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Foreword

On taking office, Prime Minister David Cameron pledged to make the UK Coalition Government the “greenest government ever” and committed to “protect wildlife and...restore biodiversity”. The RSPB warmly welcomed these ambitions, as did many thousands of nature lovers. The RSPB’s Letter to the Future, which calls on governments across the UK to invest in nature for the wellbeing of present and future generations, has been signed by well over 300,000 people in the past year.

Decision-makers and society now face the challenge of achieving these green ambitions during a prolonged period of fiscal austerity. In this report, we examine options for government to encourage business and civil society to contribute more to achieving UK environmental goals. We focus specifically on ways of unlocking private funds for nature conservation.

The challenge of funding nature conservation coincides with our growing understanding of the vast and varied benefits of the natural world. Existing markets do not capture many of these values. There are opportunities to capture more of the benefits of nature conservation – from carbon storage to water quality – and market these to consumers. There are also opportunities to have polluters pay more towards mitigating the impact their activities have on the environment. We explore some of these options in the following pages.

Many of these options for conservation financing rely heavily on the involvement of civil society and business. Although parts of these sectors already contribution heavily towards nature conservation, it is right to ask if they can do more or act more efficiently. However, it is not possible for government to walk away from nature conservation. Most of the proposals we have identified require government intervention. Where opportunities exist for new markets in environmental goods and services, government must help to set the rules, endorse and regulate those markets. Because many of nature’s assets are ‘public goods,’ there will always be a central role for governments to play in managing nature for public benefit.

There is growing debate about the need for governments across the UK to develop new approaches to managing the natural environment. For example, in Wales, A living Wales – a new framework for our environment, our countryside and our seas will be produced in early 2011. In addition, the UK Government will produce a Natural Environmental White Paper in Spring 2011. These initiatives provide a once in a generation opportunity to make a positive change to the future conservation of our natural environment. We hope they will address the longer-term needs for achieving our biodiversity goals. To do so, they will need to contain clear plans for how governments intend to achieve their ambitions for the natural world.

The UK failed to meet its commitment to halt biodiversity loss by 2010 because politicians did not develop delivery mechanisms in tandem with its goals. Financing will be critical to
meeting biodiversity goals in the future. If we do not fund nature, we will continue to miss our environmental goals, and leave a world for our children that is more impoverished than the one we enjoyed.

We hope this report will be a starting point for discussions about how to ‘do better next time.’ We do not think we have all of the answers, but we hope here to open a debate. We invite other NGOs, industry bodies, businesses and governments across the UK to join us in this critical and timely debate.

Martin Harper
Head of Sustainable Development
Executive Summary

In the UK, the availability of public funds for nature conservation is shrinking, just as the need to conserve biodiversity becomes more acute. Although government’s direct role in funding nature conservation remains critical, it is timely to reflect on the role non-government sectors can play in complementing government investment. This report examines suggestions for new sources of non-public finance to help fill the conservation finance shortfall that currently stands at over £275 million a year.

Main findings

Conservation credits

A strong biodiversity offset market has the potential to reduce environmental damage from development, simplify the planning system and increase funding for conservation. Likely funding raised is £53 million a year. Alternatively, a simple levy on housing would not track biodiversity loss and gain, but would be a quick and simple way to raise funding for nature conservation.

Environmental taxes on peat, fertiliser and pesticide use

The UK Government has stated that it wishes to increase the proportion of tax revenue accounted for by environmental taxes. Peat, fertiliser and pesticide taxes have the potential to help address damage to biodiversity and natural resource degradation, while raising much needed revenue. The funds raised and the behavioural change expected depends on a variety of factors that are outlined in this chapter.

Non-government sector funding and delivering of conservation

Businesses and civil society have a key role in addressing the biodiversity challenge. Innovative measures and the creation of partnerships can help to raise funds and deliver better conservation. However, there are clear limitations to the actions of both groups, representing a need for governments to support the non-government sector.

Privately funded payments for ecosystem services (PES)

Businesses can benefit by establishing privately financed payments for ecosystem service schemes. The promise for new schemes is greatest in water quality management; outside of this area the potential remains limited.

Overall, this report reveals that there are clear limitations to how much more non-government sectors can do alone. This is due to a lack of information and understanding
about the benefits from biodiversity and ecosystem services, and the absence of private benefits in the short term which reduces incentive to pay for the delivery of natural services.

There is also a common conclusion across chapters that voluntary markets are unlikely to raise any significant amount of additional funding.

**Moving Forward**

Businesses and NGOs will need to do more to help fund and deliver nature conservation. However, they will need the support of governments across the UK. Governments could adopt a range of approaches to encourage and enable non-government action, such as:

**Unlocking private finance**

- Prepare to establish markets in biodiversity offsets
- Consider using a simple housing levy to raise funds for biodiversity in the absence of more formal offset markets
- Set up regulated markets in ecosystem services that encourage the development of private PES, or help mediate the development and management of private PES between private landholders and businesses
- Implement forms of green taxes to reduce negative behaviour and raise revenue, particularly around peat, pesticide and fertiliser use.

**Improving information flows and promoting the Big Society**

- Research and test metrics to measure biodiversity and other ecosystem services to assist with offsets, PES and eco-labelling markets.
- Support biodiversity and ecosystem service research to more clearly establish the links between services and beneficiaries, particularly businesses, and publicise benefits of investing in ecosystem services
- Encourage cooperation between civil society, business, and government, to jointly approach the shortfalls in establishing markets for biodiversity and ecosystem services.

Even if all of these options are implemented, it is not clear if it will be enough to ensure governments’ green ambitions are met. One thing is for certain: doing nothing is not an option.
Chapter 1 - Introduction

We are entering a period of deep and prolonged fiscal austerity in the UK. With less money likely to be available for nature conservation, alternatives will need to be found to ensure governments across the UK meet their green aspirations. The UK Government has expressed its hopes that a Big Society can increase the delivery of societal benefits with less recourse to the public purse. Businesses, individuals, communities, and NGOs are integral to this Big Society. This report includes ideas on how private enterprises and civil society might engage in nature conservation financing. Understanding what scope there is for greater use of non-public sector financing for nature conservation is important in planning for the biodiversity challenges ahead. Similarly, the limitations of private approaches need to be properly understood.

The challenge

In 2001 the UK, along with other EU Heads of State, committed to the target of stopping biodiversity loss by 2010. The following year, at the World Summit on Sustainable Development, governments across the world agreed to slow the rate of biodiversity loss. The UK based its response on the UK Biodiversity Action Plan (BAP), which had originally been devised in 1994 following the Rio Earth Summit in 1992. The UK BAP consists of national strategies and action plans to identify, conserve and protect existing biological diversity and enhance it where possible. The ambition is to address biodiversity both inside and outside of the protected area network.

The Millennium Ecosystem Assessment (MA) demonstrated forcefully why biodiversity matters and why these targets make good economic sense. It concluded that humans are placing such a strain on the planet’s ecosystems that we are undermining the ability of nature to support future generations. The assessment estimated that two-thirds of the world’s ecosystems are in decline, and services such as water purification, genetic resources and pest regulation are threatened. The UK National Ecosystem Assessment, due in Spring 2011, is likely to reveal negative trends in ecosystem services at the national level.

It is clear now that the 2010 target has not been achieved.

- When last assessed in 2008, 24% of BAP species and 42% BAP habitats in the UK were still declining
- Over half of SSSIs are not in favourable condition in England and Wales, and more than a quarter of listed features are in unfavourable condition in Scotland and Northern Ireland.
- Between 1970 and 2008, the UK farmland bird index – a key indicator of countryside health – fell by 47%
- Between 2000 and 2008, the number of seabirds breeding around the UK declined by over 600,000 or 9% of the UK population.
Encouragingly, this missed target has been replaced by the 2020 European target, which was adopted by EU Heads of States in March 2010. It aims at “halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss”. The UK Government has committed to meeting this target.³

Moreover, there are important Coalition Agreement commitments to:

- Introduce measures to protect wildlife and promote green spaces and wildlife corridors in order to halt the loss of habitats and restore biodiversity. Take forward the Marine and Coastal Access Act and ensure that its conservation measures are implemented effectively.
- Maintain the Green Belt, Sites of Special Scientific Interest (SSSIs) and other environmental protections, and create a new designation – similar to SSSIs – to protect green areas of particular importance to local communities.
- Increase the proportion of tax revenue accounted for by environmental taxes.

However, a clear message from the 2010 target, and the numerous global aid targets we have failed to meet, is that commitments agreed in the absence of the mechanisms needed to achieve them, inevitably fail. Achieving the UK Government’s green commitments requires us to continue to protect our finest wildlife sites, to recover threatened species and habitats and to manage the wider countryside and the marine environment sympathetically for wildlife. While reform of governance and policy will be necessary, it is clear that funding is a fundamental requirement to achieve this new target. One of the most detailed estimations for managing biodiversity was produced in 2010 for the UK BAP.⁴ The annual amount estimated for 2010-2015 is £837 million. Based on estimated current expenditure, this leaves a funding gap of £273 million a year. We also need to fund a comprehensive system of marine protected areas. In the absence of increases in public funding this gap will get bigger without alternative action.

**The role of governments in nature conservation**

We know that the value of the world’s ecosystem services, supported by biodiversity, is immense. The interim report of the world leading The Economics of Ecosystems and Biodiversity (TEEB) estimated that, without action, biodiversity loss will cost a staggering 7% of global GDP per year by 2050. The TEEB for policy makers demonstrated that “understanding and capturing the value of ecosystems can lead to better informed and possibly different decisions; accounting for such value can result in better management; investing in natural capital can yield high returns; and sharing the benefits of these actions can deliver real benefits to those worst off in society.”

Despite this value, the environment continues to be degraded. Failure of free markets to always achieve a socially efficient outcome has long been recognised as a reason for widespread damage to our life supporting services. Environmental attributes are not reflected in market prices, which mean they are not fully taken into account when people make decisions.
Many environmental goods and services are public goods, which means that they are non-rivalrous (one person using the service doesn’t reduce its availability to others) and non-excludable (it is not possible to exclude someone from using the good). Because of these attributes, it is difficult to charge for their provision, leading to a lower than optimal level of supply (i.e. less than society wants). Biodiversity – the variety of life in all its forms - is a clear example of a public good – one person benefiting from the existence of biodiversity does not diminish someone else’s ability to enjoy it, and one cannot stop anyone else in the world from benefiting from biodiversity. Additionally, many of the beneficial services biodiversity supports, such as carbon sequestration, are public goods to some degree.

Another key problem that limits the efficiency of markets is the existence of negative environmental externalities that occur when individuals and businesses do not take environmental damages into account in their decisions.

HM Treasury identifies market failure due to externalities as one of the main rationales for UK Government intervention. Government intervention can broadly take one of the following forms:

- Direct delivery of goods and services
- Regulation (legal intervention such as stopping negative activities)
- Suasive (changing people’s priorities and values)
- Market based instruments
- Improving information

Given the current fiscal constraints, the role of direct intervention is going to be more limited, which means that the other instruments will be of growing importance.

The instrument chosen to address an environmental problem will depend partially on the way property rights are allocated. The term ‘property rights’ refers to legal rights to a good or service, and benefits that stem from that good or service. Often there are multiple property rights associated with a piece of “property” in the sense of land ownership. For example, a person may own a piece of land, but not the mining, timber or water extraction rights on that land. We typically distribute property rights based on precedence, the law and community expectations.

The polluter pays principle is a moral position that can help with distributing property rights, with many international institutions and UK Governments believing that society has the right to a non-polluted environment in many instances and that the polluter should thus bear the costs of their actions. This may lead UK Governments to clarify current property rights. For example, we might decide that society rather than an industry owns the right to clean air, and the polluter should therefore pay for looking after it/not damaging it. These factors may change over time. Some of the options explored in this report would involve reallocation of property rights in accordance with the polluter pays principle.
Outline of this report

This report focuses on market mechanisms and interventions that will generate finance from sources other than the UK Government purse. Consequently, no measures will be assessed that include increasing or re-allocating current public funds, or any command and control regulation. This focus aims to tailor the options laid out in this report to the circumstances faced by the current governments across the UK.

We have also chosen to focus on instruments with a natural environment focus, rather than carbon or other issues such as waste management. This is not because climate change is not a key policy objective but because there are many other people working on climate instruments.

A further critical issue for government and civil society is whether our nature conservation objectives are being delivered cost effectively. There are many instruments available that may increase the cost-effectiveness of current spending. For example, conservation auctions are a different way of distributing agri-environment funds that may be more cost-effective in some situations. Although the legalities of employing conservation covenants (easements) in the UK are unclear, if clarified they may offer a more cost-effective way of achieving conservation outcomes, as they only require compensation for some property rights that are removed rather than the whole bundle of rights. They may also encourage long-term voluntary conservation. Current UK Government policies could be reviewed to ensure they do deliver public goods effectively, and revised if not. For example, the Common Agriculture Policy could re-distribute Single Farm Payments, which offer unclear objectives, to payments that support public goods. However, these issues of cost-effectiveness are beyond the scope of this report, and will not be discussed any further.

In this report, we examine the following instruments:

- Conservation credits – biodiversity offset market and development levy
- Green taxes on peat extraction, fertiliser and pesticide use
- Greater contributions from NGOs and businesses to financing the natural environment, e.g. through eco-labelling, innovative charging mechanisms, and greater cross-sector cooperation
- Privately funded payments for ecosystem services

For each, we have tried to estimate the potential size of each market, and highlight factors that will impact this potential. While these attempts are necessarily crude we believe it is crucial to have some understanding of their potential limitations for when governments across the UK decide which approaches to pursue. The UK Government has a large task in trying to reconcile the need to cut public funding with its green ambitions. We hope that the options outlined in this report help stimulate debate about the potential for the private sector to be able to do more in financing nature conservation.
4 Although it is not clear what the new Coalition UK Government will do with BAP, it will remain the most recent costed biodiversity action for the near term. GHK Consulting, 2010, Costs of the UK Biodiversity Action Plan – Update, DEFRA.
Chapter 2 - Potential for a market for conservation credits

A strong biodiversity offset market has the potential to reduce environmental damage from development, simplify the planning system and increase funding for conservation. Alternatively, a simple levy on housing would not track biodiversity loss and gain, but would be a quick and simple way to raise funding for nature conservation.

This chapter attempts to assess the potential size of the market for offsets in the UK. The analysis deals with biodiversity offsets from development, as ecosystem services more generally will be even harder to quantify and face potential conflicts between services. The purpose is not to provide recommendations for offset design, or the RSPB’s view on offsets, but to highlight the potential for a market and the likely issues that will impact this market size. The figures are often illustrative rather than definite. A simpler alternative system of a housing levy to raise conservation finance is also outlined. The two options together are referred to as conservation credits. Although planning and nature conservation are devolved matters, this chapter deals with the potential UK demand and supply for offsets.

Background

Biodiversity offsets are conservation actions designed to compensate for the residual impact on biodiversity caused by development and other land use change activities, to ensure no net loss of biodiversity (or another policy objective), after appropriate steps have been taken to avoid and minimise impacts. A recent report for the European Commission defined habitat banking as “a market where credits from actions with beneficial biodiversity outcomes can be purchased to offset the debit from environmental damage. Credits can be produced in advance of, and without ex-ante links to, the debits they compensate for, and stored over time”.\(^1\) In this chapter, we also discuss an alternative compensation mechanism for biodiversity losses, a conservation housing levy in. We use the term “conservation credits” to apply to both these options.

Offset schemes have been used in the United States for decades to compensate for wetland loss, and have been extended to help achieve no net loss in habitats for endangered species. Offset schemes have recently become popular in Australia, with complex schemes launched in New South Wales (NSW) (BioBanking) and Victoria (BushBroker) in the last five years. A recent research report found 39 existing offset programmes around the world, with another 25 programmes at various stages of development. There are over 600 offset banks worldwide (including individual transactions) and a conservative estimate of the global annual market size is $1.8-$2.9 billion.\(^2\) The overwhelming majority of this activity takes place within regulated markets within the United States ($1.5-$2.4 billion). The Ecosystem Marketplace estimate that the regulated biodiversity offset market could increase to $10 billion by 2020 and $20 billion by 2050, with the potential for voluntary offsets estimated at $100 million by 2020 and $400 million by 2050.\(^3\)
A requirement for compensating exists under the European Birds and Habitats Directive where development of overriding public interest is predicted to cause damage to Natura 2000 sites or sites occupied by European Protected Species. Historically this has been ex-post like-for-like offsets, though recent changes in UK and EU guidance now require the offset to be fully functioning before damage occurs. However, a system for the loss of non-Natura 2000 biodiversity does not exist yet, though interest in offsets is increasing in the UK and Europe. Recent research includes Defra’s commissioned report *Scoping Study for the Design and Use of Biodiversity Offsets in an English Context* and the European Commission’s report *The use of market-based instruments for biodiversity protection – The case of habitat banking*.

A reason that interest in this mechanism has grown has been the continued loss of biodiversity in the UK, and the missed 2010 biodiversity targets. Establishing an offsets market has the potential to help stem this loss in an efficient manner. It also streamlines the development process by indicating to developers which land is ecologically preferable to build upon. Operating a banking element to an offset or development levy system also has the advantage of encouraging funds to be accumulated in larger projects that are more cost-effective and ecologically functional. All sectors in our economy have a shared responsibility for the past loss of biodiversity, and conservation credits could provide a way to include land-use development in the ambition to restore what has been lost.

The Business and Biodiversity Offsets Program (a partnership between companies, governments and conservation experts) recommends a series of principles be used when designing and implementing offsets, and verifying their success. While these were developed at a global level, they provide a helpful benchmark for considering the design of any offset system within the UK. We assume that these principles would apply to any offsets system developed.

1. **No net loss:** A biodiversity offset should be designed and implemented to achieve *in situ*, measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity.

2. **Additional conservation outcomes:** A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations.

3. **Adherence to the mitigation hierarchy:** A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimization and on-site rehabilitation measures have been taken according to the mitigation hierarchy.

4. **Limits to what can be offset:** There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected.

5. **Landscape Context:** A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach.
6. **Stakeholder participation**: In areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation and monitoring.

7. **Equity**: A biodiversity offset should be designed and implemented in an equitable manner, which means the sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a project and offset in a fair and balanced way, respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognised rights of indigenous peoples and local communities.

8. **Long-term outcomes**: The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project’s impacts and preferably in perpetuity.

9. **Transparency**: The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner.

10. **Science and traditional knowledge**: The design and implementation of a biodiversity offset should be a documented process informed by sound science, including an appropriate consideration of traditional knowledge.

**Offset system**

Offsets can help society address a no net loss of biodiversity objective, or even a net gain objective. The various forms of offsets are outlined in Table 2.1. The current planning system does not ensure this outcome is achieved as, with the limited exceptions (Natura 2000 sites/European Protected Species), there is:

- No requirement to compensate for damage to biodiversity;
- No requirement to monitor and report on loss or damage to biodiversity; and
- No requirement to monitor and report on compensation for loss or damage to biodiversity.

**Table 2.1: different types of offset mechanisms**

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Like for like project level compensation</strong></td>
<td></td>
</tr>
<tr>
<td>(Bespoke project level offset)</td>
<td></td>
</tr>
<tr>
<td><strong>Like-for-like habitat compensation</strong></td>
<td></td>
</tr>
<tr>
<td>targeted at the addressing the damage caused by an</td>
<td></td>
</tr>
<tr>
<td>individual project. Aims to replace the</td>
<td></td>
</tr>
<tr>
<td>species, habitats and ecological functions damaged: most</td>
<td></td>
</tr>
<tr>
<td>likely to be provided after</td>
<td></td>
</tr>
<tr>
<td>Intertidal habitat compensation for damage to an estuarine</td>
<td></td>
</tr>
<tr>
<td>Natura 2000 site by port development e.g. ABP’s Welwick</td>
<td></td>
</tr>
<tr>
<td>managed realignment, Humber estuary, UK</td>
<td></td>
</tr>
</tbody>
</table>
| **Compensation banking**  
(Bespoke aggregated offsets) | Large-scale intertidal habitat compensation at several locations adjacent to an estuarine Natura 2000 site to compensate on a like-for-like basis for the predicted losses of mudflats to sea level rise over the next 50 years from future flood risk management works e.g. Alkborough managed realignment, Humber estuary, UK. |
| Large-scale creation of like-for-like habitat compensation provided in advance of predicted damage by several schemes. Damage is predicted in advance of projects and the required compensation identified and attributed to specific projects. Credits are sold to developers for the appropriate amount of habitat needed to compensate for damage predicted to be caused by their scheme. |  
| **Habitat banking**  
(generic aggregated offsets) | No specific example at present. Unlike compensation banking, there does not have to be a strong relationship between the habitats and species damaged by development and those that benefit from the habitat created. |
| Large-scale provision of habitat from which credits are sold to developers for damage to biodiversity in general. The habitat created does not have to be like-for-like in terms of matching the damage caused by a developer’s scheme. |  

The assumption in this paper is that habitat banking will be encouraged.

The offset system envisaged in this chapter would aim to address non-critical biodiversity losses. Therefore, compensation for damage to Natura 2000 sites and European Protected Species should continue to be dealt with separately under their own regulatory system. Compensation for damage to SSSIs might need to be dealt with outside a broad based offset system, due to the relatively small market, the high value placed by society on the wildlife protected by SSSIs and the associated inherent need for a more bespoke approach to compensating for damage to their interest features. In cases where damaging development still occurs it might be useful to have access to any habitat banks that have created appropriate habitats prior to the damage.

In general all activities that restore or re-create biodiversity (species, habitats or ecosystems) can constitute offsets. Some habitats will not be able to be re-created and so should be excluded from an offsets system. In particular those with long timeframes will not be included such as limestone pavement. Those that depend upon particular soil types will be restricted geographically (e.g. calcareous grassland) but may still have high potential for re-creation in some areas. Other habitats will have more restoration and creation potential.

For the purposes of analysis, we assume the market has been created through compulsory measures as a viable market will only be created if there is a requirement on developers to offset their damage. The Defra report concluded that it was difficult to know if this requirement could be part of current policies with clearer guidance on when and how
offsets are required, or whether a new regulatory driver is necessary. An option suggested to trigger offsets is to strengthen the Biodiversity Duty under S40 of the Natural Environment and Rural Communities (NERC) Act 2006 in England and Wales. The authors suggest that the Community Infrastructure Levy is not the right delivery mechanism for an offsets system and that an alternative could be a more targeted use of s106 planning agreements.

The focus remains on biodiversity rather than wider ecosystem services. This is because measuring and compensating for offsets is difficult enough for biodiversity, but is likely to be possible. Measuring for ecosystem services increases the complexity immensely, particularly as there are likely to be trade-offs between different services.

The best way to deal with the loss of arable habitats is unclear. In other countries such as Australia, it has been possible to elicit conservation credits from farmers with the use of a covenant that assures that the habitat will be protected in perpetuity. This type of covenant, particularly if it involves positive management, might not be possible in England under current legislation.

However, even if perpetual arable management was legally possible, it is still very complex to have arable habitats included on the credit side of an offsets market, especially if planners want to avoid expensive monitoring and need for continual change to the contract over time. This is because it is much harder to ensure that an agricultural system (e.g. growing wheat with appropriate agri-environment measures) remain the same in perpetuity than another habitat type. Due to the risks involved it would probably be quite expensive to have a permanent agreement on agriculture too, and other instruments might be more appropriate. In this chapter, we have not included arable habitats as a habitat to be created – though arable land can still be used to create other types of habitats - but have instead focussed on a range of multiple alternative habitats.

The potential size of an offset market

What follows is a basic attempt to illustrate the potential size of an offsets market in the UK using readily available figures on the annual level of built development, alongside some simplistic assumptions on the biodiversity impact of that development and the cost of compensating for biodiversity loss.

The market will determine the price of credits. There is no need for government valuation or other intervention to set these prices. To get an idea of the possible size of the market, the cost of providing habitat re-creation and ongoing management can be used. The cost of enhancing and creating ecosystems varies between habitat types. A 2006 study for Defra, by GHK Consulting, updated in 2010, revealed a wide range of costs depending on the habitat and the management required.

In this chapter, the cost of offsetting these habitats is calculated based on the average capital cost of restoration and expansion (assuming half of each) per hectare and enough
funds for 200 years of management (which is called the present value) using these updated GHK figures. We assume that a trust fund to provide for ongoing management is created when the credit is established, as happens in the NSW BioBanking system. In the absence of knowing who is likely to provide the offsets, the UK Government’s declining discount rates have been used. This is a conservative approach that ensures the fund will not run out of funds in times of low commercial interest rates.

Some offset schemes, such as BushBroker in Victoria, allow for trading up, where an impact on a lower priority habitat is offset by creating a smaller area of a higher priority habitat elsewhere. However, the protection/restoration hierarchy is not as clear in the UK. In the absence of better information, this calculation assumes that an equal number of BAP habitats are damaged and created.

The calculation follows these steps:

- Loss of higher value biodiversity land to development
- Costs of establishing and managing habitats lost to development
- Costs of land acquisition and administration
- Estimated total size of offset market

**Loss of higher biodiversity land due to development**

Assuming 120,000 homes are built each year (this is the approximate current rate) and a dwelling takes an average 0.0325 hectares, the housing sector use 3,900 hectares a year. Eighty percent of this development is brownfield, which is not necessarily biodiversity free. In lieu of data measuring this direct loss, we assume half of the brownfield land is very low biodiversity value, while half is higher. This is a conservative assumption — Buglife found that of the 478 open mosaic habitats on previously developed land sites surveyed along the Thames Gateway 71% were of significant biodiversity value. This leaves 2,340 hectares (all greenfield plus half the brownfield) that would be in a biodiversity offsets scheme.

This type of market could also apply to industrial and commercial development. The land take for this sector is typically around 20% of total development compared to 57% of the total for housing. This implies that if housing takes 3,900 hectares, then industrial and commercial uses 1,368 hectares. Other types of development are going to be harder to track, or already attempt to offset some of their activity (e.g. large transport projects), and thus aren’t considered in this conservative illustration.

This makes for a total of 3,708 hectares a year.

We have also considered an extreme version of the potential market, to provide an upper limit to the range. The CLG’s most recent Departmental Strategic Objective for housing need was a much higher 240,000 dwellings a year. It is not clear how this level will be achieved in a time where public funding is under pressure, and private investment has slowed. However it is useful as an upper estimate. In this more extreme version, we have also assumed 100% of development is on greenfield/high biodiversity brownfield so all area is...
included (240,000 houses=7,800 hectares using the 0.0325 dwellings/ha figure). We have included an additional 43% of the total developed area (the non-housing portion of the total land take) to represent all other forms of development, including commercial, industrial, transport and small projects (3,354 hectares). This is more than double the area included in the conservative example. This makes a total of 11,154 hectares for the higher range estimate.

**Costs of establishing and managing habitats lost to development**

Without data on types of habitat lost to development, this analysis assumes an average cost of management based on an average of 15 habitats of £117/hectare per year. As discussed, these are converted into the present value over 200 years. The restoration and creation costs are average capital costs per hectare for the same suite of habitats, which is a one-off value of £1,077/hectare.

These are shown in Table 2.2.

**TABLE 2.2: average costs for establishing and managing land**

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Cost per hectare</th>
<th>Total cost for loss of 3,708 ha/yr</th>
<th>Total cost for loss of 11,154 ha/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present value management costs (£/ha) over 200 years</td>
<td>3,734</td>
<td>13,845,672</td>
<td>41,649,036</td>
</tr>
<tr>
<td>Restoration/expansion costs (£/ha) – one-off</td>
<td>1,077</td>
<td>3,993,516</td>
<td>12,128,858</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>17,839,188</td>
<td>53,661,894</td>
</tr>
</tbody>
</table>

The total annual cost of establishing and managing offsets using these assumptions would be £17.8-53.6 million a year.

**Costs of land acquisition and administration**

Although in some instances landholders can convert their land into a new habitat without any purchase, in other cases land will need to be purchased (e.g. by mitigation banks or NGOs). There is no forecast market for the likely development of the offset market. In the absence of data, we have assumed 50% of the land will need to be purchased, and this cost incorporated. The current land price for bare arable land is £15,177/ha. This means 1,854 hectares will cost £28 million in land purchases. For the upper estimate, we have assumed a 100% land purchase cost (i.e. no farmers or NGOs use their own land), which makes for £169 million in acquisition costs each year.

For the conservative example, an additional 15% is added on to represent any administration costs and/or profits for landholders engaged in the transaction. This includes ongoing monitoring costs, which are included in the payment the developer makes into the
trust fund. For the more extreme example, an administration and profit level of 30% is included.

**Estimated total size of offset market**

Using these illustrative figures, the total potential size of the biodiversity offsets market from housing and industrial development in the UK is a conservative **£53 million a year**. Assuming a much higher house building rate; no brownfield development/all brownfield developed high biodiversity value; inclusion of every type of development; and 100% land purchase and higher profits the market size could be **£289 million a year**. This does not factor in the costs of setting up an offset scheme as this is outside the scope of this analysis. These figures are summarised in Table 2.3.

**TABLE 2.3: Summary table of offset market costs**

<table>
<thead>
<tr>
<th>Type of cost</th>
<th>Cost per year, lower calculation (3,708 ha)</th>
<th>Cost per year, upper calculation (11,154 ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management cost (present value 200 years) and restoration cost (one-off)</td>
<td>17,839,188</td>
<td>53,661,894</td>
</tr>
<tr>
<td>Land purchase 50% of total land</td>
<td>28,138,158</td>
<td>169,284,258</td>
</tr>
<tr>
<td>Admin/profit costs 15% for conservative, 30% for larger</td>
<td>6,896,602</td>
<td>66,883,846</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>52,873,947</strong></td>
<td><strong>289,829,998</strong></td>
</tr>
</tbody>
</table>

On a practical point, this mechanism will not be able to be deployed immediately. Some activities in the next few years that could boost the chance of a successful system being implemented include:

- Assessing the likely impacts on biodiversity from development
- Review any new planning frameworks developed by the UK Government in England and assess how no net loss of biodiversity can be encouraged, for example by creating a legal duty to offset where it is shown it is not possible to avoid or mitigate impacts.
- For Scotland, Wales and Northern Ireland, research into how an offsets system could fit within their planning frameworks needs to be undertaken.
- Creating and testing metrics to measure biodiversity
- Assess which land will be involved in the system, and how additionality will be defined
- Review the outputs of the Lawton review and ensure the offset scheme proposed supports its recommendations
- Establish and test guidelines for contracts, monitoring, probity etc

Pilot projects might be useful to develop and test some of these tasks.
**Levy system**

This is a simpler, alternative system aimed at addressing the loss of widespread biodiversity through development, rather than no net loss of biodiversity *per se*. In these cases, development represents a slow nibbling at the edges of biodiversity rather than loss of significant sites, but the cumulative impacts can lead to the continued loss of biodiversity that is still being observed in the UK today. Treweek et al suggest a system with a checklist of features and a suggested cost for the habitat destroyed based on its management costs.  

This is likely to form part of an offsets scheme where there is always some low value sites that do not need a full assessment. This section imagines a new tariff or one that works in conjunction with a compulsory Community Infrastructure Levy.

While waiting for an offset scheme to be developed, or even as an alternative, a simple funding mechanism that could contribute to biodiversity conservation is a levy per dwelling. This will help with addressing the cumulative impact of biodiversity loss through development and the increased impact on natural areas from increased local population. The money could be used in a collective pool that prioritises good quality and cost-effective schemes. A proportion might go to local biodiverse rich green spaces.

When calculating the total amount a housing levy would raise, we include new dwellings on brownfield sites as the residents are still putting pressure on local ecosystems, and will enjoy greater biodiversity provision. Assuming we continue to build around 120,000 homes a year, and we charge £500 per dwelling the total take is £60 million. This could represent an average, with flats and social housing being charged less (or even nothing for new social housing), and houses charged more.

There is evidence to show that a higher price is workable without hampering development. The Interim Planning Framework in Dorset heathland charge raises funds from new housing developments to help mitigate recreational impacts on adjacent Natura 2000 sites. The scheme, which has been successfully operating since 2007, charges £1,724 per house and £1,034 per flat.

Lacking the numbers for the number of units of industrial and commercial buildings built each year, an area rate could be applied. The previous section established that this sector takes approximately 1,368 hectares a year. If the same level compensation fee for housing is applied from the previous section (£14,259/ha based on £52,873,947 over 3,708 hectares), this is an additional £19.5 million a year for the levy scheme.

Based on these assumptions, the **total levy could raise £79.5 million a year**. Obviously, this will change depending on the final level of the levy chosen. If higher house build rates of 240,000 a year are achieved, this increases the levy by £60 million a year, which makes a total of **£139.5 million a year**.
Voluntary schemes

The fee could be operated as a voluntary levy, such as the case with the Community Infrastructure Levy. The recent Defra and EC reports conclude that such a system is likely to have low demand and fail to achieve no net loss. For example, the Defra report says, “regulation is essential to create a sufficient business case and to ensure that conditions are in place for markets to flourish.” The Ecosystem Marketplace also forecasts voluntary biodiversity offsets to raise 1% of the amount raised by regulated biodiversity by 2020. One of the reasons voluntary systems cannot guarantee no net loss is that it does not require a widespread measurement of biodiversity lost and gained.

A voluntary scheme is unlikely to raise significant sums of money for nature conservation. In 2007/08, of the £4.9 billion raised by s106 agreements, only a small amount of funds were used for nature conservation, with the majority of funds being used for affordable housing provision.24 Of the £490 million allocated to direct payments under s106, only £4.8 million was allocated to “Ecology and nature conservation, countryside management and community forests.” Similarly, within in-kind support a very small proportion - £1.9 million out of £144.5 million – was given to nature conservation. This is likely to include mandatory compensation for European protected species, so not be entirely voluntary. There is no reason to suppose a voluntary S106 agreement will raise more funds in the future than this.

Even if a voluntary scheme could raise the funds, small and scattered projects have been shown to be less cost-effective and ecologically functional. For example, the direct payments for nature conservation under s106 are an average of £35,000 each. Local markets may be too small to allow for trading. Without a larger market to encourage banking, this would mean many small scattered, low-value sites across the country.

There are also risks to governments from a voluntary, unmonitored market. In California, a large conservation bank went bankrupt in 2005, potentially exposing the government to step in to assume large financial liabilities.25 Inadequate oversight of endowments was a contribution to this problem, and as a result, state wildlife agencies now use special software to track the financial obligations of these banks.26

Conclusion

A biodiversity offset system in the UK could be worth around £53-289 million a year. The wide range reflects the impact of changing a few key assumptions such as house build and source of offsets. A levy could raise £80-140 million a year, and is obviously dependent on the level chosen.

These simple illustrations indicate that there is likely to be significant potential for an offsets market in the UK to raise non-government funds for conservation. It is likely that both of the options outlined will require government intervention to clarify expectations and set rules. The formal biodiversity offsets system may require more development, but has the clear advantage of being more likely to ensure no net loss of biodiversity. This approach also has
the advantage of developing a market for credits, which would increase the efficiency of compensation provision in the UK. The levy (or a voluntary offset scheme) would not directly tackle biodiversity loss from built development and therefore could not guarantee no net loss of biodiversity. However, it would be a relatively quick and simple way to help fund conservation, and could draw on the experience of schemes that already operate, such as the Dorset Heathlands scheme. It could even play a role in raising funds while a more complete system is developed, which would help raise urgently needed funds to help meet the 2020 biodiversity target. A voluntary system is unlikely to play much part in either fundraising or meeting no net loss of biodiversity.


4 Treweek, J, ten Kate, K., Butcher, B., Venn, O., Garland, L., Wells, M., Moran, D. and Thompson, S., 2009, Scoping study for the design and use of biodiversity offsets in an English Context, DEFRA.


8 See http://www.banc.org.uk/Events/AGM/Alkborough.pdf for more information.

9 Treweek et. al., 2009, Scoping study for the design and use of biodiversity offsets in an English Context, DEFRA.

10 Section 106 agreements are a legal agreement between a developer, the planning authority and other parties with an interest in the land.


14 The habitats used are wood pasture parkland, native woodland (7 HAPs), lowland heathland, upland heathland, coastal and floodplain grazing marsh, purple moor grass and rush pastures, lowland calcareous grassland, lowland dry acid grassland, blanket bog, upland calcareous grassland, upland hay meadows, coastal vegetated shingle and fens.

15 RICS, Global Real Estate Weekly, May 21st 2010


17 Ibid.


21 These are the 15 habitats outlined earlier, from GHK Consulting, 2010, Costs of the UK Biodiversity Action Plan – Update, DEFRA.

22 RICS Economics, RICS rural land market survey, July 2010.

23 Treweek, J, 2009, Scoping study for the design and use of biodiversity offsets in an English Context, DEFRA.

24 Crook et. al., 2010, The Incidence, Value and Delivery of Planning Obligations in England in 2007-08, Department for Communities and Local Government: London


Chapter 3- Environmental taxes

Peat, fertiliser and pesticide taxes have the potential to help address damage to biodiversity and natural resource degradation, while raising much needed revenue. The funds raised and the behavioural change expected depends on a variety of factors that are outlined in this chapter.

The Coalition’s Programme for Government states the aim to increase the proportion of the overall tax revenue that is accounted for by environmental taxation. Such fiscal instruments can correct market failures relating to the natural environment, and reduce the environmental damages that are done by private industry. They also offer opportunities to raise revenue, which could be reinvested in conservation activities, or else contribute to other policies, such as income tax reform. The UK Government also intends to fund its deficit reduction with 20% of taxation revenues, towards which environmental taxes could potentially make a contribution.

Taxation measures can ensure that damage to UK biodiversity is accounted for in the decision making of private agents such as landholders and resource users. This is in line with the polluter pays principle. A green tax will encourage the private sector to manage their businesses with a better understanding of the costs of their decisions. This should also lead to greater investment, and job creation, in green alternatives.

Most taxation policies will both raise revenue, and cause behavioural change, delivering benefits to society via both of these avenues. However, it is important to note that these outcomes exist as trade-offs, and it is useful to the policy making process to clearly identify its objectives regarding these outcomes, and the ways in which benefits will be delivered.

This chapter aims to propose practical ways for the UK Government to employ fiscal instruments in the peat, pesticides, and fertiliser markets to help reduce damage to biodiversity, and raise valuable sources of revenue. The case for each tax is assessed, and different options for each tax are presented, along with key considerations. Finally, some broad suggestions for government action are noted.

Peat

Peat is commercially extracted from lowland raised bog, a rare and slow forming habitat that contains rich and rare biodiversity and function as an effective carbon store. 94% of this habitat has been lost in the UK, with the 1960’s surge in peat extraction for use in horticultural products causing the biggest recent impact. 1 Peatlands are home to a multitude of species, including unique insect eating plants, butterflies, dragonflies and numerous birds, which would struggle for survival if their habitat was completely lost. In acknowledgement of these issues, the UKBAP includes the objective for lowland raised bogs for “90% of the total market for soil improvers and growing media to be peat free in the UK
by 2010”. This goal has been missed by some distance, with alternatives to peat currently making up only 58% of the growing media and soil improver markets.³

Peatlands can be sources or sinks for greenhouse gases (GHGs), and are important stocks of carbon and nitrogen, forming the UK’s largest terrestrial carbon store. Commercial peat extraction causes carbon to be released into the atmosphere, contributing to the UK’s carbon footprint, and global climate change. Addressing these emissions would help to achieve the objectives laid out in the 2008 Climate Change Act for an 80% reduction in greenhouse gas emissions by 2050 compared to 1990 baseline, and at least 26% below 1990 levels by 2020³.

Valuing the environmental impact of peat extraction through carbon emissions can give an indication of the non-market costs associated with peat extraction. CO₂ emissions from peat extraction in the UK in 2007 of 1,308,400 cubic metres⁴ were 280,250 tonnes⁵, giving an emissions factor of 0.214 tonnes of CO₂ per cubic metre of extraction. Using this factor, total UK peat extraction in 2009 of 942,100 cubic metres produced over 200,000 tonnes of CO₂ emissions, and total peat consumption in the UK in 2009 of 2,963,200 cubic metres⁶ produced over 630,000 tonnes of emissions. Using the latest central non-traded carbon price of £51.70⁷, peat extraction costs society roughly £11 per cubic metre, and total peat consumption in the UK costs around £32.5 million.

This significant cost to society is not reflected by the prices of peat or peat-based products. Furthermore, it must be considered as a floor valuation as it ignores damage to biodiversity done by peat extraction from lowland bogs.

These environmental concerns are compounded by the length of time that peat takes to form, at a rate of roughly one centimetre every ten years, making extraction in the short-term an even more significant threat to the long-term ecosystem services delivered by this habitat.⁸

A recent Defra report shows that the rate of decline in peat replacement by alternatives in growing media and soil improver markets is slowing. At the current rates of decline for the proportion of peat supplied to horticultural markets compared to alternatives, the aforementioned UKBAP objective for lowland raised bogs will not be achieved until 2050. It is clear that alternatives to peat are currently well established within the market, but they are often not competitive with peat on price. Making them more price competitive by penalising the producers and consumers of peat for the environmental damage they cause, would help reduce the degradation of lowland bog habitats, and help the UK Government achieve its stated objectives for biodiversity and climate change.

Given the high costs to society of peat usage, a ban on peat extraction is the preferable policy option. If this is not considered possible in the short term, a tax on usage could be used to help mitigate some of the damage, and raise revenue.

In 2001 the Government designated 3 large peat extraction sites as Special Areas of Conservation (SAC), and paid over £17m in compensation to the extraction firms.⁹ This is an
example of government expenditure that may not be viable in the future. In the current climate, adopting a polluter pays approach to policy seems appropriate, to make the private sector accountable for the damage it causes, and encourage innovation and entrepreneurialism in green alternatives.

Facilitating the move towards sustainable alternatives to peat will have additional benefits for the environmental sector. Green waste will be diverted away from landfill, instead being recycled and used to form organic compost and soil improvement products. This process will ease pressure on current landfill, and create waste recycling jobs in the UK, helping to strengthen the UK’s green economy. Further R&D and engagement in green alternatives would also follow a tax, driving prices for alternative growing media and soil improvers down. This process would again be facilitated by the fact that many growing media producers currently offer both peat and alternative products, meaning firms’ internal infrastructure for substituting production is largely already in place.

Market Analysis

Peat usage in horticultural growing products (soil improvers and growing media) has been declining in recent years, with alternatives playing an increasing role in the industry. In 2009 the total volume of peat and alternatives used in these products was 6,975,100 cubic metres, of which 42% was peat, and 58% alternatives such as bark or organic composted waste. Due to an increase in demand for peat and peat alternatives, total consumption of peat between 2007 and 2009 only fell from 3,012,300 cubic metres to 2,963,200 cubic metres, a decline of just 49,100 cubic metres (1.63%).

Of the roughly 3 million cubic metres of peat consumed in the UK, 32% comes from the UK, 60% from Ireland and 8% from Northern Europe. Total extraction in the UK is some 942,100 cubic metres.

A recent assessment of 6,500 litres of growing media, from 26 different brands, compared the products by price, peat content, and effectiveness. Of the top rated 13 products, and the 1 worst product (based on effectiveness for plant flowering, vegetable yield, and watering frequency), the 4 best options noted were peat free, and the worst product contained significant levels of peat. This implies that alternatives can certainly compete in terms of practical effectiveness.

The average peat content of peat products reported in this survey was 57.5%, illustrating that multipurpose composts are generally no longer 100% peat. There is a lack of data on the total consumption of peat products in the UK, therefore this figure can be used to calculate an estimate. To do this it is necessary to make the assumptions that this peat proportion estimation can be applied to all growing media and soil improvers, making the average peat content of 0.575 litres of peat per litre of peat product reflective of products across the market. Therefore based on an annual consumption of 2,963,200 cubic metres (2,963,200,000 litres) of peat, the total consumption of peat products would be
5,153,391,304 litres. To simplify this figure, and make the following tax revenue estimates more conservative, a figure of 5 billion litres of peat products will be used.

The average price per litre of alternatives compost was 10.2p and the average price per litre of peat compost was 10.4p. It is important to note that among the top products, peat and alternative growing media are similarly priced by the litre. However, there is far more variability in the peat compost products based on the size of the bag and the brand (from 6p to 18p per litre), whereas the alternatives compost remained at an almost constant price per litre for different brands and bag sizes. Consumers are therefore encouraged to buy peat products in greater proportions to get better value for money.

There is a lack of transparent data on the prices of bulk peat and alternative inputs to growing media producers, meaning that it is difficult to model potential economies of scale in detail. It is likely though that peat extraction is more amenable to scale economies than producing alternatives.

A final note about the peat market is that extractors are generally major suppliers of both peat and alternative growing media and soil improvement products. This may imply that a further transition towards alternatives from peat would be relatively smooth in terms of the competitiveness of businesses, and the costs of adopting different technology and practices.

**Tax options**

1. **A sales tax on peat products**

   This would target growing media and soil improvement products such as compost, taxing the products by the litre. Two options will be assessed below to calculate the revenue raising potential of a tax on peat products. A number of simplifying assumptions will be made in this calculation.

   Firstly, it is assumed that all peat products contain roughly the same levels of peat, at 57.5%. The costs of measuring and administering peat content for each product may justify making this simplifying assumption. Secondly, it is conservatively assumed that such a tax would only impact upon amateur gardeners, who constitute 66% of the peat products market. Other consumption of peat, by industry, or local councils, may involve direct extraction, or internal production from purchases of bulk peat, meaning it is simpler to assume that this 34% of peat product consumption will not be affected by a tax on high street peat products. Therefore a total consumption of 3.3 billion, rather than 5 billion, litres of peat products will be used. It must be stressed that the revenue figures calculated below are illustrative, and aim to roughly calculate the potential of a tax.

   **A lower tax rate:** Given the proximity of per litre prices for peat and alternatives products, a tax of 2p per litre (roughly 20%) on peat products would make alternatives significantly more competitive. This tax would only raise the price of a 25 litre bag of compost by 50p, and a larger bag (60 litres) by £1.20. If such a tax did not shift demand...
away from peat products, and total amateur gardener consumption remained at the estimated current level of 3.3 billion litres, revenue of £66 million could be raised. This could be used to fund current peatland restoration projects.

A *larger tax:* Alternatively, a larger tax could be levied to attempt to change behaviour and reduce demand for peat. A tax of 5p per litre (roughly 50%) would make similarly priced alternatives far more competitive, and would address some of the economies of scale that seem to be enjoyed by peat products, with per litre prices being higher for peat products at the upper end of the compost bag size scale as well. This would raise the price of a 25 litre bag by £1.25. If such a tax did not persuade any substitution away from peat products, it could raise revenue of £165 million.

One drawback of this approach is that the tax only targets amateur gardeners as a consumer group, and it would be desirable to tax all sectors for peat usage, for environmental and equity reasons. It is also unlikely to that there would be no behaviour change in the market, which would mean the revenue raised would be smaller than estimated here, but without information on people’s likely responses to the price rise, this change cannot be estimated.

The option below suggests a more comprehensive approach to peat taxation.

2. **Introducing peat into the Aggregates Levy**

This would target more directly the extraction of peat itself, to make the process less profitable to firms. This option is attractive as the Aggregates Levy is an established tax system, involving self-reporting by extraction firms, making administration costs comparatively low. Two options are noted for setting the level of the levy:

- **A flat levy based on weight:** As with the other materials in the levy, this would set a standard fee for extracting a set weight or area of peat. This level could be set by the cubic metre, as with the tax in option 1, so as to raise revenue, or alternatively to discourage extraction altogether. Some further research would be needed into measuring the best way to measure this weight, as this can vary due to water content of the bog. However, Growing Media Association standards for water content and weight could be used as guidelines to establishing this tax.

- **A levy based on the cost of carbon released on extraction:** Using the latest central non-traded carbon price, it is possible to set a levy based more closely upon the environmental damage being done by extractors. Despite ignoring the damage to biodiversity, for which valuation data is largely unavailable, this method more closely reflects the polluter pays principle, and will be a more structured approach to internalising the externalities. This would mean that extractors would have to pay £11 per cubic metre of peat extracted. At current rates of extraction, this would raise roughly £32.5 million in tax revenues. In reality there may be behavioural changes following such a tax, and the benefits would be received partly from a direct
reduction of habitat damage, and partly from tax revenues from any continued extraction. If aimed at behavioural change, a larger rate of tax may be necessary.

Considerations

Level of tax: As has been noted, estimating a floor value of the damage done to the environment by peat extraction has shown that the costs to society are significant; therefore perhaps a high level of tax on peat products would represent the most efficient environmental regulation.

Compatibility within regulatory framework: Use of the aggregates levy as the taxation mechanism and the UKBAP habitat objectives as the regulatory mechanism illustrate a levy on peat could be highly compatible with existing frameworks. This would lower administration costs and aid the effectiveness of the policy.

International competitiveness for peat or peat products: A tax or levy on domestic extraction would put firms who extract predominantly in the UK at a disadvantage in terms of input costs and thus competitiveness compared to foreign extractors. A tax on the first sale or use of peat in the UK, as per the existing aggregates levy, could be introduced, to prevent substitution by domestic peat consumers towards foreign imports. Further research may be needed into the exact mechanisms for tracking the first sale or use of peat.

Downstream products: The international competitiveness of upstream products (bulk peat) could perhaps be protected by a tax on first sale or use in the UK, as for materials in the aggregates levy. However, peat differs from other materials in the levy as it is used in a number of downstream products. Of the 211 million plants that are imported to the UK annually, it is estimated that 101,873 cubic metres of peat is used in their growing, and so indirectly imported. This averages at around 0.5 litres of peat per plant (roughly the peat content per litre of peat based growing media), meaning a 2p per litre tax would increase the price of a plant by approximately the same amount. This amount is not likely to motivate a shift towards foreign horticultural products. Furthermore, if domestic growers shifted towards peat alternative products, rather than accepting the peat tax and continuing to use peat products, domestic horticultural products need not face this rise in input prices, and domestic producers need not face any loss of competitive edge.

Potential to scale up peat free production: One important consideration is the rate at which the production of peat free alternative can be scaled up. This will determine the appropriate time horizon over which changes should be introduced and will influence the balance between revenue raising and behavioural change aspects of the measures.
Pesticide and Fertiliser taxes

Pesticides and fertilisers are both inputs used mainly in the agricultural sector that can have significant negative impacts upon the terrestrial and aquatic environment. Other sectors, such as domestic growers, use these inputs to some extent, or else contribute to similar environmental damages, an example being diffuse pollution caused by water companies. However, agriculture stands out as a net contributor to the damages brought about by these two sources.

Of the various sources of diffuse water pollution, Defra identifies agriculture as the most significant, with 60% of nitrates, 25% of phosphorus, and 80% of sediments being attributable to the sector. In addition, for the first round of the Water Framework Directive River Basin Plans, water companies are contributing to 77% of the costs, compared to just over 0.1% contributions from the agricultural industry. Therefore, the following options are focused on taxation methods to correct the externalities in the agricultural sector.

In some instances, it may be appropriate to use agri-environment funds to assist the farming industry in meeting higher societal objectives. In particular, schemes where EU nature and water legislation restricts landholders based on spatial or geographic factors may require compensation payments to ensure that unequal burden across farms is avoided. In order to avoid increasing the UK Government’s fiscal burden, national envelope funds could be used to help fund resource protection.

However, in line with the Polluter Pays Principle, there is also scope for increasing private contributions towards preventing damage to wildlife and ecosystems services. Diffuse water pollution represents an example of the damage caused by both pesticides and fertilisers. The costs of water pollution from agriculture are estimated to be between £445-872 million a year, a significant cost that is overlooked by existing private markets. Water companies spend over £127 million a year improving water quality affected by run offs of these inputs from agricultural land. The damage that is not mitigated results in degradation of our natural environment and represents a loss in social welfare. Taxes on fertilisers and pesticides use could help address this problem.

In both the case of pesticides and fertilisers, efficient regulation is complicated by the difficulties in estimating the marginal damage from a unit of substance use at both the input and output level. The location and scale of the damages done by these pollutants are highly context dependent, making it more difficult to address the externalities in a uniform and cost-effective way. Taxing at the input stage, the sale of the products, may therefore make it difficult to align a tax with the level or location of damages caused, however, it will be far more practical than attempting to tax based on the output stage, from measuring damages done. This will be considered in the options below.
Pesticides

Pesticides used in agriculture to eliminate pest species cause significant unintended damage to non-pest organisms and habitats, and consequently harm both terrestrial and aquatic ecosystems. For example, pesticides have been shown to have negative effects on farmland birds.\textsuperscript{18} In addition, there is growing evidence of the effects of some pesticides on UK bees. Pollination is a regulating ecosystem service provided by bees that plays a key role in supporting UK agriculture, with recent evidence revealing that bees help support 13\% of farming incomes.\textsuperscript{19} Recent research has also suggested that some forms of pesticides, those containing neonicotinoids, may be more deleterious to bees than previously thought.\textsuperscript{20}

These negative environmental externalities have been recognised in the UK for some time. Measures such as the Voluntary Initiative, introduced in 2001, are currently used to help England, Wales, Scotland and Northern Ireland comply with EC directives on pesticides, as an alternative to direct regulation. However, fiscal measures could help prevent the decline of UK biodiversity by guaranteeing that the damage done by the polluting activities is incorporated into their decision making.

There are numerous examples of voluntary measures to reduce the damage done by pesticides in the UK. The Voluntary Initiative has instigated schemes based around information sharing, pesticide testing, and use advice.\textsuperscript{21}

Such schemes should be applauded for the contributions they make to enhancing awareness around pesticide damages, reducing those damages, and delivering conservation in the UK. However, success must be based upon external indicators, rather than participation or awareness levels, which are a means to an end. The Voluntary initiative acknowledges that “Skylarks, corn bunting, grey partridge and yellowhammer populations are known to be affected by loss of habitat or shortage of insect life and seeds which can result from the use of pesticides. They are therefore the best indicators of the manner in which pesticides are used on a farm”.\textsuperscript{22} Between 2008 and 2009, the UK population of grey partridges fell by 20\%, and corn buntings by 5\%, with lapwings and corn buntings remaining Red List species.\textsuperscript{23} Although pesticide pollution can not be held solely accountable for these declines, it is likely a contributing factor to this species loss in the UK.

These trends imply that despite the valuable contribution made by voluntary schemes, stronger legislation may be needed to restrict pesticide use and provide the agricultural sector with clearer incentives to account for damages done in this area. This has been acknowledged by member states across the EU, with widespread examples of environmental levies relating to pesticides.\textsuperscript{24} Given the value of biodiversity to society, as well as the agricultural industry, a continued reliance on harmful pesticides is perverse, and encouraging less use or use of less harmful pesticides a desirable outcome for all stakeholders.
Market analysis

The pesticides market contains numerous products that are differentiated by price, required dosage, function, and environmental impacts. Comprehensive UK market data is not readily available, and the diversity of the chemical inputs in the products makes a detailed analysis of supply and demand difficult. However an overview of price and use through the following indices, as well as an assessment of the price elasticity of demand, will be broadly instructive regarding the nature of a possible fiscal intervention.

Figure 3.1 shows that the demand for pesticides is closely correlated with area farmed and cereals produced, but seems relatively unresponsive to changes in price.

Figure 3.1: Changes in the agricultural pesticides market since 2000

A spike in pesticide usage from 2006 to 2008 (most likely driven by increased farming area) occurred despite rising prices. Accordingly, estimates of the price elasticity of demand (PED) for pesticides in the UK find it to be relatively inelastic, at no greater than -0.39. This means that for every 1% increase in price, demand will fall by a maximum of 0.39%. This implies that a tax imposed on products will be unlikely to reduce total pesticide consumption.

There is also evidence that consumers would switch between pesticides of different harm levels more readily than they would switch away from pesticides use completely. This highlights the potential for an appropriately designed banded tax based on the toxicity or harmfulness of pesticides to encourage substitution towards less damaging products.
Tax options

1. A banded tax on pesticides by volume based on total hazard score.

The majority of research into a pesticides tax has concluded that this would be the best compromise between the contending criteria of scientific feasibility, cost-effectiveness, and environmental effectiveness. Such a tax could be levied on sales of a kilogram of all products based on a tiered designation of hazard reflecting the damage potential of the substance, indicated by product labels. Therefore it would take into account volume of pesticides used, as well as the toxicity, as a gauge of total environmental damage. In this way pesticide use could be de-coupled from environmental damage, with consumers being incentivised to purchase less harmful products. Such a tax, based on toxicity levels was adopted in Norway in 1999.²⁸

Setting the tax at an absolute level for each band would appear to be a more attractive option as it would be easier to administer, and would not lose its effectiveness in the face of any technological advances that could reduce overall pesticide prices. In addition, all products would be taxed based solely on their hazard designation, with equal rates within each band, meaning products with higher prices would not be taxed more on that basis. Conversely, a proportionate tax would allow for better responsiveness to inflationary pressures, as an absolute tax would potentially lose its potency over time.

As has been previously noted, the marginal environmental damage of pesticides is spatially heterogeneous and difficult to measure, and differentiating between the damage done by each separate product would be even harder. Initial research would be required in designating the banding. This could potentially be done at low cost with a focus only on toxicity levels and required dosage per hectare of arable land. However, hazard levels would be different for each criterion and may cause some conflicts. For example a chemical non-hazardous to humans may be toxic to birds. Setting hazard level based on one criterion may be the most appropriate in terms of administration costs, but may also have perverse effects. Also assessing active ingredients is different to assessing the impact of the formulation or the tank mix (the mix of chemicals that are applied together. The formulation often contains surfactants (like detergents) that aid application and wetting of the crop.

Despite being relatively inelastic, demand for pesticides would fall if high enough tax levels were imposed. This would directly reduce the environmental damage caused by agricultural products, but may have implications for the viability of some farming enterprises, or implications for the cost of some desirable foods such as fruit and vegetables. Conversely, a low rate of tax would cause substitution across products rather than a fall in total demand, and could raise revenue to aid funding for government initiatives such as the River Basin Management Plan.
2. **A pollution specific sales tax on the most hazardous substances.**

This would involve a tax on the final sales of the types of pesticides that have been shown to cause the highest levels of environmental damage. This allows for a cheaper and simpler policy that would encourage substitution towards non-taxed pesticides for which less scientific evidence of damage exists. This tax could again be set at a low rate to raise revenues or a high rate to discourage demand, with any revenues reinvested in national bee health programmes. Some research would be required into the viable alternatives for the taxed substances and the nature of demand to ensure that the tax would not target and marginalise any particular sector of the farming industry.

3. **A sales tax on all pesticides.**

This would invoke a percentage rate of tax at the final sale of any pesticide product. This would be a blunt measure in terms of regulating environmental damage, as it would ignore the relative marginal damages of products, and hit costly pesticides more than others. The effects on the pesticides markets would therefore not be directed towards any necessary improvement in environmental standards and could result in increased demand for more damaging products. However, it would be cheap and easy to administer, meaning that if justifiable, would be an attractive means of raising revenue for mitigating agricultural pollution.

**Considerations**

*Complexity of measuring damage:* The combination of weather and location dependent, diffuse pollution is compounded by the diversity of products in the market. Errors in measuring the damages done by each product could result in taxes that could perverse substitution towards more harmful products.

*Distributional Issues:* The coverage of pesticide pollutants most commonly covers agriculture, as this is where the majority of demand and environmental damage stems from. It is also important to consider the effects on a tax of pesticides used in forestry and in home gardening. In addition, given that the agricultural sector would be worst hit by a tax, it may be appropriate to reinvest some of the funds back into helping the industry transition to more sustainable methods of dealing with pests, weeds and moulds.

*International Competitiveness:* Raising the price of pesticides in the UK may mean that consumers import more pesticide products from foreign producers. To seek to ensure that UK business remains competitive in EU and global markets, further analysis is needed on the possibility of a first sales tax, or import tariff for competitive foreign products.

*Downstream markets:* Introducing a tax on pesticides may raise the price of agricultural inputs in the UK, and consequently have implications for domestic food prices. This could potentially be avoided by encouraging substitution towards similarly priced but less harmful alternatives. Where less harmful products are more expensive, or the tax premium is incurred within agricultural costs, further research into the implications for food prices may
be required. Considering the likely size of a tax in relation to total agricultural inputs however, any effects are likely to be small.

**Fertiliser**

Nutrients from agriculture inputs, detergents, the water industry, and other private enterprises cause significant environmental damage. Measures implemented or planned to correct this damage include the Nitrate Directive, the Water Framework Directive (WFD), and the Urban Waste Water Treatment Directive and a ban on phosphorus in detergents from 2015.

Fertiliser products are designed to increase crop productivity, and are distinguished by the levels of nitrates and phosphorus that they contain - both substances which have documented negative impacts upon water quality. Nitrate repositories (primarily from agricultural fertilisers and sewage treatment) occur in both surface and ground water through leakage and deposition, leading to eutrophication which inhibits aquatic biodiversity. Some research also suggests that high-nitrate drinking water has human health issues, as acknowledged in the EU Nitrates Directive.\(^29\)

High phosphorus levels have similar effects, with the water and agricultural industries being the main contributors. Defra estimates that phosphorus pollution in water bodies from agriculture will need to be reduced by 48% in order for there to be an 80% chance of meeting WFD standards by 2015.\(^30\)

In addition to concerns over water quality, fertiliser use in the agricultural industry contributes to climate change through carbon intensive production processes, and the release of GHGs such as Nitrous Oxide. It is estimated that the production, distribution, and use of fertilisers is responsible for between 2% and 3% of global GHG emissions\(^31\).

Environmental damage is relatively measurable from the input side, as there are few products with explicit contents; however, marginal damage is still highly dependent on the geographical context of application from the output side.

**Market analysis**

There are a relatively small number of fertilisers, differentiated openly by the types of substances they contain. It is difficult to estimate the size of the market, as market data is not widely available, for example on total UK consumption. However, as with the pesticides market, an analysis of the price elasticity of demand can help instruct the debate on appropriate taxation methods.

The price elasticity of demand for fertiliser is relatively low with estimates at \(-0.2^{32}\). This means that for every 1% increase in price, demand will fall 0.2%. This is reflected in the reaction of the market to the recent price increases in fertiliser. As seen in Figure 3.2, a very large increase in fertiliser price has had a small impact on use.
As with pesticides demand, these trends imply that any fiscal intervention on fertiliser products or their components would have to be significant to be behaviourally corrective. However, a smaller tax aimed at raising revenue rather than changing behaviour could help fund environmental clean-up, particularly when supported by other policy mechanisms.

**Tax options**

1. **Sales tax on all fertiliser products**

   This would involve a tax, either a nominal amount or a percentage, on all domestically marketed fertiliser. It is difficult to estimate at what level of price increase it will be unprofitable to purchase fertilisers, as demand has been resilient to an increase of 150% over the past decade. It is likely that a relatively high tax could be put in place without disrupting demand, meaning that significant revenues could be raised to fund public clean-up of nutrient rich waterways. This option is the most blunt available, but also the least costly to implement and administer.

2. **A tax at the input level - on the level of pollutants in fertiliser products**

   For example, prioritising phosphorus as the primary pollutant for which the agricultural sector has a responsibility to abate, this tax would be levelled on fertiliser products based on the level of phosphorus they contain. Product transparency would make this a relatively simple process to administer. This tax would be more likely to be behaviourally corrective in encouraging fertiliser users to substitute towards less polluting products. It would also raise revenue, which could be reinvested into funding the river basin management plan or other initiatives. A tax based on the components would also
incorporate industry, homeowner, and any other sources of phosphorus pollution. Nitrates could also be used as the target substance for the tax.

3. A tax at the output level - on the environmental damage caused by fertiliser usage

At odds with the first two options, this tax would attempt to charge polluters based on marginal damage by focusing on the pollution stage of the process, for both nitrates and phosphorus. Fertiliser users (over a certain number of kilograms per year) would be required to report their usage along with their location. This usage could then be combined with a measure for the proximity of the site to a vulnerable water body (either a Nitrate Vulnerable Zone or high phosphorus water supply) to calculate an annual levy owed by the user based on an assessment on the level of damage caused. This approach would be more difficult to implement, and more costly to enforce, however, it would target taxation more directly at areas where abatement would alleviate damages. A geographically dependent levy may also have more complex distributional issues than a tax levelled on product sales, and may have high administration costs due to monitoring requirements.

Considerations

**Distributional impacts:** Achieving the stated 48% reduction in phosphorus needed to meet WFD targets would result in an average cost to farmers of between 1% and 12% of their income depending on the methods used. Therefore consideration should be taken regarding the impacts of a tax on farmers’ incomes, especially in the short term.

**Effect on downstream markets:** Higher costs for agriculture may be passed on to consumers through higher prices for arable produce. This could lead to increases in price for high street products such as bread, as well as for pastoral farming inputs such as livestock feed, which could in turn lead to higher meat prices. A small revenue raising tax, however, would incur far lower costs to farmers than the full costs of nutrient pollution abatement. Consequently the costs passed down to consumers in downstream markets would be less severe.

**Environmental-effectiveness/cost-effectiveness trade-off:** As with the previous taxes, the blunt, universal taxes will be cheapest and easiest to implement, but least effective in terms of addressing areas of externalities to internalise within private decision making. Decision makers would need to establish early on whether the main driver for a tax would be to help achieve specific environmental standards, or to address an externality in the most cost-effective way possible.

**Compatibility with existing regulatory background:** The WFD could be used as the regulatory mechanism and set of objectives under which a levy or tax could fall.

**Possible alternatives to high nutrient fertiliser:** Further research could be done into organic alternatives to fertiliser (such as manures, slurries, composts or crops which fix nitrogen). A tax could be introduced to promote the use of these (even though if not used wisely these
can also cause diffuse pollution), and encourage the agricultural industry to take nitrogen content of manures and slurries into account.

*International Competition:* As with a pesticides tax, a first sales tax or direct tariff for imports could be investigated to ensure domestic producers were not disadvantaged compared to foreign producers.

**Conclusion**

There is potential in the UK for the use of fiscal policy to correct environmental externalities, and raise revenue in the process. This revenue could be essential to filling the conservation finance gap in the UK, or contribution to the UK Government’s deficit reduction strategy. Amongst the options laid out above, it is possible for some configurations to raise more revenue, whilst others have more of an impact on behaviour.

**Peat** – Recent data shows demand for peat to be levelling out. There are significant environmental damages associated with the industry, through carbon emissions and damage to biodiversity. Viable green substitutes exist, with significant supply capacity, and better performance. A peat tax could address the environmental externalities in this sector by discouraging further peat use, and re-investing tax revenues to deliver societal benefits.

**Pesticides** – The damages done by pesticides to biodiversity and ecosystems services could be undermining the sustainability of the agricultural sector, which is highly dependent on pollination, as well as the UK natural environment. A pesticides tax could help finance and deliver conservation, encourage investment into environmentally friendly alternatives, and encourage more sustainable agricultural practice.

**Fertiliser** – The agricultural sector currently stands out as a significant net contributor to diffuse water pollution in the UK. A phosphorus, nitrate, or broader fertiliser tax could raise revenue for achieving WFD objectives, and encourage the demand and supply of more environmentally friendly products.

**Suggestions for governments across the UK**

- Support research into measuring damages from polluting substances, such as phosphorus, nitrates, and pesticide chemicals. This will enable greater understanding of the environmental externalities, and how best to correct them. For example, a minerals account system for farms in the Netherlands and Denmark has allowed better tracking of diffuse air and water pollution.
- Encourage reporting of harmful content levels, such as peat content for compost, nitrate and phosphorus levels for fertilisers, and toxicity rating for pesticides on packaging and websites. This will help to inform consumers.
- Investigate options for environmental taxation, such as those listed above, taking into account considerations such as; international competitiveness, the availability of environmentally friendly substitutes, distributional issues, effects on downstream markets, cost-effectiveness, and adherence to existing regulatory framework.
1 Lindsay and Immirzi, 1996, *An inventory of lowland raised bogs in Great Britain*, Scottish Natural Heritage Research.
2 DEFRA, 2010, *Monitoring the horticultural use of peat and progress towards the UK Biodiversity Action Plan target*.
3 DECC, 2008, *Climate Change Act*.
13 Ibid.
14 Ibid.
18 Bright, J., 2008, *A review of Indirect Effects of Pesticides on Birds and mitigating land-management practices*
21 Information and advisory measures have also been adopted by farm assurance schemes, the industry lead Good Neighbour Initiative, and organisations such as RSPB, LEAF and the Pesticides Action Network.
22 The Voluntary Initiative, 2010, *Annual report 2009-10*
23 BTO, 2010, *Breeding Bird Survey 2008-09*
26 Pearce and Koundouri, 2003, *Fertilizer and Pesticide Taxes for Controlling Non-point Agricultural Pollution*
27 Ibid.
Chapter 4 – Non-government sector funding and delivering of conservation

Businesses and civil society have a key role in addressing the biodiversity challenge. Innovative measures and the creation of partnerships can help to raise funds and deliver better conservation. However, there are clear limitations to the actions of both groups, representing a need for governments to support the non-government sector.

To address the challenges faced by biodiversity in the UK, at a time when the UK Government is dealing with severe fiscal constraints, it will be necessary for the other sectors of society to increase their contributions to the financing and delivery of conservation. The private sector must do more to recognise its dependencies on natural resources and services, account for its impacts on those services, and capture the business opportunities present to invest in nature moving forward. In addition, the UK Government’s Big Society agenda emphasises the scope to transfer more power and responsibility to civil society, and the need for individuals, communities, and organisations to expand their role in the provision of societal welfare.

Businesses already play a role in financing UK conservation activities. Firms engage voluntarily in green activities for numerous reasons, such as to improve cost-effectiveness, promote brand, motivate employees, or for philanthropic reasons. These activities can take the form of financing partnerships with NGOs, greening internal operations, or establishing environmental standards for goods and services. Businesses who depend directly upon ecosystem services have invested in private Payment for Ecosystem Services (PES) schemes. Such schemes can benefit biodiversity and are explored in more depth in the next chapter.

Civil society plays a unique role in providing social welfare through direct delivery of environmental goods and services. Civil organisations by definition represent the preferences of society that are not sufficiently satisfied by government or the private sector. They are the means by which individuals and communities can independently stand up for the natural environment in the UK to help address the shortfall in finance for nature conservation.

There are many ways in which parties within each sector can act individually to increase their contribution to conservation in the UK, which will be studied in more detail throughout this chapter. Likewise there are ways in which cross sector cooperation can be used to grow the market for voluntary finance, and there are methods governments can use to facilitate these processes. By themselves, business and civil society may be ill equipped to fund the gap in UK nature conservation. Ultimately, the former sector’s focus on profit and the latter sectors’ resource constraints mean that government intervention could be key in fulfilling the UK Government’s aims to halt the decline in biodiversity and become the greenest government ever.
This chapter assesses the current roles businesses and civil organisations play in financing conservation, the potential for the expansion of these roles, the limitations to doing so, and finally recommendations for action moving forward.

**Business and Biodiversity**

Businesses are linked to biodiversity and ecosystems services in two ways, dependencies, and impacts. All firms are dependent, either directly or indirectly, on the natural environment, and all operations have direct or indirect impacts upon natural resources and services. Traditionally, however, these dependencies have been taken for granted, and the impacts have not been fully unaccounted for in business decisions.

Table 4.1 outlines the following threats and opportunities relating to the dependencies and impacts of firms on biodiversity and ecosystem services in current market conditions.

**Table 4.1: Threats and opportunities for business relating to biodiversity and ecosystem services**

<table>
<thead>
<tr>
<th>Threats</th>
<th>Opportunities</th>
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<tr>
<td><strong>Regulatory and legal</strong></td>
<td>Regulation regarding biodiversity is becoming increasingly common, as decision makers attempt to correct environmental externalities. Legislation such as the Environmental Liability law and Natura 2000 can restrict the practice of business, with implications for the profitability of firms that impact upon biodiversity. Examples of legal threats are quotas, fines, third-party claims, usage rights, suspension of permits and licences, refusals to grant licences, legal proceedings etc. The legal consequences of not observing nature conservation laws can have serious consequences for firms. By anticipating regulation that creates markets, such as cap and trade schemes, firms can be first movers in those new markets, gaining competitive advantages. In addition, conservation legislation may aim to preserve resources that firms depend on, thus making those businesses more sustainable.</td>
</tr>
<tr>
<td><strong>Operational</strong></td>
<td>Some raw materials used by business and sourced from biodiversity, for example, fish, clean water, and genetic resources, are at risk of becoming endangered. Many ecosystem services that firms depend on, such as pollination, soil formation, and water purification are also at risk. Unless a comprehensive conservation strategy is found for those resources that support economic activity, firms may find their own survival at risk, There are a variety of ways biodiversity protection can be incorporated into business strategies, to help sustain a business. For example, improving the quality of site management, investing in technologies for reducing consumption of essential natural resources, developing low impact industrial processes, and reusing resources. Through such practices,</td>
</tr>
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35
for example, following cuts in the supply chain, or increases in raw material prices.

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<th>Reputational and image</th>
<th>Unsustainable or damaging practices, if acknowledged by consumers, stakeholders, or environmental groups, can constitute risks to branding and reputation. Furthermore, failing to comply with environmental legislation, and the consequent legal fall-out, can also tarnish brand image.</th>
<th>Biodiversity could be included in firms’ differentiation strategy, to capture increased political and public concern about environmental damage. There is growing scope for sustainable production methods, and activities such as labelling that advertise these methods can improve brand image and sales. This also applies for attracting employees, and investors.</th>
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<tr>
<td>Market share</td>
<td>In a society where ecological, environmental and climate issues feature ever higher in consumer purchasing decisions, ignoring these concerns can make firm’s unresponsive to shifts in consumer preferences, that could leave it with a damaged consumer base, on top of an already tarnished brand image.</td>
<td>New markets are developing based upon greater consideration and protection of our environment. From renewable energy and sustainable biofuels, to recycled carrier bags, new market opportunities, and niches are developing for innovative environmentally friendly products and services. Firms can capitalise on these opportunities to diversify their consumer coverage and increase market share.</td>
</tr>
<tr>
<td>Physical</td>
<td>The benefits firms, along with all aspects of society, receive from ecosystems services represent significant risk if degradation of biodiversity continues. For example, losing services such as water regulation, climate regulation, and disease regulation in the UK could hurt firms directly and indirectly.</td>
<td>There are numerous opportunities for businesses to sustainably exploit numerous ecosystems services that are becoming increasingly better understood. For example, cultural services through eco-tourism, or biochemical provisioning services through genetic research.</td>
</tr>
<tr>
<td>Finance and access to capital</td>
<td>All of the above threats, new regulation and compliance costs, supply chain interruptions, media or public pressure, or natural catastrophes – can lead to financial losses for firms. Thus cash flows can be impacted, and firms’ credit rating affected, making capital and finance harder to come by, and insurance costs higher.</td>
<td>Companies with no track record of degrading ecosystems – overexploitation, contamination, illegal practice etc. – will find fewer constraints in accessing capital markets, and have lower insurance costs.</td>
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In light of these issues, many firms currently engage in activities to limit their impacts upon biodiversity and ecosystem services, and some actively support conservation in the UK. The forms these activities take are varied, as are the specific justifications. The financing contribution firms make is significant, with £67 million spent in 2003 on protecting the
environment. However, with just 2% of this figure being spent on nature protection in the past, the expansion of these funds is critical to addressing the shortfall in conservation activities in the future.²

The remainder of this section aims to assess in more detail how business and the natural environment are linked, the actions businesses currently undertake to preserve nature, and limitations to the expansion of this avenue of finance for UK conservation. One key marketing instrument that is currently being used to great effect is eco-labelling, which will be assessed in more detail. Recommendations for businesses can be found in The Economics of Ecosystems and Biodiversity (TEEB) for business report.³

**Categorising impacts**

Industries can broadly be placed into one of three main categories in terms of their relationship with biodiversity and ecosystem services.

1. **Industries directly dependent on biodiversity and ecosystem services.**

Tourism, agriculture and fisheries are clear examples of industries where the quality and quantity of goods are affected by natural services, such as soil productivity, pollination, water purification, and landscape beauty. Businesses within these industries frequently have operational incentives to invest in nature, either to reduce supply chain risk, minimise costs, and sustain their business. Businesses that fall into this industry category may also benefit from establishing a PES scheme, as described in chapter 4.

2. **Industries where operations directly impact upon biodiversity and ecosystem services, but where businesses are not directly dependent on BES.**

Mining, non-renewable energy and domestic cleaning products are examples of industries where operations impact upon the natural environment, but for which there is no direct, quantifiable links between BES and the quality and quantity of product. These businesses generally have negative environmental impacts, but may not have operational or financial incentives to offset any damage they cause.

Firms in this category may incorporate biodiversity voluntarily within their corporate social responsibility strategies (CSR), acting to offset or limit their impacts. This could be driven by marketing concerns, in an attempt to benefit the business through brand perception. Companies may also be motivated by concern over potential legal ramifications and public disquiet regarding environmental impacts. Finally, voluntary environmental CSR may also be related to notions of green philanthropy and concern within the governing interests of the firm for the state of the natural environment.

3. **Industries that neither directly impact upon nor have direct dependency on biodiversity and ecosystem services.**

This may include professional sport, and services based around the marketing of human capital. Whilst many of these will indirectly impact upon the environment through the
supply chain, (for example, through travel and the use of office supplies) operations in these industries do not correspond directly to damage to biodiversity and ecosystem services.

For these industries, there may be no obvious motivation to invest in the natural environment. However, as with firms in all industry categories, investment in conservation may be used to promote brand, motivate employees, encourage investors and stakeholders, or simply as charity.

It must be noted that no business has a zero impact on biodiversity, ecosystem services or the environment; however, the impacts vary in their nature and extent. The nature of impacts can generally be broken down into the following four types:

- **Primary Footprint**: Businesses with a primary footprint that use land and have a direct impact on biodiversity. These are generally firms in category 1 and category 2 industries.

- **Finance Footprint**: Businesses that influence biodiversity outcomes through their financial impacts e.g. banks, insurance companies. This is generally restricted to category 3 industries.

- **Intellectual Property Based**: Businesses that create intellectual property rights around biodiversity based products, such as pharmaceutical companies. This footprint, again, applies generally to category 3 industries.

- **Supply Chain Footprint**: Businesses that have indirect impacts on biodiversity further down the supply chain, through further processing of commodities. All industry categories have this footprint to a greater or lesser extent.

A recent report by AXA Investment Managers notes the ratio of environmental damages and voluntary contributions to the environment made by businesses by industry, with financial services and real estate receiving the worst rating.

**Business-NGO partnerships and internal greening**

Two main means by which businesses contribute to conservation finance in the UK are alliances formed with green organisations, and unilateral adoption of greener policies.

*Partnerships* can take a number of forms, from a lump sum paid to an NGO for use of logo on a product, to financial backing of targeted conservation projects related to a product or brand.

Examples of these activities in practice include:

- **HSBC** - WWF's freshwater work in the UK is supported by HSBC as part of their Climate Partnership, and provides £1.7million to UK conservation activities. This is a five year programme aiming to improve planning and management of freshwater
habitats to restore and protect ecosystems in the context of a changing climate. As part of the programme, WWF is able to contribute to delivery of the Water Framework Directive, as well as support other organisations such as Waterwise.

- **Crossrail** – The RSPB has formed a partnership with the developers of Crossrail, London’s new cross-capital rail link. Over 4 million cubic metres of material excavated from beneath the city will be used to create roughly 400 hectares of tidal habitat on Wallasea Island, providing significant biodiversity benefits, and soaking up around 880 tonnes of carbon per year. This project combines the largest construction project in Europe, with the continent’s biggest coastal habitat creation scheme, saving both projects significant sums of money.

- **Black Grouse whisky** - The Black Grouse whisky brand donates money per bottle of whisky sold to RSPB black grouse recovery projects. Over the past 3 years this partnership has seen over £200,000 donated by The Famous Grouse parent company to conservation activities in the UK.

- **CEMEX** - In October 2009, CEMEX UK and the RSPB commenced a two-year partnership to develop a national biodiversity strategy. The £100,000+ project will create 1000 hectares of quality UK BAP biodiversity habitat by 2020, and has involved the appointment by CEMEX of an RSPB biodiversity advisor. This partnership is an integral part of a global 10 year partnership between CEMEX and Birdlife International covering good practice at 400 quarry sites worldwide.

*Internal greening policies*, to limit biodiversity and ecosystem service footprints of firm operations, are becoming more common in the UK. Such activities have significant positive benefits for the natural environment, both through limiting environmental damage, and providing finance for activities in the UK. For example:

- **B&Q** - B&Q have adopted a number of environmental policies under their One Planet Home initiative. They have made commitments on internal practice and the sourcing of products, promote environmental products through price incentives, and offer extensive information to consumers on energy, water and biodiversity conservation measures to adopt at home. For example, their price parity policy for peat and peat-alternative products encourages consumers to buy the generally more costly peat-alternatives, hence discouraging consumption of peat and destruction of lowland bog habitats by suppliers.6

There are even examples of these methods being combined, with businesses partnering with firms to best adopt greener internal policy. For example:

- **Marks & Spencer** - M&S is currently working with WWF to achieve its 5 year “100-point eco-plan”, which includes commitments to make all UK and Irish operations zero carbon, send no waste to landfill, and reduce the amount of raw materials used by 2012.7
All of these activities benefit biodiversity, by firms reducing their biodiversity and ecosystem service footprints, and also through more indirect means such as increasing awareness of environmental impacts among producers and consumers. There are limits to estimating the total value of such voluntary conservation activities by businesses in the UK; however, these examples serve to illustrate the potential gains that are being delivered by firms through investment in biodiversity and ecosystem services.

**Eco-labelling**

Eco-labelling is an effective tool for businesses to adopt beneficial environmental practices in their operations, and capitalise on consumer demand for products with more socially and environmentally positive footprints. It can help fund biodiversity directly by providing finance to environmental groups for conservation activities through business partnerships, and indirectly through lowering the pressure on the environment from production processes. This may free up finances for NGOs who were addressing these environmental pressures, or would have needed to address them in the future.

Eco-labelling helps markets function more effectively by transmitting information on products or production processes between suppliers (who hold information on their products or activities) and consumers (who hold environmental values). Labels can communicate information about the environmental impacts of a product to a consumer, such as the extent of their biodiversity and ecosystem service footprint. Demand for green certified products also encourages firms to invest in green activities, to raise a price premium on a product. In this way they can be a valuable source of private investment in conservation.

**Label Types**

The International Organization for Standardization (ISO) defines three main types of environmental labels. These are:

- **Type I** – a voluntary, multiple-criteria based, third party program that awards a license which authorises the use of environmental labels on products indicating overall environmental sustainability/quality of a product within a product category based on life cycle considerations.

- **Type II** – informative environmental self-declaration claims.

- **Type III** – voluntary programs that provide quantified environmental data of a product, under pre-set categories of parameters set by a qualified third party and based on life cycle assessment, and verified by that or another qualified third party.

Although most eco-labels are voluntary, some certifications are compulsory as well, sometimes imposed by government as a way of helping consumers access better information about their decisions. Type I is useful for consumers when seeking to quickly ensure they purchase “environmentally friendly” goods or services. An example of this is the
European eco-label that applies to many non-food products that minimise environmental impact across Europe. Types II and III require more interpretation of information by the consumer. An example of type II is the Ecover range of cleaning products, who self-certify their environmental claims. An example of Type III is the EC’s energy label, which list out various energy attributes of a good and give it a rating from A to G (more to less efficient respectively).

Further examples of current food eco-labels include organic schemes (such as the UK’s Soil Association label, Defra’s Organic Farmers and Growers Label and the new European label), Rainforest Alliance, Leaf and the Marine Stewardship Council. These endorse a product as meeting certain environmental standards. Non-food labels include the European flower logo, Forest Stewardship Council timber and the Carbon Trust Standard for carbon reductions. Sometimes labels are created by coalitions, such as “Future Friendly”, which is a combined effort of Proctor and Gamble brands (e.g. Ariel, Fairy and Duracell) and sustainable living groups such as the Energy Saving Trust, Waste Watch and Waterwise.

Consumers may prefer to use products that have been certified by an NGO. A recent PricewaterhouseCoopers study revealed that 51% of consumers trusted NGOs to tell the truth about the environmental impact of a product, compared to 20% trusting the government and 16% trusting the producer. This emphasises the brand perception benefits businesses can gain from partnering with NGOs to invest in conservation.

Proportion of markets covered by eco-labels

It is difficult to estimate the proportion of product or service markets are covered by eco-labels. In terms of supply, Germany established one of the first eco-labels, blue angel, in 1977. Since then, the number of labels, and the proportion of sale covered, has undoubtedly grown, but difficulties in defining what an eco-label is have hindered measurement. The global Eco-label Index has registered 330 labels worldwide, in over 200 countries. The EU Eco-label had 1,073 registered products as of mid 2010. Although this is presumably a small proportion of world market, eco-labelling has been growing fast – up from 279 registrations in 2005 – implying that businesses have increasingly seen benefits from the label.

In terms of demand, a recent survey of 4,000 UK consumers found that significant increases in the proportion of consumers demanding green or related ethical products. For example, the number who responded that they bought Fairtrade products rose from 20% in 2005 to 50% in 2008. In addition, the proportion of consumers who bought organic food purchasing increased from 22% of to 43% over the same period. A second survey of around 25,000 UK consumers found that the proportion of consumers willing to pay more for environmentally friendly goods increased from 36% to 40% from 2000 to 2007. However, this figure has since fallen to 32% from 2007 to 2010, most likely in response to the global recession. This reflects that there is a significant market for these goods, with signs of further future growth, but emphasises the vulnerability of the environment during times of recession.
Around 5-15 percent of consumers in the UK, Europe and the USA are categorised as “deep green”, meaning they regularly purchase “environmentally friendly” food products, place environmental criteria above other production factors and are willing to pay 5-10 percent more for the products.\textsuperscript{18}

There is also evidence that opportunities may exist in untapped markets for environmentally-friendly products in Europe, the USA and Australia, representing further incentives for firms to advertise investment in nature on their products.\textsuperscript{19} In addition, some businesses receive brand-related benefits when switching to environmentally friendly products. For example, since Sainsbury’s introduced more sustainable fish (such as pole and line caught tuna) its market share in other fish products has risen. Its share of cod has risen from 19\% to 21\%, and haddock from 26\% to 28\%.\textsuperscript{20}

PricewaterhouseCoopers estimate that consumption of sustainable labels such as Fairtrade and Organic had a market value of £12 billion in the UK in 2007.\textsuperscript{21} The Ecosystem Marketplace has estimated that the current value of certified forest products is approximately $15 billion a year, and is expected to rise to £50 billion by 2050.\textsuperscript{22} Certified agricultural products (such as organic and conservation grade) are estimated to reach $97 billion by 2012, £210 billion by 2020 and $900 billion by 2050. In support of these estimates, Jordans Cereals Conservation Grade licensees now outnumber their Jordans licensees in the UK, illustrating the growth in the market.\textsuperscript{23}

However, environmentally friendly products are still likely to have niche markets. Despite the rapid growth and future potential, market share for green products is mostly around one percent.\textsuperscript{24} The main limitations to growth in the eco-labelling market have been identified as price premiums that are too high for the consumer, a lack of green substitutes to regular products, and a lack of trust about the validity of the label.\textsuperscript{25} This means that eco-labelling may be a useful tool in nature conservation, but is unlikely to be sufficient in isolation. This is supported by the same research showing that consumers are willing to accept a price premium for environmental goods, but with only a small proportion supporting a premium of greater than ten percent.

\textbf{Limitations to financing of conservation by business}

The examples listed above illustrate that there is potential for business to help fund nature conservation through voluntary investments in biodiversity and ecosystem services. Both greater understanding about supply side issues such as cost-effectiveness and future revenue streams, and demand side issues such as consumer preferences, are driving growth in this market. However, the majority of firms have not currently identified gains from engaging in such activities. The limitations here stem from two main sources.

\begin{enumerate}
\item \textit{Lack of biodiversity and ecosystem service knowledge amongst business}
\end{enumerate}

Firstly, there is a basic lack of understanding about the ways in which natural services such as pollination and water regulating services, benefit businesses. There is even unfamiliarity with the terms ‘biodiversity’ and ‘ecosystem services’ within
business, which is serving as an initial barrier to understanding for many individuals and firms. Among other barriers identified in the TEEB for business report are the lack of an established metric for measuring biodiversity and ecosystem services, and a general absence of scientific and economic studies to evaluate services. What this means is that there may be benefits to business profitability or sustainability through better management of biodiversity and ecosystem service impacts, which remain unexploited because businesses simply lack the information on what these opportunities may be.

2. **Lack of biodiversity and ecosystem services knowledge amongst consumers**

Labelling and other information sharing can help to inform consumers about the benefits of green activities undertaken by business. However, the majority of consumers also have a lack of basic understanding about the importance of biodiversity and ecosystem services and the benefits from conservation activities on their wellbeing.

In addition, where information is incomplete, confusing, or in other ways imperfect, consumer confidence can be undermined. Nearly 20% of consumers rate confusion about the implications of their choices and the social and environmental trade-offs of their purchases as a key barrier. For example, there are currently seven sustainable fish labels in the UK, which is potentially confusing for consumers, diminishing their perceptions of the individual labels, and sustainable business operations in general.

These knowledge gaps prevent the current market for businesses engagement in conservation activities from being fully exploited.

3. **Missing Markets**

Perhaps the most pressing limitation is the absence of markets for conservation activities. In the majority of cases, firms simply understand that to invest in activities related to preserving biodiversity and ecosystem services would be a net cost to the business, and consequently take no action.

Environmental damage by firms often constitutes an externality that the polluter is not required to correct. When the firms have no dependencies, and consumer preferences for green operations and products are insufficient, firms generally have no financial incentive to account for their environmental liabilities, even if those liabilities were well understood and quantified. In this case the government will need to resort to alternative means of intervention, such as regulation of businesses through the EU environmental liabilities directive.
Civil Society

There is a need for civil society, as well as business, to play a greater role in marketing, financing and delivering UK nature conservation. The UK Government's ‘Big Society’ agenda encourages NGOs, social groups, and communities to engage more actively in delivering the social benefits that they value, including those related to the natural environment. This heightened role affords new opportunities for all non-governmental and non-private entities from individuals and local community groups, to national and international NGOs.

It must be emphasised that civil society already makes a huge contribution to the financing and delivery of conservation in the UK. The value of this sector’s contribution is that public goods and services that are not associated with any market (and so cannot be profited from) are provided to society, at little or no cost to government.

NGOs and social enterprise organisations provide the means for individuals to directly engage with improving society in the ways they deem to be appropriate. For example regarding environment, this can mean anything from being energy efficient at home, to starting up a community waste management task-force. For conservation in particular, this can mean volunteering on nature reserves or making donations to NGOs working to preserve biodiversity.

As with business financing, it is difficult to calculate an exact figure for the value of conservation activities currently generated by civil society due to risks of double counting and the prominence of voluntary work. It is estimated that members of Wildlife and Countryside Link (33 members including the RSPB) spend around £39 million a year directly on BAP actions. In terms of charitable giving by the public to biodiversity and the environment, a sample of the top 75 NGOs in the UK in 2007 found that total revenue from donations, legacies, and membership revenue totalled £169.2million. This emphasise the scope of current charitable giving in the environmental sector.28

This section aims to assess current and potential future mechanisms by which civil society can increase finance for, or resources used in support of, UK conservation.

Raising finance

1. Public engagement

This is an extremely important step in ensuring the public recognise the benefits offered by the natural environment. Raising awareness of and support for biodiversity is a core aim of many NGOs, to encourage current and future generations to engage in environmental stewardship. It is also an essential means of creating revenue for conservation. Donations, memberships, and legacies are invaluable sources of finance for conservation activities, making public engagement a main priority for retaining and increasing funds. The RSPB is an example of a large membership organisation, with over 1,076,000 members donating over £55million in memberships and legacies per year.
Recruiting support for conservation work can be done via a number of methods and there are a range of innovative strategies used by community groups, social groups, and NGOs to retain and increase this kind of support. Written and visual advertising can be done in newspapers, magazines, public billboards, television and online. More personal communication can also be achieved through telemarketing and face-to-face engagement. Of these, one of the methods that has proved most effective is raising revenue is face-to-face recruitment.

More recent techniques include utilising social networking and blogging sites to inform and engage web users. Internet Cookies can also be used alongside other market research methods to assess public preferences, and membership demographics. Consequently recruitment plans can be targeted to be as effective and efficient as possible.

Citizen science is a cost-effective way of combining public engagement with research. Public participation helps to inspire involvement in, and financial support for, conservation activities. It can also save money for organisations wishing to gather information about the state of biodiversity, and provide a measure of public interest in an issue. The RSPB’s Big Garden Bird-watch, which had over 550,000 participants in 2010, is a good example of this.

2. **Volunteering**

Unemployment levels in August 2010 stood at 7.8%\(^{29}\), with potentially challenging prospects for jobs looming in the coming years. Volunteering with a conservation organisation can not only help the NGO involved, but can help unemployed people learn new skills and gain valuable experience.

The RSPB, for example, currently has over 16,000 volunteers who give almost 882,000 hours to the RSPB, equivalent of over £5 million at minimum wage rates and equivalent to 446 full time staff. Nationally over 300,000 volunteers work with the British Trust for Conservation Volunteers.\(^{30}\) Using volunteers has the potential to deliver as a relatively low cost but high value activity for nature conservation. However, the RSPB faces capacity constraints to managing more volunteers in some areas, as do many other NGOs. This is due to the costs involved with making sure that volunteers are safe, have a positive experience and are managed to undertake useful work.

3. **Charging for conservation service**

Organisations that manage land for wildlife conservation and provide biodiversity and ecosystem services can raise revenues by charging for public use of those services. This could allow organisations to absorb consumer surplus from people who are willing to pay more than they do for the visit, thus generating funds for further activities.

In place of, or in addition to, direct charging for admission to conservation sites, revenue may be raised by introducing voluntary donations schemes, and developing visitor facilities such as coffee shops, picnic areas, or even green gym projects. However, the success of such schemes is again dependent on market conditions.
The RSPB currently charges for people or cars at approximately 24 of its reserves. This helps with income generation but does not generally cover costs. However, if costs were higher it could be a barrier to participation, particularly for people who have not had contact with nature before. In some cases it costs more than it is worth to charge at the other reserves but donation boxes are being investigated for unstaffed sites. These will not cover the costs but will help indicate to visitors that they are visiting a charity and conservation does not come for free.

It must be noted that the potential for success in this area is restricted by issues relating to the ideology and brand of the organisation, the market conditions, and the effectiveness of conservation delivery. Charging is not always worthwhile on nature reserves, and most UK (i.e. not just RSPB) reserves cannot be self-financing in this way. This is particularly true in areas where there are not many visitors likely to be expected, or where the nature visit market is saturated. If there was more funding to be made in this way we would expect to see a greater proportion of profit-making private nature reserves in the UK.

4. Using sites to deliver other ecosystem services

Organisations, individuals, or communities that manage land can also look into innovative ways of putting this land into further use for the public, to deliver a broader range of services, for example, through green gyms, health walks, or micro-generation. These schemes can broaden the social benefits offered by public areas or conservation sites, such as the health benefits of tackling inactivity, which costs the economy an estimated £8.2 billion per year. Promoting the environment in these ways can also help finance conservation.

For example, the British Trust for Conservation Volunteers’ (BTCV) green gym programme offers the opportunity for people to improve their fitness and the environment at the same time, increasing public engagement and awareness, whilst also delivering conservation benefits in the UK, relieving the stress on financing.

Another innovative method would be adopting small-scale renewable energy generation, is a means to lower operational costs and even raise funds whilst reducing carbon footprints. A local approach to lowering emissions could lead to significant carbon savings nationally, and globally, with significant benefits to biodiversity and ecosystem services. The RSPB has been investigating the introduction of renewable energy generation at reserves, to generate energy for use, and sale back to the grid, generating further profits for conservation.

5. Products

Conservation organisations could raise revenue by producing goods and services that relate to the ideology or delivery of their biodiversity objectives, and branded under the organisations’ name. For example, the trading branch of RSPB operations raises over £3.7million per year through sales of items such as chocolate and bathing products.
As has previously been noted, RSPB experience has implied that many products work best at a local level. Therefore this type of fundraising may be best suited to local groups or individuals willing to engage in conservation entrepreneurialism to help market the natural environment. Examples of this may be locally sourced meat farmed at a conservation site, or sustainably sourced local woodcrafts.

6. Networks and cross-sector cooperation

Creating networks between community groups, environmental organisations, and businesses is an effective way of sourcing finance and ensuring more cost-effective provision of conservation. It facilitates the formation of revenue raising partnerships, transferral of knowledge between sectors, and spillovers of expertise.

As well as gaining funds through the private sector and information from larger NGOs, establishing local community networks can raise finance in a number of ways. It can lower costs by encouraging voluntary work, improve cost-effectiveness by decentralising environmental decision making, and encourage donations by instigating a culture of individual and community responsibility.

Limitations to the contribution of civil society

Through the above measures, voluntary, social, and charitable organisations can assist in filling the financing shortfall for conservation activities in the UK. Ideally, civil society will work closely with government to encourage a culture of environmental awareness and participation. However, there are restrictions to the results that can be obtained without some form of government intervention. These limitations come under three categories:

1. Saturation of existing markets

Some of the revenue raising options listed above have been considered by conservation organisations, and found to be wanting in terms of their potential to raise revenue. There may be little or no existing consumer surplus for the privately marketed goods and services offered by conservation related activities such as conservation meat, or UK wildlife tourism. An absence of demand would make any attempt to extract payments for these goods and services unprofitable. This means that opportunities for expansion are limited.

2. Lack of resources and expertise

By their very nature, NGOs often do not have access to the finances or skills required to employ the activities listed in the previous section. Identifying investments in products, visitor facilities, or people engagement strategies that would deliver financial returns requires specialised skills, and even capital investment. Even to organisations that do possess the relevant non-capital resources, they may simply not have the funds to put them into use. No activity is in fact free. For example, using volunteers incurs costs for organisations when they want to ensure that the programme is rewarding, safe and
useful to both the volunteer and the conservation cause. It is possible that the Big Society Bank\textsuperscript{32}, which will operate from April 2011, will be able to help with the capital side of this problem, but the success for this in the environmental sector depends on who can access the funds and how much support there is to do so.

3. Missing markets

Whilst there is some scope for civil organisations to engage in existing markets to raise funds, the vast majority of biodiversity related activities aim to provide social welfare through goods and services for which no markets currently exist. This is a reflection of the current perception of the environment in the UK, and the place biodiversity takes within the spectrum of societal preferences. There is a need to better understand the benefits afforded us by the natural environment, encourage a culture of environmental stewardship across all sectors of society, and for government to intervene more directly to create markets where appropriate.

Conclusion

There are significant ways which civil society and business can finance and deliver conservation in the UK. There is likely room for further expansion of the voluntary conservation activities market, through broadening and deepening their scope. However, it is also important to recognise that there are limitations to what this voluntary market can deliver. In many cases, businesses may find that there are no gains to be made from investment in biodiversity and ecosystem services, and civil society will always face a struggle to find the resources for its activities.

In addition to business and civil organisations, the UK Government has a role to play in facilitating the Big Society’s delivery of UK biodiversity. The following are some ideas for how government can enhance the finance and delivery of conservation.

Suggestions for governments across the UK

- Investing in biodiversity and ecosystem service research will help promote awareness, and aid businesses in accounting for their environmental impacts and dependencies. In addition, supporting research into measuring biodiversity and ecosystem services footprints will facilitate better business accounting.
- Helping to ensure quality and consistency in eco-labelling, possibly by introducing government standards.
- Encouraging cooperation between civil society, business, and government, to jointly approach common issues, and help establish markets for biodiversity and ecosystem services.
- Helping to facilitate change towards a greater culture of environmental stewardship amongst citizens. Methods from behavioural economics could contribute to this end, with small government investments reaping proportionately large rewards on terms of voluntary societal action.
1 Adapted from AXA IM, 2010, Biodiversity and economic growth: A fusional relationship http://www.london-accord.co.uk/images/reports/pdf/biodiv_axa.pdf
3 TEEB – The Economics of Ecosystems and Biodiversity Report for Business - Executive Summary 2010
5 AXA IM, 2010, Biodiversity and economic growth: A fusional relationship
12 PricewaterhouseCoopers (PWC), 2008, Sustainability: are consumers buying it?
16 PWC, 2008, Sustainability: are consumers buying it?
17 Target Group Index, Kantar Media UK Ltd 2010. All use of TGI data is subject to TGI’s terms and conditions.
21 PWC, 2008, Sustainability: are consumers buying it? and RSPB calculations.
23 Pers comms 2010, Tim Nevard at Jordan’s Cereals.
25 Ibid.
27 Cracknell and Godwin, 2007, Where the green grants went.
29 BTCV, http://www2.btcv.org.uk/display/facts_and_figures Accessed 28 September 2010
30 Bird, W., 2004, Natural Fit, RSPB.

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Chapter 5 – Private payment for ecosystem service schemes

Businesses can benefit by establishing privately financed payment for ecosystem schemes. The promise for new schemes is greatest in water quality management; outside of this area the potential appears limited.

Nature provides people with many valuable services such as water regulation and purification, carbon sequestration and cultural services. Despite their value, often the provision of these ecosystem services is unrewarded, and as a result they are under-provided and over-exploited. Establishing a system of Payments for Ecosystem Services (PES) can help encourage the provision of these services.

A PES scheme can also help businesses. The Economics of Ecosystems and Biodiversity (TEEB) report for Business recommended that businesses identify the impacts and dependencies upon biodiversity and ecosystem services, assess the related business risks and opportunities and then design measures to avoid, minimise and mitigate biodiversity and ecosystem service risks. Payments for ecosystem services could be a key measure to accomplish this.

A commonly accepted definition of a PES scheme is a voluntary transaction which contains the elements:

- A well-defined environmental service or a land use likely to secure its provision
- At least one buyer
- At least one provider effectively controlling service provision
- An agreement where the environmental service provider secures service provision.

There are three main categories of PES schemes:

- Regulated PES, where obligations on an individual or business encourage them to pay for the provision of ecosystem services e.g. water quality regulations leading to water utilities to pay landholders within the catchment to change their management.
- Private PES, where businesses are negatively impacted by changes in ES delivery, and pay other businesses (including individual landholders) for their provision.
- Mediated PES, where a public agency or NGO coordinates PES payments that include some proportion of private funds.

PES schemes are increasingly used around the world in supporting delivery of services such as clean water, healthy soil, carbon sequestration and biodiversity. Table 5.1 displays the recent value of various environmental markets, with the regulated carbon market leading the way.
TABLE 5.1: Size of global environmental markets 2008

<table>
<thead>
<tr>
<th>Environmental market</th>
<th>Market Value (2008 $US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulated carbon</td>
<td>$117,600,000,000</td>
</tr>
<tr>
<td>Water Quality</td>
<td>$9,250,000,000</td>
</tr>
<tr>
<td>Biodiversity</td>
<td>$2,900,000,000</td>
</tr>
<tr>
<td>Voluntary Carbon</td>
<td>$705,000,000</td>
</tr>
<tr>
<td>Forest Carbon</td>
<td>$37,100,000</td>
</tr>
</tbody>
</table>

The non-regulated markets are still generally supported by public funds or NGOs. The high level of government intervention that characterises PES schemes to date is because ecosystem services often deliver public goods, which government undertake to ensure delivery on behalf of the public who are assumed to benefit. This includes Europe’s large agri-environment schemes, which pay landholders for provision of public goods such as landscape, biodiversity and improved water quality.

However, as discussed in the previous chapter, some businesses also benefit from the provision of ecosystem services, and may suffer if these services are lost or degraded. In such cases, establishing privately funded PES may help these private enterprises as well as providing an important new source of conservation funding.

It is important to remember that ecosystem services and biodiversity conservation are not always mutually compatible – there are sometimes conflicts between services. If biodiversity conservation is the objective, PES schemes need to be carefully designed to reflect this.

Examples of private and mediated PES

An example of a self-organised privately funded PES is found in France, where in the late 1980s the bottled water company Vittel (owned by Nestlé) found that its water quality was declining due to intensive agricultural practices in the water catchment. Due to the high brand value of Vittel, it was important to Nestlé to ensure high water quality standards were maintained. As land purchase was not possible, over the next 15 years the company negotiated with the key farmers in the area, and set up a payment system to help the landholders move to an extensive farming system. Farmers signed 18 or 30 year contracts and received financial assistance to farm more sensitively. Nestlé have been able to continue to market Vittel water.

An example of a mediated PES approach is the well-known Costa Rican PES scheme that has been operating since 1997. This programme funds forest protection and re-forestation to support biodiversity, landscape, water and carbon services. A main source of income is hypothecated funds from a portion of a national fuel tax. Other funds come from hydro-electric companies interested in preserving their water flows, carbon markets, NGOs, a
brewery and the tourism industry. By 2008 it had raised USD $126 million. The funds are managed by a national forest agency.

Coca Cola is researching a similar private/public scheme in the Uluguru Mountains, Tanzania, where water quality is increasingly being negatively impacted by farming upstream of Dars Es Salaam. The public water utility and Coca-Cola are currently investigating the impact of changed practice on water quality through a PES scheme.

A UK example of this mixed funding approach is the Sustainable Catchment Management Project (SCaMP). The project is a partnership between the water company United Utilities (UU) and RSPB that was established in 2005 to improve the upland land owned by UU. Funding is sourced from UU and agri-environment schemes. The primary objective was to improve SSSI habitats, but it was also believed there would be improved downstream water quality. The private benefits to UU were anticipated to be reduction in suspended solids, pathogens (particularly cryptosporidium), nutrients and water colour. When setting up the project in 2004, United Utilities estimated that the likely benefits to water colour were worth £1.21 million - £2.42 million a year. In the next ten years, water treatment facilities for UU will need upgrading, and improved water quality may make this process cheaper. There was also an expectation that the habitat work might mean that flooding was reduced lower down in the catchment.

The most recent results from the SCaMP monitoring are promising. SCaMP has brought 12,322 ha of blanket bog within SSSIs into favourable or recovering favourable condition, and other habitats have benefited too. There was a 43% drop in the dissolved organic carbon loss between the first and second year. The most recent monitoring report concluded that, “taken as a whole, the data are showing that grip blocking, reduced stocking levels and the cessation or altered management of moorland burning are all registering a momentum towards success in terms of water quality, upland hydrological function and habitat restoration”.

**Designing a PES scheme**

Before anyone can be expected to pay for ecosystem services, it is essential to have some understanding of the flows of services from a site. Additionally, there are some factors that make a successful PES more likely. These are that:

- There is clear demand for the ecosystem service, and the service is financially important to an individual or business
- The supply of this service is threatened
- There are specific management actions that can address this supply constraint.

For example, understanding the impact of improved land management on water quality, and the dependence upon the clean water flows, was important to the Vittel scheme. Even when there is not perfect information it may be possible to start a PES, but ensure there is rigorous monitoring to confirm whether the benefits occur, as is the case with SCaMP.
Having a clear objective of any prospective scheme is also crucial, as there may be conflicts between services. For example, securing some regulatory and provisioning services may not preserve biodiversity values. This is the case with lowland heathland restoration from commercial forestry, where there is likely to be a loss in timber and carbon values from clearing homogenous plantations but a gain in an important habitat for biodiversity.

The SCaMP and Vittel examples also suggest that working closely with the individuals providing the services is key to the success of a programme. Brokers may be useful to help negotiate and organise PES deals between ecosystem service providers and beneficiaries.

PES can be designed for either new actions (such as habitat restoration) or maintenance (such as grassland management). When designing a PES scheme, it is important to remember that polluters should not be paid for changing their behaviour, particularly when public funds are employed. Payments should typically be for actions that are additional to what is usually expected of landholders – they should not be compensated for obeying the law, but rather for actions that society considers beyond the landholder’s responsibility.

Often schemes make payments for set periods of times, such as the five or ten year contracts for England’s agri-environment schemes. Some schemes have even longer payment periods. These payments are particularly attractive to farmers as they represent a stable income source compared to fluctuating commodity prices.

The funds raised through PES can be allocated using a variety of mechanisms. One is to negotiate payments, such as in the Vittel scheme. Another is to set a flat fee payment per activity or per hectare, as occurs in the publicly-funded UK agri-environment schemes. Finally, conservation auctions can be used to discover the competitive rate for conservation in PES schemes. The most cost-effective mechanism for each situation will depend on a number of factors, such as number of participants in the scheme (smaller numbers are easier to negotiate with while extremely large numbers suit flat-fee schemes) or heterogeneity of participant costs (when costs are differing, which is often the case, auctions are most cost-effective).

Figure 5.1 suggests a possible process for implementing a PES scheme through an ecosystem service approach. The process starts with establishing an inventory of services and goes through to providing an incentive for conservation. More information on understanding ecosystem services and its links to nature conservation can be found in the RSPB publication *Naturally at your service: why it pays to invest in nature*.
Figure 5.1: Implementing an Ecosystem Service approach

1. Inventory services, people and landscapes (population governance, land use, climate, etc.)
2. Measure, model and map service production
3. Measure, model and map service flows
4. Measure, model and map beneficiaries of services
5. Measure, model and map benefits of conserving services
6. Measure, model and map costs of conserving services
7. Map distribution or winners and losers
8. Construct plausible future scenarios and repeat 2-7
9. Design mechanisms that capture service values providing incentives for conservation
10. Ex-post appraisal
**Future for private PES**

The potential to develop PES depends in part on the extent to which a service is a public good. Adequate private markets are less likely to develop without support in the case of pure public goods, such as existence value for biodiversity. As described in the introduction to this report, this is because it is difficult to charge for goods that are both non-excludable and non-rivalrous. Goods that share only one of these characteristics are easier to provide privately, for example club goods (which are non-rivalrous to a point but excludable, such as cinemas and swimming pools) are often provided for by private businesses. Nature reserves that charge for entry are an example of an attempt by the private sector to charge for biodiversity and landscape provision (even if most are not cost-covering charges). In other cases, such as with carbon sequestration, government intervention is required to establish a market for public goods, for example through setting a cap on emissions and distributing tradable permits to emit carbon. Table 5.2 outlines these categories and possible market and non-market solutions.

**Table 5.2: Types of public goods**

<table>
<thead>
<tr>
<th></th>
<th>Excludable</th>
<th>Non-excludable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rivalrous</strong></td>
<td>Private goods</td>
<td>Common goods</td>
</tr>
<tr>
<td></td>
<td><em>e.g. food, clothes</em></td>
<td><em>Eg. fish stocks, common grazing</em></td>
</tr>
<tr>
<td>Possible mechanism</td>
<td>Free market</td>
<td>Commons agreement; transferable fishing quotas</td>
</tr>
<tr>
<td><strong>Non-rivalrous</strong></td>
<td>Club goods</td>
<td>Public goods</td>
</tr>
<tr>
<td></td>
<td><em>e.g. cinema, private park</em></td>
<td><em>e.g. biodiversity, atmosphere</em></td>
</tr>
<tr>
<td>Possible mechanism</td>
<td>Free market (though may not be optimal level)</td>
<td>Requires government intervention</td>
</tr>
</tbody>
</table>

Outside of regulated markets, there are also likely to be businesses that are impacted by the loss in ecosystem services and react to secure them. A recent survey found that 27% of global CEOs found they were concerned over the impact of biodiversity loss on their business growth prospects. The TEEB Report for Business concluded that “Given the ongoing decline of BES [biodiversity and ecosystem services] and the interaction between biodiversity loss, decline in ecosystem services and other major trends, business can expect both the associated risks and opportunities to increase over time.”

Table 5.3 contains predicted global market sizes for a variety of ecosystem services in 2020 and 2050. It is unclear how these global figures would apply to the UK. It is clear that, although regulated markets are likely to remain the largest in size, there is scope for private and government mediated markets, particularly by 2050.
### TABLE 5.3: Potential size of global ecosystem markets

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulated forest carbon</td>
<td>$5 million- 5 billion</td>
<td>$0 - 5 billion</td>
</tr>
<tr>
<td>Voluntary forest carbon</td>
<td>$10 million to 5 billion</td>
<td>$10 million to 5 billion</td>
</tr>
<tr>
<td>Regulated water quality</td>
<td>$1 billion</td>
<td>$2 billion</td>
</tr>
<tr>
<td>Voluntary water</td>
<td>$2 billion</td>
<td>$10 billion</td>
</tr>
<tr>
<td>Government mediated watershed PES</td>
<td>$6 billion</td>
<td>$20 billion</td>
</tr>
<tr>
<td>Regulated biodiversity offsets</td>
<td>$10 billion</td>
<td>$20 billion</td>
</tr>
<tr>
<td>Voluntary biodiversity offsets</td>
<td>$100 million</td>
<td>$400 million</td>
</tr>
<tr>
<td>Government mediated biodiversity PES</td>
<td>$7 billion</td>
<td>$15 billion</td>
</tr>
</tbody>
</table>

In recent years, lack of scientific information or information asymmetry between potential market participants has come to been seen as a reason for missing markets. For markets to develop in conservation related services, one requirement is to understand the functioning of ecosystems and ecosystem services and their dependence on land cover or use. Recognition, and identification and better scientific understanding of ecosystem services should therefore encourage more private PES schemes to operate.

For example, when scientific understanding of the causes of the loss of bees is further advanced, it is possible to envisage a private PES where landholders that rely on pollination pay for a reduction in damaging actions elsewhere. For example, if a type of pesticide used on an arable crop was found responsible, fruit growers who rely on bee pollination could compensate local arable farmers for any loss in production that resulted from not using the pesticide. As bees contribute over £400 million to farmer’s incomes this could be a potentially sizeable market. The main limitations will be developing clear scientific understanding, and adequate cooperation between farmers on both ends of the market (i.e. seller and buyer of services).

Similarly, the science around carbon and changing land use is improving constantly. In combination with regulation that constrains overall carbon outputs and allows for purchase of land management change, there may one day be an increase in habitat restoration and creation in the UK as a form of carbon PES. This assumes that a robust methodology for measuring and maintaining these changes can be developed. Creating carbon-rich habitats could assist with achieving both biodiversity goals and mitigation of greenhouse gas emissions. Recent studies suggest that saltmarsh, for example, store a mean 1.51 tonnes of carbon per hectare\(^{11}\). Protecting or creating these habitats could potentially play a part in
carbon mitigation. Similarly, there are potentially sizeable amounts of carbon locked up in British soils whose improved management would help both nature conservation and greenhouse mitigation objectives. However, a limitation here will be accurate metrics for measuring carbon stores under different management. Another mechanism, such as agri-environment, may be a more appropriate and flexible payment vehicle.

The most promising market for private PES appears to be in water quality markets. Understanding of water services is rapidly advancing in the UK. There are already positive signs of increasing numbers of voluntary actions involving private landholders and water companies. Following on from SCaMP, there are now 108 schemes in England that include catchment management in water management plans. As information on the benefits of improved land management for water quality increases, it is likely that these schemes will become larger in scope.

**Conclusion**

Private PES schemes appear likely to remain far smaller in scope than publicly funded programmes, but could offer some future conservation financing in the UK. This is particularly the case for water markets. As discussed in the previous chapter, this market is likely to be sparked by businesses that are dependent upon biodiversity and ecosystem services.

Governments could help encourage private finance to enter PES by:

- Increasing the evidence base for the private benefits of ES. Publicising the benefits may encourage private markets to emerge
- Creating metrics to measure services, such as carbon sequestration resulting from land management changes, is another useful step to support private markets in ecosystem services
- Mediating the development and management of a PES scheme, for example by being responsible for contributing part funding for the benefits that do not accrue to the business (e.g. biodiversity benefits from upland water management).
- Regulate to establish upper use limits on natural resources such as the atmosphere and water bodies, and setting a cap on their use. This in turn may mean more private businesses using PES under the cap as a cheaper way of meeting their obligations.