

“Applying Payments for Ecosystem Services”

A report of a workshop
held in Edinburgh, 24th February 2015

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Executive Summary

Payments for ecosystem services (PES) is a concept that aims to link the beneficiaries or 'users' of nature's services with the stewards or 'providers' of those services, in order to protect or enhance these services. Within the UK the idea has received increasing attention in recent years, but its potential is not well understood.

The workshop described in this report aimed to share understanding and expectations of payments for ecosystem services (PES) across a range of settings in the UK, as well as identify key questions facing those interested to develop new PES projects. It included presentations and discussion on the identity of PES, international experience as well as some practical examples in the UK.

The workshop's presentations and discussions showed that the initiation of PES schemes requires a detailed understanding of the needs, interests and capabilities of both those who may benefit from ecosystem services and those that influence their provision or delivery. Discussions about provision of ecosystem services typically focus on private land-managers (especially farmers), but it is an open question as to what extent other public and private groups could be involved in ecosystem service delivery, and to what extent the PES concept could apply in other settings, particularly marine. In any case, the process of bringing buyers and sellers together in meaningful financial relationships within a complex and diverse landscape (or marine) setting will inevitably take many years. The process of 'bundling' or 'stacking' individual 'deals' together into packages likely requires the presence of intermediaries that can build relationships of trust over long periods of time.

Participants identified a need for greater clarity about what is unique about PES projects in relation to existing schemes and ways of managing land and marine areas for the array of services they provide. In particular, there is uncertainty as to how PES relates to existing public policies and schemes that shape land management.

Ultimately, it is important to remember that - like any concept- PES will inevitably have its limitations. PES does not offer a 'silver bullet' to the practical and resourcing challenges that face contemporary natural resource management. There is a need to identify where and how PES can complement existing initiatives and mechanisms in the UK. This includes showing how PES can work with existing legislation, land ownership and tenure arrangements. There is also a need to show how it can fit with existing projects for natural resource management. Identifying the best 'fit' will allow us to identify how the concept may most efficiently dovetail with other ongoing initiatives and mechanisms. If we can identify if and how it may best complement and further stewardship of nature, this may also help to address ethical concerns about PES.

While it is clear that application of PES in the UK is still in its infancy, the discussion at this workshop represents significant advances on previous thinking. It is essential to keep capturing and sharing ideas and practical experiences of PES in different parts of the UK and evaluating experiences in other parts of the world.

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Introduction to workshop and this report

Payments for ecosystem services (PES) is a concept that aims to link the beneficiaries or 'users' of nature's services with the stewards or 'providers' of those services in order to protect or enhance them. The approach has been applied in diverse settings around the world.

Within the UK, the concept has received increasing attention in recent years. Some attempts to test the approach have already been made, most notably a set of pilots in England and Wales supported by Defra¹. Nonetheless, many unanswered questions remain about how the PES concept may best be interpreted and applied. This includes how it is connected with traditional approaches to managing land and marine areas for all the private and public goods they provide.

Ideas about PES are rapidly evolving, with new ideas and applications of the concept emerging regularly. For this reason, the Ecosystem Knowledge Network ran two events to discuss the application of PES, one in Bristol (May 2013) and another in Manchester (December 2013). To update on progress and new developments since these events, and to further refine ideas about possible applications of the concept, the Network and the James Hutton Institute co-hosted a workshop in Edinburgh in February 2015.

The workshop aimed to:

- Share understanding and expectations of payments for ecosystem services (PES) across a range of settings in the UK.
- Identify key questions facing those interested to develop new PES projects.
- Support learning and networking between those with a range of levels of experience with PES.

The event, which was open to all, was advertised primarily through the Ecosystem Knowledge Network, as well as by informal word of mouth and targeted emails. Forty-five people attended the event, from all four constituent parts of the UK. Participants came from the public sector (both policy making and statutory agencies), private sector, third sector, and from research organisations. The number of participants and the representation of different sectors together suggest widespread interest in the application of PES in the UK.

This report provides a brief overview and summary of the points presented and discussed during the day. It follows the agenda structure. The agenda of the workshop is attached as an annex to this report (Page 19), together with a link to some of the presentations made on the day.



¹ <http://ecosystemsknowledge.net/resources/programmes/pes-pilots>

Expectations of PES

At the start of the day, participants were asked to discuss their ideas, doubts about and expectations of PES. They were asked to note what they thought or hoped 'PES can offer'; and the other to contain a 'key questions or area of uncertainty.' The facilitators arranged the notes on a board into common themes that were reviewed in a plenary discussion. These points from both the notes and discussion are summarised below. Some points indicate the differing ideas and expectations of separate participants. This includes, for example, whether PES will increase or decrease complexity, or whether or not individual PES schemes can be sustained in the long-term.



What PES may offer

- The new arrangements offered by PES may increase funding opportunities or provide alternatives to existing sources of funding and supporting natural resource management.
- These new arrangements might simplify present funding arrangements, make conservation more cost-effective, and provide a new source of income for land-managers (farmers).
- PES may help to bring people together. It may assist in building 'social capital' or links between different parts of society. It has the potential to change the way in which people relate to nature. In particular, it may serve to raise awareness of the diversity of ways in which nature benefits society (often referred to as ecosystem services).
- PES might offer the ability to improve sustainability in the long term, and facilitate climate change adaptation.
- PES projects might offer the ability to protect more types of ecosystems and places, potentially including urban settings, than tends to occur at present.
- PES may be able to deliver multiple benefits (multiple types of ecosystem services).



Questions, doubts and uncertainties about PES

- There was doubt about the amount of evidence need to design, monitor and evaluate PES projects. In particular there were questions and disagreements about the amount of valuation data needed. Some participants said that more valuation evidence is needed before PES can be properly implemented. However, some doubted that there would ever be enough valuation data available, and others said lack of valuation data should not be used as an excuse not to try PES – instead the key challenge is to accept and handle uncertainty.
- A key issue was whether PES will achieve more than a ‘rebranding’ of existing schemes that involve financial transactions to maintain or restore the natural environment. This includes agri-environmental schemes where the government makes agreements with land managers on behalf of the general public. If not, it is important to be clear about what is unique about PES projects versus existing schemes and ways of working. It is also essential to establish how PES relates to existing public policy and schemes.
- Some participants’ questions concerned who to involve in setting up a PES project, and how to go about engaging them. For instance, should PES always require involvement from a statutory agency? There were also questions about who should, or could, pay for PES and how to involve these buyers. Building interest, relationships and trust is a critical challenge to developing new PES projects.
- Will attempting to implement PES simply increase complexity of our challenges and projects?
- Will PES projects offer only short-term solutions?
- When to undertake PES, and when not to. In what situations or what challenges is PES useful, ethical and appropriate? Queries of this nature sometimes related to ethical concerns about when it is appropriate to pay someone to improve environmental management (which can be interpreted to conflict with the polluter pays principle). There were related doubts about the equity implications of PES projects and the distribution of payments – i.e. is it fair if these projects predominately add to farmers’ incomes?
- Doubts over when to attempt PES also relate to the above points about how PES connects with pre-existing legislation and projects, and also relates to queries if it is more likely to be suitable for some resource types than others: at present, both within and beyond the UK, PES projects seem to be predominantly based on addressing water management issues.



The PES concept: How it has been applied in the UK and beyond:

The meeting began with an overview of the PES concept, and how it has been applied in the UK and beyond, as captured in two presentations led by Steve Smith and Julia Martin-Ortega.

An overview of the concept of Payments for Ecosystem Services (PES) and the principles underpinning PES schemes – Steve Smith (Aecom)

Summary: Developing PES projects can provide a means to address the so-called ‘economic invisibility of nature’ (cf Pavan Sukhdev) but they are just one mechanism in a family of incentive- or market-based approaches to fostering environmental protection. (Others examples include cap-and-trade schemes and eco-labelling.) PES schemes are predicated on the ‘beneficiary pays’ rather than the ‘polluter pays principle’ and so generally involve payments to land or other resource managers for the provision of ecosystem services over-and-above the services provided in the absence of payment: this is the concept of ‘additionality’.

Some of the key aspects of PES schemes include the scale at which they are established (e.g. international, national, catchment, local); the actors involved in their development and implementation (buyers, sellers, intermediaries and knowledge providers); whether or not ecosystem services are sold separately (‘layered’ scheme) or together (‘bundled’ scheme); and whether payments are made for actual increases in ecosystem service provision (‘output-based’ payments) or actions considered likely to enhance service provision (‘input-based’ payments).

Current PES schemes in the UK are often focused primarily on water quality and funded by water companies with a clear financial interest in improved raw water quality; however, there are other areas in which PES schemes might also be developed in the coming years, including in relation to urban green/blue infrastructure provision and in connection with managed realignment schemes. Crucially, PES schemes are something of a ‘learning-by-doing’ experience and require strong interdisciplinary working for success.



Lessons from water PES schemes in Latin America – Julia Martin-Ortega (James Hutton Institute)

Summary: Latin America has been a pioneer in the implementation of PES and numerous schemes are now in place. Water services are involved in the majority of these existing PES schemes. Therefore, the study of Latin America’s experience with these schemes provides an excellent stock of information from which relevant lessons can be learnt. This presentation provided a conceptual model and key messages derived from a review of forty PES schemes dating from 1984 up to 2012,

involving 310 distinct types of transactions (payment exchanges). This encompassed both cash payments and non-cash rewards. These examples suggest that water can be a good 'vehicle', schemes that focus on water may also tend to protect other less tangible services (e.g. carbon sequestration, biodiversity protection), whether or not actions are formally bundled together.

These examples also illustrate the challenges faced in translating the theory of PES into practical water PES schemes. Many of these challenges and open questions are relevant to the UK. One key question is establishing the role of NGOs. In these examples, NGOs often took a crucial role as promoters and intermediaries of PES. It is open question as to who might play that role in the UK, and whether there needs to be specifically constituted bodies to do this, as is the case with the Latin America's water funds. In many of the examples reviewed joint efforts and cooperation between government, NGOs and other organisations (e.g. Trusts) were essential to designing and implementing the projects. NGOs are not the only potential group of actors whose involvement may be required. Another challenge is identifying how to persuade different types of private businesses to participate in PES. For example, one could discuss the potential of hydropower companies to join PES schemes in the UK, and then discuss how to go about involving them and achieving this.

Another challenge highlighted is the need to adapt projects to local conditions (PES works at the local scale and the theory can never be applied without interpretation and adaptation); whilst allowing flexibility for schemes to be adjusted over time if needed. In all situations, however, it can be tricky to design and allow price differentiation, e.g. for a scheme to adjust to non-constant marginal benefits. Quite possibly schemes can never perfectly adjust in this way, but it is important to identify when adjustment is 'good enough' and how this may be achieved.

An important conclusion of this study is that the 'classic definition' or theory of PES is often not well reflected in practice. For example, project monitoring is often based on compliance with agreed actions, rather than on delivery of the services, which may pose a problem for assuring conditionality. Payments are not often the result of bargaining between buyer and sellers, so we may not be reaching optimum prices. It is not always clear how to define and measure the services being paid for. Given all these deviations from the theory, we need to be vigilant to check whether expected results are actually obtained. In particular, more research is needed in terms of effectiveness of actions, as well as economic studies to inform the design of PES schemes.

In the discussion that followed these two talks, participants queried the relationship of PES with existing agri-environmental schemes, if these schemes will deliver the outcomes desired and explored how this relationship can be demonstrated or evaluated. Due to the way in which existing support for farmers is often regarded, there was a perceived risk that PES payments would be regarded as a right or subsidy, whereas PES is not supposed to be an unconditional subsidy. Participants also queried whether the discussions about PES always needed to be about rural settings, if more attention was needed on urban settings, and how to better connect urban and rural issues – which often would surely be required in order to deliver services in urban areas. Whatever the setting, a critical challenge is always to identify who could or should initiate a PES project, and then if and how to involve other groups. Julia explained that in Latin American schemes were often started by a local trusted NGO, particularly in areas with governance challenges. Participants from the floor suggested that in the UK it was often a buyer who initiated a scheme. In one particular case it was 'serendipitous', following a catchment based management plan where buyers came later.

Lessons learnt from Defra PES pilots – Bruce Howard (Ecosystems Knowledge Network)

Summary: Between 2011 and 2014, Defra commissioned 11 pilot projects to establish proof of concept for PES, and to test specific applications. These pilots were located in urban and rural settings across England, in addition to one project in Wales. Some projects sought to address specific environment-related issues, such as flood risk in the City of Hull and nutrient enrichment in Poole Harbour. Others, such as the project administered by Montgomeryshire Wildlife Trust, explored opportunities for attracting inward investment in landscapes that are recognised for their multiple benefits. The pilots vary greatly in their market readiness. The reverse auction that involved South West Water and farmers in the catchment of the River Fowey, England, is one of the few where significant financial transactions took place within the duration of the study.

The pilot studies offer a wide range of lessons. It is clear that the PES concept can be interpreted in many different ways. Conformity with all the theoretical criteria for PES schemes is not always possible at the outset. The pilots show the need to focus on opportunities for land owners and managers, who 'supply' the services, to diversify their income streams. One challenge is that many such suppliers are hesitant to commit to long-term agreements. The business case for buyers of ecosystem services (those acting on behalf of beneficiaries) also needs to be carefully designed so as to make the risks and rewards of an investment clear. It is clear from the pilots so far that buyers and suppliers are often only brought together into PES agreements by the actions of intermediary organisations that are around for the long-term and are trusted by all parties. A clear environmental baseline needs to be defined, so that the added value of the scheme can be clear to all involved.

While there is substantial experience of PES outside the UK, it is clear that its application in the UK is still in its infancy. The 11 Defra pilots completed to date, along with several other independent trials, give us some early indications of the opportunities and challenges.



The presentation was followed by discussion about how and when to define a 'need' for PES. Suggestions included; starting with a desk based study or holding lots of meetings to discuss what nature does or could do for people. The question of how to sell ecosystem services and connect with funding available from organisations' corporate social responsibility (CSR) programmes, was also raised. However, the extent to which tapping into CSR money fits with the PES concept is questionable: whilst accessing into CSR funds may produce much-needed financial support for conservation or natural resource management, because these companies are not typically the beneficiaries of the services that may be produced, it isn't necessarily appropriate to call these activities examples of PES.

Examples of PES 'on the ground'

After lunch, presentations and discussion focused on sharing the detail of some practical experiences of PES in the UK. Further links to information about all of these schemes, and others, is available from <http://ecosystemsknowledge.net/resources/programmes/pes-pilots>

Developing a PES scheme with landowners and tenants on Exmoor – Charles Cowap

Summary: The peatlands of Exmoor illustrate the challenge and complexity of developing PES schemes, and the related economic and legal considerations. Upland peat has multiple benefits to society, biodiversity and other ecosystem services (e.g. water supply, carbon storage, flood mitigation). The potential and the balance between the value of these services will vary from one location to another. For example the area of Exmoor draining to the River Barle (a tributary of the Exe) offers little flood mitigation benefit, but does offer potential savings to South West Water in reduced replenishment pumping costs for the Wimbleball Reservoir. Financial quantification of these benefits is complex. Questions also arise over how these benefits should be distributed equitably amongst beneficiaries - in this case the land managers who are able to provide the ecosystem service, South West Water itself with a need for retained profits for reinvestment, its shareholders and not least, the water users of the South West.

Careful financial appraisal is also necessary from a land manager's point of view. For land-managers, the potential for extra revenue to provide certain services via PES, may have to be set off against losses elsewhere, for example from reduced stocking or extra management costs. More broadly, key questions remain over the market and legal infrastructure for PES: How will markets start to function? What are the key legal relationships which will be required and how will they be formulated and documented? Key questions remain over the market and legal infrastructure for PES. How will markets start to function? What are the key legal relationships which will be required and how will they be formulated and documented?

After Charles' talk, he was asked how long the Exmoor scheme had taken to get going, and it was established that it could take a long time to set up PES projects (the Exmoor scheme had taken 5-6 years to get up and running). Payment to farmers are modelled on the marginal effect on profits and, depending on assumptions, is about £10-15/ hectare, but since many other factors affect profits (and these factors keep changing, such as agricultural subsidies) it is hard to decide and fix a figure. These can affect the extent of participation by land-managers in the scheme: for example, due to the upcoming change in farm payments, Charles was unsure how many farmers would stay with the Exmoor scheme. The value of natural science evidence and data to assist in deal-making was also discussed, although the basis of this need to be discussed in order for it to be trusted, for not even 'good data' is ever perfect as it is often derived from different sites and so is not always directly comparable.



Exmoor uplands, from http://upload.wikimedia.org/wikipedia/commons/d/dd/Exmoors_on_Exmoor.jpg

A local authority perception of PES - Katarzyna Wysocka (Luton Borough Council)

Katarzyna proposed that Local Authorities definitely have a role to play in developing and delivering PES schemes. The idea of being a service provider is very familiar to local councils, even if the concept of PES is new to them. As landowners of many green spaces, councils can engage in providing additional benefits from amending their current land management practices, and they are used to communicating and engaging with their local residents. PES projects might also be an attractive new source of income. However, when setting up PES projects with local authorities, it is also important to appreciate their organisational context. Objectively increased demand on one department could mean cuts in another. Any PES project expecting the local authority to be the buyer must ensure a perfect fit with council priorities and clearly committed funding streams. It must also present a strong value for money and ideally fall within the statutory functions, for example, flood risk management. Lastly, there is a better chance of success when project set up and monitoring of deliverables is straight forward and cost-effective.

Luton Borough Council has been involved in the River Lea in Luton PES pilot scheme. The greatest achievements of the pilot were bringing together a wide range of stakeholders interested in the river and developing an overarching vision for the role of the River Lea in the urban surroundings of Luton. The stakeholder group has since become formalised into the Luton Lea Catchment Partnership hosted by Groundwork Luton and Bedfordshire (a charity). Even though no PES project had been implemented in Luton as yet, by working towards a common vision and developing a greater understanding of each other's objectives and constraints, the partners are creating an environment where new approaches are acceptable and welcome and perhaps a PES scheme will be the preferred option one day.

The PES pilot at the Winford Brook Catchment - Chris Sherrington (Eunomia consulting)

Chris spoke about a Defra-funded PES Pilot Project that he is managing in the Winford Brook catchment south of Bristol. This work is being undertaken in partnership with Avon Wildlife Trust, and supported by Wessex Water, Bristol Water, and TLT Solicitors. The catchment faces a number of issues - such as high levels of soil erosion, and associated impacts on water quality - and the project team is developing an approach intended to address these issues in a cost-effective manner. This project runs from 2014-2015 and is part of the third round of PES pilot studies funded by DEFRA to provide evidence and identify issues to help the future development of PES schemes. It has involved a reverse auction, where land-managers have been able to bid to carry out interventions to improve intended to water quality, control soil erosion and flood risk. Bristol water has been the main paying beneficiary, via a PES fund that also allows for other inputs from other beneficiaries. Drawing on the early experiences of this project, Chris offered a number of practical recommendations for others planning to develop a PES scheme, some of which echo with those contained within Defra's evaluation of its first and second phase PES pilot projects.

Small group discussions

The participants divided into groups to discuss the following topics:

- A. Measurement, monitoring and evaluation of schemes
- B. Understanding scheme costs and agreeing prices.
- C. Finding providers, intermediaries and beneficiaries, and forming partnerships.
- D. How to design schemes that have multiple objectives (more than one ecosystem service)
- E. How to integrate or connect with pre-existing projects or funding schemes (such as agri-environmental schemes)

These had been identified before the meeting, based on issues raised in the literature and in previous work workshops on PES in the UK.



Participants were asked to consider the topics, and provide feedback to the other groups following the structure below:

1. Ideas about how to do this? Tips and strategies.
2. Ideas about how not to do this? Risks and pitfalls.
3. What might need to change (and by whom) to help support good practice & to avoid risks?
4. Any issues or ideas that are contentious or unresolved? This included noting key questions or topics where more experience or information is needed?

This structure was used for the following summaries of the small group discussions.

A. Measurement, monitoring and evaluation of schemes.

How to measure and evaluate schemes? Schemes need clearly defined objectives: it may be prudent to design or refine these objectives by thinking first of what can be measured. What can be measured and monitored may dictate the appropriate scale and/or mix of ecosystem services for a project to focus on. In monitoring and evaluation, it is essential to distinguish between efficiency and effectiveness, and to distinguish between inputs and actions versus outcomes and results. In addition, if outcomes are to be measured, and the way they were (or were not) achieved needs to be understood and measured in order to judge whether payments should be made. For example, if the desired outcome is increasing pollination services, not only do pollination services need to be measured, but also all the factors that affect this, so that the cause of any changes in pollination services can be understood – it may be that a land-manager has performed the desired actions to support to pollination, but other factors such as adverse weather events mean there has been no change in pollination services. This level of understanding may be feasible for some services or situations but not others, and so can help to inform when schemes are set up payments for actions or for outcomes. Lastly, as there is a requirement to demonstrate that it is appropriate to spend money on monitoring, participants highlighted the need for care in the way PES and its monitoring is communicated. They suggested that a ‘rebranding’ of ecosystem services may be needed using different terminology when discussing these schemes with the public.

What not to do? Participants thought that it was important not to “monitor for monitoring’s sake”. This means that data shouldn’t be collected if it is to be ignored or un-usable. By specifying a monitoring framework from the outset feedback can be obtained to enable changes and allow adaptive management.

If schemes do not dictate the precise actions required to achieve the scheme’s objectives, but allow flexibility (as is the case, for example, with reverse auctions), this might cause complications for evidence needs and for monitoring. Firstly, it may be difficult to choose between different proffered actions, as there may be different certainty in their predicted effects. Similar later monitoring of different actions may be associated with different degrees of uncertainty or specificity for different measures. In addition it may be more difficult or costly to monitor many different types of actions; since different equipment, types of data collection etc. may be needed. This is important to note for any putative schemes that may provide the option of choosing between multiple actions.

What needs to change? Participants were not entirely sure since those in the discussion had not yet participated in monitoring and evaluation of PES schemes. However, there was a strong conviction that lessons could be learnt from the challenges of monitoring and evaluation for other types of projects. The main lesson was that flexibility to allow adaptive management is required; at present it appears that few management projects, PES or otherwise, appear to achieve this.

Unresolved issues or evidence gaps? There is a need for more knowledge about how to go about setting up a scheme, including how to engage and with whom. In general there is a need for more information about social benefits of projects, not just information about costs and ecosystem services. It would be useful to establish an ‘evidence base’ on PES: this could include structured data collection on PES projects, in order to facilitate longer term and cross project monitoring and evaluation of PES scheme design and concept. A separate issue to be clarified is the roles of different types of academics, private sector, third sector and agencies in monitoring and evaluating schemes.

B. Understanding scheme costs and agreeing prices.

How to understand costs and agree prices? While there was no definitive answer to this question, it was felt that there can be a danger of spending too long on measuring and trying to establish precise prices for services, when all that is really needed is to know that benefit justifies the cost. It is the buyers that typically require the greatest level of details. Economic costs are needed for comparison with the cost of development benefit. However, it may be important to emphasise that values are place, person and context dependent, as different prices relate to or will affect people in different ways. Local context matters in several important ways e.g. in relation to climate change and flood risk. Biodiversity, recreation and air quality considerations need to be included in valuation studies.

What not to do? Some of the notes above relate to this point. There were no other agreed views about pitfalls or things to avoid, but there was agreement that it would be a mistake to exclude people/stakeholders in the process of agreeing prices. Instead, it is beneficial and necessary to get them involved as early as possible and invest in engagement and advice. Another issue discussed was that of offsetting (measurable compensation for the impacts of development that are deemed unavoidable). If applied to ecosystem service provision, it should be recognised that there are some things can't be offset, such as access to nature from local communities.

What might need to change to help support good practice and to reduce risks? More skills and knowledge are needed to communicate economic benefits, particularly with regard to urban schemes. Political will is needed for change. It will be a mistake if schemes try to value the whole system or total effects of a scheme, but should instead concentrate on measuring marginal gains.

Unresolved issues or evidence gaps? Transferring the PES concept to urban environments will require more involvement of local people in order to raise awareness of the benefits, particularly in relation to public health. There is ongoing discussion regarding the relevance of PES in the marine environment and how to transfer existing knowledge including valuation approaches. Although the effects of some actions can be valued, e.g. for opening up water courses, this does not make clear who could or should pay. Could a Local Planning Authority regime be developed to deliver ecosystem services?



C. Finding providers, intermediaries and beneficiaries, and forming partnerships.

How to find providers and form partnerships? Participants in this group were keen to point out that the level of effort involved in building partnerships is significant and shouldn't be overlooked. In the early days of building these partnerships, to help explain and build trust, it can be important to have access to information about cause and effect. With regard to finding providers, it can be important to use the language of the market, rather than any language or terms that have connotations of subsidies, and to understand the motivation and attitudes of providers (often land-managers). Involving stakeholders from the beginning, and 'monetising' as many as possible of the services to be generated, can facilitate identification and involvement of buyers (beneficiaries or representatives).

What not to do? Many PES schemes are started by one or two enthusiastic individuals who invest huge amounts of time. However, this is not necessarily sustainable and will never result in a functioning scheme unless the financial incentives are there to encourage buy in, and properly structured so that they are understood to be conditional, not a subsidy. Landowners may treat PES differently if they see it as similar to the Common Agricultural Policy (CAP) and its subsidies, and if this occurs they may be deterred from participating in PES. There was a perceived need for communities to get together, so that PES could operate on a landscape scale rather than a 'scattergun' approach. As most land-managers are operating commercial business schemes and usually have little incentive to collaborate, this must be taken into account, it may be useful to encourage or require land managers to work together to participate in a scheme.

What might need to change? As community-led schemes may often be cash poor, it was suggested that the government could provide funding for these schemes, or funding on research about alternative ways they can access or provide resources. Opportunities should be taken to rethink ways of looking at return on investment, possibly inventing new markets to adopt a 'less stick, more carrot' approach.

Unresolved issues or evidence gaps? Should PES be considered and communicated as setting up a new market? Could a single one-off payment still be considered PES?

D. How to design schemes that have multiple objectives (more than one ecosystem service)

How to design schemes that have multiple objectives? It is vital to keep the work tightly focussed, remembering that PES is only one tool amongst many (including regulations, the planning system, CAP cross-compliance, partnership working, taxation, knowledge transfer and decision-making tools, general advice). In addition it is important to ensure that PES stays rooted in the Ecosystem Approach more generally. This means that networking, partnership creation, trust building and knowledge exchange need to be recognised as all vitally important. The requirement for patient development of social capital is just as important as the development of natural capital.

What not to do? Few specific risks were discussed, although many are inherent in the comments regarding scheme design. There may also be problems from beneficiaries (or their representatives) that pay into a scheme now and may expect the benefits to be delivered soon, not in 20 years' time.

What might need to change? Participants spent some time discussing tax incentives and the resolution of PES on tax. They commented that social aspects can't be neglected when designing PES and that 'someone' needs to balance the complexity and simplicity of PES.

Unresolved issues or evidence gaps? The group noted that identifying the 'additionality' of schemes was difficult. Another question implicit in some of the group discussion was a question as to when it would be appropriate to implement PES or to select a different approach to facilitate the delivery of multiple benefits. The alternatives include legislation for environmental quality standards and offsetting (compensatory measures).

E. How to integrate or connect with pre-existing projects or funding

How to design schemes that have multiple objectives? The discussion revealed many challenges in linking different funding streams – some of which may be classed as PES and others that may not. In particular, funding arrangements for agri-environmental and rural development schemes tend to have different application and reporting deadlines. There is also the challenge of beneficiaries needing to prove that any new scheme classed as PES is providing benefits that are additional to those already funded. One way forward identified by participants would be for local and landscape-scale partnerships that have an interest in the integration of multiple objectives to become more involved in the administration of payments. The idea was that such partnerships (many of which are long-established, even if non-statutory) would have an interest in linking up multiple schemes operating over an area of land. (This is sometimes referred to as layering or bundling of PES).

What not to do? The topic is too new to recommend specific activities or approaches to avoid. However, there is a clear need to avoid situations where areas of land are subject to multiple agreements that may themselves conflict with one another.

What might need to change? The group identified the value of central web-based registries that link actions leading to improved ecosystem service provision with potential buyers and funders.

Unresolved issues and evidence gaps? The legal and taxation aspects of one area of land being associated with multiple schemes that improve of ecosystem service provision needs to be clarified. There is also a need for greater clarity on how multiple funding streams (which may come and go over time) link to legal covenants on land.

Final plenary discussion

After the small group discussions, each group shared its feedback with the others. In the subsequent discussion there was a feeling that much of what had been discussed may not be unique to PES, and might be common to other types of action designed to improve natural resource management. There are many opportunities for shared learning about how to address specific challenges, such as water quality, flood risk, and ecological restoration. In future discussion on the challenges of applying the PES concept, it will be useful to explicitly distinguish what is and is not shared with other management concepts, to avoid confusion and to allow research and action to be appropriately focused.

A challenge that is specifically associated with PES is that of understanding costs and prices. This has two interconnected challenges: firstly, some form of information about monetised values must be estimated in order to allow a PES scheme to proceed, secondly, it is unclear to what level of detail and degree of confidence is needed in these figures. Creating, compiling and using valuation data can be costly, yet is never 'perfect', so identifying the most appropriate and worthwhile investment in valuation studies will be useful. Related to this, understanding how to handle uncertainty, and the subjectivity inherent in valuation data, is unavoidable and essential.

Valuation figures alone are far from sufficient for establishing a PES project. If a 'win-win' situation can't be provided, and therefore prices agreed, PES will never work. Good communication and facilitation skills are vital to identify, bring together and engage potential buyers and sellers. It is important to recognise that PES projects are attempting to implement a very new concept, to some extent it is unproven and associated with uncertainties. This may give many potential participants cause for concern. Convincing participants to participate in a PES project may depend on significant efforts in relationship-building and establishing trust, as well as allowing flexibility in scheme design.

Conclusions

This report summarises the presentations and discussions of diverse participants united by an interest in PES. While it is clear that application of PES in the UK is still in its infancy, the discussion at this workshop represents a significant advance on previous thinking. The event identified a number of insights, as well as questions, for those who seek to for those who seek to develop and apply the concept in the UK.

Ecosystem service provision is the result of a complex array of factors, and any putative PES project must understand and engage with this complexity. The initiation of PES schemes requires a detailed understanding of the needs, interests and capabilities of both those who may benefit from ecosystem services and those that influence their provision by the way that they manage land or water. It may therefore take many years to bring potential buyers and sellers together to establish financial relationships that are in the interests of both buyers and sellers. This may be particularly true for complex schemes that attempt to 'bundle' or 'stack' individual deals together into projects that will address multiple issues (flooding, water quality, tourism etc.). In this process intermediaries are probably essential to build relationships and trust.

The experiences of the Defra PES Round 1 and 2 pilots are an excellent source of insights and ideas, as captured in the evaluation report. This report does not repeat these insights, which are available from <https://www.gov.uk/government/publications/payments-for-ecosystem-services-pes-best-practice-guide>. However, it is useful to highlight that many of the challenges faced by these pilots, as well as some other PES initiatives, are reminiscent of the challenges shared by other attempts to facilitate natural resource management (e.g. the challenges of engaging and involving different stakeholder groups), so it is important to recognise and share the lessons learnt from other domains.

The PES concept requires an understanding of the value of nature for society, attention to valuation, and to agreeing prices. However, a focus on valuation of ecosystem services will not, by itself, inevitably lead to PES schemes. Designing a scheme requires a good understanding of the complexity of both natural and social systems that together govern ecosystem service provision. For example, some services may be more suitable to being the primary focus of a scheme, perhaps because they are most easily or reliably measured, even if it is hoped that multiple benefits will be provided. Or, societal priorities and demands may indicate which services are most appropriate amenable to being the focus of a scheme. In short, understanding the ideas and needs of communities and organisations is as essential as habitat surveys or ecological modelling. This also has implications for the skills required: social science (including economics) and natural science skills will be useful during both scheme design and monitoring. Furthermore, organisers, facilitators or intermediaries with 'people skills' and patience are always essential, for forming and sustaining partnerships.

Ultimately, it is important to remember that – as with any concept- PES will inevitably have its limitations. PES does not offer a 'silver bullet' to the practical and resourcing challenges that face contemporary natural resource management. Presently there is need to identify where and how PES can best complement or build on existing initiatives and institutions in the UK, including existing legislation and policy mechanisms, with different land ownership and tenure arrangements, as well as existing site-specific management interventions. Identifying the best 'fit' will allow us to identify how the concept may most efficiently dovetail with other ongoing initiatives and mechanisms.

If we can identify when and how PES may best complement existing initiatives, this may also help to address ethical concerns about PES. These include a perception that PES will detract from the 'polluter pays principle', objection to commodification of the natural environment, and questions about how different communities of interest in society will win or lose as a result of these projects. Some of these concerns will be better understood – and may be ameliorated - by more attention to questions of equity, acceptability and fairness during PES project design and evaluation.

Fully understanding the multiple issues shaping PES project outcomes will take many years, and so as we look to the future it is essential to keep capturing and sharing ideas and experiences of PES.

Annex A – Agenda

10:00 - 10:30 Registration and refreshments		
	Introduction to ‘Payments for Ecosystem Services’	
10:30 - 10:50	Welcome to meeting Warm-up: what do we want PES to do?	Kerry Waylen & Bruce Howard
10:50 - 11:30	The PES concept and how it’s been applied in the UK and beyond	Steve Smith, Aecom Julia Martin-Ortega
11:30 - 12:00	Discussion: the scope and ‘identity’ of PES	Convened by Kerry Waylen
12:00 - 12:25	Lessons learnt from UK pilots	Bruce Howard
12:25 - 13:15 Lunch and networking time		
13.15 - 14:30	PES ‘on the ground’ – some examples	
	Developing a PES scheme with landowners and tenants on Exmoor	Charles Cowap, Chartered Rural Surveyor
	A PES Pilot Project in the Winford Brook catchment	Dr Chris Sherrington, Principal Consultant at Eunomia Research & Consulting Ltd
	A local authority perspective on PES	Katarzyna Wysocka, Luton Borough Council
14:35 - 15:25	Small group discussion: initiating and sustaining PES. (Refreshments available.)	Convened by table facilitators
15:30 - 16.00	Summary discussion and wrap up	Kerry Waylen & Bruce Howard
16.00-17:00 Refreshments and informal discussions		

Annex B - Resources

Links to PowerPoint presentations and other materials available on the day: <http://ecosystemsknowledge.net/about/events/pes-edinburgh>

- Assessing the potential for payments for ecosystem services in Wales (<http://gov.wales/topics/environmentcountryside/consmanagement/green-growth-wales/9027971/?lang=en>). Commissioned by Welsh Government and prepared by Cascade Consulting and eftec.
- Experiences with payments for ecosystem services in Latin America (<http://www.sciencedirect.com/science/article/pii/S2212041613000818>). Journal article, but written to be accessible to non-academics. Email info@ecosystemsknowledge.net if you are unable to access this and require a personal copy for educational purposes.
- Payments for ecosystem services best practice guide (<https://www.gov.uk/government/publications/payments-for-ecosystem-services-pes-best-practice-guide>). Commissioned by Defra and prepared by a partnership led by URS (now aecom).

Annex C - Participant list

Note: the observations in this report have been made by the workshop convenors based on discussions during the event. They should not, however, be attributed to any one organisation.

Sian	Atkinson	Woodland Trust Scotland
Mary	Christie	Scottish Natural Heritage
Charles	Cowap	Chartered Surveyor and Registered Valuer
Rhys	Davies	Morgan Sindall
Garry	Duncan	Forestry Commission Scotland
Nick	Elbourne	Royal HaskoningDHV
Jo	Ellis	Forestry Commission Scotland
Anne	Fairhead	Cascade Consulting
Joseph	Ferris	BMT Cordah
Adam	Fitchet	Environ Corp
Zoe	Frogbrook	Scottish Water
Morag	Garden	Scotch Whisky Association
Linda	Gateley	Scottish Government
Karen	Haysom	Bucks, Berks and Oxon Wildlife Trust
Max	Hislop	Glasgow & Clyde Valley Green Network
Bruce	Howard	Ecosystems Knowledge Network
Ann	Humble	Welsh Government
Jamie	Hume	Scottish Government
David	Jones	Pembrokeshire Coastal Forum
Vanessa	Kind	Scottish Environmental Protection Agency
Carol	Kyle	James Hutton Institute
Clive	Lightfoot	Arun and Rother River Restoration Trust
Aftab	Majeed	Aberdeen City Council

Neville	Makan	Scottish Natural Heritage
Julia	Martin-Ortega	James Hutton Institute
Fraser	Maxwell	Arup
Andrew	McBride	Scottish Natural Heritage
Emma	Mckinley	University of Chichester
Francesca	Moore	Black & Veatch
Simon	Neale	Natural Resources Wales
Lynne	Osgathorpe	RSPB
Joel	Paterson	Scottish Natural Heritage
Sara	Pearce	Shropshire Wildlife Trust
Angus	Pettit	JBA Consulting
Susanne	Raum	Imperial College, London
Edward	Ross	Scottish Government
Petrina	Rowcroft	Aecom
Vadim	Saraev	Forestry Commission Scotland
Helen	Sellars	Forestry Commission Scotland
Chris	Sherrington	Eunomia Consulting
Maike	Waldmann	Scottish Government
Paul	Watkinson	Scottish National Heritage
Joanna	Wawrzyczek	University of Edinburgh
Kerry	Waylen	James Hutton Institute
Andrew	Wells	Forestry Commission Scotland
Phillip	Wilson	Environment Agency
Katarzyna	Wysocka	Luton Borough Council