



Surveying views on Payments for Ecosystem Services: Implications for environmental management and research



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ABSTRACT

The concept of Payments for Ecosystem Services (PES) is globally of increasing interest. However, little is known about the views and expectations of professionals and practitioners expected to enable or implement this concept. Since these individuals design, select, shape and deliver environmental management, their views and expectations are critical to understanding how PES may play out in practice. Using the first survey on this topic, in the UK this research discusses the implications for future research and environmental management.

Responses indicate a range of views about PES and its potential effects. Most expect to see greater use of PES in future; and are cautiously positive about the environmental, social and economic consequences of doing so. Many hope PES may overcome existing challenges facing environmental management, subject to conditions or changes. The research also revealed tensions related to broader challenges in environmental governance – e.g. calls for standardisation may conflict with requests for adaptability. Meanwhile, other expectations – e.g. improved engagement with groups currently uninterested in the environment – indicate priorities that may be better addressed with other instruments. Varied views are likely in most countries and must be assessed to better understand the prospects and potential of PES.

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1. Introduction

Recent decades have seen increasing support for the use of Market Based Instruments (MBIs) to achieve goals in environmental management. MBIs are imprecisely defined, but usually involve pricing environmental attributes or ecosystem services, with the expectation of improving the economic efficiency of their management (Gómez-Baggethun & Muradian, 2015). MBIs include instruments such as carbon trading, wetland banking, biodiversity offsetting and Payments for Ecosystem Services, known as PES (Pirard, 2012). The growing attention to MBIs has attracted many critiques and questions (Muradian and Gomez-Baggethun, 2013). These critiques reflect misgivings about related concepts such as markets, capitalism, commodification and/or neoliberalism (Brockington & Duffy, 2010) and also practical doubts about when and how these concepts may be applied in practice (Reid & Nsoh, 2016).

PES schemes are particularly prominent in this debate. PES is typically defined as voluntary transactions where ecosystem ser-

vices are bought and sold between beneficiaries and providers of those services (Wunder, 2005). Payments are expected to be conditional on the delivery of ecosystem services, or actions to deliver those services; and the schemes are expected to provide 'additionality' i.e. go beyond what would be delivered in the absence of the scheme (Derissen & Latacz-Lohmann, 2013). However, there is debate about whether all these elements must be present for an intervention to 'count' as PES (Kumar et al., 2014; Sattler & Matzdorf, 2013; Wunder, 2015).

Implementation of PES is particularly widespread in developing country contexts, specially water management in Latin America (Martin-Ortega et al., 2013), where there have often been few other tools available to improve management. Even though PES has been identified as suitable for places with weak governance (Engel et al., 2008) it is now of interest in many developed countries that have a strong tradition of controlling environmental problems via regulation. Since the 1990s, many of these countries have implemented Agri-Environment Schemes (AES), which some argue are a form of PES, since the government pays farmers for actions intended to benefit the environment (Schomers & Matzdorf, 2013). However, there are potentially many other forms that PES could take. There are thus many debates about when and how to choose and use these approaches (Reid & Nsoh, 2016), and how to relate them

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to existing conservation approaches (Sattler & Matzdorf, 2013), a challenge compounded by theoretical dispute over what 'counts' as PES (Wunder, 2015).

One issue that has so far received little direct attention is the views of the range of professionals working on environmental management, who would be expected to enable and implement PES. Reviews and comparisons of schemes (e.g. Brouwer et al., 2011; Grima et al., 2016; Martin-Ortega et al., 2013) do not usually focus on attitudes *per se*, but indicate that the social context of schemes can be an important factor shaping the progress of interventions. Meanwhile, studies of individual schemes have highlighted a range of perceptions and attitudes held by stakeholders within schemes (e.g. Rodríguez-Robayo & Merino-Perez, 2017). These might range from enthusiasm to doubt or even hostility, which may relate to questions over the effectiveness or equity of PES outcomes (e.g. Calvet-Mir et al., 2015).

However, existing studies rarely provide insight into the perceptions of those 'environmental professionals' expected to enable and implement schemes. This can encompass anyone from a policy maker through to site managers, NGO groups through to academics. The interaction of these individuals and their institutions can have a large influence on understanding how PES practice evolves and differs from abstract concepts and logic of PES (Brimont & Karsenty, 2015). Since these individuals design, select, shape and deliver environmental management, their views and interpretations are critical to understanding how PES may (or may not) play out in practice.

It is therefore important to understand current views of individual instruments such as PES, to better understand the prospects and potential for further such instruments as well as to build understanding of the plurality of views within the environmental sector. To address this challenge, this study reports the views on PES held by the first survey of environmental professionals. The research uses the UK as an example of a developed country where there is a clear policy interest in PES. The UK is certainly not alone in developing experience on this topic (Schomers & Matzdorf, 2013), and use of the PES format amongst other European or developed countries is particularly notable in Germany and the United States (Matzdorf et al., 2014). However, the UK carried out one of the first national ecosystem service assessments, which highlighted the need to incorporate these in 'economic decision-making' (Bateman et al., 2013): subsequently Defra, the Department for Farming and Rural Affairs, commissioned three rounds of pilot PES projects between 2012 and 2015 (Environment Analysis Unit Defra, 2016). When we hosted a 2015 cross-sectoral workshop to share experience and ideas on PES in the UK, we encountered a wide range of understandings, attitudes and questions about PES (Waylen et al., 2015b). This suggested that academic views or policy support might not always be mirrored by the wider community of environmental professionals, and highlighted the need for more evidence on this issue.

Our research questions are: (1) What are current understandings of PES, and expectations of what it may achieve, within the UK environmental sector? (2) What does this indicate about whether and how to enable PES, to improve environmental management?

2. Methodology

2.1. Survey design and sampling procedure

We used a structured online survey to elicit understandings and opinions on PES held by environmental professionals in the UK. The design of the survey was informed by the PES literature (see previous section) and a 2015 workshop that we had co-organized

with the Ecosystem Knowledge Network¹. Forty-five people had attended the workshop, from all parts of the UK and from all sectors (public, private, third sector and from research organizations). This had identified a wide range of expectations about PES, both positive and negative, and some confusion about the links between PES and other practices and concepts. This indicated a need for further research and action on this topic. Further details on the workshop and its outputs can be found in Waylen et al. (2015b).

The survey questionnaire (see [Supplementary Material](#)) aimed to build understanding of three topics: i) understandings of PES, i.e. what attributes constitute PES, what is the relationship between PES and other environmental instruments; ii) expectations of the effects of PES, i.e. are views about its consequences positive or negative and why, what types of effects are expected, and why or when might PES be appropriate; and iii) ideas about if and how to go about further developing PES in the UK, including priorities for future research and practice.

Each topic was probed using a mixture of open and close-ended questions, preceded by questions that profiled the respondent's background and familiarity with PES. The survey included both compulsory and non-compulsory questions and included opportunity for respondents to enter additional comments. The design of the questions did not presume an expert understanding or positive attitude to PES. The survey and overall research plan was checked and approved by the James Hutton Research Ethics Committee.

The survey was hosted on Leeds University servers and piloted three times in spring 2016 for its content and for web-programme functionality. The answers to the last pilot were incorporated into the final dataset, since no further substantive changes were introduced after this pilot. Questionnaire testers spanned representatives from several sectors (public sector, third sector, environmental knowledge broker and academic), as well as an expert in survey development. The survey was open from the 10th of May to 14th of July 2016. On average, it took around twenty minutes to be filled.

The research was purposively targeted at any individual "who works on any topics related to nature conservation or environmental management within the UK". Those who did not define themselves as such were screened out at the beginning of the survey. Emails to individuals, list serves and networks were used to promote the survey using the extensive network of contacts of the authors and their partner organizations. A snowball process was promoted as contacted individuals were asked to circulate the survey amongst their own contacts. Our emails emphasised that we encouraged any environmental professional to take part on the survey, regardless of their pre-existing understanding or views on PES. However, there may have been some self-selection by professionals with a degree of confidence in their understanding of PES, or a positive view of PES.

2.2. Survey participants

Our sample size (N) varies from 160, the number of respondents who completed the first parts of the questionnaire, through to 100 who reached the final question. For most questions, answers were not compulsory. There is thus variation in the sample size reported for different questions in the findings section.

Respondents included a range of job roles and professions, and were quite evenly spread across the private sector (28.1%), public sector (26.9%), third sector (22.5%) and academia (also 22.5%). Respondents' roles ranged from enabling, studying or directly carrying out management of nature and the environment. 60% of our

¹ The Ecosystem Knowledge Network is the primary network promoting information sharing and learning across the UK in support of holistic and inclusive management of the environment <http://ecosystemsknowledge.net/about>.

respondents had a training or educational background in the natural sciences (e.g. ecology). Other backgrounds were economics (7.5%), social sciences (4.4%), engineering (2.5%) and business (0.6%). In addition, 8.1% of respondents had a background not in any these groups (ranging from farming to legal studies) whilst 16.9% had mixed-disciplinary training (e.g. economics and natural science).

2.3. Analysis of responses

Closed questions were reported using descriptive statistics (mainly frequencies). Open ended questions were analysed using an inductive thematic analysis, identifying and grouping recurrent themes as they emerged from the data (Ritchie & Lewis, 2003). We tested for the relationship between personal attributes and other responses to the survey (e.g. using the Chi-square test of independence), but did not usually observe any significant associations, so our findings presented next do not differentiate between these groups. When relevant, responses by one individual were cross-checked across several questions, and open and closed responses were analysed in combination for complementarity. In early 2017 a summary of the results was circulated to survey participants to share our findings and give opportunity for their feedback on our interpretation of results (no feedback was received that disputed or elaborated on the findings).

3. Results

3.1. Understandings of PES

Whilst most of the 160 respondents (95%) considered themselves as ‘completely’ or ‘somewhat familiar’ with the idea of PES, far fewer (37.5%) classed themselves as experts. 125 respondents were aware of existing PES projects in the UK, whilst 47 said they were actively connected with UK PES projects and named many different initiatives. These initiatives were often connected with water management or the recently-commissioned Defra pilot projects (Environment Analysis Unit Defra, 2016).

Early in the survey, respondents were asked to describe PES in their own words (without receiving any prompts as to the meaning of PES). Most of these descriptions focused on ecosystem services being bought and sold, and all were compatible with definitions of PES offered by theorists (e.g. Wunder, 2005). Details of the exchange itself were rarely mentioned – i.e. that transactions should be voluntary, conditional and additional – but we should not necessarily expect unprompted spontaneous answers to mirror every aspect of carefully-developed definitions in the literature. Respondents’ definitions and their relationship with alternative theories offered by the literature is further explored in Martin-Ortega & Waylen (in submission). We also asked if people saw PES as related to other environmental management concepts and practices. The list of concepts and respondents’ rating of similarity is shown in Table 1.

The concepts provided in the list were chosen to range from initiatives that explicitly describe themselves as linked to PES, such as the Peatland code, a UK standard for projects wishing to market the climate benefit of peatland restoration (IUCN, 2017; Reed et al., 2013; Reed et al., 2016), to those that pre-date PES, such as Integrated Catchment Management, a holistic approach to managing water and land across a watershed (Marshall et al., 2010). Respondents generally saw most pre-existing practices and initiatives as similar but not identical to PES. Having said that, all concepts were rated as ‘identical’ by one or a few respondents: thus there was clearly a mixture of understandings across the sample. The schemes most often seen as closely related were ‘Integrated Catch-

ment Management’ and ‘Biodiversity Offsetting’. This is interesting as these concepts do not necessarily match the PES concept: for example, Integrated Catchment Management is not necessarily framed in terms of ecosystem services, let alone financial exchanges. The greatest spread of views was associated with Agri-Environment Schemes, and the Peatland code (IUCN, 2017), where there was no clear clustering towards either end of the rating-scale.

When the subsequent question requested comments on “*how you think PES is unique versus other management instruments or concepts*” of the 19 comments received, the largest group (N = 5) said that only PES had a specific focus on ecosystem services (which was noted as being explicit in other concepts such as AES) and monetised the value of these services. However, three other respondents said they did not think that PES was unique. Other answers said PES was unique for involving the private sector, markets and/or building “*business to business relationships*” which could potentially “*attract extra funding*”.

Overall, although there was usually a sense that PES projects should involve financial exchanges to support delivery of ecosystem services, there was not a strong or uniform view about the details of how this should occur, nor how this relates to other ongoing practices.

3.2. Expectations of what PES may achieve

In future, our respondents both desired and expected to see more implementation of PES across the UK (Table 2).

Their support can be explained by the mostly positive expectations of the social, environmental and economic consequences of PES projects (Fig. 1). Cross-referencing answers showed no obvious link between these expectations and respondents’ earlier definitions of PES.

When asked for “*your comment or explanation*” for these expectations, common responses were that PES could: unlock new or alternative funding opportunities, at least for land-managers; allow the protection of more types of places and ecosystems, especially in urban settings; encourage delivery of multiple benefits; improve sustainability in the longer-term; and, raise awareness of the diversity of ways in which nature benefits society. PES was also noted as a means of bringing together groups not currently thinking about or working to manage the environment.

However, this was not expected to happen automatically or unproblematically: most felt changes were needed to better enable PES. We asked, “*Does there need to be any actions taken or changes made now, in order to better enable implementation of PES in the UK?*” and those indicating changes may be needed were asked to explain their answer. We synthesised three categories of change in these answers: (1) more understanding, evidence and testing; (2) more guidance, regulation and clarity to enable PES; and (3) more awareness of PES and engagement with the public and potential participants. Many felt such changes needed to be enabled via resources for facilitation and partnership working to set up and administer new PES schemes.

An open question about “*For what types of challenges or situations should PES be considered?*” provided further insights about respondents’ concerns. Use of PES was widely seen as an additional instrument for nature management, rather than a replacement for existing approaches such as regulation (indeed, several explicitly noted that it was essential not to reverse the polluter pays principle). It was seen as suitable where there was certainty about how ecosystem services are supplied, and where they are relatively easily defined and measurable.

Many seemed motivated to try PES because they felt that other approaches (e.g. designating protected areas) had often not been able to prevent biodiversity loss. Past decision-making processes

Table 1
Respondents' view of the similarity of PES to existing concepts and practices in environmental management, as rated on a 5-point Likert scale ranging from 'Completely unrelated' to 'Identical'. N varies from 54 to 94 as answers to each item were not compulsory.

Concept	Completed unrelated	Shares some features	Similar	Very similar	Identical
Corporate Social Responsibility, N = 82	28%	51%	15%	6%	0%
Agri-Environmental Schemes (e.g. under EU Common Agricultural Policy), N = 89	6%	35%	25%	26%	9%
Capital investment in environmental projects, N = 89	15%	54%	20%	10%	1%
Visitor Giving (voluntary donations from visitors to benefit places they go to), N = 92	26%	41%	16%	11%	5%
Peatland code, N = 54	15%	28%	20%	26%	11%
Public donation to environmental NGOs such as RSPB, N = 94	48%	36%	11%	3%	2%
Offsetting (e.g. for biodiversity or carbon), N = 92	11%	41%	27%	15%	5%
Ecolabelling, N = 75	47%	40%	7%	7%	0%
Ecotourism, N = 92	34%	51%	9%	5%	1%
Participatory holistic management (e.g. the Ecosystem Approach), N = 79	6%	51%	24%	15%	4%
Integrated Catchment Management, N = 88	15%	45%	26%	14%	0%
Green taxes (e.g. charges for environmentally-damaging activities), N = 94	29%	39%	15%	12%	5%

Table 2
Ratings selected on a 5-point Likert-scale in response to two questions that both began "Thinking 10 years ahead, in comparison to now:..."

	Much less	Less	About the same	More	Much more
Do you expect to see more or less implementation of PES? N = 93	0%	2%	17%	72%	9%
Would you like to see more or less implementation of PES? N = 81	2%	2%	10%	57%	28%

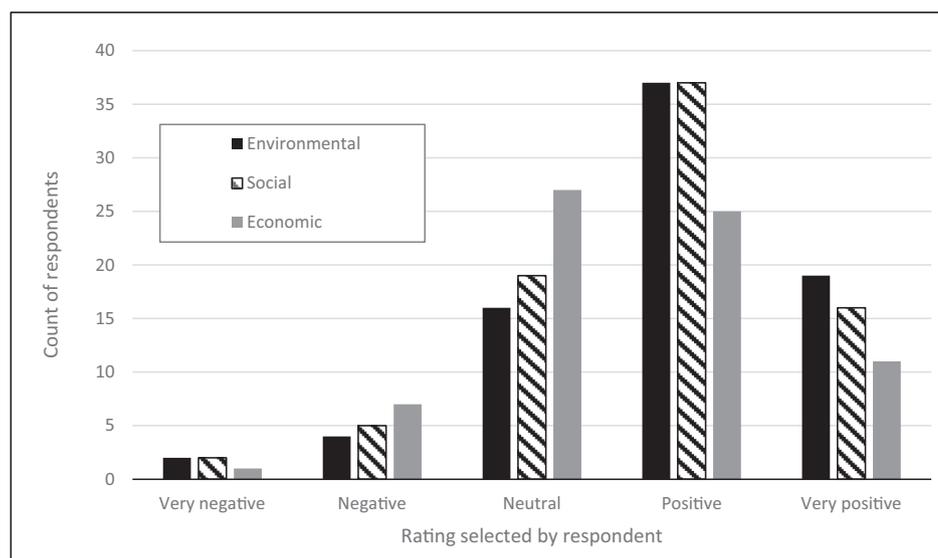


Fig. 1. Respondents' expectations of the potential environmental (N = 78), social (N = 79) and economic (N = 71) effects of implementing PES in the UK.

have often not given sufficient weight to nature, so it was hoped that PES will redress this by "factoring in the value of services provided by an ecosystem". PES was seen as worth trying where there were "no other alternatives" to engage or change land-manager behaviour. As such, much willingness to try PES seemed to be driven by frustration with the existing situation, compounded by fear of future reductions in resourcing for conservation.

A cluster of answers suggested PES was expected to be particularly suited to catchment management, particularly for reducing diffuse pollution. However, beyond this there was not much agreement about the specific situations or challenges suited to PES. Ideas from different respondents could even be contradictory. For example, a handful advocated flexibility and local adaptation when implementing PES, whilst several others called for simple standardized approaches which would preclude adaptation. Respondents were not asked to further justify their ideas and there was no overt link with other patterns of questionnaire responses, so

it is unclear why people may come to hold opposing or contradictory views.

However, some of these opposing ideas may be resolvable through further research. For example, further evidence could help understand the effects of scale (some expected that PES would only be suitable for managing large areas, whilst others said it only works at smaller scales); or the pros and cons of schemes attempting to deliver multiple ecosystem services (some advocated that it should be used only to deliver single specific services, whereas others thought we should be looking to 'bundle' as many as possible ecosystem services).

Priorities for research were also elicited directly: 83 out of 98 respondents answered yes to a question "Do we need more research or evidence on any topics related to PES?", and were then asked to suggest what was required. This elicited a wide range of ideas, summarised in Table 3. We identified the themes in Table 3, by searching for the most common general ideas that occurred across

Table 3

Our synthesis of research needs identified by respondents to this survey. Headings in italics indicate major themes linked to more specific points and also often directly identified by respondents. Specific points with asterixes were also identified by more than one respondent. ES = ecosystem services.

<p>(1) Research to understand systems and ecosystem services (ESS) <i>Natural science led research</i></p> <ul style="list-style-type: none"> Relationship between biodiversity + ES. Relationship between ecosystem processes and ES.* How are different ES linked together. Basic science on management actions or land-use change, effects on ESS, and concise reports on this. Non-substitutability of ecosystem and their services – what are these, where are the limits to use. Models showing effect and value of green-space, tree planting etc given different population density, recreation options etc. <p><i>Research on costs, benefits and valuation</i></p> <ul style="list-style-type: none"> More (certainty) about valuation of ES, to stop ES being under/non-valued. More information on the costs of delivering ES. Estimates of societal Willingness to Pay. More ‘robust’ info about links between ESS +/nature conservation and Bs to society. If and how does crowding-out occur. More information on who currently bears the costs of enviro degradation. “How to apply the valuation hierarchy”? If/how does natural capital accounting link with PES. 	<p>(2) Research on governance to understand how and when to operationalise PES in the UK <i>Understanding how to act in the face of imperfect understanding</i></p> <ul style="list-style-type: none"> Can PES work without monetised ES? When/how to act in the face of uncertainty?* How to address information asymmetries? <p><i>Build understanding of how to operationalise PES in a UK context</i></p> <ul style="list-style-type: none"> How to identify potential PES schemes suitable for particular settings?* How to link ‘private PES with public PES’ e.g. AES What is most apt roles of existing agencies/NGOs/research communities in facilitating schemes? What regulation/taxation/other mechanisms are needed to support PES* How to scale up PES? How PES could fit with a National Land Use Strategy? <p><i>Research on behaviour, persuasion and partnership working</i></p> <ul style="list-style-type: none"> How to promote/enable PES to new audiences, including farmers? Identify how to understand collective and multi-stakeholder negotiation approaches?* How to encourage cooperation? How to reflect actual behaviours and rules (citing Ostrom)? <p><i>Research to produce recommendations for monitoring</i></p> <ul style="list-style-type: none"> Specify how to monitor delivery of public goods. Identify metrics and monitoring approaches specific to PES. Find cost-effective ways to assess the benefits of a scheme. 	<p>(3) Monitoring multiple dimensions of new and existing projects <i>Commission more examples of certain types of PES</i></p> <ul style="list-style-type: none"> Replicates in different places and scales Pilots for layered schemes. PES in different habitats including wetlands, arable, marine* Ideally use a Before-After-Control-Impact (BACI) design <p><i>Study effects – both expected and unforeseen – over long time periods</i></p> <ul style="list-style-type: none"> Ecological effects. Attitudinal effects, including if commodification occurs. Equity implications for society i.e. is it fair? Direct economic benefits to farmers and other groups. Track what happens when a PES scheme ends. Understand transaction costs of administering, negotiating and monitoring schemes, and how these change over time. <p><i>More comparative work, and more information-sharing and visibility of existing projects</i></p> <ul style="list-style-type: none"> Compare PES to other instruments in terms of feasibility, cost, risks, benefits. Compare successful with unsuccessful PES projects. Compare with PES projects in other countries, especially UK with similar countries, to show what can and cannot be generalised. Study PES at different scales.*
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more than one answer. These themes were (1) Research to understand socio-ecological systems, how these support ecosystem services and societal consequences; (2) Research on the governance to know when and how to enable PES in a UK context, including in the face of uncertainty or non-monetised information about services; and (3) Studies and monitoring of new and existing PES projects, studying all aspects of process and all dimensions of sustainability over long-term scales.

4. Discussion

4.1. Current understandings of PES and expectations of what it may deliver

Our survey results indicate that those working on environmental management hold a range of understandings about PES and how best to enable it. Most expect to see greater implementation of PES across the UK in future; furthermore most are cautiously positive about the environmental, social and economic consequences of doing so. However, detailed examination of answers reveals a variety of ideas linked to these views. In particular, there is divergence about how best to enable it, and about the relationship with existing practices.

To some extent, this mix of views echoes a debate about the definition and potential of Market Based Instruments (MBIs) – which PES is usually seen as part of (Gómez-Baggethun & Muradian, 2015) – and debates about how these concepts may be applied in practice (Reid & Nsoh, 2016). A strident debate in the literature about whether to embrace or reject markets and MBIs is reflected by equally varied views – albeit more nuanced and pluralistic – held by individuals within the sector (Holmes et al., 2016). Our data suggest a pragmatic stance on their motivations for supporting PES: respondents are not necessarily ideolog-

ically motivated to adopt PES, but hope that doing so may overcome some of the existing challenges and constraints on environmental management. PES is generally seen as something worth trying where other approaches have failed, but needs careful implementation and support.

4.2. Implications for improving environmental management

UK policy has so far encouraged experimentation with varied interpretations of PES, to foster innovation and promote learning (Environment Analysis Unit Defra, 2016). Experimentation and learning about applying PES in developed countries has also been encouraged in Germany and the United States (Matzdorf et al., 2014). Flexibility and innovation can allow adaptation to different conditions and challenges. However, if practices deviate too far from theory, they may be less likely to deliver theoretically-expected results (Martin-Ortega et al., 2013; Wunder, 2015). This risks disillusionment with PES. Conservation and environmental management shows a track record of embracing and then disappointingly abandoning concepts, so there is a strong risk that PES will fall into this pattern (Redford & Adams, 2009). To tackle this, we suggest future efforts to understand or promote PES will benefit from reconsidering the balance between standardisation and innovation. In particular, the definition of what is labelled as ‘PES’ in practice probably needs to be tightened, and more explicit reference made to how it can relate to specific pre-existing practices and approaches used for environmental management.

These challenges are also reflected in how best to communicate and engage environmental professionals about PES. It is especially important to clarify what is distinct about PES in relation to other concepts, and how implementing it may differ – or not – from more familiar pre-existing practices. In situations where PES is intended to be implemented, explicitly assessing how it relates

to and differs from any ongoing practices could also be helpful, since past ways of working tend to persist and may hinder attempts to implement all intended changes (Waylen et al., 2015a). This discussion needs to be part of a broader participatory dialogue that builds a shared understanding about what the new intervention entails and the specific arrangements needed to enable it. This can help to avoid problems that may arise from diverse views and expectations by different individuals working together in any situation.

An additional challenge is to communicate what is *not* the purpose of PES. In our survey, several voiced concern that the ‘polluter pays principle’ should not be reversed. If this is not indeed the intention – and existing guidance has often noted the need to ensure additionality (e.g. Dunn, 2011; Smith et al., 2013) – then emphasising this should greatly assist in persuading and engaging environmental professionals to more consider the concept. Investment in engagement should go beyond simply targeting communication, to embrace cooperation and partnership working throughout the design and implementation of projects. Our participants’ desire to emphasise this resonates well with previous findings on the importance of cooperation and partnership in enabling PES (Huber-Stearns et al., 2015).

Investing in cooperation and communication may address some challenges, yet be limited by an underlying issue: in many countries the responsibilities of land-managers to deliver public goods are often not well-defined. Thus, different sectors and individuals may have quite different assumptions about what land-managers should be expected to do without payment (Davies & Hodge, 2007). In the UK this has rarely been explicitly acknowledged until recent debates about what a post-Brexit Agricultural Policy might look like (Hodge, 2016). Deliberative processes on the rights and responsibilities of those managing natural resources could help to identify and agree what should and should not be paid for. Scotland’s ‘land use pilots’² are amongst the few UK examples showing how such discussions can be organised (Bloomfield et al., 2001) – but experiences from other countries can also offer insights and examples (Holmes & Scoones, 2000). Many countries may benefit from open discussion on rights and responsibilities: these could help to avoid or allay misgivings about the purpose of instruments such as PES, and would also be valuable to inform and contextualise all initiatives to improve environmental governance.

4.3. Implications for future research

The results of the survey identify several implications for research on PES itself, and also broader research challenges.

A list of research needs was directly provided by our respondents (Table 3). Research priorities were also indicated by doubts or differing answers provided by different respondents. Taken altogether, these form a very comprehensive research agenda, that would need input from a range of social, economic and natural sciences. For example, many of our respondents requested more understanding as to how to enable access to sources financing in the private sector. Such requests could be partially resolved by summarising evidence about actors and institutional structures already present in each country. However, such efforts need to be complemented and informed by insights already available in the literature. In this case, the expectation that PES will enable access to new sources of financing can be challenged by literature questioning why we expect public goods would be supplied by private funding (Gómez-Baggethun & Muradian, 2015) and empirical evidence that the vast majority of such existing projects are publicly funded (Vatn, 2015).

Not all expectations about PES are likely to be satisfied. It is particularly clear that some expectations will be disappointed, when different individuals hold conflicting views. For example, some of our respondents said that PES is likely to prove most useful and feasible at the small-scale, whereas others said it is best applied at large scales. It is likely that there is no single ‘best’ scale at which to apply PES. However, better understanding when PES can be applied at different scales could be improved by more work to understand and trace how conditions and context shape the performance and outcomes of PES (Huber-Stearns et al., 2017). For example, the type of ecosystem services targeted will probably have bearing on the appropriate scales to design new interventions. Pilot projects co-designed with these and other research questions in mind could provide valuable evidence. However, this evaluation and learning process must incorporate the full range of disciplinary perspectives (as highlighted by Table 3) to understand the “messy” processes by which PES schemes evolve (Ishihara et al., 2017).

Several of the questions or tensions posed by our data relate to broader challenges in environmental governance beyond PES. In particular, we saw several doubts or conflicting answers related to the challenges of allowing adaptation and flexibility, yet promoting simplicity and standardisation. This relates to a long-standing challenge about how best to balance flexibility and efficiency (Armitage et al., 2012). The maturing literature on environmental governance (e.g. Underdal, 2010) may yet offer insights that can benefit the application of PES, and vice versa. For example, principles of adaptive governance could help indicate changes to improve payment schemes for the provision of ecosystem services (Cook et al., 2016). However, it is unlikely that we will find a single or simple answer to these questions.

Lastly, several expectations for PES were not necessarily specific to PES or MBIs. For example, one of the most common themes was a hope that PES could achieve engagement of actors not currently interested or able to support environmental management. How best, if at all, PES can help achieve such aspirations is unknown. There are also many other approaches and techniques that could help to address such goals (Reed, 2008). Similarly, some approaches also aim to deliver valued or quantified ecosystem services by alternative mechanisms (see for example green bonds; DuPont et al., 2015), often linked to innovation in other sectors that have aimed to provide returns to the private sector from provision of public goods (Warner, 2013). Other approaches may not even involve quantified metrics of exchange, yet may have similar overall aims to some PES projects (see for example, integrated catchment management; Marshall et al., 2010). Ideally, future studies should study PES in combination and in interaction with these other instruments, both to understand how PES plays out in practice, but also to better understand the relative pros and cons of different concepts (Borner et al., 2017). Thus, further priorities for future research and intervention should not necessarily be focused solely on PES, or presume PES is always best.

5. Conclusion

The results of this survey make clear that environmental professionals can have varied understandings and expectations of PES. Some of the questions and challenges raised by this survey may be specific to the UK, and are particularly pertinent to it as it considers potential policy changes after leaving the European Union. However, varied understandings and expectations likely occur in most countries, and therefore may pose similar challenges for understanding, choosing and enabling PES.

Whilst varied ideas can allow flexibility, innovation and adaptation, they can also jeopardise opportunities for implement and learn from new practices. Therefore, to better understand – and

² <http://www.gov.scot/Topics/Environment/Countryside/Landusestrategy/regional>.

if appropriate encourage – what PES offers, it is important to acknowledge and tackle some of these varied ideas through clear communication, and by explicitly considering what is and is not distinct about PES when planning new interventions.

It is also important that we think beyond PES. For example, many respondents in this survey expected PES to unlock new sources of private sector funding, or foster engagement; but other instruments may be more appropriate means of achieving such goals. Implementation and study of PES must therefore be linked to broader conversations about priorities and possibilities in environmental governance.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.ecoser.2017.11.007>.

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