

## Pragmatic conservation: Discourses of payments for ecosystem services in Colombia



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### ABSTRACT

Payments for Ecosystem Services (PES) schemes incentivise landowners to maintain, restore or enhance ecosystem services. Currently, there are more than 550 active PES programmes worldwide, expected to support conservation efforts and, ideally, to also reduce rural poverty. In this article we explore the discourses that underpin PES debates and practice in Colombia, a late-comer to the PES agenda in Latin-America. Informed by interviews with PES actors and Q-methodology (n = 41), we identify three PES discourses: conservation conduit, contextual conservation, and inconvenient conservation. The narratives diverge in their framing of deforestation processes; their most preferred PES design features; the likely role of payments in changing people's motivations to conserve biodiversity over time; and the potential effectiveness of PES, specifically when the latter aim to contribute to peace-building efforts and reducing illicit crop cultivation. The conservation conduit and contextual discourse are by far the most popular, while the inconvenient conservation narrative is only endorsed by academic actors. This suggests the existence of a broad community which believes PES are a pragmatic conservation strategy and who supports PES because payments can correct the often-uneven distribution of conservation costs and benefits. This overall positive engagement with PES, we argue, may facilitate the increase and upscaling of PES initiatives throughout the country, provided that funding and other supporting social conditions are met.

### 1. PES as a contested concept

Payments for Ecosystem Services (PES) schemes incentivise landowners to maintain, restore, or enhance ecosystem services (ES). As an increasingly popular environmental policy tool, there are now more than 550 active programmes worldwide that represent USD 36 billion in annual transactions (Salzman et al., 2018). Latin America dominates PES implementation, with the Costa Rican and Mexican national programmes being two of the largest schemes in the world, followed by China's Sloping Land Conversion programme. PES were popularised as they are assumed to have more effective potential than other conservation tools, such as community conservation areas, and they represent an alternative source of income for vulnerable communities in the global South (Muradian et al., 2013; Pagiola et al., 2005).

In spite of the growing popularity of PES across conservation policy and practice circles, it remains a contested and dynamic concept. In practice, very few PES schemes adhere to Wunder, (2005) canonical

PES definition, with PES involving upstream water providers and downstream urban beneficiaries being perhaps those schemes more closely related to such a definition (e.g., Borda et al., 2010). Regardless of how much PES adhere to or differ from this definition, it is evident that the way in which implementing actors conceptualise PES will affect their design and outcomes. For example, funding and implementing agencies more concerned about the environmental additionality of PES schemes than about poverty-related issues might target payments to highly biodiverse ecosystems and disregard the socio-economic conditions of the beneficiary populations. In contrast, if these agencies are interested in reducing poverty, the degree of marginalisation of the beneficiary populations might be a more important criterion for payment targeting than the deforestation risk of nearby ecosystems. In fact, when PES have been conceptualised as a strategy for the recognition of environmental stewardship, environmental additionality has not been a critical design issue or evaluation criterion (Swallow et al., 2009). Therefore, trade-offs between design features and the quest for

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particular objectives in PES implementation reflect how specific paradigms or discourses about deforestation, environmental degradation, poverty, or the role of incentives in motivating specific human behaviours are understood and thus mainstreamed in such implementation.

There has been a call in academia for a deeper understanding of PES conceptualisations, contexts, and power dynamics (Büscher, 2012; van Hecken et al., 2015a, 2015b; Vatn, 2009 McAfee and Shapiro, 2010 van Hecken and Bastiaensen, 2010). In this article, we respond to such call and contribute to PES debates by disseminating the discursive assumptions and beliefs that underlie contemporary and future PES discussions and programmes in Colombia which, despite the uniqueness of the country, can be found in other similar contexts where both the agricultural and urban frontiers are advancing over less altered and more biodiverse ecosystems. Colombia is a late-comer to PES regulation and rather under-researched in terms of PES policy and practice, when compared to other Latin American countries (Muñoz-Piña et al., 2008; Pagiola, 2008). Furthermore, Colombia's environmental policy is decentralised, and therefore PES schemes are or will be led by sub-national authorities operating in different regions. Additionally, PES law in Colombia was issued in the context of the Peace Agreements between the government and the FARC guerrilla, therefore in principle PES are mandated to further peace-building and social justice missions. These characteristics make it even more relevant to understand PES discourses in Colombia after decades of dispersed experiences and advancements in regulations.

Below, we begin with a brief review of the literature on environmental and PES discourses. In Section 3, we present Colombia's PES context and we introduce Q-methodology as our main analytical approach. We highlight two methodological innovations carried out: a web-search algorithm to extract statements from social media, and an additional factor analysis to evaluate the balance of the final set of statements. In Section 4, we distil the three PES discourses identified: PES as conservation conduit, PES as contextual conservation, and PES as inconvenient conservation. These discourses vary in their degree of support of PES as a policy instrument and on the priority assigned to environmental *versus* development goals. The discourses also diverge in terms of which policy mechanisms are envisaged for tackling environmental degradation and deforestation. In Section 5, we discuss the findings and conclude the article, arguing that, in contrast with other studies, the little opposition to PES observed in the discourses might reflect the country's historical momentum; and it might also contribute to ease the further implementation of PES across the country, provided funding opportunities and conducive institutional developments are realised.

## 2. Examining PES discourses

Discourses are a “shared way of apprehending the world”, which construct meanings and relationships, “helping to define common sense and legitimate knowledge” (Dryzek, 2005: 9). Discourses influence views and realities; which discourses have more influence on reality depends on the power they embody. Dominant discourses are those that comply with two conditions: (1) they are used by many people (discourse structuration) and (2) they solidify or materialize into programs, institutions and organizational practices (discourse institutionalization) (Hajer, 2006). For example, Garrett Hardin's *Tragedy of the commons* (Hardin, 1968) was and still is, in some contexts, a dominant discourse that resulted in a trend of privatisation and nationalisation while ignoring community-based natural resource management (Agrawal and

Gibson, 1999). Plurality in discourses is difficult to discern because sometimes different voices are forced to use the vocabulary of the dominant discourse (Adger et al., 2001). Discourses have different characteristics: they exist and are not true or false; they are historical constructs, and not objective givens; they are very stable and do not change overnight; and they are heterogeneous and not the product of a single author or single source (Hajer, 2006). Dominant discourses can change over time as the product of influential actors, groups or coalitions, for example, scientific communities, who can reframe a particular situation (Appelstrand et al., 2010). For instance, The Intergovernmental Panel on Climate Change (IPCC) is an epistemic community, or a network of knowledge-based experts, that has shaped our understanding of climate change and reinforced particular ideas and discourses of its causes and consequences (Corbera et al., 2015).

Environmental discourses frame the understanding and conception of environmental problems (e.g., deforestation, climate change) and related solutions (e.g., PES, REDD+). Literature on environmental discourses has focused on identifying global discourses (Appelstrand et al., 2010; Arts and Buizer, 2009; Dryzek, 2005), and understanding their impact on environmental governance and practice (Leipold, 2014). For example, Adger et al. (2001) identify two global environmental discourses that prevail around the issues of desertification, deforestation, climate change and biodiversity use: the global environmental management (GEM) discourse and the populist discourse. The GEM discourse represents a technocratic worldview under which slash and burn farmers are the main cause of the destruction of forests and are depicted as “villains”. As such, external solutions like financial payments for the conservation of forests and the adoption of soil conservation practices are encouraged under the GEM discourse. For example, the Global Environmental Facility is an institution that advocates this discourse. Under the populist discourse, small farmers are presented as “victims” who are pushed to deforest by economic marginalization and trends of commodity consumption (ibid: 687). Solutions to deforestation under the populist discourse come in the form of community-based conservation approaches to forest management. These two discourses are, of course, reductionist perspectives on environmental problems; they do not help *per se* in comprehensively tackling the pervasive environmental problems faced by humanity but make visible the distance between policy-making discourses and resource users' realities (Adger et al., 2001).

PES discourses are a subset of environmental discourses. They reflect shared conceptions about what drives observed changes in ecosystem services flows and their constitutive ecosystems (or land-use change and biodiversity loss more generally), how best to support the conservation and enhanced provision of specific ecosystem services, and specifically what potential payments can have –if any– in doing so. As a result, PES discourses are likely to be pluralistic and two analytical camps can be distinguished in current scholarship. A number of studies have analysed PES discourses as part of a broader market-oriented discourse in conservation thinking and practice, while others have analysed them in a country-specific implementation context.

The first group of studies suggest that discourses on markets and ecosystem services among conservation professionals can be grouped into four broad categories: the enthusiasts, the pragmatics, the realists, and the sceptics (Blanchard et al., 2016; Fisher and Brown, 2014; Sandbrook et al., 2013). Each discourse is founded upon different assumptions on the role of markets in conservation, their potential to benefit local people, and the underlying causes of deforestation or environmental damage, among other aspects. The enthusiast's discourse

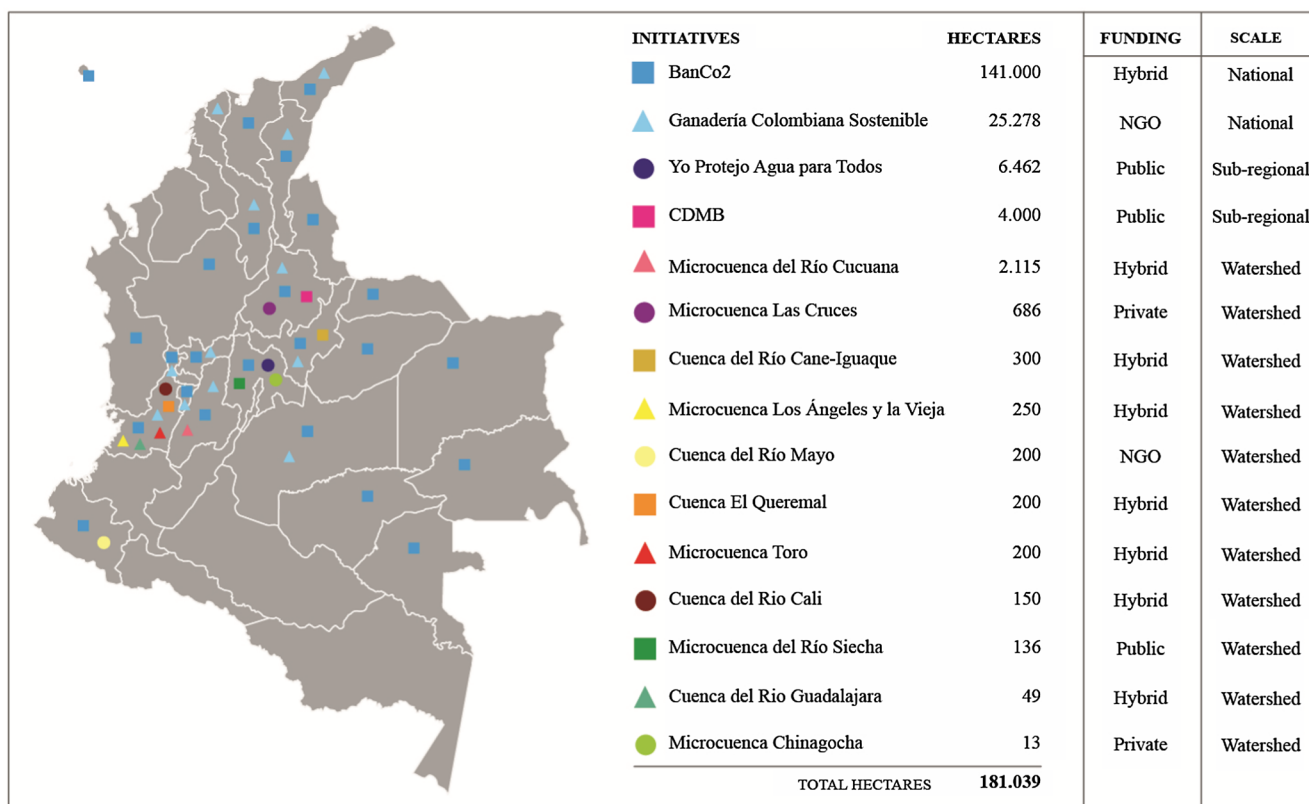


Fig. 1. PES initiatives being implemented in Colombia, organised by number of hectares enrolled. Each coloured shape represents a different PES programme. BanCo2 is the largest scheme both in number of hectares and in number of administrative departments (25 of 32). Some geographical regions concentrate several initiatives, such as Valle del Cauca, on the left, which has 7 different PES programmes. The present study acknowledges that other programmes exist, but the mapping here is based on official government data. (Source: Own elaboration based on PES official government data (2019)). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

gives priority to market arguments for conservation over moral or ethical reasons (Fisher and Brown, 2014), where markets are seen to provide a new large and sustainable source of funding for conservation (Blanchard et al., 2016; Sandbrook et al., 2013). The pragmatic’s discourse combines instrumental and intrinsic arguments for the conservation of nature (Sandbrook et al., 2010), and it suggests that PES schemes, for example, are not necessarily ideologically motivated but “worth trying where other approaches have failed” (Waylen and Martin-Ortega, 2018). The realists’ discourse emphasises the role of MBIs on creating incentives for local people and providing livelihood opportunities for the rural poor (Blanchard et al., 2016), whilst the sceptics’ discourse is grounded on ideological concerns about markets for conservation and the lack of empirical evidence regarding their actual effectiveness (Blanchard et al., 2016; Sandbrook et al., 2013). This discourse considers that “putting a price on nature detracts from other values, and (...) that conservation organisations should not promote economic valuation or the commodification of nature” (Sandbrook et al., 2013: 238).

The second group of studies focus on PES adoption and implementation at the country level. For instance, Fletcher and Breitling (2012) explore how PES implementation in Costa Rica, mainly driven by the State as the buyer, deviated from its initial market-based

conceptualisation with minimal involvement of the government. In Mexico, the initial conceptualisation of PES based on economic principles and a strong focus on environmental objectives shifted towards poverty alleviation, in response to the opposition of state representatives and rural social movements (McAfee and Shapiro, 2010). In Nicaragua, van Hecken et al. (2015a,b) tracked the evolution of PES-thinking and found that the majority of PES projects continue to be driven by market-based discourses, despite the Sandinista’s more critical public stance on market-driven approaches to conservation. In Ecuador, the national PES programme Socio Bosque incorporated elements from the discourses of rights of nature and *buen vivir* (a criticism to conventional ideas of economic development) into its conceptualisation and design (de Koning et al., 2011). In Vietnam, the PES national scheme does not follow the orthodox neoliberal conservation approach characterised by “patterns of privatization, retreat of the State and decentralization of management, and commodification of nature” (McElwee, 2012: 413). Instead, the programme reflects the dominant role of the State in PES design and implementation, which also characterises other environmental policy domains in Vietnam. McAfee and Shapiro (2010) demonstrate the existence of four PES discourses in Mexico that range from those that conceive PES as a necessary, purely market-oriented instrument (the conservation efficiency discourse), to

those that reject PES on the premise that they represent a complete affirmation of the commodification of nature (the anti-PES discourse). In the middle there is the pro-market pro-poor discourse which de-politicises nature-society relations and considers poverty alleviation to be a benefit of greener capitalism, and the compensation for ecosystem services discourse, which considers that rural communities must be rewarded and recognised for their stewardship efforts.

Our research identifies the key assumptions underlying PES discourses (the first group of studies) at a country level (the second group). By doing so, we expect to advance the understanding of PES discourses, and market-oriented conservation discourses more broadly whilst recognizing the specific context in which discourses take place.

### 3. Analysing PES discourses in Colombia through Q-methodology

#### 3.1. Country overview

Colombia stands out for its high biodiversity in addition to its high deforestation rates: it is the second most biodiverse country in the world after Brazil, and along with Mexico, has the highest increase in rates of deforestation in Latin America (Armenteras et al., 2017). In Colombia, deforestation increased by 23% between 2016 and 2017, with 219,973 ha of forest cleared during this period (IDEAM, 2018). Deforestation rates vary across regions and are often explained by a combination of factors that are found elsewhere in the American tropics: low population density, extreme poverty, low income, and the presence of an illicit economy (Armenteras et al., 2013).

Although many PES programmes have been implemented in Colombia since 2002, as a response to deforestation and ecosystem services degradation, the country is a late-comer to PES regulation in Latin America. The national PES law (Law No. 870, 2017) and the national PES policy document (Departamento Nacional de Planeación -DNP, 2017) were issued in 2017. Taken together, these two documents establish the framework for PES implementation and differ in their scope and nature. The law does not establish a national PES programme but instead lists the requirements for the design and implementation of all publicly-funded programmes, whereas the policy document presents the guidelines for PES implementation across the country, including the roles national and sub-national governments play in that regard.

The fact that PES implementation in Colombia will not be dominated by a single national programme managed by a public institution (such as FONAFIFO in Costa Rica or CONAFOR in Mexico) makes it, on one hand, more diverse, but on the other, harder to compare and establish its overall effectiveness.

Currently, Colombia hosts more than 15 PES programmes covering around 181,000 ha across the country, with the exception of the Amazon basin where none have been developed (Ministerio de Ambiente y Desarrollo Sostenible, 2018b). Eight of these programmes are hybrid and funded through private-public partnerships, four are publicly funded, and three are funded through donations from private firms or corporate social responsibility initiatives (Fig. 1). Most of these PES programmes were launched before the issuing of the national law and thus have not followed the standard implementation requirements which it proposed. They differ in their geographical scale (e.g., national, sub-national, watershed level), design features (e.g., selection criteria for participants, payment amounts, payment mode, and contract length to mention a few), and parameters of success (e.g., number

of enrolled hectares, permanence of behavioural changes). For example, the PES programme known as BanCo2 has wide national coverage (141,000 ha spread across several of the country's departments), is funded through private firms' and citizens' donations and public funds, and pays monthly (USD 100–250 per hectare). Conversely, the PES programme Yo Protejo, Agua Para Todos has a limited sub-national scope (6,000 ha spread across one single department), is publicly-funded, and pays annually (USD 96–192 per hectare). The national government's goal is to encourage current and new PES implementers to target and enrol at least 1,000,000 ha by 2030 (0.87% of the country's area).

While private and hybrid schemes in Colombia have the flexibility to establish their own design features, any publicly-funded PES must target conflict-ridden municipalities or areas where illicit crops are grown, since this is mandated by the PES Law (Law No. 870, 2017, chapter II, Art. 8). The rationale behind such mandate is that the law was issued in the context of the Peace Agreements with the FARC guerrilla and it thus had to align with the peace-building process and serve social justice concerns. The law encourages the participation of informal landowners in PES schemes, and among these those who are poorest. Under any public scheme, payments must range between USD 106 and USD 159 per hectare per year for forest conservation, and USD 53 and USD 105 per hectare per year for forest restoration. According to one PES expert, payments for conservation are higher than those for restoration to prevent perverse incentives towards a path of deforestation followed by restoration to get the payment. These values are considerably lower than those in Costa Rica but slightly higher than those in Mexico (Muñoz-Piña et al., 2008; Porras et al., 2013). Publicly-funded PES payments in Colombia are set at a very low payment range, which suggests that they are not aimed at covering the opportunity cost of alternative land-use activities, but rather as a complementary income source of income for participating families. The relative effect of such payments on participants' total income will depend on the opportunity costs and underlying governance system of the targeted lands, which obviously vary across the country. BanCo2, for example, is the country's PES initiative with greater impact on participant households' income, since participants receive up to one minimum monthly wage salary (USD 250/month) for conservation related activities.

#### 3.2. Q-methodology: the Q-concourse and the Q-set

Q-methodology has been increasingly used in conservation research and environmental studies for different purposes: to ascertain management options, to critically reflect upon the values underpinning conservation practice and research, to appraise current or prospective policy acceptability and to mediate conflicts by making visible opposing views in precise terms and facilitating dialogue among stakeholders (for a review of these studies see Zabala et al., 2018).

Q-methodology allows for the systematic study of human subjectivities, that is, "how people conceive and communicate their point of view" (Zabala, 2014: 164), assuming that only a limited number of distinct viewpoints on a certain topic exist (Brown, 1980). Q-methodology presents statements to participants to elicit their views on a particular topic and the method assists with the understanding of opinions. Q-methodology compares individuals' ranking of opinion statements to identify the underlying structure behind subjective positions (Fisher and Brown, 2014). One of Q-methodology's strengths is that it combines

qualitative and quantitative data techniques and analysis (Zabala et al., 2018). It also mitigates one common limitation of discourse analysis: researchers' confirmatory bias, namely, taking from the data information that confirms previous beliefs or hypotheses (Leipold, 2014; Widdowson, 1998). Q-methodology does not require a large set of statements to produce valid results (Watts and Stenner, 2005). All that is required are enough respondents with distinct viewpoints to establish the existence of a discourse or perspective (Brown, 1980: 192).

Q-methodology requires, as a first step, that the Q-concourse or the set of statements that capture the complexity of the topic being studied are defined. In the context of this research, we understand a statement as a clear expression of PES purpose or intentionality; for example, "PES make marginalised communities visible", or "PES are expected to reduce climate change vulnerability". To identify these statements, we followed two novel procedures: (1) we developed a web-search algorithm, or automated search process, to capture every possible mention of PES on the Facebook and Twitter accounts of Colombia's PES actors; and (2) we reviewed the 100 top-cited PES papers found in the scientific repository Scopus.

The web-search algorithm captured complete sentences containing the following key words in Spanish: *pagos por servicios ambientales* (payments for environmental services), *pagos por servicios ecosistémicos* (payments for ecosystem services) and *incentivos a la conservación* (incentives for conservation) on the official Twitter and Facebook accounts of 105 actors relevant to the discussion, design or implementation of PES in Colombia. These three concepts are used interchangeably among Spanish native speakers in reference to PES. The actors were identified based on the local knowledge of two of the authors of this article and they represented all the stakeholders with social media accounts involved in PES debates, policy, and practice in Colombia. However, we acknowledge that actors without a social media account or whose accounts were not active or did not exist during the period of study might be missing. The time span of the search goes back to the date of creation of the account until March 2018. The search yielded a total of 629 captures (260 on Facebook and 369 on Twitter). 176 of the 260 (67.6%) Facebook statements and 299 of the 369 (81%) Twitter statements were manually deleted because they contained public forum invitations, public announcements, were reposted, or did not mention a clear expression of PES purpose. The web-search algorithm thus identified a total of 154 statements related to PES design and/or practice.

The statements automatically collected were, in general, positive about PES. Hence, the algorithm-led web search was complemented with a content review of the most cited 100 articles about PES according to Scopus, in order to achieve a more balanced sample of PES views. The search terms were "payments for ecosystem services" OR "payments for environmental services" in the abstract, title or key words of the article. After reading the abstracts of articles, we excluded 50 from further analysis because these did not mention a clear purpose, objective or conceptualisation of PES. They were in most cases articles that modelled ecosystem services flows, reviewed other articles, or introduced special issues. An in-depth reading of the 50 selected articles by the lead author permitted to identify 79 statements that referred explicitly to PES objectives.

Overall our Q-concourse encompassed 233 statements: 154 from the web-search algorithm and 79 from the literature. We subsequently reduced it to a manageable Q-set, i.e. the statements to be organised by the participants (Watts and Stenner, 2005), by removing redundant statements. In existing literature, some studies use matrices derived from pre-existing theories on the topic of interest to reduce the Q-concourse, others simply select the statements that seem more pertinent or relevant according to the issue at hand (Exel, 2005), while most fall somewhere in between (Eden et al., 2005).

For this article, we developed a 4-step procedure to reduce the Q-concourse. First, each of the 154 statements captured from social media accounts was related to one of eight broad categories we exclusively created as a heuristic tool to reduce the Q-concourse: (1) rural development and wellbeing, (2) global and local provision of public goods,

(3) social (in)justice and equity, (4) conservation actors, (5) post-conflict in Colombia, (6) policy interplays, (7) markets and ecosystems, and (8) society and nature relationships. These categories were developed based on our knowledge of PES debates and experience in PES pilot projects. The lead author and two research assistants from the Universidad de los Andes undertook the task of classifying statements independently and without communication. The assistant's payment varied depending on the level of coincidence between the three coders in the classification of each statement.<sup>1</sup> When there was no agreement between coders for a given statement, a discussion was held, and a decision made regarding which category the statement belonged to.

Second, the lead author alone proceeded to categorise each of the 79 statements from the literature review, in order to reach a balanced final Q-set (Fig. 2).<sup>2</sup> Third, and once we had all the statements distributed across the eight categories, we selected those which were more intelligible whilst making sure that each category mentioned above would be represented in the final Q-set. This was not completely possible given the higher number of statements in the global public goods and social (in)justice and equity categories, which in turn reflected the fact that both public and academic debates about PES had addressed issues related to these categories notably more than others. The final Q-set included 36 statements, which fell within the range of other Q-methodology studies. The Q-set reflected the bias within the PES debate, with 7 statements coming from the global public goods and social (in)justice and equity categories and between 3 and 4 statements from the others. As for data origin, 17 came from the web-search algorithm and 19 from the literature (see Fig. 2 and Appendix A). Finally, we piloted the Q-set with 18 graduate students from the environmental economics class taught by one of the authors at Universidad de Los Andes (Colombia) and, as a result, some minor wording adjustments in a few statements were made to improve participants' understanding.

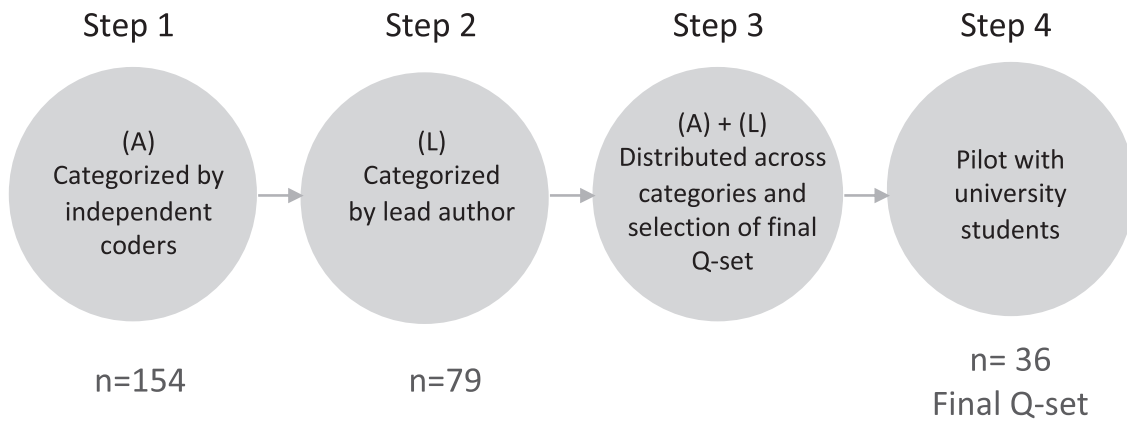
### 3.3. The Q-sorting

The study targeted 41 people involved in the discussion, design or implementation of PES in Colombia. A combination of purposive and snowball sampling was used for participant selection and a diversity of viewpoints and backgrounds was actively sought. Participants were selected based on their knowledge and experience with PES schemes in Colombia. The final sample includes representatives of national and international NGOs, development agencies, ethnic and peasant communities, central and regional environmental authorities, research institutes and universities, independent consultants and public service companies. The sample size falls within the range of other studies in conservation research (typically ranging between 26 and 46 people according to Zabala et al., 2018). Participants were asked to rank each of the 36 statements along a continuum from strongly agree to strongly disagree using a Q-grid that follows a flattened normal distribution to encourage participants to prioritise statements (Appendix B).

The interviews were conducted in Spanish and face-to-face by the lead author following a Q-sorting script aimed at providing consistency across Q-sortings. Each Q-sorting took around one hour, and Q-sorts were conducted in the cities of Bogotá, Cali, Buenaventura, and Medellín from April 11th to June 25th, 2018. After a brief explanation of the project and the method, participants were asked to read through all the statements on the cards and, while reading, to divide the cards

<sup>1</sup> The payment aims to ensure inter-coder reliability (Flick, 2007). The latter refers to the extent "to which two or more independent coders agree on the coding of the content of interest with an application of the same coding scheme" (Lavrakas, 2008: 344; Flick, 2009).

<sup>2</sup> Please note that this process did not follow the same multiple-coders procedure developed in the first step. This second step was conducted to complement the original set of statements and was carried out after performing the web-search algorithm and performing step 1 above.



**Fig. 2.** Overview of the Q-concourse reduction process. The first step of reduction consisted in categorizing the algorithm-based statements (A) into the eight broad categories created to this purpose. This process was conducted by three coders. Second, the literature-based statements (A) were categorised by the lead author of this article. Third, the (A) + (L) statements were distributed across the eight categories, and we selected those which were more intelligible to compose the final Q-set. Finally, we pilot tested the final Q-set with university students in Bogotá.

into three piles: disagree, neutral, and agree. Next, respondents were asked to order the statement cards in the Q-grid supported by the rough order of the piles. Where participants had questions on the meaning or interpretation of a statement, the lead author provided a brief and limited explanation, in effort to not interfere in the process and avoid researcher bias. The lead author conducted post-sorting interviews to understand the participants' interpretation of the statements, in particular, for those placed at the extreme ends of the continuum.

### 3.4. The Q-analysis

The R package “qmethod” developed by Zabala (2014) was used to analyse Q-sorts and reduce responses into a few main groups of perspectives or discourses (named factors in Q-analysis). Principal Component analysis (PCA) and varimax rotations were used to identify clusters of Q-sorts that are similar or dissimilar to one another. Brown's standard requirement (1980: 222) was followed to determine the number of factors and only those factors with (i) eigenvalues (variances of the principal components) greater than 1.00, (ii) factors that had at least two Q-sorts, and (iii) factors that had the greatest amount of variability explained were selected. Choosing factors is always a trade-off between the lesser number of factors for simplicity purposes and the greatest percentage of variation explained. We tested the model with three, four and five factors. In the five-factor solution, the fifth factors had an eigenvalue greater than one (1.618) but only one Q-sort loaded onto this factor. As for the four-factor solution, even though the three criteria were met, the gain in explanatory variance was marginal (only 4%). In turn, the first three factors represented almost the 60% of the total explanatory variance, a percentage consistent with other Q-studies (e.g., Albizua and Zografos, 2014; Zabala et al., 2017). Specifically, the first two factors represented almost 50% of the explanatory variance and the third represented 9%. The fourth factor sunk to 4%. This analysis drove us to decide for the three factors solution, since it was the simplest model with the greatest explanatory variance.

Each respondent was then associated to a factor via a Q-factor loading which indicated the relation between each respondent and a factor (known as ‘flagging’ in Q-methodology). Factor loadings are interpreted similarly to correlation coefficients (Zabala et al., 2018). Four respondents were not flagged into any factor because they had relatively high loadings in all three factors meaning that they moved across discourses or shared features from more than one PES discourse (Appendix C). Next, the responses from flagged participants were used to define the content of each discourse. For each statement, the weighted or normalised mean response was calculated (known as ‘z-scores’ in Q-methodology), resulting in an idealised Q-sort for each discourse. The idealised

Q-sort represents “how a hypothetical respondent with 100% loading on that factor would have ordered all the statements of the Q-set” (Exel, 2005: 9). To identify differences and similarities between factors, the z-scores for each statement were compared across factors. When this comparison was statistically significant, it meant that the statement was considered a distinguishing statement, i.e. only relevant and distinctively positioned in the correspondent discourse. If it was not statistically significant, the statement was considered a consensus statement, positioned similarly across factors and thus shared by all discourses.

Further, we performed an additional analysis that is not reported in any previous Q-study: we graphed the factor analysis of statements (Appendix D). This analysis allowed us to rule-out the common method bias, that is, the case in which the results are driven by the research instrument rather than by the constructs they represent (Campbell and Fiske, 1959). The fact that the graph in Appendix D shows that statements project in different directions demonstrate that such statements are balanced and capture different dimensions of PES discourses. We think that such reflected plurality of PES views can be attributed to the combination of the web-search algorithm and the literature review, which enhanced the probability of having a more comprehensive Q-set.

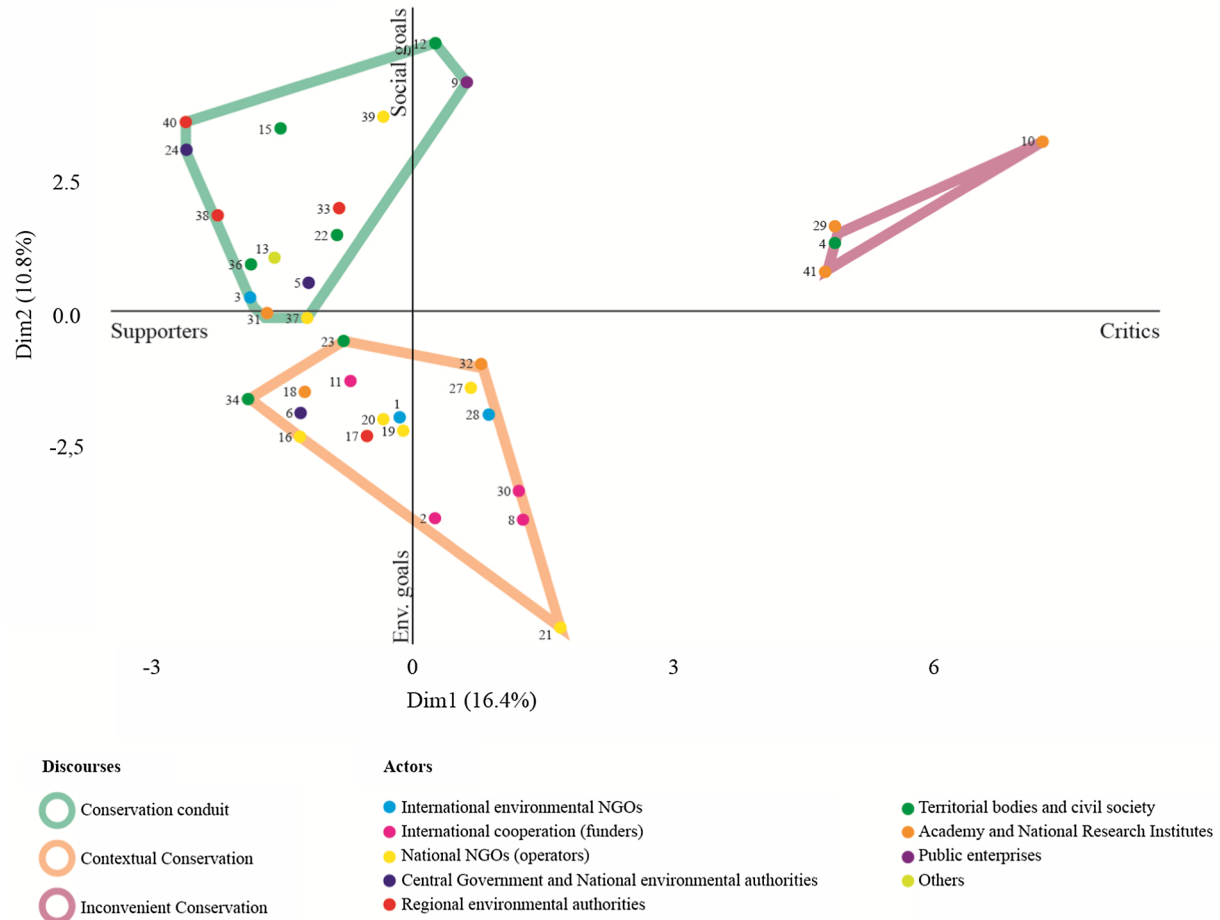
## 4. Results

### 4.1. Identifying and mapping out PES discourses in Colombia

Three PES discourses were identified: conservation conduit, contextual conservation, and inconvenient conservation. Instead of using manual rotation suggested by Brown (1980: 229), when mapping out identified discourses we used the hierarchical clustering method to find an optimal spatial solution. This procedure brings information into a two-dimensional plane to provide the researcher a better analytical perspective (Rokach and Maimon, 2005). Clusters, in this case, are similar to factors, grouped by geometrical distances. To name the dimensions or axes of the factor map we followed an inductive approach according to the underlying structure of discourses as proposed by Brown (1980: 247). The factor map in Fig. 3 indicates the location of each participant, into each cluster, based on their geometrical distance with other participants.<sup>3</sup>

<sup>3</sup> The mathematical algorithm supporting the clustering is based on k-means. The procedure computes first the hierarchical clustering and cut the tree into k clusters. Secondly, computes the centre of each cluster and thirdly, compute k-means by using the set of cluster centres (identified in step 2) as the initial cluster centres. The use of this method is innovative in Q-studies and resulted in a highly useful procedure for analytical purposes meeting the same purposes and rigor of the rotation.

Factor Map: PES in Colombia



**Fig. 3.** Factor map of PES discourses in Colombia: Each dot represents a flagged participant, and dots nearest to each other make up a factor based on their geometrical distance. PES as conservation conduit is presented in green, PES as contextual conservation in yellow and PES as inconvenient conservation in pink. The X axis represents the PES approach of each discourse (supporters vs. critics). The Y axis represents the PES scope of each discourse (social vs. environmental goals). Each number refers to an actor who represents an organization. This figure includes only flagged participants and participants that loaded to the same factor both in the flagging process and the hierarchical cluster analysis. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

As shown in Fig. 3, the three discourses identified vary in being either supportive or critical with PES (X axis) and in being either mostly concerned with social or environmental outcomes (Y axis). For example, the figure shows that the conservation conduit discourse falls in the supporters (X axis) and social objectives (Y axis) quadrant. This means that this discourse considers income generation for vulnerable communities the main objective of PES and also supports PES as a conservation tool for different reasons, for example, as it might be more cost-effective than protected areas. The contextual conservation discourse is mostly focused on the environmental objectives of PES (e.g., additionality in forest cover, water quantity and quality, etc.) and it is slightly more critical with PES than discourse 1, since a higher number of actors belonging to this discourse appear in the “critics” area of Fig. 3. Finally, the inconvenient conservation discourse is deeply critical, fundamentally grounded on the belief that PES deepens the commodification of nature.

In the following section, we interpret three discourses using the idealised scores of representing statements in parenthesis (Statement#-idealised score). The idealised score represents how the ideal respondent would sort the statements. Distinguishing statements are marked with an asterisk for  $P < 0.05$  and two asterisks for  $P < 0.01$ . Table 3.1 presents the 36 statements with idealised scores for each of the three discourses and Table 3.2 presents a summary of the discourses.

4.2. PES as conservation conduit

This discourse is associated with Factor 1, and it is shared by 15 out of 41 participants (Appendix C), including four representatives of local environmental authorities, two representatives of indigenous and departmental territorial bodies, one representative of Afro-Colombian communities and one of peasant organisations, representatives of two

**Table 3.1**  
 Statements with idealised scores for each discourse. Distinguishing statements are marked with asterisks: (\*) denotes significance at 5%, and (\*\*) at 1%. Consensus statements in italics. Source of the statement in brackets (A) for web searching algorithm and (L) for literature.

Statement	Z-score F1	Factor-score F1	Z-score F2	Factor-score F2	Z-score F3	Factor-score F3
1. "PES contribute to comply with international conservation agreements, such as those adopted by the UNFCCC-COP21"	0.17	0	0.56	1	0.47	1
2. "PES are a tool for the recognition of cultural services provided by indigenous communities"	-0.12	-1	-0.36	-1	-1.91	-3**
3. "PES are an instrument for aligning the interests of landowners/holders and society in general"	0.07	0	0.74	1**	0.08	0
4. "PES surrender the management of ecosystem services to a market model focused on efficiency"	-0.89	-2**	-0.07	0**	1.23	2**
5. "PES are a tool for the conservation of endangered species"	0.1	0	0.1	0	-0.97	-2**
6. "PES are an effective policy instrument because they engage different actors in a broad and inclusive manner"	0.23	0**	-0.39	-1**	-1.55	-3**
7. "PES are an instrument that crowd-out the intrinsic motivations for conservation"	-1.4	-3**	-0.54	-2**	1.38	3**
8. "PES are an instrument that, in seeking to reduce poverty, is limited in its conservation objectives"	-0.81	-2**	-0.12	0	0.27	1
9. "PES are a mechanism for the reduction of illicit crops"	-0.45	-1	-0.73	-2	-0.69	-2
10. "PES are a tool for the fight against deforestation and protect strategic ecosystems"	1.3	3	0.93	2	1.02	2
11. "PES are an alternative to command and control instruments that displace peasants from their lands"	-0.63	-1	-0.65	-2	-1.92	-4**
12. "PES create new sources of funding for the protection of ecosystem services"	0.52	1**	1.07	2	1.49	3
13. "PES are a conservation tool that disparages the rights and intrinsic value of nature"	-1.48	-3	-1.58	-3	0.62	2**
14. "PES are an instrument for the commodification of ecosystem functions and goods that have traditionally been public goods"	-1.11	-2	-1.2	-2	1.38	2**
15. "PES are a land-use planning tool"	-0.61	-1	1.87	4**	-0.56	-1
16. "PES are a tool for the construction of territories in peace"	0.62	1*	-0.15	0	-0.2	0
17. "PES are a simpler tool for decision makers as they simplify the impact evaluation"	-0.38	-1*	-1.25	-2**	0.05	0*
18. "PES reconfigure the relationships between human beings and their environment, promoting a relationship that hinges on the exploitation of nature"	-1.06	-2	-1.25	-3	0.53	1**
19. "PES are an effective tool for conservation because they distribute their benefits in a way that is perceived as fair at a local level"	0.75	1**	-0.22	-1	-0.53	-1
20. "PES are a tool for contributing to adaptation to climate change"	0.27	1	0.8	1*	-0.12	0
21. "PES contribute to improving the quality and quantity of water"	0.27	1	1.27	3**	-0.14	0
22. "PES allow rural communities who care for forests to receive a decent income"	1.52	4**	-0.53	-1	-0.25	-1
23. "PES are a tool for involving peasants in the conservation of natural resources and strategic ecosystems"	1.51	3	1.29	3	0.67	2*
24. "PES recognize the conservation work of peasant, indigenous and Afro-Colombian communities in areas of ecosystemic importance"	1.06	2	0.9	2	-0.26	-1**
25. "PES engage citizens and private companies in conservation"	1	2	0.9	2	0.21	1*
26. "PES contribute to Integral Agrarian Rural Development, according to the provisions of the Havana agreements"	-0.24	-1	-0.3	-1	-0.2	0
27. "PES are an instrument that implicitly recognizes the unequal distribution of the costs and benefits of conservation and therefore transfers resources to those who assume such costs"	1.16	2	1.06	2	1.58	3
28. "PES take advantage of market forces to achieve more efficient environmental results"	0.03	0	0.54	1	0.4	1
29. "PES are an instrument for rewarding the restoration of ecosystem services"	0.78	1**	0.3	1**	-0.81	-2**
30. "PES are a more cost-effective instrument for conservation compared to command and control instruments"	0.94	2**	0.01	0**	-0.78	-2**
31. "PES are a tool for motivating productive practices consistent with conservation"	0.82	2**	1.74	3**	-0.4	-1**
32. "PES are a tool for depriving poor peasants of their lands"	-2.23	-4	-2.28	-4	-1.58	-3*
33. "PES are bribes paid to the guardians of the territory, contributing to the handover of control of natural resources to more powerful actors"	-2.06	-3	-2.03	-3	-0.9	-2**
34. "PES aim to make it more profitable for rural communities to protect forests than to deplete them"	1.35	3**	-0.36	-1	0.33	1
35. "PES are an instrument of neoliberal policy that introduces market criteria to the management of environmental public goods"	-1.19	-2**	-0.22**	0	2.33	4**
36. "PES contribute to the reduction of greenhouse gas emissions"	0.18	0	0.14	1	-0.25	-1



**Table 3.2**  
Summary of discourses.

	Discourse 1 Conservation conduit	Discourse 2 Contextual conservation	Discourse 3 Inconvenient conservation
No. of participants	17	16	4
Distinctive view	PES connect people, economic development and conservation through the generation of new income sources for vulnerable communities	PES complement other state policies like land-use management and conservation	PES represent a neoliberal and anthropocentric form of conservation
Mechanisms to stop environmental degradation	Improving economic conditions of vulnerable communities	Land-use planning and law enforcement	Establishing a new contract with nature
Conservation and development objectives exclusive?	No, but prioritizes development goals	Perhaps, but prioritizes environmental additionality	YES
PES more cost effective?	YES	NO, per se	NO
Negative effects of PES?	NONE	NONE	Plenty
PES and Motivations	Reinforces motivations Crowding in	Do not negatively affect	Negatively affect Crowding out
Actors represented	Local territorial bodies and environmental authorities	National and international NGOs and PES operating agencies	Academics
% of explained variance	27.6	23.7	7.7
Eigenvalues	11.3	9.7	3.2
Composite Reliability	0.986	0.985	0.941

environmental NGOs (one local, one international), one environmental research institute, one representative of a water fund, one water supply and sewerage company, one representative of a water users’ association, one scholar from a private university, one leading expert from the IPBES platform, and one central government representative.

This discourse conceives PES as a new income stream that can simultaneously foster economic development and conservation among rural vulnerable communities (S22: +4\*\*). It emphasizes the social objectives of PES, such as the improvement of PES participants’ economic status. It is grounded on the belief that “as long as there are poor economic conditions, conservation will never be a priority” (Q-sorter #40). As such, PES should make forest conservation more profitable than deforestation activities (S34: +3\*\*), as rural communities face “a lack of economic opportunities which are the major threat for forests” (Q-sorter #38). Advocates of this discourse also believe that PES can become a mechanism to motivate agricultural eco-friendly practices (S31: +2\*\*) and sustain that the environmental and social objectives of PES should not be regarded as opposite goals (S8: -2\*\*).

Advocates of the conservation conduit discourse support PES for different reasons: they think PES are more cost-efficient than other conservation measures (S30: +2\*\*), they can distribute their benefits in a locally perceived equitable manner (S19: +1\*\*), and they represent a new source of conservation funding (S12: +1\*). This discourse strongly disagrees with those who think that PES can result in social or environmental dispossession (S32: -4), in elite capture (S33: -3), or that payments can undermine nature’s intrinsic value over time (S13: -3).

#### 4.3. PES as contextual conservation

This discourse is associated with Factor 2, and it is shared by 16 out of 41 participants (Appendix C): eight representatives of national and international NGO operating agencies, two independent consultants, two international non-governmental environmental conservation organisations, two environmental authorities at departmental and national level, one representative of a departmental territorial body, and

one representative of Afro-Colombian communities in the country’s western Pacific region.

PES in this discourse is understood as a land-use planning tool (S15: +4\*\*) that has two environmental objectives: promoting agricultural eco-friendly practices (S31: +3\*\*)—similar to the previous discourse—and improving water quality and quantity (S21: +3\*\*). The discursive emphasis is placed on the environmental objectives of PES, specifically on environmental additionality (Y axis). Its advocates tend to believe that “the problems of deforestation and environmental degradation arise from poor land use planning and law enforcement” (Q-sorter #16). Within this discourse “PES are a complement to other state policies for land-use management and conservation” (Q-sorter #21), and as such, PES are not regarded as a policy panacea. In fact, the advocates of this discourse acknowledge that the scope and impact of PES are very sensitive to their design and the (local) institutional context. Hence, they do not necessarily consider PES a more cost-effective instrument than other conservation policy options (S30: 0\*\*), and they do not think that PES will crowd-out intrinsic pro-environmental motivations (S7: -1\*\*).

Finally, the advocates of this discourse do not care if PES fit into the neoliberal conservation paradigm or not (S35: 0\*), or if PES forces ecosystem services provision into a market model (S4: 0\*\*). Rather, they are concerned with PES role and contribution to conservation and sustainable land use management as part of a broader portfolio of land-use management policies and tools, regardless of their governance nature, i.e. more or less state- or market-driven.

#### 4.4. PES as inconvenient conservation

This discourse is associated with Factor 3 and is represented by only 4 out of 41 respondents (Appendix C); all of them scholars from private and public universities in Bogotá. PES as inconvenient conservation is underpinned by a criticism of PES, which are conceived as a neoliberal tool for conservation (S35: +4\*\*). This discourse argues that PES contribute to the further commodification of nature (the transformation of nature into a tradable object) (S14: +2\*\*), which will over time

undermine intrinsic pro-environmental motivations (S7: +3\*\*). PES are thus regarded as a policy instrument that might reconfigure nature-human interactions by promoting an extractive relationship (S18: +1\*\*) which disregards nature's rights and intrinsic value (S13: +2\*\*). However, the advocates of this discourse do not necessarily PES as a platform for land dispossession (S32: -3\*\*), or for an increased control of natural resources by third parties (S33: -2\*\*).

Advocates of this discourse acknowledge that PES have contributed to engage rural communities in conservation efforts (S23: +2\*\*), but warn that such engagement has been built on and might result in unfair processes and outcomes, respectively. For example, it is argued that “there is great [power] asymmetry among the social actors that are involved in [PES] schemes” (Q-sorter 41), which might jeopardise PES ability involve the most marginalised actors in a broad and inclusive manner (S6: -3\*\*). The four academics who adhere to this discourse challenge the belief that PES can become a way to recognize the cultural services provided by Colombia's indigenous communities (S2: -3\*\*), and they suggest that “we are asking a lot more of PES than they are capable of” (Q-sorter #29). Furthermore, they think that PES might not be effective in conserving key threatened species (S5: -2\*\*), or restoring ecosystems (S29: -2\*\*).

In contrast with discourses 1 and 2, the PES as inconvenient conservation narrative does not conceive PES as a more cost-effective policy option than traditional command and control measures (S30: -2\*\*), such as land purchases (LP). According to an advocate of this discourse, “there is some evidence that land purchases might be more cost-effective, at least, in the short term than PES” (Q-sorter #41). However, the discourse also acknowledges that LP require of a strong institutional framework. This includes legitimate and enforceable property rights and property transaction rules, which might not exist in some countries across the global South, particularly in those where complex systems of both legal and customary tenure co-exist.

## 5. PES discourses in Colombia and beyond

This article is the first attempt to map out PES discourses in Colombia. It advances the research frontier in environmental discourse analysis by making visible the assumptions and beliefs that underlie the present debates and implementation of PES in Colombia. The results demonstrate that there are two discourses that are supportive of PES and another that is more critical. Each of these discourses reflect different assumptions about forest loss and degradation, the required solutions, and the role PES should play in this context.<sup>4</sup>

The conservation conduit discourse considers PES to be an environmental policy tool that contributes to tackle deforestation by improving the economic conditions of marginalised communities. This discourse is represented mainly by local environmental authorities and representatives of indigenous, Afro-Colombian and peasant organisations. The fact that the indigenous, Afro-Colombian and peasant leaders who participated in our study endorsed this discourse, and support rather than criticise PES on the grounds of the possible additional income that might represent, contrasts with other studies where similar social actors often stand against incentive-based conservation (de Koning et al., 2011). We are not suggesting, however, that such support to PES is shared by other ethnic minority and peasant leaders across the country, since our sample did not reach the great diversity of indigenous and rural collectives existing in Colombia. For example, the

<sup>4</sup> We checked to which coding category belongs the distinguishing statements for each discourse. We found that discourse's 1 and 3 distinguishing statements are part of “markets and ecosystems” category and discourse 2 is part of “policy interplays”. This ex-post check suggests that our interpretation of the discourses is coherent since discourses 1 and 3 put an emphasis on markets and ecosystems –but for opposing reasons– while discourse 2 is clearly linked to the integration of different types of conservation and land-use management policies.

Afro-Colombian community of the Yurumanguí river in Valle del Cauca initially refused to participate in the implementation of REDD+ activities led by the NGO Bio-REDD (Consejo Comunitario del Río Yurumanguí, Personal Communication, November 28th 2018).

The conservation conduit discourse, with its underlying assumptions, is perhaps the most commonly reported discourse in the literature. This discourse emphasises the role of PES, and more broadly of market-based conservation tools, in providing new resources for conservation, which is an aspect that is prioritised in the *enthusiast's* and *realist's* discourses identified by Blanchard et al., (2016) and Sandbrook et al., (2013). The discourse also resonates with the *populist* discourse identified by Adger et al. (2001), which portrays small farmers as victims of economic marginalisation, and with McAfee and Shapiro's (2010) *compensation for ecosystem services* discourse that considers development and environment objectives as complementary and inseparable.

The second most popular discourse found in our study is the contextual conservation discourse. This discourse considers PES as a land-use planning tool and a complement to command-and-control policies. International and national NGOs and PES implementing actors align with this view. Deforestation, under this discourse, is the result of poor law enforcement and unsustainable land-use planning, an aspect shared by the *pragmatist* discourse identified by Fisher and Brown (2014). The contextual conservation discourse also prioritises environmental over societal or poverty reduction goals, to be considered a positive side effect of PES rather than an explicit goal, and in doing so the discourse resonates with the *PES conservation-efficiency* discourse identified by McAfee and Shapiro (2010) in Mexico. Seemingly, the discourse's emphasis on top-down land-use planning, and of PES being part of such endeavour, resonate with Adger et al.'s (ibid.) *technocratic* discourse.

Academics are the only social actor embracing the third and only critical discourse in our sample, PES as inconvenient conservation. This discourse considers PES a policy tool at the service of a neoliberal conservation agenda (Fletcher and Buscher, 2017). It shares elements with the *sceptical* discourse (Blanchard et al., 2016; Fisher and Brown, 2014) which proposes that moral and ethical arguments should be prioritised over instrumental or economic reasons, in order to avoid crowding out pro-environmental motivations. However, the basis for the critical stance of the inconvenient conservation discourse in Colombia are neither the lack of positive evidence in terms of environmental outcomes, as in the *evidence-oriented sceptics'* discourse (Blanchard et al. 2016), nor the risks PES may entail in terms of land dispossession or resource enclosure, as in the *anti-PES* discourse (McAfee, 1999). The fact that this critical discourse is only endorsed by academics reflects that this collective is more acquainted with conceptual debates and emerging evidence from international PES implementation outcomes than it seems to be with PES implementation in the country, which remains generally under-researched. Despite having made an effort to identify additional and critical actors who would like to participate in our study, we acknowledge that other actors in Colombia might also adhere to this critical discourse, among the above-mentioned indigenous and rural collectives but also elsewhere.

Besides identifying PES discourses in Colombia, and highlighting their main commonalities and differences, this article can foster further collaboration and debate over PES in Colombia, since discourses serve to “sensitize scientists, practitioners and other stakeholders of different mechanisms, assumptions and trade-offs in environmental governance” (Zinngrebe, 2016: 6). For example, the results suggest that there is a low level of consensus across discourses because these only concur in four out of 36 statements. The first consensus statement relates to the role of PES in correcting the inherent asymmetry in conservation costs and benefits (S27). This idea is the only one that ranked high and positively across the three discourses, which suggests that PES is considered a mechanism to account for the unequal distribution of conservation costs and benefits, a common concern in developing countries where the socio-economic gap between ES providers and beneficiaries

is usually very high (Daw et al., 2011). Although we do not have empirical data to support these claims, this shared belief might be implicitly assuming that (1) the low provision of ES is a market failure that can be corrected within the present social and economic structures, and (2) that the distributional dimension of social equity matters in PES (Pascual et al., 2014). This idea of PES as correcting the imbalances in conservation costs and benefits is particularly important in creating points of convergence between different discourses and might make PES operationalisation more flexible, sensitive to the contexts in which it is proposed and ultimately, perhaps, more effective.

The other two consensus statements relate directly to the post-conflict context of Colombia, with all discourses acknowledging that PES are *not* alternatives for reducing illicit crops (S9), and that PES are *not* contributing to rural development as emphasised in the Peace Accord with the FARC guerrilla (S26). Such shared beliefs on the limits of PES in a post-conflict context is a unique characteristic of the Colombian case, and a finding that is contrary to the PES law that explicitly links PES to coca cropping mitigation and peace-building efforts. We further suggest that such level of agreement over these statements across the three discourses reflects a general disconformity with the far-stretched ambition of Colombia's PES law to use payments for conservation as a means to tackle illicit cropping and promote peace. However, we are also aware that the PES law was strategically linked to post-conflict and peace-building efforts in order to guarantee itself a faster approval by Congress in the broader context of the Peace Agreement, which in turn explains its ambitious mandate and therefore unlikely effectiveness in this regard in the future.

The fourth and final consensus statement is related to the potential of PES to reduce or mitigate greenhouse gas emissions (S36). The three discourses are neutral and rather indifferent in this regard perhaps because the role of PES in reducing greenhouse gases from land-use activities is limited due to their potential implementation scale, particularly when compared to REDD+ initiatives or carbon pricing schemes which are almost non-existent in Colombia. We acknowledge that the combined roll-out of several policy instruments to preserve forests and avoid deforestation should be pursued urgently in the coming years, in order to reduce the share of land-use change emissions in the country, which currently account for 36% of the country's total greenhouse gas emissions (IDEAM, PNUD, MADS, DNP, and Cancillería, 2018). In this context, PES schemes supporting forest conservation in collective ethnic territories, which encompass more than 50% of the country's forests, and initiatives restoring large areas of recently deforested and degraded lands are more likely to have a higher climate change mitigation impact than private small-scale initiatives, which currently dominate PES implementation throughout the country. BanCo2 is the only PES program that involves large collective territories, but its environmental effectiveness is still a matter of controversy among PES practitioners.

The increasing appeal of PES as a policy tool can be interpreted as a product of the "general disenchantment with the conventional command and control approach" (Rodríguez-de-Francisco and Boelens 2015: 495), as well as the emergence of an active PES epistemic community that promotes the tool based on the construction of 'success stories', not always based on empirical data (Büscher, 2012; van Hecken

et al., 2015a). This trend is visible not only in Colombia but is also found, for example, in the literature reporting the spread of pro-market thinking and pro-PES policy among US and UK-based conservation professionals (Blanchard et al., 2016).

From a methodological standpoint, we have contributed to Q-methodology and discourse analysis more broadly in at least three ways: first, by developing a web-search algorithm to capture PES-related statements from social media; second, by proposing the factor map as a new way to characterise discourses and provide the researcher a better analytical and interpretative perspective; and, third, by proposing the PCA as a new analysis to ensure a balance across statements and rule-out the possibility of the common-method bias. In combining these three innovations, we have developed a more systematic protocol to capture, define and prioritise the statements that make up the Q-set. Notwithstanding, we are aware that the combination of the web-search algorithm and the literature review might have still be insufficient to capture all aspects that might be relevant for PES –or another topic– in a given country or social context, since the former is limited to information from the web and the latter to information written by scientists and, in our case, in English alone. Therefore, future researchers aiming to replicate the methodology presented in this article should complemented it with in-depth interviews that can help capturing context-specific discursive elements. They are also encouraged to undertake a careful curatorship of the statements gathered through the automated process, in order to avoid multiple interpretations and inconsistent coding due to long, double-barred statements or double-negations.

In conclusion, the three PES discourses in Colombia identified in this article reflect the relatively high level of acceptance of PES as a policy tool as of today. They are a snapshot of PES discussions in the country and the outcome of years of national policy debate and early practice, which was characterised by limited social opposition. The rather small constituency that endorses the critical PES discourse suggests that PES initiatives are likely to grow in number and geographical coverage if funding and other institutional conditions are met, such as well-funded implementing organisations and enough communities and landowners willing to participate. In Colombia, PES are regarded today as a pragmatic conservation approach for which only time will tell if environmentally effective and socially transformative.

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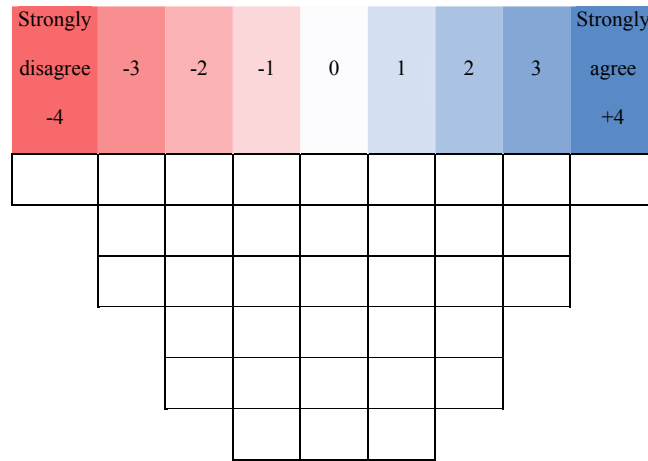
## Appendix A

Final statements that constitute the Q-set in Spanish and English. The source of each statement is marked with an (A) for statements drawn from the web searching algorithm or with an (L) for statement drawn from the literature review.

#	Statement in Spanish	Statement in English	A/ L
1	“Los PSA contribuyen a cumplir los acuerdos internacionales de conservación como los de la COP21”	“PES contribute to compliance with international conservation agreements such as those reached in COP21”	A
2	“Los PSA son una herramienta para reconocer los servicios culturales que proveen las comunidades indígenas”	“PES are a tool for the recognition of cultural services provided by indigenous communities”	A
3	“Los PSA son un instrumento para alinear los intereses de los dueños/poseedores de tierras y la sociedad en general”	“PES are an instrument for aligning the interests of landowners/holders and society in general”	L
4	“Los PSA someten la gestión de los servicios ecosistémicos a un modelo de mercado enfocado en la eficiencia”	“PES surrender the management of ecosystem services to a market model focused on efficiency”	L
5	“Los PSA son una herramienta para conservar especies amenazadas”	“PES are a tool for the conservation of endangered species”	A
6	Los PSA son un instrumento de política efectivo porque involucra a diferentes actores de manera amplia e incluyente”	“PES are an effective policy instrument because they engage different actors in a broad and inclusive manner”	L
7	“Los PSA son un instrumento que debilita las motivaciones intrínsecas para conservar”	“PES are an instrument that crowd-out the intrinsic motivations for conservation”	L
8	“Los PSA son un instrumento que al buscar reducir la pobreza se limita en sus objetivos de conservación”	“PES are an instrument that, in seeking to reduce poverty, is limited in its conservation objectives”	L
9	“Los PSA son un mecanismo para reducir los cultivos ilícitos”	“PES are a mechanism for the reduction of illicit crops”	A
10	“Los PSA son una herramienta para luchar contra la deforestación y proteger ecosistemas estratégicos”	“PES are a tool for the fight against deforestation and protect strategic ecosystems”	A
11	“Los PSA son una alternativa a los instrumentos de comando y control que desplazan a los campesinos de sus tierras”	“PES are an alternative to command and control instruments that displace peasants from their lands”	A
12	“Los PSA crean nuevas fuentes de financiación para la protección de los servicios ecosistémicos”	“PES create new sources of funding for the protection of ecosystem services”	L
13	“Los PSA son una herramienta de conservación que menosprecia los derechos y el valor intrínseco de la naturaleza”	“PES are a conservation tool that disparages the rights and intrinsic value of nature”	L
14	“Los PSA son un instrumento para la mercantilización de funciones y bienes ecosistémicos que tradicionalmente han sido bienes públicos”	“PES are an instrument for the commodification of ecosystem functions and goods that have traditionally been public goods”	L
15	“Los PSA son un instrumento para el ordenamiento del territorio”	“PES are a land-use planning tool”	L
16	“Los PSA son una herramienta para construir territorios en paz”	“PES are a tool for the construction of territories in peace”	A
17	“Los PSA son un instrumento más simple para los tomadores de decisión pues simplifica la evaluación de impacto”	“PES are a simpler tool for decision makers as they simplify the impact evaluation”	L
18	“Los PSA reconfiguran las relaciones entre los seres humanos y su entorno promoviendo una relación de explotación de la naturaleza”	“PES reconfigure the relationships between human beings and their environment, promoting a relationship that hinges on the exploitation of nature”	L
19	“Los PSA son una herramienta efectiva para la conservación porque distribuye sus beneficios de una manera que es percibida como justa a nivel local”	“PES are an effective tool for conservation because they distribute their benefits in a way that is perceived as fair at a local level”	L
20	“Los PSA son una herramienta que contribuye a la adaptación al cambio climático”	“PES are a tool for contributing to adaptation to climate change”	A
21	“Los PSA contribuyen a mejorar la calidad y cantidad de agua”	“PES contribute to improving the quality and quantity of water”	A
22	“Los PSA permiten que las comunidades rurales que cuidan los bosques reciban un ingreso digno”	“PES allow rural communities who care for forests to receive a decent income”	A
23	“Los PSA son una herramienta para vincular a los campesinos en la conservación de los recursos naturales y ecosistemas estratégicos”	“PES are a tool for involving peasants in the conservation of natural resources and strategic ecosystems”	A
24	“Los PSA reconocen la labor de conservación de los campesinos, indígenas y afro-colombianos en áreas de importancia ecosistémica”	“PES recognize the conservation work of peasant, indigenous and Afro-Colombian communities in areas of ecosystemic importance”	A
25	“Los PSA involucran a la ciudadanía y empresas privadas en la conservación”	“PES engage citizens and private companies in conservation”	A
26	“Los PSA contribuyen a un Desarrollo Agrario Integral según lo previsto en los acuerdos de la Habana”	“PES contribute to Integral Agrarian Development, according to the provisions of the Havana agreements”	A
27	“Los PSA son un instrumento que reconoce implícitamente la distribución desigual en los costos y beneficios de la conservación y por esto transfieren recursos a quienes asumen tales costos”	“PES are an instrument that implicitly recognizes the unequal distribution of the costs and benefits of conservation and therefore transfers resources to those who assume such costs”	L
28	“Los PSA aprovechan las fuerzas del mercado para conseguir resultados ambientales más eficientes”	“PES take advantage of market forces to achieve more efficient environmental results”	L
29	“Los PSA son un instrumento para recompensar la restauración de los servicios ecosistémicos”	“PES are an instrument for rewarding the restoration of ecosystem services”	L
30	“Los PSA son un instrumento más costo-efectivo para la conservación en comparación a los instrumentos de comando control”	“PES are a more cost-effective instrument for conservation compared to command and control instruments”	L
31	“Los PSA son una herramienta para motivar prácticas productivas acordes con la conservación”	“PES are a tool for motivating productive practices consistent with conservation”	A
32	“Los PSA son una herramienta para despojar a los campesinos pobres de sus tierras”	“PES are a tool for depriving poor peasants of their lands”	L
33	“Los PSA son un chantaje para los guardianes del territorio que contribuye a ceder el control de los recursos naturales a actores más poderosos”	“PES are bribes paid to the guardians of the territory, contributing to the handover of control of natural resources to more powerful actors”	L
34	“Los PSA tienen como objetivo hacer que en las comunidades rurales sea más rentable proteger los bosques que acabarlos”	“PES aim to make it more profitable for rural communities to protect forests than to deplete them”	A
35	“Los PSA son un instrumento de política neoliberal que introduce criterios de mercado en la gestión de bienes públicos ambientales”	“PES are an instrument of neoliberal policy that introduces market criteria to the management of environmental public goods”	L
36	“Los PSA contribuyen a la reducción de emisiones de efecto invernadero”	“PES contribute to the reduction of greenhouse gas emissions”	A

**Appendix B. The Q-grid used in this research**

It consists of 36 cells, one for each statement. Participants were asked to organize statements into cells along a continuum from (−4) Strongly disagree to (+4) Strongly agree.



**Appendix C. Q-sorts and factor loadings**

Q-sort #	Factor 1	Factor 2	Factor 3
1	0,5	0,57*	0,2
2	0,29	0,76*	0,11
3	0,72*	0,37	0,01
4	0,13	0,13	0,71*
5	0,73*	0,31	0,19
6	0,46	0,6*	-0,01
7	0,51	0,27	0,49
8	0,11	0,75*	0,28
9	0,64*	0,1	0,32
10	-0,13	-0,1	0,76*
11	0,4	0,65*	-0,1
12	0,66*	0,1	0,05
13	0,74*	0,41	0,02
14	0,54*	0,33	0,11
15	0,77*	0,21	-0,06
16	0,41	0,78*	0
17	0,44	0,68*	0,12
18	0,45	0,68*	-0,12
19	0,29	0,68*	0,08
20	0,3	0,71*	0,06
21	-0,06	0,86*	0,26
22	0,65*	0,3	0,07
23	0,39	0,51*	-0,21
24	0,83*	0,23	-0,17
25	0,4	0,42	0,26
26	0,58*	0,33	-0,44
27	0,4	0,58*	0,25
28	0,25	0,53*	0,35
29	-0,08	0,13	0,6*
30	0,15	0,77*	0,24
31	0,71*	0,48	-0,01
32	0,37	0,46	0,45
33	0,62*	0,26	0,16
34	0,59	0,65*	-0,04
35	0,35	0,32	0,24
36	0,64*	0,43	-0,01
37	0,6*	0,43	0,08
38	0,82*	0,29	0
39	0,72*	0,09	0,2
40	0,87*	0,21	-0,13
41	0,1	0,3*	0,38



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