon market in the world has emerged in the US. Of the 40 US carbon offset providers, 10 of these offer forestry offsets. For forestry, there are interesting questions about the role of government in these markets. Potential roles in the monitoring, verification and certification of projects are being considered as well as being a provider of offset credits. This raises some concerns about the competitiveness of the market, and potential conflicts of interest. Any involvement by the FC in the UK voluntary market will face similar scrutiny.

vi. In the absence of international agreement on tackling deforestation, PES has emerged as one way in which tropical deforestation can be tackled. Schemes for forestry have been adopted in several countries, including Costa Rica and Mexico.

1: Introduction

1.1. In May 2007, Jenna Coull of the Forestry Commission and Gregory Valatin of Forest Research undertook a research trip to the United States to explore experiences and perceptions in the field of Payments for Ecosystem Services. It is an area which has gained increasing recognition as a innovative mechanism to appropriately value ecosystem services, and its use has developed rapidly in the US and other economies, with schemes covering carbon, biodiversity and water markets.

1.2. In conjunction with Forest Trends (an international NGO) an itinerary was put together incorporating meetings and site visits with a range of individuals and organisations in Washington D.C., California and Oregon (table 1). We would like to take the opportunity to thank them for their hospitality and the insights they provided in this field.

1.3. The trip had several objectives to increase our understanding and awareness of PES, these are outlined below:

- To gain a broad understanding of the coverage and workings of PES in the areas of carbon, water and biodiversity in the USA and in California in particular;
- To understand the current role of the Forestry sector in PES and it's future potential;
- To gauge the performance of PES generally and in particular on cost-effectiveness and environmental standards ;
- To ascertain the perceptions of PES as a tool for environmental management;
- To explore the potential for combining PES across the carbon, biodiversity and water markets.

1.4. This collection of policy notes presents key findings most relevant to the UK. At the end of each note are several discussion points aimed at invoking further thought and debate. A longer research document outlining the issues in more depth accompanies this document.

Table 1: Host organisations in the USA

Public Sector	Voluntary	Private
<ul style="list-style-type: none"> • US Forest Service • US Department of Agriculture • Environmental Protection Agency • US Corps of Engineers • US Fish and Wildlife Service • National Association of State Foresters • Clean Water Services • World Bank • Oregon Department of Forestry 	<ul style="list-style-type: none"> • Forest Trends • Winrock International • Conservation International • WWF-US • Environmental Defense • Centre for Resource Solutions • Pacific Forest Trust • Resources for the Future • Ecotrust, Oregon • The Climate Trust , Oregon • Willamette Partnership 	<ul style="list-style-type: none"> • Westervelt • Wildlands Inc • Parametrix • Environmental Banc & Exchange, LLC • Ecosystem Investment Partners

2: Payments for Ecosystem Services

2.1. Ecosystems provide us with a range of goods and services, play a role in regulating the climate and contribute to the cultural environment in which we live. The Millennium Ecosystem Assessment in 2005 concluded that 15 of the 24 ecosystem services assessed were degraded or used unsustainably.

2.2. This situation can be attributed to there being insufficient incentive for landowners to protect ecosystems as they may receive little benefit from them. Economists often classify most ecosystem services as public goods, goods that are non-rivalrous and non-excludable in consumption. This means that consumption of the good by one individual does not reduce the amount of good available for consumption by others and no one can be excluded from using that good. Putting a value on a good helps provide an incentive for people to produce it, and in the case of ecosystem services conserve it. Payments for Ecosystem Services attempt to tackle this by offering a framework of financing and paying for these services. A broad definition of a Payment for Ecosystem Service is 'any mechanism involving paying for an ecosystem service'.

2.3. Types of schemes under this definition vary. "Cap and trade" systems set an appropriate level of pollution and provide permits to polluters to meet this cap. Trade takes place between polluters who can reduce their pollution at a low cost and sell on their permits to those who cannot. Examples in this field include regulation-driven carbon markets, for example EU-ETS and water quality trading. Offsets are widely viewed as providing compensation for damage to ecosystems, for example forestry projects used to offset carbon emissions. In the USA, compensatory mitigation programmes in wetlands and conservation provide alternative habitats for damage done elsewhere. Public payments to land owners to protect the land can also fall under the PES banner, and include programmes such as the Federal Conservation Reserve Programme in the USA which provides technical and financial assistance to farmers to address environmental concerns on their land. Finally, action through private self-organised and voluntary market deals, such as voluntary carbon markets in the USA, are examples of individuals or organisations working together towards voluntary agreements.

2.4. There remain some significant unresolved issues with Payments for Ecosystem Services. Firstly, ensuring that additional services are received for any payments is crucial but is often difficult to ascertain. Second, there are issues around distributional justice, as PES can be seen to target those landowners that have not been managing their land well, while those who are already doing so potentially receive nothing. Third, property rights need to be clearly defined to ensure payments reach those legally responsible for the ecosystem. Fourth, schemes need to be well designed to ensure they are easily understood and not over burdensome administratively. Finally, the issue of "bundling" of services where a piece of land provides more than one service requires further attention. Forests provide a range of ecosystem

services across, for example, carbon sequestration, biodiversity, and watershed protection and landscape beauty. The majority of schemes tend to focus only on one of these, and may conflict with other services. Including several services within the same scheme adds to the complexity of design. Despite these issues, PES are important as they offer policymakers another tool to deliver policy. If correctly designed and monitored, they offer a means of appropriately valuing ecosystems in an innovative and flexible way.

References

- Costanza et al (1997) The Value of the World's Ecosystem Services and Natural Capital, *Nature* 387,253-260.
- Landell-Mills, N. and Porras, I.T. (2002). Silver Bullet or Fools' Gold? A Global review of Markets for Forest Environmental Services and their impact on the poor. IIED, London: www.iied.org/pubs/pdf/full/9066IIED.pdf.
- Powell, White, Landell-mills (2002): Developing Markets for the Ecosystems of Forestry Services *Forest Trends*.
- Salzman, J. (2005): The promise and perils of payments for ecosystem services, *International Journal of Innovation and Sustainable Development*, 1 (1,2), 5-20.
- The Millenium Ecosystem Assessment (2005) *Ecosystems and Human Wellbeing*, UNDP / Island Press: <http://www.millenniumassessment.org/en/index.aspx>.
- Wunder, S. (2007). The Efficiency of Payments for Environmental Services in Tropical Conservation, *Conservation Biology*, 21 (1), 48–58.

3: Wetland and Conservation Banks

Summary

- Legislation in both the Clean Water Act and Endangered Species Act in the USA has an allowance for offsetting damage to habitats. Subsequently, mitigation banks have emerged which sell credits for parcels of newly created or restored habitats to help developers comply with this legislation.
- There are similar provisions in Europe through the Habitats Directive, although, to date in the UK, compliance with the Directive has been tackled through the planning system.
- Nevertheless the emergence of mitigation banks raises some interesting ways in which compliance can be met.

Discussion

3.1. The Clean Water Act 1977 regulates the discharges into water in the USA from infrastructure and development projects, covering impacts on water quality and wetlands. Section 404 sets out a requirement for 'no net loss of wetlands'. In order to gain a permit for any activity, the applicant must show that he/she has taken steps to avoid the damage were possible, minimise the impacts and finally provide compensation for any unavoidable impacts.

3.2. Initially, meeting this final compensatory requirement was achieved by creating wetlands close to the impact site. This resulted in a patchwork of small mitigation sites across states, which were difficult to maintain by the developer and difficult to monitor for the Environmental regulator. A report by the Environmental Research Council in 1991 deemed the majority of these sites inappropriate and poorly designed¹.

3.3. Mitigation banks emerged in the 1990s when entrepreneurs realised the potential of creating larger wetland sites. Wetlands were created or restored in advance of anticipated losses. Once established, they can gain mitigation credits that can be used to offset permitted losses. These credits can be used either by the person who established the bank or sold on to another party. The Army Corps of Engineers (responsible for waterways) and the Environmental Protection Agency regulate the banks. In order to be established, the banks go through a five-year stringent planning process with assurances being given for environmental and financial standards, including an endowment plan for their maintenance in perpetuity. Credits are released over the five-year period of establishment. There are now over 500 banks in the USA, the majority being for profit. Between 2000-2005, over 9,229 hectares were established, with an average price of \$36,000 per hectare, and a range of between \$5,000 to \$250,000 per hectare. The range reflects the

¹ See: Committee on Mitigating Wetland Losses: Compensating for Wetland losses under the Clean Water Act, 2001, Appendix A.

differences in types of wetlands, and the location and price of the land they were built upon².

3.4. In the field of conservation, similar banks have emerged to comply with legislation under the Endangered Species Act of 1973. This legislation protects and recovers species on which ecosystems depend through the listing of either 'endangered' or 'threatened'. Section 10 requires a Habitat Conservation Plan, outlining any activity which may impact these species proving that avoidance, minimisation and compensation rules have been followed. Although at a much smaller scale, conservation banking has emerged to meet compliance to the compensatory requirement. Currently 44,000 hectares of land have been established under these banks.

3.5. The banks have obvious advantages to developers. It is probable that it is both cheaper and quicker to buy credits than establish sites near developments. A key factor is that on buying the credit, the liability and subsequent risk to meeting legislation is transferred to the banker. There are arguably economies of scale for biodiversity at a larger site than many dispersed smaller sites. The regulators like them as they are easier to monitor and regulate.

3.6. Nevertheless there are still important issues which remain to be resolved. In terms of quality, very little is known about the comparison of destroyed ecosystems to those of the mitigation banks. Ratios of land are used to get round this issue, for example, for every hectare destroyed, 2 hectares have to be created, but questions remain as to whether this adequately reflects the quality difference. There is also an issue around the geographical equality of destroyed or degraded sites to mitigation sites. A recent study assessing 12 mitigation banks in Ohio showed that despite fairly stringent regulation only 3 sites met the criteria set out by regulators for successful wetland creation. Moreover, several of these sites were known to be failing but had not been called to account by the regulators.

3.7. In the UK, the EU Habitats Directive is the main piece of conservation legislation, and introduces a range of measures using a network of protected sites known as 'special areas of conservation', which also covers woodlands. Along with designated sites of 'special protection areas' under the Birds Directive, these make up the Natura 2000 network of sites across Europe. In the UK, compliance with this legislation is dealt with through the planning system. A developer requests consent from the planning authority to develop, an assessment is made on the likely impact and consent is only granted if there is no detrimental impact on the site. If this is not evident, changes may be made to the project to meet these requirements. In terms of offsetting, there is allowance for this in the legislation if it can be proved to be in the public interest. In the UK this requires a decision by the Secretary of State, who must take measures to replace the habitats affected. The Directive does not explicitly state the location of the habitat, or indeed the quality of it, just that the 'overall coherence of Natura 2000 should be protected'. This

² Source: the National Mitigation Banking Association, extracted from Ecosystem Marketplace.

suggests that offset areas could fall out with the UK regions, which may not be desirable.

3.8. There was the perception among many stakeholders in the USA that mitigation banks are the best solution to meeting the legislation requirements there. It introduces a new player in conservation through the mitigation bankers, who have emerged as a strong lobby group in this field. However, the legislation only indirectly protects forestry from development [WHY?], and forecasts by the Forest Service project that a total of 21.7 million acres of private forestry will be transformed from rural to urban by 2030.

Discussion Points

- Can mitigation banking be a useful model in complying with EU legislation?
- Could the principal of 'compensatory mitigation' be extended more widely in the UK, for example to cover forestry lost?

References

- Background to mitigation banking from Ecosystem Marketplace market watch: http://ecosystemmarketplace.com/pages/marketwatch.backgrounder.php?market_id=4&is_aggregate=0
- Board on Environmental Studies & Toxicology: Compensating for Wetland Losses under the Clean Water Act, National Academy Press, 2001. http://www.nap.edu/openbook.php?record_id=10134&page=R1
- Ecosystem Marketplace, News: Guest Editorial: Wetland Mitigation Banking, Deborah Fleischer, July 2005.
- Ecosystem Marketplace, News: Ohio Study shows mitigation Banks Not living up to Potential, Alice Kenny, August 2006.
- Environmental Protection Agency, guidance on mitigation banks: www.epa.gov/owow/wetlands/guidance/mitbankn.html
- Johnson, White, Perrot -Maitre (2000) Developing Markets for Water Services from Forests: Issues and Lessons for innovators. Forest Trends
- Kate, Bishop, Bayon: Biodiversity Offsets: Views, experience and the business case. Published by IUCN, November 2004.
- Natura 2000: <http://www.natura.org/sites.html>
- Robertson, Morgan: Emerging ecosystem service markets: trends in a decade of entrepreneurial wetland banking. Frontiers in Ecology and the Environment 2006; 4 (6); 297-302.
- State of Knowledge: Ecosystem Services from Forests, October 2006 USDA: <http://www.fs.fed.us/ecosystemservices/pdf/state-of-knowledge.pdf>
- Stein, S. M. et al. (2005). Forests on the Edge, Housing development on America's private forests, USDA, Forest Service, <http://www.fs.fed.us/projects/fote/reports/fote-6-9-05.pdf>.
- United States Forestry Department: [Http://www.fs.fed.us/ecosystemservices/watershed.shtml](http://www.fs.fed.us/ecosystemservices/watershed.shtml)
- Federal site for Endangered Species: <http://www.fws.gov/endangered/>

4: Water Quality Trading

Summary

- The Clean Water Act in the USA and the Water Framework Directive in the UK are instrumental pieces of legislation in water quality. Both allow for the use of trading as a tool to meeting regulatory goals.
- Whilst the UK has so far opted for more traditional instruments such as rules and licensing, the USA has several water trading schemes which are used to meet regulations.

Discussion

4.1. Managing the water environment could be considered to be relatively straightforward in comparison to other ecosystems. It is a localised resource, there may be relatively few stakeholders in the watershed area and often payments made will benefit those upstream that have a greater influence on the quality of the water environment. Water quality trading refers to a cap and trade system, whereby an acceptable level of pollution is set and permits are issued to that level. Those who can reduce pollution cheaply do so and sell permits to those who cannot.

4.2. In the USA, the Clean Water Act 1977 is the primary federal law that governs the water environment. The act has a requirement to eliminate the discharge of toxic substances into water, including nutrients and sediments. Rivers that fail to meet the required standard have 'total maximum daily load' requirements imposed upon them, essentially a cap on pollution. Water quality trading has been experimented with to meet these requirements since the 1980s. A study by the Environmental Protection Agency in 2003 highlighted evidence that 40% of rivers, 45% of streams and 50% of lakes with total maximum daily load requirements were failing to improve. Subsequently, the Environmental Protection Agency issued a Water Quality Trading Policy.

4.3. The majority of trading programmes in the US focus on reducing phosphorous or nitrogen bases pollutants, but there are also programmes to reduce sediment runoff and temperature. Programmes exist across the USA. For example, in Long Island, Connecticut, the state established a reduction goal of 64% for nitrogen by 2014 for 79 Publicly Owned Treatment Works. An Equivalent Nitrogen Credit was developed to account for differing locations and variations in nitrogen delivery efficiency to the various water bodies in the region. An Act passed through Connecticut State legislature guaranteed the legal rights of those involved, with establishment of a Nitrogen Credit Trading Program also being authorised. The first year of trading produced more than the required level of reduction in nutrient load, with the environmental infrastructure programme buying excess credits to clear the market.

4.4. The Clean Water Services in the Portland metropolitan area serves 480,000 residents from one watershed around the Tualatin River. They established a Thermal Load Credit Trading Plan, renewed every five years which allows for the offsetting of excess thermal load from the 4 main

wastewater treatment facilities through flow augmentation and riparian planting. (Flow augmentation refers to changing the watercourse to influence the speed at which the current flows, and riparian planting is the planting of native species to restore the natural habitat). Over the first two years, credits from these activities more than offset the thermal load from the wastewater treatment facilities.

4.5. In the UK, the Water Framework Directive is the main piece of legislation that has impacts on the water environment. The legislation was transposed into UK law through the Water Act 2003 in England and Wales, and the Water Environment and Water Services Act in Scotland. It aims to ensure that all inland and coastal water bodies reach 'good ecological status' by 2015. Good ecological status is not yet defined. The focus of the legislation is on the preservation and restoration of the water bodies, not just minimising negative impacts.

4.6. The legislation requires that the most cost-effective means be used to meet the requirements. In the UK, the response to this legislation thus far has been General Binding Rules on low risk activities, and registration and licenses on high-risk activities. The majority of activities fall under the small low risk activities that are captured under General Binding Rules. Water Quality trading has not been considered to be a viable option, due to the perceived administrative costs.

4.7. Water quality trading offers several advantages to policymakers. Where it is appropriately utilised, it can offer economic benefits in reduced administration costs. Arguably it may achieve environmental standards quickly and encourage innovation in meeting these.

4.8. There remain some unresolved issues. Property rights are a tricky issue. In the USA, conservation easements have often had to be obtained for work along a watercourse. The landowner retains ownership rights but signs off the land for management to the easement holder into perpetuity. Tackling non-point pollution (i.e. pollution from agricultural and urban run off) is more difficult, but there are examples of trading systems where these sources have been included.

4.9. Overall, water quality trading is considered favourably as a tool in the USA, and the use of forestry through measures such as riparian planting is seen to be part of this solution.

Discussion Points

- Has water quality trading been adequately explored as a policy tool to meet the WFD?
- Would water quality trading be cost effective in the UK?

References

- EPA: Water Quality Trading Assessment Handbook. Can Water Quality Trading Advance Your Watershed's goals?
- Kieser and Feng Fang (2005) Water Quality Trading in the United States, Ecosystem Marketplace
http://ecosystemmarketplace.com/pages/article.news.php?component_id=3954&component_version_id=5625&language_id=12
- Robertson and Mikota (2007) Water Quality trading and wetland mitigation banking – different problems and different paths?, National Wetlands Newsletter, 29(2) Environmental Law Institute
- SEPA WFD pages: <http://www.sepa.org.uk/wfd/index.htm>

5: Carbon Trading

Summary

- Regulatory-driven carbon markets are currently under development in the USA, mainly at state and regional levels.
- The USA has the largest voluntary carbon markets in the world.
- The EU Emissions Trading Scheme is currently by far the largest regulation-driven carbon market in the world, but excludes forestry.

Discussion

5.1. Although the USA did not ratify the Kyoto Protocol on climate change, there has been significant activity at both a regional and state level. Currently, there are 11 federal climate mitigation bills under consideration by the Congress and Senate, mostly involving carbon trading. It is unlikely that any of these bills will be passed before 2009 and, in the absence of regulations, the world's largest voluntary carbon markets have emerged. The Chicago Climate Exchange is by far the largest of these markets - in 2006, it accounted for 10 mtCO₂e traded, representing an estimated 2/5ths of all global voluntary market trades.

5.2. At state level, over a dozen states have adopted their own emission targets. Some are ambitious. For example, California and Oregon have respective emissions targets of 80% and 75% below 1990 levels by 2050. This compares with a target of 60% in the UK, considered by some to be unachievable. Other states have introduced restrictions on any targets being set.

5.3. There are currently two regional carbon-trading initiatives under development in the US. The North East Regional GHG Initiative (RGGI) incorporates 10 states under a cap-and-trade system, including Connecticut, New York and New Hampshire, and is due to be launched in January 2009. The Western Climate Initiative covers six states including Oregon, California, Utah and British Columbia.

5.4. Many of these schemes, both at a state and regional level, include proposals to include forestry offsets. For example, although coverage in California is still to be finalised, it looks almost certain that they will be included. This will set a precedent for the Western Climate Initiative and future federal legislation. Much of the activity in the voluntary markets is thought to be in anticipation of federal legislation and in the hope of influencing federal systems. It is likely then that if forestry is included in state schemes, it will also be included in a federal one. A recent survey suggests that forestry offsets account for around 50% of the transactions in 'over-the-counter' voluntary markets in the US,³ compared to 36% of such transactions worldwide.

³ Defined as all voluntary market transactions except those on the Chicago Climate Exchange (Hamilton et al, 2007).

5.5. However, problems with offsets remain. The quality of offsets is very variable and there is a fear that low quality offsets could undermine the markets. The Chicago Climate Exchange, California Climate Action Registry and the Climate Group are developing several standards for offsets. A certification scheme for offset providers is being developed by a non-profit organisation, the Center for Resource Solutions based on a previous scheme for renewable energy. The certification process is aimed at increasing confidence in the markets and ensuring that consumers get what they paid for.

Discussion Points

- What work is required to ensure that the design and implementation of forestry offsets satisfies the requirements of robust and effective trading schemes?

References

- Capoor, K. and Ambrosi, P. (2007) state and trends of the carbon markets, World Bank
- Hamilton, K. et al (2007). State of the Voluntary Carbon Market 2007: Picking Up Steam, Ecosystem Marketplace.
- Yowell, M.A. and Ferrell, J. K. (2005). Using Carbon Sequestration Projects to Offset Greenhouse Gas Emissions, *Natural Resources and Environment*, 20, 1, 25.
- For forestry sector emissions statistics see:
www.statistics.gov.uk/STATBASE/Expodata/Spreadsheets/D5690.xls

6: Forestry Offsets

Summary

- The US government is developing ways to facilitate the forestry sector's involvement as an offset provider to voluntary markets.
- The US Forest Service obtains some private sector funding for forestry offset demonstration projects.
- Standards and certification schemes under development in the US encompass forestry offsets.
- The voluntary code for the UK market developed by DEFRA excludes forestry offsets.
- The current UK position is that offsets are of value when used in conjunction with, rather than instead of, reducing emissions.

Discussion

6.1. Public authorities in the US are facilitating forestry offsets in a range of ways. The Farm Bill, which is the major legislation governing agriculture, rural development, renewable energy, and conservation policies is currently under review and includes proposals to create a new standards board for forestry offsets, and provide audit and certification services. There are also some state-level initiatives providing incentives for the development of forestry offset projects. These include obligations in Oregon and Washington State for new power plants to offset a proportion of their emissions and the creation of the Oregon Forest Resource Trust.

6.2. The Oregon Forest Resource Trust, established in 1993 as part of the Oregon Department of Forestry acts as a source of finance for projects on non-industrial private forestland. The Trust provides one mechanism by which electricity generation companies can meet the requirement to offset some of their emissions in order to obtain a permit to operate a new plant. For example, PacificCorp a Portland-based utility invested \$1.5m in 1999 to provide 1.16 Mt of carbon dioxide offsets over a 100-year period from a 2,400 acre site.

6.3. The US Forest Service currently obtains limited private sector finance for offset demonstration projects on public land through the National Forest Foundation's Carbon Capital Fund. The US Forest service is also considering helping to provide insurance for private sector offsets, using premiums to provide carbon benefits by undertaking forestry projects that would not otherwise occur. As with public forestry offsets, a key issue is establishing a baseline for public forestry and demonstrating that projects provide additional benefits. There is also the concern about 'political leakage', whereby politicians might subsequently decide to reduce public funding on the basis of the increased private funding.

6.4. The inclusion of forestry offsets allows higher emission reduction targets to be met. Some commentators have argued that there is a potential conflict of interest in the Forest Service being both the provider and regulator. If the scale of public involvement was to increase significantly this would be

regarded by some as creating unfair competition with private sector offset providers, distorting the market. Conflicts of interest could also arise if the federal or state Forest Services also became involved in monitoring, verification, or certification of projects. There remain scientific uncertainties around including fossil fuel/material substitution benefits and questions around including soil carbon measurements.

Discussion Points

- How should the FC participate in voluntary carbon markets (e.g. offset provider, certifier, or in helping provide insurance)?
- Should the proportion of emissions reductions accounted for by forestry offsets (once allowed) within the EU ETS be limited?
- How could incentives for carbon sequestration provided by inclusion of forestry offsets within the EU ETS be combined with a neutral impact on landowners' profits?

References

- CCX (2007) Registry Offsets Report
<http://www.chicagoclimatex.com/offsets/projectReport.jsf>
- Hamilton, K. et al (2007). State of the Voluntary Carbon Market 2007: Picking Up Steam, Ecosystem Marketplace.

7: Tropical Deforestation

Summary

- Tropical deforestation is extensive and currently accounts for around a fifth of global carbon dioxide emissions. This source is currently excluded from financing under the Kyoto Protocol Clean Development Mechanism (CDM).
- Costs of reducing tropical deforestation are generally relatively low per tonne of carbon saved compared to other approaches.

Discussion

7.1. Deforestation in the tropics is estimated to be between 5-10% each year, an equivalent area of the size of Portugal. At this rate, little may remain of the tropical forests by the middle of the century. This rate of deforestation accounts for around a fifth of global CO₂ emissions. Drivers of deforestation are diverse and include population pressures, high timber or agriculture prices and insecure property rights.

7.2. Avoiding deforestation is relatively inexpensive compared to other measures for reducing carbon emissions. The Stern Review (2006) highlighted this issue: 'A substantial body of evidence suggests that action to prevent further deforestation would be relatively cheap compared with other types of mitigation, if the right policies and institutional structures are put in place'. Under the Kyoto Clean Development Mechanism, only afforestation and reforestation projects are currently allowed, so that international carbon financing opportunities to reduce tropical deforestation are limited. Proposals to establish a Forest Carbon Partnership Facility under the World Bank to pay for emissions reductions are currently under consideration.

7.3. Some official development assistance for reducing tropical deforestation is available, such as the £50m allocated in the 2007 UK budget to support 10 Congo Forest countries as part of the new Environmental Transformation Fund. However, there has been a marked decline in total international development assistance going to forestry since the early 1990s⁴. In 2006, the UN Forum on Forests agreed to mobilise significant new finance to reverse the decline in official development assistance for sustainable forest management⁵.

7.4. Limited funding is also provided through voluntary carbon markets. A recent global survey of 'over-the-counter' offset providers indicated that avoided deforestation projects account for around 3% of such transactions worldwide, with projects located predominantly in South America⁶.

⁴ Khare. et al (2005)

⁵ UNFF (2007)

⁶ Defined as in footnote 2 above.

7.5. Of the wide range of PES schemes adopted in developing countries, a few have a forestry-focus. It is too early for comprehensive evaluation, but initial evidence on their performance is mixed.

7.6. The first developing country to establish a large-scale PES system was Costa Rica. A 1996 Forest Law provides the basis for landowners to be paid for carbon sequestration, hydrological services, biodiversity conservation, and visual amenity. Agreements were negotiated with hydropower companies and other water users to pay for hydrological services provided by upstream forests, and Certifiable Tradable Offsets, relating to carbon savings mainly from avoided deforestation, sold to the Norwegian government, the World Bank Biocarbon Fund, and others. Financed primarily by a fossil fuel tax, and to a lesser extent by ecosystem service users and international development assistance, landowners can apply for fixed payments per hectare for sustainable forest management.

7.7. The PES scheme in Costa Rica is widely credited with helping halt and reverse deforestation. However, it is difficult to separate its impact from other policy influences, such as a prohibition on clearing forests, and factors such as falling profitability in livestock rearing. Findings of empirical studies have been mixed. Sánchez-Azofeifa et al. (2007) report that in 1997-2000 deforestation rates in Costa Rica were not significantly lower in areas receiving payments than in other areas, and some studies suggest that many participating landowners would have protected their forests anyway in the absence of payments.

7.8. Agreeing international financing mechanisms in this field is essential. Well defined property rights and strong institutional structures are important, as corruption can be a significant impediment to development. Collaboration with governments is vital for PES to work in most places. PES can be seen to efficiently target those ecosystems most at risk, but at the detriment of excluding those who preserve the forests anyway and to the benefit of those who would otherwise have degraded or destroyed them.

Discussion Points

- Should credits for avoided deforestation be covered by international regulation-driven carbon trading systems (e.g. the EU ETS)? If so, should there be a cap on the proportion of emissions reductions they account for, or is a parallel trading system desirable?
- To what extent should PES schemes target areas of high biodiversity or focus on poverty reduction, rather than maximising carbon savings, or avoided deforestation per se?
- How can PES schemes be designed that are both effective in avoiding deforestation and reward good stewardship of those already conserving forests?

References

- Alix-Garcia, J. et al. (2005). An Assessment of Mexico's. Payment for Environmental Services Program, FAO, Rome; <http://are.berkeley.edu/~sadoulet/papers/FAOPEsreport.pdf>.
- Chomitz, K. et al (2007). At Loggerheads? Agricultural Expansion, Poverty Reduction, and the Environment in the Tropical Forests. World Bank Policy Research Report, IBRD / World Bank, Washington DC.
- Grieg-Gran, M. (2006). The Cost of Avoiding Deforestation, Report prepared by IIED for the Stern Review, HM Treasury, http://www.hm-treasury.gov.uk/media/1/4/stern_review_supporting_technical_m_greiggran_261_006a.pdf.
- Hamilton, K. et al (2007). State of the Voluntary Carbon Market 2007: Picking Up Steam, Ecosystem Marketplace.
- Khare, A. et al (2005). Forest Finance, Development Cooperation and Future Options, RECEIL, 14, 3, 247-254.
- Landell-Mills, N. and Porras, I.T. (2002). Silver Bullet or Fools' Gold? A Global review of Markets for Forest Environmental Services and their impact on the poor. IIED, London.
- Sánchez-Azofeifa, G. A. et al. (2007). Costa Rica's Payment for Environmental Services Program: Intention, Implementation, and Impact, Conservation Biology, forthcoming.
- Sohngen, B. (2006). Cost and potential for generating carbon credits from reduced deforestation, Workshop on reducing deforestation in developing Countries, Bad Blumau, Austria, Oct, <http://www.ioanneum.at/REDD/REDD-Sohngen.pdf>.
- Stern, N. (2006). The Economics of Climate Change, HM Treasury / Cambridge University Press: http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm.
- UNFF (2007). Highlights from Enabling Sustainable Forest Management: Strategies for equitable development, for forests for people, UN Forum on Forests, New York.

8: Conclusions and recommendations

8.1. Evidence in the US indicates that, if well designed and implemented, PES offer considerable potential in protecting our ecosystems.

8.2. Findings from the USA demonstrate the importance of regulation as a driver for PES schemes. Mitigation banking, for example, is driven principally by requirements under the Clean Water Act and Endangered Species Act. Much of the activity in the voluntary carbon markets is believed to be driven by the expectation of regulation in this field. PES also has the potential for large distributional impacts, for example a USA wide carbon trading scheme could lead to the creation of wealth over \$100bn.

8.3. Further research and policy analysis is needed on some aspects of PES in order enable effective mechanisms to be put in place. For example, PES focuses on delivering additional improvements and does not necessarily reward those who are already providing the services desired. In some cases, there are no solid methodologies for testing the improvement in ecological standards, and comparing costs to other options is difficult. It is possible that this information will improve as the number and ways in which PES is implemented continues.

8.4. Mitigation banking offers an attractive mechanism for compliance with compensatory or offsetting regulation. There may be merit in considering if and in what circumstances this mechanism may work in the UK.

8.5. The scope of water quality trading should be explored further as a means to meeting requirements under the Water Framework Directive. In the carbon markets, there are many ways in which the government could get involved in the carbon markets as facilitator, regulator or participant. The role for government needs to be carefully considered to avoid potential conflicts of interest. Finally, PES schemes to avoid tropical deforestation appear to have much potential, but face some hurdles in terms of institutional and governance issues.

8.6. Further work is recommended to:

- assess the feasibility of PES to meet regulations in the UK
- explore the potential role of forestry in these schemes; and,
- examine the design (i.e. robust-ness) of potential PES mechanisms.

8.7. Collaboration and co-ordination should be sought with other stakeholders (including government departments, environmental regulators and interest groups). Developments in PES elsewhere should be monitored to inform this process. A joined-up approach among potential stakeholders will help to develop policy mechanisms that gain wide support and that maximise effectiveness.

Glossary

Additionality

An impact arising from an intervention is additional if it would not have occurred in the absence of the intervention.

Army Corps of Engineers

The United States Army Corps of Engineers (USACE) is responsible for providing engineering services to the US nation, including planning and designing, building and operating water resources and other civil works projects; designing and managing the construction of military facilities and providing design and construction management support for defence and federal agencies.

CDM (Clean Development Mechanism)

Under Kyoto, CDM allows Annex I (industrialised) countries to meet their emission reduction targets by paying for greenhouse gas emission reductions in non-Annex I (developing) countries.

EU –ETS (European Union Emissions Trading Scheme)

In January 2005, several European sectors including energy, metals, minerals and pulp and paper came under EU Emissions Trading Directive that sets carbon dioxide gas emission limits. If a company emits less than its allowed limit, it may sell its extra allowance to other companies who are not meeting their targets.

Farm Bill

The Farm Bill is a major US federal law that deals with agricultural production, food and nutrition assistance, rural development, renewable energy, and conservation policies. Typically the bill is reviewed at 5-year intervals.

Forest Trends

Forest Trends is an international non-profit organisation that works to expand the value of forests to society; to promote sustainable forest management and conservation by creating and capturing market values for ecosystem services; to support innovative projects and companies that are developing these new markets; and to enhance the livelihoods of local communities living in and around those forests. <http://www.forest-trends.org/whoweare/mission.htm>

Public Goods

A public good is a good that is non-rivalrous and non-excludable. This means that consumption of the good by one individual does not reduce the amount of good available for consumption by others and no one can be excluded from using that good.

Kyoto Protocol

The Kyoto Protocol is a legally binding agreement that arose out of the United Nations Framework Convention on Climate Change (UNFCCC) to tackle climate change through a reduction of greenhouse gas emissions. Countries (those listed in Annex I) are legally bound to reduce man-made greenhouse

gases emissions by approximately 5.2% by 2012. Individual countries have their own reduction targets outlined in Annex B of the Kyoto Protocol. The text of the protocol was adopted at the third conference of the parties to the UNFCCC in Kyoto, Japan, on 11 December 1997.