Developing a stakeholder engagement approach for payments for ecosystem service schemes to improve water quality in agricultural catchments

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Payments for ecosystem services (PES) schemes are an increasingly popular option for improving water quality in UK agricultural catchments. Although stakeholder engagement has been shown to be a key factor in the success of schemes, current guidance for this is underdeveloped. This pilot study explored the nature of stakeholder engagement being carried out by experienced catchment management practitioners who were establishing PES schemes in three case-study catchments. Practitioners engaged in novel ways with catchment scientists to gain an understanding of the catchment, with early adopter farmers to design the schemes, with late adopter farmers during implementation to encourage enrolment and with both types of farmers during evaluation by disseminating results. However, this differed for a scheme where an 'intermediary' organisation sought to link payments from multiple downstream water users to upstream farmers. This understanding was combined into an approach that will guide future schemes aimed at improving water quality but could also be useful for schemes addressing other environmental issues.

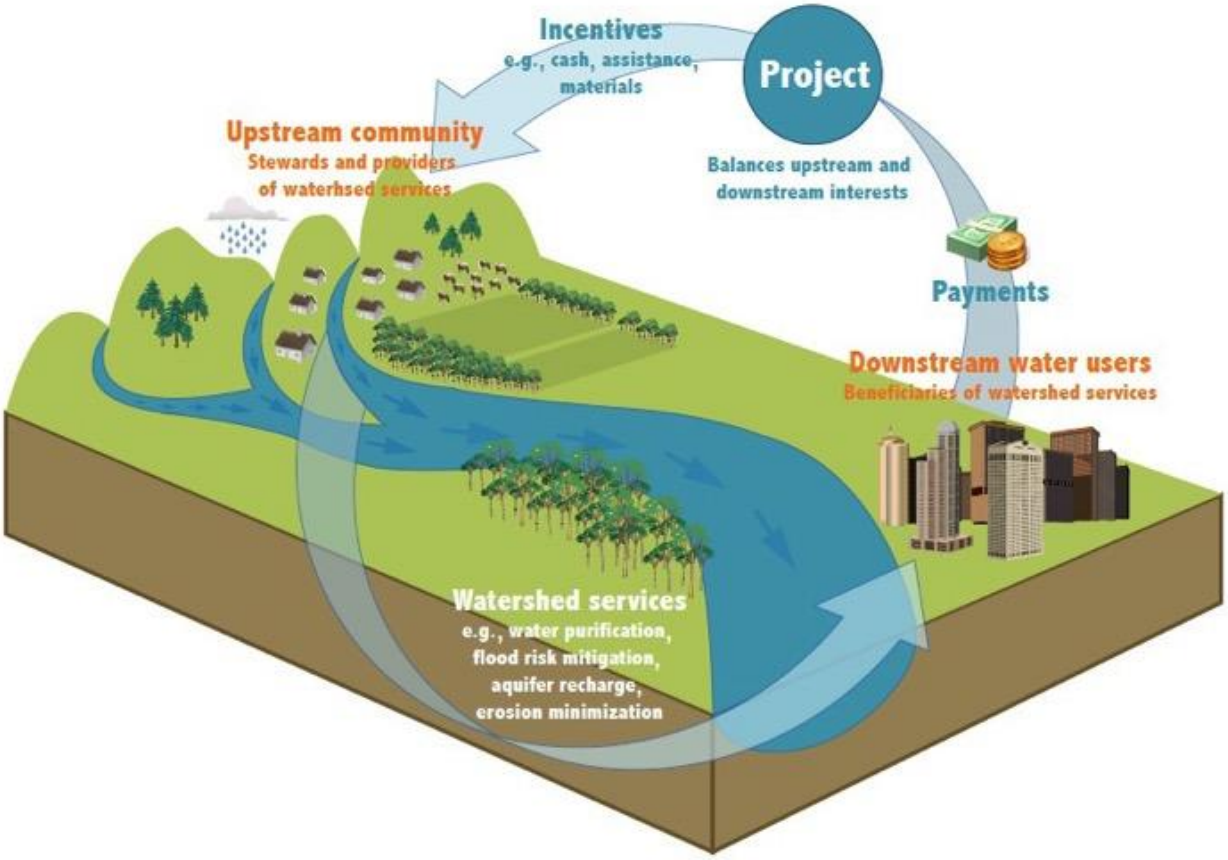
Keywords

stakeholder engagement, payments for ecosystem services, water quality, agricultural catchments, catchment management, PES practitioners

Introduction

Elevated inputs of nutrients nitrogen (N) and phosphorus (P) from agriculture to rivers, lakes and groundwater is a major cause of water quality deterioration in many countries (Le Moal, Gascuel-Odoux et al. 2019). However, agri-environmental policy frameworks are not always sufficient to improve water quality. To overcome this, downstream users impacted by poor water quality are increasingly taking the problem into their own hands by paying upstream farmers to improve practices in what practitioners often refer to as 'payments for ecosystem services' (PES) schemes (Figure 1).

Figure 1. The PES concept (Bennett, Nathaniel et al. 2013).



Stakeholder engagement in catchment management and PES

Stakeholder engagement is the process of involving people in decision-making who are likely to be affected by water quality. It is crucial for solving water quality problems because of the local knowledge required to solve local problems and because of the large number and diversity of land managers that contribute to the problem and thus need to be engaged with (McGonigle, Burke et al. 2014). Stakeholder engagement is therefore a key requirement laid out by many overarching water quality policies, such as the EU's Water Framework Directive (OJEC 2000), which puts a strong emphasis on a participatory approach. As such, stakeholder engagement is generally well understood and practiced in catchment management.

However, the nature and structure of engagement will vary depending on the type of catchment management and a unique approach may be required for PES over other types of catchment management. For example, stakeholder engagement has been a key factor in some of the most effective water quality related PES schemes such as the Vittel and New York City Water PES examples (Appleton 2002, Perrot-Maître 2006). In the Vittel example, where the bottled water company paid farmers to improve practices, stakeholder engagement was key to negotiating and setting mutually beneficial payment levels. This is an aspect that may not be relevant to other forms of catchment management, and which, in this case, encouraged a high percentage of farmers in the catchment onto the scheme.

PES design

Many papers dealing with PES design come from the fields of biodiversity conservation and have tended to focus on aspects such as spatial targeting of practices and conditionality of payments (e.g. Jack, Kousky et al. 2008, Wendland, Honzák et al. 2010). Furthermore, the majority of these papers deal with experiences in developing countries, such as Mexico and Trinidad and Tobago. This means that, where stakeholder engagement has been covered (e.g. Kosoy, Corbera et al. 2008, Rawlins and Westby 2013) it has been in countries where PES schemes may differ greatly in aims and in integration with vastly different policy frameworks (Wunder, Engel et al. 2008). As such, guidance for stakeholder engagement in water quality focussed PES schemes is limited, and even more so in developed countries such as the UK. For example, in Defra's 2013 guidance on PES (Smith, Rowcroft et al. 2013), stakeholder engagement is not included as one of the seven key principles, which should ideally underpin any PES scheme. Instead, they advise that "in developing a PES scheme, it may also be appropriate to undertake stakeholder engagement with those likely to be affected by the scheme". Although they do cover stakeholder engagement in a little more depth later on, this has not been fully built upon in order to provide adequate guidance for practitioners looking to establish water quality focussed PES schemes.

Objectives of the study

The objectives of this pilot study were to i) understand stakeholder engagement in three developing PES schemes led by experienced catchment management practitioners and to ii) use this understanding to develop an approach that will guide stakeholder engagement in future schemes. To achieve these, I worked with key stakeholders or 'PES practitioners' in three case-study catchments through workshops and meetings to explore the practice of stakeholder engagement. I then used this understanding to develop a framework to guide stakeholder engagement based on the key stages in establishing a scheme.

Methods

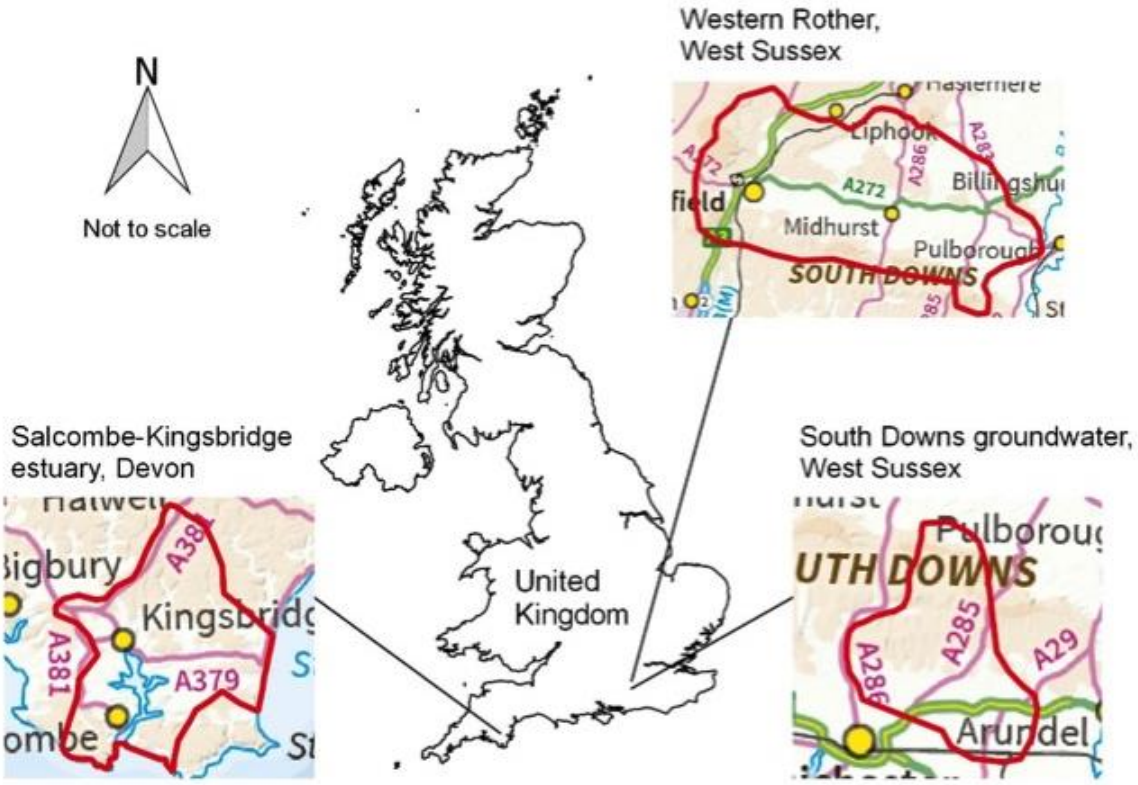
Case-study catchments

All three case-studies form part of the Channel Payments for Ecosystem Services project (https://www.cpes-interreg.eu/), which is an EU Interreg (inter-regional) funded project led by the University of Chichester to facilitate PES establishment over a three-year period. They included the Western Rother river catchment in West Sussex, South Downs groundwater in West Sussex and the Salcombe-Kingsbridge estuary in Devon (Figure 2, below).

In the Western Rother catchment, the main downstream users are Southern Water who abstract (i.e. remove water from a source) water for drinking at Hardham near the catchment outlet and confluence with the river Arun. In this catchment, they are impacted by erosion of agricultural fields and subsequent sedimentation of the river. This increases filtration and dredging costs at their downstream abstraction point. As such, they are developing a PES scheme to incentivise upstream farmers to adopt practices that reduce erosion. South Downs groundwater is an important source for raw water for Portsmouth Water who distribute it as drinking water after processing. They have, amongst others, a group of boreholes to the west of Arundel. However, the concentrations of nitrate in water at those boreholes have recently exceeded drinking water standards. To

avoid the high costs of setting up and running a nitrate removal plant, Portsmouth Water are designing a PES scheme to incentivise catchment farmers to adopt practices that reduce nitrate leaching. At the Kingsbridge-Salcombe estuary, the main problem is algal blooms resulting from increased nitrogen and phosphorus inputs from agriculture in the surrounding catchment area. Acting as an intermediary, the Westcountry Rivers Trust, a registered River Trust charity since 1995, are developing a scheme to attract payments from downstream users (mainly tourism reliant businesses) to upstream farmers that will ensure more water friendly practices.

Figure 2. Location and boundary of the three case-study catchments within the UK. Maps: Ordnance Survey.



Data collection

To gain a better understanding of stakeholder engagement for PES, I worked with these key stakeholders or 'PES practitioners' through workshops and meetings (Plate 1), and gathered information from stakeholder engagement plans. In my analysis, I counted the number active engagements such as meetings, seminars, workshops and visits but excluded passive engagements such as websites, because many of these might introduce skew or bias to the data. For the same reasons, one-to-one meetings with farmers to agree actions and sign contracts were also excluded. As the practitioners were in the early stages of establishing schemes, some of these engagements had been conducted, whereas others were only planned. I used summary statistics to explore the number of engagements with different stakeholder groups and how they varied between different stages of scheme establishment and case-study.

Plate 1: Meeting with catchment scientists to discuss data requirements and acquisition. Photo: Kate Rice

Key stakeholder groups

The intensity of engagement will vary depending of the nature of the stakeholder or group of stakeholders and their interest in and influence over the scheme (Sterling, Betley et al. 2017). Looking inside these developing schemes, I identified seven distinct groups of stakeholders being engaged:

1. Catchment scientists (from academia or industry external to the practitioners' organisations)
2. Early adopter farmers (See: Ryan and Gross 1950)
3. Late adopter farmers
4. General public
5. Government/politicians
6. Other interest groups (NGOs, businesses etc.)
7. Other water users (who may benefit directly from improved water quality)

Stages of scheme development

As stakeholder engagement will vary with the different stages of any environmental project (Sterling, Betley et al. 2017), I investigated the number of engagements with different stakeholder groups at each stage of scheme development. Four key stages of scheme development were evident:

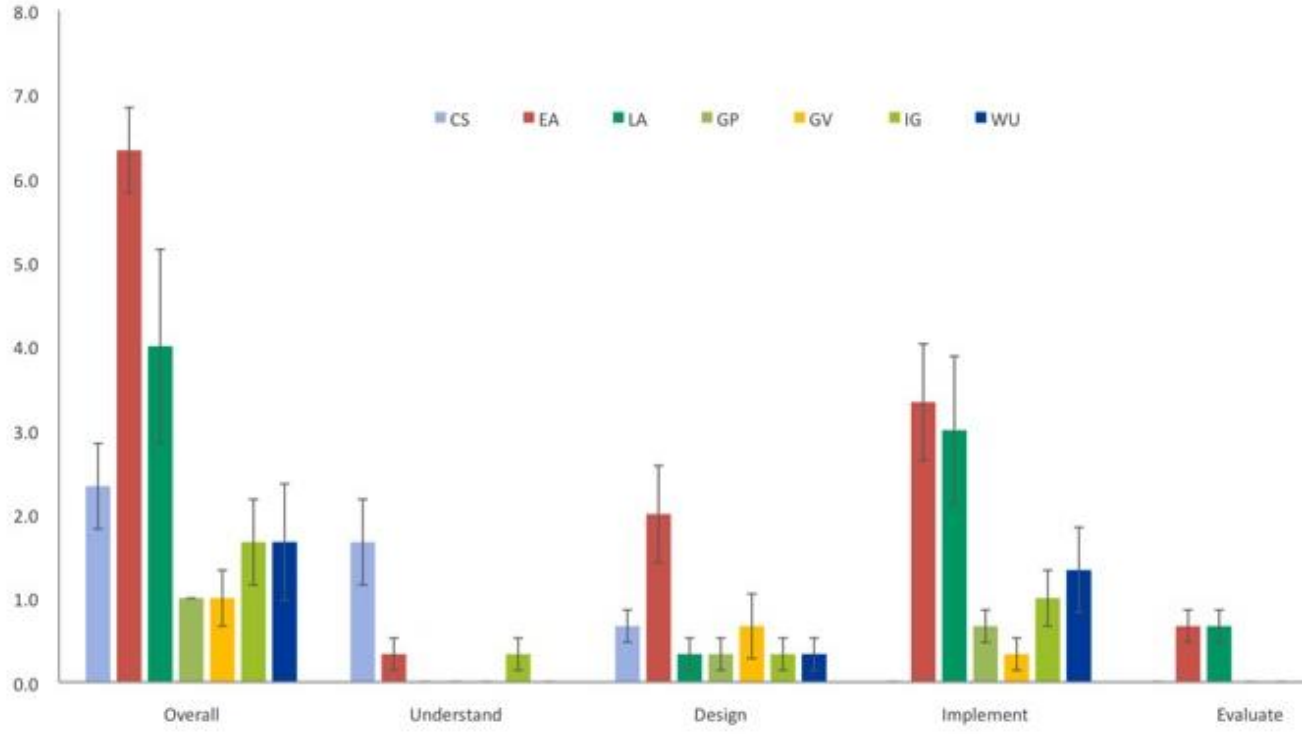
1. Understanding the river/groundwater catchment
2. Designing the scheme
3. Implementing the scheme
4. Evaluating the scheme

Understanding the catchment involved defining a baseline of water quality data and establishing a scientific link between farming practices and water quality. Designing the scheme involved determining the practices to be incentivised and the financial mechanisms to be used. Implementing the scheme involved agreeing on contracts with farmers and farmers carrying out those practices. Evaluating the scheme involved collecting data on water quality and practice change post-implementation.

Results, observations and discussion

The average number of engagements either conducted or planned for the three-year project period was high at 18 ± 1. The number of engagements was greatest for early and late adopter farmers (Figure 3 below), which makes sense, given the high number of farmers that needs to embrace practice change if a scheme is to have an impact on water quality.

Figure 3. Average (mean) and standard error (*n* = 3) for the number of engagements by stakeholder group for the schemes overall and for each stage of scheme development.



Key: CS, catchment scientists; EA, early adopter farmers; LA, late adopter farmers; GP, general public; GV, government/politicians; IG, other interest groups; WU, other water users.

Stage 1: understanding the catchment

During the stage of understanding the catchment, practitioners engaged mostly with catchment scientists (Figure 3). This was usually to provide data to establish baseline conditions in the catchment and to establish a scientific link between farming practices and water quality. It was usually done through meetings involving data synthesis and report writing. For example, Southern Water held meetings with catchment scientists from the Environment Agency, South Downs National Park Authority and the Arun and Rother Rivers Trust to explore avenues for the acquisition of baseline data and to understand stakeholders in the catchment (Plate 1). They also worked with catchment scientists in Universities to establish the connectivity between erosive fields in the catchment and the river. Where data was not available this was done through eliciting expert judgement. For example, Portsmouth Water sought the opinions of the local farm advisors on the general attitudes of farmers towards water quality issues.

Stage 2: designing the scheme

During the design phase, early adopter farmers were engaged for the purpose of designing the scheme (Figure 3). Involving farmers or 'sellers' of ecosystem services in the design of practices and payment mechanisms using these 'co-design' approaches ensures that the schemes will be compatible with current farming systems and financially attractive, respectively (Tittonell 2014). They did this in novel ways, for example, Portsmouth Water worked with farmers of the South Downs Farmers Group to decide on practical treatments for a cover crop field trial. They invited the group to visit the field trial, shared data on nitrate leaching, and discussed payment mechanisms and levels. Southern Water also engaged with early adopter farmers through the Rother Valley Farmers Group indicating that UK government supported 'farm clusters' are a useful vehicle for PES development.

Stage 3: implementing the scheme

During the implementation stage, there was increasing emphasis on engagement with late adopter farmers (Figure 3). Plans for this took the form of communication for behavioural change as the intention was to make farmers aware of the issues, to motivate them to change practices and reward them for changed practices, which was hoped to result in sustained new practices (Cabanero-Verzosa 1996). An example of this was in the Western Rother catchment, where Southern Water hosted farmers at their Hardham water treatment works to discuss and make farmers aware of sedimentation issues they are facing (Plate 2). Websites and social media were also an important tool for making farmers, and the general public, aware of the issues and schemes, and these passive engagements could be analysed separately once the schemes are more developed.

Plate 2: Making farmers aware of the issues of sedimentation in the Western Rother. Photo: Kate Rice

Stage 4: evaluating the scheme

Engagement for scheme evaluation mainly involved plans to disseminate the results of scheme evaluation to farmers enrolled on the scheme. However, the lack of data for this stage may indicate that not all engagements were fully planned. Other techniques for engaging stakeholders in evaluation could include citizen science (Conrad and Hilchey 2011) where ecosystem service buyers are numerous and diverse, and farmer self-evaluation and benchmarking, which has been shown to encourage behaviour change (Burton and Schwarz 2013). Good engagement during the evaluation phase may encourage further participation in the scheme from other ecosystem service buyers and sellers. This also highlights the need to view PES scheme development and engagement as a potentially long-term, iterative process if they are to have maximum impacts on water quality.

Variation between case-studies

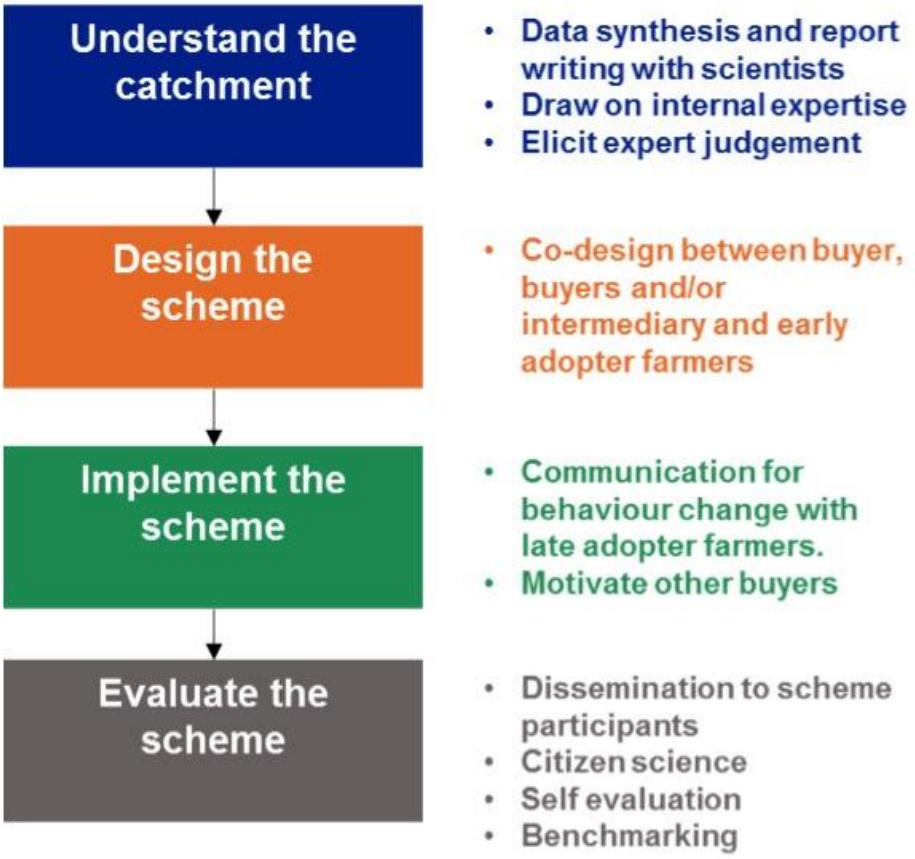
High variation around the average number of engagements (Figure 3 above) indicates that engagement also varied by case-study. During the understanding the catchment stage, Westcountry Rivers Trust relied more on internal personnel than did the other two practitioners. This could be related to their expertise in catchment science and the wealth of data and tools made available to them as a registered River Trust through the 'Catchment Based Approach' (https://catchmentbasedapproach.org/). At the design and implementation stages, Portsmouth Water and Southern Water, being single buyers of water quality ecosystem services, both took similar approaches as outlined above. Whereas, the Westcountry Rivers Trust being more of an intermediary, needed to also attract a range of potential buyers onto the scheme and hence had or had planned more engagements with other water users and other interest groups. They also engaged more with government/politicians such as Defra, Natural England and the Environment Agency as a way of influencing and informing policy.

Devising a tailored approach to stakeholder engagement

I used these observations in order to define an approach to stakeholder engagement (Figure 4 below), which is augmented at the evaluation stage by suggestions from the author. Although the approach accounts for varying engagements depending on the nature of the catchment and on who is implementing the scheme, the approach only covers the initial establishment of schemes, which in reality are likely to be long-term and iterative. At present, there are no data indicating the success of this approach or the engagement carried out by the practitioners i.e. data on the percentage of catchment farmers enrolled onto the PES schemes is lacking. However, what gives the approach credibility is the wealth of catchment management and stakeholder engagement experience held by the practitioners. Southern Water have a long history of catchment management and, in the Western Rother catchment, have been involved in the Arun and Western Streams Partnership, who have completed numerous river improvement projects in the catchment. Portsmouth Water have been conducting catchment management for over 10 years, and most notably they have been advising farmers on improved practices through the Downs and Harbours Clean Water Partnership (https://www.cleanwaterpartnership.co.uk/). The Westcountry Rivers Trust was set up as a registered charity in

1995 and has since completed numerous catchment management projects including successful PES schemes such as 'Upstream Thinking' (http://www.upstreamthinking.org/). The approach will therefore be useful for guiding, ***not directing***, other practitioners who are looking to develop PES schemes for water quality improvements in agricultural catchments specifically. It could also guide engagement for PES schemes in other fields such as biodiversity conservation.

Figure 4. Overall approach to stakeholder engagement for establishing PES to improve water quality in agricultural catchments.



Conclusions

Payments for ecosystem services practitioners must encourage the numerous land managers and farmers who contribute to the water quality problem to enrol and change practice. The high levels of stakeholder engagement observed in the case-study catchments, and the novel methods being used by the practitioners show that those experienced in catchment management are using stakeholder engagement widely in water quality focussed PES schemes. This shows a clear appreciation by practitioners of the crucial role of stakeholder engagement in catchment management. It also shows that PES schemes are well aligned with overarching water quality policy, such as the EU's Water Framework Directive, that puts a strong emphasis on a participatory approach. Through PES, this engagement will lead to schemes incentivising practices that are highly cost-effective and attractive to local farmers, which are key features of successful schemes in developed countries. Other practitioners looking to develop similar schemes could use the approach devised in this paper to guide engagement with the aim to achieve similar results.

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Will Roberts' research interests are in the ecosystem services provided by farmland, especially those relating to water quality in river catchments. He joined the University of Chichester Business School in January 2018 as an Environmental Systems Research Assistant on the Channel Payments for Ecosystem Services project (CPES). Before joining the school, he worked as a Research Associate at the Teagasc Agriculture and Food Development Authority in the Republic of Ireland, and prior to that, he was awarded a PhD in Environmental Science from Lancaster University.

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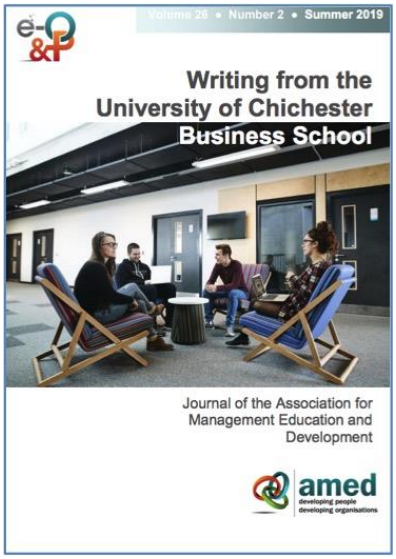

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