



Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Revisiting the concept of payments for environmental services

Sven Wunder

Center for International Forestry Research (CIFOR), Rio de Janeiro, Brazil

ARTICLE INFO

Article history:

Received 24 January 2014
Received in revised form 17 August 2014
Accepted 25 August 2014
Available online xxxx

Keywords:

Incentives
Conservation
Natural resource management
Definition
Max Weber

ABSTRACT

This article revisits the payments for environmental services (PES) concept and reviews existing PES definitions. Based on Weberian philosophy of science, it is argued that an ideal PES type, strongly embedded in PES theory, is needed to understand their logic. Many broader, empiricist definitions fail to distinguish PES from the larger generic family of positive environmental incentives, thus eroding their meaning by excessive vagueness. Arguably, PES definitions should focus on describing a functional tool, rather than normatively integrating desirable PES outcomes. A modified narrow PES definition is proposed, outlining conditionality as the single defining feature, avoiding the buyer–seller terms, and linking PES to offsite externalities. Extensive explanatory guidelines address many valid conceptual concerns raised in the recent PES literature.

© 2014 Elsevier B.V. All rights reserved.

1. Introduction

The concept of environmental services (ES) has increasingly been mainstreamed into environmental policies (Gómez-Baggethun et al., 2010). Simultaneously, payments for environmental services (PES) continuously attract considerable attention among both scholars and conservation implementers (Muradian et al., 2013). A decade ago, I proposed a simple PES definition (Wunder, 2005). PES implementation and research during this past decade have been highly dynamic. Hence, alternative PES definitions with substantially different emphasis and delimitation have also been proposed, especially criticizing the 2005 definition for being so narrow that few real-world interventions fully satisfy its five criteria. A broader PES definition would thus accordingly be needed for a more inclusive PES debate. The definition has also been seen as too market-based, allegedly missing out on alternative institutional frameworks. Hence, the debate over the last decade justifies a fresh look at the conceptual fundamentals.

The purpose of this article is to compare the different definitions, their inherent logic and terminologies, and ultimately the implications for PES design and implementation. The underlying questions relate not only to the philosophy of science (why do we need a PES definition, and how precise should it be?), but also to pragmatic policy-making (what steps are quintessential in implementing PES interventions)? Hence, in the selection of defining terms, “competing preferences represent far more than word games” (Shelley, 2011:210). How to define PES is not just a taxonomic quarrel inside the academic ivory tower, but just

as much a debate over what features are innovative in PES, and hence quintessential to their implementation.

The article is structured as follows. First I discuss broad vs. narrow definitions in the philosophy of science (Section 2). Then a systematic overview of existing PES definitions is given (Section 3). In Section 4 follows a discussion of the proper terms composing PES. Finally, Section 5 proposes a clarified definition and extensive interpretative guidelines.

2. Definitions and the Philosophy of Science

As foreshadowed above, a key point of contention is how ‘narrowly’ versus ‘broadly’ PES should be defined. This question contains two sub-aspects. First, how ‘precisely’ versus ‘vaguely’ should we delimit the PES concept? Second, to what extent should PES definitions be guided by interpretations derived from PES theory, as compared to embracing the larger family of similar initiatives? After dealing with these two questions, I propose four criteria to evaluate PES definitions.

2.1. Definitional Vagueness vs. Clarity

The quest for optimal definitional precision and conceptual clarity has a long history in science. The traditional and dominant view has been that “vagueness and ambiguity are to be avoided, though not at all cost” (van der Steen, 1993:11). For environmental sciences in particular, it has been stated that “vagueness ... is nonproductive because it detracts from the ability to communicate effectively about habitat-related subjects” (Hall et al., 1997:174). Being too vague arguably hinders both theoretical deduction and empirical refutation of hypotheses.

E-mail address: swunder@cgiar.org.

Furthermore, it may seduce researchers to stretch their theories beyond the limits of validity.

Yet, some degree of scientific imprecision is inevitable, making judgment calls necessary — as is sometimes illustrated by the paradox of the heap.¹ Austrian philosopher Ludwig Wittgenstein advanced the concept of ‘family resemblance’ as a concept based on the degree of commonality across multiple criteria. Critics of this concept state that its extension cannot be effectively delimited, creating what has been called problems of wide-open texture. In practice, degrees of vagueness are thus bound to appear in most definitions, especially in the social sciences (Andersen, 2000:313).

Nevertheless, some scholars argue that conceptual vagueness can be outright desirable for scientific advance (Hodges, 2008). Strunz (2012) used the example of social–ecological resilience as an innovative, fuzzy field of “broad, multifaceted, and loosely organized cluster of concepts” (ibid: 113). Vagueness, so the argument goes, could in particular be justified in new scientific applications (that have not yet reached the maturity of conceptual consolidation), rapidly moving interdisciplinary areas (where researchers customarily use terms differently), or to solve “wicked problems” (the *ex ante* formulation of which remains contested).² When combinations of these factors apply, degrees of vagueness could help promoting greater inclusiveness in stakeholder participation, stimulating creativity, and fostering adaptivity. Strunz concludes that tradeoffs between vagueness and precision have to be managed according to context: “sound empirical knowledge requires conceptual precision but pragmatic and creative problem-solving may benefit from conceptual vagueness.” (ibid: 118).

Where on this multidimensional tradeoff curve is PES currently positioned? Indeed, it is an area of interdisciplinarity, yet also with a dominant theoretical basis in economics (Simpson and Sedjo, 1996; Ferraro, 2001; Ferraro and Simpson, 2002). The generic problem to solve is not conceptually “wicked”, but well-framed: to correct for environmental externalities (Pagiola and Platais, 2007; Engel et al., 2008). And while PES is scientifically still fairly young, it is rapidly reaching levels of maturity where calls for solid empirical knowledge are intensifying (Pattanayak et al., 2010; Ferraro, 2011). Satisfying these legitimate demands for, in Strunz’ terminology, “sound empirical knowledge” will also require more conceptual precision, and correspondingly less vagueness.

2.2. Interpretative vs. Empiricist Approaches

Secondly, to what extent should a PES definition follow an applied interpretation of a theory-based analytical framework, versus inclusively mirror the variety of established implementation practices? Does it matter most what PES were conceptualized to be, or the way the ideas currently are being practiced? The latter approach corresponds roughly to Max Weber’s ‘average type’ (*Durchschnittstypus*),³ the former to his ‘ideal type’ (*Idealtypus*).⁴ Weber believed ideal types were best suited

¹ The first premise is that a large number (say, one million) of grains of sand together constitute a heap of sand. The second premise is that a heap of sand minus one grain is still a heap. The paradoxical question then is when iterations of premise 2 are repeated continuously, when exactly would the diminishing bunch of sand lose its justification for being denominated “a heap” — ultimately a judgment call.

² One might add an additional factor to Strunz’ list: in action research settings where researchers have to communicate with decision-makers, some further vagueness may also be called for, to the extent researchers and decision-makers do not share the same terminology.

³ In later interpretations, Weber’s “average type” has also been denominated as “real type”.

⁴ “An ideal type is formed by the one-sided accentuation of one or more points of view and by the synthesis of a great many diffuse, discrete, more or less present and occasionally absent concrete individual phenomena, which are arranged according to those onesidedly emphasized viewpoints into a unified analytical construct” (Weber, 1949 [1904]: 147).

for conceptualizations, because we cannot understand a particular phenomenon just by describing the multiple actions of its participants. To interpret these actions functionally, we may first have to abstract from the diversity in which they manifest themselves in reality. As summarized eloquently by Kuchenbrod (1999):

“The ideal type is formulated primarily from a pragmatic research point of view. It needs not be ‘true’ in the sense of blending seamlessly with reality, but it must be useful to the research process by elucidating interesting problems. Logically, the ideal type is formed by featuring individual components of the research object within a conceptual construct — especially those components that distinguish it most clearly from similar or related objects, with which it could potentially be subsumed under one generic term. These ‘ideal’ and ‘purist’ mental structures are conceptually easier to comprehend, while real historical diversity is harder to frame. But this multiplicity can then be related to the ideal type; it appears as a ‘contaminated’ form, with a small or large measurable ‘deviation’ from the conceptual ideal” (my translation from German).

As will be shown below, the two Weberian terms are at the heart of the debate about PES concepts: my own narrow definition (Wunder, 2005) mirrors the functioning of an ideal PES type, whereas various broader concepts integrating ‘PES-like’ initiatives under their umbrella are ‘average type’ definitions trying to read the landscape of self-denominated PES schemes.

2.3. Desirable Features of a PES Definition

Some observations from this section may serve us below for examining alternative PES terms and definitions. Specifically, what attributes would we welcome in a sound and operational PES definition? I propose the following conceptual features:

- I. Consistent and precise enough for generating empirical knowledge: Definitions should not be internally contradictory, and with Strunz (2012), we should avoid excessive vagueness: we would not want our PES definition to slip between our fingers like wet soap when we try to get an empirical grip.
- II. Distinctive in function from indirect positive incentives: In Max Weber’s spirit, we would want PES to be separable from the generic family of other positive environmental incentives. PES theory was developed particularly as a direct alternative to indirect tools, such as integrated conservation and development projects (ICDP).⁵ One litmus test is thus whether a definition is capable to clearly distinguish PES from ICDP.
- III. Robust to intertemporal variations in implementation: A good PES definition should be insensitive towards minor time-bound variations in implementation and outcomes of an intervention, i.e. avoiding hyper-sensitive classification swaps between PES and non-PES categories.
- IV. Simple enough to remember: As an Albert Einstein quote says: “Make things as simple as possible, but not simpler.”⁶ A good PES definition should not compromise precision, but also avoid redundancies and excessive complexity. One hands-on simplicity test is whether we would picture a practitioner to be able to remember the definition after having read it three times: if not, then the definition may have been phrased overly complex.

⁵ See e.g. Simpson and Sedjo (1996), Ferraro (2001), or Ferraro and Kiss (2002).

⁶ There is doubt whether (and when) Einstein actually expressed himself in these exact words, or whether somebody else summarized his thoughts in this way (<http://quoteinvestigator.com/2011/05/13/einstein-simple/#more-2363>).

3. Existing PES Definitions: An Overview

3.1. User vs. Government-Financed PES

In the definition from almost a decade ago (Wunder, 2005:3), I characterized PES by five criteria: “(1) a *voluntary* transaction where (2) a *well-defined service* (or a land-use likely to secure that service) (3) is being ‘bought’ by a (minimum one) *ES buyer* (4) from a (minimum one) *ES provider* (5) if and only if the ES provider secures ES provision (*conditionality*).” In essence, PES is thus defined as an integration of a user fee with a targeted, conditional subsidy. Over the years, this PES definition became the most widely accepted globally.⁷

However, collaborative case-comparative work quickly triggered a further distinction. The above PES type was by default labeled “Coasean”⁸ (Pagiola and Platais, 2007), “private” (Wunder, 2005) or “user-financed” (Engel et al., 2008). Yet, in a “government-financed” PES variant, a centralized public administration finances payments, acting as a buyer on behalf of private service end-users (Engel et al., 2008; Wunder et al., 2008). Government-financed PES are particularly common for globally transcending ES with public good character (non-rival, non-excludable) (Farley and Costanza, 2010). For instance, for biodiversity-related ES pure Coasean deals are extremely difficult to organize, given the huge scope for free-riding among ES users.

3.2. Environmental Economics Definitions

In the emerging debate, several alternative PES definitions have been proposed (Table 1). Here we start with the ones closest to my own, in what Luca Tacconi called “the environmental economics school” (Tacconi, 2012). He concluded that Coasean PES definitions focused on buyers and sellers are too narrow, and suggested that:

“A PES scheme is a transparent system for the additional provision of environmental services through conditional payments to voluntary providers.” (ibid: 35).

This definition deliberately does not specify who pays on the demand side (nor whether those payments would be voluntary), while keeping all other main features from Wunder (2005) intact (incl. conditionality). Notably, Tacconi adds environmental conditionality (i.e. incremental services being delivered) and transparency as criteria.

Similarly, Sommerville et al. (2009) characterize PES as an umbrella term for a set of resource-management tools based on the philosophy of implementing conditional positive incentives. In their view, PES are:

“Approaches that aim to (1) transfer positive incentives to environmental service providers that are (2) conditional on the provision of that service”. They add two defining principles: “successful implementation is based on a consideration of (1) additionality and (2) varying institutional contexts.” (ibid: 2).

Hence, conditionality is identified as key, whereas service definition, buyers, and sellers become implicit features. PES are seen as not always voluntary, even on the provider side (e.g. when illegal land uses are subject to regulatory threat). Like Tacconi, Sommerville et al. use additionality as a defining principle.

Is the inclusion of additionality desirable? It could be problematic, since it depends on an *ex post* evaluation of PES impacts. For instance,

⁷ For Google Scholar internet searches of the terms “payments for environmental services” and the sometimes preferred “payments for ecosystem services” (see also Section 4), Wunder (2005) constitutes with 1045 citations the most referenced paper (accessed 1 August 2014). By far most authors cite the paper specifically for its PES definition.

⁸ Coase (1960) had criticized the universal application of the “polluter pays” principle (Pigou, 1924), showing that negative environmental externalities might often be solved preferably through privately negotiated deals between the affected parties (polluter vs. polluted). Yet, his preconditions include well-defined ‘rights to pollute’ and low transaction costs of negotiating deals.

the pioneer reference to PES in developing countries has been Costa Rica’s national PES program, implemented since 1996. Various recent impact evaluations have revealed the program may have had very little additionality (e.g. Pattanayak et al., 2010). Should we then after almost two decades of implementation declare to the world: “this is actually not PES, since we now know that it was largely non-additional”? The proposed additionality criterion may also decrease robustness (definitional standard III). For instance, Costa Rica recently introduced ES spatial targeting practices that may suddenly have increased additionality. This would mean that from year X to Y, this was not a PES, but after the design change it became one – a definitional sensitivity that is not helpful. Also, “successful implementation” (Sommerville et al.) of other, non-PES environmental interventions depends equally on achieving additionality. If we included this outcome criterion in their respective definitions, could an ineffective forest law not be labeled “a law”, or a paper park not be labeled a protected area? In conclusion, we better not mix impact assessments into concepts and definitions.

Finally, Porras et al. (2008) conclude their review of 95 watershed PES by noting that the Wunder (2005) definition excludes ‘PES-like’ programs with non-market institutional arrangements, e.g. funded through taxes and other non-voluntary sources, such as obligatory user fees. Three PES principles are thus first being featured:

1. Environmental externality addressed through a payment
2. Voluntary in principle on the supply side
3. Conditionality in principle on pre-agreed land uses

A modified PES definition thus follows:

“A transaction in which a supplier or seller of the ecosystem service is responding to the offer of compensation from a single or multiple beneficiaries (NGO, private party, local or central government entity) and/or a beneficiary separate from the seller which is not a central government entity, compensation is conditional upon the land management practices specified by the program, and the voluntary component is only attached to the supply-side of the transaction in that the provider ‘voluntarily’ enters in to the contract.” (Porras et al., 2012: 7)

What is new in this (quite long) definition? We have voluntariness on the provider side only (as Tacconi), distinguishing users vs. buyers and government vs. intermediaries, conditionality based on land-use proxies rather than service delivery, and target ES being specified as externalities. Even though this definition is not “simple to remember” (criterion IV), all three synthetic observations are very useful for our discussion below.

3.3. “Compensation and Rewards” Based Definitions

This group of conceptual contributions was inspired by work done at the World Agroforestry Center (ICRAF), in particular its Southeast Asian program for Rewarding Upland Poor for the Environmental Services they provide (RUPES). It was empirically supported by an ICRAF-led global PES scoping exercise with broad institutional participation.⁹ It also links well to observers perceiving ES and pro-poor welfare outcomes as inseparably linked (Rosa et al., 2003; Shilling and Osha, 2003).

Principally three points of critique are raised vis-a-vis the Wunder (2005) definition (Swallow et al., 2009; van Noordwijk et al., 2012). First, conditionality and voluntariness are not binary features, but rather moving targets on sliding scales of degree. Second, monetary payments as “transfer of financial capital” are too narrow a currency for the type of incentives that can be effectively exchanged between service users and providers, ranging from in-kind benefits to recognition, and to the

⁹ Consortium members included besides ICRAF the World Conservation Union (IUCN), Forest Trends, Ecoagriculture Partners, Institute for Social and Economic Change, Corporación Grupo Randi Randi, United Nations Environment Program (UNEP), the African Centre for Technology Studies, and International Development Research Centre (IDRC).

Table 1
PES definitions compared: terms, actors, and features.

Feature/Author	Wunder	Tacconi	Sommerville et al.	Porras et al.	van Noordwijk et al.	Swallow et al.	Shelley	Karsenty	Muradian et al.
Publicat. year	2005	2012	2009	2008, 2012	2007	2009	2011	2011	2010
Acronym	PES	PES	PES	PES	CRES	CRES	CRES	PES	PES
Transfer	Transaction	Payment	Positive incentive	Transaction	Compensation & reward	Compensation & reward	Compensation & reward	Payment	Incentive
Demand	Buyer	-	-	User/buyer/government	-	Beneficiaries intermediaries	Beneficiaries	Agent	Social actor
Supply	Seller	Provider	Provider	Provider/seller	Steward	Steward	Steward	Agent	Social actor
Service/action	Environmental	Environmental	Environmental	Ecosystem + externality	Environmental	Environmental	Ecosystem	Environmental	Land-use decision
Conditional	Yes	Yes	Yes	Yes, for land management	Yes	-	Yes	"Aimed at" (intention)	-
Voluntary	Demand & supply	Supply	Yes	Supply	Demand & supply	-	-	-	-
Additional for environment	-	Yes	Yes	-	Effective in reducing threats	-	-	-	-
Welfare impacts	-	-	-	-	pro-poor, fair	-	-	-	In the social interest
Other features	ES well-defined	Transparent	Varying institutional context	Intermediaries Government buyer, but not user	Includes co-investments, certification	Features at sliding scales, includes co-investments	Stewardship is being sold	Preserving, restoring or increasing ES	-
Observations & critiques	"Coasean", narrow, is associated to markets	Concise, but mixes impacts into concept	Concise, but mixes impacts into concept	Elaborate concept, but hard to recall as definition	Criteria and indicators; impact focus	Fairly broad, inclusive, no conditionality	Fairly broad, stewardship focus	Generic for most environ. incentives	Generic for all 'pro-social' environmental incentives

Note: - factor not mentioned; left open-ended.

conditional provision of land rights to local people (Suyanto, 2007). Through joint strategies involving the exchange of multiple assets, eventually "buyers and sellers become co-investors in cross-linked systems" (van Noordwijk et al., 2012: 397). Third, a conceptual distinction is proposed between ES providers' entitlement-based "compensations" and the effort-based "rewards" they may receive as incentives (van Noordwijk et al., 2007).

These observations also logically result in a broader definition,¹⁰ several subcategories, and more complex relationships between ES users and providers (Namirembe et al., 2014). Van Noordwijk et al. (2007: 9) thus conceptualize the broader "compensation and reward mechanisms for environmental services" (CRES) with the following criteria and indicators:

1. Realistic: Effectively mitigates, reduces or avoids threats to ES for all parties involved;
2. Voluntary: Engagement involves choice rather than being the object of regulation;
3. Conditional: Service and rewards or compensation are dynamically linked;
4. Pro-poor: Mechanisms selected are positively biased towards disadvantaged stakeholders.

Conceptual novelties here are that environmental additionality is coined as effectively addressing threats, and PES are also to achieve pro-poor outcomes. A later synthesis article from the global PES scoping exercise has a slightly different CRES definition¹¹:

"We define CRES as follows: contractual arrangements and negotiated agreements among ecosystem stewards, environmental service beneficiaries, or intermediaries, for the purpose of enhancing, maintaining, reallocating or offsetting damage to environmental services." (Swallow et al., 2009:5).

Conditionality no longer features in this definition; voluntariness is only indirectly represented (through negotiation or contracts). In turn, the demand side is more specifically described (although not mentioning governments), as is the variability in the nature of ES provided. The type of arrangement still includes co-investments but also eco-certification, i.e. material products verified to have been produced bundled with environmental benefits (Milder et al., 2010).

Several conceptual elements from the global scoping synthesis can be traced back to an earlier pan-American PES assessment by Salvadoran NGO PRISMA (Rosa et al., 2003): the term "compensations" is preferred over (monetary) payments, including enhanced community rights and collective action, and focus on farmer-provided landscape-level ES (rather than set-aside conservation), promoting greater likelihood of pro-poor outcomes. Shelley (2011), formerly working with PRISMA, concludes a thorough review of existing PES definitions with a slight CRES modification. His "compensation and rewards for ecosystem service stewardship (CRESS)" adds an "S" for stewardship, arguing that ES are jointly generated by humans and nature, and thus not owned by people (Shelley, 2011: 220-22).

For all "compensation and rewards" definitions, we can observe a marked sensitivity towards institutional diversity, fairness, and multi-dimensional goals of PES interventions. However, some caveats also apply. First, if pro-poor impacts are being elevated to be part of CRES, we could get the same problems as for additionality¹²: if subsequent impact assessments call pro-poor effects into doubt, would we then have to *ex post* backtrack on our classification? If the pro-poor status changes

¹⁰ As Swallow et al. (2009: 5) conclude: "Although this definition (Wunder, 2005) has been generally accepted by economists working on market-based instruments for environmental policy, it suffers from being too restrictive."

¹¹ We thus also treat it as a separate column in Table 1.

¹² In principle, the notion of "effectively addressing environmental threats" (van Noordwijk et al., 2007 and Table 1) is also something we can only meaningfully assess once we are well into the implementation of a PES program, and is thus subject to the same constraints as the definitions including environmental additionality.

over time, would we have to swap in and out of classifications?¹³ And what if simply none of the participating agents happen to be poor? We can find PES examples from both developed¹⁴ and developing countries¹⁵ where both ES users and providers belong to better-off social strata, and poverty alleviation is thus a non-issue. Could these hence not be labeled PES programs, while functional lookalikes, with some poor people being present and benefited, would be? This would hardly seem to be desirable. Once again, it may be unfortunate to have normative features about what we would like PES to achieve dictate the way we define the instrument up front.

Secondly, when looking at the CRES(S) concepts and their complex sub-numbered under-categories,¹⁶ the subtle question emerges why all these instruments have to be gathered under the same umbrella – given that several of the instruments in question (ICDP, ecocertification, ecotourism, etc.) have their own established literatures, with distinct design features. For instance, van Noordwijk et al. (2012) provide an excellent, broadly contextualized PES literature review, and conclude that “[i]n practice, most of the currently known PES applications in the tropics ... involve linkages of complex systems in buyer and seller communities, involving exchanges of multiple asset types” (ibid: 396–7): they allegedly look more like co-investments, and are thus better summarized by CRES. Yet the authors also realistically admit that co-investments are not fully PES: “It appears that the co-investment paradigm seeks a middle ground between ICDP and PES concepts, with partial conditionality” (ibid: 397). Hence, why not leave the co-investment strategies as a hybrid of the well-defined PES and ICDP concepts, rather than creating a super-umbrella of CRES, and force it to somehow simultaneously embrace PES, ICDP, co-investments, and several other environmental management tools?¹⁷

Finally, are CRES’ broader currencies of reward compatible with conditionality? In other words, can they be effectively withdrawn in cases of ES providers’ insufficient compliance? In case of conditional tenure rights (Suyanto, 2007), withdrawal may in principle be possible, though at large political costs. In case of co-investments, similar dilemmas as for ICDP emerge: the school or the road has already been built at sunk costs, and leverage on ES providers is reduced. Experimentation with mixed forms, such as partially conditional ICDP, could indeed be interesting, but should we necessarily label those as PES?

3.4. Ecological Economics Approach

Following Tacconi’s (2012) classification, PES definitions from the environmental economics school are being challenged mainly by ecological economics scholars. I would count Alain Karsenty’s contribution as one of those (Karsenty, 2011):

“[t]his definition (Wunder, 2005) uses market terminology (buying, selling), which implies that the services have been appropriated prior to the transaction (one can only sell what one possesses). However, environmental services are qualities associated with elements (for example the quality of water flowing through a drainage basin, or the carbon storage capacity of a forest) that cannot be appropriated. (ibid: 1)”

¹³ This could happen when, for instance, a number of poor service providers in an ES target area get bought out by richer landowners.

¹⁴ For example, a PES program run by WWF and RFF in the Northern Everglades (USA) compensates large ranchers for changed wetland management; none of the land of ES interest is being owned by poor people (Shabman and Lynch, 2013).

¹⁵ In Heredia (Costa Rica), a regional PES scheme pays a series of wealthy, mostly recreational landowners for watershed protection, because those are the people that happen to occupy the environmentally sensitive upper watershed (Kosoy et al., 2007).

¹⁶ For instance, CES1, CES2, RES1 and RES2 are being listed in Swallow et al. (2009).

¹⁷ Keeping these concepts apart does certainly not preclude an acknowledgement of similarities of tools (PES, eco-certification, CRES-type of co-investments), with “an orientation that recognizes the externalities [and] provides incentives for ecosystem stewardship that require conditionality” (Barry Shelley, pers.comm. 18 June 2014).

His alternative definition is kept deliberately broad in every respect (agents, action, and space):

“PES is a payment to an agent for services provided to other agents (wherever they may be in space and time) by means of a deliberate action aimed at preserving, restoring or increasing an environmental service agreed by the parties.” (Karsenty, 2011:1).

The idea that “one can only sell what one possesses” arguably rests on a generalized misperception about the service economy. Due to service intangibility, exchange of property rights is usually not required in service trade: a teacher does not own the provision of knowledge, a house cleaner has no patented right to cleanliness, and a dentist does not own his clients’ teeth.¹⁸ Following Shelley (2011), ES instead imply the provision of stewardship in ways where humans and nature interact.

The primary representative of the ecological economics conceptual PES critique is Muradian et al. (2010:1205), who define PES as:

“A transfer of resources between social actors, which aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources”.

This definition, used in their own special PES section of this journal, as well as a subsequent one (Farley and Costanza, 2010), is now the likely most popular ‘broad’ PES definition, after the ‘narrow’ Wunder (2005).¹⁹ Again, the purpose is to widen the institutional set-ups and incentive types, especially beyond pure markets. It is sometimes seen as “far more in line with ecological economics, in which ecological sustainability and just distribution take precedence over market efficiency in further social interests” (Farley and Costanza, 2010:2063).

There are various similarities to Karsenty’s definition (e.g. generic “actors” vs. “agents” on supply and demand sides), but arguably the Muradian et al. definition is broader (using “incentives” instead of “payments”, no hint at conditionality). Arguably, we could accommodate just about every environmental policy instruments with an economic component under this umbrella: ICDPs, ecocertification, subsidies, tax exemptions, “co-investments” and co-management agreements (as for “rewards and compensations”), and cap-and-trade schemes. All these imply “a transfer of resources” to influence “land use decisions”. Note that the floor is also open to environmental taxes, fees, and fines: these can equally aim “to create incentives to align ... land use” – just *negative* incentives, which unlike in other incentive-based definitions (e.g. Sommerville et al., 2009) are not excluded here. Is PES thus in the ecological economics view a one-size-fits-all term for any economic instrument in the environmental policy toolbox?

In fact, there is one aspect where the Muradian et al. (2010) is narrower than any other definition in Table 1 (incl. Wunder, 2005): in terms of welfare impacts, incentives have to “align ... decision with the social interest”. Imagine now a micro-watershed PES, where a few downstream water users compensate some upstream farmers to stop encroaching on steep slopes subject to high erosion and stream sedimentation. As a result, upstream farmers now move to expand instead into remoter forestlands that do not trigger sedimentation, but the conversion of which has high costs for habitat loss of birds endemic to those forests. Is the net result a land-use move that is in “the social interest”? It may not be, if in the tradeoff of social interests the loss of endemic biodiversity is of greater concern to society than what a few water users gain in water quality. Consequently, if net social welfare gains are negative, according to Muradian et al. (2010) this could not be called a

¹⁸ Wikipedia says about “service (economy)”: “Service provision is often an economic activity where the buyer does not generally, except by exclusive contract, obtain exclusive ownership of the thing purchased.”

¹⁹ On 14 January 2014, the Muradian et al. (2010) article had been cited 271 times on Google Scholar, a large share of which is likely due to the use of their PES definition.

PES scheme — although by all of its mechanisms and functions (the five criteria from Wunder, 2005), it certainly looks like one. What then should we call such an initiative?

The problem here is that alignment “with social interest” is a normative impact prescription that does not specify scale (is the “social interest” local, national, or global?), nor the tradeoffs in interests that may occur between these scales, and between different environmental service users. It also ignores that not all environmental services are public; some are club goods (as in this example), and yet others are fully private (e.g. when the only downstream user is a private brewery), and thus not necessarily correlated directly to “the social interest”. Hence, this is yet another example where a definition including intended ‘good’ impacts comes to look politically correct — as it did to Farley and Costanza (2010) — but in fact complicates our task of framing a phenomenon with the needed conceptual clarity.

4. Dissecting the PES Term

4.1. Popularity of Terms

In the previous section, we have emphasized the right-hand side of the definitional equation: how is PES functionality explained in various definitions? In this section, we will discuss the left-hand side: how do we call the proper mechanism? What transfer (“payment” vs. alternatives) and nature-related action (“environmental services” vs. alternatives) terms have been used?

First, an operational definition should in principle not have identical terms on the two sides; yet various definitions in Table 1 violate that consistency principle. For instance, Karsenty (2011:11) in his definition (cited fully in Section 3) uses all three terms on both the right- and left-hand sides: “PES is a payment...for services... aimed at...an environmental service”. If one explains terms by using the same terms in the explanation, such causal circularity may reduce the aimed-for definition to an annotated acronym list.

Second, Table 2 gives us a quick impression of how popular different (combinations of) terms from Table 1 are, using contemporary searches in Google and Google Scholar.²⁰ as rough indicators. As we can see, “payments”²¹ is clearly leading the economic resource transfer terms: its use outpaces the second-listed “rewards” by factor 9, “incentives” by factor 11, and “compensation” by factor 16. On the natural action side, “environmental services” is both per se and in all combinations (except with “rewards” term) more popular than its competitor “ecosystem services” — in some cases with a large gap. As one earlier assessment of this type shows, this wide margin has existed for at least a decade.²²

Finally, outside the Anglophone sphere, in the Spanish-language PES literature “payments for environmental services” (*pagos por servicios ambientales*) dominates the corresponding “ecosystem” term (*pagos por servicios ecosistémicos*) by a wide margin.²³ This is important since much PES implementation has been done in Latin America (S. Pagiola, pers.comm., 4 June 2014). Indeed, the English-language “payments for environmental services” term itself seems to originate from a translation of the Costa Rican PSA term (Derissen and Latacz-Lohmann, 2013).

²⁰ The Google search engines were deliberately preferred over Scopus, so as to include more practitioner-oriented uses that go beyond academics.

²¹ I tried both plural and singular forms, and generally then selected the ones that gave higher hits (for details, see Table 2 note #2).

²² Pagiola and Platais (2007: Box 2:3) found in May 2007 (and before in July 2004) over 41,000 (758) hits for ‘payment for environmental services’, 12,700 (117) for ‘payment for ecosystem services’.

²³ A Google search on 4 August 2014 returned 1.1 million hits for “pagos por servicios ambientales” vs. just 0.2 million hits for “pagos por servicios ecosistémicos”.

Table 2
Popularity of key concepts: hits on Google searches.

Transfer/action	“Environmental services”	“Ecosystem services”	Total
1 None	1,390,000	286,000	1,676,000
2 “Payments for”	931,000	865,000	1,796,000
3 “Payments for” (Google scholar)	6120	4540	10,660
4 Payments for (no quotes)	21,200,000	1,520,000	22,720,000
5 “Compensation for”	74,000	27,900	101,900
6 “Rewards for”	70,700	111,000	181,700
7 “Compensation and rewards for”	42,000	7600	49,600
8 “Co-investment in”	7	3	10
9 “Incentives for”	125,000	29,400	154,400
10 Total (2 + 5 + 6 + 7 + 8)	1,242,707	1,040,903	2,283,610

Notes:

(1) Searches 15 January 2014 in <https://www.google.com> and <http://scholar.google.com/> using Internet Explorer 9, in-private browsing mode.

(2) For transfer, we used singularis form (compensation, co-investment) when these had higher total hits than the pluralis form. Similarly, we combined with “in” and “for” so as to maximize hits.

4.2. Nature-Related Action

Popularity aside, do the two ES, “environmental services” and “ecosystem services”, mean something substantially different? In fact, the two terms are widely used as synonyms, including in the PES debate and in popularized media.²⁴ Some observers see the phenomenon “referred to as ‘payments for ecosystem services’ (when the emphasis is on enhancing ‘nature’ services) or ‘payments for environmental services’ (when amenities provided by the built environment are also included)” — yet then go on to use the single acronym “PES” for both (Bulte et al., 2008:245). In practice, even this distinction may get blurred, since nature-related services always require human action coupled with the environment, coordinating biophysical and socio-economic processes: both human and natural elements are always present, although to a variable degree. Some scholars see ecosystem services as a subcategory under environmental services (Muradian et al., 2010:2012), and others vice versa (Derissen and Latacz-Lohmann, 2013:14). My slight preference is for “environmental” over “ecosystem”, since many PES rewarded actions (e.g. tree planting on steep slopes, riparian vegetative regeneration, or biodiversity-friendly cropping practices) are not necessarily “systemic” nor bundled (Wunder, 2005), but instead represent pragmatic marginal changes in land management practices, with likely tradeoffs among ES from the same ecosystem. Nevertheless, in practice both terms are used so similarly and interchangeably that a distinction between them probably is the least important conceptual dimension of PES (Shelley, 2011).

One reason some PES observers prefer the “ecosystem services” term is because it was popularized by the prestigious Millennium Ecosystem Assessment (MEA) (e.g. Shelley, 2011). Yet, the MEA has arguably caused some confusion by labeling material products as so-called “provisioning services”, although their product character (tangibility, divisibility, excludability, internalized benefits) sets them fully apart from genuine services (Buyers, 2008). Hence, designing PES for “provisioning services” is unthinkable, as landowners fully control harvested benefits, and can typically charge for their use directly. Following the logic of the MEA, we should perhaps rather talk about “payments for regulating services” (carbon sequestration, water purification, etc.), where most externalities are concentrated? Yet, some “cultural services” can also be rewarded through PES (e.g. recreational benefits in the Costa Rican PSA). Alternatively, the total economic valuation

²⁴ For instance, Wikipedia (accessed 16 January 2014) actually redirects a search for “environmental services” to “ecosystem services”, and notes: “Humankind benefits from a multitude of resources and processes that are supplied by ecosystems. Collectively, these benefits are known as ecosystem services and include products like clean drinking water and processes such as the decomposition of wastes.” (http://en.wikipedia.org/wiki/Environmental_services).

framework, pre-dating the MEA, holds the externality-oriented category of “indirect use values”, which is overlapping more closely with a PES scope (Pagiola and Platias, 2007). However, many payments for preservation of biodiversity fall into alternative non-use categories of existence and option values.

More interesting than the distinction between the two discussed ‘E’s is thus the third ‘E’: the externalities PES were explicitly designed for (e.g. Ferraro and Simpson, 2002). Externality is “the cost or benefit that affects a party who did not choose to incur that cost or benefit” (Buchanan and Stubblebine, 1962). As noted in the criticisms above, externalities were not explicitly teased out in Wunder (2005). But is it for all externalities that we need PES schemes? Imagine a farmer who besides his agricultural business is running a small nature tourism operation on his property. Farming activities surely have the potential to interfere negatively with visiting tourists’ recreational experience (e.g. expansion of crops into forest, noisy farm machinery, cattle trotting hiking trails). But the farmer needs not sign a PES contract with his visitors to receive compensation for curbing these agricultural externalities jeopardizing the recreational ES: he can just charge a premium on overnight visitors, or an entree fee on day trippers.

This fits with the observation that some community-based ecotourism programs clearly fit the five PES criteria from Wunder (2005), yet the externality problem does not call for the typical PES contract (Naidoo et al., 2011). The implication is that the spatial divide between ES provision and use is decisive: the subset of offsite externalities (e.g. downstream water uses, global warming) call for PES contracts, while externalities for ES consumed on the site of provision can be internalized otherwise (see Section 5).

Finally, a critique of Wunder (2005) above is that ES provision is frequently guaranteed through stewardship processes – more so when there is no well-defined landownership (Shelley, 2011; Swallow et al., 2009), whereas the underlying services may actually seldom be “well-defined” (Farley and Costanza, 2010). Likewise, PES conditionality is often (in watershed PES, practically always) based on land management proxies (Porrás et al., 2008), rather than a more complex measurement of actual services delivered, which are mediated by natural fluctuations and third-party effects (Salzman, 2009). These are useful observations to keep in mind for Section 5.

4.3. Economic Transfer Terms

As Table 2 showed, “payments” is the clearly dominating term, compared to “reward”, “compensation”, “incentives” and “co-investment” – and, I believe, for good reasons: it is neutral enough to cover a sufficiently wide spectrum of relevant value transfers (cash vs. in-kind, markets vs. two-party transactions or to/from government).²⁵ Notably, payments go in scope much beyond markets, reflecting an increasing consensus that PES are only exceptionally being realized through markets (Wunder, 2013), and that even the term “market-based” is severely overstretched (Lapeyre and Pirard, 2013).

“Co-investment” is, as recognized by its inventors, a rather special case. Investment by definition requires capital outlays for asset creation in the expectation of future returns.²⁶ Yet, we also have PES-type transfers ‘for inaction’, as in avoided deforestation; any assets involved here remain intangible at best (e.g. social capital). All other popular terms from Table 2 are much closer in meaning, only separated by nuances. “Incentive” is functionally linked to ES providers’ changed behavior²⁷; it is less apt though than “payment” for portraying user-side fees. “Compensation” has a clear connotation of reimbursement to breakeven for

damages suffered,²⁸ and may thus fail to honor the legitimate aspirations of service providers to profit and make welfare gains from PES, over and above their ES provision costs. “Reward(s)”, the second-most popular term, also conveys the notion of an incentive to providers (less than a payment by users), has stronger undertones of reinforcing (already practiced) good behavior, and can also be used for negative stimuli.²⁹ Some of these terms could also be linked to generalized entitlements. For instance, if avoided deforestation earned “rewards” or “compensations”, then Finnish and Siberian forest owners, or indeed any resource steward leaving trees standing instead of felling them, might rightfully make a claim.

In fact, the terms “payments”, “rewards”, “compensation”, and “incentives” all express functional aspects that any PES scheme should fulfill. For instance, a program fully focused on cost-effective ES additionality would seek to pay providers cost “compensation” and only minor “incentives” on top; one that strongly stresses PES fairness would feature ample “rewards” for desirable behavior. Arguably all PES interventions have to somehow manage tradeoffs between (short-run) environmental efficiency and fairness, so as to achieve their goals. Hence, some flavors of rewards, compensation, and incentives all have to be present in the PES recipe. My sense is that “payments” remains the best umbrella term for this spicy multifunctional mix, as a transaction transferring value from ES users (or a government) to ES providers.³⁰

5. Conclusion: Guidelines on how to Conceptualize PES

5.1. PES or not PES – is That Really the Question?

In this article, I have argued that the way we define tools such as PES has important implications for how we eventually design and implement them. From the philosophy of science, we would want a PES definition to be sufficiently precise for empirical use, robust to small intertemporal variations in implementation, and not constructed in a too complicated way. Perhaps most importantly, in Weberian terms the definition should be able to effectively distinguish PES from other resembling members of the family of positive environmental incentives, which PES could easily be confounded with. For PES, that refers first to the close cousin of eco-premiums providing ES rewards through certification, but work through (and vary in size with) markets for the host products they functionally are bundled with.³¹ Quintessentially, PES should conceptually be clearly separated from ICDPs – the standard indirect way of investing in environmentally more benign livelihoods while providing incentives, which PES were thought to be an alternative to.³² If we fail to do so, and succumb to the empiricist temptation of embracing all resembling family members, i.e. classifying all positive environmental incentives as PES, then we implicitly come to nullify the logic that in the first place underpinned the emergence of PES, and that makes them function differently. Consequently, any conceptual analysis of PES initiatives would also lose focus, by mixing apples with oranges. This conceptual mix-up is a potential danger with empiricist definitions, such as those inspired by the ecological economics school (Muradian et al., 2010; Karsenty,

²⁵ “Financial compensation (disambiguation)” is the most relevant category of use among several meanings identified by Wikipedia, which then distinguishes various sub-categories: reimbursement for damages, for nationalization, payment, and remuneration (accessed 19 January 2014).

²⁶ Wikipedia defines a reward as “a positive stimulus that can be presented in the process of reinforcing behavior”. The Free Dictionary says: “Something given or received in recompense for worthy behavior or in retribution for evil acts.” Finally, the Oxford Dictionary expresses: “a thing given in recognition of one’s service, effort, or achievement” (all accessed 19 January 2014).

²⁷ The proper words “transaction” or “transfer” are equally generic and neutral. However, given the popularity of the “payment” term, and arguably no major drawbacks to its use, there seems to be no reason to substitute it.

²⁸ See Ferraro and Simpson (2005) for the differences in functionality between PES and eco-certified products.

²⁹ For functional comparisons of PES and ICDPs, see Ferraro (2001) and Ferraro and Kiss (2002).

²⁵ Wikipedia defines as follows (accessed 1 January 2014): “A payment is the transfer of an item of value from one party (such as a person or company) to another in exchange for the provision of goods, services or both, or to fulfill a legal obligation.”

²⁶ Wikipedia (accessed 19 January 2014).states: “investment is putting money into an asset with the expectation of capital appreciation, dividends, and/or interest earnings”.

²⁷ “An incentive is something that motivates an individual to perform an action” (Wikipedia, accessed 19 January 2014).

2011), and to some extent also the compensations and rewards type (van Noordwijk et al., 2007; Swallow et al., 2009; Shelley, 2011).

But why do we see an increasing popularity of very broad PES definitions? Why do the same authors not simply use a “positive environmental incentives” label, which arguably describes their scope much more accurately? Why flock insistently around PES? First, PES are currently seen as innovative (and thus have a dynamic community of practice), and are also highly popular with donors – sometimes beyond realistic expectations about under which preconditions PES can thrive (Wunder, 2013). Hence, there are usually tangible rewards for riding the PES train, and incentives for continuously widening their definition, so as to make more train seats available.³³ Second, many observers recognize the strengths of the PES model, but remain skeptical of its socio-economic impacts in its purest form, e.g. on landless people. Out of this concern comes a desire to improve on PES outcomes from the conceptual side (including with elements from other tools), i.e. “holding onto the promise of PES by trying to make some relative of PES work in effective, sustainable, and just ways” (Barry Shelley, pers.comm., 18 June 2014).

Several of the definitions referred to above have thus tried to integrate normative elements of what PES should achieve with respect to poverty, justice, and environmentally additionality. In fact, one contribution goes a step further by outlining a definition of the type of PES schemes that would be needed to make a combination of desirable outcomes more likely (Pirard et al., 2010).³⁴ This is an interesting thought experience, and in the above my intention has not been to downplay these legitimate concerns about PES impacts and tradeoffs. But in this article I have argued that definitions and implementation guidelines are best kept distinct from each other, so as to not deliberately blend our functional concepts with our normative perceptions of desirable outcomes.

Does a Weberian narrow PES definition not leave too few initiatives as ‘pure PES’, and too many in the gray zone of ‘PES-like’? First, in our 2008 Special Issue of this journal (Engel et al., 2008; Wunder et al., 2008), we discussed a dozen of initiatives with close approximation to our definition (Wunder, 2005), plus its government-financed variant, proving the Weberian criteria of feasibility in real life (together with logical consistency and rationality) was satisfied. Yet, we also had within the editorial team constructive discussions about border cases, and how important their deviation from ideal PES types was. After all, the prime function of conceptualization is not to put a stamp on real-existing objects to lock them into a drawer, labeled e.g. “PES”. Recent research shows that the degree of deviation from a PES *Idealtypus* is also measurable, as called for by Weber.³⁵ Conceptual models often appear in reality only in contaminated forms, but that does not per se invalidate their usefulness – as discussed already by Engels (1895) on the concept of feudalism.³⁶ Also, real-world PES usually appear in policy mixes

rather than isolation, and with specific framing preconditions (Wunder et al., 2008). More interesting than a binary inside vs. outside classification (‘is it PES or not?’) is thus discussing closeness to the ideal PES model, which also becomes an entry to debating the intervention’s logic and consistency.

5.2. A Revised PES Concept

These considerations still leave us with the practical dilemma of whom we should invite to our next PES workshop and whom not: how do we measure distance from the ideal type? Are there any *sine qua non* features that we would definitely not want to see omitted in a real-world PES scheme? In agreement with Sommerville et al (2009), I believe conditionality stands as a PES defining feature that at least in instrument design should always be present, if we are to respect the logic of the aforementioned analytical contributions. Obviously, we should also expect de facto conditionality in implementation to vary in degree, across initiatives and over time. Conditionality, as the performance-based *quid pro quo* right of ending an agreement, is what makes PES the frontrunner of a new paradigm of contractual conservation. Conditionality also somehow mediates the other criteria: at least two parties have to transact, some voluntariness is needed so one of them can discontinue the deal in cases of non-compliance, which again has to be based on some tangible performance criterion.

Table 3 proposes and explains a slightly modified version of the Wunder (2005) definition with detailed explanatory notes that capture many of the above observations from the literature. The purpose here is not to discard the functionality of my previous definition, but to offer some clarifications that could ease its understanding. Accordingly, and after thorough peer discussions of some earlier draft versions,³⁷ it is suggested that payments for environmental services (PES) can be defined as:

- (1) *voluntary transactions*
- (2) *between service users*
- (3) *and service providers*
- (4) *that are conditional on agreed rules of natural resource management*
- (5) *for generating offsite services.*

Where are the differences to the 2005 definition? Some simplifications aside, first this definition takes on board the observation that by far most agreements are constructed around resource-use proxies, rather than referring to ES proper (which cannot always be “well-defined”) as the prime measurable performance and compliance indicator. Yet, buyers will normally also want to monitor aggregate ES additionality of the intervention, though neither environmental nor welfare (‘pro-poor’) outcomes should enter the definition (see above). In fact, the argument has been made that PES contracts could be more efficient if they were at least partially conditional upon monitored ES delivery (Hanley and White, 2014). This would require that contractual ES provision can be monitored at reasonable transaction costs, and that ES providers are willing to share the risks that separate land-use proxies from ES flows; in many cases neither of the two assumptions may hold.³⁸

Second, the terms “buyer” and “seller” gave some readers an inadequate market association (Muradian et al., 2010; Gómez-Baggethun et al., 2010). I have thus employed the “user” and “provider” terms instead, which is the pool of people any ES buyers and sellers would be recruited from. Notably, users and providers can either act individually or

³³ Yet, we do begin to see also the opposite mechanisms, i.e. interventions that clearly satisfy the PES criteria (and used to be called PES) now purposely using different labels so as to escape emerging political-ideological backlashes against PES (watershed retribution arrangements in Bolivia are one such example).

³⁴ “Wunder’s definition of PES may be elaborated in this way: PES are (i) a voluntary transaction in order (ii) to preserve or enhance at least one well-defined environmental service, between (iii) at least one provider, (iv) who clearly cannot be subject to the polluter pays principle, (v) and at least one buyer, (vi) who offers a payment over a limited period (vii) as a means for investment in locally productive and sustainable activities”.

³⁵ Ezzine de Blas et al. (submitted for publication) construct in their global analysis of PES schemes an index measuring “deviation from canonical PES” as one of the comparative characteristics of PES cases.

³⁶ “Did feudalism ever correspond to its concept? Founded in the kingdom of the West Franks, further developed in Normandy by the Norwegian conquerors, its formation continued by the French Norsemen in England and Southern Italy, it came nearest to its concept – in Jerusalem, in the kingdom of a day, which in the Assises de Jerusalem left behind it the most classic expression of the feudal order. Was this order therefore a fiction because it only achieved a short-lived existence in full classical form in Palestine, and even that mostly only on paper? Or are the concepts which prevail in the natural sciences fictions because they by no means always coincide with reality? From the moment we accept the theory of evolution all our concepts of organic life correspond only approximately to reality.” (Engels, 1895).

³⁷ I am here grateful in particular to Stefano Pagliola for a fruitful exchange of opinions (see Acknowledgments for other contributors).

³⁸ For instance, imagine a group of landowners being rewarded directly for measured reductions in downstream water sedimentation. They could take all the right land-use steps to reduce soil erosion, and yet still see increased river sedimentation, due to extreme weather events. Being paid for ES delivered, they would thus have to assume the weather risks of ES provision.

Table 3

A revised PES definition: some annotated guidelines.

Feature	Wunder (2005)	Modified proposal	Explanatory notes (for modified proposal)
Term	Payments for environmental services	Payments for environmental services	a) "Environmental" and alternative term "ecological" are used as close substitutes b) "Payments" should functionally compensate ES provision costs, provide on top an additional ES incentive, balanced with strategic rewards to pre-compliant ES providers.
Acronym	PES	PES	
Voluntary	Yes	Yes	Collective organization of ES providers and/or users (more frequently occurring on user side) may de facto restrict the degree of voluntariness of individuals
Transfer	Transaction	Transaction	a) Could be market-based (with competitive forces in play), but in most cases is not b) In most cases involves a written contract c) Is often facilitated by an intermediary
Demand side	Buyer	Service users	a) ES use(r)s including here some non-use benefits (e.g. option and existence values). b) Enrolled ES users become ES buyers <i>ex post</i> c) ES users may organize in single units (e.g. a firm), clubs (e.g. user association), or government-financed PES (local, national) – as highest-level aggregation of ES users
Supply side	Seller	Service providers	d) Often intermediaries (e.g. civil society) bring together ES users and providers a) ES providers may be landowners (with or without title), tenants, concessionaires – effective stewardship managing ES provision is key requirement b) ES providers may be individuals or collectively organized/contracted c) Enrolled ES providers become ES sellers <i>ex post</i>
Conditional	Yes	Yes	a) Conditionality by design is the single <i>sine qua non</i> defining feature of PES b) Implementation will exhibit varying degrees of de facto achieved conditionality
Nature-related action	ES provision (or land use proxy)	Agreed rules of natural resource management	a) Compliance of ES providers is normally (but not always) w.r.t. pre-agreed resource-use rules, not payments for hard-to-measure (and fluctuating/risky) ES provided b) "Land use" would restricts us from including marine PES c) Most PES are area-based.
Service	ES well-defined	Offsite services	a) PES adequate for internalizing offsite externalities (i.e. spatially set apart from provider's land-use jurisdiction). b) ES may be bundled, but clear ES target delimitation may improve implementation
Additional for environment	–	–	Desirable impact, but not a definitional feature
Welfare gains	–	–	Desirable impact, but not a definitional feature

Note: factor not mentioned; left open-ended.

organize collectively (e.g. when free-rider problems abound) – with government as the highest level of user aggregation, creating a special PES case that is deviating slightly from the Coasean ideal. ES providers, whether formal landowners or not, basically need to fulfill an environmental stewardship function, i.e. manage the natural resources they control, in the (land or water) area they are contractually responsible for, in ways that respect the rules agreed to with ES users.

Third, the wording "for generating offsite services" deliberately links PES to the aforementioned subset of environmental externalities, which the resource-use rules aim to address. The ES beneficiaries are thus external to the physical site where ES provision is generated. Since ES users are enjoying their benefits in a distinct location, they cannot be directly charged for them, making a PES arrangement pertinent. Note that ES "users" also can derive some benefits that strictly speaking are non-use values (e.g. cultural, option, or existence) values.³⁹

What things have notably not changed? Conditionality is now outlined as the single most important PES feature. Voluntariness is also preserved as criterion, including in order to label some cases where farmers were seemingly forced to participate in PES (e.g. in Vietnam or China) as deviations from the PES principle (Wunder et al., 2008). I agree with Tacconi (2012) and Porras et al. (2012) that individual agents' voluntariness can be severely restricted, especially for ES users/buyers. However, I don't believe this relates to specific buyer-side issues, but to the fact that collective decision-making at different aggregation levels (user associations, utility companies, municipalities, or governments) for public or club goods is more common for ES users than providers. Yet, fully similar restrictions can occur for ES providers when these sell services collectively; e.g. subgroups of households within communities may be made worse off without being able to exit PES individually.⁴⁰ Voluntariness restrictions thus seem

³⁹ I considered instead the more inclusive term "ES beneficiaries", but comments received indicated that this term is often associated with PES recipients, i.e. the providers.

⁴⁰ One such example is in the CAMPFIRE program, where households living closest to the focused wildlife areas clearly faced the highest ES provision costs, but had no choice of independently leaving the program that their community had signed up for (Frost and Bond, 2008).

best addressed by explanatory notes featuring the possibility of limitations imposed on individual decision-making by collective ES action: at the collective level, both users and providers need to have the power to discontinue the agreement; otherwise conditionality cannot function.

This bounded definition should still satisfy all the four criteria set out in Section 2 (precision, distinctiveness, robustness, and simplicity). In particular, it should be sufficiently simple for PES implementers and policy makers to understand, thus also easing future empirical assessments of PES effectiveness. It clearly distinguishes PES from ICDP, and even from ecocertification (which is not a direct user-provider transaction). The fact that conditionality is emphasized now as quintessential to PES should also help implementers in setting priorities, hopefully emphasizing this particular design feature.

On a closing note, being close to or far away from a narrowly set PES definition does not necessarily say anything about how well-designed or -implemented an environmental intervention is: 'PES-like' is not per se an inferior classification to PES; customizations, policy mixes and combinations can represent perfect adaptations to complex realities. However, the 'PES-like' label can typically be made more precise by analyzing explicitly from which other instrument types the intervention has drawn inspiration.⁴¹ This may help us better understand the elements of logic behind the real-world intervention, and the assumptions needed for that logic to function. Having analyzed these phenomena with the needed conceptual clarity will doubtlessly be the first step in that direction.

Acknowledgments

I am grateful for comments on earlier drafts received from Barry Shelley, Jan Börner, Meine van Noordwijk, Stefano Pagiola, and two anonymous reviewers. For discussing subtleties of a revised PES definition, I am in addition grateful for comments from Amy Duchelle,

⁴¹ A good example is the above mentioned case of "co-investments" that are positioned in between the PES and the ICDP paradigms (van Noordwijk et al., 2012).

Eduardo Marinho, Erik Gomez-Baggeth, Romain Pirard, and William Sunderlin. Part of this research was funded by the EU FP7 project NEWFOREX (No: 243950), by NORAD, and was carried out under the CGIAR Research Program on Forests, Trees and Agroforestry (FTA).

References

- Andersen, H., 2000. Kuhn's account of family resemblance: a solution to the problem of wide-open texture. *Erkenntnis* 52 (3), 313–337.
- Buchanan, J.M., Stubblebine, W.C., 1962. Externality. *Economica* 29 (116), 371–384.
- Bulte, E.H., Lipper, L., Stringer, R., Zilberman, D., 2008. Payments for ecosystem services and poverty reduction: concepts, issues, and empirical perspectives. *Environ. Dev. Econ.* 13 (3), 245–254.
- Buyers, B., 2008. Ecosystem Services: What Do We Know and Where Should We Go? ARD, Burlington.
- Coase, R.H., 1960. The problem of social cost. *J. Law Econ.* 3, 1–23.
- Derissen, S., Latacz-Lohmann, U., 2013. What are PES? A review of definitions and an extension. *Ecosyst. Serv.* 6, 12–15.
- Engels, F., 12 March 1895. Letter to Conrad Schmidt (Zurich). Marx and Engels Correspondence, Available from: http://marxists.anu.edu.au/archive/marx/works/1895/letters/95_03_12.htm (accessed 19 January 2014).
- Engel, S., Pagiola, S., Wunder, S., 2008. Designing payments for environmental services in theory and practice: an overview of the issues. *Ecol. Econ.* 65 (4), 663–675.
- Ezzine de Blas, D., Wunder, S., Ruiz-Perez, M., Moreno-Sanchez, R., 2014. Global patterns in the implementation of payments for environmental services. *Proc. Natl. Acad. Sci.* (submitted for publication).
- Farley, J., Costanza, R., 2010. Payments for ecosystem services: from local to global. *Ecol. Econ.* 69 (11), 2060–2068.
- Ferraro, P.J., 2001. Global habitat protection: limitations of development interventions and a role for conservation performance payments. *Conserv. Biol.* 15, 990–1000.
- Ferraro, P.J., 2011. The future of payments for environmental services. *Conserv. Biol.* 25 (6), 1134–1138.
- Ferraro, P., Kiss, A., 2002. Direct payments to conserve biodiversity. *Science* 298 (5599), 1718–1719.
- Ferraro, P., Simpson, R., 2002. The cost-effectiveness of conservation payments. *Land Econ.* 78, 339–353.
- Ferraro, P., Simpson, R., 2005. Protecting forests and biodiversity: are investments in eco-friendly production activities the best way to protect endangered ecosystems and enhance rural livelihoods? *Forests, Trees Livelihoods* 15, 167–181.
- Frost, P.G.H., Bond, I., 2008. The CAMPFIRE programme in Zimbabwe: payments for wildlife services. *Ecol. Econ.* 65 (4), 776–787.
- Gómez-Baggeth, E., De Groot, R., Lomas, P.L., Montes, C., 2010. The history of ecosystem services in economic theory and practice: from early notions to markets and payment schemes. *Ecol. Econ.* 69 (6), 1209–1218.
- Hall, L.S., Krausman, P.R., Morrison, M.L., 1997. The habitat concept and a plea for standard terminology. *Wildl. Soc. Bull.* 173–182.
- Hanley, N., White, B., 2014. Incentivizing the provision of ecosystem services. *Int. Rev. Environ. Resour. Econ.* 7 (3–4), 299–331.
- Hodges, K.E., 2008. Defining the problem: terminology and progress in ecology. *Front. Ecol. Environ.* 6 (1), 35–42.
- Karsenty, A., 2011. Payments for environmental services and development: combining conservation incentives with investment. *Perspective Environmental Policy*. CIRAD, Paris.
- Kosoy, N., Martinez-Tuna, M., Muradian, R., Martinez-Alier, J., 2007. Payments for environmental services in watersheds: insights from a comparative study of three cases in Central America. *Ecol. Econ.* 61 (2), 446–455.
- Kuchenbrod, M., 1999. Bausteine der Wirtschafts- und Sozialgeschichte. Die Funktion des Idealtypus nach Max Weber Available from: <http://www.matkuch1.de/tutideal.htm> (accessed 03 January 2014).
- Lapeyre, R., Pirard, R., 2013. Payments for environmental services and market-based instruments: next of kin or false friends? Working Paper #14/13 (June). IDDRI, Paris.
- Milder, J.C., Scherr, S.J., Bracer, C., 2010. Trends and future potential of payment for ecosystem services to alleviate rural poverty in developing countries. *Ecol. Soc.* 15 (2), 4.
- Muradian, R., Corbera, E., Pascual, U., Kosoy, N., May, P.H., 2010. Reconciling theory and practice: an alternative conceptual framework for understanding payments for environmental services. *Ecol. Econ.* 69 (6), 1202–1208.
- Muradian, R., et al., 2013. Payments for ecosystem services and the fatal attraction of win-win solutions. *Conserv. Lett.* 6 (4), 274–279.
- Naidoo, R., Weaver, L.C., De Longcamp, M., Plessis, P.Du., 2011. Namibia's community-based natural resource management programme: an unrecognized payments for ecosystem services scheme. *Environ. Conserv.* 38 (04), 445–453.
- Namirembe, S., Leimona, B., van Noordwijk, M., Bernard, F., Bacwayo, K.E., 2014. Co-investment paradigms as alternatives to payments for tree-based ecosystem services in Africa. *Curr. Opin. Environ. Sustain.* 6, 89–97.
- Pagiola, S., Platais, G., 2007. Payments for Environmental Services: From Theory to Practice. World Bank, Washington DC.
- Pattanayak, S.K., Wunder, S., Ferraro, P.J., 2010. Show me the money: do payments supply environmental services in developing countries? *Rev. Environ. Econ. Policy* 4 (2), 254–274.
- Pigou, A.C., 1924. *The Economics of Welfare*. Macmillan, London.
- Pirard, R., Billé, R., Sembrés, T., 2010. Upscaling payments for environmental services (PES): critical issues. *Trop. Conserv. Sci.* 3 (3), 249–261.
- Porras, I., Grieg-Gran, M., Neves, N., 2008. All That Glitters: A Review of Payments for Watershed Services in Developing Countries. International Institute for Environment and Development (IIED), London (130 pp.).
- Porras, I., Dengel, J., Aylward, B., 2012. Monitoring and evaluation of payment for watershed service schemes in developing countries. Paper Read at the 14th Annual BioEcon Conference on "Resource Economics, Biodiversity Conservation and Development".
- Rosa, H., Kandel, S., Dimas, L., 2003. Compensation for Environmental Services and Rural Communities. PRISMA, San Salvador, p. 78.
- Salzman, J., 2009. A Policy Maker's Guide to Designing Payments for Ecosystem Services. Duke University, School of Law, (available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1498629).
- Shabman, L., Lynch, S., 2013. Moving From Concept to Implementation: The Emergence of the Northern Everglades Payment for Environmental Services Program. RFF DP 13–27. Resources for the Future, Washington DC.
- Shelley, B.G., 2011. What should we call instruments commonly known as payments for environmental services? A review of the literature and a proposal. *Ann. N. Y. Acad. Sci.* 1219 (1), 209–225.
- Shilling, J., Osha, J., 2003. Paying for Environmental Stewardship. WWF Macroeconomics for Sustainable Development Program Office, Washington DC.
- Simpson, R., Sedjo, R.A., 1996. Paying for the conservation of endangered ecosystems: a comparison of direct and indirect approaches. *Environ. Dev. Econ.* 1, 241–257.
- Sommerville, M.M., Jones, J.P., Milner-Gulland, E., 2009. A revised conceptual framework for payments for environmental services. *Ecol. Soc.* 14 (2), 34.
- Strunz, S., 2012. Is conceptual vagueness an asset? Arguments from philosophy of science applied to the concept of resilience. *Ecol. Econ.* 76, 112–118.
- Suyanto, S., 2007. Lessons on the Conditional Tenure and RiverCare Schemes in Sumberjaya, Indonesia: conditionally in Payment for Environmental Services. <http://www.worldagroforestrycentre.org/downloads/publications/pdfs/bc07202.pdf> (accessed 13 January 2014).
- Swallow, B.M., Kallesoe, M.F., Iftikhar, U.A., van Noordwijk, M., Bracer, C., Scherr, S., Raju, K.V., Poats, S., Duraiappah, A.K., Ochieng, B.O., 2009. Compensation and rewards for environmental services in the developing world: framing pan-tropical analysis and comparison. *Ecol. Soc.* 14 (2), 26.
- Tacconi, L., 2012. Redefining payments for environmental services. *Ecol. Econ.* 73, 29–36.
- van der Steen, W.J., 1993. *A Practical Philosophy for the Life Sciences*. State University of New York Press, Albany.
- van Noordwijk, M., Leimona, B., Emerton, L., Tomich, T.P., Velarde, S., Kallesoe, M., Sekher, M., Swallow, B., 2007. Criteria and indicators for environmental service reward and compensation mechanisms: realistic, voluntary, conditional and pro-poor. CRES Scoping Study – Issues Paper #2, ICRAF Working Paper #37. World Agroforestry Center, Nairobi.
- van Noordwijk, M., Leimona, B., Jindal, R., Villamor, G.B., Vardhan, M., Namirembe, S., Catacutan, D., Kerr, J., Minang, P.A., Tomich, T.P., 2012. Payments for environmental services: evolution toward efficient and fair incentives for multifunctional landscapes. *Annu. Rev. Environ. Resour.* 37 (1), 389–420.
- Weber, M., 1949 [1904]. *The methodology of the social sciences*. New York: Free Press.
- Wunder, S., 2005. Payments for environmental services: some nuts and bolts. CIFOR Occasional Paper, #42, p. 24.
- Wunder, S., 2013. When payments for environmental services will work for conservation. *Conserv. Lett.* 6 (4), 230–237.
- Wunder, S., Engel, S., Pagiola, S., 2008. Taking stock: a comparative analysis of payments for environmental services programs in developed and developing countries. *Ecol. Econ.* 65, 834–852.